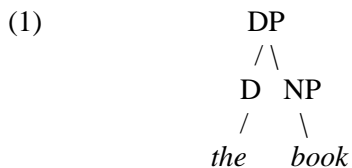


Word Order, Structure and Relativization*

1. Introduction

Nominal systems appear to have significant differences cross-linguistically. Take English and Chinese nominal phrases for instance¹. Prominent differences between them include the fact that nouns in English generally do not occur in the "bare" form but those in Chinese can.² Moreover, a bare noun in Chinese can be interpreted as definite, indefinite or generic; these different interpretations of an English nominal phrase rely on the occurrence of the definite article *the*, indefinite article *a* or some other determiners. Take a definite expression for instance. Chinese is sufficient with a bare noun [N], such as *shu* 'book'; whereas English requires the definite article [*the* N] *the book(s)* or its equivalent.³ A very interesting question arises from such a difference is the structure of nominal phrases in these languages. An article/determiner in English, for instance, plays a key role in the structural representation: a nominal phrase is represented as a Determiner Phrase (DP), headed by a Determiner (D) (see Abney 1987). The definite article *the* can be in the D position (see Longobardi 1994, Chierchia 1998, among others). In other words, *the book* can have the structure in (1), headed by *the*:⁴



What, then, is the structure of a definite expression such as *shu* in Chinese? Is it like (1) with a null D head (where N might move to)? Or, does it have a simpler structure, such as (2)?



The answers are anchored in important theoretical and empirical issues. Theoretically, if *shu* is interpreted in the same way as *the book*, should they have the

*Many thanks to Tom Ernst, Jim Huang, Yafei Li, Bingfu Lu, Sze-Wing Tang, Zoe Wu and Patricia Schenider-Zioga for their help with this work.

¹ Chinese in this work refers to Mandarin Chinese.

² Mass nouns in English can occur in the bare form.

³ Demonstratives, possessives etc. which also make a nominal phrase definite can be analyzed in the same way, which we disregard here.

⁴ In this work, we do not concern ourselves with the functional projections between D and N; see Carstens (1991), Ritter (1991, 1995), Valois (1991), for instance, for discussions on some of such projections. See Tang (1990), Li (1998, 1999), Cheng and Sybesma (to appear) among others for the functional projections within nominal phrases in Chinese.

same structure? Both the positive and negative answers to this question have been explored. On the one hand, it is assumed that syntax-semantics mapping is a one-to-one relation. They remain constant cross-linguistically. An N is an N and a D is a D in all cases; that is, an N is always a property-denoting expression (predicate-type) and a D is always an individual-denoting expression (argument-type). A bare noun in an argument position in languages like Chinese, therefore, needs to be projected as a DP, not simply an N(P) (see Li 1998, 1999a, b). The structure in (2), for instance, should further project to a DP when *shu* is in an argument position. On the other hand, it is possible to assume that a one-to-one syntax-semantics mapping relation need not exist. Type-shifting can take place in some languages (see Chierchia 1998). A bare noun interpreted as definite in an argument position, for instance, has undergone type-shifting and taken on the role of an argument, rather than a predicate. Because type-shifting has taken place, (2) can be a representation for a nominal expression in an argument position. Theoretically, then, the choice between (1) and (2) relies on whether a one-to-one syntax-semantics mapping relation is to be retained or whether type-shifting is an option in such cases.

