

THE SYNTAX, PROCESSING AND SECOND LANGUAGE ACQUISITION OF
CHINESE RELATIVE CLAUSES

by

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LIST OF ABBREVIATIONS

CFL	Chinese as a Foreign Language
CL/CI	classifier
DCL	demonstrative- classifier
Dem	demonstrative
Det	determiner
DO	direct object (relative clause)
DUR	durative aspect marker
EXP	experiential aspect
FGD	Filler-gap Domain
IL	interlanguage
IO	indirect object relative clause
LDT	Linear Distance Theory
NPAH	Noun Phrase Accessibility Hierarchy
NRC	non-restrictive relative clause
OPrep	object of preposition relative clause
OR	object relative clause
PAR	particle
PAS	passive marker
PERF	perfective marker
POSS	possessive relative clause
RRC	restrictive relative clause

SDT	Structural Distance Theory
SLA	second language acquisition
SR	subject relative clause
SU	subject relative clause
UG	Universal Grammar

ABSTRACT

The structural complexity and the typological universals associated with relative clauses (RCs) have made the structure particularly interesting to linguists and second language acquisition (SLA) researchers. Currently, much controversy is found in RCs in East Asian Languages. This dissertation tests the syntactic status of “relative clauses” in Chinese and explores second language (L2) learners’ processing and production of different types of Chinese RCs.

In the theoretical part of the dissertation, I test whether Comrie (2002)’s proposal of analyzing putative relative clauses in East Asian languages as “attributive clauses” can be applicable to Chinese. From a review of syntactic literature and movement test, I argue that there are crucial differences between Chinese RCs and attributive clauses. Further, reconstruction effect suggests that A-bar movement takes place within gapped Chinese RCs. More specifically, following Sauerland (2000)’s proposal, I suggest that the derivation of Chinese RCs involves the movement of an operator taking a complex NP as its complement to the Spec of CP, and that complex NP matches with an external head outside the RC.

Further, I examine the possibility of analyzing AdjP+DE structure as relative clauses, and examine the flexibility and effect of demonstrative and numeral-classifier positions and their relation with relative clauses.

In the experiment chapter, I discuss results from three experiments that tested the relative degrees of difficulty for L2 learners among different types of RCs including Subject, Direct Object, Indirect Object and Object of Preposition relative clauses, I seek

plausible linguistic and psycholinguistic proposals in explaining the performance data. The experiments include a self-paced word order judgment task, a written sentence completion task, and a written sentence combination task. It was found that the L2 acquisition of Chinese RCs is generally consistent with the Noun Phrase Accessibility Hierarchy (Keenan & Comrie, 1977), a typological generalization based on natural languages and a hierarchy that was found to be predictive of learners' order of acquisition in SLA studies of many other languages.

Keywords: syntax; relative clause; second language acquisition; processing

CHAPTER I

INTRODUCTION

With the progressive increase in communication among people who speak different languages and the various information technologies that make the spread and the research of various languages possible, we increasingly realize that in order to truly understand human languages, one has to look into as wide a range of language data as possible. In understanding a particular structure, comparative studies that show language universals as well as their individual uniqueness will yield fruitful results. Among the various well-studied syntactic structures of human language, one particular structure that has caught linguists and second language acquisition (SLA) researchers' attention is the relative clause (RC). The interest in this structure stems not only from its wide range of usages in world languages and frequent utterances in human speech, but also its grammatical complexity and the rich typology that it manifests in different languages. For instance, one aspect related to its grammatical complexity is the possibility of creating an infinite utterance by recursively using relative clauses. For instance, that unbounded dependencies are possible in RCs is one fact of the recursion possibilities. Since the capacity to represent propositions with the possibility of recursion and infiniteness is thought to be one major advantages of having a hierarchical structure rather than a linear one, discussion of the structure of relative clauses bears great importance to other aspects of syntax and human language's capacity in general. In regard to its typological richness, relative clauses can be categorized in terms of RC position, i.e., head-final prenominal RCs or head-initial postnominal RCs, in its semantic interpretation, i.e., restrictive RCs

and non-restrictive RCs, in head position, internally-headed or externally-headed RCs, in whether the head is pronounced, i.e. free relative clauses versus overtly headed relative clauses, etc. The current project focuses on the syntactic structure of Chinese relative clauses, and investigates issues in the second language (L2) acquisition of Chinese RCs.

1.1 Background and Current Gaps

The exploration of the syntax, psycholinguistic aspects, and the acquisition of RCs in English began in the 1960s. In the theoretical analysis of RCs, two major approaches that were developed based primarily on English RC data are Chomsky (1977)'s "matching approach" (in which operator movement takes place) and Kayne (1994)'s "raising approach" in which the head N moves. Attempts have been made to use both approaches to explain Chinese RC data. At the same time, there is no consensus that relative clauses even exist in Chinese. Since Chinese RCs use *de* as a relativizer (complementizer) and *de* is also a general nominal phrase marker, some traditional grammarians refer to Chinese RCs as *de*-phrases or *de*-constructions (Zhu, 1978). Recently, Comrie (2002) has suggested the possibility that RCs may not exist in languages like Japanese because putative RCs in those languages permitting *pro* may be analyzed as noun-modifying (attributive) clause with a *pro* in the gap position. Since the literature in Chinese syntax sometimes refers to examples where island constraints seem not to be observed in putative Chinese RCs, one is tempted to ask if putative Chinese RCs may not involve movement and whether they might be attributive clauses too.

In the field of relative clause processing, it is generally accepted (and proved by numerous psycholinguistic studies) that subject relative clauses are easier than object

RCs in English. Different theories have provided motivations such as differences in structural distance (Hawkins, 1999), or linear distance (Gibson, 1998) between the “filler” and the “gap” to explain the subject-object asymmetry in processing. However, previous studies in Chinese RC processing yield inconsistent results, with some finding Subject RCs to be easier (Lin & Bever, 2006) and some exactly the opposite (Hsiao & Gibson, 2003).

In the current project, I try to make a connection between psycholinguistic theories and L2 processing and L2 acquisition. While those psycholinguistic theories were often established based on L1 data, possible applications of those theories to L2 processing could be explored. Further, processing difficulty in reading tasks might be relevant to acquisition difficulty, which is often measured through production tasks in SLA studies of relative clauses. While there are a few studies investigating the L2 acquisition order and difficulty of Chinese RCs, those studies sometimes involve multiple L1 groups (e.g. Chen, 1999) and thus bringing more confounding factors to the results, or lack valid interpretations of the data. At the same time, SLA studies of English type of RCs often have robust results that learners’ acquisition of those RCs adhere to a hierarchy that is referred to as the Noun Phrase Accessibility Hierarchy. Particularly, learners are expected to learn Subject RCs first, followed by acquisition of Object RCs, and then Indirect Object and finally Object of Preposition RCs. Some recent studies in other East Asian languages such as Japanese, Korean, and Cantonese report that the acquisition of RCs in those languages does not adhere to that acquisition order as rigidly as English RC acquisition appears to do. Some of those studies try to explain such results by suggesting

that putative RCs in those languages may indeed be noun-modifying clauses without movement (Ozeki & Shirai, 2007; Jeon & Kim, 2007). One rather interesting aspect of a Chinese RC is its word order: the Chinese RC is head-final like Japanese and Korean RCs, but Chinese follows SVO word order in canonical sentences like in English. Because of such unique properties of Chinese RCs, results from processing and acquisition experiments in Chinese RCs can complement findings from previous studies on postnominal RCs (English type RCs) and Japanese type RCs. Investigating L2 processing and acquisition difficulties of Chinese RC is therefore not only to our best interest in understanding Chinese syntax, but will also help us understand L2 speakers' processing difficulty in general as well as the development of their knowledge representations of the second language.

1.2. Goals and Overview

Compared to investigations of RCs in European languages, our knowledge of the nature of Chinese RCs is actually meager. Given these unsettled questions and the gap in acquisition studies of Chinese RCs, my dissertation sets out to explore the following questions:

- Does Chinese have true relative clauses that show movement effects? Is Comrie's proposal against the existence of RC structures in some East Asian languages applicable to Chinese?
- How are Chinese RCs derived? Should a "matching approach" or a "raising approach" be most appropriate for the analysis of Chinese RCs?
- What are some other syntactic characteristics of Chinese RCs? For instance,

how does the position of the demonstrative and classifier affect the syntax and interpretation of Chinese RCs?

- What types of RCs are easier for L2 learners of Chinese? Assuming that processing ease correlates with or even predicts ease of acquisition, are any psycholinguistic models helpful in analyzing the L2 acquisition of Chinese RCs?

I will first investigate the syntactic properties of Chinese RCs using standard grammatical judgment methodology, and then, based on results of the syntactic analysis, will use experimental methodologies to test the applicability of several psycholinguistic models to the L2 behavior.

The dissertation is organized as follows: Chapter 2 is primarily formulated as an argument against Comrie's non-RC proposal. Through both literature review and my own analysis of the movement constraints in putative Chinese RCs, and examination of the licensing conditions of RCs and noun-modifying clauses, I argue that the two must be distinguished. In Chapter 3, I first review the "matching" and "raising" analyses, as well as Sauerland(1998; 2000)'s proposal of a different type of "matching" analysis for English RC data. Then, through a series of reconstruction test, I propose a derivation process for Chinese RCs in the spirit of Sauerland's proposal. Chapter 4 discusses the similarities and differences between Adjective Phrase-*de*-N and relative clauses. I also discuss the factor of demonstrative and classifier position in shaping the semantic interpretation and affecting the syntactic structure of Chinese RCs. The last chapter, Chapter 5, first reviews a number of psycholinguistic theories that are thought to be

applicable to RC processing and acquisition. I then report the methods and results of three experiments that I carried out to tackle the question of L2 processing and acquisition difficulties of Chinese RCs. These experiments include a self-paced word order judgment task, a written sentence completion task, and a sentence combination task. Apart from addressing whether the acquisition of Chinese RCs is consistent with the Noun Phrase Accessibility Hierarchy, this chapter reports a number of competence issues relevant to learners' first language (L1) transfer too.

CHAPTER II
CHINESE RELATIVE CLAUSES
AS A DISTINCTIVE SENTENCE STRUCTURE

This chapter starts with a review of the concept of relative clauses. We shall first consider the composition of English relative clauses. Two major camps in the syntactic analysis of relative clauses are referred to as the “matching” approach (Chomsky, 1977) and the “raising approach” (Kayne, 1994). In 2003, Aoun & Li put forward a hybrid proposal (Aoun & Li, 2003). First I summarize these basic positions with respect to the English relative clause.

The second part of this chapter will examine the status of relative clause structure in Mandarin Chinese. Comrie (2002) suggests that true relative clauses may not exist at all in East Asian languages and that the structure can be analyzed as a type of attributive clause in those languages. In this part, I will test whether this non-RC proposal is applicable to Chinese. From a review of the syntactic literature and movement tests, I contend that there are crucial differences between Chinese RCs and noun-modifying (attributive) clauses.

2.1 Relative Construction in English

Relative clauses manifest themselves differently cross-linguistically. Vries (2001) refers to two essential properties of relative constructions:

- a. A relative clause is subordinated
- b. A relative clause is connected to surrounding material by a pivot constituent.

The *pivot* is referred to as a “constituent semantically shared by the matrix clause and

the relative clause (Vries, 2001, p.14). From a syntactic perspective, we refer to it as the *head* of a relative clause. In English, the relative clause typically contains a gap, which may be associated with a relative pronoun, and the head appears as an antecedent outside the RC.

The two major camps in the analysis of English RCs often referred to in literature are the matching/operator analysis (Chomsky, 1977), and Kayne's (1994) promotion/raising analysis. The former is exemplified in the work of Safir (1986), Browning (1987), and the latter has been developed by Bianchi (1999; 2000).

2.1.1 Matching/Operator Movement Analysis

Chomsky's (1977) analysis of RCs assumes an adjunct structure of the following form:

- (1) a. $[_{NP}[\text{The man}_i] [_{CP} \text{who}_i [_{TP} \text{I like } t_i]]]$
 b. $[_{NP}[\text{The man}_i] [_{CP} \text{Op}_i [_{C} \text{that} [_{TP} \text{I like } t_i]]]]]$

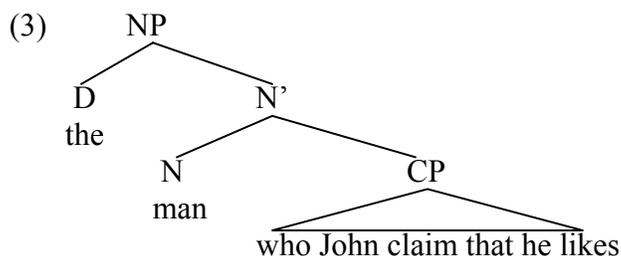
The RC head is base-generated external to the relative clause, which is adjoined to it. Within the RC, a wh-pronoun is base-generated in argument position, and acts as an operator and moves from within the TP to the Spec of CP position. In *that*-relatives or RCs without an overt marker, a non-overt operator moves from the position within TP to the Spec of CP. If *that* is present, it occupies the complementizer position.

An advantage of this structure is that it captures the similarity between wh-interrogatives and relative clauses. Wh-movement observes island constraints such as wh-islands, adjunct islands, and complex NP constraint (CNPC) island; it leaves a gap, and unbounded dependencies are possible. Such behavior patterns are observed in relative

clauses too. For instance, (2a) and (2b) demonstrate long distance relations in *wh*-questions and relative clauses respectively, while (2c) and (2d) shows the action of the CNPC in both types of construction. Further, in the following sentences, the same lexical items—*wh*-words—appear in both *wh*-questions and in RCs.

- (2) a. Who_i does John claim that he likes t_i?
 b. [_{NP} [the man_i] [who_i John claims that he likes t_i]]
 c. *Who_i does John make the claim that he likes t_i?
 d. *[[_{NP} the man_i who_i John makes the claim that he likes t_i]

In the literature, it has sometimes been suggested that *who* is co-indexed with *the man* (See, for instance, Haegeman, 2002, p.408). However, if *the man* and *who* have exactly the same index, such relative clauses will have to be interpreted as nonrestrictive. A more accurate characterization of the semantic situation is that the relative clause (CP) modifies the N, further restricting its reference intersectively, and the determiner *the* scopes over both N and RC to denote the individual, while *who* satisfies the restrictions imposed by the N+RC predicate. With this consideration, the structure of a restrictive RC is shown in (3).

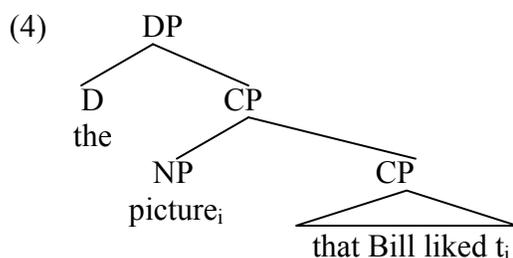


For a detailed description of the function of the determiner as well as the predicate (but not ‘co-indexing’) function of the RC, readers are referred to Partee (1995) and

Heim & Kratzer (1998).

2.1.2 Raising Analysis¹

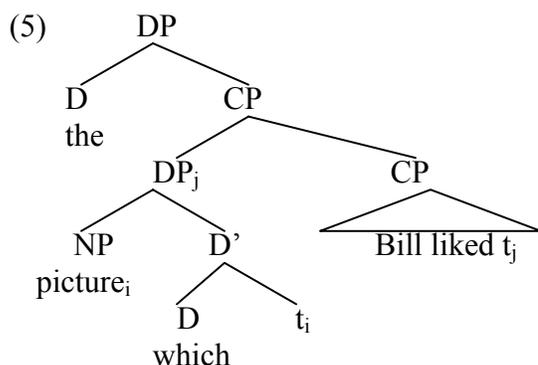
Kayne's (1994) antisymmetry theory of syntax states that because an element A adjoined to B necessarily c-commands B, A therefore precedes B. This amounts to saying that there is only left-adjunction, no right-adjunction. The matching analysis outlined above should therefore be forbidden, as the matching approach assumes that the relative clause (CP) is adjoined to N. If that is so, Kayne's theory predicts that the CP should precede the N instead of following it. That creates a problem for the analysis of all head-initial relative clauses, English included. Kayne proposes instead a complement structure for RCs in which the head N is base-generated inside the RC and then moves from a base position within the RC to the Spec of CP position. The analysis also assumes a DP instead of NP analysis (Abney, 1987). For *that*-relatives (and RCs without an overt marker), the structure looks like (4).



For *wh*-relatives, Kayne proposes that they involve a DP base-generated inside the RC, with the *wh*-word (*who*, *which*, etc.) as the D, followed by movement of the DP (e.g., *which picture*) to [Spec CP] and a subsequent movement of the NP within the DP (e.g.

¹ The “raising analysis” is also referred to as the “promotion analysis”. Earlier versions of the promotion analysis could be found in Schachter (1973) and Vergnaud (1974). Those earlier analyses, however, assume an adjunct structure.

picture) to [Spec, DP].



Differences in the matching versus the raising analyses will be illustrated in detail in Chapter 3. In the following, I turn to putative Chinese relative clauses.

2.2. Chinese Relative Clauses

2.2.1 Comrie (2002)'s non-RC proposal

Relative clauses are thought to exist in at least 176 languages around the world, with varying relativization strategies (Vries, 2001). One parameter of the structure is the linear order of the head and RC: an RC can be head initial, or head final. An example of the former is English relative clauses and examples of the head-final type are Japanese, Korean, Turkish, and Chinese RCs.

Comrie (2002), however, asks us to reconsider some structures which, while serving as the translation equivalent of relative clauses in some sense, do not exhibit the full typological and syntactic characteristics of RCs. According to Comrie, two characteristics distinguish RCs from other structures: (i) that there is clear syntactic link between the main clause and the RC such that the latter modifies a noun phrase (NP) in the former, and thus there is a notional head that is shared by, and plays a syntactic role in both

clauses, (ii) that that they are a distinct construction type that can be identified as “relative clause”. The first characteristic that Comrie summarizes is roughly the same as Vries (2001)’s definition, and the second characteristic requires an RC structure to behave differently from any other constructions in the language. With these features of RCs in mind, Comrie suggests that certain structures, the putative “RCs” of Japanese, for instance, are merely a type of general noun-modifying clause. Specifically, a sentence like (6) is “pretty much what we see on the surface”: a head noun *hon* ‘book’ modified by a clause *gakusei ga katta* ‘the student bought [it]’ (p.30).

- (6) Gakusei ga katta hon
 student NOM bought book
 ‘the book that the student bought e’

While Comrie does not specify to what extent this non-RC proposal may be applicable to structures hitherto considered RCs in different languages, later studies in Korean, Cantonese, etc. refer to this proposal in suggesting that RCs may not exist in East Asian languages more broadly (Ozeki & Shirai, 2007; Yip & Matthews, 2007). Those languages share some similarities with Japanese, such as being null-anaphor languages, and having other instances of a head noun accompanied by a modifying clause that cannot be treated as instances of relative clauses (as will be illustrated below).

At the same time, the concept of RC did not seem to exist in traditional Chinese linguistics in the 1960s to 1970s. Constructions including [Adj DE], [VP DE], and [NP DE] before a head noun were thought to be “attributives”, i.e., general modifiers of the N. (Zhu, 1966; Ross, 1983). In the following, I will first consider whether the non-RC proposal can be applicable to Chinese. (7) is a putative Chinese relative clause.

- (7) [[Lisi xihuan *e* de] na ge ren] zai Beijing shangxue.
 Lisi like *e* DE that CL person at Beijing study
 ‘The person that Xiao-en likes is right now studying in Beijing.’

Obviously there is a subordinate clause *Lisi xihuan* ‘Lisi likes *e*’ and a main clause. The notional head *na ge ren* ‘that CL person’ has independent semantic roles in the subordinate clause (i.e., a [+theme] role) and the main clause (a [+agent] role). What we will consider here is whether such Chinese RCs have the second characteristic claimed by Comrie: whether it is a “distinct” construction type that should be differentiated from other noun-modifying clauses.

In Comrie’s analysis of Japanese “RCs”, he first notes that because Japanese allows *pro*, the basic structure of the subordinate clause in (8) is perfectly well-formed as a main clause.

- (8) Gakusei ga katta
 Student NOM bought
 ‘The student bought (it).’

In other words, Comrie is suggesting that there is a *pro* in (9) in the position where one would normally expect a gap of movement in an RC construction.

- (9) [[Gakusei ga katta *pro*] hon]
 Student NOM bought *pro* book
 ‘the book that the student bought’

Without a true gap in the subordinate clause, (9) then would be similar to a general noun-modifying clause, illustrated by (10) and (11).

- (10) [gakusei ga hon o katta] zizitu
 student NOM book ACC bought fact
 ‘the fact that the student bought the book’

- (11) [dareka ga doa o tatakui] oto

someone NOM door ACC knock sound
 ‘the sound of someone knocking at the door’

According to Comrie, these subordinate structures are clearly not relative clauses. Instead, the semantic relationship between the subordinate clause and the main clause is subject to pragmatic inference, and he notes that the subordinate clause is sometimes interpreted similarly to an English relative clause, sometimes not. Comrie suggests that it is perhaps possible to give semi-English translations of (8)-(10) by using a *such as* construction.

(12) the student such that he bought the book

(13) the fact such that the student bought the book

(14) the sound such that someone knocked at the door

This proposal is in some way similar to Fukui & Takano (2000)’s argument that Japanese RCs are licensed by an “aboutness” relation between the RC and the relative head, (although Fukui & Takano do acknowledge the legitimate status of Japanese RCs). Fukui & Takano further claim that this aboutness condition is not peculiar to the licensing of Japanese RCs, but is evident in the licensing of certain topic constructions in Japanese and English.

(15) sakana-wa tai-ga ii
 fish-TOP red.snapper-NOM good
 ‘As for fish, a red snapper is the best.’

(16) As for sports, I like baseball best.

This analysis is equivalent to saying that there is no operator movement or head raising in Japanese relative clauses, and that gapless “RCs” are possible. In other words,

the “aboutness” licensing proposal and the non-RC proposal are similar in that they consider sentences like (9) and (10) to have the same structure.

A third argument that Comrie raises is that Japanese RCs actually do not exhibit movement constraints. He claims that what used to be taken as instances of such constraints in Japanese are of a pragmatic rather than a syntactic nature. (p.34). Comrie refers to examples where native speakers find instances of the Complex Noun Phrase Constraint (CNPC) inapplicable in Japanese.²

(17) [Inu o katta ita] kodomo ga sindesimatta.
 Dog ACC keeping was child NOM died
 The child [that *e* was keeping the dog] died.

(18) [[katte ita] kodomo ga sindesimatta] inu
 keeping was child NOM died dog
 the dog_i [that the child_j [that *e_j* was keeping *e_i*] died]

Another example where “relativization” in Japanese does not seem to comply with the CNPC is given in (19).

(19) [pro_i kiteiru yoohuku-ga yogoreteiru] sinsi_i
 is wearing suit-NOM is.dirty gentleman
 ‘a gentleman who the suit that (he) is wearing is dirty’
 (From Aoun & Li, 2003, p.195).

2.2.2 Applicability of the Noun-modifying Clause Proposal to Chinese RCs

2.2.2.1 Putative Chinese RCs

Putative Chinese relative clauses that have been referred to in literature include the following types³:

(20) a. Subject RC

² Comrie (2002) admits that judgments on the noun phrase (18) vary, but at least some native speakers find (18) perfectly acceptable.

³ Chinese also has adjunct relative clauses. See example (28) in this chapter.

[xihuan Xiaoming de na ge ren] jiao Zhenni.
 like Xiaoming DE that CL person named Zhenni.
 ‘The person that likes Xiaoming is named Jenny.’

b. Object RC

[Xiaoming xihuan de na ge ren] jiao Zhenni.
 Xiaoming like DE that CL person named Zhenni
 ‘The person that Xiaoming likes is named Jenny.’

c. Indirect Object RC

[Xiaoming jie-gei ta shu de na ge ren] jiao Zhenni.
 Xiaoming lend-to she book DE that CL person named Zhenni
 ‘The person that Xiaoming lent the book to is named Jenny.’

d. Object of Preposition RC

[Xiaoming xiang ta wen-lu de na ge ren] jiao Zhenni.
 Xiaoming from she ask-way DE that CL person named Zhenni
 ‘The person that Xiaoming asked the way from is named Jenny.’

e. Possessive RC

[(ta) nv'er zhong-le caipiao de na ge ren] jiao Zhenni.
 she daughter win-PERF lottery DE that Cl person named Zhenni
 ‘The person whose daughter won the lottery is named Jenny.’

As noted in the example labels, these relativizations are referred to as Subject (Subj.), Direct Object (Obj.), Indirect Object (IO), Object of Preposition (OPrep), and Possessive relative clauses (Poss). It should be noted while putative Subject and Object relative clauses in Chinese involve a gap, a resumptive pronoun *ta* (“he/she”) is obligatory in IO and OPrep relative clauses. (On the other hand, the use of a resumptive pronoun instead of a gap in Subj. and Obj. relative clauses renders the structure ungrammatical.) As for Poss relative clauses, the resumptive pronoun is optional in the example given. However, the optionality or the obligatoriness of the pronoun is dependent on the relationship of the Possessor NP and the Possessed NP, as well as the

predicate of the relative clause.⁴ A more detailed survey of relative clause typology in Chinese will be given in Chapter 4.

As was mentioned, earlier grammarians referred to the clauses in (20a-e) as noun-modifying clauses. At the same time, works by Huang, C.-R. (1989) and Li & Thompson (1989: 579-587) do make distinctions between relative clauses and noun-modifying clauses. In this section, I will analyze the applicability of Comrie's noun-modifying clause proposal to those putative Chinese RCs in detail. At first sight, Chinese RCs seem to share some similarities with Japanese putative RCs: apart from also being head-final, Chinese is also a null-anaphor language, and also has structures that look like gapless RCs. For instance, the counterpart of (11) is grammatical in Chinese.

(21)[Xiaoming chang ge] de shengyin
 Xiaoming singsong DE sound
 'the sound of Xiaoming's singing'

Putative Chinese RCs are like general noun modifying clauses in that they share the same marker DE. That is, unlike English RCs which have relative pronouns such as *which*, *who*, etc., Chinese or Japanese RCs do not have such relative pronouns.⁵ In Chinese, the general noun phrase marker DE is also used as a RC marker.⁶ (22a) is a putative Chinese RC, while (22b), and (22c) contain general noun-modifying clauses:

⁴ As seen from Lin, C.-J. (2006) and my informants' responses, the requirement of resumptive pronouns in Poss relative clauses may also be subject to regional/dialectal variations.

⁵ The fact that Chinese does not have relative pronouns has been used as evidence that Chinese does not have relative clauses. This idea is frequently referred to in some Chinese as a Foreign Language teaching materials.

⁶ There is some disagreement as to which position DE takes in a Chinese RC. Simpson (2002), for instance, contends that DE occupies the position of Determiner.

- (22) a. [ta kan-dao] de na zhang zhaopian
 he see DE that CL photo
 ‘the photo that he saw’
- b. [zhuang che] de na zhang zhaopian
 hit car DE that CL photo
 ‘the photo of the car accident’
- c. [ta ci-zhi] de na jian shi
 he resign DE that CL fact/event
 ‘the fact that he resigned’

In English, however, noun-modifying clauses and RCs can be clearly distinguished. For instance, the *that* in *the fact that he resigned* cannot be replaced by *which*.

In addition, Chinese, like Japanese, is a topic-prominent language. In some cases, it seems when an “aboutness” relation can license a topic-comment structure, it can also license a noun-modifying clause, or “gapless RC” structure in Chinese:

- (23) a. zhe ge ren, yifu hen zang
 this CL person, clothes very dirty
 ‘As for this person, his clothes are very dirty.’
- b. yifu hen zang de zhe ge ren
 clothes very dirty DE this CL person
 ‘the person whose clothes are very dirty’
- (24) a. zhe ke shu, yezi hen da.
 this CL tree, leaf very big
 ‘As for this tree, its leaves are very big.’
- b. yezi hen da de zhe ke shu
 leaf very big DE this CL tree
 ‘The tree such that its leaves are very big’

Further, recall the Japanese example (19), repeated here.

- (19) [pro_i kiteiru yoohuku-ga yogoreteiru] sinsi_i
 is wearing suit-NOM is.dirty gentleman
 ‘a gentleman who the suit that (he) is wearing is dirty’

While the English equivalent to this Japanese sentence is ungrammatical because it involves relativization out of a complex NP, and thus violates the CNPC, the Chinese equivalent to (19) seems perfectly fine.

- (25)a. *[the man [that [the shirt t wears] was very dirty]]
 b. [[[t_i chuan de] yifu] hen zang de] na-ge ren_i
 t wear DE clothes very dirty DE that-CL person
 ‘the person such that the clothes he wears are very dirty’

The grammaticality of (25b) seems to indicate that there are instances of relativization in Chinese in which certain island effects are not observed. It seems tempting to suggest that Chinese, like Japanese, may not have true relativization constructions. Do relativizations really not exist in Chinese? Are sentences like (19) and (25b) like topic-comment constructions only licensed by a general “aboutness” relation to the head noun, similar to what is suggested for Japanese? Can they be considered merely a type of noun-modifying clauses in accordance with Comrie’s proposal? A closer look at those Chinese structures indicate that despite the surface similarities, putative RC structures in Chinese may be of a different nature from those Japanese constructions and are actually more similar to English RCs that display movement constraints.

2.2.2.2 *pro* and Adjunct RCs

Recall example (6) and (8).

- (6) Gakusei ga katta hon
 student NOM bought book
 the book that the student bought *e*

- (8) Gakusei ga katta
 student NOM bought
 ‘the student bought it.’

The grammaticality of (8) leads Comrie to suggest that there is no initial objection to saying that the structure of (6) is simply a head noun to which a modifying clause has been attached. Obviously, such an analysis would not work for English, since *that/which the student bought* is not a well-formed main clause and the alternative *the student bought* is only possible “under very restricted pragmatic circumstances” (p.30). While Chinese allows null anaphors, the equivalent of (8) in Chinese, like the English equivalent, is generally ungrammatical, unless it is provided as an answer to a question asked immediately above.

- (26) a.?? Xiaoming mai-le.
 Xiaoming buy-PERF

- b. A: shei mai-le zhe ben shu? Xiaozhang haishi Xiaoming?
 who buy-PERF this CL book? Xiaozhang or Xiaoming?
 ‘Who bought this book? Xiaozhang or Xiaoming?’

- B: Xiaoming mai-le e. Xiaozhang mei mai e.
 Xiaoming buy-PERF Xiaozhang NEG buy
 ‘Xiaoming bought this bought; Xiaozhang didn’t.’

In the example of B’s answer in (26b), however, the empty category is argued to be a variable bound by an empty topic *zhe ben shu* “this book”, instead of as *pro* (Huang, C.-T., 1984; 1989). In fact, Huang, C.-T. argues with strong evidence that Chinese *pro* may only occur as a subject in a sentence, not as an object (1989, p.193). Hypothetically analyzing putative subject RCs in Chinese as noun-modifying clauses without a gap, we are still faced with the problem of explaining object relative clauses like the following,

since the empty category cannot be a *pro*, given Huang, C.-T.'s conclusions.

- (27) [[Xiaoming mai e] de [zhe ben shu]]
 Xiaoming buy e DE this CL book
 'the book that Xiaoming bought.'

Analyzing the RC structure with *pro* also does not explain why adjunct RCs exist in Chinese, expressing location, time, reason, and manner, parallel to English adjunct RCs. Examples of Chinese adjunct RCs are referred to in many previous studies, such as Ning (1993).

- (28) Adjunct of [+location]
 a. [[wo zhu de] [difang]] li zhe'er hen yuan
 I live DE place from here very far
 'The place where I lived is far away from here.'

- Adjunct of [+time]
 b. ta yongyuan jide [[ta biye de] [na yi tian]]
 he forever remember he graduate DE that CL day
 'He will always remember the day that/when he graduated.'

- Adjunct of [+reason]
 c. mei ren zhidao [[ta likai de] [yuanyin]]
 no person know he leave DE reason
 'Nobody knows why he left.'

- Adjunct of [+manner]
 d. [[ta chuli wenti de] [fangshi]] he bie-ren bu tong
 he deal.with problem DE method and other-person no same
 'The way that he deals with issues is different from others.'

Since these adjuncts are not expressed as NPs, an analysis of these RCs as containing a *pro* in the position of an adjunct is implausible.

As for the argument that an "aboutness" relation may license putative Chinese RCs, I will come back to that in 2.2.2.5.

2.2.2.3 Movement Constraints

There is strong evidence that constraints such as Subjacency, the Complex Noun Phrase Constraint (CNPC), the Sentential Subject Condition, and the Adjunct Condition do actually hold in Chinese (Huang, Li, & Li, 2009; Ning, 1993). The following is an example of a CNPC violation in a Chinese RC.

(29) CNPC

- a. [CP wo fabiao- le [NP [CP wo re'ai zhe ge guojia] de xuanyan]]
 I announce-ASP I love this CL country DE declaration
 'I made the declaration that I love this country.'
- b. *[CP Op_i wo fabiao-le [NP[CP wo re'ai t_i de] xuanyan] de]
 I announce- ASP I love DE declaration DE
 [NP zhe ge guojia]
 this CL country.
 'the country such that I made the declaration that I love it.'

- (30) a. [CP ta tangzhe kan shu] dui yanjing mei haochu. (Data due to Ning, 1993)
 he lie DUR read book for eye no goodness
 'For him to read a book while lying down is not good for his eyes.'
- b. *[CP[CP OP_i ta tangzhe kan t_i] dui yanjing mei haochu de] [NP na ben shu]
 he lie-DUR read t for eye no goodness DE that CL book
 'The book such that reading it while lying down would do no good for him.'

There are some examples in the literature showing apparent violations of island conditions in Chinese RCs. However, these seeming counter-examples can be explained through other mechanisms. (31b) is an example from Huang, C.-T. (1982), cited by Ning (1993).

- (31) a. *[the book [that [for Lisa to read t] is the most appropriate]]
- b. [[Lisi kan t] zui heshi] de] na-ben shu
 Lisi read t most appropriate DE that-CL book
 'the book such that for Lisi to read it is the best'

At first seems, it seems that both (30b) and (31b) involve relativization out of a

sentential subject, but only (30b) is ungrammatical. Ning reanalyzes (31b) as the relativization of (32a), a matrix clause with an embedded adjunct clause modifying a predicate adjective.

- (32) a. [zhe-ben shu [_{ADJ} *pro* (you) Lisi kan e] zui heshi]
 this-CL book *pro* for Lisi read e most appropriate
 ‘This book is most appropriate for Lisi to read.’
- b. [*Op*_i [_{t_i} [*pro* (you) Lisi kan] zui heshi de] [na-ben shu]]
 t for Lisi read most appropriate DE that-CL book
 ‘the book that is most appropriate for Lisi to read’

In this analysis, “for Lisi to read” becomes an adjunct clause modifying the predicate within “This book is ... appropriate”. Object *pro* is licensed because it is close to its controller, the operator (Ning, p.78). Therefore, (31b) is really then relativization of a subject out of the matrix clause.

Recall our example in (25b), repeated here.

- (25) a. *[the man [that [the shirt t wears] was very dirty]]
 Intended: the man such that the shirt he wears is very dirty
- b. [[[_{t_i} chuan de] yifu] hen zang de] na-ge ren_i
 t wear DE clothes very dirty DE that-CL person
 ‘the person such that the clothes he wears is pretty’

However, while (25b) is grammatical, (25c) is not.

- (25) c. *[wo xihuan [[_{t_i} chuan de] yifu] de] na-ge ren_i
 I like t wear DE clothes DE that-CL person
 ‘the person such that I like the clothes he wears’

It seems that while subjacency is not observed in (25b), an island effect does surface in (25c). To explain the difference, Huang, C.-T. (1982) claims the subject *t_i* position in (25b) is in fact occupied by a *pro*, which can be identified by the most local c-

commanding antecedent, which is the relative head in (25b). That is, (25b) is indeed a noun-modifying clause.

(25) b' [[[pro_i chuan de] yifu] hen zang de] na-ge ren_i
 wear DE clothes very dirty DE that-CL person
 ‘the person such that the clothes he wears are very dirty’

Note that this does not imply that all putative Chinese subject RCs can be analyzed as a noun-modifying clause with a *pro*. Different patterns are shown by phonetically null head tests, which will be explained Section 2.2.2.4.

In (25c), however, a *pro* is not licensed because the most local c-commanding antecedent would be the subject of the RC *wo* (“I”). Looking at some other examples, Huang, C.-T. (1982) concludes that the apparent violation of island conditions always involves an island in the subject position. The contrast between (25b) and (25c) shows that when movement does apply, Chinese RCs do observe island conditions.

2.2.2.4 Noun-modifying Clauses

While attributive clauses do exist in Chinese, they do not exhibit movement constraints and should be distinguished from RCs. This can be verified by the grammaticality of (25b). Another contrast between RCs and attributive clauses is that while RCs can take a phonetically null head N (particularly in a copular sentence), the head N in attributive clauses (e.g. in a noun-complement clause) always has to be phonetically realized.⁷ For instance, while (33b) contains an RC with a phonetically

⁷ The observation that gapped relative clauses can take phonetically null head was made by previous scholars such as Aoun & Li (2003, p.179-180). While some earlier studies did not consider the grammatical status of “relative clauses” in Chinese, many scholars have pointed out similar ideas. Zhu (1983), for instance, points out that the head of a complex NP can be null if a certain case-bearing role

empty head and is grammatical, the example in (34b), a null-headed attributive clause, is ungrammatical.

- (33) a. [_{NP} ta gaosu wo de] zhe jian shi]
 he tell I DE this CL thing
 ‘the thing that he told me about.’
- b. zhe jian shi shi [_{NP} ta gaosu wo de]
 this CL thing BE he tell I DE
 ‘This thing is what he told me about.’
- c. [_{NP} ta gaosu wo de] bu-shi zhen de
 he tell I DE no-BE true DE
 ‘What he told me about is not true.’
- (34) a. [_{NP} ta ci-zhi de zhe jian shi]
 he resign-post DE this CL thing
 ‘the thing of his resignation/the fact that he resigned’
- b. *zhe jian shi shi [_{NP} ta ci-zhi de].
 this CL thing BE he resign-post DE
 Intended: this is the thing/fact of his resignation.
- c. *[ta ci-zhi de] bu-shi zhen de
 he resign-post DE no-BE true DE
 Intended: The thing/fact of his resignation is not true.

Relativization with a null head is possible in English too, and such structures are referred to as “free relative clauses” (See, for instance, Vries, 2001, p.16-17).

- (35) [_{NP} [_{CP} what_i [_{TP} he told me t_i]]] was a pure lie.

Note that such free relative clauses do require a special operator, *what*. Phonetically null operators do not license free relative clauses in English.

- (36) * [_{NP} [_{CP} Op_i that [_{TP} he told me t_i]]] was a pure lie.

The Chinese examples in (33-34) demonstrate that there is no equivalent to the

is missing in VP in [VP DE N] structure (p.33-34).

English “free relative” (35) for a Chinese attributive clause, but there is an equivalent for a true relative clause. In other words, the licensing condition for a headless complex NP structure in Chinese seems to be that the CP needs to be gapped. Non-movement structures do not permit headless referential clauses.

Now recall our example (25b), in which apparent “relative clauses” that violate islands seem to be possible. Referring to Huang, C.-T. (1982), we concluded that there is no movement structure in (25b) at all but they are rather attributive structures with a resumptive *pro*. The example is repeated here as (37a). If we are correct above that non-movement structures do not permit the free relative analysis, then these island-violating “relatives” should be ungrammatical without a head. Indeed, (37b) is ungrammatical.

- (37) a. [[[pro_i chuan de] yifu] hen zang de] na-ge ren_i
 wear DE clothes very dirty DE that-CL person
 ‘the person such that the clothes he wears are very dirty’
- b.* [pro chuan de yifu] hen zang de] zao zou-le
 wear DE clothes very dirty DE early leave-PERF
 Intended: The person such that he wears dirty clothes left early.

The ungrammaticality does not improve with copula support, shown in (38).

- (38) *na ge ren shi [[pro chuan de yifu] hen zang de]
 that CL person BE pro wear DE clothes very dirty DE
 Intended: that is the person such that the clothes he wears are very dirty.

As is expected, a relativization structure with gap, however, can take a phonetically null head.

- (39) a. [ta xihuan de] zao zou-le
 she like DE early leave-PERF
 ‘Who she likes left early.’

b. na ge ren shi [ta xihuan de]
 that CL person BE she like DE
 ‘That is the person that she likes.’

Now we have found that attributives do not allow headless structures while gapped relative clauses do. It can be hypothesized that this is because headless relatives have a null operator that has moved and can satisfy the argument structure of the embedded predicate. (As for the exact derivation of the operator movement, I will return to this point in Chapter 3). Attributives do not have a headless equivalent because there is no such operator.

Further, we find that relative clauses with resumptive pronouns cannot take a null head either⁸. Recall that Chinese requires obligatory resumptive pronouns in Indirect Object and Object of Preposition relative clauses. (40b) is ungrammatical.

(40) a. [_{NP} wo jie-gei ta shu de na ge ren]
 I lend-give he book DE that CL person
 ‘the person that I lent the book to’

b. *na ge ren shi [_{NP} wo jie-gei ta shu de]
 that CL person BE I lend-give he book DE
 Intended: That is the person that I lent the book to.

For another example, (41a) and (42a) differ minimally in the position of relativization: (41a) relativizes the direct object of a three-argument verb, and (42b) relativizes the object of a preposition. Both (42b) and (42c) are ungrammatical, in

⁸ In Zhu (1983), however, he indicates that [VP DE] with a resumptive pronoun can refer to the NP that is co-indexed with the pronoun. “李大夫...给他治好了关节炎的（那位病人）”. But Zhu does not explicitly state whether the head NP can be phonetically null in this case. He refers to such structures of [VP DE] as “other-designating” (他指) for the purpose of contrasting with “self-designating” (自指) [VP DE N] phrases in which the head NP does not bear any semantic roles assigned by the verb. The distinction between self-designating and other-designating VP-DE-N phrases is in fact the distinction between attributive clauses and relative clauses (gapped or non-gapped with a resumptive pronoun). See more discussion of Zhu (1983) later in the main text in this section.

contrast with the grammatical examples in (41b) and (41c).

- (41) a. [_{NP} wo jieshao-gei Xiaoming de na ge ren]
 I introduce-to Xiaoming DE that CL person
 ‘The person that I introduce to Xiaoming.’
- b. na ge ren shi [wo jieshao-gei Xiaoming de]
 that CL person BE I introduce-to Xiaoming DE
 ‘That person is who I want to introduce to Xiaoming.’
- c. [wo jieshao-gei Xiaoming de] yiding bu-hui cuo
 I introduce-to Xiaoming DE definitely no-will wrong.
 ‘Who I introduce to Xiaoming won’t go wrong.’
- (42) a. [_{NP} wo xiang ta jieshao Xiaoming de na ge ren]
 I towards he introduce Xiaoming DE that CL person
 ‘The person that I introduced Xiaoming to.’
- b. *na ge ren shi [wo xiang ta jieshao Xiaoming de]
 that CL person BE I towards he introduce Xiaoming DE
 ‘That person is the one whom I introduced Xiaoming to.’
- c. *[wo xiang ta jieshao Xiaoming de] yiding bu-hui cuo
 I towards he introduce Xiaoming DE] definitely no-will wrong
 ‘The person that I introduce Lisi to won’t go wrong.’

The examples in (40b) and (42b-c) indicate that there is no movement involved in those relative clauses with resumptive pronouns. In other words, these pronouns are base-generated and co-indexed with the head.

Zhu (1983) observes that a phonetically null head is licensed when a case associated with the verb is missing in the predicate. In his words, VP-DE designates an NP that bears the missing case within the VP. The “missing case” can be any of the following: agent, patient, recipient, or instrument (Zhu, p.34).⁹ This observation, however, is not

⁹ Zhu’s definition of “case” refers to semantic cases in Fillmore, C. J.’s case grammar (“*The Case for Case*”, *Universals in Linguistic Theory*, 1968), not argument cases.

entirely sufficient: it is not entirely clear what might count as a “missing case” associated with the verb. For instance, Huang, G. (1982) and Fan (1979) point out that VP-DE without a head NP can also sometimes designate a location.

- (43) a. [xiaohai shui de] shi xin-chuang.
 children sleep DE BE new-bed.
 ‘What the children sleep on is a new bed.’
- b. zhe ge chang-di shi [women da-qiu de].
 this CL ground-place BE we hit-ball DE
 ‘This is where we play ball games.’

Although not frequently pointed out in literature, [+time] adjunct relative clauses can sometimes have a null head too.

- (44) zhe ge shijian-duan shi [women kaihui de].¹⁰
 this CL time-period BE we meet DE
 ‘This is when we would have our meetings.’

If we take the position that Chinese RCs, including adjunct RCs expressing [+time], [+location], [+manner], and [+reason], are different from attributive clauses, those adjunct RCs should be analyzed as RCs involving operator movement. The hypothesis that a phonetically null head is licensed when operator movement occurs can then explain the examples in (43a-b) and (44).¹¹

¹⁰ An alternative to (44) is shown in (i) or (ii)

- (i) zhe ge shijian-duan shi [women kaihui yong de]
 this CL time-period BE we have-meeting use DE
 ‘This time period is used for having meetings.’
- (ii) zhe ge shijian-duan shi [women yong-lai kaihui de]
 this CL time-period BE we use-come have-meeting DE
 ‘This is the time period that we use for having meetings.’

In these examples, the NP *time period* can be analyzed as a direct object of the verb *yong* or *yong-lai* (“use”).

¹¹ Compare with A&L (2003)’s analysis that adjunct RCs involve operator movement (but argument RCs involve head movement). A&L claim that RCs involving an operator do not license a null head because

It should be pointed out that it seems more difficult for [+reason] and [+manner] adjunct to take a phonetically null head, although it is sometimes grammatical, particularly with copula *shi* support and for [+manner] adjuncts.

- (45) a. zhe zhong fangshi shi zhongguo daren jiaoyu xiaohai de.
 this CL manner BE China parents educate children DE.
 ni bie yong zai wo shen-shang.
 you do-not use at I body-up.
 ‘This is the way that Chinese parents educate children. Do not impose it upon me.’