The empirical question is even more interesting. Is there empirical evidence helping us to determine if a DP structure is projected in languages like Chinese? Does the availability of a DP projection, in addition to an NP, provide opportunities to derive more empirical generalizations than an analysis that does without a DP projection? Li (1998, 1999a, b) argues for a positive answer, based on the facts concerning word order and constituent structures within nominal expressions, the distribution of nominal phrases within a sentence, and the distribution of the plural marker *-men* in Mandarin Chinese. Indeed, many interesting facts are derived by the presence of D and an N-to-D raising process. On the other hand, Fukui and Takano (1999), based on a theory of universal phrase structure proposed by Takano (1996) and Fukui and Takano (1998) and a prohibition against right-adjunction structures (Kayne 1994), argue that the linear ordering between a relative clause and the head it modifies (the relative head) in different types of languages can be derived from a contrast in nominal structures. They argue that there are Japanese type and English type languages. In the English type, a DP is projected and N-to-D raising must take place. Such a raising process would place a relative clause, which is base-generated as left-adjunction to the head N, after this N.⁵ In contrast, the type of languages like Japanese, which uses bare nouns as definite, indefinite and generic expressions, does not have a D projection. Because of the lack of a D projection, a N-to-D raising process cannot take place. A relative clause therefore maintains to be left-adjoined to the head N and, accordingly, surfaces on the left of this N. Such a parametric difference between these two types of languages, according to Fukui and Takano, is not only manifested in the contrast in ordering between a relative clause and its head but also reflected in how relative clauses are formed and licensed in these two different types of languages.

If Fukui and Takano are correct, their analysis would provide strong empirical support for the absence of a DP projection and N-to-D raising in languages like Japanese. It would also pose interesting challenges to Li's claim that Chinese does project a DP and that N-to-D movement does take place in this language. After all, Chinese and Japanese have identical word order with respect to a relative clause and the head it modifies, both

⁵ Kayne (1994) further developed the promotion analysis by Schachter (1973) and Vergnaud (1974) and proposed that English relativization is a promotion process which raises the relativized nominal to the Spec of a relative CP, which in turn is a complement of D. In such a structure, the head modified by the relative clause is not the syntactic head of the structure. Because the English structure is not the main concern in this paper, we continue using the term "head" to refer to the noun (phrase) modified by a relative clause.

being head-final. Moreover, Chinese appears to have similar properties concerning relativization as Japanese, in addition to the fact that both languages allow a bare noun in an argument position.

In brief, Chinese seems to belong to the Japanese type of languages, rather than the English type, at least with respect to the ordering of a relative clause and its head and the form/interpretation of bare nouns. This raises the question of whether Chinese, indeed, projects a DP and allows an N-to-D raising process, as Li has claimed.

In this work, I will show that the various empirical generalizations claimed to be derivable from the parametric differences in nominal structures between Japanese and English types of languages discussed in Fukui and Takano cannot be correct considering Chinese relativization structures. The conclusion has to be drawn that Fukui and Takano's alleged correlation between N-to-D raising and the ordering between a relative clause and its head cannot be upheld. None of the properties of relativization that are claimed to be related to word order and N-to-D raising are true in Chinese. There is, thus, no evidence against the existence of a DP projection and N-to-D raising in Chinese. It, therefore, can be maintained that Chinese does project a DP.

2. Word order and the structure of relative clauses

A major claim of Fukui and Takano's (1998) work is that the ordering between a relative clause and the Head modified by the relative clause is due to the absence or presence of D and the subsequent movement of N to D when D is present. Adopting Kayne's proposal that only left-adjunction is allowed in the grammar, Fukui and Takano claim that a relative clause is always left-adjoined to the head: [CP N].⁶ A Japanese relative construction, illustrated in (3), has the structure in (4) after the relative clause is left-adjoined to the head.

- (3) John-ga kinoo mita syasin
 John-Nom yesterday saw picture
 'the/a picture that John saw yesterday'

- (4)
$$\begin{array}{c} N_1 \\ / \backslash \\ CP \ N_1 = \text{syasin} \end{array}$$

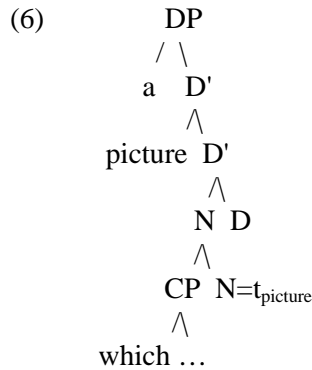
Because a Japanese nominal phrase does not contain a D projection or other functional categories according to Fukui and Takano, (4) will not merge further and it is the full representation for the relative construction illustrated in (3). A slight modification of (4) has been made by Fukui and Takano: the relative clause should be an IP (TP), not a CP, a claim to which we will return shortly.

In contrast, an English nominal phrase must project a D. A phrase marker like (4) must further merge with a D in order to generate a well-formed nominal structure in English. After D is merged with the phrase markers, N-to-D raising must take place in

⁶ Fukui and Takano (1999) label the Head N and the relative clause CP. Left adjunction of the relative clause to the Head NP, thus, is [CP N]. Such an account does not distinguish complementation structures from adjunction structures, as a complement XP is also a sister of N so a complementation structure is also [XP N].

order for the N to check the features in D. An English relative construction as illustrated in (5), therefore, has the structure in (6).

(5) a picture which John saw yesterday.⁷



The following generalization thus emerges given Fukui and Takano's theory: the word order [relative clause + relative head] indicates that N-to-D raising has not applied and the reverse order [relative head + relative clause] indicates that N-to-D raising has applied. The former is illustrated by Japanese and the latter by English.

Fukui and Takano note further that there is a cluster of differences between English type and Japanese type languages which can "fall out in a simple and elegant fashion, based solely on the single parametric difference between the languages: English exhibits N-to-D raising, while Japanese does not (simply because the latter language lacks the category D)." (abstract).⁸ The differences discussed are briefly described in the following subsections.

2.1. Relative pronoun

According to the two authors, the absence of a relative pronoun (as in Japanese), or its possible presence (such as *which* in (5)) can be derived from the structural contrast between (6) and (4). Assuming that a relative pronoun must be bound by a relative head, they claim that a relative pronoun in a structure like (6) in English is legitimate because in this structure, the relative head (the raised N) c-commands the relative pronoun *which*. The relative pronoun *which* is, therefore, properly bound and thus, English allows a relative pronoun in a relative clause. In contrast, because N₁ has two segments in (4), the relative head does not c-command CP, if the definition of c-command in May (1985), Chomsky (1986), and Kayne (1994) is adopted, which incorporates the notion of segments and exclusion.⁹ If the relative head does not c-command the relative clause CP,

⁷ Fukui and Takano (1998, 1999) assume with Takano (1996) that a complement is generated to the left of a head.

⁸ Fukui and Takano's proposal requires N-to-D movement to apply in all cases in English. This contrasts with, for instance, the analysis of Chierchia (1998) or Longobardi (1994) which does not raise N to D when an article occurs (at least overtly). In these analyses, an article occupies the D position and N stays in the N position, N being a property-denoting, predicate type of expressions. Fukui and Takano place the definite article *the* in a position higher than the Spec of D position which hosts the raised N, N-to-D raising being a substitution process.

⁹ The definition adopted in Fukui and Takano is this:

it cannot c-command a relative pronoun in the CP. In order for (4) to be well-formed, the relative clause cannot contain a relative pronoun since such a relative pronoun would not be c-commanded and properly bound by the relative head. Consequently, Japanese does not and cannot have a relative pronoun in its relative clause. The contrast between the structures in (6) and (4) captures the contrast between the existence of a relative pronoun in English and the lack of one in Japanese.

2.2. Operator movement

The lack of a relative pronoun, according to Fukui and Takano, indicates that a Japanese relative clause is not "operator-oriented." It is not licensed as a modifier of the relative head through the mediation of a relative pronoun functioning as an operator creating an open position within the relative clause. Instead, it is licensed by an "aboutness" relation between the relative clause and the relative head. They claim that such an aboutness condition is not peculiar to the licensing of the Japanese relative clause. It can also be seen in the licensing of certain topic constructions in Japanese and English:

(7) sakana-wa tai-ga ii
 fish-Top red-snapper-Nom good
 'As for fish, a red-snapper is the best.'

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

Attributing **the insight** to Kuno (1973) and Murasugi (1991), Fukui and Takano argue that this aboutness condition licenses relative clauses in Japanese. Thus, in the following example, the relative clause can be interpreted as being about a picture.

(9) John-ga kinoo mita syasin
 John-Nom yesterday saw picture
 'the/a picture John saw yesterday'

Being in an aboutness relation with the relative head, the relative clause is properly licensed.