A&L point out that for [+reason] and [+manner] adjuncts (but not other adjunct or argument RCs), a resumptive element is possible with *wh*-words.

- (45) b. [mei-jia daren zenme jiaou xiaohai de fangshi] dou bu yiyang.
 every-family parents how educate children DE way all no same
 ‘The way how parents educate their children differs from family to family.’

Interestingly, resumptive [+manner] RC usually cannot take a phonetically null head.

- (45) c. zhe zhong fangshi shi [zhongguo daren (*zenme/ruhe) jiaoyu xiaohai de].
 This CL manner BE China parents how educate children DE
 ‘This is the way how Chinese parents educate children.’

zenme (“how”) is thought to fall between an operator and a variable in Chinese (Tsai, 1994; A&L 2003). One possible way to analyze (45c), then, is that there is a [+manner] Operator in Spec of CP which binds the *wh*-word. That is, similar to RCs with a resumptive, the head in (45c) cannot be null because there is no movement of the operator.

Alternatively, one may propose that operator movement takes place at LF in the relative clause in (45), or that *zenme* is pronounced in situ despite the operator’s

“a null form does not have enough content to identify the null operator” (p.182). However, their analysis cannot be entirely correct as it cannot explain the data in (41a-b) and (42). It can also not explain why resumptive adjunct RCs with *zenme/ruhe* (“how”) and *weishenme* (“why”) (see later this section) cannot have a headless structure even though the operator is phonetically realized and does not need to be identified by a head.

movement to Spec of CP. We further note that a [+reason] adjunct with a null head is usually ungrammatical, whether it uses a resumptive *wh*-word or not.

- (46) a. zhe jiu shi [_{NP} ta-men (weishenme) chaojiao de yuanyin]
 this just BE he-PL (why) quarrel DE reason
 ‘This is the reason why they quarreled.’
- b. *zhe ge yuanyin shi [tamen (weishenme) chaojiao de]
 this CL reason BE he-PL (why) quarrel DE
 ‘This is the reason why they quarrel.’

While it is not entirely clear why [+reason] and [+manner] adjuncts behave differently from other RCs that involve operator movement, there is evidence that these adjuncts are unique in their own ways. For instance, consider English. While other *wh*-operators exhibit “quantificational variability effects” (QVE) (Huang, Li & Li, 2009; Tsai, 1994), in that the word *who* can be analyzed as the composition of *who* = *person* (*X*) + *Op*, and *whoever* can be analyzed as the composition of *person*(*X*) + *universal quantification operator*, *wh*-words like *why* do not have such a restrictor component, thus the ungrammaticality of “whyever” or “somewhy”, etc. The fact that only *zenme/ruhe* and *weishenme* are possible resumptive operators in relative clauses also demonstrates that these adjuncts are different from argument RCs or adjuncts of [+time] and [+location]. Whatever the details might be, there needs to be a matching relation between the operator and the relative clause head in these cases. It can be argued that such a feature “matching” requirement forbids the relative clause head to be null even when there is operator movement.

In this section, I have discussed the differences between an attributive clause and a relative clause with respect to their capability of licensing a null head. I have suggested

that operator movement within CP satisfies the predicate requirement and that the head can be null in such cases. Attributive clauses as well as putative relative clauses with a resumptive pronoun do not license a headless structure because no operator movement occurs within CP. At the same time, adjunct RCs of [+time] and [+location] as well as some [+manner] adjuncts do permit headless structures.

2.2.2.5 “Aboutness” Relations and RC Modification

In this section, I turn to the question of whether an “aboutness” relation can be the licensing condition for Chinese relative clauses. While some relativization structures seem to be licensed by the same “aboutness” semantic relationship that can license topic-comment constructions, not all instances of topicalization have a relativized counterpart.

(47) a. shuiguo, wo xihuan chi juzi.
 fruit, I like eat orange
 ‘As for fruits, I like eating oranges.’

b. *Wo xihuan chi juzi de shuiguo
 I like eat orange DE fruit

(48) a. yu, wo xihuan chi xian-yu
 fish, I like eat salty-fish
 ‘As for fish, I like having salty fish.’

b. *wo xihuan chi xian-yu de yu
 I like eat salty-fish DE fish

While an argument might be raised that the indefiniteness of the topic makes it impossible to relativize, equivalent topics with [+definite] feature cannot be relativized either.

(49) a. zhe san bu dianying, wo xihuan na liang bu aiqing pian.
 this three CL movie, I like that two CL love movie.
 ‘As for these three movies, I like the two romantic ones.’

- b. *[_{NP} wo xihuan na liang bu aiqing pian de san bu dianying].
 I like that two CL love movie DE three CL movie
 Intended: the three movies such that I liked the two on romance.

- (50) a. zhe ge ban, wo renshi liang ge nan-sheng.
 this CL class, I know two CL male-student
 ‘About this class, I know two male students.’

- b. ??[_{NP} wo renshi liang ge nan-sheng de zhe ge ban]¹²
 I know two CL male-student DE this CL class.
 Intended: the class such that I know two male students (among the class members)

It seems that the licensing condition of Chinese relative clauses cannot really be explained by an “aboutness” relation, which licenses a topic-comment structure. Note that while it is possible to use “such that” to express the intended reading of (49b) and (50b) in English, this “such that” relation does not license relative clauses in Chinese.

Secondly, relativization in Chinese adjunct RCs requires the disappearance of the preposition in a PP. However, topicalizations often require the presence of P when a PP is topicalized (A& L, 199). Particularly, when the NP in [PP [P NP]] indicates [+reason], [+location], [+time], [+manner], the P is never spelled out in relativization. In topicalization, in contrast, the P is often retained, especially when the PP indicates [+reason] or [+manner].

- (51) a. *zhe ge yuanyin, ta-men chaojia le.
 this CL reason, he-PL quarrel PERF
 ‘For this reason, they quarrel’

¹² The interpretability/grammaticality of (50b) is slightly better than (49b), though still with much awkwardness. It may be suggested that the relation between “class” and “two male students” is somewhat similar to that of adjunct [+location]. In other words, the very marginal acceptability of (50b) could be due to the possibility of analyzing (50b) as an adjunct RC of [+location] where the English equivalent would be “The class where I know two male students”.

- b. [_{NP} ta-men chaojia de yuanyin]
 he-PL quarrel DE reason
 ‘the reason why they quarreled’

A grammatical topicalization structure for (51a) would be (52a) below. While the regular pronoun *ta* ‘he/she/it’ cannot be used to refer to a reason, *ci* or *zhe ge*, interpreted more abstractly as ‘this’, are better candidates of pronouns here. It is important to note that even with a PP illustrated in (52), relativization of the [+reason] NP does not become grammatical. In other words, the obligatory disappearance of the preposition is not just motivated by the ungrammaticality of ‘preposition-stranding’. Relativization involves a fundamentally different structure (involving operator movement for adjunct RCs).

- (52) a. wei-zhe-ge / yin-ci, ta-men chaojia le.
 for-this-CL/for-this, he-PL quarrel PERF
 ‘They quarreled because of this (reason).’
- b. * [_{NP} ta-menwei-zhe-ge_i /yin-ci_i chaojia de yuanyin_i], mei ren zhidao.
 he-PL for-this-Cl/for-this quarrel DE reason, no one know.
 ‘Nobody knows about the reason for which they quarreled.’

On the other hand, recall that resumptive adjuncts are possible for [+reason] and [+manner] RCs in Chinese. I repeat example (46a) below.

- (46) a. zhe jiu shi [_{NP} ta-men (weishenme) chaojiao de yuanyin]
 this just BE he-PL (why) quarrel DE reason
 ‘This is the reason why they quarreled.’

As was mentioned, *weishenme* is typically analyzed as an overt operator undergoing wh-movement (and such movement takes place at LF and *weishenme* remains in situ). Similar patterns are observed for [+manner] adjuncts: in topicalization, the Prepositional Phrase has to be realized, as in (53a). Without the preposition, topicalization is

ungrammatical, as in (53b).

- (53) a. tongguo zhe ge fangshi, ta huode-le chenggong
 through this CL method, he acquire-PERF success
 ‘by dealing with things in this way, he succeeded.’
- b. *zhe ge fangshi, ta huode-le chenggong
 this CL method, he acquire-PERF success
 ‘this way, he succeeded.’

In relativization, on the other hand, there is no Prepositional Phrase; instead, an adjunct operator exists. See (54).

- (54) [NP [CP Op_i [TP ta t_ihuode chenggong] de] fangshi]
 he acquire success DE method
 ‘The way he achieved success’

The contrast in (55a) and (55b) shows that while a preposition together with a pronoun *ci* can be topicalized, using a topicalized PP as a resumption at the relativization site is not grammatical.

- (55) a. jie-ci, ta huode-le chenggong.
 borrow-this, he win-PERF success
 ‘Through this, he succeeded.’
- b. *[NP ta jie-ci_i huode chenggong de fangfa_i]¹³
 he borrow-this win success DE method
 ‘The method by which he succeeds’

2.2.2.6 Apparent “Gapless” Relative Clauses

In this section, I will look at some apparent “gapless” relative clauses. Recall that we pointed out that sometimes an “aboutness” relation seems to be licensing topic-comment

¹³ (55b) is ungrammatical, *ci* ‘this’ cannot be co-indexed with ‘the method/way’, although the sentence may be interpretable if *ci* ‘this’ refers to some factors/causes mentioned previously in discourse).

structures as well as relativization. I repeated those examples in (23) and (24) as (56) and (57).

- (56) a. zhe ge ren, yifu hen zang
 this CL person, clothes very dirty
 ‘As for this person, his clothes are very dirty.’
- b. yifu hen zang de zhe ge ren
 clothes very dirty DE this CL person
 ‘the person whose clothes are very dirty’
- (57) a. zhe ke shu, yezi hen da.
 this CL tree, leaf very big
 ‘As for this tree, its leaves are very big.’
- b. yezi hen da de zhe ke shu.
 leaf very big DE this CL tree
 ‘The tree such that its leaves are very big.’

Instead of analyzing (56b) and (57b) as noun-modifying structures licensed by an “aboutness” relation between the head and the predicate, these examples should in fact be analyzed as possessive RCs. The licensing conditions for such possessive RCs will be discussed in Chapter 4.

The literature also refers to another type of “gapless” relative clause in Chinese. Such structures do not exist in English.

- (58) Ta change de shengyin
 he sing DE voice
 ‘the voice of his singing’
- (59) Ta jiu-ren de huibao
 He rescue-man DE reward
 ‘the reward of his rescuing a man’

Aoun & Li note that the head NP is related to the entire relative clause rather than a

subpart of it and that (58-59) are more like English structures of [NP [P XP]] (e.g. ‘the reward for his rescuing the man’) and suggest analyzing those structures differently from RCs (p.186-187).

However, some restrictions on such “gapless” structures must be noted. For instance, Cheng & Sybesma (2005) find that those structures always involve some kind of activity: (60b) improves the grammaticality of (60a) by making the word *gaoxing* (“be happy”) more [+dynamic] and less [+stative].

(60) a.?? wo xihuan [ta hen gaoxing de xiaorong]
 I like he very happy DE smile
 ‘I like the smile that he has when he is very happy.’

b. wo xihuan [ta gaoxing qi-lai de xiaorong].
 I like he happy up-come DE smile
 ‘I like the smile that he has when he becomes happy.’

Cheng & Sybesma propose to analyze *de* as a generalized lambda (λ) -abstraction operator which can bind either an argument variable, or an adjunct variable, or an event variable, as in those gapless RCs; the poorness of (60a) is due to the absence of an event variable for binding.

Ning (1993, p. 137) notices something that is shared by all those apparent “gapless” structures: in those RCs, the head NP always seems to be associated with a (covert) VP headed by a verb having the general meaning of *dedao* (“obtain”). Similar observations have been made by Huang, G. (1982). She therefore proposes a structure that looks like the following, making it an object RC containing a covert verb:

(61) [Op_i [ta changge [_{VP} [v E] t_i] de]] [shengyin].
 he sing song DE voice

‘the voice of his singing the song/ the voice that he obtains while singing the song’

The [v E] is a verb with the general meaning of “obtain”. She claims that while the “primary adjunct RCs” are recoverable by being within the limitation of the four (universal) domains of [+location], [+time], [+reason], and [+manner], RCs like (61) are licensed because they have an “operator that is recoverable by being theta-marked by the empty verb having the designated meaning of ‘obtain’” (p. 139).

Whatever the detailed analysis may be for those apparent “gapless” structures, it is clear that a hypothesis of an “aboutness” relation as the licensing condition will overgenerate ungrammatical examples – it is always the case that some type of operator exists in relative clauses. In other words, the existence of those seemingly “gapless” structures in fact serve to illustrate the difference between Chinese relative clauses and attributive clauses.

2.2.3 Conclusion: Differences between Attributive Clauses and Chinese RCs

In this section (2.2), I have tested the status of putative Chinese relative clauses with consideration of Comrie’s “attributive clause” proposal. There seems to be ample evidence that Chinese RCs should be distinguished from an attributive clause and I summarize these points below:

1. Facts about distribution of *pro* in Chinese main clauses mean that an attributive analysis cannot explain Chinese object-gapped RCs and adjunct RCs;
2. Movement constraints are indeed observed in Chinese RCs. Apparent violations of these constraints can be explained by more fine-grained analyses of the relevant examples.

3. The existence of headless relative clauses (as contrasted with the impossibility of a headless attributive clause) supports an operator movement analysis of gapped RCs and the absence of movement in resumptive RCs.
4. While an “aboutness” relation can license topic-comment structures in Chinese, the licensing conditions of Chinese RCs are much more strict. Such a loose semantic relation cannot be used to describe the relation between the relative head and the predicate. In fact, there is evidence that some operators (e.g. *weishenme* “why” for [+reason] adjuncts, or an operator related to an event of “obtain”) exist in apparently “gapless” structures.

We can therefore conclude that Chinese RCs are indeed relativization structures that normally involve movement and should be distinguished from attributive/noun-modifying clauses. In the next chapter, I will discuss the exact derivation of Chinese relative clauses.

CHAPTER III

DERIVING CHINESE RELATIVE CLAUSES

This chapter starts with a look into the derivation of English relative clauses. In particular, I will examine the implications of reconstruction effects for a matching analysis and a raising analysis, respectively. In discussing the derivation of Chinese relative clauses in 3.2, I will start by reviewing Aoun & Li's analysis. While I share their view that Chinese RCs have an adjunction rather than a complementation structure, I find that reconstruction effects support the notion that the constituent undergoes A-bar movement within a gapped RC is a full copy of the external head (Sauerland, 1998; 2000). More specifically, an operator with a complex head moves from the gap position to the Spec of CP; at the same time, there is an "external head" outside the relative clause and only the external head is pronounced in Chinese RCs. At the same time, a head raising analysis is available in relativization structures involving an indefinite, non-referential head.

3.1 English Relative Clauses

3.1.1 Reconstruction Effects and Two Types of RCs

As is mentioned in Chapter Two, the matching approach and the raising approach are the two major analyses for relative clause structures. I review the structure of English relative clauses with these two analyses below:

The Matching Approach

- (1) a. $[_{NP}[\text{The man}_i] [_{CP} \text{who}_i [_{TP} \text{I like } t_i]]]$
 b. $[_{NP}[\text{The man}_i] [_{CP} \text{Op}_i [_{C} \text{that} [_{TP} \text{I like } t_i]]]]]$

The Raising Approach

(2) a. [DP[D the [CP[NP picture]_i [CP that Bill liked t_i]]]]

b. [DP[D the [CP[DP [NP picture]_i [D' which t_i]]_j [CP Bill liked t_j]]]]

The two approaches differ in two major aspects: the first difference concerns reconstruction effects, and the other difference is that the matching analysis assumes an adjunction structure while the raising analysis has a complementation one. I will start with a literature review of the studies analyzing reconstruction effects in English relative clauses in 3.1.1 and 3.1.2. The difference between a complement versus an adjunct structure will be discussed in 3.1.3

The two analyses give different predictions as to reconstruction effects: Assuming the raising analysis, the head position is derived by direct movement, and reconstruction to the RC internal argument position (which is occupied by a trace) should be possible. In the matching analysis, since the head does not undergo direct movement, reconstruction should not occur.

The literature points to reconstruction effects with respect to scope, reflexive binding, bound pronouns, and idiom chunks.

Reconstruction of scope

Bianchi (1999, p.45-46, p.122-123) discusses reconstruction effects and scope in Italian. Aoun & Li (hereafter A&L) (2003, p.98) examines the English counterparts of Bianchi's examples.

(3) a. Every doctor will examine two patients.

b. Every doctor will examine the two patients.

c. I phoned the two patients that every doctor will examine tomorrow.

In (3a), *two patients* can be interpreted as having narrow scope with respect to the subject QP *every doctor*. That is, there can be twice as many patients as doctors. (3b), with the definite article in *the two patients*, has only the interpretation that there are only two patients in total and they are examined by every doctor. A&L note that in (3c), *two patients* can have the same narrow scope interpretation as (3a). In other words, there is evidence that *two patients* can be interpreted in the direct object position within the relative clause, showing that the head NP with its nominal quantifier is raised from that position.

Reconstruction of reflexives

Schachter (1973) finds reconstruction effects surface with respect to reflexive pronouns. In (4), *himself* is able to reconstruct to the direct object position within CP to be bound by *John*.

(4) The portrait of himself_i that John_i painted is extremely flattering.

Reconstruction of bound pronouns

Sauerland (2000) notes that reconstruction of bound pronouns is also possible. In (5), *his* is bound by *everyone*, indicating that the NP, *the best pictures of his best friend*, must be raised from the object position within the relative CP.

(5) I would like to collect the [best pictures of his_i best friend]_j that [everyone_i will bring tomorrow t_j]. (Adapted from Sauerland, 2000)

Reconstruction of idiom chunks

There appears to be evidence that part of an idiom chunk can be reconstructed to its

base position inside the relative CP too.

(6) The headway that John made proved insufficient.

Such data would support a raising analysis since idioms are assumed to be generated in chunks. But Aoun & Li, following Carlson's (1977) observation that idiom chunks are not always reconstructable in RCs, observe that when the relative marker is a *wh*-word, the reconstruction effect is much harder to get. Specifically, Carlson (1977) argues that there are two types of RCs: amount RCs and restrictive RCs (Carlson's definition of restrictive RCs are different from what is typically referred to as "restrictive" versus "non-restrictive" relative clauses). Amount RCs are those with determiners that can co-occur with number expressions. Those determiners are like "the/these/every/any", etc. In those RCs, only an amount interpretation is possible.

(7) a. Mary put everything that he could in his pocket.

b. *Mary put everything which he could in his pocket.

Carlson's restrictive RCs refer to RCs with determiners like "ten/few/many/some", etc.

(8) a. Marv put something which was bigger than his fist in his pocket.

b. Marv put something that was bigger than his fist in his pocket.

Carlson notes that amount RCs show reconstruction effects with respect to idiom chunks, but at least some restrictive RCs do not.

(9) a. The/All/That/What headway that Mel made was astounding. (Amount RC)

b. *Some/Much/Most/Little/This headway that Mel made was very satisfactory.

(Restrictive RC)

Aoun & Li extend Carlson's proposal and claim that when the relative clause uses *wh*-operator instead of *that*, and uses determiners such as "few/many/several/each" instead of determiners such as "the/these/every/any", head raising cannot occur. Instead, operator movement is then the right analysis. They note that the use of *wh*-pronouns and determiners such as "few/some" not only prevents idiom chunks from serving as the relative head but also prohibits reconstruction of pronouns and quantifiers (p.113-114).

(10)?? The headway which John made was impressive.

(11) *?The picture of himself_i which John_i painted in his art class is impressive. (Aoun & Li, p.111)

(12) ??I would like to collect the best pictures of his_i best friend which I think everyone_i will bring tomorrow.

Reconstruction also seems to be impossible within the scope of *wh*-relatives. *Two patients* in (13b) can only have narrow scope while wide scope is possible for *two patients* in (13a). (Compare with example (3)).

(13)a. I phoned the two patients that each doctor will examine tomorrow.

b. I phoned the two patients who each doctor will examine tomorrow

A&L therefore support two types of RCs, one derived through raising, and the other matching. As there appears to be some evidence for a dependency relation between the head and the CP (see section 3.1.2), A&L assume both types of RCs have a complementation structure, rather than adjoining the RC to N. Adopting Rizzi (1997)'s split-CP analysis, they propose that for operator RCs, e.g., (14a), the head is generated in the Spec position of a ForceP, which is a complement to the determiner. For *that*-RCs, or

head-raising RCs, such as (14b), the head is base-generated in the direct object position, with an empty D ([_{DP} D⁰ boy]). This head then moves to the Spec of TopP as an intermediate step and further moves to the Spec of ForceP.

(14) a. [_{DP} the [_{ForceP} [_{NP} boy] [_{ForceP'} F [_{TopP} who_i [_{TP} I like t_{DPi}]]]]]

b. [_{DP} the [_{ForceP} [_{DP} D⁰ boy]_i] [_{ForceP'} F that [_{TopP} t_i [_{TP} I like t_{DPi}]]]]]

3.1.2 Sauerland's Internal Head Proposal

So far, it seems that an analysis with recognition of the availability of both the matching and raising analyses could best account for the data. However, there is still evidence supporting the matching analysis that is not accounted for: in (15), the R-expression within the RC doesn't trigger a Condition C effect in the trace position (Sauerland, 2000).

(15) Which is the picture of John_i that he_i likes?

(15) should be a "restrictive relative" in Carlson's categorization, and should be derived through raising of the NP 'picture of John'. Yet it is surprising that (15) does not trigger a Condition C violation. If (15) reconstructs, *John*, an R-expression, would be bound by *he*.

Sauerland further observes that when a raising analysis is forced by including a variable bound by the RC subject 'every girl' in the NP head, a Condition C effect does appear:

(16) *The [letters by John_j to her_i] _k [that he_j told every girl_i to burn t_k] were published.

To resolve the dilemma, Sauerland proposes that even the matching relatives have a complex internal head that is elided, which is a silent copy of the external head.

Sauerland turns to Antecedent Contained Deletion (ACD) to support this proposal. ACD is a form of VP-ellipsis inside of a relative clause where the RC head seems to be part of the antecedent VP, as in (17a), with <visit t> as the elided VP and ‘visited every town that’s near the town (...)’ as the antecedent.

(17) a. Polly visited every town that’s near the town Eric did <visit t>.

Sauerland contrasts (17b) with (17a).

(17) b. *Polly visited every town that’s near the lake Eric did <visit t>.

While ACD can take place in (17a), it cannot in (17b). The elided VP within the relative clause in both cases should represent the material of ‘visited every town’. It seems that the ungrammaticality of (17b) is caused by the mismatch between the head N and the materials represented in the elided VP. The contrast between the two sentences therefore supports the assumption that some material of the relative clause head is represented in the relative clause internal trace position. Sauerland therefore claims that a matching/*wh*-RC is supposed to have an LF like (18). The silent copy of the head *book* is a complement of the operator *which*.

(18) the book which <book> Susi likes *t*
 antecedent elided NP

This ellipsis process is different from VP-ellipsis because the ellipsis of the NP in (18) is always obligatory (where as VP-ellipsis is optional). Coming back to the absence of a Condition C violation in (15), Sauerland suggests that a Condition C effect is not seen because in the ellipsis, there is a “vehicle change” of the NP into an NP-anaphor, say, a *one*-anaphor. The concept of “vehicle change” was first proposed in Fiengo & May (1994) and it refers to situations in (19) & (20).

(19) John likes the story about Mary_i and she knows he does <like the story about her_i>.

(20) Mary is more proud of John_i than he_i thinks she is <proud of him_i>. ¹⁴

Fiengo & May argue that Condition B rather than Condition C determines the possibility of coreference in (19) and (20). Such evidence supports the idea that R-expression in the antecedent can correspond to a pronominal in the elided VP.

Sentence (21a) can then be analyzed as (21b).

(21) a. picture of John that he likes.

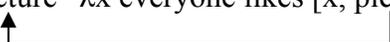
b. [picture of John]_j λx that he_i likes [x, one]_j

Sentences like (16), however, would block vehicle change to a one-anaphor, because “her” needs to be bound by “every girl” and the null NP must be interpreted downstairs at LF (Sauerland, 2000, p.13).

Sauerland takes the word “matching” “seriously” (p.76). “Matching” in his work does not imply operator movement and an agreement relation between the external ‘head’ and the operator. Instead, he means that at some point in derivation, the internal ‘head’ must be (almost) identical to the external “head”, as shown by (22b).

(22) a. the picture everyone likes

b. the $\overbrace{\text{picture}}^{\text{head}}$ which $\overbrace{\text{picture}}^{\text{elided head}}$ λx everyone likes [x, picture]



(Sauerland 1998, p.86-87; example (94))

In addition, Sauerland argues that the matching requirement is satisfied at LF. Support for the LF application of matching comes from the coreference of *every student* and *his* in (23)

¹⁴ Note that the possibility of vehicle change is relevant to how deeply embedded the R-expression is in the antecedent.

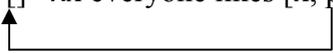
- (23) a. [Which paper of his_k that Mary_j was given] did she_j tell every student_k to revise t_i?
 b. [Which [] [] [λz Mary_j was given [z]]_i x did she_j tell every student_k to revise [λx , paper of his_k]?

(modified from Sauerland, 1998, p.86, example (92-93))

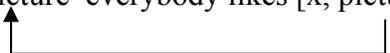
In (23b), both the internal and the external heads are empty, which satisfies the matching requirement. Specifically, matching is satisfied after the higher copy of *paper of his* is deleted, because before deletion, the relative clause in (23) is expected to have a lower copy, and the bound variable *his* would not be in the scope of its binder in the LF-representation in (23b). Therefore, (23) supports the idea that the matching relation applies at LF.

Since matching applies at LF and can be satisfied when both the internal and the external heads are empty, it is possible to consider a raising structure to be a special case of the matching structure, one in which both the external and the internal NPs are empty, as in (24c).

- (24) a. the picture everyone likes
 b. the $\overbrace{\text{picture}}^{\text{head}}$ which $\overbrace{\text{picture}}^{\text{elided head}}$ λx everyone likes [x, picture] (matching analysis)

 c. the [] which [] λx everyone likes [x, picture] (raising analysis)


Sauerland states that since the relative operator is related to the trace position by movement, the LF of (24c) before LF movement should look like (24d).

- (24) d. the [] which picture everybody likes [x, picture]


To get the pronunciation of a raising analysis correct, the structure in (24d) does entail a further stipulation that in cases where both external and internal NPs are empty, the internal head is pronounced in its moved position.

Sauerland further claims that the lexical material of the top copy of a *wh*-chain can be deleted at LF only if this is required for the interpretation of a bound variable that is not bound in this high position. It can be suggested that this generalization holds for relatives as well. That is, the internal copy of “head” in the position of the relative clause operator can be deleted only if it contains a variable that is bound internal to the relative clause. On the other hand, if the copy of the internal copy of the “head” (in the operator position) doesn’t delete, the external ‘head’ has to be non-empty as well (to satisfy “matching”). That means the “raising analysis” applies only in restricted conditions; in those conditions, “matching” is satisfied by both the external and internal NPs being empty.

3.1.3 Adjunct or Complement

While maintaining a theoretical difference between matching and raising relatives, Sauerland’s proposal actually unifies the two major approaches and explains the observed reconstruction effects. Another major difference between the other raising and matching analyses in the literature, however, is the relationship that is proposed between the DP/NP and the CP: the traditional matching analysis assumes an adjunct structure, while the raising approach considers the CP to be a complement of D. Specifically, the structure in the raising analysis is given in (25).

(25) $[_{DP}[_D \text{ the } [_{CP}[_{NP} \text{ picture}]_i [_{CP} \text{ that Bill liked } t_i]]]]$

Previous studies point to examples where a close dependency between the D and CP seems to be attested. In (26) and (27), for instance, the obligatory CP suggests a complement relation between the D and the CP.

(26) the Paris *(that I knew) (Vergnaud, 1974)

(27) Mary bought a house with the windows *(that she liked). (Li, 2001)

Li, A&L also refer to some examples that show the trace of the relativized nominal is not interpreted as definite, e.g., (28b), and cases where “the” occurs in a relativization structure even when the relativized nominal generally cannot co-occur with “the”, e.g. (29b). These examples support the idea that D is outside the relative CP (Li, p.169-170).

(28) a. *There were the men in the garden.

b. The men that there were in the garden.

(29) a. *They made the fun of me. (Fabb, 1990, p.71)

b. the fun that they made of me

However, there is some evidence that casts doubt on the complementation structure. For instance, Borsley (1997) points out that in some overt case marking languages such as Polish, the case marking indicates that the head NP and the external D consistently have the same case.

(30) Widzialem tego pana, co zbil ci szybe.
 saw-1SG the-ACC man-ACC what broke your-SG glass-ACC
 ‘I saw the man who broke your glass.’

Yet we have a different situation in (31), which according to Kayne (1994)’s complementation structure would presumably have a similar structure ([D CP]).

(31) To, kogo Maria widziala jest tajemnica
 that-NOM who-ACC Maria saw is secret.

‘Who Maria saw is a secret.’

As Borsley argues, the raising analysis would have difficulty in achieving an agreement between a D and a constituent in [Spec, CP] in a relative clause structure that would not apply where a D has an ordinary CP complement. Although Kayne suggests that the NP receives its case from the higher D, one wonders why it does not also inherit a case from the trace position, and why a case conflict would not arise in this situation.

Recall in example (26), Vergnaud (1974) notes that certain expressions seem to need a relative clause when they are selected by a determiner. Comparisons of grammaticality are given below:

(32) a. Paris is a beautiful town.

b. *The Paris is a beautiful town.

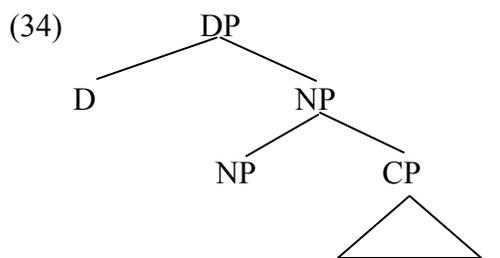
c. The Paris I know is a beautiful town. (modified from Vergnaud, 1974, p.265)

The improved grammaticality of (32c) shows that the restrictive relative clause forces *Paris* to be interpreted as a common noun, and in that case, the use of a determiner is necessary. Del Gobbo (2003), however, claims that such restrictions are not syntactic (selectional restrictions), but semantic, as when other demonstratives occur with the proper name, the proper name does not need to be followed by a relative clause.

(33) That Paris is really dirty.

(meaning a particular part of Paris, not a specific Paris)

Del Gobbo then suggests that English (restrictive) relative clauses should be analyzed as having the structure in (34): A relative clause adjoins to NP, and the projection of this NP is the complement of the determiner.



(modified from Del Gobbo, p.44)

This structure of CP adjoining to NP is similar to Partee (1995)'s and Chomsky's proposal (see Chapter 2). With this structure, it is possible to explain data such as (30), where the determiner and the NP bear the same case, because the NP does not originate inside the CP.

3.2 Chinese RCs under the Matching and Raising Analysis

In this section I will discuss the syntactic structure of argument relative clauses in Chinese. I will explore whether the matching or raising approach is applicable to the analysis of Chinese relative clauses and put forward a new proposal.

Assuming the matching/operator analysis approach of Chomsky (1977), (35a-b) and (36) shows the structure of an English and a Chinese RC, respectively.

(35) a. [NP[The man_i] [CP who_i [TP I like t_i]]]

b. [NP[The man_i] [CP Op_i [C that [TP I like t_i]]]]

(36) [NP [CP Op_i [TP wo xihuan t_i] de] na-ge nanhai]
 I like DE that-CL boy
 'the boy that I like'

In this analysis, Chinese does not have overt operators. *de* is assumed to be a relative marker and it is usually assumed to be in the complementizer position like English *that* (Ning, 1993; Del Gobbo, 2003, etc.).

On the other hand, with the head-raising analysis (Kayne, 1994; Bianchi, 1999), a Chinese RC has the structure in (37).

- (37) $[_{DP} [_{TP} \text{wo xihuan } t_i] [_{D} \text{de} [_{CP} [_{DP} \text{na-ge nanhai}] [_{C} t_j]]]]]$
 I like DE that-CL boy
 ‘the boy that I like’ (adapted from Simpson, 2002, p.4)

To achieve a head-final structure, the head NP *na-ge nanhai* (“that boy”) first moves out of the TP to the Spec of CP. Then the remnant TP *wo xihuan t* then moves leftward to the surface position (Simpson, 2002, p.4).

This analysis, however, has to face several oddities because of the unusual analysis of DE in (37) as the determiner. With this proposal, one wonders why the Chinese Determiner carries no definiteness power at all¹⁵, and how it can co-occur with demonstratives, which are typically thought to occupy the Det slot. While multiple occurrences of DE are very common in Chinese NPs, multiple occurrences of determiners seem to be much more unusual. Stacking relatives would also seem to cause an issue.

3.2.1 Aoun & Li’s Adjunct Structure and NP Projection Proposals

Aoun & Li (2003) propose that Chinese RCs are NP projections instead of DPs, and that the structure is one of adjunction, instead of complementation. They use the following reconstruction tests to support the NP projection proposal.

3.2.1.1 Reconstruction Tests

Aoun & Li (2003)’s argument is that reconstructions of bound pronouns and idioms

¹⁵ Simpson gives several examples to show that a determiner does not necessarily contribute to definiteness. In English, some determiners, e.g. *a*, also do not contribute to definiteness, but such determiners specify definiteness, i.e., [-definite]. It is puzzling, if *de* really occupies the Determiner slot, why *de* is entirely unspecified for definiteness (positive or negative) and quantification.

are possible, so long as the head noun is not a DP.

First, they note that reconstruction of bound pronouns is possible.

- (38) a. mei-ge xuesheng_i dou hui dai [[wo gei ta_i] de shu]
 every-CL student all will bring I give he DE book
 ‘Every student_i will bring the book that I gave him_i.’
- b. [[mei-ge xuesheng_i dou hui dai] de [[wo gei ta_i] de shu]]
 every-CL student all will bring DE I give he DE book
 ‘the book that I gave him_i that every student_i will bring.’

In (38a), ‘*he*’ is in the scope of *every student* and can be bound by it. In the relative clause formed in (38b), ‘*he*’ is not in the scope of ‘*every student*’, since ‘*every student*’ is embedded inside the second RC. At the same time, the pronoun does have the bound reading with respect to *every student*. In order for the bound interpretation to be achieved, *he* needs to reconstruct to the gap position within the higher CP. The possibility of the bound reading therefore supports reconstruction. A&L also note that reconstruction of reflexives is possible. In (39b), *ziji* can be bound by an antecedent in the relative clause.

- (39) a. wo jiao Zhangsan quan meigeren_i kai ziji_i de chezi lai
 I ask Zhangsan persuade everyone drive self DE car over
 ‘I asked Zhangsan to persuade everyone_i to drive his_i car over.’
- b. [_{CP} wo jiao Zhangsan quan meigeren_i kai lai de] [_{NP} ziji_i de chezi]
 I ask Zhangsan persuade everyone drive come DE self DE car
 ‘self’s car that I asked Zhangsan to persuade everyone to drive over’

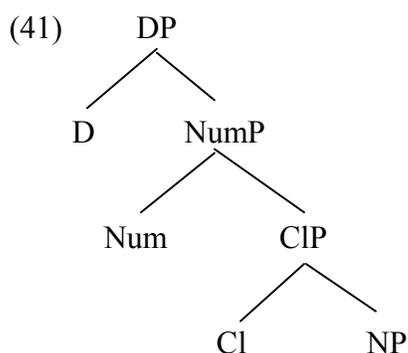
They note that reconstruction of scope without a bound pronoun, however, is not available in Chinese RC. In (40a), *san ben shu* (‘three books’) can have a wide or narrow scope reading, but in (40b), *mei-ge ren* (‘everybody’) has an obligatory narrow scope reading, meaning that everybody reads the same three books — the quantified phrase ‘three books’ must be interpreted outside the RC, without being able to reconstruct to its

base position within the scope of 'every person'.

(40) a. mei-ge ren dou hui kan san-ben shu
 every-CL person all will read three-CL book
 'Everybody will read three books.'

b. mei-ge ren dou hui kan de san-ben shu
 every-CL person all will read DE three-CL book
 'the three books that everybody will read'

Aoun & Li suggest that reconstruction of scope is not possible in Chinese relative clauses because only NPs can be reconstructed; the sequence of Numeral+Classifier+N, however, constitutes a NumP, a projection larger than NP projection. To be specific, the structure of a Chinese nominal is shown in (41) (Li, 1998; 2002).



Aoun & Li further claim that reconstruction of idiom chunks is possible in Chinese RCs. *Chi-cu* (“eat-vinegar”) is an idiomatic expression in Chinese, meaning “be jealous”. The following examples show that part of the idiom can be the predicate of a relative clause in Chinese.

(42) a. ta hen rongyi chi-cu
 he very easy eat-vinegar
 'He can easily get jealous.'

b. [[ta chi]de cu] bi shei dou duo.
 he eat DE vinegar comparewho all more

Lit: The vinegar he eats is more than anyone else's.
 'He is more likely to be jealous than anybody else.'

The authors contend that the object of a [V+O] idiom is generally non-referential (i.e. the projection does not need to be larger than NP), and reconstruction is thus possible.

3.2.1.2 NP Projection, Adjunction Structure

Aoun & Li then use the conjunction test to argue for an adjunct structure for Chinese relative clauses.

In Chinese, *jian* ("and") is a conjunction that connects two properties of an individual, while *he/gen* ("and") connects two individual-denoting expressions, two DPs (i.e., proper names, pronouns, expressions with Demonstrative or Classifier Phrase). The contrast can be illustrated by the following examples.

(43) a. He is a secretary and typist.

b. Ta shi (yi-ge) mishu jian daziyuan
 He is (one-CL) secretary and typist.
 'He is a secretary and typist.'

(44) a. Wo hen xihuan ta he/gen Zhangsan

I very like he and Zhangsan.
 'I like him and Zhangsan very much.'

b. *wo hen xihuan ta jian Zhangsan.

I very like he and Zhangsan.

(45) a. Wo xiang zhao [[yi-ge mishu] he/gen [yi-ge daziyuan]].

I want find one-CL secretary and one-CL typist.
 'I want to find a secretary and a typist.'

b. *wo xiang zhao [[yi-ge mishu] jian [yi-ge daziyuan]].

I want find one-CL secretary and one-CL typist.

The contrast in (46) shows the head of a Chinese relative construction is an NP.

- (46) a. wo xiang zhao yi-ge [[fuze yingwen de mishu]
 I want find one-CL in.charge.of English DE secretary
 jian [jiao xiaohai de jiajiao]
 and teach children DE teacher
 ‘I want to find a secretary that takes care of English (matters), (one who can be) a
 tutor that teaches kids.’
- b. *wo xiang zhao yi-ge [[fuze yingwen de mishu]
 I want find one-CL in.charge.of English DE secretary
 he/gen [jiao xiaohai de jiajiao]
 and teach children DE teacher

It is also observed that Chinese RCs, like a traditional modifier, can occur quite freely in various positions. The following description of the behavior pattern is adapted and revised from Aoun & Li, with arrows showing where RC could occur (2003, p.146).

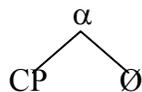
- (47) Demonstrative + Number + Classifier + Noun
 ↑ ↑ ↑

- (48) a. meiren yao de na shi-ben shu (RC + Dem + Classifier P + N)
 nobody want DE that ten-CL book
- b. na meiren yao de shi-ben shu (Dem + RC + Classifier P + N)¹⁶
 that nobody want DE ten-CL book
- c. na shi-ben meiren yao de shu (Dem + Classifier P + RC + N)
 that ten-CL nobody want DE book
 ‘the ten books that nobody wants’

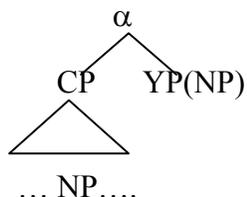
Based on these reconstruction and conjunction tests, Aoun & Li conclude that what is relativized is an NP (not a DP) and that relativization has an adjunction structure. They propose the following derivation for Chinese RCs.

- (49) a. A CP is generated.
 b. Targeting CP, insert \emptyset external to CP, forming a phrase marker α .

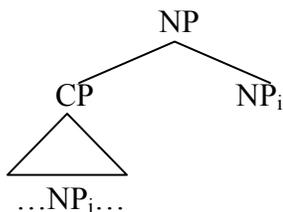
¹⁶ Huang, Li, & Li (2009) point out that RC rarely occurs between a demonstrative and a Num+CL.



c. Substitute YP for \emptyset . YP can be a copy identical to a phrase inside CP (move) or a new copy.



d. Determine the projection of α : NP projects (replacing α label)



(modified from A&L, p.159-161).

While appealing, Aoun & Li's analysis has some shortcomings. Particularly, one wonders what Aoun & Li would say about a relative clause followed by Dem-CL phrase, such as (50)

(50) wo xihuan de na ben shu
 I like DE that CL book
 'The book that I like'

As A&L claims that reconstruction effect does not take place beyond the NP projection (as they find reconstruction of scope interaction to be impossible), it seems that YP in (49c) cannot be a DP moved from inside the CP. They do claim that the YP that is adjoined can either be a copy identical to a phrase inside CP (move) or a "new copy" (p. 160), perhaps intending to refer to DPs of this kind. If, however, we adopt this view of

their analysis, two questions arise. First, suppose a relative construction like (50) is derived through proposing a new copy adjoined to CP, with that new copy being a DP, then we wonder how the existence of movement constraints in such constructions can be explained. Also, with a “new copy” permitted in the relative construction, this analysis seems to equate Chinese relative clauses to any adjunct structure of $[[CP\ NP]\ NP]$, which does not distinguish relative clauses from noun-modifying clauses and undermines the independent status of Chinese RCs. In the following section, I use more reconstruction tests to support a different analysis of the Chinese RC structure

3.2.2 Towards a “Matching” Analysis of Chinese Relative Clause

3.2.2.1 Reconstruction of Anaphors and Bound Pronouns

In this section, I examine the reconstruction of anaphors in Chinese relative clauses.

At first glance, reconstruction seems to take place in (51), but not in (52).

(51) a. ta_i $xiang$ $zhao$ [yi ge $neng$ $zhaogu$ $ziji_{i/j}$] de $zhangfu_j$
 she want find one CL can take.care.of self DE husband
 ‘She wants to find a husband who can take care of her/himself’

b. ta_i $xiang$ $zhao$ de $neng$ $zhaogu$ $ziji_{i/j}$ de $zhangfu_j$
 she want find DE can take.care.of self DE husband
 ‘the husband that can take care of himself/her that she wants to find’

(52) a. [CP wo $xiwang$ [CP $ta_{(i)}$ $zhao$ [NP [CP $neng$ $zhaogu$ $ziji_{i/j}$ de][NP $zhangfu$ (j)]]]]
 I want she find can take.care.of self DE husband.
 ‘I want her to find a husband that can take care of her/himself.’

b. [[CP wo $xiwang$ $ta_{(i)}$ $zhao$ de] [NP [$neng$ $zhaogu$ $ziji_{(j/*i)}$ de] [NP $zhangfu$ (j)]]].
 I want her find DE can take.care.of self DE husband
 ‘the husband that can take care of himself that I want her to find’

(52a) is ambiguous: $ziji$ can refer to either “her” or the potential husband.

Pragmatically, there is a bias towards the preferred reading ‘that the potential husband

can take care of her’. If reconstruction of an anaphor is possible, we should get the same preferred reading of *ziji* co-indexing with *ta* (‘she’) in (52b). However, in (52b), not only does this preference disappear, *ziji* actually cannot refer to *ta* (‘ta’), but has to refer to the husband instead.

This raises the question of why in (51) and (52), reconstruction of the anaphor behaves different. What seems to be interesting here, is that such (difference in) reconstruction effect is observed exactly in interrogative sentences:

(53) *ta_i xiang zhao na ge [[neng zhaogu ziji_{i/j} de] ren_j] zuo zhangfu?*
 she want look.for which CL can take.care.of self DE person make husband
 ‘Which person that can take care of himself/herself does she want to make him her husband?’

(54) *ni xiwang ta_i zhao na ge [[neng zhaogu ziji_{j/*1} de] ren_j] zuo zhangfu?*
 you wish he look.for which CL can take.care.of self DE person make husband
 ‘Which husband that can take care of himself do you wish she would make him her husband’

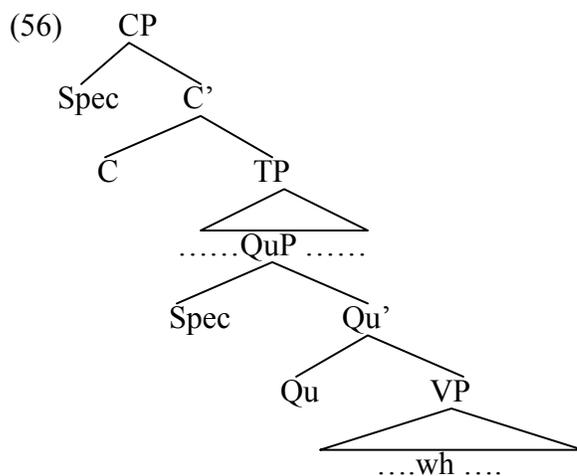
While in (53), ‘self’ can co-index with either ‘she’ or ‘husband’, in (54), the anaphor can only co-index with ‘husband’.

I suggest that the similar patterns witnessed in reconstruction effect in *wh*-movement and relativization are not coincidental: there is at least one type of relativization construction in Chinese that is achieved through A-bar movement of a null operator from within the TP to the Spec of CP, something similar to *wh*-movement or operator movement that is proposed in the matching analysis of English relative clauses. Despite the fact that Chinese does not have overt *wh*-movement, it is often proposed that some

type of A-bar movement has to take place to achieve a wide scope reading of the *wh*-word. Nishigauchi (1986), for instance, proposes that Chinese *wh*-questions involve LF movement to the Spec of CP where a complex NP is pied-pied.

- (55) [_{CP} [mai shenme de ren] [C [_{TP} ni zui xihuan ti]]]?
 buy what DE person you most like
 ‘The person that bought what do you like most?’

In a different analysis, A&L (1993) propose a Question projection with a Qu operator for *wh*-questions. Such QuP can be base-generated in a lower clause and undergo A-bar movement to achieve scope.



While I will not discuss the differences between these theories about the movement of *wh*-questions here, these proposals do suggest that sometimes a full phrase, a QuP or a complex NP, goes through A-bar movement instead of a single operator moving by itself, as in Sauerland’s analysis.

What I propose is that in relativization, similar movement takes place. That is, instead of suggesting that a single operator moves from the gap position to the Spec of

CP, I assume the operator takes the NP as a complement and goes through A-bar movement. This is in line with Sauerland (1998)'s "matching" analysis for English relative clauses: that there is a complex internal head in "matching" relative clauses. To be specific, the LF of a Chinese relative clause looks like (57). *laoshi* 'teacher' in the Spec of CP position is referred to as the internal head, versus the external one in the head NP position. Only the external head is pronounced and a matching relation between the two NPs has to be maintained.

$$(57) \underbrace{[_{NP}[_{CP}[_{Op} \text{ laoshi}]_i]}_{\text{internal head}} \text{ [wo xihuan } t_i \text{] DE] } \underbrace{[_{\text{ laoshi}]_i]}_{\text{external head}}^{17}$$

But up till here we haven't explained why there is a difference in reconstruction effect between (51b) and (52b), as well as (53) and (54). Note that the only difference between (53) and (54) seems to be that the copy of 'the husband that can take care of self' has to go through an intermediate step in order to be in the Spec of the higher CP position. It can be suggested that such movement of an operator with an NP complement is 'costly', and when movement takes more than one step and when a more local binder of the anaphor is available, the intermediate copy will be replaced by "one" anaphor, as in Vehicle Change (Fiengo & May, 1994). In our example from (51) to (54), 'self' has a local binder, 'husband' in the lower NP. Therefore, when successive movement takes place, intermediate copies are replaced by "one", making 'self' unable to be further bound by 'her', which situates in the higher clause.

¹⁷ While I will not go into details here, the structure in (57) might also help us reconcile the RC structure with other kinds of A-bar phenomena in Chinese, such as topicalization.

Compare with Aoun & Li's sample in which they claim that reconstruction of anaphor is possible, repeated here as (58).

- (58) a. wo jiao Zhangsan quan meigeren_i kai ziji_i de chezi lai
 I ask Zhangsan persuade everyone drive self DE car over
 'I asked Zhangsan to persuade everyone_i to drive his_i car over.'
- b. [_{CP} wo jiao Zhangsan quan meigeren_i kai lai de] [_{NP} ziji_i de chezi]
 I ask Zhangsan persuade everyone drive come DE self DE car
 'self's car that I asked Zhangsan to persuade everyone to drive over'

It is now possible to explain why reconstruction takes place in (58) although the movement seems to take several intermediate steps—vehicle change of the 'one' anaphor does not take place in (58) because there is no local binder for the anaphor 'self' in (58b).

Recall Aoun & Li's example of bound pronoun reconstruction, too. In those pronoun binding examples, again there is no NP which is more local that can bind the pronoun *ta* 'he', and reconstruction remains possible. I recall example (38b) here as (59a).

- (59) a. [mei-ge xuesheng_i dou hui dai de] [wo gei ta_i de shu]
 every-CL student all will bring DE I give he DE book
 'the book that I gave him_i that every student_i will bring'

Reconstruction of bound pronouns is possible in a *wh*-interrogative involving the same complex NP in Chinese too.

- (59) b. ni xiwang mei-ge xuesheng dou hui dai na ben ni gei ta de shu?
 you wish every-CL student all will bring which CL you give he DE book?
 'Which book that you give him_i do you wish every student_i to bring?'

It is possible to answer (59b) with 'I wish student A would bring book X that I gave him, student B would bring book Y that I gave him, and student C would bring book Z that I gave him'.

3.2.2.2 Scope Interaction

3.2.2.2.1 Quantity-denoting and Entity-denoting Number Expressions

Recall that Aoun & Li claim that reconstruction of scope without a bound pronoun is not available.

(60) a. mei-ge ren dou hui kan san ben shu
 every-CL person all will read three CL book
 ‘Everybody will read three books.’

b. mei-ge ren dou hui kan de san ben shu
 every-CL person all will read DE three CL book
 ‘the three books that everybody will read’

According to A&L, (60a) is ambiguous: ‘three books’ can have either narrow or wide scope, but the RC head in (60b) can only have a wide scope reading: it refers to the three books that everyone all reads.

In this section and the next section, I will reexamine the reconstruction effect in this pair. I will rely on literature on the structures of number expressions as well as my own analysis to support the following to claims: in (60a), the ambiguity is caused by the availability of both an entity-reading of the number expression and a quantity-reading of the number expression; in (60b), there is only an entity-reading of the number expression the structure of which is in fact [D [NumP]] with a null Determiner. In this section I will first discuss structures and interpretations of Chinese number expressions.

The proposal that Chinese number expressions like *san ben shu* ‘three books’ can have two different structures was first put forward by Li (1998). Li claims that in (61a), the NumP indicates the quantity of ‘three’ and in (61b), it is a DP with a null D. Li refers

to the structure in (61b) as an individual-denoting number expression. Because the term ‘individual-denoting’ is often used in the literature to contrast with ‘property-denoting’ expressions and ‘entity-denoting’ seems to be a more standard semantic terminology in this case, I will use the term ‘entity-denoting’ number expressions here to refer to the same concept.

- (61) a. [NumP san ben shu]
 b. [DP D [NumP san ben shu]]

Li (1998) and Huang, Li, Li (2009) contend that the quantity-denoting NumP structure should not be considered to be just an indefinite NP having only narrow scope, as there are differences between the two readings: For one thing, quantity-denoting number expressions cannot be co-indexed with pronouns (62a), while entity-denoting (indefinite) number expressions can (62b).¹⁸

- (62) a. *san-ge ren tai-bu-qi ni gei tamen de gangqin
 three-CL person lift-not-up you give he-PL DE piano.
 ‘Three people cannot lift the piano that you gave them.’
- b. wo jiao liang-ge xuesheng ba tamen de shu na-lai.
 I call two-CL student BA he-PL DE book bring-com
 ‘I will ask two students to bring their books.’

Secondly, while scope ambiguities exist for entity-denoting number expressions, quantity-denoting expressions will not cause such ambiguities: (63a) is not ambiguous, meaning that three people altogether can finish five bowls of rice, while (63b) is, with the

¹⁸ In English, quantity-denoting expressions also cannot be co-indexed with pronouns.

(i) a. This book weighs three pounds. *They are British, not American ones.
 b. Susan weighs sixty kilograms. *They equal 132 pounds.
 c. There are 6 people in this car. *They exceed the number of people allowed in this type of vehicle.

possible interpretation that three people are asked to consume fifteen bowls of rice ('three people' has wide scope), or consume five bowls of rice altogether (with 'three people' having narrow scope).

- (63) a. san-ge ren chi-de-wan wu-wan fan.
 three-CL person eat-can-finish five-bowl rice
 'Three people can finish five bowls of rice.'
- b. wo rang san-ge ren chi wu-wan fan.
 I let three-CL person eat five-bowl rice
 'I asked three people to eat five bowls of rice.'

Li (p.695) also notes that number expressions in subject or topic positions should be analyzed as quantity-denoting. In the literature, it is often said that indefinite NPs cannot occur in subject or topic positions (Li & Thompson, 1989). Li provides several 'counter-examples' to this claim. Some examples are similar to (63). An additional example is given in (64).

- (64) liang-zhang chuang, ji-le wu-ge ren
 two-CL bed, squeeze-PERF five-CL person
 'Five people were squeezed into the space of two beds.'

Li observes that those counter-examples share the common property that the number expressions receive an interpretation related to quantity. In other words, such 'counterexamples' do not really run against the generalization that only indefinite NPs appear in subject and topic positions in Chinese. Instead, those number expressions are not entity-denoting expressions but are quantity-denoting only. She further notes that the patterns allowing number expressions in these positions always involve a quantity-related predicate (Li, 1998).

In the following, I will discuss the issue of what interpretations are available in which context. Cheng, L. (1991) explains why indefinite NPs are usually disallowed in subject position by the rule of existential closure. According to her, the only way for an indefinite to be interpreted in Chinese is to be bound by existential closure, which applies to VP only (p.129). An indefinite NP in subject position therefore needs to be licensed by other operators. Cheng, L. analyzes *you* 'have' as such an operator, a modal is equivalent to the rule of existential closure which can bind the indefinite NP (in subject position) (p.173). (65) is only grammatical if preceded by *you*.

(65) *(*you*) ren lai zhao-guo ni .
 have person come look for-EXP you
 'Somebody came to look for you.'

Number expressions can appear in subject positions if preceded by *you*.

(66) *you* san-ge ren yijing lai-le
 have three-CL person already come-PERF
 'Three people have already come.'

Relevant to the upcoming discussion, some proposals analyze '*you* NumP' as [D NumP] with *you* as a strong determiner (Tsai, W.-T., 2003). Tsai, W.-T.'s example uses *you yixie ren* ('have some-CL person', or 'some people'). Using a replacement test, Tsai, W.-T. claims that *you* in sentences like (66) occupies the slot in [D [NumP]] (p.5, p8). The function of the strong determiner is to contribute to the specificity of the NP and quantify the NumP.

Number expressions can also appear in subject positions when *dou* ('all'), a universal quantifier operator, is present in the main predicate.

(67) san-ge ren dou lai-le.

three-CL person all come-PERF.
 ‘All of the three people have come.’

In both (66) and (67), the number expression must be interpreted as entity-denoting (Li, 1998). Further, a quantity-denoting interpretation of the number expression is not available in such contexts.

- (68) a. you san ge ren neng chi wu wan fan.
 have three-CL person can eat five-CL rice
 ‘there are three people; they each can eat five bowls of rice’
- b. san-ge ren neng chi wu-wan fan.
 three-CL person can eat five-bowl rice
 ‘three people together can eat five bowls of rice’

Note that the meaning of (68a) and (68b) are different, but neither of them is ambiguous: The quantity-denoting reading is not present in (68a), and the sentence only has the reading that ‘three specific individuals each can eat five bowls of rice’. Similarly, the quantity-denoting reading of ‘three people’ is not present in (69).

- (69) san-ge ren dou chi-le wu-wan fan.
 three-CL person all eat-PERF five-bowl rice
 ‘For all of the three individuals, they each had five bowls of rice.’

Also, a quantity-denoting predicate, apart from its ability to license number expressions in subject position, can also license universal quantifiers. Typically, *mei* (‘every’) needs to be licensed by *dou* (‘all’) (Cheng, L., 1991). But (70b) is grammatical.

- (70) a. mei-ge ren *(dou) kan-le shu.
 every-CL person all read-PERF book.
 ‘Everyone has read (some) books/the book.’
- b. mei-ge ren kan-le san-ben shu.
 every-CL person read-PERF three-CL book.
 ‘Everyone reads three books.’

In other words, it appears that quantity-denoting predicates can function in similar ways as an ‘operator’.

The above observations can be summarized as the following:

Number expressions in subject position receive quantity-denoting interpretations if they are licensed by a quantity-related predicate, and they receive entity-denoting interpretations if preceded by *you*, or bound by *dou*. They are never ambiguous.

Number expressions in object positions do seem to be ambiguous. If Cheng, L. (1991) is correct in saying that indefinite NPs need existential closure to be interpreted, number expressions in object position can certainly be entity-denoting. As we have noted above, that number expressions in this position can be quantity-denoting too, acting in similar ways as an operator, e.g., (70b). Recall the example in Aoun & Li’s reconstruction test, (60a), repeated here as (71).

(71) mei-ge ren dou hui kan san-ben shu
 every-CL person all will read three-CL book
 ‘Everybody will read three books.’
 (compare from (70b))

The universal quantifier ‘every’ is licensed by *dou*. This should not forbid the quantity-denoting reading of ‘three books’ in object position from being available in (71). The quantity denoted by the number expression can be contrasted, as shown by (72a). In entity-denoting number expressions in (72b) in subject position, on the other hand, there

can not be a contrast on the ‘quantity’.¹⁹

(72) a. mei-ge ren dou hui kan san-ben shu, bu-zhi liang-ben.
 every-CL person all will read three-CL book, no-limit two-CL
 ‘Everyone will read three books, not just two.’

b. ??san-ge ren dou chi-le wu-wan fan, bu-zhi liang-ge.
 three-CL person all eat-PERF five-bowl rice, no-limit two-CL
 Intended: All of the three people had three bowls of rice, not just two of them.

Whether entity-denoting number expressions in Chinese can have scope ambiguities is controversial in the literature. Cheng, L. (1991) claims that after the rule of existential closure applies, those number expressions would not raise as quantifiers. She finds (73) to be unambiguous, claiming that *yi-ben shu* cannot have a [+specific] reading.

(73) mei-ge ren dou mai-le yi-ben shu.
 every-CL person all buy-PERF one-CL book
 ‘Everyone bought a book.’ (Cheng, L., p.171, (1))

But Huang, S.-Z. (1996) thinks that scope ambiguities do exist. He considers (74), his example (56b), to be ambiguous, with the higher scope reading of ‘one poem’ possible.

(74) mei-ge xiaohai dou hui bei yi shou tangshi.
 every-CL child all can recite one CL poem
 ‘Every child can recite one poem.’

What can be concluded from previous studies and observations so far is that entity-denoting number expressions can be [+definite]. That is, when preceded by *you*, and when followed by *dou* in the main predicate, number expressions can occur in subject positions, a position that is generally thought to disallow indefinite NPs: there is thus

¹⁹ Examples with *you* are more complicated, since *you* can have different interpretations. I therefore use entity-denoting expressions licensed by *dou* as a contrasting example here.

evidence for a [D NumP] structure for such number expressions, where a null D carries a [+definite] feature. Recall that in Tsai, W.-T. (2003)'s analysis, the D position may be realized as *you* if the number expression is in subject position. In other words, we have seen number expressions that are quantity-denoting, and have seen number expressions that are entity-denoting and [+definite]. The question of whether [-specific] and [+specific] readings of (entity-denoting) number expressions exists in Chinese, i.e., whether there are scope ambiguities equivalent to English QPs in those expressions, actually does not affect our current examination to test reconstruction effects. I will briefly discuss the reason in the next section.

3.2.2.2.2 Re-examination of ‘Scope Interaction’ in Relativization

Recall example (60a-b) where A&L claim scope interaction of QPs to be impossible.

(60) a. mei-ge ren dou hui kan san-ben shu
 every-CL person all will read three-CL book
 ‘Everybody will read three books.’

b. mei-ge ren dou hui kan de san ben shu
 every-CL person all will read DE three CL book
 ‘the three books that everybody will read’

I have argued that in (60a), ‘three books’ can receive a quantity interpretation; it can also be interpreted as a [+definite] DP with [D NumP] structure as proposed by Li (1998). Whether this phrase (within the entity-denoting reading) behave like English QPs with [-specific] and [+specific] readings does not concern the purpose of this Chapter: Even if ‘three books’ can have a [-specific] reading, this reading will not survive the relativization process that I have proposed earlier in (57).

(57) $[_{NP}[_{CP}[_{Op} \overbrace{[\text{laoshi}]_i}^{\text{internal head}}] [\text{wo xihuan } t_i] \text{ DE}] [_{\text{laoshi}]_i}^{\text{external head}}$

I have already mentioned that specificity is related to the ability to have this type of A-bar movement. For instance, in the literature, many proposals analyze Chinese *wh*-words as indefinites: the existential interpretation of *wh*-words *shenme*, *shei* is always related to a [-specific] feature, and only [+specific] *wh*-words can be interpreted as interrogative and are subject to A-bar movement for scope at LF (if the proposals adopt an LF movement analysis ²⁰). In other words, according to this structure, if [-specific] reading of the NP is available in (60a), such narrow scope reading will not be available in (60b), because the [-specific] NP cannot go through A-bar movement to the internal head position.

A [+specific] NP ‘three books’ can be relativized in this way, and the wide scope reading would be maintained after relativization. That seems to be the case in (60b). But what may be a more accurate description of the situation is that *san ben shu* in (60b) should be analyzed as having a $[_{DP} D \text{ NumP}]$ structure with a null D carrying [+definite] feature. Evidence for this structure and derivations will be discussed in detail in Chapter 4. Therefore, although scope readings in relativization in (60a-b) may not lend direct support for the structure in (57), it certainly is not inconsistent with the proposal.

‘Three books’ in (60a) also has a quantity-denoting reading. The quantity-denoting reading should be not subject to relativization. The following English examples are

²⁰ Some analysis, including Cheng, L. (1991), Pesetsky (1987) assumes a Q morpheme (phonetically realized or null) gives interrogative force to such *wh*-words, which would be otherwise interpreted as indefinite.

awkward:

(75) a. *the three pounds that are weighed by the book

b. *the six feet that this man measures

That is, English measure phrases as well as Chinese quantity-denoting expressions do not typically take modifiers, relative clauses included. Occasionally, examples of measure phrases taking an RC may sound marginally acceptable.

(76) the twenty grams that this letter has weighed

(See Schwarzschild, 2002 for a brief example)

But such usages seem to be associated with unique pragmatic purposes (i.e., treating ‘grams’ as if it were an entity) not associated with the typical functions of measure phrases. See also contrast in (77) and (78).

(77) a. The two hundred dollars that he spent on the girl would be better spent elsewhere.

b. *The two hundred dollars that he spent on the girl is a lot of money.

(78) a. 1000 square feet is equal to 92 square meters.

b.?? The 1000 square feet that this house measures is equal to 92 square meters.

A possible explanation is that measure phrases, as well as Chinese number expressions, contain sufficient information to denote quantity by themselves; modifications are therefore superfluous. Therefore, the head noun in (60b) cannot be interpreted as quantity-denoting.

In addition, there is evidence that number expressions, when used as relative clause head in Chinese, have to be entity-denoting. I have mentioned previously that quantity-

denoting number expressions in the subject position can be licensed if there is another quantity-denoting number expression in the predicate. In (79a), such is the case. (79b), however, is odd. In (79c), the grammaticality is improved because the Num-CL is outside the relativization, making the quantity-denoting reading still possible for the NumP.

- (79) a. san-ge ren zonggong zuowan-le shi-dao ti.
 three-CL person altogether finish-PERF ten-CL questions.
 ‘Three people altogether solved 10 questions.’
- b. ?? san-ge ren zonggong zuowan-le [[laoshi buzhi de][shi-dao ti]].
 three-CL person altogether finish-PERF teacher assign DEten-CL uestions
 ‘Three people altogether solved 10 questions assigned by the teacher.’
- c. san-ge ren zonggong zuowan-le [shi-dao [laoshi buzhi de] ti].
 three-CL person altogether finish-PERF ten-CL teacher assign DE question
 ‘Three people altogether solved 10 questions assigned by the teacher.’²¹

²¹ The same contrast observed in (80b-c) is maintained if the RC is a subject-extraction one too.

- (ii) a. ?? san-ge ren zuowan-le [[rang laoshi hen bu-jie de] [shi-dao ti]]
 three-CL person finish-PERF make teacher very no-solve DE ten-CL question
- b. san-ge ren zuowan-le [shi-dao [rang laoshi hen bu-jie de] ti]
 three-CL person finish-PERF ten-CL make teacher very no-solve DE question
 Three people finished ten questions that (even) the teacher could not solve.

However, it appears that in some contexts where the number expression receive quantity-denoting readings, RCs always make the NP ungrammatical, whether it precedes or follows the numeral-classifier.

- (iii) a. yi-zhang chuang ji-bu-xia si-ge ren.
 one-CL beds, squeeze-no-down four-CL person
 Four people cannot be squeezed into the space of one single bed.
- b. *yi-zhang chuang ji-bu-xia [[ai chi laji shipin de] [si-ge ren]]
 one-CL bed squeeze-no-down love eat junk food DE four-CL person
 One bed cannot accommodate four people who love eating junk food.
- c. *yi-zhang chuang ji-bu-xia [si-ge [ai chi laji shipin de] ren]].
 one-CL bed squeeze-no-down four-CL love eat junk food DE person
 One bed cannot accommodate four people who love eating junk food.

Intuitively, it seems that any RC-modification will make the sentence ungrammatical, unless one can interpret the property described by the RC to be describing some concept related to quantity too. For instance, if the RC describes a property such as ‘four people that each weigh 150 pounds’, or if we are forced to imagine the size of the four people who regularly consume junk food, then (iiib-c) might be grammatical.

We see a difference in the sequence of numeral-classifier (Num-Cl) preceded by an RC in (79b) and the sequence of numeral-classifier followed by an RC in (79c). It appears that while the structure in (79c) may still receive a quantity-denoting reading, the structure in (79b), namely RC-Num-Cl-N, can only be entity-denoting. In addition, for the phrase in (79c) to receive a quantity-denoting reading, one has to understand the property of ‘assigned by the teacher’ to be an inherent property of the ‘questions’: the RC-N as a whole, rather than the N by itself, refers to an integrated concept. The difference in the two sequences will be discussed in detail in Chapter 4.

In sum, for the reconstruction effect in (60a-b), it appears that the ambiguity in (60a) is caused by an entity-denoting and a quantity-denoting reading of the number expression. It is not, then, surprising that (60b) is not ambiguous: quantity-denoting number expressions cannot be relativized. While I leave out the controversy on whether we need to distinguish a [-specific] reading and a [+specific] reading of the number expressions, I have mentioned that *san-ben shu* (‘three books’) in (60a), if entity-denoting, can have a [D NumP] structure, and the head in (60b) should be analyzed as [D NumP] too. This structure is consistent with the wide-scope only interpretation of (60b), and the difference in the readings of the number expressions in (60a) and (60b) is consistent with the derivation of RCs proposed in (57).

I will turn to reconstructions without *dou*. Aoun & Li claim that with those examples, a reconstruction effect seems to appear.

- (80) a. mei-ge-ren hui kan san ben shu
 everyone will read three CL book
 ‘Everyone will read three books.’

- b. [[mei-ge-ren hui kan de] san ben shu] (modified from AL, p.134, (4))
 everyone will read DE three CL book
 ‘the three books that everyone will read’

A&L’s interpretation is that in (80b) both the wide scope and narrow scope reading of ‘three books’ is possible. This, however, is not interpreted by them to indicate reconstruction has occurred; rather, they assume QR of ‘everyone’ in (80b) provides the narrow scope reading for ‘three books’. This analysis would have to assume QR out of an adjunct RC island, which is generally forbidden, but argued by AL to be possible for subject QP raising in Chinese due to the absence of agreement (p.135). I will offer a different analysis for (80b) below on the basis of our discussion about Chinese NumP and its licensing conditions.

First of all, as I have argued before, *san ben shu* ‘three book’ in (80a) can only have the structure of [Num P] and be must interpreted as quantity-denoting instead of entity-denoting, as that is the licensing condition for *mei ge ren* ‘everyone’ in the subject position without *dou*. It then appears that (80b) cannot be derived by (57), in which we assume the relative head is base-generated within CP: ‘three books’ in (80b) must be entity-denoting, unlike (80a). In other words, the grammaticality of (80b) despite the quantity-denoting nature of ‘three books’ in (80a) suggests that some relative clauses in Chinese must have a base-generated head. The traditional matching analysis in which a simple operator moves from the gap position to Spec of CP is therefore required in this case.

The argument that some RC heads can be base-generated in its s-structure position

was put forward by Aoun & Li and will be reviewed in the next section. Here, I will try to explain why A&L interpret (80b) as having both wide and narrow scope. A&L's complete example is (81) (their example (4) on p.134).

- (81) wo hui zhengli [mei-ge-ren hui kan de san-ben shu]
 I will arrange everyone will read DE three-CL book
 'I will arrange the three books that everyone will read.'
 (different three books according to A&L)

However, (81) does not sound grammatical or at least not natural to me or my native-speaker informants. On the other hand, it is possible to have the NP with the relative clause in a different context.

- (82) a. [mei-ge ren hui kan de san-ben shu] dou bu yiyang.
 every-CL person will read DE three-CL book all no same.
 'The three books that everyone reads are never the same set of three books.'
- b. [mei ge ren hui kan de san ben shu] *(dou) zai zhuozi shang.
 every-CL person will read DE three CL book all at table up
 'The three books that everyone reads are (all) on the table.'

(82a-b) suggest that the NP *mei ge ren hui kan de san ben shu* 'the three books that everyone read' needs to be licensed by a *dou* in the matrix clause. That is, this NP behaves like a simple universal quantifier like *mei ge ren* 'everyone'. The interpretation of the NP is in fact close to 'Every set of three book read by each individual'.²²

²² There is another context, namely in a *shi...de* sentence (the predicate is restricted to *shi yiyang de/shi bu yiyang de* ('are the same/'are not the same'), where the NP may appear grammatically without *dou*.

- (iv) [mei-ge ren hui kan de san-ben shu] shi yiyang de.
 every-CL person will read DE three CL book BE same DE
 'The sets of three books that each individual read are the same.'

This is also a context where universal quantifier phrases can appear.

These observations indicate that an interpretation of ‘wide scope’ (different three books) for the NP *mei ge ren hui kan de san ben shu* is not exactly accurate. At the same time, my interpretation of ‘every set of three book read by each individual’ would seemingly indicate that the ‘universal quantifier’ *mei* ‘every’ has raised out of the adjunct island. This would not be an ideal solution. Remember, however, that Chinese number expressions needs to be licensed by a licenser to be interpreted as entity-denoting. In cases like (82a-b), the licenser is *dou*. Unlike English, where the quantification is inherently borne by the NumP, it is reasonable to suggest that the quantification in Chinese is determined by the position of the operator/licenser, instead of by where the NumP is located. This is similar to the non-movement analysis of Chinese *wh*-words (Aoun & Li, 1993; 2003; Cheng, L., 1991; Tsai, W.-T., 1994, etc.). In those analyses, a *wh*-phrase does not have inherent quantificational force, but is a variable licensed and bound by an interrogative operator. Because the quantificational force is associated with the operator outside, the *wh*-phrases do not exhibit some island effects. For instance, Aoun & Li claim that in Chinese *wh*-questions, the scope of quantification is determined by where the Question is instead of where the Restriction is:

(83) Question + Quantification ... Restriction (*wh*-words)

(A&L, 2003, p.89)

Although ‘every’ in Chinese does not exhibit variability in its interpretation

-
- (v) *mei-ge ren shi bu yiyang de.*
 ever-CL person BE no same DE.
 ‘Everyone is not the same.’

Leaving aside the details of the mechanism, it could be suggested that predicates such as ‘are (not) the same’ could also license universal quantifiers in the subject position.

depending on different operators like indefinite *wh*-words do, it does need to be licensed by *dou* in most contexts.²³ In addition, *dou* can act as an operator licensing the ‘universal’ reading of *wh*-words too.

(84) ta shenme dou chi
 he what all eat
 ‘He eats everything.’

It can also bind a *wh*-word inside an island.

(85) ta [shei xie de shu] dou kan.
 he [who write DE book all read
 ‘He reads all the books written by different authors.’
 (Compare from (82a-b))

Cheng, L. (1991) distinguishes *dou* from unselective binding; she observes that *dou* can only quantify one element at a time. Her observation is that *dou* moves to the closest element (‘every’, or a *wh*-word) that can use a trigger (p.164). But she acknowledges previous literature which claims that ‘all’ can be associated with different parts of the sentence.

(86) na-xie shu women dou kan-guo²⁴
 that-CL book we all read-EXP
 a. All of those books, we have read
 b. We all have read these books

In other words, we can understand (83a) as having ‘universal quantification’ without assuming raising out of the island; instead, the scope is in the main clause because *dou* is in the main clause, although *mei* is inside an island, it can nevertheless be bound by the operator. (80b) is not relativized from (80a), but has a base-generated head outside the

²³ For some exceptions, see Cheng, L. (1991, p.165). To my knowledge, a straight-forward solution to those exceptions has yet to be developed.

²⁴ Cheng, L. (1991) mentions that earlier studies claim that there is a third reading ‘All of us have read all of these book’. She claims that this third reading does not really exist (p.162).

CP. (80b) can be grammatical if it appears in a sentence where *dou*, a universal quantification licenser, is available.

3.2.2.3 Relative Clauses Involving a [-specific] NP Head

Recall that Aoun & Li claim that reconstruction of idiom chunks is possible, with the example of *chi-cu* ‘eat vinegar’ (be jealous) and *kai-dao* ‘cut-knife’ (perform surgical operations)

- (87) a. ta chi de cu bi shei dou duo.
 he eat DE vinegar compare who all more
 ‘He is more likely to be jealous than anybody else.’
- b. ta kai de dao bi shei dou hao.
 he cut DE knife compare who all good
 ‘His surgical operation skills are better than anyone else’s.’

The object of a VO idiom is always nonreferential. Therefore it would be odd for our analysis if VO idioms can reconstruct, since the head N is [-specific]. With a closer look. Aoun & Li’s examples in (87) may not be fully convincing. First of all, such ‘reconstruction’ is only allowed in very restricted contexts. For instance, we cannot further relativize such NPs.

- (88) a. * [_{NP}[rang wo taoyan de [ta chi de cu]]
 make I disgust DE he eat DE vinegar
 Lit: The vinegar that he eats that makes me sick.
 Intended: His jealousy that makes me sick
- b. * [_{NP}[jiu-huo-le bingren de [ta kai de dao]].
 save-alive-PERF patient DE he cut DE knife
 Lit: The knife that he cut that saved the patient
 Intended: His surgical operation that saved the patient.

The reason that (87a-b) seem grammatical may be a phenomenon associated with other aspects of Chinese morphosyntax, unrelated to relativization issues. For instance,

even a word can be separated by DE, as shown by Aoun & Li's other example.

- (89) wo ting-bu-dong [[ta you de] mo]
 I listen-not-understand he hu-DE-mor
 'I don't understand his humor.'

youmo 'humor' is a loan word from the English word 'humor'. Unlike what Aoun & Li suggest, this is a single word and cannot be analyzed as having a V-O structure. The grammaticality of (89) shows that under certain context the separation of a word by DE is allowed. Whatever the exact explanation may be, the grammaticality in these examples may have nothing to do with relativization.

The ungrammaticality of (88a-b) shows that even though such V-DE-O structures are allowed, as part of the general promiscuity of DE-insertion, the head N (e.g. 'vinegar') is still [-specific], and therefore cannot undergo relativization with the internal head matching structure that I have proposed earlier.

On the other hand, as Aoun & Li acknowledges, the object of a VO idiom can be associated with a verb in the main clause.

- (90) ta lao ai chi [[rang ren shou-bu-liao de] cu]
 he always like eat make people cannot bear DE vinegar
 Lit: He always likes to eat vinegar that makes people unable to bear him.
 His jealousy is hard for people to put up with.

(90) indicates that some head NPs in Chinese relative clauses seem to be base-generated in its head position. In (90), the head NP is [-specific]. I have also pointed out that the NumP head in the earlier example (80b) is also [-specific]. These RCs do not show reconstruction effect to the gap position. It can be suggested that while RCs with a [+specific] N head is derived through movement with the structure proposed in (57), RCs can also have a base-generated [-specific] head. In the latter situation, similar A-bar

movement of an operator takes place within the CP, as in the following:

(91) $[[_{CP} Op_i [_{TP} \dots t_i \dots] de] NP]$

CHAPTER IV

SURVEY OF CHINESE RELATIVE CLAUSES

In this chapter, I will start with a review of the syntactic status of AdjP+DE structure, focusing on the debate about whether such structures can be analyzed as relative clauses. In Section 4.2, I will examine the flexibility in position of demonstratives, numerals and classifiers, and the relative clause. In some previous studies, the optionality of numeral-classifier positions with respect to relative clauses and its position in relation to Adjectival Phrases have been used as support to distinguish AdjP from relative clauses. However, on closer examination, I conclude that this distinction may not really stand.

Another controversy revolving around the phenomena of optional demonstrative positions and their relation to RCs is the distinction between restrictive and non-restrictive relative clauses. I will review the literature on this debate and argue that while Chinese RCs can modify certain proper nouns, the nature of descriptive relative clauses in Chinese may be quite different from nonrestrictive RCs in English.

Before the conclusion of this chapter, I will also review different types of RCs, focusing on the use of resumptive pronouns in Chinese RCs, and make a connection to the typological generalization of the Noun Phrase Accessibility Hierarchy.

4.1. The Status of Adj.+DE+N

4.1.1 Review: Nonpredicate Adjectives

Because it is often suggested that Chinese adjectives are in general conflated with (intransitive) stative verbs (Paul, 2005, p.758), and previous studies, including Yeh (1993), Smith (1997), among others, have considered Chinese adjectives to be stative

verbs, it has been suggested that prenominal adjectives followed by *de* (AdjP + DE + N) are reduced relative clauses in Chinese (Sproat & Shih 1987, 1991; Duanmu, 1998). Paul (2005) and Yang (2006), however, argue against this position and suggest that all AdjP + DE + N sequences should be analyzed differently from relative clause structures.

The proposal of analyzing a prenominal AdjP as a relative clause considers (1) as having a relative head N modified by a CP whose predicate is a verb equaling to “_ be fresh”. On this analysis, (1) should be translated as “I want to buy vegetables which are fresh” rather than “I want to buy fresh vegetables”.

(1)a. wo xiang mai xinxian de shucai.
 I want buy fresh DE vegetables
 ‘I want to buy fresh vegetables.’

b. wo xiang mai [NP [CP Op_i [t_i xinxian] de] shucai]
 I want buy fresh DE vegetables

Sproat & Shih (hereafter S&S) (1987) classify prenominal modification with *de* as “indirect” modification (and prenominal *de*-less modification as “direct” modification). In their analysis, *de*-modification has the same syntax and semantics as relative clauses. Such an analysis predicts that prenominal adjectives in *de*-modification must be able to occur in predicate positions, and that if an adjective cannot appear in predicate position, it cannot occur as prenominal *de* modifier. They only used one example to support this claim (S&S, 1987, p. 476): they found that adjective *qian* (“former”) cannot be used in predicate position in Chinese, and cannot be used as prenominal *de* modifier either.

(2) a. *zhe-ge xiaozhang qian
 this-CL principal former

b. *qian de xiaozhang
former DE principal

c. qian xiaozhang
'former Principal'

However, Paul (2005, p.784) argues that (2b) is only unacceptable because *qian* is a bound morpheme. The bi-syllabic counterpart of *qian*, *yiqian* can be used as a prenominal *de* modification, yet it is still impossible to use *yiqian* in the predicate position.

(3) a. yiqian de xiaozhang
former DE principal
'the former Principal'

b.*zhe-ge xiaozhang yiqian
this-CL Principal former

Note that (3c) is ungrammatical, indicating that *yiqian* cannot be a bound morpheme like *qian*, and that (3a) is a legitimate example of de-modification in S&S's theory.

(3) c.**yiqian xiaozhang*
'former Principal'

Paul (2005) argues against the position taken by S&S and suggests that AdjP+DE+N should be analyzed differently from reduced relative clauses. Paul's argument is largely built on the claim that there exist a large number of nonpredicate adjectives in Chinese.

The following are some of her examples:

(4) a. fang de panzi.
square DE plate
'a square plate'

b.? zhe-ge panzi fang.
this-CL plate square.

‘This plate is square.’

- (5) a. juemi de wenjian
top-secret DE documents
‘top-secret documents’
- b. ? zhexie wenjian juemi
these documents top-secret.
‘These documents are top-secret.’

Note that sentences like (4b), (5b) are judged as grammatical by S&S but ungrammatical by Paul (2005). The different judgment stems from the fact that Chinese “scalar adjectives” in predicate position generally have to co-occur with *hen* ‘very’.²⁵ According to Li & Thompson (1989), ‘Scalar adjectives’ describe relative qualities, which may be attributed to an entity to a greater or lesser extent. Examples are *gao* ‘tall’, *pang* ‘fat’, *piaoliang* ‘pretty’. The meaning of *hen* in such cases may be ‘bleached’ unless it is heavily stressed (Li & Thompson, p.143). According to Yang (2006), the reason why there is such a constraint is not well understood. Yang considers structures like (4b), (5b) incomplete, in that the bare adjectives must function as “comment” in a topic-comment structure (Yang, 2006, p.265).

- (6) zhe-ge panzi fang; na-ge yuan.
this-CL plate square; that-CL round.
‘This plate is square, and that one is round.’

With the help of *hen*, the sentence would read complete.

- (7) zhe ge panzi hen fang.
this-CL plate very square
‘This CL plate very square.’

²⁵ Li & Thompson (1989) claim that scalar adjectives can occur as the sole element of a verb phrase, but more often than not, “a scalar adjective occurring as the sole element of a verb phrase will take on the adverbial modifier *hen* ‘very’” (p.143).

Another type of adjective that can be used as intransitive verbs are ‘absolute adjectives’ such as *cuo* ‘wrong’, *bing-liang* ‘ice-cold’. These adjectives cannot be modified by *hen*. According to Li & Thompson, most of these adjectives do not occur as the sole element of a verb phrase. Those adjectives can be followed by the perfective particle *le*, and they pattern similarly to verbs in *shi...de* sentences²⁶.

- (8) *zhe zhong fangfa cuo.²⁷
 this type method wrong
 Intended: ‘this method is wrong.’

There also appear to be some exceptions.

- (9) na wan fan bing-liang. (Li & Thompson, p. 144, example 170c)
 this bowl rice ice-cold
 ‘This bowl of rice is ice-cold.’

It should be noted that when such absolute adjectives which can occur solely in predicate positions are used as attributive adjectives, *de* is obligatory.

- (10) bing-liang *(de) fan
 ice-cold DE rice
 ‘the rice that is ice-cold’

Recall Paul & Yang’s arguments. Their position against a relative clause analysis of AdjP+DE+N is based on the existence of nonpredicate adjectives. (Other arguments by Paul & Yang will be analyzed below). In their analysis, AdjP+DE+N is a phrase, say, a modifier phrase, ModP, which is possibly headed by *de* (Paul, 2005, p.781). However,

²⁶ For adjective phrases and verb phrases in *shi...de* sentences and their functions, see Xu (2008).

²⁷ For such absolute adjectives that cannot occur as the sole element of a verb phrase, they can be nominalized with the particle *de* to occur in the verb phrase of a copula sentence, as in (i) (Li & Thompson, p.145).

(i) zhe zhong fangfa shi cuo de.
 This type method BE wrong DE.
 This method is wrong.

evidence presented by Paul & Yang can only lead us to conclude that not ALL AdjP+DE+N are reduced relative clauses. Aoun & Li (2003) for instance, argue that there are two types of adjectives in Chinese (with a different type of categorization from the scalar adjective and absolute adjectives mentioned above). The first type can function as predicate (and when they do function as predicate, the intensifier *hen* generally co-occurs.)

(11) a. zhongyao de shiqing
 important DE matter
 ‘important matters’

b. hen/bu zhongyao de shiqing
 very/not important DE matter
 ‘very important matters/unimportant matters’

(12) zhe-jian shiqing hen/bu zhongyao.
 this-CL matter very/not important.
 ‘This matter is very important./This matter is not important.’

Aoun & Li state that “when an adjective occurs prenominally and can function as a predicate, it is possible to analyze it as a reduced relative clause” (p. 147). They do not distinguish adjectives modified or unmodified by *hen*: their position is that both (11a) and (11b) can be analyzed as reduced relative clauses.

Aoun & Li further claim that there is a second type of adjective which cannot be used predicatively.

(13) a. zhuyao de daolu²⁸
 main DE road
 ‘main road’

²⁸ A&L’s second type of adjectives is not the same with ‘absolute adjectives’ in Li & Thompson, although they pattern similarly in their inability to take *hen* or *bu*, as well as in having to be in a *shi...de* sentence when used in the predicate position. ‘Absolute adjectives’ are verbs, with their ability to be followed by perfective particle *le*, while adjectives like *zhuyao* cannot.

b. **hen*/**bu* zhuyao de daolu
 very/not main DE road

c. daolu **hen*/**bu* zhuyao
 road very/not main.

They then conclude that nonpredicate adjectives occurring in prenominal positions cannot be reduced relative clauses. (While not making a commitment, they suggest that the second type of adjective in prenominal position most likely occupies the Spec position of an independent projection with a head that is not the noun that it modifies (p. 148). This idea is similar to the Modifier Phrase proposal by Yang.

Aoun & Li's argument recognizes the difference between predicate and nonpredicate adjectives, but unfortunately ignores the awkwardness of bare adjectives in predicate positions such as in (14) (compare with (12)):

(14) zhe jian shiqing ?(*hen*) hongyao.
 this CL matter very important.
 'This matter is very important./This matter is not important.'

Without *hen*, (14) sounds "incomplete", as in Yang's description and such incompleteness is judged as "ungrammatical" at least by some (e.g., Paul). If (11a) is indeed a reduced relative clause, one wonders why (14) is not completely grammatical. Based on the literature review, it seems reasonable to distinguish adjectives that need to be modified by *hen* when used as a predicate, and those that can solely occur in the predicate position in an absolute sense (i.e. need not be modified by *hen*). With this distinction in mind, I will discuss whether predicate adjectives occurring as prenominal modifications with DE can be analyzed as relative clauses.

4.1.2 Predicate AdjP+DE+N

In Yang (2006), she makes the following points to argue against a relative clause analysis of all Adj.+DE+N structures.

First, Yang refers to the fact that DE can be often absent in those adjective prenominal modifications, while it is compulsory in relative clauses (p.211). A *de*-less counterpart of (11a) is given in (15).

(15) zhongyao shiqing
important matter

(16) wo gaosu ta *(de)shiqing
I tell he DE matter
'the thing that I told him about'

I would contend, however, that the optionality of DE in prenominal adjectival modification in fact supports the relative clause analysis of predicate Adj.+DE+N.

While there exist different analyses of the structure of (11a) and (15), it is widely recognized that *de*-less modification and adjectival modification with *de* differ syntactically and semantically. In Yang(2006), she uses the Lexical Integrity Hypothesis, the conjunction reduction test, an adverbial/degree modification test, an XP substitution test, a productivity test, etc. to argue for the word status of *de*-less modification (p.246). To be more precise, she refers to structures like (11a) as a morphosyntactic word. From the semantic perspective, she claims that for $[_{NP} N1]$ and $[_{NP} X N2]$, if N1 and N2 are the same, $[_{NP} X N2]$ is a sub-concept/sub-kind of $[_{NP} N1]$. That is, *de*-less adjectives create a sub-concept term; they do not modify the N. Prenominal adjectival modification with *de*, however, in her opinion involves a phrasal adjunction structure. The difference between

the two structures can be attested by the freer syntax of *de*-modification than *de*-less adjectives (the ordering of *de*-less adjectives is stricter) in that other adjectives with or without *de* often cannot be inserted in between a *de*-less adjective and the noun. (17a-b) show two NPs. Modifications with or without DE are equally grammatical. The contrast in (18a-b) and (19a-b) show that modifications can occur more freely in relation to adjectives with *de*.

(17) a. zhongyao xinwen
important news

b. zhongyao de xinwen
important DE news

(18) a. inserting *zhongguo guonei* in between *zhongyao de* and *xinwen*

zhongyao de zhongguo guonei de xinwen
important DE China national DE news
'important national news in China'

b. inserting *zhongguo guonei de* in between *zhongyao* and *xinwen*

*zhongyao zhongguo guonei de xinwen
important China national DE news

(19) a. inserting *guoji* in between *zhongyao de* and *xinwen*

zhongyao de guoji xinwen
important DE international news

b. inserting *guoji* in between *zhongyao* and *xinwen*

*zhongyao guoji xinwen
important international news

Although Paul (2005) has a different analysis of the two structures and considers both modifications to be at the phrase level, she considers that *de*-less adjectival modification

with N denotes a natural, plausible classification and that only an adjective head, not maximal projections with Adv+Adj. can be modifications in a *de*-less phrase.

From Paul and Yang's argument, then, prenominal modification with *de* is clearly not the same as Adj+N. Importantly, only Adj. heads can occur in *de*-less modifications. Therefore, it is possible to suggest that while Adj(P)+DE+N can be analyzed as (reduced) relative clauses with a CP, Adj+N should not. Moreover, while they recognize that relative clause structure [_{NP} [CP N]], as well as adjective modification, are both adjunction structures, and that the phonetic realization of C is obligatory in relative clauses, they claim that AdjP+DE+N patterns similarly with relative clauses.²⁹

Yang (2006) also raises the difference between adjectives and intransitive verbs (p.263). She claims that adjectives and intransitives do not have parallel structures. Again, *hen* is often necessary when scalar adjectives and some absolute adjectives are used predicatively. With intransitive verbs, however, an aspect marker or modal verb is generally used.

(20) a. bi hen gui
 pen very expensive
 'Pens are expensive.'

b. konglong hen da
 dinosaur very big
 'Dinosaurs are big.'

²⁹ Note that we are not suggesting all prenominal modification where *de* is obligatory can be analyzed as relative clauses. If the modification cannot be used predicatively, such structures, like (iia), cannot be relative clauses: *yiqian* is not an AdjP, although when co-occurring with *de*, the phrase can be an adjunct of a NP.

(ii) a. yiqian *(de) xiaozhang
 former DE principal
 b. *xiaozhang yiqian
 principal former

- (21) a. niao zai/hui fei.
 bird DUR/can fly
 ‘Birds are flying/ Birds can fly.’
- b. gou zai jiao
 dog DUR bark.
 ‘Dogs are barking.’

As mentioned above, the adverbial modifier *hen*, if not heavily stressed, can be semantically empty in (20a-b) (Li & Thompson, 1989). However, adding *hen* as a semantically empty modifier is not a possibility for intransitive verbs in (21a-b). Yang therefore claims that adjectives and intransitive verbs are not of the same category in Chinese.

However, note that intransitive verbs, when used solely as the predicate, also need some aspectual marking as in (21a-b). I suggest that although the status of *hen* is not completely clear in (20a-b), it could be related to a projection related to tense or aspect. In other words, if we consider adjectives in (20b) to be a type of intransitive verb, then *hen* is in complementary distribution with aspectual markers such as *le* (perfective) or *zai* (durative). Yang’s argument does not exclude the possibility of analyzing adjectives in Chinese as a type of intransitive verb. In addition, corpus studies find that adjective phrases and verb phrases in *shi...de* sentences show similar patterns and have similar functions (Xu, 2008). If adjectives can indeed be analyzed as a type of stative verb, it is not surprising that stative verbs behave differently from other verbs denoting eventualities such as activities, achievements, and accomplishments. Stative verbs can be classified into stage-level or individual-level states (Smith, 1997). Stage-level states (which is expressed by adjectives in Chinese) can occur with the aspect marker *le*, like

other intransitive verbs.

(22) a. konglong da le.
 dinosaur big PERF
 ‘The dinosaur has grown bigger.’³⁰
 (compare with (20b))

b. niao fei le.
 bird fly PERF
 ‘The bird has flown away.’
 (compare with (21a))

Based on this examination, I propose that when an AdjP that can be used in the predicate position appears as a prenominal modifier, this AdjP+DE+N can be analyzed as a reduced relative clause, and that DE is compulsory in such situation.

The following tests show those AdjPs (AdjPs that can occur in predicate positions) have to be immediately followed by DE when they occur before the noun,

(23) a. zhe-ge panzi hen da.
 this-CL plate very big
 ‘This plate is very big.’

b. hen da *(de) panzi
 very big DE plate
 ‘(a) very big plate’

(24) a. zhe-ge fangfa tebie hao.
 This-CL method particularly good
 ‘This method is particularly good.’

b. tebie hao *(de) fangfa
 particularly good (DE) method
 ‘(a) particularly good method’

When *de* is optional in a prenominal modification with an adjective, this adjective cannot be used predicatively.

³⁰ *le* in (22a-b) is referred to as a sentence particle instead of an aspectual marker in Li & Thompson.

- (25) a. hong-se (de) chenyi.
red-color (DE) shirt
- b. *chenyi hong-se.
shirt red-color
- (26) a. zhuyao (de) yuanyin
main (DE) reason
- b. *yuanyin zhuyao
reason main

The definition of “predicate adjective phrase” that I use here is not exactly the same with the definition of “predicate adjective” in Aoun & Li. Specifically, in my definition, only (27b) can be analyzed as a relative clause.

- (27) a. zhongyao de shiqing
important DE matter
- b. hen zhongyao de shiqing.
very important DE matter

4.1.3 ModPN and CP N

I argue that (27a) and (27b) should be analyzed differently. *Zhongyao de* in (27a) can be a modifier phrase headed by DE. Other examples of this ModP structure could be *yiqian de* (former), *zanxin de* (brand-new) as proposed by Yang.

- (27') a. [_{ModP} zhongyao de] shiqing.
- b. [_{NP} [_{CP} [_{TP} hen zhongyao] de] shiqing]

In other words, *zhongyao de* in (27a) is no different from *yiqian de N* and *zanxin de N*, in which cases the modifier preceding *de* cannot be used as a predicate even with the support of *hen*. The grammaticality of (27b) does not change the fact that *zhongyao* is only part of a ModP (which is headed by DE in Yang’s analysis) instead of a TP.

In the following, I will provide further evidence that the prenominal modifications in (27a) and (27b) differ not only in the adverbials added, but in maximal projection. Below, I use conjunction tests to verify the TP projection in (27b).

I will use the conjunction *tongshi* ('at the same time'/ 'also') to facilitate our test. *tongshi* connects two TP/CPs.

(28) a. ta chang-ge, tongshi (ye) tiao-wu.
 he sing-song, at-the-same-time (also) dance
 'He sings (regularly), and also dances.'

b. ta shi ge yisheng, tongshi ye shi laoshi.
 he BE CL doctor, at-the-same-time also BE teacher
 'He is a doctor; at the same time he is also a teacher.'

This conjunction can also combine two CPs modifying the same NP, or combine two TPs within a CP.

(29) a. [NP [CP [CP wo xihuan de] tongshi [CP ta ye xihuan de]] ren]
 I like DE at-the-same-time he also like DE person

b. [NP [CP [TP wo xihuan] tongshi [TP ta ye xihuan] de] ren]
 I like at-the-same-time he also like DE person
 'the person that he and I both like'

tongshi cannot be used to connect two ModPs.

(30) a. *xianzai de tongshi zhuyao de jiaotong gongju
 now DE at-the-same-time major DE transportation tool

b. *zanxin de tongshi xianhong de qunzi
 brand-new DE at-the-same-time red DE skirt

Some conjunctions can combine both TPs and AdjPs. Such conjunctions are *you*, *ye*, *bingqie*. However, *tongshi*, cannot be used to connect two AdjPs. In the following, I show the differences between *tongshi* and these other conjunctions in nominalized predicate adjectives in *shi... de* sentences (Xu, 2008). According to Li & Thompson (1989),

predicate adjectives can be nominalized by *de* and occur in copular sentences. While it is possible to use *er* (and) (as well as *you*, *bingqie*) in (31a), *tongshi* cannot be used to connect two AdjPs in (31b).

- (31) a. wo de meimei shi [meili er shanliang] de.
 I DE younger.sister BE beautiful and kind-hearted DE
 ‘My sister is young and kind-hearted.’
- b. *wo de meimei shi [meili tongshi shanliang] de
 I DE younger.sister BE beautiful and kind-hearted DE
 Intended: My sister is young and kind-hearted.

Also recall that these bare adjectives in predicate position, if without *hen*, makes the sentence sound ‘incomplete’. The sentence still is awkward if *tongshi* is used to conjoin the two AdjPs.

- (32) ?? ta piaoliang, tongshi congming.
 she pretty, at-the-same-time smart.
 ‘She is pretty and smart at the same time.’

The awkwardness of (32) indicates that *piaoliang* ‘pretty’ cannot be analyzed as a complete TP structure by itself, nor can *congming* ‘smart’. With adverbial modifier *hen*, *tongshi* can be used to conjoin the two parts.

- (33) Ta hen piaoliang, tongshi hen congming.
 he very pretty, at-the-same-time very smart

Similarly, *tongshi* cannot be used to conjoin two Adjectives without *hen*, as in (34a), but (34b) is fine.

- (34) a. ?? piaoliang (de) tongshi congming de nv tongshi.
 pretty (DE) at-the-same-time smart DE female colleague
 ‘the female colleague who is both pretty and smart.’
- b. hen piaoliang (de) tongshi ye hen congming de nv tongshi
 very pretty DE at-the-same-time also very smart DE female colleague

‘The female colleague who is both very pretty and very smart.’

The above tests indicate that *tongshi*, unlike other conjunctions, do combine two TPs or CPs but not AdjPs or ModPs. (36a-c) show that *tongshi* cannot combine ModPs such as *zhongyao de* (‘important DE’), while it can combine *hen zhongyao (de)* and *hen jishi de*. Both *zhongyao* and *jishi* are adjectives that can occur in predicate positions only when accompanied by *hen*.

(35) zhe ge xiaoxi *(hen) jishi.
 this CL news very timely
 ‘This news came in a timely fashion.’

- (36) a. *_{[NP} [_{[zhongyao de] tongshi} [_{jishi de}] xiaoxi]
 important DE at-the-same-time timely DE news
- b. _{[NP} [_{CP} [_{CP} hen zhongyao de] tongshi [_{CP} hen jishi de]] xiaoxi]
 very important DE at-the-same-time very timely DE news
 ‘very important and timely news’
- c. _{[NP} [_{CP} [_{TP} hen zhongyao] tongshi [_{TP} hen jishi] de] xiaoxi]
 very important at-the-same-time very timely DE news
 ‘very important and timely news’

The contrast in the possibility of using *tongshi* to connect two TPs/CPs versus two ModPs show that in terms of their abilities to be conjoined, (27b) patterns along with relative clauses, while (27a) shows the same pattern with other ModP-N structures. Only AdjPs that can be used in the predicate position in a strict sense (without any further modification), when used pronominally, can be analyzed as having a TP structure and such [AdjP N] can be analyzed as relative clauses. For those adjectives that cannot be independently used as a predicate, Adj+DE cannot be analyzed as relative clauses. Such Adj+DE can be an independent projection not headed by N, a ModP, for instance, as is proposed by Yang (2006). My analysis differs from previous claims such as those of

Aoun & Li in that even for an Adjective Phrase that can be used in predicate positions with *hen* (e.g. *zhongyao* ‘important’), when it is used alone in a pronominal position, it cannot be analyzed as a relative clause. (27a) and (27b) therefore have different structures.

4.1.4 AdjP+DE and Numeral + Classifier

Another argument that Yang (2006) raises regarding the difference between relative clauses and AdjP + DE has to do with the possible positions where AdjP+DE can occur. Yang claims that the two structures differ in syntactic distribution, in that AdjP cannot immediately precede a numeral, while RC can (p.268, example 112-113).

(37) a. **congming de san ge xuesheng*³¹
 smart DE three CL student
 ‘three smart students’

b. *wo jiao-guo de san ge xuesheng*
 I teach-PERF DE three CL student
 ‘The three students that I have taught’

The difference in the acceptability of (37a) and (37b) should be recognized. *congming* ‘smart’ cannot be used solely as a predicate and thus (37a) thus cannot be analyzed as an RC. It is important to note, however, that (37c) is also generally unacceptable, although the acceptability may be slightly improved with *tebie* ‘particularly’.

(37) c. ??*hen/tebie congming de san-ge ren*
 very/particularly smart DE three-CL person
 ‘three very smart people’

³¹ This example was found to be ungrammatical by Yang. Later in this section, however, I will illustrate that the unacceptability of this sequence is really due to discourse factors.

Recall A&L's claim that Chinese RCs can occur both in pre-numeral and post-numeral positions. This claim is in fact a simplified generalization. Tang, T.-C. (1975, p.53-55) claims that while demonstratives like *naxie* ('those') can occur either immediately preceding an RC or following it regardless of whether it's a subject or object RC, quantifiers like *henduo* ('many'), *meiyige* ('everyone') can only occur in pre-RC positions for at least some RCs.

(38) a. *naxie/henduo dai yanjing de xuesheng dou yonggong*
 those/many wear glasses DE student all diligent
 'Many/Those students who wear glasses are diligent.'

b. *dai yanjing de naxie/*henduo xuesheng dou yonggong*
 wear glasses DE those/*many student all diligent

The ungrammaticality of (38b) with *henduo* calls for attention. The grammaticality of (38b) may be improved but still appears to be somewhat odd if we use 'three CL' instead of 'many'.

(38) c ? *dai yanjing de san ge xuesheng dou yonggong.*
 wear glasses DE three CL student all diligent
 'those three students who wear glasses'

In other words, at least some RCs seem to behave similarly to AdjPs in that they typically do not precede numerals, while others can occur either in pre-numeral or post-numeral positions. In the next section, I will discuss restrictions on the RC-Num-CL sequences, and show that the difference (37b) and (37c), as well as the ungrammaticality of (38b) and the oddity of (38c) are due to the nature of their modification. I will show that AdjP and RCs behave similarly. In other words, contrary to Yang's claim, there is no evidence from the sequence of AdjP and numerals versus RCs and numerals that could

refute a relative clause analysis of those AdjP+DE+N sequences that I mentioned in the previous section.

4.2 Demonstrative, Quantificational Expression and RCs

4.2.1 RC/ModP Positions and Levels of Modification

For relative clauses preceded by Num-CL or phrases such as ‘many’ and ‘everyone’, I have argued in Chapter 3 that they can be like other number expressions and can be either quantity-denoting or entity-denoting if they are bound by an operator or existential closure. Both relative clauses and AdjPs can appear in this (post-numeral) position. Here, I will discuss the opposite sequence of RC-Num-CL. I have given examples above to show that Yang (2006)’s claim that AdjP cannot immediately precede a numeral while RC can is not entirely correct. In (38b) and (38c), relative clauses followed by *henduo* or a numeral are as awkward as the AdjPs followed by a numeral in (37a) or (37c). I will begin by looking at RCs and AdjP followed by *henduo*.

Henduo is a quantificational expression, meaning ‘many’. A crucial difference between *henduo* and a Num-CL sequence is that while Num-CL-N can only be entity-denoting when bound by some operator (existential closure rule or *you, dou*), *henduo N* can be entity-denoting by itself: it need not be licensed by *you* when occurring in a Subject position.

- (39) a. *(you) san-ge keren yijing lai-le.
 have three-CL guest already come-PERF
 ‘Three guests have already come.’
- b. (you) henduo keren yijing lai-le.
 have many guest already come-PERF
 ‘Many guests have already come.’

Recall that NumP in Chinese in the Subject position needs to be bound by *you* or *dou*. Only one of these binders can occur with a NumP. Thus (40a) is ungrammatical. It is possible, however, for *you* and *dou* to co-occur with [*henduo* NP]. The grammaticality of (40b) shows that *you* in (40b) as well as in (39b), which is optional, is dissimilar to the binder *you* in (39a), and that the phrase. In that case, *henduo keren* ‘many guests’, is entity-denoting by itself.³²

- (40) a. **you san-ge keren dou lai-le.*
 have three-CL guest all come-PERF
 ‘Three guests came.’
- b. *you henduo keren dou lai-le.*
 have many guest all come-PERF
 ‘Many guests came.’

The data above indicate that *henduo* is a quantifier that carries a [-definite] feature, and, unlike a Num+CL+N string which needs to be bound by an operator in order to be interpreted as entity denoting, *henduo* is entity denoting by itself. Because of its indefinite feature, *henduo* is in complementary relationship with demonstratives in Chinese which carry a [+definite] feature.

- (41) a. *zhe-xie xuesheng dou hen congming.*
 these students all very smart
 ‘These students are all very smart.’
- b. *henduo xuesheng dou hen congming.*
 many students all very smart
 ‘Many students are smart.’

³² One might argue that the optionality of *you* in (39b) may also indicate that *henduo* can either be quantity-denoting (thus requiring *you*), or entity-denoting. But even so, one has to explain the grammaticality of (40b) with both *you* and *dou*. That is, we still need to recognize that there is another type of *you* which can occur optionally with *henduo*.

- c. *zhe-xie henduo xuesheng dou hen congming
 these many student all very smart
- d. *zhe henduo xuesheng dou hen congming
 this many students all very smart

Recall that *certain* relative clauses cannot precede *henduo*, and neither can AdjP+DE phrases.

- (42) a. * dai yanjing de henduo xuesheng
 wear glasses DE many students
 ‘many students who wear glasses’

(the ungrammaticality is pointed out by Tang, T.-C., 1975, Hou & Kitagawa, 1987)

- b. * hen congming de henduo xuesheng
 very smart DE many students
 ‘many very smart students’

In the literature, there have been some attempts to explain the ungrammaticality of (42a) by attending to the Subject/Object asymmetry observed. Recall that Yang gives an example in (37b) where an RC can precede a numeral. At first glance, this RC can be followed by the indefinite determiner *henduo* too.

- (43) a. wo jiao-guo de san-ge xuesheng (the same with (37b))
 I teach-PERF DE three CL student
 ‘The three students that I have taught’
- b. wo jiao-guo de henduo xuesheng
 I teach-PERF DE many student
 ‘Many students that I have taught’

Hou & Kitagawa (1987) claim that (43a-b) are grammatical because they are Object relative clauses while (42a) is a Subject relative clause. They tried to explain the data by proposing a *pro* in the subject gap in sentences like (42a), therefore reducing the

difference to the difference in required conditions for pronominal (*pro*) and non-pronominal empty categories (an operator). This proposal, however, would lead one to wonder whether all subject-gapped putative RCs in Chinese should be analyzed as clauses with a *pro*. Such should not be the case, as we have seen movement constraints/island effects for both Subject and Object RCs.

However, it appears that the alleged Subject & Object asymmetry may not really exist. For instance, if we use the same verb in (40a-b), *jiao-guo* ‘taught’, in Subject RCs preceding a numeral, the sentences appear to be more acceptable.

- (44) a. *jiao-guo* *wo de san-ge laoshi dou hen youming.*
 teach-EXP I DE three-CL teacher all very famous.
 ‘The three teacher who taught me are very famous.’
- b. *jiao-guo* *wo de henduo laoshi dou hen youming.*
 teach-EXP I DE many teacher all very famous.
 ‘Many teacher who taught me are very famous.’

In fact, a look into the corpora data indicates that contrary to Hou & Kitagawa’s claim, Subject RCs can precede a numeral too. A search into the Center for Chinese Linguistics (CCL) corpora with the key word *de henduo ren* ‘DE many people’ shows four subject relative clauses. I gave one example below. While I simplified the predicate of the main sentence, the Subject NP with the RC was drawn from the corpora data:

- (45) *kan-guo* *zhe ben shu de henduo ren dou xihuan ta.*
 read-PERF this CL book DE many person all like it
 ‘Many people who have read this book like it.’

In fact, while yielding four Subject RCs, this corpora search does not yield any Object relative clauses, examples like (43b). This of course could be due to the fact that

Object RCs in Chinese are generally less frequent than Subject RCs (Kuo & Vasishth, 2006; Gibson & Wu, 2008), but the data do reveal there is no such Subject and Object asymmetry as claimed by Hou & Kitagawa: at least some Subject RCs can precede *henduo*.

At the same time, some Object relative clauses preceding *henduo* are also ungrammatical, although this fact has been ignored in previous literature.

- (46) a. *xiaozhang kaichu-le ta yixiang bu-xihuan de henduo xuesheng
 principal expel-PERF he always NEG-like DE many student
 ‘The principal expelled many students that he had always disliked.’
- b. xiaozhang kaichu-le henduo ta yixiang bu-xihuan de xuesheng
 principal expel-PERF many he always NEG-like DE student
 ‘The principal expelled many students that he had always disliked.’

It seems that some features within the predicate or the verb itself make it possible for certain RCs to precede *henduo* while others not.

The difference between (44a-b), (45) (i.e. Subject RC-*henduo* order b grammatical) and (42a) (i.e., certain Subject RC-*henduo* order being grammatical while others ungrammatical) seems to be that the verbs within CP in (44a-b), (45) are more [+dynamic] than the verb *dai* ‘wear’ in (42a). The verb in (42a) describes an individual-level state ‘wearing glasses’, a relatively permanent property of the designated individual(s) of the NP.

When we turn to look at example (46), it also appears that the Object relative clause involves an individual-level state too. On the other hand, all the four RC (Subject RC) examples with ‘many people’ found in CCL corpora involves [+dynamic] predicates, including ‘went to’, ‘wait on’, ‘have read’, and ‘gathered’.

The grammaticality of RC-*henduo* sequence is related to the concept of stage-level (s-level) modifications and individual-level (i-level) modifications. This is not surprising. The literature points to restrictions on the order of nominal modifiers related to these two different levels of modification.

In English, postnominal adjectives are said to attribute a property temporally or episodically, in other words s-level modification, while prenominal adjectives can attribute a property characteristically or intrinsically, in other words i-level modification.³³ Larson and Takahashi (2002) observe that a difference in i-level and s-level distinction exists in prenominal modifier positions too. They referred to Boling (1967)'s distinction of temporary properties, such as 'nonvisible' in (47a) and enduring properties, such as 'visible' in (47a), and claim that intrinsic or generic properties rather than temporary properties tend to occur closer to the Noun.

(47)a. The nonvisible visible stars include Capella.

b. #The visible nonvisible stars include Capella.

(47b) is odd, because it is semantically incoherent to assign the temporary property of being visible to stars that are intrinsically nonvisible.³⁴ Larson & Takahashi also refer to Chierchia (1995)'s proposal to analyze i-level predicates as predicates carrying an eventuality variable bound by a generic quantifier. Drawing insights from these studies, they claim that the generic quantifier is located close to N and only APs sufficiently close to N can be bound by such a quantifier. The following is an example used by

³³ See Chierchia(1995) for discussions on i-level and s-level predicates.

³⁴ In Larson & Takahashi (2002)'s argument, they also mention that prenominal relative clauses in Japanese and Korean may attach to either NP or DP, like prenominal adjectives and time modifiers in English.

Larson & Takahashi that shows that time expressions that occur in prenominal positions can both have a generic or deictic reading, but the generic reading time expressions would occur closer to the Noun.

(48) The Wednesday Thursday lecture was packed.

(Said of a regular Thursday lecture that was moved to Wednesday for one week)

(Larson & Takahashi' example (35a))

Their conclusion is that i-level adjectives occur closer to the noun than s-level ones, and that generic modifiers occur closer to the noun than deictic ones. Larson (1998) contend that a nominal comprises two distinct domains of modification: DP modification and NP modification.

(49) [DP D β [NP α N] β] (β = DP-modifier; α = NP-modifier)

That is, NP-modifier has potential generic/i-level readings, while the DP-modifier can only have s-level readings. Note that the structure in (49) is in some way comparable Yang (2006)'s analysis of AdjP-N structures that we reviewed in 4.1.2, in which she claims *de*-less modification with N, [NP X N], is a 'morphosyntactic word' denoting a sub-kind of [NP N].

Larson & Takahashi also examined Japanese and Korean relative clauses. They found that individual-level RCs must follow, and occur closer to the noun than stage level relatives. This review of literature is relevant to our following discussion of sequences of RCs with numeral-classifiers (Num-Cl), and will help us explain why certain RC-Num-Cl sequences are unnatural.

For Chinese RCs, Del Gobbo (2005) makes a connection between levels of modification with the alleged distinction between ‘restrictive’ relative clauses and ‘descriptive/attributive’ RCs. The term ‘restrictive’ versus ‘descriptive’ was borrowed from Chao (1968). It should be noted that the ‘attributive/descriptive’ RC that we refer to here is not the same concept used in English RCs to distinguish restrictive RCs and non-restrictive RCs. Nor is the use of ‘restrictive’ exactly the same with the traditional concept of ‘restrictive RCs’ in English. See more discussions on that in Section 4.3.

The distinction between restrictive RC and descriptive RC was first proposed by Chao (1968). Chao refers to an RC followed by a demonstrative as ‘restrictive’, while an RC preceded by a demonstrative is ‘descriptive’.

(50) a. dai yanjing de na-ge nvhai shi wo tongxue. –restrictive
 wear glasses DE that-CL girl BE I classmate
 That girl who is wearing glasses is my classmate.³⁵

b. na-ge dai yanjing de nvhai shi wo tongxue --descriptive
 that-CL wear glasses DE girl BE I classmate
 That girl who wears glasses is my classmate.

Del Gobbo argues that the distinction parallels with the difference in s-level and i-level modification, in that RCs preceding the demonstrative are always ‘restrictive’ and have to be interpreted as s-level property, while RCs following the demonstrative can either be s-level or i-level modification. Similarly, in Japanese and Korean RCs, when they co-occur, i-level RCs must be closer to the N.

(51) a. [wo zuotian kanjian de] [xihuan qu yinyuehui de] ren shi Zhangsan.

³⁵ I use a present participle instead of a simple present tense in the translation for (50a) so that the translation reflects Larson & Takahashi and Del Gobbo’s proposal that RCs preceding the DCL is interpreted to describe s-level rather than i-level properties.

I yesterday see DE like go concert DE person BE Zhangsan
 ‘The person that likes going to the concert that I met yesterday is Zhangsan.’

b. *[xihuan qu yinyuehui de][wo zuotian kanjian de] ren shi Zhangsan
 like go concert DE I yesterday see DE person BE Zhangsan

(Del Gobbo’s example (30-31))

Del Gobbo also claims that if a demonstrative is present, only s-level relatives can precede it. (I will later refute this claim.) The examples that Del Gobbo uses are sentences with both s-level and i-level modifications, and I cite them below (Del Gobbo’s example (32-33)).

(52) a. [zuotian meiyong lai de] na-ge [hen xihuan shangke de] xuesheng jiao
 yesterday no come DE that-CL very like class DE student name
 Zhangsan.
 Zhangsan.

‘That student who enjoys being in classes but wasn’t here yesterday is named Zhangsan.’

b. *[hen xihuan shangke de] na-ge [zuotian meiyong lai de] xuesheng jiao ZS.
 very like class DE that-CL yesterday no com DE student name ZS.

c. na-ge [zuotian meiyong lai de] [hen xihuan shangke de] xuesheng jiao ZS.
 that-CL yesterday no come DE very like classes DE student name ZS.

d. *na-ge [hen xihuan shangke de] [zuotian meiyong lai de] xuesheng jiao ZS.
 that-CL very like classes DE yesterday no come DE student name ZS

It should be noted that while these examples do show that when there are both i-level and s-level modifications, s-level modification occurs further away from the head noun, it does not really support Del Gobbo’s claim that only s-level modifications can precede demonstratives. I will come back to this point later.

Similar ideas have been pointed out by Lu (1998) too. Lu observes that

“referentiality is measured with the modifiers in the highest position”.³⁶ More specifically, for NPs, “[e]verything else being equal, a constituent is always more referential in left position than in right position, when a referential difference is involved.” (Lu, 1998, p.109). Lu considers that the definite-indefinite dichotomy is inadequate to code various degrees of referentiality and proposes to consider the difference in terms of ‘more referential’ versus ‘less referential’ instead. He also extends the notion of “referentiality” to AdjP and other modifications of an NP, based on the understanding that functional demarcation between nouns and adjectives is not absolute, and some modifiers can directly denote referents and the referentiality of NPs comes mostly from their modifiers (p.82). He considers articles like *the* and *a*, as well as AdjPs to be indirectly ‘referential’ in the sense that they contribute to the referentiality of their mother NPs. In other words, Lu uses the term “more referential” to mean “more restrictive” but he prefers the term “referential” partly because he wants to accommodate demonstratives, which are typically considered as “deictic” rather than “restrictive” (p.86). Referential modifiers are those that are essential for identifying referents, or for enabling the audience to pick out whom or what he is talking about, and therefore, a modification is more “referential” if it restricts the referent to a greater degree. It is said that if a head noun is modified by more than one modifier, its referentiality is measured with the modifiers in highest position (p.85). In the example of *invisible visible stars*, for instance, the s-level modifier imposes further restrictions, or limit the number of possible available candidates of what *visible stars* would refer to, *invisible* as a modifier is thus

³⁶ “Referentiality” in Lu’s term is a concept with a functionalist approach.

thought to be more “referential”.

Lu (1998) points out that Chinese modifiers, unlike English, can either precede or follow a determiner (more specifically, a demonstrative in Chinese). Possible sequences for Chinese modifiers and determiners are illustrated by the chart below. Recall that in Chapter 3 in example (47), Aoun & Li generalize that these are exactly the positions where RCs can occur.

(53) modifier D modifier Q modifier N
 III II I
 (Simplified from Lu’s (1) on p. 129)

Lu points out the rarity of modifiers in Position II and observes that Position III and Position II modification seems to be mutually exclusive (distributionally complementary). He argues that modifiers in these positions function alike. Lu’s illustration can be compared to Larson’s differentiation between DP modification and NP modifications. In (53), Position III and Position II seem to be DP modifications while Position I modifiers appear to be NP modifications. Lu refers to Position II and III as most “referential”, i.e. claims that modifiers in this position must be more restrictive, and modifiers in position I to be “attributive” in nature.³⁷ (Lu also acknowledges that position I modifiers can be “restrictive” too if given contrastive focus.)

The correlation between the status and position of prenominal modification can be summarized below, with D referring to demonstratives and Q referring to numeral expressions.

³⁷ Attributive modifiers are thought to be irrelevant to identifying referents; supposedly they involve some descriptions to the referents that have already been identified through other means, but Lu also maintains that the distinction is not always explicit (p.87).

Particularly with respect to the nature of adjectives, Hawkins (1983) in summarizing the universals of NP internal order says that “when any or all of the modifiers (demonstrative, numeral, and descriptive adjective) precede the noun, they are always found in that order”. (From our discussion, it seems appropriate to restrict Hawkins’ term “descriptive adjectives” to “i-level adjectives”.) Therefore, (i-level) AdjP. are most often found following *henduo* instead of preceding it, while RCs do not have to follow that order (because of s-level RCs). (On the other hand, only RCs following *henduo* can be interpreted as i-level modifications.)

S-level AdjP. can in fact be used in pre-Q positions too. For instance, while we found that all the RCs in the *de henduo ren* ‘DE many people’ keyword search on CCL corpus involve [+dynamic] verbs (activity, accomplishment or achievement), there is one example with AdjP+*henduo*.

- (55) shiwang de henduo ren jilie piping-le xingwei zhuyi
 disappoint DE many person vehemently criticize-PERF Behaviorism.
 ‘Many people who were disappointed criticized the Behaviorism vehemently.’

(Simplified from the CCL corpus, with the Subject NP kept intact)

Similarly, AdjPs like *shengbing* ‘sick’ *buman* ‘discontent’ can precede *henduo* too.

- (56) shengbing de henduo ren dou bei song-qu-le yiyuan
 sick DE many person all PAS send-go-PERF hospital
 ‘Many people who were sick were sent to the hospital.’

- (57) dui zhe-ge tiyi buman de henduo ren bagong youxing

for this-CL event angry /sad DE many person all BE he friend
 Many of the people who are sick/sad are his friends.

b. *congming /shanliang de henduo ren
 smart /kind-hearted DE many person

Intended: many people who are smart/kind-hearted

See more examples at the end of this section.

Towards this-CL proposal discontent DE many person strike parade
 ‘Many people who were discontent with this proposal went on a strike.’

In general, modification preceding *henduo* is rare. While I do not have a satisfactory explanation at this point, it seems likely that this could have something to do with the [-definite] feature of *henduo*.

4.2.2 RCs in Pre-Q Positions

In the following I will concentrate on discussing the sequence of RC –Num-CL. In Chapter 3, I have pointed to literature which claims that an RC-Num-CL sequence is acceptable, with the existence of a covert determiner. That is, (58a) is thought to have the same structure with (58b) (Del Gobbo, 2003).

(58) a. [DP_{CP} wo jiao-guo de] [D [NumP san-ge xuesheng]]
 I teach-EXP DE three-CL student
 ‘three students that I taught’

b. [wo jiao-guo de] [zhe san-ge xuesheng]
 I teach-EXP DE this three-CL student
 ‘the three students that I taught’

The same point of view was discussed in Lu (1998) too. Lu states that “pre-Q modifiers necessarily make their mother NPs definite” (P. 110). Evidence comes from the fact that a head noun preceded by a Mod-Num-CL sequence cannot occur in existential sentences, just like definite nominals. On the other hand, a head noun preceded by Num-CL-Mod can occur in such context, supporting the claim that the NP in (59a) without the demonstrative is [-definite] while the NP in (59b) is [+definite].

(59) a. zhuozhi shang you (*zhe) san-ben hongse de shu.
 table upon have this three-CL red DE book
 ‘There are three red books on the table.’

- b. *zhuozi shang you hongse de san ben shu.
table upon have red DE three CL book

(Lu's example (27), p.106-107)

Also, definite nominals and a head noun preceded by Mod-Num-CL cannot follow verbs of appearance, but a head noun preceded by Num-CL-Mod can. The contrast between (60a) without the demonstrative and (60b) also indicates the definiteness of Mod-Num-CL-N.

- (60) a. lai-le (*zhe) liang-ge ren.
come-PERF this two-CL person
'Two people came.'

- b.* lai-le wo renshi de liang-ge ren.
come-PERF I know DE two-CL person
'Two people that I know came.'

(modified from Del Gobbo's example (81) p.77)

In addition, both an AdjP/RC-Num-CL-N sequence and definite nominals can occur in certain topic positions, while Num-CL-AdjP/RC-N cannot. It is generally agreed that topics should be either definite or generic, and indefinite NPs with numerals typically do not occur as topics (Li & Thompson, 1989, p.86, p. 167-168). (61a-c) demonstrate that while a Num-CL-RC-N sequence cannot occur as a definite topic, RC-Num-CL-N can, just like a DP.³⁹

³⁹ Zhang, L. (2005) claims that RC-Num order cannot be accepted as a topic either. She uses the following examples:

- (iv) [ni hen xihuan de] *(na) yi-ge timu zuihao buyao tichu-lai.
you very like DE that one-CL topic better not raise-come
As for the topic that you like very much, you'd better not bring it up.

A difference between (iii) and my example in (61c) is that the RC in (61c) describes a s-level property while the RC in Zhang, L.'s example describes an i-level property. Even though the RC-Num sequence

- (61) a. *(zhe) liang-ge wenti, women xianzai jiu taolun yi-xia.
 this two-CL issue, we now just discuss briefly
 ‘As for these two issues, we shall discuss briefly now.’
- b. *Liang-ge Xiaozhang tichu-lai de wenti, women xianzai jiu taolun yi-xia.
 two-CL Xiaozhang raise-come DE issue, we now just discuss briefly
 ‘As for the two issues that Xiaozhang raised, we shall discuss briefly now.’
- c. Xiaozhang tichu-lai de liang-ge wenti, women xianzai jiu taolun yi-xia.
 Xiaozhang raise-come DE two-CL issue, we now just discuss briefly
 ‘As for the two issues that Xiaozhang raised, we shall discuss now.’

However, it seems that both Del Gobbo and Lu’s generalizations need some modification. Particularly, since *henduo* obligatorily carries a [-definite] feature, the grammaticality of some head nouns preceded by *ModP/RC-henduo* is puzzling since the modifier occurs in pre-Q positions yet the nominal has to be [-definite]. *ModP henduo N* seems to behave differently from *ModP Num-CL N* structures. The following examples are contrasted with Compare with (59b), (60b), (61c).

- (62) wuzi li you zhuxi yong-guo de henduo dongxi
 room in have chairman use-PERF DE many stuffs
 ‘In the room, there were many things that the Chairman once used.’
- (63) zuotian wanhui, lai-le wo yiqian mei jian-guo de henduo ren.
 yesterday party, come-PERF I past no see-PERF DE many person
 ‘On yesterday’s party, many people that I did not know in the past came.’
- (64) * Xiaozhang tichu de henduo wenti, women xianzai jiu taolun yixia.
 Xiaozhang raise DE many issues, we now just discuss briefly

In other words, it is puzzling how RCs followed by *henduo* can fit into the [DP [CP [D NumP]]] structure proposed by Del Gobbo. Further, according to Del Gobbo, only s-level *ModP/RCs* can precede *Num-CL*. This, in fact, is not correct. I have mentioned in

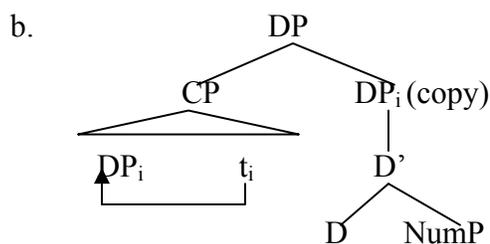
in (iii) should still be [+definite], the usage of such a sequence is much more restricted: it is only used when the nominal can be contrasted with other references in the discourse by the property described by the RC. See discussions on this in the next two sections.

4.1.4 as well as 4.2.1 that while i-level RCs can never precede *henduo*, it seems some i-level RCs can precede Num-CL in restricted context. These data need to be accounted for. In the following section, I will set out to explain these observations.

4.2.3 Solutions for RC-Num-Cl Involving I-level Modification and Indefiniteness

I will first examine s-level RCs followed by the [-def] *henduo N*. Taking Del Gobbo's (2005) claim that when such pre-Q modification is immediately followed by Num-CL, a phonetically null determiner has to be assumed, and in the light of the proposal that I put forward for Chinese RC derivation in Chapter 3, (65a) should have the (matching analysis) structure in (65b).

- (65) a. [_{DP}[_{CP} wo jiao-guo de] [_D [_{NumP} san ge xuesheng]]]
 I teach-EXP DE three CL students
 ‘three students that I taught’



In (65b), within the CP, an operator takes the complete DP (with a null Det) as the complement and moves to Spec of CP. A copy is generated outside the CP to match the internal head.

If such is the structure for an RC headed by *henduo N*, one would expect reconstruction effects to appear with these RCs too. However, as it seems, reconstruction of bound pronouns and anaphors does not take place if the RC is headed by *henduo*. For instance, the following example can be contrasted with example (38c) in Chapter 2 in

which I showed reconstruction of bound pronouns is possible when the head is an NP without *henduo*.

- (66) a. mei-ge xuesheng_i dou hui dai [[wo gei ta_i] de shu]
 every-CL student all will bring I give he DE book
 ‘Every student_i will bring the book that I gave him_i.’
- b. [[mei-ge xuesheng_i dou hui dai] de *henduo [[wo gei ta_i] de shu]]
 every-CL student all will bring DE many I give he DE book
 *‘Many books that I gave him_i that every student_i will bring.’

Example (67), as an example of reconstruction of anaphors, can be contrasted with example (39) in Chapter 3. In (67a), ‘self’ can be co-indexed with ‘everyone’, while in (67b) with ‘many’, the co-indexation cannot take place. (With marginal acceptability, ‘self’ in (67b) may be bound by ‘I’.)

- (67) a. wo jiao Zhangsan quan meigeren_i dai ziji_i de shu lai
 I ask Zhangsan persuade everyone bring self DE book com
 ‘I asked Zhangsan to persuade everyone_i to bring his_i book over.’
- b. [_{CP} wo jiao Zhangsan quan meigeren_i dai lai de] *henduo [_{NP} ziji_i de shu]
 I ask Zhangsan persuade everyone bring come DE many self DE book
 ‘self’s car that I asked Zhangsan to persuade everyone to drive over.’

In the following example in (68b), ‘self’ can only be co-indexed with ‘friends’ instead of ‘she’. (A contrasting example, without *hendou* and allowing reconstruction can be found in example (51) in Chapter 3.)

- (68) a. ta_i xiang zhao [henduo neng zhaogu ziji_{i/j}] de pengyou_j
 she want find many can take.care self de friends
 ‘She wants to find many friends who can take care of her/themselves.’

- b. ta_i xiang zhao de henduo neng zhaogu ziji ^{*i/j} de pengyou_j
 she want find DE many can take.care.of self DE friends
 ‘The friends that can take care of themselves/*her that she wants to find.’

It should also be noted that in all of the three examples, reconstruction is still possible if the head is Num-CL-N such as ‘three-CL pengyou’ in (68b).

The difference suggests that RCs followed by *henduo-N* may not be derived through (65b). Since reconstruction does not take place, the most plausible explanation is that *henduo* is a [-specific] indefinite, and while the structure is also [DP [CP DP]], the head is base-generated outside the CP and a matching analysis with operator movement, rather than with a DP copy, is implied.

In the following, I will discuss contrasts between i-level RCs followed by *henduo* and followed by Num-CL. Given that *henduo* is [-specific], and in light of previous claims that i-level modification does not precede D that I have reviewed above, it is not surprising that (69a) is ungrammatical, as noticed by Tang, T.-C. (1975) and Hou & Kitagawa (1987). However, I have mentioned in 4.1.4 (in example (38c)) that if *henduo* is changed into Num-CL, grammaticality seems to be improved.

- (69) a. *dai yanjing de henduo nvhai
 wear glasses DE many girl
 b. ? dai yanjing de san-ge nvhai
 wear glasses DE three-CL girls
 ‘The three girls who wear glasses’

This (relatively marginal) acceptability is brought about by the restricted context in which (69b) can be uttered. Intuitively, it is grammatical when there is a specific context in which there are exactly three girls who wear glasses.

(70) naxie nvhai youde dai yanjing, youde bu dai. Dai yanjing de san-ge nvhai hen
those girl some wear glasses, some not wear. Wear glasses DE three-CL girl very
'Some of those girls wear glasses and some do not. Those three who wear glasses

yonggong. Bu dai yanjing de naxie dou hen lan.
diligent. No wear glasses DE those all very lazy.
are very diligent. Those who do not (wear glasses) are all very lazy.'

(69b) is not grammatical in a context where there are more than three girls wearing glasses. Compare (71a) with (71b).

(71) a. women ban you si-ge nvhai dai yanjing. *dai yanjing de san-ge nvhai
I-pl class have four-CL girl wear glasses. *wear glasses DE three-CL girl
'There are four girls in our class that wear glasses. The three girls that wear

hen yonggong.
very diligent.
glasses were very diligent.'

b. women ban you si-ge nvhai dai yanjing. (you) san-ge dai yanjing de
I-pl class have four-CL girl wear glasses. (have) three-CL wear glasses DE
'Our class has four girls who wear glasses. Three of the girls who wear glasses

nvhai hen yonggong.
girl very diligent
are very diligent.'

In fact, with a closer look, AdjP+DE can precede Num+CL given the right context too.

(72) tamen you san-ge erzi, dan zhi you liang-ge erzi dui tamen hen xiaoshun.
he-pl have three-CL son, but only have two-CL son towards he-pl very filial
'They have three sons, but only two of them are filial.'

[hen xiaoshun de liang-ge erzi] houlai zhuan qian le.
very filial DE two-CL son later earn money PERF
'The two sons who are filial to them later earned (a lot of) money.'

This is not surprising, as we have mentioned that modifiers, AdjP included, can serve referentially given the right discourse situation. However, these data run contrary to

Del Gobbo's proposal that only s-level modifications can precede numeral expressions: In (72), it would seem odd to propose that 'very filial' should be interpreted as a s-level modification. Similarly, it is hard to think why the CP in (73b) instead of (73a) must be considered an s-level property:

- (73) a. yixiang bu-xihuan Xiaoming de naxie tongxue xianhai-le ta
 always dislike Xiaoming DE these classmates trap-PERF he
 'These classmates who never liked Xiaoming trapped him.'
- b. naxie yixiang bu-xihuan Xiaoming de tongxue xianhai-le ta
 these always dislike Xiaoming DE classmate trap-PERF he
 'These classmates who never liked Xiaoming trapped him.'

In (74), it also seems that the modification preceding the demonstrative describes an i-level property.

- (74) pingshi you Zhang laoshi jiao de zhe-men ke, jintian you Wang laoshi
 Normally from Zhang teacher teach DE this-CL class, today from Wang teacher
 jiao
 teach
 'This class which is normally taught by teacher Zhang is taught by teacher Wang today.'

But *henduo* still cannot be used in these contexts in which the referent can supposedly be identifiable by the i-level RC. That is, the sequence of i-level AdjP – *henduo* seems to be ungrammatical.

- (75) a. hen xiaoshun de liang-ge erzi (acceptable in (72))
 very filial DE two-CL son
 'the two sons who are very filial'
- b. *hen xiaoshun de henduo ren
 very filial DE many person
 'many people who are filial'
- (76) a. yixiang bu-xihuan Xiaoming de (zhe) san-ge tongxue
 always dislike Xiaoming DE (this) three-CL classmate
 'the three classmates who always dislike Xiaoming'

- b. *yixiang bu-xihuan Xiaoming de henduo tongxue
 always dislike Xiaoming DE many classmate
 Intended: many classmates who dislike Xiaoming

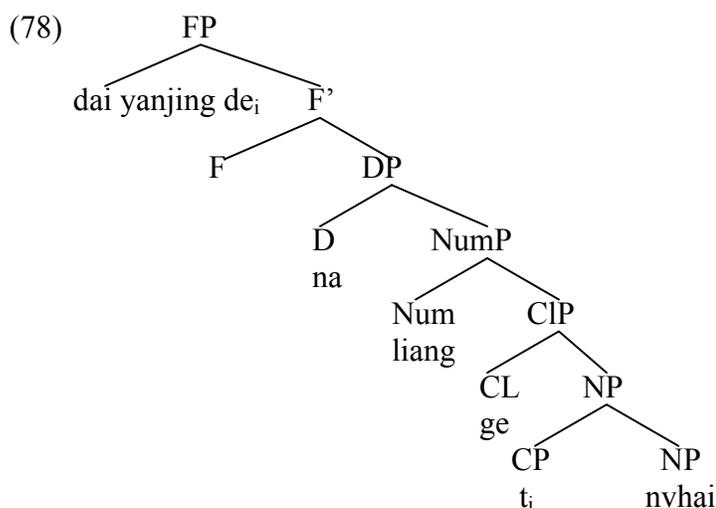
It appears that the contrast must be due to the [-specific] indefiniteness of *henduo*.

An important observation that we have is that examples such as ‘wear glasses DE three-CL girl’ can only be grammatical given the right discourse context, i.e., when the referent should be clearly identifiable by information given in the RC (or ModP). In examples of RC-Num-CL-N sequences in (70-72), we have seen a maximizing effect observed in Internally Headed RCs in languages like Korean (Hoshi, 1995). In fact, in these contexts, these RCs can well take a phonetically null head. In such cases, it resembles free relative clauses in English. This is true whether the RC describes an s- or i-level property. However, because s-level modification often tend to be more “referential”, i.e. can provide additional information to specify the referent of an individual, it is more likely for s-level modifiers or RCs describing s-level properties to precede DCL or a Num-CL. I-level RCs can still take a null head or can precede Num-CL as long as the information given by the RC is enough to identify the referent within the discourse.

- (77) naxie nvhai youde dai yanjing, youde bu dai. dai yanjing de (san-ge nvhai)
 those girl some wear glasses, some no wear. wear glasses DE three-CL girl
 ‘Some of those girls wear glasses and some do not. Those three who wear glasses
 hen yonggong. bu dai yanjing de (naxie) dou hen lan.
 very diligent. no wear glasses DE (those) all very lazy.
 are very diligent. Those who do not (wear glasses) are all very lazy.’

Meanwhile, Zhang, L. (2005) puts forward an alternative proposal to explain the RC-

(D)-Num sequence. She claims that the D-Num-Cl-RC sequence is how the ‘basic structure’ looks, and a pre-Q RC is derived by moving the CP to the [Spec, FP] position.



(modified from Zhang, L., 2005, (9), p.549)

Zhang, L. specifies that the notion of ‘focus’ here refers to ‘contrastive focus’ instead of ‘presentational focus’ which typically refers to the part in a sentence that carries new information. ‘Contrastive focus’ on the other hand serves to ‘isolate or identify a particular individual/kind’ (p. 550). This function of pre-Q RCs was found in Ming (2005)’s corpus study. In Ming(2005)’s corpus study, in which he finds 20% of such RCs used were to name ‘a referent which otherwise would be unavailable to the addressee’ (20%) (p.363).

But Ming also finds that RCs preceding demonstratives can ‘introduce a new referent’ too (67%). While unfortunately he did not categorize different types of RCs according to their levels of modification, the two examples that he used to demonstrate

the function of ‘introducing new referent’ are both s-level RCs, while those examples for contrastive focus are i-level RCs (p. 361-362).

I have argued above that s-level RCs, but not i-level RCs, followed by Num-Cl can be explained by (65b). It seems Zhang, L.’s proposal in (78) can actually explain usages of pre-Q i-level RCs. But Zhang, L. claims that for such movement to take place, either the relative clause head has to have an overtly realized demonstrative, or the RC needs to contain a ‘deictic anchor’, i.e. a definite element such as a proper name or pronoun, some aspect markers, or time expressions, so that ‘the referent of the nominal is more clearly fixed’. We have seen that this generalization is not entirely correct, since an RC-Num-Cl without D can still carry [+definite] feature. What we need to account for is the ungrammaticality we witnessed with *henduo*, in (69a), repeated here as (79a).

- (79) a. **dai yanjing de henduo nvhai*
 wear glasses DE many girl
- b. ? *dai yanjing de san-ge nvhai*
 wear glasses DE three-CL girls
 ‘the three girls who wear glasses’

The contrast in (79a-b) should be associated with the indefiniteness of *henduo*. Why is movement of an i-level modification to a pre-determiner position not available when the Determiner is [-definite]? Huang, C.-T. (1982) claims that in a sequence of RC-Dem-N, pre-D modification or DP modification is possible because the demonstratives are anaphorical or can refer back to restrictions imposed by the RC. On the other hand, a [-definite] determiner cannot be anaphorical. For instance, the [-definite] article in (80b) cannot be anaphorical, unlike the [+definite] determiner in (80a).

(80)a. I met Jane yesterday. The girl looked fabulous.

b. I met Jane(i) yesterday. *A girl(i) looked fabulous.

That is, for the movement for contrastive focus to take place in (78), the D must carry [+definite] feature, because otherwise, it cannot refer back to the restrictions imposed by the CP. An i-level RC-*henduo* sequence is not possible because the [-definite] feature would block such a movement.

4.2.4 Structure of RC-DCL-N

I summarize the observations and analysis of pre-Q RCs below: s-level RCs precede (D)-Num-Cl as well as a [-definite] D, as in (81a-b). I-level RCs can precede (D)-Num-Cl in a contrastive focus environment, but can never precede a [-definite] D.

(81)a. wo jiao-guo de san-ge xuesheng
 I teach-EXP DE three-CL students
 ‘the three students that I have taught’

b. wo jiao-guo de henduo xuesheng
 I teach-EXP DE many students
 ‘many students that I have taught’

(82)a. ? dai yanjing de san-ge xuesheng
 wear glasses DE three-CL students
 ‘the three students that are wearing glasses’

b. * dai yanjing de henduo xuesheng
 wear glasses DE many students
 ‘many students who are wearing glasses’

Both (81a-b) involve a [DP [CP DP]] structure. They differ in whether the DP is base-generated in the gap position in CP or in the external head position, and whether in the A-bar movement the operator takes the DP as a complement or not. This structure is not possible for (82a-b) because CP normally cannot precede D if it describes i-level

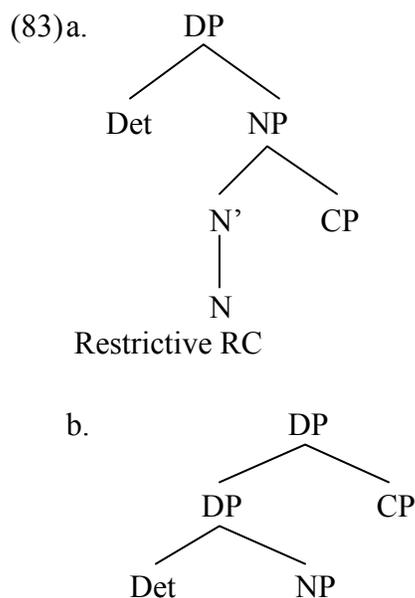
properties. However, when the property described by the CP can be contrastively focused, i.e. when the information carried by the CP is enough to identify the referent within the relevant discourse, the CP can be moved to the Spec of a FocusP, as in (82a). But such a movement would require the D to be [+definite]. Therefore (82b) is ungrammatical.

4.3 Restrictive Versus Non-restrictive RCs

4.3.1 Distinctions between NRCs and RRCs

In the literature, attempts have been made to correlate the differences in DCL position with the distinction between restrictive and nonrestrictive relative clauses (RRCs and NRCs). A restrictive RC (RRC) restricts the reference of the nominal it modifies, and a non-restrictive RC (NRC) merely provides additional information about an already identified referent.

In English, a classical analysis of the structural difference between a restrictive and nonrestrictive relative clause is presented below in (83a) and (83b), modified from Partee (1995, p.320-321).



Non-restrictive RC

Partee points out that meaning of a whole is a function of the meanings of the parts and of the way they are syntactically combined. The determiner *the* has the interpretation that the set has one and only one member (appropriate for the context but not necessarily for the whole world). In (83a), the NP is complex set-denoting expression, denoting the intersection of the two sets each denoted by the N and the modifier (CP). The interpretation of the NP, combined with the determiner, will correctly lead to the denotation of one and only one member of that class. In (83b), the Det first combines with the NP, leading to the presupposition that there is one and only one individual (and that individual is denoted by the NP). The modifier CP then combines with that already formed NP. In that way, the modifier/CP can only be interpreted in a non-restrictive way.

It is also uncontroversial that NRC is not in the scope of the definite article, so it does not serve to restrict reference. Kayne (1994) proposes that the NRCs and RRCs in English have the same syntactic structure illustrated in (84a), but for NRCs, the TP has to move out and take scope over D at LF (and such movement is associated with intonation breaks in English).

(84)a. [_{DP} Det [_{CP} NP_i [_C [_{TP}... [_e]_i ...]]]]

b. [_{DP} [_{TP} ... t_j...]_i D [_{CP} [_{NP} Head noun]_j [_C t_i]]]

One piece of evidence comes from the fact that a quantified head NP cannot be the head of a NRC, as (85) shows.

(85)*John ate every cookie, which they baked.

This is because that there is a variable in object position bound by ‘every’, and it

must remain in the scope of the quantifier at LF. As the structure in (79b) shows, in an NRC relativization, D fails to c-command the RC, and makes the sentence ungrammatical. The ungrammaticality can also be accounted for by the structure in (78), in which the CP is also out of the scope of the determiner.

I have mentioned that Chao (1968) considers relative clauses in a DCL-RC-N sequence to be ‘descriptive’, and the ones in the RC-DCL-N order to be ‘restrictive’. Hashimoto (1971) shares the same point of view. The distinction, however, is challenged by Tang, T.-C. (1981), as well as Tsai, W.-T. (1994), who proposes the exact opposite, claiming that RCs in DCL-RC-N sequence is ‘restrictive’, and vice versa.

In English, both restrictive and nonrestrictive (appositive) RCs exist. Besides the difference in quantification noted above, they also differ on a number of other dimensions. NRCs are associated with an intonation break, indicated orthographically by commas, and the two types of RCs are also distinct in the relativizers which can occur with them (who/which/that etc. for restrictive RCs and who/which/*that for non-restrictive RCs) too.

There appear to be a number of tests that can differentiate NRCs from RRCs. Both Del Gobbo (2003) and Zhang, N. (2001) use these tests to argue that Chinese does not have NRCs at all. I will first review the test results, and then discuss the validity of these tests. We will see that most of these tests only show that a restrictive RC interpretation is still *possible* for the DCL-RC-N sequence, but they do not provide conclusive evidence *against* the existence of NRCs in Chinese.

First, Del Gobbo cites Sells (1985), in saying that only the antecedent of NRCs, but

not RRCs, can be any maximal projection including AP, PP, VP, CP etc.⁴⁰The fact that Chinese only allows NP as the antecedent is thus used as evidence by Del Gobbo. However, Lin, J.-W. (2003) explains that the constraint on NP category as the antecedent “is a consequence of the linking element DE”, which can only link a modifier XP to a nominal element, and should therefore not be viewed as supporting evidence for the lack of NRCs in Chinese.

Secondly, Del Gobbo cites Ogle (1974)’s generalization that sentential, speaker-oriented adverbs of modification can appear only inside NRCs, not inside RRCs, and claims that such sentential adverbs are not allowed in Chinese RCs.

(86)a. The new secretary, who I frankly don’t like, is flirting with the boss.

- b. *[zhe-ge wo laoshi-shuo bu xihuan de mishu] gongzuo bu qinkuai.
 this-CL I frankly speaking no like DE secretary work no diligent
 ‘The secretary who I frankly don’t like does not work diligently.’

Lin, J.-W. claims that the constraint is due to the fact that Chinese only allows sentential adverbs in root clauses, but not in subordinate clauses. My intuition, however, is that sentential adverbs can actually be permitted: with some modification of the adverb used, (87) can be grammatical.⁴¹

⁴⁰ Del Gobbo cites from previous literature for examples of such antecedents. I gave some of them below.

- (v) a. Mary was [_{ADJP} intelligent], which John never was.
 b. They talked [_{PP} from 12 to 1], which was a long time.
 c. [_{CP} John left early], which surprised me.
 d. Joe [_{VP} debated in high school], which Chuck did too.

⁴¹ Del Gobbo’s example (86) seems to be biased, because *laoshi-shuo* tend to occur sentence initial positions even in a simple sentence. Uttering it as an insertion seems to lead to some degrees of awkwardness

- (vi) a. laoshi-shuo, wo bu xihuan na-ge mishu.
 frankt-speak I no like that-CL secretary
 Frankly speaking, I dislike that secretary.
 b. ? wo laoshi-shuo bu xihuan na-ge mishu.
 I frankly-speak no like that secretary.

- (87) [zhe-ge shuo-shi-hua wo hen taoyan de mishu] gongzuo bu qinkuai.
 this-CL say-true-word I very dislike DE secretary work no diligent
 ‘The secretary who I frankly don’t like does not work diligently.’⁴²

It is also possible to have a sentential adverb for Subject RCs:

- (88) [zhe-ge shuo-shi-hua rang wo hen naohuo de mishu] gongzuo bu qinkuai.
 this-CL say-true-word make I very annoyed DE secretary] work no diligent.
 ‘The secretary, who frankly annoyed me, does not work diligently.’

Also, it is said that while RRCs allow stacking, NRCs cannot be stacked (McCawley, 1988). Chinese RCs can be stacked (whether they precede or follow DCLs).

- (89) a. na wei [wo renshi de] [jiao yuyanxue de] zhongguo laoshi
 that CL I know DE teach linguistics DE Chinese teacher
 ‘the Chinese teacher that I know that teaches linguistics’
 b. [wo renshi de] [jiao yuyanxue de] na wei zhongguo laoshi
 I know DE teach linguistics DE that CL Chinese teacher
 ‘the Chinese teacher that I know that teaches linguistics’

However, as Lin, J.-W. (2003) has pointed out, the post-demonstrative order does not necessarily mean that those RCs in (89) has to be interpreted non-restrictively.

Finally, NRCs can be used to qualify unmodified proper names, RRCs cannot. While Del Gobbo claims that Chinese RCs can modify a proper name but the interpretation is always restrictive, Lin, J.-W. contends that it is “easy to find examples in which a proper name can be modified by a nonrestrictive relative clause if there is no DNC” (p.24).

shuo-shihua seems to be a better candidate of sentential AdvP for insertation. It is more acceptable than (vb).

- (vii) wo shuo-shihua bu xihuan na-ge mishu.
 I speak-truth no like that-CL secretary.
 Frankly speaking, I dislike the secretary.

⁴² Note that it is more difficult to test the grammaticality of sentential adverbs for RC-DCL sequences, since in this case the sentential adverb will appear in the left-most position, making it ambiguous – in such cases, the interpretation of the sentential adverb as a modifier for the main clause may be preferred. The argument and the purpose of Del Gobbo’s test, however, is to show that DCL-RC type of relative clauses are not NRCs.

- (90) a. [xianglai bu ai du-shu de Xiaoming] xianzai ye kaishi du-qi shu lai
 always no love read-book DE Xiaoming now also begin read-up book come
 le
 PAR
 ‘Xiaoming, who never likes reading books, now begins to read too.’
- b. [yongyou wu-qian-nian lishi wenhua de zhongguo] zhongyu juexing le.
 have five-thousand-year history culture DE China finally awake LE
 ‘China, who has five thousand years’ of history and culture, is finally awakened.’

The grammaticality of these sentences is acknowledged by Zhang, N.(2001), and was also realized by Tsai, S. G.(1972), Tsao (1986). These earlier studies suggest that those examples are due to the influence of English and other European languages. However, importantly, external factors do not refute the grammaticality of (90a) and (90b); instead, as Lin, J.-W. claims, “the status of the nonrestrictive usage of Chinese relatives should be acknowledged in synchronic grammar, given that every native speaker can accept [it]”. (p.25). I will return to the discussion of modifying a proper name later too.

There are also a number of characteristics that are said to be exclusive to RRCs. For instance, as noted above, a quantified NP, i.e. an NP modified by ‘every/any/no’ cannot be the antecedent of a NRC but can be the antecedent of a RRC (Ross 1967). Del Gobbo contends that in Chinese, such quantified NP antecedents are possible.

- (91) a. Every boy who wears socks is a swing dancer.
 b. *Every boy, who wears socks, is a swing dancer.
- (92) meige chuan wazi de nanhai dou tiaowu
 every wear sock DE boy all dance
 ‘Every boy who wears socks dances.’

However, such evidence works as an argument that these quantification-RC-N

sequences are not NRCs, but does not really constitute an argument that NRCs do not exist. It is possible that a DCL-RC-N sequence can nevertheless be ambiguous, having the potential to be interpreted either restrictively, or non-restrictively.

Another characteristic said to be exclusive to RRCs is that quantifiers in the matrix clause can bind a pronoun in only in RRCs but not in NRCs (Safir, 1986). Del Gobbo uses the sentence in (93c) to argue that pronoun binding is possible in DCL-RC-N sequences.

(93)a. Everybody brought the book that I gave him

b. *Everybody_i bought the book, which I gave him_i.

c. mei-ge xuesheng_i dou yuanliang naxie cengjing shanghai ta-men_i de ren
 every-CL student all forgive those once hurt he-PL DE person
 ‘Every student forgives those who hurt him.’

However, the same point can be made here that the grammaticality of (82) is not really evidence against the existence of NRCs in Chinese, though it does show that (93c) has the RRC structure.

4.3.2 Relation between DCL Position and NRC Interpretation

It should be noted that DCL-first and DCL-second RCs do have different interpretations at discourse level. As was mentioned previously, Ming(2005)’s corpus study find that the discourse function of a RC-DCL-N sequence is to introduce a new referent or to identify a referent which otherwise would be unknown to the addressee, such as the following:

(94) wo suibian dian-xia zhe-xie pai, jiu neng dian dao [ni tiao de na
 I casually shuffle-briefly these cards, just can point reach you pick DE that

zhang pai].

CL card

‘I only need to briefly shuffle the cards, and I can point to the card that you picked.’
(Simplified from corpus, Ming’s example (8))

In other words, the latter function of the relative clause in RC-DCL-N is to impose further restrictions of a referent that has already been established previously (i.e. ‘cards’), thus specifying a particular member/members (i.e. ‘the one that you picked’) that belong to the super-ordinate class designated by the former referent. Both these functions of RC-DCL-N are ‘restrictive’.

Ming claims that one function of the DCL-RC-N sequence is to ‘name people/individuals whose identity would be otherwise unclear without using them’ (p.361), as in (95).

(95) na-xie congqian xiuxiudada de fengzhi xin-yi de ren ye dafang le
this-PL in the past bashfully DE make new-clothes DE person also brave PERF
‘Those who used to make new clothes only bashfully are not brave enough (to put on new clothes).’⁴³

It appears that this function is also ‘restrictive’ and Ming characterizes 57% instances of DCL-RC-N samples to belong to this function of ‘naming the referent’.

Yet the other function of DCL-RC-N is to ‘track a referent which has previously been introduced into the discourse’ (p. 363).

(96) muqin dui erzi huai-zhe zhiwang, xiangxin zhe-ge bu shuohua de
mother towards son hold-DUR expectation, believe this-CL NEG talk DE
‘The mother holds expectations for the son, believing that this child, who remains

haizi zhong hui you da qiantu.
child finally will have big prospect

⁴³ DE after ‘bashfully’ is a marker indicating manner adverbials; it is not the relativizer DE.

silent, will have a great prospect later anyway.’

According to Ming, 33% examples (20 sample out of a total 60 randomly sampled from the LCMC corpus) of DCL-RC-N sequence serve this function.

It appears that the RC in (96) does not have a “restrictive” function; it does not contribute to providing additional identification of the referent, since the referent has been clearly established in the discourse already.

Note that while the RC-DCL-N sequence was found to be less common than DCL-RC-N (854 versus 136 instances in LCMC and Sinica in Ming’s study), it was even more unusual for RC-DCL-N to have a “tracking” function. Ming reports only one such case out of a total of 30 sampled instances of RC-DCL-N.

The “tracking” function of DCL-RC-N appears to be consistent with the discourse functions of NRCs.

Indeed, interpretations of DCL-first RCs seem to be similar to NRC interpretations in discourse. Del Gobbo quoted Chierchia & McConnell-Ginet (1990)’s argument that appositive RCs are not presuppositions, but backgrounded assertions. After a sentence like (97a), it is possible to add a NRC such as (97b), but not an RRC (97c).

(97) a. Let me tell you something about Jill Jensen, a woman I met while flying from Ithaca to New York last week (Chierchia & McConnell-Ginet 1990:351).

b. That woman, who lost her luggage on the flight from Ithaca to New York, was pretty upset.

c. The woman that lost her luggage on the flight from Ithaca to New York was pretty upset.

The infelicitous result in (97c) is due to the fact that the content of an RRC with a

definite determiner is presupposed/taken for granted, while nothing in the context provided by (97a) provides such information. It seems from this example that RRC with a definite determiner cannot be uttered felicitously in a discourse context that does not take its truth for granted (Del Gobbo, p.93). Del Gobbo then uses similar Chinese sentences with a DCL-RC-N sequence to argue that DCL-first RCs cannot be appositive: she finds that (98a), if followed by (98b), the result will be awkward.

(98)a. rang wo gaosu ni guanyu Xiao Yu de yixie shi.
 let I tell you about Xiao Yu DE some things.
 ‘Let me tell you something about Xiao Yu’

b. Na-ge zai cong Beijing dao Niu Yue lutu zhong diu-le xingli de
 That-CL in from Beijing to New York journey middle lose-PERF luggage DE
 ‘That woman who lost her luggage in the journey from Beijing to New York was

nvren hen shengqi
 woman very angry
 very angry’

Del Gobbo claims that if (98b) is intended simply to provide background information, it should be felicitous when uttered after (98a). While I agree with Del Gobbo that (98b) following (98a) produces an awkward result, we should note that the corpus example that we saw in (91) is a clear example where the RC after the demonstrative is used to provide supplemental (non-presupposed) background information. The awkwardness of (98b) could be related to the use of the distal demonstrative *na-ge* ‘that-CL’ instead of the proximate *zhe-ge*, which is more appropriate because the referent was just introduced, and the stage-level nature of the RC (See discussion of stage/indiv constraint on NRCs in Chinese in section 4.3.3). Note that it is perfectly okay for (99) to follow (98a).

- (99) zhe-ge dui dajia dou hen youhao de nvhai you tian yudao-le mafan.
 this-CL to all people all very friendly DE girl have day encounter-PERF trouble
 ‘This girl, who is very friendly towards everybody, once encountered some trouble.’

The restriction that in order for RCs to be interpreted non-restrictively, they need to be individual-level instead of s-level properties is noticed by Lin, J.-W. (2003). I will come back to this point later. Also, while the demonstrative *zhe* ‘this’ seems more preferable than *na* ‘that’, it is not the case that ‘that’ can never be used as a demonstrative for such non-restrictive interpretations. (100) is a simplified version of the sentence that actually follows (91) in the corpus example, which uses *na*:

- (100) muqin kan-zhe na ban-shui-ban-xing yi han chi-fan, bian hui jingshen
 mother look-DUR that half-sleep-half-awake one call eat-meal, just will cheer-up
 ‘The mother is looking at the child, who is half asleep and half awake, and who
 de haizi
 DE child.
 would become attentive as soon as you ask him to eat.’⁴⁴

Now it seems that DCL-RC-N can provide background information, i.e., the content of these RCs in (100) are not presuppositions and simply track reference instead of introducing new referent or providing further identifying restrictions on the referent. These are similar interpretations of typical NRCs. We do need to explore more clearly the question whether such a semantic interpretation associated with DCL-RC-N (or Quantification-RC-N) stems from an NRC structure.

⁴⁴ The original sample was
 ‘母亲则于心灵深处对幼子怀着羞怯而不可名言的指望，相信这个不说话而贪食的孩子终究会大有前途。所以晚间从地里回来……
 仍然忘不了偷看孩子几眼即那捧着碗，合着眼，半睡半醒地躺在地上，只要一喊吃饭，便会精神起来的孩子’。Interestingly, while some of the descriptions within the RC appear to be eventive, the whole RC describes a more or less individual-level property, since the child is described to be in the habit of appearing to be half sleepy and getting excited/attentive at the call of dinner.

As we have witnessed in the test result in 4.3.1, a Quant-RC-NP order cannot force a NRC structure because such clauses can still exhibit certain characteristics exclusive to restrictive RCs. It may be possible that Quant-RC-NP is structurally ambiguous, with a structure (a) for NRC interpretation and a structure (b) for RRC. That is, in those tests cited above in (86-90) and (92-93) in section 4.3.1, we could happen to have only the RRC structure since that is the only one compatible with tests such as pronoun binding and a quantified head. In the following, I will test whether, in those contexts in which only a RRC structure is supposed to survive, whether the semantic/discourse differences in Quant/DCL position are still maintained. That is, do the meaning differences between DCL-RC-N and RC-DCL-N that motivated us to explore the correlations between restrictiveness/non-restrictiveness of RCs and DCL position still exist even in the RRC test context? If so, then it may be irrelevant to explore the interpretation of DCL-RC-N with recourse to an NRC structure, since it will not be helpful in explaining the semantic/discourse functions associated with the two positions.

It appears that position of quantification position still causes some differences at least at discourse level.

- (101) a. zhe shi shang, mei-ge chuan qunzi de nvhai dou ai piaoliang.
 This world up, every-CL wear skirt DE girl all love pretty
 ‘In this world, every girl who wears skirts likes being pretty.’
- b.? zhe shi shang. chuan qunzi de mei-ge nvhai dou ai piaoliang.
 this world up, wear skirt DE every-CL girl all love pretty
 ‘In this world, every girl who wears skirts likes being pretty.’

As was mentioned before, an RC-Quant-N sequence is often used for contrastive focus. The grammaticality of (101b) will be improved in the following context.

(102) zhe-ge ban shang youde nvhai chuan qunzi, youde bu-chuan.
 this-CL class up some girl wear skirt, some neg-wear.
 ‘In this class some girls wear skirts, while others don’t.’

Chuan qunzi de mei-ge nvhai dou ai piaoliang.
 Wear skirt DE every-CL girl all love pretty.
 ‘Every girl who wears skirts likes being pretty.’

It appears that the context which could provide a “contrastive focus” is also the context where the presupposition criteria can be achieved. That is, from the improved grammaticality in (102), we can see that RC-Quant-N sequences tend to work better in a context where the content of the RC has been presupposed.

As for pronoun binding, it seems that Del Gobbo’s example in (93c) may be unnatural for binding because of the plurality of the pronoun *tamen* ‘them’. It seems to me that the grammaticality improves if we change the pronoun into *ta* ‘he’ instead. (103a) gives a better example.

(103) a. mei-ge nvhai_i dou hui bei na-ge ai ta_i de ren gandong.
 every-CL girl all will PAS that-CL love he DE person move
 ‘Every girl will be moved by the person who loves her.’

b. mei-ge nvhai_i dou hui bei ai ta_i de na-ge ren gandong.
 every-CL girl all will PASS love her DE that-CL person move
 ‘Every girl will be moved by the person who loves her.’

It seems that pronoun binding is possible in both (103a) and (103b). (103b) appears to be grammatical even though there is no contextual information offering any presupposition. Note that it is also the case for the English translation, ‘Every girl will be moved by the person who loves her’. At the same time, the naturalness of (103a) seems to rely on the presupposition that ‘for every girl, there should exist a boy that loves her’.

That is, there is some presupposition on the existence of the referent referred to by the DCL *na-ge*. Since pronoun binding is possible in both sentences, the RCs in (103a-b) should be restrictive. Although the demonstrative in (103a) may not serve the function of tracking a referent, the existence of the demonstrative does seem to force a presupposition of the existence of such a referent.

From these comparisons, it seems that the semantic interpretation and discourse functions of DCL-first and DCL-second RCs do still differ even when they are in test contexts, where only restrictive RCs should be allowed. It is most likely that the position of the RC itself, instead of a NRC versus RRC structure, is causing the difference. That is, in a DCL-RC-N sequence, the demonstrative is presupposed to have a referent; in RC-DCL-N, the definiteness of the demonstrative seems to be bleached (even though the complete NP is still [+specific]). Compare (104b) versus (104a).

(104) rang wo gaosu ni guanyu Xiao Yu de yixie shi.
 let I tell you about Xiao Yu DE some things.
 ‘Let me tell you something about Xiao Yu’

a. zhe-ge piqi yizhi dou hen hao de nvhai you yi-tian fa-le-huo.
 this-CL temper always all very good DE girl have one-day lose temper (PERF)
 ‘This girl, who is always well-tempered, one day lost her temper.’

b. ?? piqi yizhi dou hen hao de zhe-ge nvhai you yi-tian fa-le-huo.
 temper always all very good DE this-CL girl have one-day lose temper (PERF)
 ‘This girl who is always well-tempered one day lost her temper.’

(104b) is odd in this context, because ‘girl’ would seemingly refer to someone else rather than Xiao Yu; at the same time, such a ‘new referent’ is unclear because no previous information has been given regarding a well-tempered girl. It seems from (104b)

that RC-DCL-N sequence cannot be interpreted non-restrictively; the specificity of the referent has to be set by the RC instead of by the demonstrative. A DCL-RC-N sequence may be used non-restrictively in the sense that the referent is fully identified by the [+definite] demonstrative; the referent is clear to both interlocutors even without the RC. It should be noted that even when DCL-RC-N is used in a context where the definiteness is set by the demonstrative, the structure is still different from NRCs in English: quantified head and pronoun binding appears to be possible, which are not options for NRC structures in English.

4.3.3 Additional Observations

I have mentioned previously that some Chinese RCs can be used to modify proper names. Lin, J.-W. (2003) has made an important observations regarding such RCs: he finds that while the example in (90a), repeated here as (105), is grammatical, (106a) or (106b) is not.

(105) [xianglai bu ai du-shu de Xiaoming] xianzai ye kaishi du-qǐ shu lai le
 always no love read-book DE Xiaoming now also begin read-up book come LE
 ‘Xiaoming, who never likes reading books, now begins to read too.’

(106) a. ? [ni zuotian kanjian de Xiaoming] shi wo de pengyou
 you yesterday see DE Xiaoming is I DE friend
 ? ‘Xiaoming, who you saw yesterday, is my friend.’
 b. *[zuozaì caodi shang de Zhangsan] hěn xǐhuan chōuyān.
 Yesterday grass up DE Zhangsan very like smoking.
 ‘Zhangsan, who is sitting on the lawn, likes smoking very much.’

In other words, grammatical NRCs describe a more/less stable unchanging property, while ungrammatical ones describe a temporary property. Lin, J.-W. thus formulates the Condition on Chinese nonrestrictive relatives as the following:

The use of a nonrestrictive relative in Chinese is felicitous if it describes a more or less stable unchanging property, i.e., an individual-level property.

In Lin, J.-W.'s conclusion, if an RC occurs with DNC (no matter the order), it is always restrictive; however, when there is no DNC, the RC can be nonrestrictive if it characterizes a more or less permanent property.

However, it appears that it is not really the case that demonstratives can never co-occur with an RC if the interpretation is non-restrictive. (107a-b) are grammatical. Example (107a) is repeated from (105) above, with an added demonstrative.

(107) a. zhe-ge xianglai bu ai du-shu de Xiaoming xianzai ye kaishi du-qi
this-CL always no love read-book DE Xiaoming now also begin read-up

shu lai le
book come PERF

‘Xiaoming, who never likes reading books, now begins to read too.’

b. zhe-ge yongyou wu-qian-nian lishi wenhua de zhongguo zhongyu juexing
this-CL have five-thousand-year history culture DE China finally awake

le.
PERF

‘China, who has five thousand years’ of history and culture, is finally awakened.’

Recall that in the corpus example in (100), demonstratives also occur together with the RC, yet the RC must be interpreted non-restrictively since the discourse refer to the only single son of the mother. It is true, however, that the RC typically has to describe some individual-level properties, as in the example of (95) and (96). Additionally, adding demonstrative in pre-RC positions in (106a-b) does not make the sentences more grammatical.

In this section, I have discussed differences in DCL-first and DCL-second RCs in

semantic interpretation and discourse functions. From test results with both sequences, it appears that DCL position does not really make a distinction in RRC and NRC structures. At the same time, some RCs in Chinese may be interpreted non-restrictively. Those RCs typically describe i-level properties and can optionally take a demonstrative in pre-RC position.

4.4 The NPAH and Resumptive Pronouns

Before concluding this chapter, I will review types of RCs in Chinese, and make a connection to the typological generalization of the Noun Phrase Accessibility Hierarchy (NPAH, Keenan & Comrie, 1977). The NPAH can be roughly presented as Subject>Object>Indirect Object>Oblique Object>Genitive/Possessor>Object of Comparison, where “>” means “easier to relativize” (Comrie, 2002). Examples of these RCs are given in (108a-e).⁴⁵

- | | |
|---|----------------------------|
| (108) a. [NP the man _i [CP that __ _i met Shaun] | – subject RC |
| b. [NP the man _i [CP that Shaun met __ _i] | – object RC |
| c. [NP the man _i [CP that Shaun gave the book to __ _i] | – Indirect object RC |
| d. [NP the man _i [CP that Shaun talk to __ _i] | – object of preposition RC |
| e. [NP the man [CP whose dog bit the neighbor] | -- possessive RC |
| f. [NP the man [CP whom John is taller than] | --Object of Comparison RC |

Keenan & Comrie (1977) state that there are different relative clause forming strategies, and the primary strategy is the gap strategy.⁴⁶ The NPAH states that

⁴⁵ Keenan & Comrie’s (1977) original proposal distinguishes “oblique object” and “object of preposition”. Oblique NP is defined as “NPs that express arguments of the main predicate, as the *chest* in *John put the money in the chest* rather than ones having a more adverbial function like *Chicago* in *John lives in Chicago* or *that day* in *John left on that day*” (p. 66). But many studies in SLA, including Gass (1982), do not distinguish arguments from nonarguments, I would, following Ozeki & Shirai (2007), use the terms equivalently.

⁴⁶ In Keenan & Comrie, they refer to the gap strategy as the [-case] strategy, as the structure may a general subordination marker, such as “that” in (1a-1d), or use no subordination marking, or a fronted case-invariant relative pronoun, or a participial verb form.

- (a) A language must be able to relativize subjects;
- (b) Any RC-forming strategy must apply to a continuous segment of the hierarchy;
- (c) Strategies that apply at one point of the AH may in principle cease to apply at any lower point (Keenan & Comrie, p. 67).

That means, for instance, if language X can use the gap strategy to form indirect object RCs, then it must be able to use the gap strategy to relativize the subject and object positions too. Relativizations of other positions (lower on the hierarchy) may not exist, or speakers may resort to different strategies to relativize these positions, such as relativizing the oblique object or possessor RCs. One such alternative relativization strategy is the resumptive pronoun strategy (Keenan & Comrie, 1977, p.72).⁴⁷

The use of the resumptive pronoun (pronoun retention or copy pronoun) strategy has the reverse implicational order than the primary gap strategy. That is, if a resumptive pronoun in a relative clause is grammatical in position X on the hierarchy, the resumptive pronoun will be grammatical in all lower positions that can be relativized at all (Comrie & Keenan, 1979). The hierarchy also allows a possible overlap of the strategies as long as a particular strategy applies to a continuous segment of the hierarchy.

In this section, I will examine whether the use of resumptive pronouns in Chinese RCs consistently adhere to Keenan & Comrie's NPAH. That is, if a resumptive pronoun strategy can be used in a position X on the hierarchy, can we be sure that it is the right relativization strategy to apply in all lower position on the AH?

As is pointed out by Aoun & Li, both movement and base generation with resumptive

⁴⁷ This strategy is considered as a subinstance of the [+case] strategy by Keenan & Comrie.

pronoun strategies are available to derive relative clause structures in Chinese.

First of all, resumptive pronouns are not used in relativization in (simple) subject and (simple direct) direct object positions.

- (109) a. (*ta) xihuan Zhangsan de na-ge ren
 she like Zhangsan DE that-CL person
 ‘the person who likes Zhangsan’
- b. Zhangsan xihuan (*ta) de na-ge ren
 Zhangsan like she DE that-CL person
 ‘the person that Zhangsan likes’
- c. Zhangsan song Lisi de na-ben shu
 Zhangsan give Lisi DE that-CL book
 ‘the book that Zhangsan gave to Lisi’

A resumptive pronoun is obligatory when an indirect object is relativized.⁴⁸

- (110) a. wo song-le ta yi-ben shu
 I give-PERF he one-CL book
 ‘I gave him a book (as a present).’
- b. wo song (*ta) shu de ren
 I gave (he) book DE ren
 ‘The person that I gave the book to’

Similarly, the resumptive pronoun strategy is used when the object of a preposition

⁴⁸ In Houg (1986). She claims that relativization of some IO (indirect object) takes a resumptive pronoun optionally. These are IOs of a verb with the meaning of “ask”, “consult with”.

(viii) a. wo qingjiao na-ge laoshi wenti. (modified from Houg, p.101, example (28))
 I ask that-CL teacher question
 ‘I asked that teacher questions.’

b. wo wenwenti de na-ge laoshi
 I askquestion DE that-CL teacher
 The teacher that I asked the question from.

However, although (viib) is comprehensible, it is hardly grammatical in Chinese. Native speakers that I have consulted with clearly prefers (viii) to (viib). Therefore, I consider the use of resumptive pronouns obligatory instead of optional.

(ix) wo wen ta wenti de na-ge laoshi
 I ask he question DE that-CL teacher
 ‘The teacher that I asked questions from’

is relativized.

(111) wo xiang *(ta) wen-lu de na-ge ren
 I toward he ask-way DE that-CL person
 ‘the person that I asked the way from’

It does seem that relativization out of the Subject, Object, Indirect Object, Object of Preposition positions adhere to the NPAH. However, when it comes to Possessive RCs, the situation is more complicated. In the following, I will review literature on the use of resumptive pronouns in Poss RCs in detail.

Unlike English which uses *whose* as a unique relative pronoun for Possessive RCs, Chinese possessive RCs do not use relative pronouns. Possessive RCs are grammatical when certain conditions are satisfied. According to Tang, T.-C. (1981), the following conditions need to be satisfied:

1. When the relationship between the Poss NP (the possessor) and the possessed NP is “inalienable”, such as “human being- parts of human body”, “thing (in the sense of being tangible)-direction”.
2. When the poss NP + possessed is the subject of the relative clause.

Tang, T.-C.’s “inalienable” relation can be specified as the following: The relationship between the Poss NP and the Possessed NP must be either (a) a meronymic relation: i.e, part-whole relation as between *yanjing* ‘eyes’ and *guniang* ‘girl’; (b) a conventional personal relation typically between family members and friends, as that of between daughter and parent(s); (c) a qualitative relation, i.e., a relation of quality to entity as shown between *weidao* ‘taste’ and *tang* ‘soup’ (d) a conventional relation between properties and their owners, i.e., a relation between *tudi* ‘land’ and *nongmin*

‘farmer’.⁴⁹

- (112) a. yanjing big de na-ge nvhai
 eye big DE that-CL girl
 ‘the girl whose eyes are big’
- b. qizi zhuang-le che de ren.
 wife hit- PERF car DE person
 ‘the person whose wife got hit by a car’
- c. weidao hao de tang
 taste good DE soup
 ‘soup of which the taste is good’
- d. tudi bei yan-le de nongmin
 field PAS flood-PERF DE farmer
 ‘farmers whose fields were damaged by flood’

In the literature, such possessive RCs are sometimes thought to be extendable to less strict thematically subordinated relations. For instance, in Lin, C.-J. (2006), conventional personal relations are extended to that of hierarchical relations in a social context, such as between *guke* ‘customer’ and *laoban* ‘shop-owner’, as in (113a). I will take it as examples such as (113a) are grammatical in certain dialects/judged grammatical by some native speakers, though not without awkwardness. Judging from Lin, C.-J. (2006)’s example, the relation of a social institute and its affiliated members can also license possessive RCs in Chinese, as in (113b).

- (113) a. ?guke bei ousha de laoban hen danxin.
 customer PAS beat DE shop-owner very worry

⁴⁹ Ning (1991, p99) considers thematically subordinate relations to license gapped adjunct RCs in Chinese. Such relations are first described in Na & Huck, 1991. Other relations mentioned include “conversive relation”, i.e. a relation in an institutional hierarchy, and “taxonomic relation”, a relation in a natural hierarchy as held between *shuigu* (fruit) and *juzi* (orange). I modified use of the term “conversive relation” into “family/relative relations”. Taxonomic relations are inapplicable to adjunct or possessive RCs. However, the latter can license topic-comment structure in Chinese. See Na, Y. & G. J. Huck (1991). *On the status of certain island violations in Korean*. ms. University of Toronto. (cited by Ning, 1993, p.99):

‘The shop-owner whose patron was beaten was very worried.’

- b. jidi bei dijun zha-hui de guanbin-men chetui-le.
 base PAS enemy bomb-damage DE soldier-PL back-PERF
 ‘Soldiers whose bases were hit by the enemy’s bombs backed off.’
 (modified from Lin, C.-J., 2006, p. 180; items in Experiment 2-4).

However, apart from the relation between the Possessor NP and the Possessee NP, another important factor determining the grammaticality/naturalness of Chinese Possessive RCs is the predicate, as noted by Houg (1986). Houg finds that as the inalienability between the Possessor and Possessed NP decreases, and as the stativeness of the predicate increases, the Possessive RC becomes less natural.

Houg’s examples of the inalienability of the Poss and Possessed NP include that of (1) parts of the human body, (2) conventional personal relations, (3) that of possessed property and the owner. The predicates are either stative, e.g., *hen mei* (“very pretty”), or dynamic, e.g., *bu jian-le* (“has disappeared”). (Houg, 1986, p.112-115). The following are some modified examples from Houg’s tests.

- (114) a. toufa hen chang de na-ge nvhai.
 hair very long DE that-CL girl
 ‘the girl whose hair is very long’
- b. ?mama hen haokan de na-ge nvhai
 mother very pretty DE that-CL girl
 ‘the girl whose mother is very pretty’
- c. ? yifu hen piaoliang de na-ge nvhai.
 clothes very pretty DE that-CL girl
 ‘the girl whose clothes are very pretty’
- d. *gou hen congming de na-ge nvhai
 dog very smart DE that-CL girl
 ‘he girl whose dog is very smart’

- (115) a. mama bu-jian-le de na-ge nvhai
 mother disappear-PERF DE that-CL girl
 ‘the girl whose mother disappeared’
- b. yifu bu-jian-le de na-ge nvhai.
 clothes no-see-PERF DE that-CL girl
 ‘the girl whose clothes disappeared’
- c. ? gou bu-jian-le de na-ge nvhai.
 dog no-see-PERF DE that-CL girl
 ‘the girl whose dog disappeared’

While I cannot offer a theoretical explanation for the licensing condition, it is interesting to note that the relativization condition is related to the predicate being [+dynamic]. It should be noted that the distinction is really an eventiveness vs. stativeness difference, and should be differentiated from the i-level or s-level modification differences that was pointed out to be relevant to non-restrictive vs. restrictive interpretations earlier. Using stative but s-level predicts such as ‘being sick’ and ‘being dirty’. In the comparison in (116) and (117), we see that adding a perfective marker, which has the effect of enforcing an eventive reading for the predicates, makes the sentence more acceptable

- (116) a. mama bing-de hen zhong de na-ge nvhai
 mother sick-DE very seriously DEthat-CL girl
 ‘the girl whose mother is seriously sick’
- b. mama bing-le de na-ge nvhai
 mother sick-PERF DE that-CL girl
 ‘the girl whose mother has gotten sick’
- (117) a. ?yifu hen zang de na-ge nvhai
 clothes very dirty DE that-CL girl
 ‘the girl whose clothes were dirty’
- b. yifu nong zang-le de na-ge nvhai
 clothes got dirty-PERF DE that-CL girl

‘the girl whose clothes got dirty’

A point can be made here that the licensing conditions of Chinese RCs, apart from syntactic constraints, are often related to semantic features related to aspect.

Turning back to Tang, T.-C. (1981)’s second licensing condition on the position of the relativized Possessed NP, only Possessed NPs in a subject position can be relativized.

(118) a. yanjing hen piaoliang de na-ge nvhai
 eye very pretty DE that-CL girl
 ‘the girl whose eyes are pretty’

b. *wo xihuan yanjing de na-ge nvhai.
 I like eye DE that-CL girl
 ‘the girl whose eyes that I like’

In Lin, C.-J. (2006)’s experiment with Possessive Chinese RCs, he still uses examples of relativization of Possessed NPs in object position such as the following:

(119) a. daitu shahai-le nv’er de mama
 gangster kill-PERF daughter DE mother
 ‘the mother whose daughter is killed by the gangsters’

b. daitu ba nv’er shahai-le de mama
 gangster BA daughter kill-PERF DE mother
 ‘the mother whose daughter was killed by gangsters’

However, in Lin, C.-J. (2006)’s grammaticality judgment test, (117a) and (117b) were considered ungrammatical by 77.62% and 83.86% of (a total of 55) participants. In a naturalness rating experiment, such Possessive relative clauses are also judged as quite unnatural, with an average rating of 4.48 and 4.92 on a scale of 1 (very natural) to 6 (very unnatural).

Lin, C.-J. did use examples of relativization of equivalent possessed NPs in subject position too, with a BEI (passive) structure, such as in (120).

(120) nv'er bei daitu shahai-le de mama
 daughter PAS gangster kill-PERF DE mother
 'the mother whose daughter was killed by the gangsters'

In Lin, C.-J.(2006)'s experiment, relative clause structures such as (120) are judged as much more "natural" and "grammatical" than (119a) and (119b), with an average naturalness rating of 2.87. Most native speaker participants (65.02%) consider such constructions grammatical.

However, such findings do not indicate that relativization of a Possessed NP in an object position is not possible. Note that with the use of a resumptive pronoun, the grammaticality of (118b) and (119a) improve.

(121) wo xihuan ta yanjing de na-ge nvhai
 I like she eye DE that-CL girl
 'the girl whose eyes I like'

(122) daitu shahai-le ta nv'er de mama
 gangster kill-PERF she daughter DE mother
 'the mother whose daughter is killed by the gangsters.'

Interestingly, HounG (1986) notes that when a Possessed NP is in subject position, "it is either relativizable without a RP or not relativizable at all". When relativization of a Possessed NP is in object position, it can always be relativized with an obligatory RP. In other words, Possessive RCs in Chinese are subject to the thematic subordinate relations of the possessed and the possessor NP. Both the gap strategy and the resumptive pronoun strategies are available for possessive relativization in a subject position. At the same time, the licensing of relativization in this position is subject to constraints on the semantic requirement of the predicate, and the inalienability of the Possessed NP and the Possessor NP. Possessive relativization in an object position must be derived by base

generating the head noun and using the resumptive pronoun strategy.

Generally speaking, the use of gap-strategy versus the resumptive-pronoun strategy in relativization in Chinese is consistent with the NPAH except in the case of the possessed subjects which are higher on the NPAH than indirect objects and object of a preposition.

Since the overall distribution of gaps and resumption is consistent with the cross-linguistic typology established by Keenan & Comrie, the above observations seem to lend some additional support to my stance that true relativization structures do exist in Chinese. On the other hand, it appears that semantic aspects do come into play in licensing conditions of relative clauses in Chinese.

As for the exception that we have found, Comrie and Keenan (1999) have noted some exceptions in other languages too and they consider that a few counter example “should not obscure the basic regularity expressed” (p.663). One interesting thing is worthy our attention and may help resolve the apparent exception: Hawkins (1999) has offered a psycholinguistic theory, using the notion of structural filler-gap distance/domain (FGD), to account for the hierarchy. In his theory, the FGD required for relativization of a Subject position takes (a minimum of) 5 nodes and relativization of a direct object position requires 7 nodes. Relativization of an indirect object, object of a preposition, as well as relativization of a genitive NP in a subject position all require 9 nodes. (Relativization of a genitive NP in an object position, however, requires 11 nodes.) In other words, the processing expense to use a gap strategy to relativize the IO, OPreP, and Subject-possessive position is the same. In Keenan & Comrie’s observation of RCs

did not distinguish the GEN-SU and the GEN-Obj. position, that have might led them to conclude GEN to be a position lower than the IO and OPrep. Although they did not report any language that uses the gap strategy in GEN position but a gap strategy in IO and OPrep positions (and this is consistent with using the FGD to explain the hierarchy, since that relativizing a GEN-Obj. though not GEN-SU, is more costly than relativizing an IO or an Oprep), they did report some languages which could relativize the Genitive position but not OPrep and/or the IO positions. For instance, they report that Yoruba can relative SU and DO positions with the gap strategy, and can relative the Gen with a resumptive pronoun strategy, but positions of IO and OPrep are simply not relativizable. Fulani (Gombe) is another example. In other words, IO, OPrep, and GEN seem to be positions with some fuzziness in the NPAH as it is originally observed and stated anyway. Taking this factor of the into consideration, it does seem that Chinese RCs in terms of using relativization strategies are very consistent with observations of the typology of various other languages. The psychological motivation for the hierarchy, the filler-gap domain theory, will be discussed in detail and tested in the next chapter, in which results from experiments were discussed to examine the applicability of the theory to Chinese RCs.

CHAPTER V

THE PROCESSING AND ACQUISITION OF CHINESE RCS

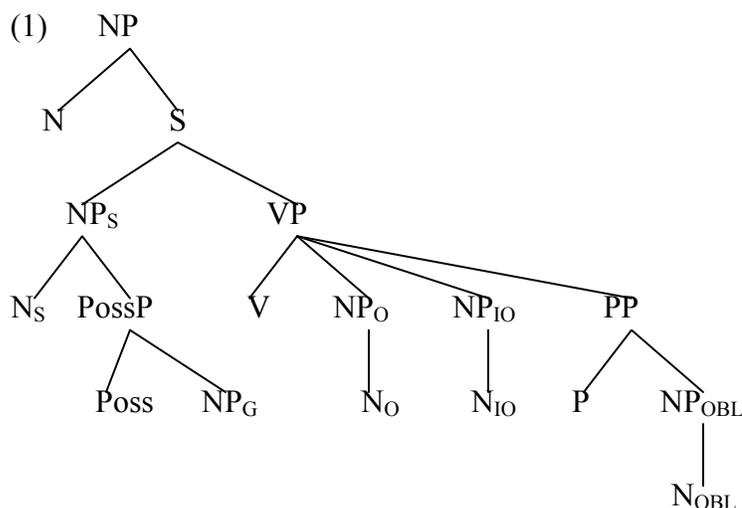
In Chapter 4, I have referred to an important early finding regarding the typology of relative clauses: Keenan & Comrie (1977)'s Noun Phrase Accessibility Hierarchy (hereafter AH or NPAH), which can be roughly presented as Subject (SU)>Direct Object (DO)>Indirect Object (IO)>Oblique Object (OBL)>Possessor (Poss), where ">" means "easier to relativize" (Comrie, 2002). The NPAH states that if a language can relativize a particular element in the hierarchy, then it must be able to relativize all higher positions. This typological observation is found to be robustly predictive of processing ease and the order of first and second language (L1 and L2) acquisition of postnominal RCs of the English type. When it comes to the processing and acquisition of RCs in East Asian languages, Chinese included, much controversy remains concerning whether the hierarchy can be extended to those languages. Particularly, the debate focuses on the relative ease of Subject (Subj.) versus Direct Object (Obj.) relative clauses. In Chapter 5, I will set out to explore the acquisition and processing ease of different types of Chinese relative clauses, focusing on Chinese as a second language.

5.1 The Noun Phrase Accessibility Hierarchy and Chinese RCs

5.1.1 Psycholinguistic Motivations for the Accessibility Hierarchy

Numerous psycholinguistic studies on RCs in Indo-European languages find that processing ease is consistent with the NPAH (Ford, 1983; Gibson, Desmet, Grodner, Watson, & Ko, 2005; Keenan & S. Hawkins, 1987; Wanner & Maratsos, 1978; see summary in Eckman 2007). Hawkins (1999) proposed the Filler-Gap Domain theory

(FGD) to account for the behavioral effects of the hierarchy. A FGD is defined as “the smallest set of terminal and nonterminal nodes dominated by the mother of a filler and on a connected path that must be accessed for gap identification and processing” (Hawkins, p.248). It is said that the human processor prefers smaller FGDs. “The minimal FGD for each relativizable position will include the filler N, the subcategorizer of N’s gap (V, P, or Poss), any overt arguments on which the gap is dependent, and all nodes dominated by the mother of N(NP) that are required for grammaticality and that are on the path from N to the rightmost constituent of the FGD” (Hawkins, p.255). Take postnominal relative clause languages for instance, a simplified abstract tree structure looks like (1).



(Adapted from Hawkins, 1999, p.254)

The nodes required for different relative types can be below.

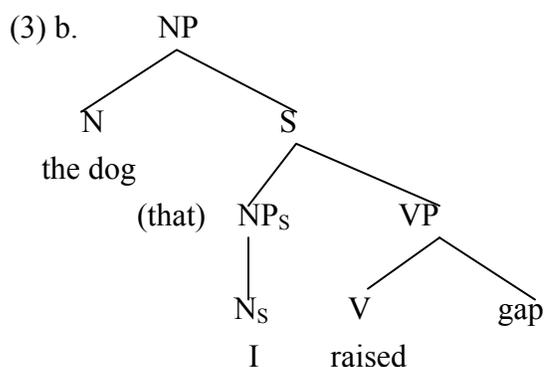
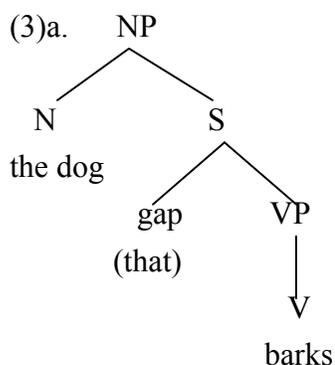
- | | | |
|-----|--------|---|
| (2) | SU = 5 | {N, NP, V, VP, S} |
| | DO = 7 | {N, NP, N _S , NP _S , S, V, VP} |
| | IO = 9 | {N, NP, N _S , NP _S , S, V, VP, N _O , NP _O } |

OBL =9 {N, NP, N_S, NP_S, S, V, VP, P, PP}

GEN-SU =9 {N, NP, N_S, NP_S, S, Poss, PossP, V, VP} ⁵⁰

(Adapted from Hawkins, p.255)

For the processing asymmetry between Subject and Object RCs, for instance, the minimum number of nodes required to establish a Subject-extraction RC is five, including V, VP, S, N, and NP, while the number required to establish an Object-extraction RC is seven. See the trees below for an example. (In Hawkins' model, the gap position itself is not counted towards the number of nodes required for FGD.)



⁵⁰ Recall that at the end of Chapter 4, I referred to Hawkins' proposal in using FGD to explain the NPAH. According to Hawkins' theory, relativization of an IO, OBL, and a genitive subject position all take 9 nodes. (Relativization of a genitive object position would take 11 nodes.) That offers a possible reconciliation between the exception that we have found between the general regularity of the NPAH and the relativization of a genitive NP in a Subject position.

As can be seen from (3a), the filler-gap relation for a Subject-extraction RC does not require NP_O or N_O, while object-extraction RCs do require NPs and Ns. Even if the Subject RC happens to take a transitive verb and has NP_O and N_O, those nodes are only “disambiguating arguments (whose presence reflects lexical idiosyncrasies of the subcategorizeor)” (p.254). Those disambiguating arguments are not counted towards the smallest set of nodes for “minimal FGD”.

Importantly, such a relative ranking of positions remains the same regardless of the linear ordering of the syntactic elements: rankings will be maintained whether the language is head-initial or final. For prenominal relative clause languages, the branching direction will be different from (1), but the number of nodes for minimal FGD for a particular type of RC will remain the same. Hawkins’ theory is sometimes referred to as the “structural distance hypothesis” (Hsu, Hermon & Zukowski, 2006). In contrast to Gibson’s Dependency Locality Theory (DLT) (which will be introduced later in this Chapter Section 5.2), FGD considers structural distance while DLT considers the linear distance of the head-dependent integration.

Studies in L1 and L2 acquisition that test the applicability of the NPAH indicate that explanations of processing ease may provide a motivation for acquisition ease. L1 acquisition studies on head-initial RCs find the hierarchy to be in effect (Hamburger & Crain, 1982; McKee, McDaniel & Snedeker, 1998). Such consistency is also found in the second language acquisition (SLA) field. As early as Gass (1979; 1982), numerous studies have found that the L2 acquisition order of different types of relative clauses adhere to this hierarchy. That is, an L2 learner who has acquired something lower on the

hierarchy must have already acquired something higher on the hierarchy: by the time that he has acquired the relativization of Object of Preposition, he must have acquired relativization of Subject, Direct Object, and Indirect Object. Such acquisition order is consistent even if the order of instruction is otherwise (Doughty, 1988; 1991). Such observations of L2 acquisition order has also been used to support the notion of Universal Grammar (UG) in learners' interlanguage (IL) (Eckman, Bell & Nelson, 1988): if L2 learners have access to UG, their IL should adhere to all the constraints applicable to natural languages. Therefore, these studies that find a connection between the acquisition order and the AH are thought to provide strong evidence in the debate since the 1980s over adult L2 learners' access to UG (Ritchie & Bhatia, 1996).

5.1.2 Application of the AH to Chinese

Recent studies of RCs in East Asian languages, however, cast doubt on whether the AH is applicable to the processing and production of those languages. Japanese, for instance, has a SOV word order in canonical sentences and RCs occur in prenominal positions. Ozeki & Shirai (2007), using corpus data and production data from a Sentence Combination task, find that Subject RCs are not necessarily easier than Object RCs for L2 learners of Japanese: their corpus data were drawn from oral interviews from different L1 groups ranging from novice learners to superior learners. They find that at the intermediate stage, there is no particular type of RC that is difficult for L2 learners to produce: even at early stages of development, learners could produce three types of RCs including SU, DO and OBL RCs. Although for superior L2 learners of Japanese as well as L1 Japanese speakers, SU relative clauses were found to occur more frequently among

the different types of RCs (i.e., SU, DO, IO, OBL, GEN), Ozeki & Shirai observe that learners appeared to be guided by the animacy of the head noun rather than the grammatical relations of the RCs. In their results from the Sentence Combination task, they used accuracy rate as a measurement, and they report no significant differences between SU and DO production, although OBL RCs do appear to be more difficult. Ozeki & Shirai therefore conclude that the NPAH might not predict the L2 acquisition order of Japanese RCs. Kanno (2007) experimented on L2 Japanese from 5 different L1 groups using a listening comprehension task. Although he reports that L2 learners overall found SU RCs to be easier to process, learners' performance was poor and varied when semantic cues were not available for them to identify the grammatical function of the RC head. He suggests that L1 word order and head directions might affect the relative processing ease. In Yip & Matthews (2007)'s study, examining the L1 acquisition of Cantonese using longitudinal diary data, they claim that the acquisition of Direct Object RCs seems to occur earlier than the acquisition of Subj. RCs, contrary to the NPAH. However, it should be noted that their data come primarily from the observation of three bilingual children and since they are naturalistic data, they admit that the "first attestations are likely to lag behind the initial use of each type" (p.287). Also, among the three children from whom they recorded the data, one of them produced Subject and Object RCs on the same day, leaving data from only two children who have attested utterances of Object RCs before Subject ones. In other words, the findings from Yip & Matthews also don't seem to be exactly conclusive.

Turning to L1 processing studies in Chinese, the controversy rests on the relative

ease of Subj. versus Object. RCs in particular. Lin, C.-J. (2006), Lin & Bever (2006), using self-paced reading tasks, find that Chinese is not different from postnominal RC languages and that Subject relative clauses are easier to process, consistent with the AH. Similarly, Kuo & Vasishth (2006) find similar results and suggest that the Subject/Object asymmetry could be due to Accessibility. (They also suggest that the relative ease of Subj. RC could also be due to Perspective Shift, a theory that will be discussed later, or the higher frequency of Subject RCs in Chinese.) On the other hand, Hsiao & Gibson (2003) found Object RCs to be easier. (Their theories and explanations will be provided later.) Gibson & Wu (2008) note that processing an object-extraction RC in an object-modifying position can be temporarily ambiguous.

(4) yiyuan zhuangdao-le yuanzhang gouyin de shaonv
 congressman bump-PERF dean seduce DE young lady
 ‘The congressman bumped into the young lady that the dean seduced.’

At encountering the word ‘dean’, a reader might interpret that word as the direct object of the verb in the main clause, ‘bumped into’. Gibson & Wu caution that this may confound results from previous experiments such as Lin & Bever (2006).

To exclude interference from such temporary ambiguities, Gibson & Wu examined the processing of Subject and Object RCs in context. They first presented the participants with sentences describing a scenario where two different objects can be distinguished. (e.g. “On a highway, a motorcycle chased a car through heavy traffic; another car saw the situation, and then chased the motorcycle”). In the scenario that was described to the participants, a character said “I heard that a high school student was driving one of the cars and a middle-aged woman was driving the other. Which car was the high-school

student driving?” Participants read sentences describing this context on a computer screen, sentence by sentence. After that, they read a character’s answer. The answer was either a Subject-extraction RC equivalent to ‘The car which chased the motorcycle is the one that the boy was driving’, or an Object-extraction RC such as “the car which the motorcycle chased is the one that the student was driving”. This sentence, which contained an RC under investigation, appeared on the screen word by word. By putting relative clauses within such a discourse context, participants will expect particular upcoming noun phrase in the answer to the question. Through this, the effect of temporary ambiguity that might possibly be associated with the processing of Object RC is excluded. In Gibson & Wu’s experiment, they find Object RCs to be processed faster. The differences between the processing time of Subject versus Object RCs were even more significant than findings from Hsiao & Gibson (2003).

If Hsiao & Gibson and Gibson & Wu’s results are correct, the FGD proposal (I will later refer to it as the Structural Distance Proposal to contrast with Gibson’s Linear Distance Theory) may not be the model that best accounts for the psycholinguistic ease of different types of Chinese RCs.

Meanwhile, results from L1 and L2 acquisition studies of Chinese RCs are interesting, but still inconsistent. Cheng, S. (1995), using a picture-description task with 27 Mandarin children aged between 3;6 to 6;3 examined the children’s use of resumptive pronouns. While there is a 23% use of resumptives in Direct Object relative clauses, there is only 3% use of resumptives in Subject relatives produced by participants. (Resumptive pronouns in both Subject and Object relativization are both ungrammatical in Chinese.)

Su (2004) uses a description, acting-out production task with L1 children and adults. In each trial she used two entities (e.g., girls and boys), with two identical characters for each type of entity, (e.g., two girls and two boys). In each trial, one of the experimenters acted out a short story with toys and props in front of the participant and a second experimenter. After the story was 'played', the second experimenter would turn around and the first experimenter pointed to one of the characters. The participant would see which character the first experimenter pointed at but not the second experimenter. And the participant was asked to ask the second experimenter to pick up the character that was pointed using verbal directions. While Su does not find significant differences in the percentage of relative clauses or target relative clauses produced between the Subject and Object type, she finds that younger children (aged 5;3 on average) has significantly lower percentage production of Object of Preposition RCs as compared to older children (aged 6;1 on average). That would indicate that the AH may partially predict the acquisition order of Chinese RCs, in that Object of Preposition RCs (lower on the hierarchy) seem to be acquired later. In addition, Su also finds that while adults never use resumptives in Subject and Object RCs, children use some (0.03-0.11) resumptives for both Subject and Object RCs. Similar to Cheng, S.'s findings, both older and younger children use more resumptive pronouns in Object RCs than in Subject RCs. The participants also realize that relativization of an Object of a Preposition must use resumptive pronouns. In conclusion, from both Cheng, S. & Su's experiment, there is partial evidence that the AH may be predicative of L1 children's acquisition order at least in terms of the use of resumptives.

Hsu, Hermon & Zukowski (2006) used an elicited production task using pictures with L1 children and adults. She finds that children perform significantly worse with Object RCs than Subject RCs. They also find that the majority of the errors were ungrammatical resumptive NPs and omission of *de*, the relative clause marker. They hypothesized that these errors indicate that “children have a problem of suppressing the pronunciation of the NP in the Object position”. Compared with the lower error rate of resumptive pronouns in the acquisition of head-initial RCs, the authors suggest that the head final structure makes it necessary for speakers to hold the head noun in memory before producing them. Subject RC may be easier because “the theta role of the head noun is discharged earlier [by the gap] in the Subject RC than in the Object RC”.

As the AH is found to be predictive of the L2 acquisition of postnominal RCs, it would be interesting to test whether the hierarchy can predict the L2 acquisition of Chinese RCs too. Chen (1999) used a grammaticality acceptance task (i.e., asking the participants to rate different types of RCs on a 1-5 scale). She finds that for L1 Chinese participants as well as for English and Japanese Chinese L2 speakers, when DCL precedes the RC, Subject RC is easier, whereas when DCL follows the relative clause, Object RCs are easier. Chen also uses an ordering task, asking participants to combine separate phrases such as demonstrative-classifier (DCL), NP, RC, and main predicate into a grammatical sentence. While her experiment involves other parameters such as modifying position and animacy, generally speaking, she finds that for both Chinese L1 and Chinese L2, English L1 participants, for Subject RCs with [+animate] head, DCL tends to follow the relative clause, while for Subject RCs with [-animate] head, DCL tends to precede the relative

clause.⁵¹ For Object RCs with [+animate] head, the preference of ordering is not clear-cut because for English L1 participants, such preference depends on RC modifying position (i.e. whether the RC modifies a subject or an object in the main clause), another dependent variable. For Chinese L1 participants, an RC-DCL order is preferred (for Object RCs with [+animate] head). For Object RCs with [-animate] head, the ordering preference again is dependent upon the modifying position. At the same time, however, Chen did not claim statistical significance for the above-mentioned differences. In other words, while informative, her findings are also not conclusive.

Recently, Packard (2008) used a self-paced reading task to examine L2 speakers' reading of Chinese RCs. He claims to find that Subject RCs are read more slowly than Object RCs. While this is the first self-paced reading task conducted with L2 participants in probing this issue, unfortunately his experiment sentences are not counterbalanced. With a closer look, his Subject RCs often involve at least one [-animate] object in the RC part, e.g. 'the woman that understood the situation', 'the man that broadcast the news'. In some Subject-gapped RCs in his experiment, both the Object and the Subject are NPs which are normally [-animate] and are not used in exactly idiomatic ways. Since there is often a tendency for subject to be more [+animate], such as in Japanese, the use of an [-animate] NP as the Subject head is often odd. Examples are *qingzhu chunjie de chunlian* 'couplet [poetry] that celebrated the New Year', *zhuhe luxun de youpiao* 'stamps that congratulated Lu Xun'⁵², *ganxie gege de luyin* 'audiotape that thanked big brother'. On

⁵¹ For Japanese L1, Chinese L2 participants, DCL tend to follow the relative clause for all Subject RCs. Chen did not attempt to offer a rationale for the difference.

⁵² In Packard, he gave the English translation 'stamps that commemorated Lu Xun'; however, *zhuhe* in Chinese is equivalent to 'congratulate' instead of 'commemorate'. The real equivalent to the English translation would be

the other hand, many Object-gapped RCs in Packard's experiment, especially those Object-gapped RCs in subject-modifying positions (in matrix sentences), involve both [+animate] Object and Subject, 'the student that everyone paid attention to', 'the shopkeeper that dad knew'. Ozeki & Shirai (2007) have pointed out in their study that animacy may have an impact on the processing ease of relative clauses and have indeed found effects of animacy in the processing of Japanese RCs. The same point is made by Diessel (2007) in his review of RC processing and acquisition studies. In other words, apart from the factors that Packard looked at including gap position and matrix position, animacy seems to be a confounding factor that has not been controlled in this study, and results from this experiment may need reconsideration.

When Ozeki & Shirai (2007) and Yip & Matthews (2007) found that the L1 acquisition order of RCs in Japanese and Cantonese may not be consistent with the AH, they appealed to Comrie's non-RC proposal to explain away the discrepancy. As I have discussed in Chapter 1, putative Chinese RC are indeed relativization structures that show movement effects and cannot be explained away by the existence of *pro* or attributive clauses in Chinese. That means any inconsistency in observed processing and acquisition data of Chinese RCs and the AH must be explained by some other mechanism rather than an attributive analysis.

In L1 studies of RC processing and acquisition, researchers often use psycholinguistic models to explain both the processing difficulty and the acquisition order. In the second language acquisition (SLA) literature, scholars have also made

jinian luxun de youpiao, which would be more acceptable in Chinese.

inquiries as to whether processing models (which are often based on L1 processing data) can provide motivations for the acquisition orders seen in L2 learning. However, earlier studies on the applicability of processing models to L2 acquisition mostly focus on learning English as a second/foreign language (Hamilton, 1994; Izumi, 2003).

In this chapter, I will refer to three experiments that were carried out to test the relative degree of difficulty among different types of Chinese RCs for L2 learners and seek plausible linguistic and psycholinguistic proposals in explaining the performance data. In the SLA field, there seems to be a heavy emphasis on production rather than comprehension tasks. Such an emphasis, however, is said to be mainly for practical rather than theoretical considerations (i.e., L2 production data are often easier to observe and more readily applicable in pedagogy) (Izumi, 2003, p.295). Nevertheless, comprehension difficulty should be important evidence to consider in assessing L2 acquisition difficulty. Therefore, with the understanding that difficulty may manifest differently depending on the type of task (Prideaux & Baker, 1986), I used a combination of comprehension and production tasks in my experiments. I assume that both processing and production difficulty for L2 speakers reflects acquisition difficulty.

These three experiments include a self-paced grammatical order judgment task, a sentence completion production task, and a sentence combination task. Assuming that processing ease correlates with or even predicts ease of acquisition, I will explore whether psycholinguistic models may be helpful in analyzing the L2 acquisition of Chinese RCs. Finally, focusing on data from production tasks, I will attempt to answer whether the L2 acquisition of Chinese RCs is consistent with the NPAH and what

learners' areas of particular difficulties are.

5.1.3 Types of RCs Under Examination

In Chapter 4, I have referred to the following two sequences of RCs in relation to demonstratives and classifiers:

- (5) a. Demonstrative-Numeral-Classifier + Relative clause
- b. Relative clause + Demonstrative-Numeral-Classifier

Apart from addressing the existing controversy focusing on Subject versus Object-gapped RCs, I will also consider these two alternative sequences. The position of the Dem-Num-CL (henceforth DCL) is in fact an important factor that has sometimes been ignored in previous literature. One recent study that has addressed the issue is Chen (1999). As is mentioned previously, Chen finds that for the DCL-RC sequence, subject relatives are easier for both the L2 and the L1 groups, while for the RC-DNC sequence, object relatives are easier. Chen, however, does not offer any explanation to account for the preference difference.

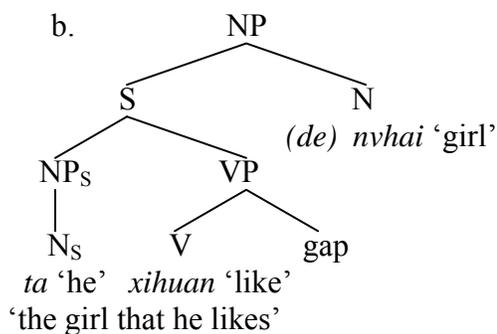
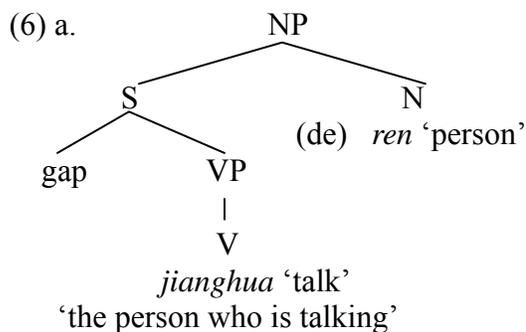
Wu, Haskell, Kaiser & Anderson (2007) observed from Chinese Treebank 5.0 (a large corpus with syntactic tags) that while RCs accompanied by determiners are rarer than bare RCs, in the distribution of classifiers with RCs, the classifiers tend to occur before the RC for Subject relatives, but after the RC for Object relatives. With the usual assumption that corpus frequency might match processing ease, their findings might indicate that the DCL-Subject RC sequence may be easier than the Subject RC-DCL counterpart, while the order of preference is reversed for Object RCs.

5.2 Different Models and Predictions

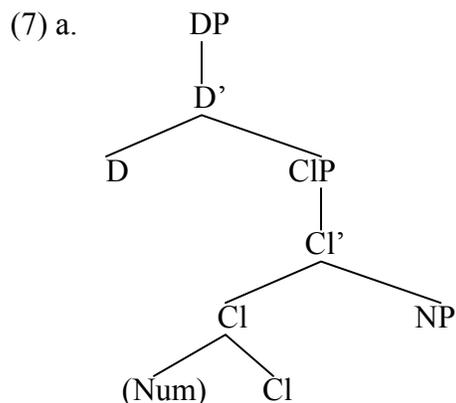
As was mentioned earlier, inquiries as to whether processing models (which are often based on L1 processing data) can provide motivations for acquisition order have been made in L2 studies of English RCs. Apart from the NPAH/FGD, alternative processing models that propose to account for the difficulty of object RCs (as compared to subject RCs) in L1 and L2 English processing include the Dependency Locality Theory, the Canonical Word Order Hypothesis, and the Perspective Shift theory. Given cross-linguistic differences, it will be interesting to see if any processing models are helpful in predicting the L2 acquisition difficulty of Chinese RCs. So far, the literature indicates that the most unsettled issue is the comparative ease of subject vs. object relatives in Chinese. Thus, one focus of my experiments will be testing the relative ease among the four types of RCs, crossing extraction types and DCL position, and exploring whether any alternative models, in lieu of the AH, can account for the psycholinguistic behavior observed in our experiments.

5.2.1 Filler Gap Domain (FGD)/ Structural Distance Theory

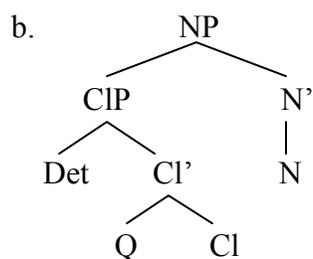
I have explained the differences in FGD in Subject and Object extraction RCs before: In simplified syntactic representations, Subj. RCs usually involve 5 nodes in FGD while Obj. RCs involve 7 nodes. Here, I will consider the factor of the DCL position. Chinese RCs have the following structures in Hawkins (1999)'s framework, with (6a) illustrating a Subject RC and (6b) illustrating an Object RC.



The number of nodes involved in FGD for a Subject RC and in an Object RC are also 5 and 7, respectively. For Chinese RCs that follow DCL, i.e., DCL-RC-N, the FGD does not change: because the demonstrative and classifier are located on higher projections than the NP, those nodes do not enter into the filler-gap structural relationship. There are different analyses on what positions a demonstrative and a classifier take in a tree structure for a Chinese nominal phrase, depending on whether a DP or an NP projection is assumed. Below I show two different proposals.



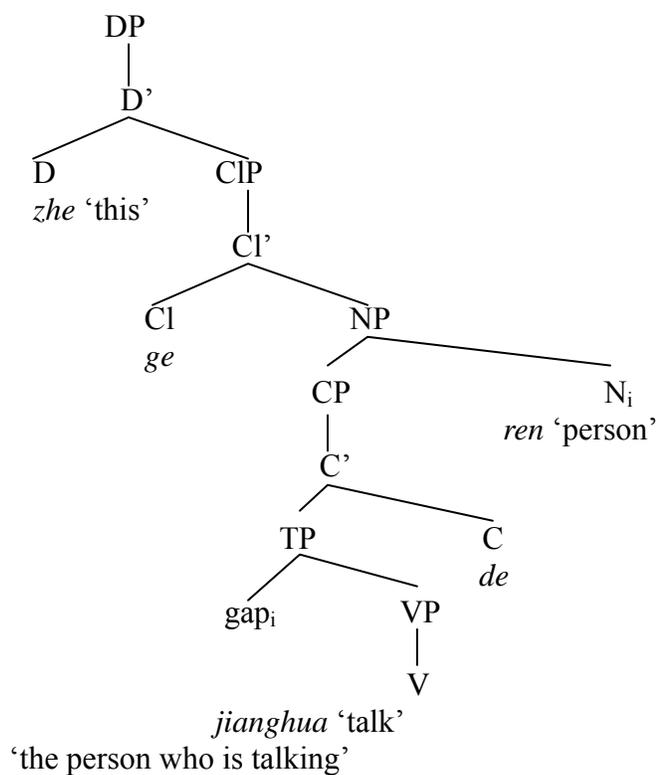
(Adapted from Tang, C. C. (1990)'s DP analysis, p.403)



(Huang, C.-T.' (1982)'s analysis)

The difference between (7a) and (7b) lies in whether a DP projection exists. In Chapter 3 & 4, I have proposed relative clause structures involving a DP when a demonstrative-classifier is present, and I have argued that when an RC precedes the DCL, there must be A-bar movement within the CP and a copy of the complex NP outside the CP (external head). Assuming Tang, C. C.'s DP analysis, and my previous argument, I contrast the structure of a DCL-RC and an RC-DCL below:

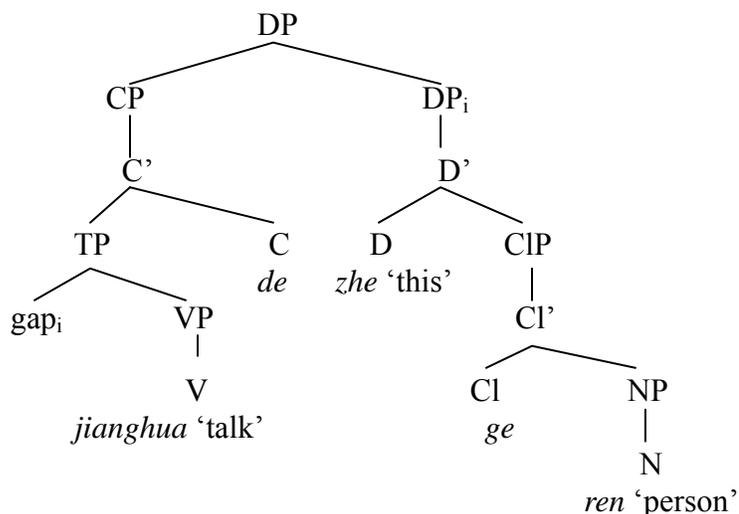
(8) a. DCL-RC



Nodes requires for the FGD: {V, VP, CP, N, NP}⁵³

⁵³ Rather than showing a simplified structure, I show projections such as TP and CP to make the structure more transparent, but I follow Hawkins' original stipulation of the FGD in counting the number of nodes. That is, head C and TP are not taken into the count since in Hawkins' articulation of theory, S replaces the CP/TP. This will not affect our comparison of the FGD in different RCs, since the number of those nodes remains the same for different types of RCs. Also note that I still simplify the representation by omitting nodes such as T and N', V'.

b. RC-DCL



‘the person who is talking’

Nodes required for the FGD: {V, VP, CP, N, NP, D, DP, CI, CIP}⁵⁴

From the filler-gap relation illustrated in (8a-b), we can see that a DCL-second sequence involves 4 more nodes as compared to its DCL-first counterparts, whether it is a Subject or an Object extraction RC. The four additional nodes involved are CI, CIP, D, and DP. If we follow the spirit of Hawkins’ theory in assuming that structural complexity involves more processing cost, then we can predict that processing RCs in a RC-DCL-N structure should be more difficult than processing a DCL-RC-N structure.

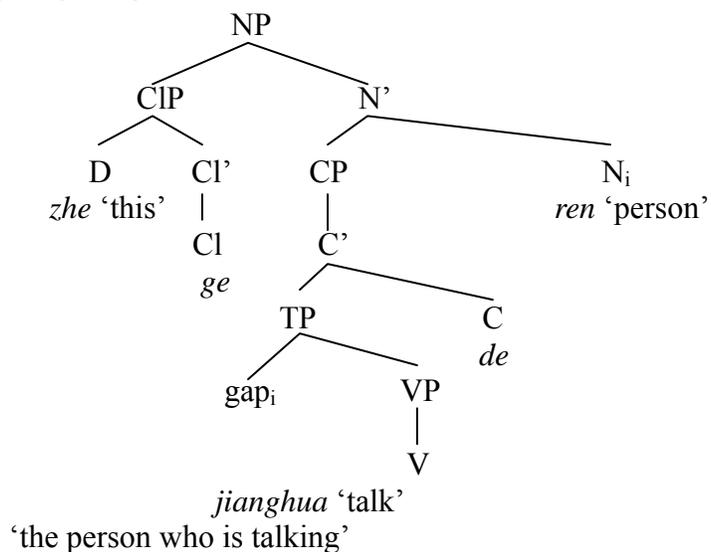
In cases where RC-DCL-N involves an i-level RC, I have argued in Chapter 4 that additional movement has to take place and a ForceP projection has to be available. Projections such as the CIP and the DP must still be available, and those RCs might as well be even more difficult to process. However, in this chapter, we are only concerned

⁵⁴ Because the external head DP is in an adjunct position, i.e., neither a head or a maximal projection, it is not taken into account in the FGD. On the other hand, the maximal projection DP is one of the 9 nodes in the FGD.

about processing differences caused by the RC and DCL sequences. Therefore, it is sufficient to say that if the FGD theory is correct, DCL-second RCs should always be more difficult than their DCL-first RC counterparts.

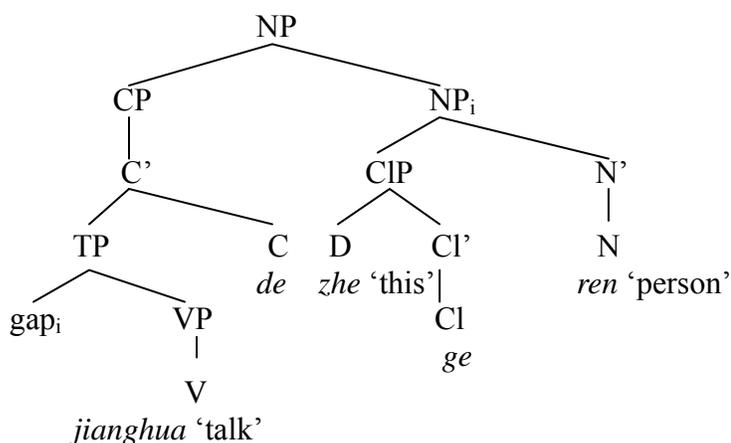
As was mentioned in (7), some analyses assume an NP projection; in that case, a demonstrative occupies the Spec of a CIP and a DP projection does not exist. Assuming such an NP analysis, I illustrate the difference in a DCL-RC structure and a RC-DCL structure below:

(9) a. DCL-RC



Nodes requires for the FGD: {V, VP, CP, N, NP}

b. RC-DCL



'the person who is talking'

Nodes required for the FGD: {V, VP, CP, N, NP, CI, CIP}

In this structure, a structure with a DCL-second sequence will involve 2 more nodes as compared to a DCL-first sequence. The two additional nodes are the head CI and the maximal projection CIP. In other words, even if we do not assume the DP structure that I proposed in Chapter 3 & 4, but rather assume the simplest structure possible for RC-DCL-N, the DCL-second sequence still involves a more complex FGD. Since in this chapter we are only concerned about whether the DCL-second sequence is more difficult, and for the purpose of simplicity, I will consider DCL-2nd RCs as involving 2 more nodes in the FGD in the following discussion. But we should bear in mind that a fully-fledged structure for RC-DCL-N could well be much more complicated.

To summarize, for the four types of RCs shown in (10), (10a) involves 5 nodes in its FGD; (10b) involves 7 nodes because it has a DCL-second sequence; (10c) also involves 7 nodes because two additional nodes, NP_S and N_S are necessary for the FGD, and (10d)

involves 9 nodes. The theory would predict that (10d) would be the most difficult, and that DCL-second RCs in general are more difficult than DCL-first RCs.

- (10) a. na ge [[*gap* xihuan Xiaozhang de] nvhai] (DCL-Subj. RC-N)
 that CL like Xiaozhang DE girl
 ‘the girl who likes Xiaozhang’
- b. [[*gap* xihuan Xiaozhang de] na ge nvhai] (Subj. RC-DCL-N)
 like Xiaozhang DE that CL girl
 ‘the girl who likes Xiaozhang’
- c. na ge [[Xiaozhang xihuan *gap* de] nvhai] (DCL-Obj. RC-N)
 that CL Xiaozhang like DE]girl
 ‘the girl that Xiaozhang likes’
- d. [[Xiaozhang xihuan *gap* de] na ge nvhai] (Obj. RC-DCL-N)
 Xiaozhang like DE that CL girl
 ‘the girl that Xiaozhang likes’

5.2.2 Dependency Locality Theory/Linear Distance Theory

The second psycholinguistic model that I will consider is Gibson (1998; 2000)’s Dependency Locality Theory, which uses linear distance as the measure of integration cost. This theory considers longer distance head-dependent integrations to be more costly than local ones, where “distance” is construed linearly rather than structurally. The head-dependent relation is not limited to filler-gap relations in RCs, but refers generally to the connection between an incoming word and its head or dependent in the current structure, such as connecting an incoming adverb to a verb (Gibson, 1998, p.8; 11; 14). It also includes connecting a pronoun with its appropriate antecedent (Gibson, 2000, p.102). With this in mind, the integration cost of the four types of RCs can be compared. When considering the Dependency Locality Theory’s application to the processing of Chinese

RCs, it is also referred to as the Linear Distance Theory, to contrast with Hawkins' Structural Distance Theory.

- (11) a. na ge_i [e_i xihuan Xiaozhang de] nvhai_i (DCL-Subj.RC-N)
 that CL *e* like Xiaozhang DE girl
 'the girl who likes Xiaozhang'
- b. [e_i xihuan Xiaozhang de] na ge nvhai_i (Subj.RC-DCL-N)
e like Xiaozhang DE that CL girl
 'the girl who likes Xiaozhang'
- c. na ge_i [Xiaozhang xihuan e_i de] nvhai_i (DCL-Obj.RC-N)
 that CL Xiaozhang like *e* DE] girl
 'the girl that Xiaozhang likes'
- d. [Xiaozhang xihuan e_i de] na ge nvhai_i (Obj.RC-DCL-N)
 Xiaozhang like *e* DE] that CL girl
 'the girl that Xiaozhang likes'

Necessary integrations in structures from (11a-11d) are summarized below:

(11a): two integrations: one integration of the empty category to the relative clause head (long distance), and one integration of the DCL to the head N.

(11b): one long distance integration

(11c): two integrations: one integration of *e* to the RC head (short distance) and one integration of the DCL to the head N.

(11d) one integration of *e* to the RC head (short distance).

While Gibson (2000) claims that "In principle, this distance-based structural integration cost might be quantified in many ways" (p.104), it is not exactly specified how one might calculate the cost of integrating the DCL with the head N. In a rough sense, the kind of co-indexing integration of the DCL to the head N might be similar at least in some way to the kind of integration of a pronoun to its antecedent, and at any

rate, such integration needs to be taken into consideration when we consider the overall processing difficulty. As multiple integrations taking place at the same processing state is thought to be particularly costly (Gibson, 2000, p.107), (11d) should be the easiest as it take only one type of integration and the filler-gap distance is short; (11a) is predicted to be the most difficult because of the long filler-gap distance and the long integration of DCL with the head N. (11b) should not be the most difficult RC type because despite the long distance integration, only one type of integration is involved; (11c) involves two types of integrations but the filler-gap relation is relatively short-distance. Because the exact ways of measuring integration cost are often not specified, I will not make a claim regarding the relative ease of (11b) versus (11c).

The relative difficulty of these types of RCs can be summarized the following, with > indicating ‘easier than’: Obj.RC-DCL-N > { Subj.RC- DCL-N; DCL –Obj.RC-N} > DCL-Subj.RC-N

5.2.3 The Canonical Word Order Hypothesis

Another processing theory that will be considered is the Canonical Word Order Hypothesis (CWO henceforth) (Bever, 1970; Slobin & Bever, 1982). This states that if the word order in a sequence is similar to the word order in canonical sentences of the language, that sequence should be easier to process. In English, for instance, the word order in Subject relatives, such as [*The girl [that likes Xiaozhang]*], has the word order of Noun-Verb-Noun (N-V-N), which is similar to the word order in simple English sentences. For Object relative clauses in English, the word order is N-N-V, e.g., [*The girl [that Xiaozhang likes]*], which is different from the canonical word order in English. This

theory makes the right prediction that processing of Subject RCs in English is easier than processing Object RCs. In Chinese, Subject RCs follow the order of [[_ V N de] N] (i.e., V-N-N) while a Direct Object RC has the order of [[N V _ de] N] (i.e., N-V-N). Thus, Direct Object relatives are predicted to be easier. Considering the additional effect of DCL position, the predictions made by the CWO on (11a-d) are illustrated below:

(11') a. DCL-Subj.RC-N

na ge xihuan Xiaozhang de nvhai DCL_S V N_O N_S
 that CL like Xiaozhang DE girl

b. Subj.RC-DCL-N

xihuan Xiaozhang de na ge nvhai V N_O DCL_S N_S
 like Xiaozhang DE that CL girl

c. DCL-Obj.RC-N

na ge Xiaozhang xihuan de nvhai DCL_O N_S V N_O
 that CL Xiaozhang like DE girl

d. Obj.RC-DCL-N

Xiaozhang xihuan de na ge nvhai N_S V DCL_O N_O
 Xiaozhang like DE that CL girl

(11'd), Obj.RC-DCL-N, is predicted to be the easiest among the four conditions as it follows the canonical order in a simple Chinese sentence. (11'a) may also be relatively easy, if we assume DCL *na ge* has some noun-like features. Although simple Chinese sentences typically require a phonetically realized noun head for the NP slot, it is possible for the head N to be omitted when the head has been mentioned in an immediately preceding context or in a contrastively contrast where the reference is clear, e.g. *zhe ge bu-hao, na ge hao* ('This (CL) no-good, that (CL) good'), meaning 'This one is no good; that one is good'.

Typically, (11'b) is often not considered to be consistent with the canonical word

order of Chinese (See Hsiao & Gibson, 2003; Kuo & Vasishth, 2006) as it starts with a verb, inconsistent with the typical SVO word order of simple Chinese sentences.

It should be noted that the previous predictions were made on the assumption that SVO word order in Object RCs is canonical. Researchers have pointed out that it may be debatable whether the canonical word order of Chinese is indeed SVO (See Juffs (2007)'s review for instance). As Chinese allows null subjects, a sentence starting with a verb might be construed to have an implicit subject, which still yields the order of SVO, but would make the word order in a Subject a RC similar to the canonical word order. At the same time, the word order in an Object RC is really SVdeO, still dissimilar with the SVO word order with the interruption of the relativizer (Kuo & Vasishth). These factors will be taken into consideration in the discussion of the result section.

Now let us consider (11'c), Object RC preceded by a demonstrative. With an order of DCL-N followed by a verb and a Subject N, this sequence is similar to the SVO word order in some ways. However, with a closer look, the classifier modifying the Object head N is immediately followed by the Subject N ($DCL_O N_S$). Previous research has referred to this sequence as a case of mismatching classifier, where 'semantic clash' takes place (Wu, et al, 2007). Eye tracking experiments have found that the mismatching classifier does have an impact in creating more difficulty in processing this type of relative clause. In their experiment, they tracked participants' eye movement when reading sentences such as *na shan zuqiu dapo de chuanghu* 'that CL(window) football break DE window' and *na zhi zuqiu dapo de chuanghu* 'that CL(football) football break DE window' and found that there was less looking at the football in the first type of

sentences where there was a mismatching classifier, indicating that lexical access of the word ‘football’ may be suppressed in that condition. Although the idea of semantic clash itself is not related to the original canonical word order proposal, this effect would be taken into consideration too.

The clear predications made by the CWO can therefore be summarized as Object RC-DCL > DCL-Subject RC. Subject-DCL RC may be more difficult if one assume VO sequence is non-canonical in Chinese despite its grammaticality under context where null Subject is allowed, and DCL-Object RC shall also be more difficult because of the mismatch between the Classifier and the Object Noun.

5.2.4. Perspective Shift

Another theory from the pragmatic or functional sentence perspective might also give us insight into the different processing difficulty of RCs. MacWhinney (1977, 1982), MacWhinney & Pleh (1988) developed the perspective shift theory. The hypothesis considers that “the choice of a starting point in production and the use of a starting point in comprehension are determined by processes involved in the active construction of a perspective” (MacWhinney, 1977, p.152). After reviewing a large number of psycholinguistic studies, MacWhinney claims that both speakers and listeners prefer sentences in which the subject argument closely matches the unmarked human “perspective”. That is, a reader’s perspective is supposed to be oriented to the sentential subject by default. The following types of relative clauses in English are predicted to have different processing and acquisition difficulties (SS refers to Subject-modifying, Subject extraction):

(12) a. SS: The dog that chased the cat kicked the horse.

b. SO: The dog that the cat chased kicked the horse.

c. OO: The dog chased the cat that the horse kicked.

d. OS: The dog chased the cat that kicked the horse.

(Examples from MacWhinney, 1982, p.111, (21-24))

Sentences of the SS type can be processed most easily because no perspective shift needs to be conducted for the interpretation of the sentence. For OO relatives, the perspective begins with ‘the dog’ but has to shift to *the horse* at the end. For OS relatives, one perspective shift also has to occur within the relative clause. For SO relatives, there is first a shift to the Subject of the relative clause and then another shift back to the perspective of the head N (the Subject of the main clause, ‘the dog’). That is, the Perspective Shift theory would predict the order of difficulty of the four above-mentioned types of English RCs to be following the order of SS > {OO, OS} > SO. MacWhinney (1982) has summarized numerous studies which find experimental results consistent with this prediction.

Now let us return to the Chinese examples that we intend to investigate:

(13) a. DCL- Subject RC –N (no shift)

na ge xihuan Xiaozhangde nvhai xingge neixiang
 that CL like Xiaozhang DE girl character introvert
 ‘The girl who likes Xiaozhang is introverted.’

b. Subject RC-DCL- N (no shift)

xihuan Xiaozhang de na ge nvhai xingge neixiang
 like Xiaozhang DE that CL girl character introvert
 ‘The girl who likes Xiaozhang is introverted.’

c. DCL-Object RC-N

na ge Xiaozhang xihuan de nvhai xingge neixiang
 that CL Xiaozhang like DE girl character introvert
 ‘The girl that Xiaozhang likes is introverted.’

d. Object RC-DCL-N

Xiaozhang xihuan de na ge nvhai xingge neixiang
 Xiaozhang like DE that CL girl character introvert
 ‘The girl that Xiaozhang likes is introverted.’

For (a) and (b) types of RCs (Subject RCs), there is no shift throughout the interpretation of the sentence. For type (c) RCs, because of the mismatching classifier with the proper name Xiaozhang (proper names cannot be modified by a Classifier), at the encountering of Xiaozhang, readers must realize that a shift of perspective is necessary; the perspective has to shift again back to the head N at the encountering of the predicate of the main sentence. In other words, two perspective shifts have to be conducted for the interpretation of type (c) RC. For type (d) RC, there needs to be one perspective shift from *Xiaozhang*, the Subject of the relative clause, to *nvhai*, the head N for the interpretation of the sentence. The Perspective Shift theory, then, would make the following predictions regarding the order of processing ease of these types of RCs: {DCL-SubRel-N; SubRel-DCL-N} > ObjRel-DCL-N > DCL-ObjRel-N.

5.3 Second Language Processing and Production Experiments

5.3.1. Experiment 1

In this experiment, I used a self-paced word order judgment task to test the L2 processing ease of the following four types of relative clauses.

(14) a. DCL-Subj. RC-N

zhe ge xihuan Tanglan de gongchengshi chengshu-wenzhong.
 this CL like Tanglan DE engineer mature
 ‘This engineer who likes Tanglan is mature.’

b. Subj. RC-Dem-CL

xihuan Tanglan de zhe ge gongchengshi chengshu-wenzhong.
 like Tanglan DE this CL engineer mature
 ‘This engineer who likes Tanglan is mature.’

c. DCL-Obj. RC-N

zhe ge Tanglan xihuan de gongchengshi chengshu wenzhong.
 this CL Tanglan like DE engineer mature.
 ‘The engineer who Tanglan likes is mature.’

d. Obj. RC-DCL-N

Tanglan xihuan de zhe ge gongchengshi chengshu wenzhong.
 Tanglan like DE this CL engineer mature
 ‘The engineer that Tanglan likes is mature.’

The Structural Distance theory will predict that type (a) will be read fastest (because their syntactic structure involves 5 nodes); type (b) and (c) sentences will be read more slowly because they involve 7 nodes; type (d) RC will take the longest time to process because the filler-gap relation requires 9 nodes to establish.

The linear distance theory (LDT) predicts that type (c) is the easiest while type (a) is the most difficult. CWO predicts that type (d) will be read fastest, as it is close to the canonical word order in Chinese simple sentences. And Perspective Shift theory predicts Subject RCs (both type (a) and type (b)) in general will take less processing time. The predictions are summarized by the following table.

program, these participants were considered intermediate-mid to intermediate-high L2 speakers of Chinese by ACTFL standards.

5.3.1.1.2. Materials

Self-paced Reading

Forty-eight quadruplets of sentences (in correct word order) were constructed, typed in simplified Chinese characters. Each list had four conditions given in (14a-d). That is, within each list, there are 12 sentences representing each type of relative clause. One sentence with particular semantic content, if presented as a DCL-Subject RC-N sequence in the first list, is presented as Subject RC-DCL-N sequence in the second list, and as DCL-Object RC-N, and Object RC-DCL-N in list three and four. Each list also contained 48 sentences with incorrect word orders (which if ordered correctly would contain a relative clause). In addition, there are 24 filler sentences, 12 with correct word order and 12 with incorrect word order. Appendix A provides a complete list of the stimuli. The stimuli were randomized for each participant by the experiment software during the experiment. All of the fillers contain determiners (*zhe* or *na*) and DE (as a general nominal marker). Most of these fillers have personal pronouns, proper names, and a generic NP like ‘friend’, ‘soldier’, like the experiment items. Thus, it is unlikely that participants would be able to identify experimental items from fillers and so remain naïve to the exact sentence structure under investigation until the end of all three experiment sessions.

Word Recognition

Essential vocabulary used in the self-paced reading task were included in the second task that participants did, the Word Recognition task. There were altogether 108 words. Common vocabulary like personal pronouns, copula and degree adverbs such as *hen* and *feichang* ('very') were not included. There were also five pseudo-Chinese words included in the list to ensure that the participants read the words for meaning.

Language Background Survey

In the language background survey, participants were asked to rate their familiarity with the words, report their native language, length of study in Chinese as a Foreign Language, experience in Chinese-speaking countries and relations with Chinese native speakers. They were also asked to rate their own level of Chinese in the four skills. (See Appendix A.)

5.3.1.1.3. Procedure

Self-paced Reading

The procedure involves two steps. First, participants were asked to engage in a self-paced word order judgment task. Similar tasks have been used in L1 processing and have been found to be sensitive enough to detect the asymmetry between subject and object RC processing in English (Nicol, Forster, & Veres, 1997). In SLA studies, a psycholinguistic methodology that has gained recognition in recent years is the grammaticality judgment task with reaction time (RT) measures (Juffs, 2001, p.208). Compared to grammaticality judgment tasks, word ordering tasks are easier for participants and instructions for this task are easier to convey to participants: unlike grammaticality judgment tasks in which participants might be to some extent influenced

by the plausibility or semantic interference of the test items, “word order” judgment tasks are more straight-forward in exploring syntactic differences (K. Forster, personal communication). In this experiment, a whole sentence reading instead of word-by-word reading method is adopted. This is because the main purpose is to test the relative difficulty or ease of different types of RCs instead of evaluating where exactly the difficulty arises. Because relative clauses are a difficult sentence structure in Chinese L2 acquisition, and a word-by-word reading method would place more demands on L2 participants’ working memory, the whole sentence reading method was deemed to be appropriate. In grammaticality judgment tasks with RT measures, the whole sentence reading technique has been used in SLA studies too (Juffs & Harrington, 1995; White & Juffs, 1998).

DMDX software, developed by Kenneth Forster and Jonathan Forster, was used in this experiment (Forster & Forster, 2003). Experiments were run on two PC laptops. Instructions were given in English on an instruction sheet, and brief instructions in Chinese were also shown on the computer screen before the experiment started.

Participants were first given 10 training items before the actual experiment session started. Each trial began with the brief exposure of a series of asterisks. A complete sentence (either with correct word order or wrong order) was then displayed on the screen. Participants were instructed to press one of the two keys to indicate their judgment. If the sentence was judged as being in the correct word order, the right-hand key would be pressed. If the sentence was judged to be in the wrong word order, then the left-hand key would be pressed. After a correct response, the word “correct” would flash

briefly on the screen and the display advanced to the next sentence. If an incorrect response was given, the word “wrong” flashed on the screen before the display advanced to the next sentence. Participants were asked to read as fast as they could and make a judgment as accurately as they could.

Word Recognition

After the self-paced reading task, participants were asked to do a Word Recognition task. The purpose of the task was to ensure that the participants were familiar with the vocabulary used in the Self-paced reading task. Although the self-paced reading task material was approved by instructors of the CFL classes that the participants were enrolled in, i.e. all words used in the experiment had already been taught, this task was used to ensure that the participants had acquired the vocabulary.

Right after the self-paced reading task, participants were given a paper with this word recognition task and a language background survey. In this recognition task, participants were asked to circle around the words that they do not know. The recognition task together with the survey questions took participants about 5 minutes to complete.

5.3.1.2. Plausibility Norming Survey

Because of time constraints before the experiment, the Plausibility Survey was conducted after the primary experiment was done. Modeling our approach after that in Gibson et al. (2005) and Hsiao & Gibson (2003), we conducted plausibility surveys to ensure that sentences in the experiments describe events that are equally natural in the real world (so that plausibility will not affect experiment results). 22 L1 speakers of Chinese completed this survey. In each survey, there were 24 items representing Subject-

extraction RCs and 24 items representing Object RCs. Each version of a sentence was read by the same number of L1 participants. To keep the lexical and encyclopedic content of the test item constant while removing the relative clause structure, the items tested in the questionnaire consists of pairs of simple sentences. For instance, to represent the Subject RC in (14a) and (14b), (15a) was used. To represent Object RCs in (14c) and (14d), (15b) was used.

(15) a. you ge gongchengshi xihuan Tanglan. Zhe ge gongchengshi
 have CL engineer like Tanglan. This CL engineer

chengshu-wenzhong
 mature

‘There was an engineer who likes Tanglan. This engineer is mature.’

b. Tanglan xihuan yi ge gongchengshi. Zhe ge gongchengshi
 Tanglan like one CL engineer. This CL engineer

chengshu-wenzhong
 mature

‘Tanglan likes an engineer. That engineer is mature.’

Participants were asked to judge the naturalness in the real world of the events described in the sentences, i.e. how likely they would occur. They were asked to rate these sentences on a scale of 1 (“very likely to occur in real life”) to 6 (“almost impossible that it would occur”). The actual instructions were given in Chinese. See Appendix F for the Plausibility Survey sheet.

The results show there was no significant difference between the Subject-extraction and the Object-extraction version of the 48 items ($p > 0.05$). The mean for the Subject versus Object version is 2.4 versus 2.2.

5.3.1.3. Results

Results from Word Recognition Test and Language Background Survey

Most participants circled all of the five pseudo-words to indicate that they did not know them, indicating that they did pay close attention to the list and were generally reporting their vocabulary knowledge in a faithful way.

Among the vocabulary list, 26 words were indicated as “unknown” by one or more participants. The least known word was indicated by 22 participants to be “unknown”. There were altogether 217 cases where a participant reported an “unknown” word.

In the actual experiment, 49 participated. Two participants’ data had to be excluded from analysis because of contamination due to interruptions during the experiment. Two other participants’ data were excluded because one of them was a native speaker of Spanish, and the other was a native speaker of Japanese and his performance appeared to be different from other participants: he reported no unknown words in the vocabulary survey task and had only 2% error rate in judgment (the next participant whose performance was closest had a 5% error rate in the judgment task).

In addition, some other participants reported a large percentage of unknown words or had poor judgment performance. Therefore, data from participants who reported more than 20 unknown words in the Word Recognition Test or had higher than 23% error rate in word order judgment were also excluded from analysis. Additionally, in order to balance the number of participants per group, data from one participant who reported the largest number of unknown words (13 unknown words) in that group, and reported that his unfamiliarity with the words was “often” the cause of his judgment errors (error rate

at 7%) were also excluded. With these criteria, I used data from 32 participants in the statistical analysis part for the result section, with 8 participants per group.

RT data were first analyzed based on all 48 test items. As described above, because some words were reported “unknown” by participants, a second round of analysis was conducted based 32 test items. Items that contain words that were reported by more than five (6 or more) participants to be “unknown” were taken out. The cutoff point was set at 6 because that guarantees that the participants knew most words used in those items while leaving us enough items to analyze. That also kept the four groups of items balanced, leaving 8 items each group. With the remaining 32 items that we kept, 12 words were still reported unknown by 1-5 participants, and there were altogether 36 such cases.

48-item 32-participants analysis

RT

As is discussed above, data from 8 participants with 12 test items in each condition were analyzed. All those 8 participants have less than 23% overall judgment error rate. (This error rate was calculated based on judgment of all sentences, including fillers and sentences in incorrect word order.) If the participants made a wrong judgment on a given sentence, the RT for that sentence was discarded (no further RTs would be recorded for that sentence, since the program moves onto the next sentence after an error is recorded). Outliers were treated by setting them equal to cutoffs established two SD units above and below the mean for each subject.

To examine the effects of the two factors (Subject type and demonstrative position) and their interactions, analyses of variance were performed, one treating subject as a

random effect (F1), the other treating items as a random effect (F2). The factors were Groups (subject groups in the subject analysis, and item groups in the item analysis), RC type, and demonstrative position (DCL-first and DCL-second). The groups factor was included to remove variance due to the counterbalancing procedure, and was a non-repeated factor in both analyses. The factor of Sentence Type and the factor of Demonstrative position were repeated measures factors in both subject and item analysis.

The RTs for the four groups were summarized in Table 2. The factor of RC type was found to be significant by both participant and item analysis, $F(1, 28)=8.69$, $p=0.006$; $F(1, 44)=4.7$, $p=0.04$.

The factor of demonstrative position was not significant either by participants or items, $F(1, 28)=0.8$, $p=0.4$; $F(1, 44)=0.5$, $p=0.5$. These two factors did not interact. $F=1.6$, $p=0.2$.

A two-way ANOVA was used to examine the effect of RC type for demonstrative-first RCs, type (a) vs. type (c). The effect was significant by both the participant and item analysis, $F(1,28)=7.98$, $p=0.008$; $F(1,44)=9.47$, $p=0.004$.

For dem-2nd RCs, type (b) vs. (d), the effect of RC type was not significant. $F(1,28)=1.9$, $p=0.2$; $F(1,44)=0.17$, $p=0.7$.

For Subject RCs, type (a) vs. type (b), the effect of Dem position was not significant on the participant analysis, but was close to significance on the item analysis. $F(1,28)=2.2$, $p=0.2$; $F(1,44)=3.7$, $p=0.06$.

For Object RCs, the effect of Dem position was not significant. $F(1,28)=0.02$, $p=0.9$; $F(1,44)=0.27$, $p=0.6$.

Table 2: Mean RT in the 42-item Analysis

Note: Solid line= significant by both the item and participant analyses; dotted line= close to significance on the item analysis.

RC Type	RT(MS)	Example
(a) DCL- Subj.RC-N	5956	<i>zhe-ge xihuan Tanglan de gongchengshi chengshu wenzhong.</i> this CL like Tanglan DE engineer mature This engineer that likes Tanglan is mature.
(b) Subj.RC- DCL-N	6101	<i>xihuan tanglan de zhe-ge gongchengshi chengshu wenzhong.</i> Like Tanglan DE this CL engineer mature This engineer that likes Tanglan is mature.
(c) DCL- Obj.RC-N	6227	<i>zhe-ge Tanglan xihuan de gongchengshi chengshu wenzhong.</i> This CL Tanglan like DE engineer mature. This engineer that Tanglan likes is mature
Obj.RC- DCL-N	6215	<i>Tanglan xihuan de zhe-ge gongchengshi chengshu wenzhong.</i> Tanglan like DE this-CL engineer mature This engineer that Tanglan likes is mature.

To examine the difference between other pairs of groups, paired-sample t-tests were also conducted. No significance was found between pairs of comparisons except for the type (a) vs. type (c) RCs, in which we find the difference significant by participant analysis but not by item analysis, $t(1, 31)=-2.3$, $p=0.026$; $t(1,47)=-1.6$, $p=0.1$. But note that a two-way ANOVA, which is a more sensitive statistical test taking the counterbalancing design (the group factor) into consideration, did show the RC type is a significant factor here.

There were no significant differences between other groups by either participant or item analysis: for type (a) and type (b) RC, $t(1,31)=-1.2$, $p=0.2$, $t(1,47)=-1.0$, $p=0.3$). For type (c) and type (d) RC, $t(1,31)=0.1$, $p=0.9$; $t(1, 47)=0.3$, $p=0.7$; For type (b) and type (d) RCs, $t(1,31)=-1.2$, $p=0.2$; $t(1, 47)=-0.3$, $p=0.8$.

Error rate

The error rate for the four types of RCs are 14%, 16%, 10%, and 13%, respectively.

Using a three-way ANOVA, we found that RC type is a significant factor by participant analysis, $F(1,28)=4.7$, $p=0.04$, and is almost significant by item analysis, $F(1,44)=3.9$, $p=0.054$. Demonstrative position is not a significant factor by either participant or item analysis, $F(1,28)=0.79$, $p=0.38$; $F(1, 44)=2.3$, $p=0.14$. There is no interaction between the two factors.

Using a two-way ANOVA, we also found that for Dem-1st RCs, type (a) and type (c), RC type factor is close to significance by participant analysis, but not by item analysis, $F(1,28)=3.92$, $t=0.058$;

RC type is not a significant factor for error rate differences in Dem-2nd RCs. $F(1,28)=1.8$, $p=0.2$; $F(1,44)=1.7$, $p=0.2$

For Subject RCs, type (a) vs. type (b), demonstrative position is not a significant factor for error rate. $F(1,28)=1$, $p=0.3$; $F(1,44)=1$, $p=0.3$.

For Object RCs (type (c) vs. type (d)), demonstrative position is not a significant factor. $F(1,28)=1.3$, $p=0.3$; $F(1,44)=1.2$, $p=0.3$.

The results from the ANOVA tests were summarized below in Table 3. I will use SR to refer to Subject RCs and OR to refer to Object RCs hereafter.

Table 3: Summary of the 48-item Analysis

Note: * = statistically significant; (*) = close to significance

		RT		Error rate	
		by participant	by item	by participant	by item
Subj. vs. Obj. RCs	6029 vs 6221	*	*	*	(*)
	15% vs. 12%				
Dem-1 st vs. Dem-2 nd	6091 vs. 6158				
	12% vs. 15%				

(a) vs (c); DCL-SR vs. DCL-OR	*	*	(*)	
(b) vs. (d); SR-DCL vs. OR-DCL				
(a) vs.(b); DCL-SR vs. SR-DCL		(*)		
(c) vs. (d); DCL-OR vs. OR-DCL				

32-Participant 32-item analysis

RT

Because the Word Recognition Survey indicates that many participants were unfamiliar with certain vocabulary used in the experiment item, a 32-participant 32-item analysis was also conducted, with items containing words unrecognized by more than 5 participants taken out. (The rationale for taking out those items were discussed in the Result from the Word Recognition Task earlier.) In the following, I report RT from this 32-item analysis. Because unfamiliar vocabulary could had an influence on the RT data, the following analysis may be considered more enlightening and may reflect L2 participants' processing difficulty more faithfully. In general, this analysis shows the same pattern as the 48-item analysis.

RTs for the four types of RCs are 5758, 6032, 6093, 6187. RC type effect was significant by both participant and by item analysis, $F(1, 28)=7.8$, $p=0.009$, $F(1, 28)=5.84$, $p=0.02$. The effect of demonstrative position was significant only by item analysis. $F(1, 28)=2.9$, $p=0.1$; $F(1, 28)=5.27$, $p=0.03$. There were no interactions between the two factors.

For Subject RCs, i.e. type (a) and (b), demonstrative position appears to be a significant factor by both participant and item analysis. $F(1,28)=4.3$, $p=0.05$; $F(1,28)=7.9$, $p=0.009$.

For Object RCs, type (c) vs. type (d), demonstrative position is not a significant

factor. $F(1,28)=0.5$, $p=0.5$; $F(1,28)=0.3$, $p=0.6$.

For Dem-first RCs, RC type is a significant factor by both participant and item analysis. $F(1,28)=8$, $p=0.009$; $F(1, 28)=7.4$, $p=0.01$.

For DCL-2nd RCs, RC type is not a significant factor. $F(1,28)=1.7$, $p=0.2$;
 $F(1,28)=0.5$, $p=0.5$.

Additionally, paired-sample t-tests were conducted to compare differences between groups.

Differences between type (a) and type (b) RC RT time were close to significance by participant analysis but not by item analysis, $t(1, 31)=-1.9$, $p=0.06$, $t(1, 31)= -1.4$, $p=0.2$.

Differences between type (a) and type (c) are significant by participant analysis only, $t(1, 32)=-2.7$, $p=0.01$, $t(1, 31)=-1.6$, $p=0.1$.

Significant differences were also found between type (a) and type (d) RCs by participant analysis, but were only somewhat close to significance by item analysis. ($t(1, 31)=-3.7$, $p<0.001$, $t(1, 31)=-19$, $p=0.07$). (This paired comparison was not done by ANOVA, since the difference was caused by two factors rather than one.)

Table 4 Mean RT in the 32-item Analysis

Note: Solid line = significant by both the item and participant analyses; dotted lines = close to significance

RC Type	RT(MS)	Example
(a) DCL-SR-N	5758	<i>zhe-ge xihuan Tanglan de gongchengshi chengshu wenzhong.</i> this CL like Tanglan DE engineer mature This engineer that likes Tanglan is mature.
(b) SR-DCL-N	6032	<i>xihuan Tanglan de zhe-ge gongchengshi chengshu wenzhong.</i> Like Tanglan DE this CL engineer mature This engineer that likes Tanglan is mature.
(c) DCL-OR-N	6093	<i>zhe-ge Tanglan xihuan de gongchengshi chengshu wenzhong.</i> This CL Tanglan like DE engineer mature. This engineer that Tanglan likes is mature

(d) OR-DCL-N	6187_----	Tanglan xihuan de zhe-ge gongchengshi chengshu wenzhong. Tanglan like DE this-CL engineer mature This engineer that Tanglan likes is mature.
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Error rate

The error rate for the four types of RCs are 11, 18, 9, 12. respectively. RC type is a significant factor by participant analysis but not by item analysis. $F(1,28)=4.3$, $p=0.05$; $F(1,28)=3.5$, $p=0.07$. Demonstrative position is a significant factor by both participant and item analysis. $F(1,28)=5.3$, $p=0.03$; $F(1,28)=7$, $p=0.01$. There were no interactions between the two factors.

For Subject RCs, demonstrative position is a significant factor by both participant and item analysis. $F(1,28)=6.8$, $p=0.01$; $F(1,28)=9$, $p=0.005$.

For Object RCs, Dem position is not a significant factor. $F(1,28)=1.3$, $p=0.3$; $F(1,28)=1.1$, $p=0.3$.

For Dem-first RCs, RC type is not a significant factor. $F(1,28)=1.9$, $p=0.2$; $F(1,28)=0.7$, $p=0.4$.

For Dem-second RCs, the factor of RC type is only marginally significant by item analysis. $F(1,28)=3$, $p=0.1$; $F(1,28)=4$, $p=0.053$.

The comparisons between groups are summarized as below:

There were significant differences in the error rate for type (a) and type (b) RCs by both participant and item analyses, $t(1, 31)=-2.3$, $p=0.03$; $t(1,23)=-2$, $p=0.05$.

There were also significant differences in the error rate between type (b) and type (c) sentences by both analyses, $t(1, 31)=3$, $p=0.004$; $t(1,31)=3.9$, $p<0.001$

Difference between error rate in type (b) and type (d) RCs are close to significance

by item analysis, $t(1,31)=1.8$, $p=0.085$, $t(1, 31)=2.0$, $p=0.055$.

There were no significant differences between type (a) and type (c) RCs. $t(1,31)=1.1$, $p=0.3$; $t(1,31)=0.6$, $p=0.5$, or between type (a) and type (d) RCs. $F(1,31)=-0.4$, $p=0.7$; $F(1,31)=-0.3$, $p=0.8$.

Table 5 Error Rate in the 32-item Analysis

Note: Solid line = significant by both analyses; dotted line = close to significance by item analysis

RC Type	Error rate(%)	Example
(a) DCL-SR-N	11 	<i>zhe-ge xihuan Tanglan de gongchengshi chengshu wenzhong.</i> this CL like Tanglan DE engineer mature This engineer that likes Tanglan is mature.
(b) SR-DCL-N	18 	<i>xihuan Tanglan de zhe-ge gongchengshi chengshu wenzhong.</i> Like Tanglan DE this CL engineer mature This engineer that likes Tanglan is mature.
(c) DCL-OR-N	9 	<i>zhe-ge Tanglan xihuan de gongchengshi chengshu wenzhong.</i> This CL Tanglan like DE engineer mature. This engineer that Tanglan likes is mature
(d) OR-DCL-N	12 	Tanglan xihuan de zhe-ge gongchengshi chengshu wenzhong. Tanglan like DE this-CL engineer mature This engineer that Tanglan likes is mature.

The 32-item analysis results are summarized in the following table.

Table 6 Summary of the 32-item Analysis

Note: * = statistically significant; (*) = close to significance

		RT		Error rate	
		by participant	by item	by participant	by item
Subj. vs. Obj. RCs	5895 vs 6140	*	*	*	
	15% vs. 10%				
Dem-1 st vs. Dem-2 nd	5926 vs. 6109		*	*	*
	10% vs. 15%				
(a) vs (c): DCL-SR vs. DCL-OR		*	*		
(b) vs. (d): SR-DCL vs. OR-DCL					(*)
(a) vs.(b): DCL-SR vs. SR-DCL		*	*	*	*
(c) vs. (d): DCL-OR vs. OR-DCL					
(a) vs.(d) – paired sample t		*	*		
(b) vs. (c)- paired sample t				*	*

5.3.1.4. Discussions

Subject vs. Object RCs

As I have discussed earlier, the 32-item analysis should provide the most accurate picture of L2 processing. In the following, I will limit my discussion to the 32-item analysis.

First, we find that Subject RCs are read faster than Object ones. There tend to be more errors associated with Subject RCs, but the difference was significant by item analysis only. At the same time, the error rate in type (b), SR-DCL sentences was significantly higher than type (a) DCL-SR RCs sentences (18% vs. 11%). In two-way ANOVA and paired-sample t-tests, the error rate of type (b) sentences was also significantly higher than type (c) and almost significantly higher than that of type (d) sentences, but the error rate of type (a) sentences was quite similar to that of type (c) and type (d) sentences. That means the relatively higher error rate associated with Subject RCs that we observe could be largely due to more errors with SR-DCL type of sentences, rather than the RC type factor itself. With that understanding, the results indicate that Subject RCs appear to be easier than Object RCs in general. That result is consistent with the Structural Distance Theory, which claim that larger FGD entails greater processing difficulty; it is also consistent with the Perspective Shift Hypothesis. It does not support the Linear Distance Theory. Because the Canonical Word Order (CWO) theory considers the whole sequence rather than processing differences caused by a single factor, it is difficult to evaluate whether the CWO is supported, but there will be more discussion of the applicability of the CWO theory in paired comparisons of different types of RCs.

Demonstrative-first vs. Demonstrative-second

There was evidence that Dem-first RCs were easier than Dem-2nd RCs, reflected in a shorter RT (significant by item) and less error rate (significant by both). The only theory that clearly makes such a prediction is the Structural Distance Theory, or the FGD theory, since demonstrative-second RCs involve a larger FGD with two more nodes as compared to the demonstrative-first counterpart. It does not support the LDT, since demonstrative-first RCs would entail an additional integration from the gap position to the demonstrative position, and the LDT would predict Dem-first RCs to be more difficult than Dem-second ones. It also is not consistent with the PS, since both types of Subject RCs involve no shift in perspective, but DCL-OR involves 2 perspective shifts as compared to 1 perspective shift in OR-DCL. The CWO again does not make clear predictions regarding the effect of demonstrative position.

One should note that there was clear evidence that there were more errors associated with demonstrative-2nd RCs. I will discuss this more in section 5.3.4. “Further discussion about the L2 acquisition of Chinese RCs”.

DCL-SR versus SR-DCL ((a) vs. (b))

In the 32-item analysis, Subject RCs preceded by DCL were found to be read significantly faster than Subject RCs followed by DCL. In addition, the error rate was also lower for demonstrative-first RCs: there was clear evidence that DCL-SR was easier than SR-DCL sentences.

This result does not support the LDT, since a DCL-SR structure involves long-distance filler-gap integration, and an additional integration of the DCL to the head N,

while a SR-DCL does not involve the additional integration cost of the latter kind, the LDT would predict type (b) sentence to be read faster than type (a), contrary to our findings.

The Perspective Shift theory would predict (a) and (b) have the same processing difficulty (or ease), since no perspective shift is necessary for either type of sentence. The result therefore does not support the PS theory. (Note that it does not refute the theory either, if we consider that PS theory does not exclude the influence from other psycholinguistic factors.)

The result supports the Structural Distance Theory. Since the minimum filler-gap domain in (b) requires at least 7 nodes for an SR-DCL structure, (b) should be more difficult than (a).

As was mentioned before, since the Canonical Word Order was not formalized as a well-defined algorithm, and it was to some extent difficult to apply the theory to Chinese. It may even be possible to reformulate the CWO hypothesis post-hoc to fit the data (Kuo & Vasishth, 2006). Here, I will not take the result to be decisive evidence for or against the theory, but will only discuss to what extent it might be applicable. Since Subject RCs in English, with *S that VO order* is assumed to be canonical despite the interruption of the relativizer *that*, it might be reasonable to suggest that Object RCs in Chinese, with *S V de O* order, despite the interruption of *de*, might still be interpreted as having the canonical word order. Such is the interpretation taken by Gibson et al. (2005). With this assumption, the result then would not support the CWO hypothesis.

The only way that the data might be considered supportive of the CWO hypothesis is

to assume that the DCL-V-O sequence, the sequence in (a), is for some reason more ‘canonical’ than the *SV de O* and *VO* sequence. That may not be an unreasonable interpretation, since DCL-V-O sequence could be grammatical in main sentences under certain discourse contexts, as was mentioned before. However, a null subject is also permitted in Chinese in main sentences. Future work on extensive corpora data might then be needed to establish what type of sequence can be considered “canonical”.

DCL-SR versus DCL-OR ((a) vs. (c))

The RT difference in type (a) and (c) sentences was found to be different in both the 48-item analysis and in the 32-item analysis. (There were no significant differences in the error rate.) That is, there is some rather strong evidence indicating that DCL-SR structure is easier than DCL-OR.

Such data would again support the SDT, since the minimum filler-gap domain in DCL-SR involves 5 nodes and DCL-OR involves 7 nodes. It is also consistent with the Perspective Shift theory: Subject RCs would not involve a perspective shift, but the DCL-OR sequence involves two perspective shifts.

RT data for these two types of sentences again do not support the LDT. Both DCL-SR and DCL-OR structures involve two types of integrations, but the filler-gap integration in DCL-SR is more costly than the one involved in the DCL-OR structure, since a longer distance integration is necessary for Subject RCs.

Again, this result cannot be considered decisive evidence for or against the CWO hypothesis. One could, however, suggest that the mismatching classifier in the DCL-OR

sequence must have a rather strong effect in causing processing difficulty. The mismatching classifier effect, however, although related to word order, is not a factor formally articulated in any CWO hypothesis.

DCL-SR versus OR-DCL ((a) vs. (d))

Type (a) sentences were read significantly faster than type (d) sentences in the 32-item analysis. This result is consistent with the SDT: the minimum filler-gap domain involves 9 nodes for type (d) sentences and the RT is predicted to be longer. The result also supports Perspective Shift hypothesis, since OR-DCL sequence requires one perspective shift.

The result is not consistent with the LDT, which would predict type (d) sentences (one short integration) to be easier than (a), with a DCL to head N integration and a long distance filler-gap relation.

The result is also not consistent with the CWO hypothesis unless we assume that *DCL-V-O* is canonical while *SV de O* is not.

(b) vs. (d), (b) vs. (c), and (c) vs. (d)

While RT for type (d) sentences seem to be longer than that for type (b) sentences, the difference was not significant in either the 48-item or 32-item analysis. At the same time, there appear to be more errors associated with type (b) sentences. Therefore, no clear conclusions could be drawn.

There was also no significant difference in the RT between type (b) and type (c) sentences, but there were more errors associated with type (b) sentences. In fact, there

appear to be more errors in type (b) RCs as compared to all other three types of sentences in the 32-item analysis. I will discuss that in the *error rate* section.

No significant differences were found between type (c) and type (d) sentences, and no implications can be made.

Error Rate

Demonstrative position was a significant factor in causing more errors. That is, participants made more word order judgment errors in demonstrative-second RCs. As was pointed out in Chapter 4, while a demonstrative can follow the RC in Chinese, this is not possible in English. That is, because a post-RC position is not a legitimate position for the English determiner *the*, or the English demonstratives *this* or *that*, L2 participants, whose L1 was English, could have had difficulty with demonstrative-second relative clauses in Chinese, and were more likely to judge such sentences to be in the wrong word order based on their experience with their L1.

There were also more errors with SR-DCL sentences in particular. Since psycholinguistic theories only predict processing difficulty, none of these theories make clear predictions regarding judgment errors. A possible explanation related to the word order of SR-DCL sentences could be offered: For DCL-first relative clauses, as soon as a reader encounters the demonstrative and classifier, they would be aware of an upcoming noun phrase. For DCL-second RCs, an object relative clause might cause a garden-path effect, because these sentences start with a noun-verb (-DE) sequence. Until a reader encounters the relativizer DE, he is likely to interpret the input as part of a main clause instead of a relative clause. Nevertheless, while this garden-path effect might affect the

RT, it would not have affected the error rate, since the reader would read on till he figures out the complete structure. For a Subject RC-DCL, however, the sentence starts with a VO sequence. And because the task was a word order judgment task, participants may be tempted to judge the sentence as being in the wrong word order without finishing reading the whole sentence. This may have caused a higher error rate associated with this particular sequence.⁵⁵

5.3.1.5. Conclusion

The RT data generally supports the Structural Distance Theory; the Perspective Shift theory can be considered to be partially supported in the sense that Subject RCs in general appear to be easier than Object RCs. The Linear Distance Theory is not supported by our RT data. While it is unclear if the Canonical Word Order is supported, the DCLs V O de Ns order may have the potential to be considered close to word orders in simple Chinese sentences,

We also have evidence that DCL-Subject RC is significantly easier than all other types of RCs. This might point to the significance of analyzing demonstrative position together with relative clause types in future processing experiment.

5.3.2 Experiment 2

This experiment complements Experiment 1 by using a production task in (a) assessing the effect of DCL position, (b) evaluating the applicability of different models

⁵⁵ Because we focus on the processing difficulty for different types of RCs, RT of those test items that were incorrectly judged as being 'in wrong word order' was not taken into consideration in the current data analysis. It is therefore difficult to evaluate how long the participants took to make an incorrect judgment on those sentences and proceeded to the next one. I acknowledge that the explanation I gave above would remain somewhat speculative until we give a more detailed look into the RT of those items that were mistakenly judged as being 'in the wrong word order'.

in L2 processing, and (c) in probing possible L1 and L2 differences and L2 Chinese learners' language competence.

5.3.2.1 Methods

5.3.2.1.1. Participants

40 L2 participants from the same participant pool of Experiment 1 participated in this experiment. Additionally, there was a control group with 28 Chinese L1 participants.

5.3.2.1.2. Materials

There were 16 test items with transitive verbs (e.g. *see*) to evaluate L1 and L2 speakers' preference for subject and object RCs. Among the 16 sentences, 8 of them were introduced to elicit DCL-RC-N and the remaining RC-DCL-N sequences. The experiment has a counterbalanced design and 16 test items were interspersed randomly with 24 filler items. Because [+agentive] verbs in the main predicate may be more likely to suggest an [+animate] subject and could predispose participants towards Subject RCs, the main clause always has a stative verb (e.g. *likes*) as the main verb. A sample sentence is shown in (16a), and an appropriate response is given in (16b).

- (16)a. _____ de na ge nansheng zai Beijing daxue dushu. (aishang)
 _____ DE that CL boy at Beijing University study. (fall.in.love.
 with)
 'The boy that _____ studies at Beijing University. (fall in love with)'
- b. Wo aishang _____ de na ge nansheng zai Beijing daxue dushu.
 I fall.in.love.with DE that CL boy at Beijing University study
 'That boy that I fell in love with studies at Beijing University.'

5.3.2.1.3. Procedure

This experiment is a written sentence completion task. This task, though not often

used in SLA studies of RCs, has a long track record in other kinds of acquisition studies (Hakansson & Hansson, 2000; Ijaz, 1986; Koda, 1993). Similar continuation tasks have also been used in experimental linguistics (Moxey, Sanford, & Dawydiak, 2001; Sanford & Lockhart, 1990).

In the experiment, participants were asked to fill in the blank to complete a sentence with the word given in brackets. In order to make the sentence grammatical, participants had to produce either a Subject or an Object relative clause. It is assumed that more grammatical productions of a particular type of RC indicates relative ease in that structure. The experiment with L2 participants was conducted in a classroom setting, and participants took 40-60 minutes to complete the task. The experiment with L1 participants was completed via the web and in the participants' own time and space. L1 participants reported that they took approximately 20 minutes to complete the task.

5.3.2.2. Plausibility Norming Survey

Similar to Experiment 1, a questionnaire was conducted to control for potential plausibility differences between the Subject-extraction and Object-extraction conditions. The survey for Experiment 2 materials were in the same survey sheet that was given to native speaker participants who had completed the Plausibility Survey for Experiment 1. Because some participants did not finish the survey, responses from eighteen native speaker participants were valid. In each survey, there were 8 items representing Subject-extraction RCs and 8 items representing Object RCs. Each version of a sentence was read by the same number of L1 participants. To reflect the situation which a targeted Subject/Object relative clause conveys without causing a bias, the resumptive pronoun *ta*

was used throughout the survey. In addition, to remove the relative clause structure, the items tested in the questionnaire consist of pairs of simple sentences. For instance, to test the plausibility for a targeted Subject RC production for the test item shown in (16), the survey item looks like (17a); to test the plausibility for a target Object RC production, the survey item is shown in (17b).

- (17) a. you ge nasheng aishang-le ta. Na ge nansheng zai Beijing
 have CL boy fall.in.love.with-PER he. that CL boy at Beijing

daxue nianshu.

University study

‘A boy fell in love with her. That boy studies at Beijing University.’

- b. ta aishang-le yi ge nansheng. Na ge nansheng zai Beijing
 she fall.in.love.with PERF one CL boy that CL boy at Beijing

daxie nianshu

university study

‘She fell in love with a boy. That boy studies at Beijing University.’

Similar to the Plausibility Survey for Experiment 1, participants were asked to rate the plausibility of the Subject-extraction condition and Object-extraction condition on a scale of 1 to 6. The result of the survey indicates that Subject-extraction sentences are equally plausible as compared to Object-extraction ones ($p=0.2$). The mean plausibility rating for each condition is 2.07 versus 1.91.

5.3.2.3. Results

L1 data were used to help evaluate whether L2 production difficulties stem from difficulty in processing the structure or from learners’ knowledge of the language (i.e., competence issues). For both groups, the number of (attempted) productions of each type of RC—that is, the subjects’ preference for each type of RC—is the dependent measure.

For the L2 group, the accuracy rate (grammatical RC production versus the total number attempted) will also be a measure. Better accuracy with a particular type of RC is assumed to reflect production ease or learners' competence with the structure (i.e., acquisition ease).

Number/percentage of Grammatical Productions

The targeted productions for demonstrative-first RCs (DCL-SU and DCL-OR) and demonstrative-second RCs are 320 RCs each. Results from L2 participants are summarized below. The percentage of grammatical productions for demonstrative-first RCs is 80% (257/320), and the percentage of grammatical RCs for demonstrative-second sentences is 84% (270/320). L2 participants' productions are summarized below.

Table 7 Summary of L2 Learners' Productions

Type	Productions	Percentage	DCL misuse	Resumptive pronouns	Adv+ V	Verb only	Other errors	Total
DCL -SR	182	71%		3				
DCL-OR	73	29%	3		9	9	41	320
SR-DCL	145	54%						
OR-DCL	125	46%		4	2	16	28	320

In other words, the demonstrative-first sequence prompts more productions of Subject relative clauses, while when demonstratives occur second (i.e., immediately before the head noun), the numbers of productions of Subject and Object RCs are close.

Results from L1 participants were summarized below. The target production for demonstrative-first and second RCs are 224 each.

Table 8 Number and Percentage of Target Productions

Type	Productions	Percentage
DCL -SR	173	77%
DCL-OR	51	23%

SR-DCL	113	50.4%
OR-DCL	111	49.6%

Errors

Many of the ungrammatical productions from L2 participants involve severely wrong sentence structures, making it impossible to categorize the error type. Errors that can be categorized include productions of ungrammatical resumptive pronouns, such as (18), Adv+V sequences, e.g. (19), or fill in the blank with the given verb only.

(18) [Yuying pei ta de na ge ren] shi ta zui hao de pengyou
 Yuping accompany she DE that CL person BE she most good DE friend
 The person that Yuping is accompanying is her best friend.

(19) [zhe ge cong xiao-shihou qi hen de ren] jiu zhu zai zhe ge lou li.
 this CL from childhood from hate DE person just live at this CL building in
 The person that (I) hated from childhood live inside this building.

The numbers of error productions and distributions are summarized in Table 7. See discussions of some of those errors in the next section and in section 5.3.4.

5.3.2.4. Discussions

Production patterns from L2 participants are similar to that of L1 participants: That is, for both L1 and L2 participants, when the demonstrative occurs first, there is a preference for Subject RCs. When the demonstrative immediately precedes the head N, there is no preference for a particular type of RC. In fact, the distribution of Subject vs. Object RC productions is almost equally. In other words, although L2 competence issues are relevant to our discussion of the L2 data (see later), the distribution of Subject vs. Object RCs that we observed in L2 data is likely to be due to processing factors, or the innate difficulty caused by the sentence structure itself.

Both the Structural Distance Theory and the Perspective Shift theory can explain the preference for Subject RCs in demonstrative-first sentences. The Linear Distance Theory cannot explain the preference, since it will predict Object RCs to be easier. If we take DCL_S-V-O sequence to be more or less canonical (while a DCL_O-N_S-V-O order is not), CWO theory might also apply.

On the other hand, there is no preference for Subject or Object RCs when the demonstrative occurs second. That would be inconsistent with the SDT, which predicts a preference for Subject RC despite the position of the demonstrative. The CWO theory would predict an Object RC preference in this case. According to the PS hypothesis, there is no shift for a Subject RC-DCL sequence, and 1 shift for Object RC-DCL sequence. It should be noted that the 1 shift is a minor one, because the Object has already received secondary focus at the end of the relative clause, making the shift “less abrupt” (MacWhinny, 2005, p.209). It appears that the PS hypothesis can best explain the preference/distribution patterns.

- (20) a. na-ge ai wo de nansheng zai Beijing daxue dushu. (aishang)
 that-CL love I DE boy at Beijing University study.
 ‘The boy who loves me studies at the Beijing University.’
- b. na-ge wo ai de nansheng zai Beijing daxue dushu
 that-CL I love DE boy at Beijing university study
 ‘The boy that I love studies at Beijing University.’

In (20a), the perspective of the Subject, ‘the boy’ is kept throughout the complete sentence. In (20b), the perspective starts with ‘that CL’, which matches with the main clause Subject ‘the boy’, but has to shift to the perspective of the RC Subject, ‘I’ after the DCL. At the encountering of the head N ‘boy’, the perspective is shifted back. It can be

suggested that the prompt sentence, with a DCL at the beginning of the blank and a head N after the blank, initiates the participants to maintain the perspective of the main clause Subject. Shifting perspectives within the production is more costly, as in (20b). Note also that there are 3 errors (produced by one participant) with the misuse of DCL.

(21) zhe-ge ren zhaogu de linju xing li.
 This-CL person take.care.of DE neighbor name Li
 The neighbor that this person takes care of is named Li.

(21) is not an ungrammatical production, although it was categorized as a type of error in Table 6. The design of the task for participants was to elicit a complete RC within the blank space (i.e., examples given to the students indicated so), while the words already given to the participants make up a main clause. Yet the L2 participant produced an RC with the DCL as part of the Subject of the relative clause

(21')_{[NP [CP [NP zhe-ge ren] zhaogu] de linju] xing li.}

There were no other L2 participants or L1 participants who made this type of error. It does indicate that the DCL at the beginning of the prompt sentence has an effect in keeping the perspective throughout the RC and the perspective of the main clause to be consistent.

Additionally, the production data is consistent with the RT data. In both the 48-item and the 32-item analysis of the RT data, we find significant differences in type (a) vs. type (c) RCs, i.e. DCL-SR vs. DCL-OR, while there were no significant differences in type (b) vs. type (d) RCs. The SDT alone cannot explain this pattern, since the differences in FGD were both 2 nodes for the difference in (a) vs. (c), and (b) vs. (d). It could be suggested that both the SDT and the Perspective Shift Hypothesis can be partly

responsible for the processing difficulty. In the following, I summarize how data from the reading and the production tasks support the SDT and the Perspective Shift theory.

Table 9 Application of Theories to Experiments Results

Note: (a)=DCL-SR-N; (b)=SR-DCL-N; (c)=DCL-OR-N; (d)=OR-DCL-N

	Structural Distance Theory	Perspective Shift Theory
	Supported by SR vs.OR differences; vs. (c) differences; vs. (b) differences; (a) vs. (d) differences	Supported by SR-OR differences; (a) vs.(c) differences--2 shifts in (c) (a) vs. (d) differences—1 minor shift in (d)
	Not supported by no difference in (b) vs. (d); no difference in (c) vs. (d)	Not supported by differences in (a) vs.(b); no difference in (c) vs. (d) no difference in (b) vs. (d)

It appears that both the SDT and the PS hypothesis can explain part of the data. They also make the right prediction that type (a) RCs would be the easiest to process since it involves no perspective shift and only 5 nodes for the FGD. We are tempted to ask why we did not observe differences between type (b) vs. (d), and type (c), (d) RCs. I summarize the number of nodes for FGD and the number of perspective shifts for the four types of sentences below:

Type (a): 5 nodes; no perspective shift

Type (b) 7 nodes; no perspective shift

Type (c): 7 nodes; 2 perspective shifts

Type (d): 9 nodes; 1 minor perspective shift

The effect of the size of FGD and the number of shifts involves in processing the whole sentence may be cancelled out for comparisons between type (c) and type (d) sentences, since while type (c) sentence involves fewer nodes in FGD, processing the sentence demands more perspective shifts. But type (d) should still be more difficult than

type (b) sentences. One possible explanation is that the CWO factor still comes into play at some level. Type (d) sentences follow the order of $N_S V de N_O$, and is generally considered to be more canonical than the $V N de N$ in type (b) sentences.

The difference between (b) and (c) was also not observed in RT data. It may be that the task may not be sensitive enough to detect processing differences caused by the number of shifts alone. Note that when there are differences in both the number of shifts and the FGD size, i.e., type (a) vs. (c), the differences in both the reading task and the production task are clearly observable.

5.3.3. Experiment 3

Experiment 3 is also a written production task. The main purpose of the experiment is to specifically test whether the acquisition of Chinese RCs adheres to the NPAH. That is, apart from SU and DO relatives, do L2 Chinese learners acquire relativizations higher on the hierarchy first, according to $SU > DO > IO > OPreP > Poss$? In addition, this experiment can help us explore issues of competence from learner productions. Assuming that NPAH as a typological observation is true, findings from this experiment will indicate whether L2 learners' Interlanguage (IL) adheres to natural language constraints.

5.3.3.1. Methods

5.3.3.1.1. Participants

45 L2 speakers from the same participant pool as Experiment 1 & 2 were recruited. This experiment is a sentence combination task. (Among them, data from 34 of them were analyzed. See discussion in the Results part.)

5.3.3.1.2. Materials and Procedure

The written sentence combination task is a classical task used to elicit L2 learners' production of RCs ever since Gass (1979)'s study (Roberts, 2000, among many others). It has also recently been used for L2 acquisition studies of Japanese (Ozeki & Shirai, 2007). However, this classical method has never been used in L2 acquisition of Chinese RCs. Each participant was given 20 pairs of sentences in a written test format. Participants were instructed to combine two sentences for each test item following examples given in the instruction section. Examples given to the participants include instances of SU, DO, IO and OPrep relative clauses. (22) provides a test item with two paired sentences. In the experiment, the items were in Chinese simplified characters, with *pinyin*/romanizations at the top of each character. Vocabulary used in this experiment were deemed suitable given results from the Word Recognition Task conducted in Experiment 1.

- (22) --- gangcai wo mama zai zhao yi ge nvren.
 just now I mother PRG look.for one CL woman
 'Just now, my mother was looking for a woman.'
 ---- na ge nvren xing Li.
 That CL girl name Li
 'That girl is named Li.'

The target formulation for (22) is a DO relative clause, i.e., (23), which combines the information in the two statements in (22).

- (23) gangcai wo mama zai zhao de na ge nvren xing Li.
 just now I mother DUR look.for DE that CL woman name Li.
 'The woman that my mother was looking for just now was named Li.'

There were 20 test items, with 4 items eliciting each of the following types of RCs: SU, DO, ID, OPrep, and Possessive RC in the Object position, and Poss. The entire test, including instructions, is given in the Appendix E.

The items are randomly ordered and controlled for animacy: sentence (b) always has

a stative verb (e.g. “live”, “like”), and the head noun of the target RC is [+human]. For sentences eliciting SU and DO RCs, sentential AdjPs like *gangcai* (“just now”) are added, as in (22), so that the lengths of the expected productions for all RCs approximately match.

The experiment also has a counterbalanced design for SU and DO relatives: each SU relative has a DO relative counterpart. For instance, a counterpart to (22) is (24).

- (24)--- gangcai you ge nvren zai zhao wo mama.
 just now exist CL women DUR look-for I mother.
 ‘Just now a woman was looking for my mother.’
 --- Na ge nvren xing Li.
 That CL woman name Li.
 ‘That woman is named Li.’

This experiment was conducted after Experiment 1 but before Experiment 2, and was administered in a regular class period of 50 minutes. I administered the experiment. In addition to the examples and instructions given on the written sheet, oral instructions were given to clarify the task, and additional examples of SU, DO, IO, and OPrep RCs with one instance each were given. The experiment was not timed, but all participants finished the task within 50 minutes, and the fastest participant finished within about 25 minutes. There were no questions about vocabulary or use of reference books, even though participants were allowed to use dictionaries and ask questions about the meanings of unfamiliar words.

5.3.3.2. Scoring

The test was scored based on whether the participants produced the target sentence, as shown by the example in (22). The scoring was either 1 (correct) or 0 (wrong).

Productions with a grammatical RC but with demonstrative-first structures, or with RCs without the demonstrative were scored as 1, since they are grammatical RCs, and convey the same meanings as target productions. It should be pointed out that the examples given to the participants contain only demonstrative-second RC structures.

Types of errors were categorized (see later). Following Ozeki & Shirai (2007), combining the two sentences into sentences with wrong order (i.e. miscombination) was considered a wrong response, regardless of the grammaticality of the produced sentence. That is, the target production is to change the first sentence in the pair into a relative clause, while using information provided in the second sentence as the main clause predicate. For instance, for a test item in (22), instead of producing (23), which is the target production, some participants produced a sentence like (25), using the verb in the first sentence as the predicate for the main clause, or produced a simple sentence without an RC if the second sentence in the prompt pair contained a copula and an AdjP, in which case they changed the second sentence into an AdjP-DE-N structure.⁵⁶

- (25) gangcai wo mama zai zhao yi ge xing Li de nvren.
 just now I mother DUR look.for one CL name Li DE woman
 ‘Just now my mother was looking for a woman named Li.’

Other types of errors are categorized will be explained in detail in the next section.

Written questionnaires from 11 participants were not analyzed. Among those 11 participants, 3 participants produced sentences of miscombinations for all the test items, indicating that they did not understand/follow instructions. 4 of them produced most

⁵⁶ Given my analysis in Chapter 4, AdjP-DE-N can still be considered relative clauses. Therefore, this type of error that the learners made does not necessarily indicate that they cannot produce RCs, but rather a simple miscombination error.

sentences as miscombinations except for one or two sentences in which they correctly followed the instructions. (Two of them only responded to the first test item correctly, producing a grammatical Subject RC; a third participant responded correctly to the first and the last items, producing Subject RCs for both, and a fourth participant had the correct response for item four, producing a Direct Object relative clause.) No other participants made more than 9 errors in miscombination. Another 4 participants could not produce relative clauses at all, or never used relativizer *de* throughout the questionnaire.

Possessive RCs were not analyzed in our current study. As was mentioned in Chapter 4, the grammaticality of relativizing an Possessive RC in an Object position without a resumptive pronoun may depend on dialectic differences. The purpose of including Possessive RCs in this experiment was to collect sample data to initiate possible future studies in Chinese Possessive RCs.

5.3.3.3. Results

The scoring/ number of target productions for each type of RCs are summarized below:

Table 10 Scoring of Different Types of RCs

RC type	Subject RC	Object RC	Indirect Obj.	Obj. of Prep
score	119	117	27	39

Among those correct responses, there were three types of responses that differ slightly from the exact ‘target production’ shown in example (22). They were (a) using *yi-ge* (one-CL) instead of Dem-CL, (b) not using Dem-CL, and (c) using Dem-CL at the beginning of the RC (forming a demonstrative-first relative clause).

Errors were categorized into the 9 categories summarized in Table 11.

Table 11 Error Types in Different Types of Relative Clauses

	Subject RC	Object RC	Indirect Obj. RC	Obj. of Prep RC	Total
Pronoun retention	0	2			3
Resumptive NP			3	4	7
Pronoun missing	/	/	90	46	136
Miscombination	3	6	3	6	18
Change into SU RC type (by using <i>bei</i>)	/	4 (meaning change in 1 case)	7 (meaning change in 3 cases)	14 (meaning change in 2 cases)	25
PreP missing & Prep wrong				17+2	19
Miss <i>de</i>	1	2			3
Structural errors	11	4	4	6	23
Others		1(orthographical)	4(gei/ba)	2orthographical (?)	7

(There were two cases within IO errors where the errors were counted twice, because the sentences involve both a ‘pronoun missing’ error and a misuse of *gei* ‘give’/ba.)

“Pronoun retention” was the use of a pronoun in a position where there should be a gap. This type of error was frequently reported in acquisition studies of RCs in European languages, (e.g. Gass, 1979; Eckman et al. 1988). (26) provides an example.

(26) wang xiansheng zai wuzi li deng ta de na-ge pengyou shi ta de tongxue.

Wang Mr. at room in wait he DE that-CL friend BE he DE classmate.

The person that Mr. Wang was waiting for inside the room was his classmate.

Relevant to this issue, some participants produced a resumptive NP instead of a resumptive pronoun in the ‘gap’ position.

(27) Xiaozhang gei-le yi ge pengyou wubai-kuai-qian de na-ge pengyou
 Xiaozhang give-PERF one CL friend 500-dollar DE that-CL friend

mei-you gongzuo

not-have job

‘The friend that Xiaozhang gave 500 dollars to does not have a job.’

I will analyze both these errors along the same lines in the Discussion section.

The change of RC type was a phrase-internal error, in which participants combined the two sentences into a Subject RC, often with the use of a passive marker *bei*. We only found cases where a targeted DO, IO, OPrep production was changed into a Subject RC. Productions with *bei* did not change the meaning of the sentence. One participant changed the RC type without using a passive marker, and therefore the production changed the meaning of the original paired sentences. For instance, a paired-item eliciting an OPrep relative clause was shown in (28a). The participant’s production was a Subject RC, in (28b).

(28) a. wo mama xiang yi-ge ren wen-lu. Na-ge ren shi ge lao taitai.
 I mother from one-CL person ask-way. That-CL person BE CL old lady
 ‘My mother asked a person for directions. That person was an old lady.’

b. Xiang wo mama wen-lu de ren shi ge lao taitai.
 from I mother ask-way DE person BE CL old lady
 ‘The person who asked my mother for directions is an old lady.’

“Missing pronoun” was an error only relevant to IO and OPrep relative clauses. With OPrep RCs, there were also errors with missing the complete Preposition phrase (the preposition and the object NP of the preposition together.) These appeared to be the most prevalent errors for IO and OPrep RCs.

“Structural errors” are cases of productions without a relative clause, or anything that could be potentially analyzed as a relative clause. Other errors include orthographical

errors and 4 cases where the participants attempted to use a *BA*-structure or the three-argument verb *gei* to produce an IO relative clause, but with ungrammatical productions. These cases indicate that the participants understand the prompt verb to be a three-argument verbs but cannot produce grammatical sentences with them. These issues are not directly relevant to our current purpose.

Finally, there were two instances of missing the relative marker *de*. Missing relative marker as an error type has been observed in previous SLA studies of relative clauses (e.g. Gass, 1979).

5.3.3.4. Discussions

Relevance to the NPAH

First of all, the scoring in the four types of RCs indicates that Subject and Direct Object RCs are easier than Indirect Object and Object of Preposition RCs. At the same time, the difficulty between SU and DO RCs appeared to be similar. That is consistent with our findings in the RT task for Subject-DCL and Object-DCL relative clauses, and consistent with the Experiment 2 in which we found the numbers of grammatical productions in Subject versus Object RCs in demonstrative-second context to be close. Since the NPAH predicts the Subject RCs to be easier, this result did not seem to provide direct support for the hierarchy in terms of the lack of difference in learners' performance in producing Subject and Object RCs. However, this may be explained in terms of a "ceiling effect": these L2 learners may have already acquired both the Subject and Direct Object relativization. Recall that in Ozeki & Shirai (2007)'s study using corpora data and a similar combination task, they did not find significant differences between SU and DO

RC productions either, and they also report that Oblique (Object of Preposition) RCs are acquired later than SU and DO RCs. They consider such results as being not very consistent with the NPAH. However, Eckman (2007) has a different interpretation of the data: He comments that Ozeki & Shirai's results actually support the NPAH since "the hierarchy does not exclude grammars in which both SU and DO relatives emerge simultaneously and are acquired before OBL relatives" (p.325). Similarly, results from our Experiment 2 and 3 are certainly not inconsistent with the hierarchy.

Additionally, the error of "changing RC type" may indicate that Subject RCs could indeed be easier than other types, since when participants produced a different type of RC than the targeted production, they always changed other types of RCs into a Subject RC, often by the use of passivizer *bei*. The same "type change" error was reported in Ozeki & Shirai's study too, in which almost all (38 out of 40) 'type change' errors involve changing other types of RCs into Subject RCs by passivization, case markers, and changing verbs. While noting that this is consistent with the NPAH, Ozeki & Shirai caution that the DO/OPrep RC to SU conversion may not be triggered by grammatical relations but by the animacy of the head noun instead. In their study, they used both animate and inanimate head nouns, and almost all the type change errors (37 out of 38) occurred when the head noun is animate. They therefore consider that the preference for Subject RCs may be due to the animacy effect. In our experiment, only animate head NP is used and I therefore leave it open to future research for the exact interpretation of such a "type change" error.

We did find the differences in the number of correct responses for Indirect Object

RCs and Object of Preposition RCs, versus SU and DO relative clauses, indicating that IO and OPrep RCs are much harder and that is consistent with the predictions of the NPAH. (That was also similar to findings in Ozeki and Shirai for L2 acquisition of RCs in Japanese.)

We found fewer grammatical productions in IO relative clauses than in OPrep, which might imply that learners have acquired better competence with OPrep than IO relativization. This might at first seem somewhat unexpected, since it was often suggested in previous research (based on English RCs) that learners' acquisition order often adheres to the hierarchy too (e.g. Gass, 1979). The proposed rationale for that consistency is because the language universal should be in some way relevant to processing ease, and that such processing ease might be reflected in 'greater accuracy' in more accessible positions (Gass, p.339). However, it should be noted that psychological ease and acquisition ease do not have to coincide with each other. Importantly, English uses the gap-strategy for all types of RCs under investigation, including SU, DO, IO, OPrep (and Possessive RCs and Object of Comparison RCs in some studies). When relativization using the gap strategy becomes costly (in processing), learners might switch to the resumptive pronoun strategy. That would surface as a learner error in studies of English RC acquisition. Therefore, in those studies, the acquisition order would appear to follow the hierarchy of the processing ease. In other words, the NPAH then correctly predicts the order of processing difficulty, as well as acquisition difficulty.

Interestingly, the most prevalent error in IO relativization is "missing pronoun", which resulted in less accuracy with IO RCs than OPrep ones. If we consider the gap

strategy and the resumptive strategy to be legitimate relativization strategies of learners' interlanguage (IL), disregarding how much the IL conforms to the target language, we observe that the learners' relativization strategies are like the following (note that using a pronoun strategy for Subject and Object RCs, and using a gap strategy for Indirect Object and Object of Preposition RCs are ungrammatical in Chinese):

Table 12 Strategies Used for Different Types of RCs

RC type	Subject RC	Object RC	Indirect Obj.	Obj. of Prep
Gap strategy	119	117	90	46
Pronoun strategy	0	2	27	39

It is obvious from Table 12 that as the position goes lower on the hierarchy, L2 learners tend to rely more on the resumptive pronoun strategy and avoid the gap strategy. That is consistent with the original observation stated by the NPAH, that pronoun retention is more common in lower positions. Also importantly, all participants who have correctly used the pronoun strategy in the IO position, used that strategy on OPrep position too. (A few productions with other error types such as “changing RC type” were excluded from this consideration.) And participants who have used the “gap” strategy in OPrep RCs used the gap strategy for all RCs too. That is, no participants used the gap strategy for OPrep relative clauses but the pronoun strategy for IO relatives. In other words, although participants who have used the gap strategy for IO relatives are not adhering to the target language form, they are using the different strategies in a way consistent with the natural order of difficulty. In other words, the NPAH is useful in explaining the trend of switching between the two relativization strategies for the L2 group, and is applicable to the relativization strategy used by individual L2 learners too.

As Eckman (2007) has pointed out, to examine whether the L2 acquisition of RCs in a given language is consistent with the NPAH, analysis would be better made based on individual data, instead of on group data (p.325-326). This is because one should not expect each learner's Interlanguage grammar to be exactly the same with one another. As long as individual learners' IL is consistent with the hierarchy, results from the L2 experiments are considered supportive to the hierarchy.

In looking at individual learners' data from Experiment 3 in detail, there appear to be two learners who started using the pronoun retention strategy occasionally at the DO position on the hierarchy, and they use the pronoun strategy systematically for IO and OPrep RCs. Their IL can be comparable to natural languages such as Persian and Genoese, languages which use the pronoun strategy optionally at the DO position but use that strategy systematically for all lower positions (See Keenan & Comrie (1977, p.94)'s observation of RC strategies in different languages.) Seven L2 learners use the gap strategy systematically for the RCs on SU, DO, and IO positions, and they used the pronoun strategy systematically for OPrep RCs (Among them, two learners did not make any other errors in the whole experiment, and five of them used the gap strategy systematically for SU, DO and IO relativization, and they used the pronoun strategy in OPrep relativization even though they made other errors irrelevant to pronoun retention. In other words, those learners appear to use the gap strategy for the IO position and all positions higher than that on the hierarchy, but not positions lower than that. Again, their IL grammar can be comparable to some natural languages. For instance, Keenan & Comrie observe that Shano uses the gap strategy in relativizing SU, DO, and IO, and uses

the pronoun strategy in relativization in the OPrep position and positions lower than OPrep.⁵⁷ Five participants displayed a pronoun retention pattern consistent with Chinese, the target language, in their production, using the gap strategy on SU and DO positions, but the pronoun strategy on lower positions. Seventeen L2 learners use the gap strategy in relativizing all the positions. That is not the grammatical pronoun retention pattern in Chinese RCs, but the grammatical pattern in English ones. Finally, two learners used the gap strategy systematically for SU, DO, and IO positions, but their productions of OPrep RCs are ungrammatical due to other errors (miscombination, changing RC type, etc.).

In Table 13, I summarize the L2 learners' pattern of using the pronoun strategy in Chinese RCs.

Table 13 Patterns of Pronoun Retention in RCs in Learners' IL

SU	DO	IO	OPrep	Number of L2 Learner	Natural language example
-	(+)	+	+	2	Persian; Genoese
-	-	+	+	5	Chinese (target language)
-	-	-	+	7	Shano
-	-	-	-	17	Japanese; English (L1)
-	-	(+)	(+)	1	?
-	-	-	?	2	

Note: - means that pronouns are not retained in that position when it is being relativized (a gap strategy is used when relativizing an NP in that position); + means that a pronoun strategy is used when relativizing an NP in that position. (+) means that the retention of the pronoun varies in the learners' production and is optional in the natural language examples. ? means lack of data.

Irrelevant errors such as RC internal structural errors and miscombination are excluded from consideration in the summary in Table 13. Most L2 learners' IL clearly adheres to the NPAH, and natural language examples that use the same pronoun retention

⁵⁷ Keenan & Comrie (1977)'s observation is that the pronoun strategy is used optionally in relativizing OPrep in Shano, and is used obligatorily in relativizing lower positions, i.e. in Genitive RCs and in Object of Comparison relativization. Still, the pattern of using pronoun retention in relativization in Shano is largely similar to those learners' IL grammar.

pattern can often be found.

Only one learners' production appears to be an exception. This learner uses the gap strategy systematically for SU and DO RCs, but uses the pronoun strategy occasionally for IO and OPrep RCs (In one out of four test items for both types of RCs, he used the pronoun strategy, and used the gap strategy in three other items.) Still, this learners' IL is not inconsistent with the hierarchy, as the NPAH does not exclude a grammar that permits flexibility within the two relativization options (gap and pronoun) on two adjacent positions. I used Keenan & Comrie (1977, p.94)'s list of relativization strategies of 26 languages as a reference to find compatible natural language examples. While I could not find a natural language among the 26 languages that they listed, it is very possible that some languages may use the pronoun strategy optionally for IO and OPrep positions, just like that particular learner's IL. In sum, detailed analysis of individual learners' Interlanguage certainly appears to be generally consistent with the NPAH.

Errors of Miscombination

This type of error was also found to be the most prevalent error in Ozeki & Shirai's study. (In their study, miscombination errors always generate a non-RC sentence, since they used a copula in the second sentence for all the paired test items.) Because it was emphasized in the training session that miscombination was considered an "incorrect" response and should be avoided, we did not find as many miscombination errors as in Ozeki & Shirai's study.

In another experiment (not discussed here) in which L1 participants were tested on the same materials used in Experiment 3 but without the training session, many L1

speakers combined the two sentences in the wrong order too. That indicates “miscombination” is not a type of error associated with L2 competence. While there is not a straight-forward explanation for this type of error, some suggestions (apart from the fact that the second sentence in the paired-item is always shorter than the first one) may be potentially helpful for future research. First, in some cases the second sentence in the paired-item uses a copula, making it possible for participants to use a *AdjP de NP* structure. In Experiment 3, all those *AdjP* can occur in predicate positions. It should be noted, however, that some participants omitted the adverbial *hen* when combining the sentences, making their *AdjP de NP* production impossible to be analyzed as RCs given my analysis in Chapter 4. In other cases, the second sentence involves a stative verb and miscombination would still result in an RC, and particularly, a Subject RC. If Subject RC is inherently easier than all other types of RCs, then it is not surprising that participants tend to relativize the second sentence instead of the first one. Finally, it may also be possible that RCs involving a [+stative] verb is for some reason easier to than RCs with [+dynamic] verbs.

5.3.4. Further Discussion about the L2 Acquisition of Chinese RCs

In the following, I will discuss issues related to L2 participants' competence.

Demonstrative Position

In Experiment 1, we found that participants made more errors in demonstrative-second RCs. A possible explanation is L1-L2 difference. It has been noted in Chapter 4 that English determiners and demonstratives never occur in post-RC positions, while Chinese demonstratives can. According to some L2 participants' responses after the

experiment, they had little exposure to relative clauses used together with demonstratives. It is therefore likely that when L2 participants made word order judgment, they would consider a pre-RC position, a position that is grammatical for English determiners, to be a grammatical position for DCL, but a sentence with post-RC DCL to be in the “wrong word order”.

In addition, Experiment 3 revealed that participants may be avoiding using DCLs in a post-RC position even when they are prompted to do so. Recall that in the task, the first sentence in the pair was to be relativized, and the second sentence always starts with a DCL. All the examples in written instruction and in the training session also contain post-RC DCLs. L2 participants seem to resort to some ‘avoidance’ strategy in their production. Those include not using DCL at all, or using *yi-ge* (one-CL) in the post-RC position, or using DCL in pre-RC positions. It is also interesting to note that the pre-RC DCL strategy is used mostly for Subject relative clauses, forming the order of DCL-Subject RC. As was found out in both Experiment 1 and Experiment 2, DCL-Subject RC appear to have the greatest processing ease among the four types of relative clauses under investigation.

In sum, L2 participants may be reluctant to accept DCLs in post-RC positions due to their accustomed word order in relative clause structures in English.

Pronoun Retention

Pronoun retention was often reported to be a frequent error in SLA studies of English relative clauses (Gass, 1979; Eckman et al. 1988). This type of error was not found in Ozeki and Shirai (2007)’s study of Japanese RC acquisition. Although pronoun retention

was not a ‘frequent’ error in our experiments, there were instances of such errors in both Subject and Object RCs in both Experiment 2 and Experiment 3. Additionally, in Experiment 3, there were errors of ‘resumptive NP’. Both types of errors can be analyzed as a non-movement structure. For instance, the sentence with a resumptive pronoun shown in (26) is repeated here as (29a), with a structure in (29b).

- (29) a. wang xiansheng zai wuzi li deng ta de na-ge pengyou shi ta de tongxue.
 Wang Sir at room in wait he DE that-CL friend BE he DE classmate.
 ‘The person that Mr. Wang was waiting for inside the room was his classmate.’
 b. [NP [CP [TP wang xiansheng zai wuzi li deng ta] de] na-ge pengyou]

Such errors are not surprising, if we assume that a filler-gap relation with movement is psychologically more costly than a coindexing relation between the resumptive pronoun/NP and the head NP.

In addition, we noticed that resumptive NPs only appeared in IO and OPrep RC productions, but not in Subject and Object RCs. This probably has something to do with the filler-gap distance: if the filler-gap distance is short, and a resumptive NP is used, the same NP (the head N) will be repeated within only a few words.

Interestingly, such examples were found in the L1 acquisition of Chinese RCs by Chinese children (Chiu, 1996). That indicates that the use of a non-movement structure in producing RCs is a strategy adopted by L2 learners (of different languages) as well as L1 learners too.

Other Competence Issues

Other types of errors that we have seen in the production data include the use of a AdvP-V-N structure for a relative clause, missing relative marker *de* and missing or

mistakes with Prepositional Phrase.

(30) gives an example of AdvP-V-N production in Experiment 2.

(30) zhe ge cong xiao-shihou qi hen de ren jiu zhu zai zhe-ge lou li.
 this CL from childhood hate DE person just live at this-CL building in
 ‘This person that (I) hate from childhood lives in this building.’

It should be pointed out that there were 2 such cases in L1 participants’ production of this type too.

(31) zhe ge teyi qinglai de ren shi ge lao tongxue.
 this CL for.special.purpose invite DE person BE CL old classmate
 ‘This person who (we) invited here for a special purpose is an old classmate.’

In the categorization of the errors, this was analyzed as an attempted Object relative clause, with a missing Subject.

(32) this CL [pro [from childhood] hate DE] person

Finally, errors of missing the complete Prepositional Phrase (PP) might be due to structural difficulty associated with OPrep relative clauses, or learners’ difficulty with the PP itself. Erroneous usages of the PP also indicates learners’ lack of full competence with certain prepositions.

5.4. Conclusion

In this chapter, I reported results from three second language processing and production experiments. The self-paced reading task reveals that Subject RCs in general are easier than Object RCs (for L2 participants), and DCL-Subj.RC-N appear to be the easiest among the four types of RCs crossing extraction type and DCL position. This result, together with the findings in Experiment 2, a production task, supports the Structural Distance Theory. There also appears to be some support for the Perspective

Shift Theory, particularly from Experiment 2 result. At the same time, this can also be interpreted as support that psycholinguistic theories can indeed be helpful in explaining L2 processing and production data.

In Experiment 3, we find that L2 learners can produce Direct Object and Subject relative clause with similar accuracy. I interpret this as a “ceiling effect” indicating that learners have acquired both structures. On the other hand, evidence such as “changing RC type” errors indicates that Subject RCs are likely to be easier. Indirect Object and Object of Preposition RCs seem to be harder for learners. We also find that individual learners’ use of pronoun retention is consistent with the Noun Phrase Accessibility Hierarchy. In other words, data from the production tasks indicates that the L2 acquisition of Chinese RCs adheres to the same pattern that is observed in the L2 acquisition of RCs in other languages, and learners’ Interlanguage appears to be subject to universal constraints such as the NPAH.

Experiment 1 and Experiment 3 also reveal that L2 learners also have difficulty with DCL-second relative clauses. This could be interpreted as an L1 transfer issue, since English does not allow Determiners to be in post-modifier positions. At the same time, many learners also have difficulty using the pronoun retention strategy in Indirect Object and Object of Preposition positions. Again, this could be due to a negative L1 transfer: those learners use the same patterns of pronoun retention in relativization in Chinese as they do in English. Such difficulty and errors, as well as other competence issues revealed from the production tasks, merit attentions from scholars and teachers in Chinese as a Foreign Language teaching.

Apart from pedagogical importance, which I will not dwell on here, a few words need to be said regarding the implications these experiments for future research. First of all, the current self-paced reading task only involves L2 participants. I did not include L1 participants in that experiment because I do not assume that L1 and L2 processing strategies must be similar. In other words, while the Structural Distance Theory and the Perspective Shift Theory seem to provide motivations for processing difficulty in certain types of RCs for L2 learners in the experiments, L1 speakers may use different mechanisms. Therefore, findings from these L2 experiments might well not correlate with L1 processing difficulty. At the same time, future research in and a straight-forward answer to L1 processing difficulty can be very useful in interpreting our L2 data in more depth: we would then be able to see whether learners' reliance on establishing a filler-gap relation in a non-linear structure is due to universal processing patterns that are applicable to both L1 and L2 processing, or whether learners rely on processing strategies preferable in their L1 in reading and producing sentences in a second language.

Another issue that might be worth exploring in future is whether the processing difficulty of RC-DCL-N sequences may vary depending on whether the RC describes an i-level or s-level modification. In Chapter 4, I propose that RCs describing i-level properties, if in an RC-DCL-N sequence, will involve extra movement to the Spec of ForceP position. If speakers do rely on the structure in processing sentences, one might expect processing an i-level RC in that sequence to be more difficult than processing an s-level RC in the same context. Experiment 1 in my project did not distinguish these two types of RCs in its design, but this might be an interesting area to explore in both the L1

and L2 processing of Chinese relative clauses.

APPENDIX A: LANGUAGE BACKGROUND SURVEY

1. Please circle around those words that you do not know.

读 钱 陪 住 帅 找 玩 弄 来 爱 穷 教 不久 不好 不错 中文
 主任 人品 做事 关系 内向 写信 军人 军官 军队 刚来
 加州 博士 印度 友好 同事 同学 喜欢 回来 外向 外国
 大家 女孩 学习 害怕 家里 寻找 尊重 小心 工作 毅坛
 帮助 干部 年轻 开朗 弹琴 很久 性格 想念 成熟 才能 批评
 拜访 推荐 支持 最近 有名 朋友 欣赏 歧视 漂亮 热心
 热情 照顾 熟悉 现在 班长 搞审 电脑 相信 看见 稳重
 经常 经验 结婚 老实 联系 能干 衣着 解雇 寿裁 警察 认真
 认识 讲究 请来 读书 负责 邻居 部队 重视 附近 雇用
 领导 鼓励 不喜欢 不太好 会计师 老战友 有礼貌 班干部 听辰基
 办公室 好朋友 受欢迎 工程师 看电影 情报人员

2. If you made mistakes in the experiment, how often is it because of your unfamiliarity with the words?

1. Almost never 2. Seldom 3. Sometimes 4. Often 5. Almost always

3. Language background

- What is your native language? _____
- At what age did you start to learn Chinese and for how many years? _____
- Have you ever lived in a Chinese-speaking country? And if so, for how long?

- Are you related to any Chinese native speaker by marriage or other terms?

e. Please estimate your level of Chinese on a scale of 1 (beginner) to 5 (advanced).

Speaking 1 2 3 4 5 Listening 1 2 3 4 5

Reading 1 2 3 4 5 Writing 1 2 3 4 5

APPENDIX B: INSTRUCTION SHEET FOR EXPERIMENT 1

Thank you for participating in this experiment.
Please turn off your cell phones.

Procedure/Instructions:

In this experiment, you will read some Chinese sentences. Only some of the sentences have correct word orders. For instance, in (a), words are in the correct word order and in (b), words are not in the correct order.

(a) 小张去过很多美国的城市。

(b) 很多城市美国的去过小张。

If you think that a sentence has correct word order, please press the SHIFT key on your right hand side. If you think the sentence has incorrect word order, please press the SHIFT key on your left hand side. (For sentences in wrong word order, please do not try to think what it should be – Just tell the computer that it is wrong using left SHIFT.) The key is: **try to proceed as fast as you could, but also as accurately as you could.**

If your answer is correct, the computer will tell you “CORRECT”. (A number will also appear next to “CORRECT”, please ignore that number.) If your answer is incorrect (e.g., for a sentence in wrong word order, you pressed the right SHIFT key), “Wrong” will appear on the screen. If you notice you made many mistakes, please slow down.

While trying to make the right judgment, you also want to read quickly. If it takes you too long to respond, the computer will say “No response” and will automatically move on to the next item.

There are 10 practice items. Then, there are 120 real experiment items. After every 20 sentences, the screen will prompt you “休息一下，然后请继续”。 You can take a short break at that time, and press SPACE key when ready.

This experiment should take you about 30 minutes (or less) to finish.

The following names will be used in the experiment:

小张 小李 小林 小王 小陈 老高 唐兰 张力 大卫 珍妮 安妮

Thank you very much for your time! Your participation is very important for us to understand how we read and learn Chinese!

APPENDIX C: EXPERIMENTAL MATERIALS FOR EXPERIMENT 1

Group A items: y indicates that the item is used in the 32-item, 32-participant analysis.

- 1y 这个重视小李的朋友很热心。
- 2y 这个请来小张的军官来军队很久了。
- 3 这个喜欢唐兰的工程师成熟稳重。
- 4y 这个相信小王的人工作很认真。
- 5y 这个相信小陈的班长很负责。
- 6y 这个支持小王的干部工作很认真。
- 7 这个推荐小林的人很能干。
- 8y 这个不喜欢小林的人经常来这儿。
- 9 这个看见唐兰的女孩很有礼貌。
- 10 这个拜访小陈的邻居家里很穷。
- 11y 这个教过小张的人现在很有名。
- 12y 这个想念小王的老战友经常写信回来。
- 13y 不喜欢张力的这个人学习不太好。
- 14 欣赏唐兰的这个男同学很讲究衣着。
- 15y 相信小王的这个同事很老实。
- 16y 喜欢小张的这个同学人品不错。
- 17 爱上小陈的这个博士读过很多书。
- 18y 爱上唐兰的这个人性格很好。
- 19y 请来大卫的这个女生性格内向。
- 20y 爱上安妮的这个诗人很内向。
- 21 鼓励唐兰的这个人中文学得很好。
- 22y 陪着小林的这个同学长得很漂亮。
- 23y 想念小王的这个女孩还在加州读书。
- 24 解雇老高的这个人人品不好。
- 25y 这个小李害怕的人就住在我们家附近。
- 26y 这个小陈帮助的警察做事很认真。
- 27y 这个小李支持的人是我们的好朋友。
- 28y 这个小张认识的军人经常和我们一起玩。
- 29 这个老高欣赏的班长刚来部队不久。
- 30y 这个唐兰批评的班干部不太受同学欢迎。
- 31y 这个小王批评的同事和大家关系不好。
- 32 这个张力熟悉的同学经常和大家一起看电影。
- 33y 这个小张喜欢的女孩叫珍妮。
- 34y 这个小李不喜欢的女生最近结婚了。

- 35 这个我们尊重的领导对大家都很好。
- 36 这个小林雇用的会计师很有经验。
- 37y 小陈联系的这个警察很有才能。
- 38 小明歧视的这个印度同学很会玩电脑。
- 39y 小李认识的这个外国朋友性格开朗。
- 40y 小陈帮助的这个同学很友好。
- 41 唐兰联系的这个情报人员很小心。
- 42 老高拜访的这个朋友很热情。
- 43y 小王陪着的这个办公室主任很友好。
- 44y 唐兰照顾的这个邻居很有礼貌。
- 45y 唐兰喜欢的这个男人很帅。
- 46y 唐兰爱的这个男生喜欢弹琴。
- 47y 小张找的这个人是年轻女孩。
- 48 大卫寻找的这个女孩是我朋友。
- 49 小王的想念去中国很想这个同学。
- 50 支持的小李人都很好这些。
- 51 信任小林这个的很认真工程师工作。
- 52 保护这个人的他的哥哥小王是。
- 53 看到的唐兰很男生高兴这个。
- 54 批评显然小张的这个不高兴很人。
- 55 认识小王钱这个的没有朋友。
- 56 想念大卫的女孩这打个经常电话。
- 57 打小王这个同学的友好很不。
- 58 相信没有钱唐兰这个男生的。
- 59 鼓励小王的责任感老师很有。
- 60 跟着小李这个的走得人很快。
- 61 这个的男人很高兴唐兰见到。
- 62 这个人推荐的小张我们老师是。
- 63 这个看到热心的很人小陈。
- 64 支持老王人很这个的激动。
- 65 这个伤害有钱的小李很商人。
- 66 这个伤害被解雇的人了小李。
- 67 这个寻找的很担心唐兰人。
- 68 这个打的生气小王同学很。
- 69 这个很等的人小明耐心。
- 70 这个关心小张担心的人很。
- 71 是他的同学这个送小李的人。

- 72 这个知道教老师我的很多。
- 73 王经理的有人解雇很这个家里钱。
- 74 带来的很朋友张力开朗。
- 75 小陈好介绍很这个的人人品。
- 76 小张想念地方的很住在的人远。
- 77 唐兰很喜欢玩游戏的邻居请来。
- 78 小张一直很爱的支持他人这个。
- 79 安妮爱上是的中国那个留学生人。
- 80 他打的那个人医院住了。
- 81 小张自信鼓励的那个残疾人很。
- 82 唐兰那个是欣赏的军人美国人。
- 83 他感谢的人那些以前帮忙经常他。
- 84 小林那个人是的我们的新同学请来。
- 85 这个老高反对的有在地位部队人。
- 86 那个小张的人是新来的批评学生。
- 87 这个小李送的人他的美国朋友是。
- 88 这个小王老客户见到的人我们是。
- 89 这个是公司的经理的人小王起诉。
- 90 小张那个指挥的很自信人。
- 91 这个小张很认识的人聪明。
- 92 这个对人小陈很热心重视朋友的。
- 93 那个小李尊重经常人加班的。
- 94 那个看到的老师是人小张我们的。
- 95 这个我们是部长人小张的请来。
- 96 那些北京大学比赛美国一个办了联合学校的。
- 97 张力的这个同学住在加州。
- 98 这个班的学生都很努力学习。
- 99 小林的这个朋友很开朗。
- 100 安妮的这个邻居很热心。
- 101 老高的这个儿子在读大学。
- 102 小李的这个美国朋友一直想去北京。
- 103 这本书是我们送唐兰的礼物。
- 104 这个网络公司的经理是我的老同学。
- 105 我的美国同学都很喜欢这本书。
- 106 唐兰的这个同学很聪明。
- 107 小李的这个朋友学习很好。
- 108 小王的这个朋友学中文很久了。

- 109 我的同学那些企业工作毕业后都在。
110 老高的很热心那个同事。
111 小王的坏了这个电脑。
112 这个暑假一家去加州老高的玩了。
113 很漂亮都中国的那些城市。
114 找工作的大家都很关心这件事小李。
115 小林的唱歌唱得很好这个朋友。
116 的士兵这些训练非常严格。
117 那些美国朋友我的都喜欢吃中国早餐。
118 很快接受了安妮中国的那种习惯。
119 这种经常邻居间的发生问题是。
120 中文很难觉得我的这个同学。

APPENDIX D: EXPERIMENTAL MATERIALS FOR EXPERIMENT 2

(In the actual exercise sheet given to the students, all Chinese sentences are annotated with *pinyin* on top of the simplified characters. Indication of relative clause types such as SU, DO in brackets is not included in the exercise sheet given to participants.)

Combine Sentences 合成句子

Following the examples, combine each pair of the sentences into one.
请按照例子，把两句话合成一句话。

Example: (a) 一个朋友送了我一束花。那个朋友是美国人。 →
送了我一束花的那个朋友是美国人。

(b) 小王昨天遇见一个女生。那个女生很漂亮。 →
小王昨天遇见的那个女生很漂亮。

(c) 昨天晚上王先生跟一个女孩子跳舞。那个小姐是我的同学。 →
昨天晚上王先生跟她跳舞的那个女孩子是我的同学。

(d) 有个朋友送了我一件礼物。那个朋友对大家都很友好。 →
送了我一件礼物的那个朋友对大家都很友好。

Exercises:

- (1) 刚才有个女人在找我妈妈。那个女人姓李。 (SU)
- (2) 王经理赔了一个客人三百美金。那个客人很不讲道理。 (IO)
- (3) 张力一直鼓励一个同学。那个同学和他在一个班上学中文。 (DO)
- (4) 安妮和一位老师在吃饭。那位老师会说法语。 (Oprep)
- (5) 昨天小王帮了一个美国学生。那个美国学生是班上新来的同学。 (DO)
- (6) 坏人打伤了一个女人的丈夫。那个女人非常担心。 (Poss)
- (7) 王先生在屋子里等一个朋友。那个朋友是他中学同学。 (DO)
- (8) 小李在路上问候了一个人。那个人以前也在这个学校读书。 (DO)
- (9) 我妈妈向一个人问路。那个人是个老太太。 (OPrep)

- (10) 坏人抢了一个男人的钱包。那个男人非常生气。 (Poss)
- (11) 我弟弟送了一个女孩一本书。那个女孩很高兴。 (IO)
- (12) 小偷偷了一个同学的电脑。那个同学很不高兴。 (Poss)
- (13) 我哥哥向一个朋友买了一台电脑。那个朋友在电脑公司工作。 (OPrep)
- (14) 有个小孩在路上撞倒了小王。那个小孩很小还不太会走路。 (SU)
- (15) 小张给了一个朋友五百块钱。那个朋友没有工作。 (IO)
- (16) 我哥哥借给了一个人一本中文书。那个人想了解中文文化。 (IO)
- (17) 我向一位老师请教了这个问题。那位老师对学生特别好。 (OPrep)
- (18) 小林弄坏了一个孩子的玩具。那个孩子很不开心。 (Poss)
- (19) 有个朋友每个周末都陪小李。那个朋友和他关系特别好。 (SU)
- (20) 有个同学昨天拜访了小张。那个同学对人很热情。 (SU)

APPENDIX E: EXPERIMENTAL MATERIALS FOR EXPERIMENT 3

(In the actual exercise sheet given to the students, all Chinese sentences are annotated with pinyin on top of the simplified characters.)

Sentence Completion 完成句子

Please complete the following sentences using the verb given in the brackets. (Please use the words in brackets as verbs in your sentence.) You are encouraged to use characters, but if you are having difficulty with some of them, you could use pinyin instead.)

请用括号中的词完成以下句子。请将括号中的词作为动词使用。

Examples

- (a) _____的人都知道他很爱学习。(认识)
认识小张的人都知道他很爱学习。
- (b) _____的同学是学校的高材生。(看见)
唐兰刚看见的同学是学校的高材生。
- (c) _____这个好消息。(告诉)
我告诉了他这个好消息。
- (d) 这本书_____。(借给)
这本书是小张借给我的。

Exercises

- 那个_____的人就住在附近。(不喜欢)
- 他_____在椅子上。(放)
- _____的那个人来自美国。(尊重)
- _____的那一年是2003年。(毕业)
- _____的那一天很热闹。(结婚)
- 这个_____的人是个老同学。(请来)

7. 他_____在笔记本上。(画)
8. 那个电话是_____。(打)
9. 那个_____的男人姓王。(等)
10. _____的声音很好听。(唱)
11. _____的这个邻居姓李。(照顾)
12. 他在饭桌上_____。(摆)
13. 车祸是_____。(发生)
14. _____的那个同学看起来心情很好。(问候)
15. 他在纸上_____。(写)
16. 那个_____的学生很有礼貌。(帮助)
17. 他_____在电视机上。(放)
18. _____的后果很严重。(偷)
19. _____的那个人是她最好的朋友。(陪)
20. 他在墙上_____。(画)
21. 那个_____的人在我们公司上班。(接走)
22. _____的宿舍很整洁。(住)
23. _____的原因很简单。(生气)
24. 那个_____的男生在北京大学读书。(爱上)
25. 他_____在花园里。(种)
26. _____的这个人公司的同事。(批评)
27. 这部电影是_____。(开始)
28. 他_____在课本上。(写)
29. 那个_____的人和大家关系很好。(信任)
30. 他在书架上_____。(摆)
31. _____的杯子是我送的。(喝水)
32. _____的这个人三十出头。(喜欢)
33. 我朋友是_____。(毕业)
34. 那个_____的人姓张。(找)
35. 这本书是_____。(写)
36. 朋友是_____。(应该)
37. _____的这个人就住在这个楼里。(恨)
38. 他在书桌上_____。(放)
39. _____的时候是下午三点。(看见)
40. _____的那个人是一个网络公司的代表。(联系)

APPENDIX F: PLAUSIBILITY SURVEY

请评价以下句子所描述的情景在现实生活中发生的可能性。请用1—5分的评分制，1表示句子描述的情景完全可能在现实中发生，5表示句子描述的情景几乎不可能在现实中发生。比如说，“这个学生看不懂作业要求”描述的情景比较容易在现

句子	很可能→ 很不可能					
	1	2	3	4	5	6
(1) 有个同学坐在我前排；这个同学经常嘲笑李红。		X				
(2) 有个男人撞到了骑车的，那个男人很不高兴。				X		
(3) 街边有个女人在骂一个男人，那个男人脸色很难看。			X			
(4) 附近的流氓殴打了一个问题学生；那个学生在我们隔壁学校上学。				X		
(5) 有个同事叮嘱我要做好这份文件；那个同事一向很能干。				X		

实中发生；“这个老师看不懂作业要求”描述的情景基本不可能在现实中发生。而“这个学生问了老师一个问题”，或者“这个老师问了学生一个问题”描述的情景都比较可能在现实中发生。比如以下例子（可能性评价供参考）：

以下请你判断句子描述情景发生的可能性。（请注意不是判断句子表达的通畅性，即对句所述的情景，也许您觉得有更好的表达方式，这与调查的目的无关。）

句子	很合理→ 很不合理					
	1	2	3	4	5	6
1 有个朋友重视小李，这个朋友很热心。						
2 有个军官请来了小张，这个军官来军队很久了。						
3 小李支持一个人，这个人是我们的好朋友。						
4 小张认识一个军人，这个军人经常和我们一起玩。						
5 有个班长相信小陈，这个班长很负责。						
6 有个干部支持小王，这个干部工作很认真。						
7 小王批评了一个同事，这个同事和大家关系不好。						
8 有个人不喜欢小林，这个人经常来这儿。						
9 小张喜欢一个女孩，这个女孩叫珍妮。						
10 小李不喜欢一个女生，这个女生最近结婚了。						
11 我们尊重一个领导，这个领导对大家都很好。						

12	有个老战友想念小王，这个老战友经常写信回来。								
13	小陈联系了一个警察，这个警察很有才能。								
14	有个男同学欣赏唐兰，这个男同学很讲究衣着。								
15	小李认识一个外国朋友，这个外国朋友性格开朗。								
16	有个同学喜欢小张，这个同学人品不错。								
17	有个博士爱上了小陈，这个博士读过很多书。								
18	老高拜访了一个朋友，这个朋友很热情。								
19	小王陪着一个人，这个人很友好。								
20	有个诗人爱上了安妮，这个诗人很内向。								
21	有个人鼓励唐兰，这个人中文学得很好。								
22	唐兰爱一个男人，这个男人喜欢弹琴。								
23	有个女孩想念小王，这个女孩还在加州读书。								
24	大卫在寻找一个女孩，这个女孩是我朋友。								
25	小李害怕一个人，这个人就住在我们家附近。								
26	小陈帮助了一个警察，这个警察做事很认真。								
27	有个工程师喜欢唐兰，这个工程师成熟稳重。								
28	有个人相信小王，这个人工作很认真。								
29	老高欣赏一个班长，这个班长刚来部队不久。								
30	唐兰批评了一个班干部，这个班干部不太受同学欢迎。								
31	有个人推荐小林，这个人很能干。								
32	张力熟悉一个同学，这个同学经常和大家一起看电影。								
33	有个女孩看见了唐兰，这个女孩很有礼貌。								
34	有个邻居拜访了小陈，这个邻居家里很穷。								
35	有个人教过小张，这个人现在很有名。								
36	小林雇佣了一个会计师，这个会计师很有经验。								
37	有个人不喜欢张力，这个人学习不太好。								
38	小明歧视一个印度同学，这个印度同学很会玩电脑。								
39	有个同事相信小王，这个同事很老实。								
40	小陈帮助了一个同学，这个同学很友好。								
41	唐兰联系了一个情报人员，这个情报人员很小心。								
42	有个人爱上了唐兰，这个人性格很好。								
43	有个女生请来了大卫，这个女生性格内向。								
44	唐兰照顾一个邻居，这个邻居很有礼貌。								
45	唐兰喜欢一个男人，这个男人很帅。								
46	有个同学陪着小林，这个同学长得很漂亮。								
47	小张在找一个人，这个人是个年轻女孩。								
48	有个人解雇了老高，这个人人品不好。								

以下有16句句，对于人称代词‘他’和‘她’，请您想象一个任意的某个人。

	句子	很合理→很不合理					
		1	2	3	4	5	6
1	他不喜欢一个人，那个人就住在附近。						
2	有个人尊重他，那个人来自美国。						
3	他请来了一个人，这个人是个老同学。						
4	他在等一个男人，那个男人姓王。						
5	有个邻居照顾他，这个邻居姓李。						
6	有个同学问候他，那个同学看起来心情很好。						
7	他帮助了一个学生，那个学生很有礼貌。						
8	有个人陪着她，那个人是她最好的朋友。						
9	他接走了一个人，那个人在我们公司上班。						
10	她爱上了一个男生，那个男生在北京大学念书。						
11	有个人批评了他，这个人是公司的同事。						
12	他信任一个人，那个人和大家关系很好。						
13	有个人喜欢她，这个人三十出头。						
14	他在找一个人，那个人姓张。						
15	有个人恨他，这个人就住在这个楼里。						
16	有个人联系他，那个人是一个网络公司的代表。						

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