Furthermore, because there is no operator movement in Japanese relativization and an aboutness condition is sufficient to license a relative clause, it follows that gapless relative clauses are possible in this language, such as (10), and relativization is not subject to island conditions as demonstrated in (11), where the relativized nominal has originated from within a complex NP.

(10) [syuusyoku-ga taihen na] buturigaku
 employment-Nom difficult is physics
 'physics (that) finding a job is difficult'

- (i) X c-commands Y iff X excludes Y and every element that dominates X dominates Y.
- (ii) X excludes Y iff no segment of X dominates Y.

The two-segmented category $[N_1, N_1]$ is the relative Head. The Head does not exclude CP. The upper N_1 , a segment of $[N_1, N_1]$, dominates the CP.

- (11) [pro kiteiru yoohuku-ga yogoreteiru] sini
 is.wearing suit-Nom is.dirty gentleman
 'the/a gentleman who the suit that (he) is wearing is dirty'

2.3. Relative complementizer

Another contrast that Fukui and Takano claim follows from the proposed structural and movement differences is that a relative clause in Japanese, unlike an English one, has a TP structure, rather than a CP structure. Japanese relative clauses do not need a CP: because of the lack of N-to-D raising, Japanese relative clauses must not be operator-oriented. The fact that an operator is not needed makes the Spec of CP unnecessary. Following Diesing's (1990) suggestion that a functional category is present in a structure only when it is necessary, Fukui and Takano claim that a CP is not necessary in a Japanese relative clause and thus is not projected. The lack of a CP projection means the lack of a C to host a complementizer. This captures the fact that Japanese does not have the counterpart of the complementizer *that* in the English relative clause *a picture that John saw yesterday*.¹⁰ A relative clause, accordingly, is not a CP in Japanese. It is a IP/TP (Murasugi 1991).

2.4. Internally Headed Relative Clause

Finally, Fukui and Takano note that only languages of the Japanese type allow Internally Headed Relative Clauses (IHRC). Following Cole's (1987) proposal that an IHRC has a head that is a null pronominal co-referential with the internal head, they note that if the English structure (6) were to instantiate an IHRC, it would violate Binding Principle C because the head *pro* would be co-indexed with, and c-command the internal head. In contrast, a *pro* in the relative head position does not c-command the internal head in (4), the proposed structure for Japanese. Consequently, only Japanese allows an IHRC.

Briefly summarizing Fukui and Takano's claims, the contrast between the English structure (6) and the Japanese structure (4), as manifested in the different ordering between a relative clause and a relative head, derives the different properties of English and Japanese relative clauses with respect to the availability of a relative pronoun, operator movement, a complementizer and an internally headed relative clause. The lack of operator movement is related to the availability of an aboutness condition licensing a relative clause, which does not obey island conditions. The lack of operator movement and the availability of licensing by an aboutness condition also make a gapless relative clause possible.

Though not discussed in Fukui and Takano, a number of other Japanese linguists have also made the observation that Japanese relative clauses do not involve operator movement. Saito (1985), for instance, shows that the lack of operator movement is manifested in the absence of long-distance relativization of reason/manner adjuncts.

¹⁰ Their argument is not easy to follow here. Even though an operator in the Spec of a CP is not needed, it does not mean that the head is not needed and therefore it does not mean that a CP projection is not needed. Consider the English example (i):

- (i) That he is here is important.

In this sentence, there is no requirement of the presence of an operator in Spec of CP. Nonetheless, the complementizer *that* must be present. The fact that a Spec of CP is not needed does not mean that the head C is also not needed.

Such relativization is clause-bound (Murasugi 2000):

- (12) a. [[Mary-ga e_i kaetta] riyuu_i]
Mary-Nom left reason
'the reason_i Mary left e_i'
- b. *[[Mary-ga [John-ga e_i kaetta to] omotteiru] riyuu_i]
Mary-Nom John-Nom left C think reason
'the reason_i Mary thinks [that John left e_i]'
- c. [[Mary-ga e_i mondai-o toita] hoo_i]
Mary-Nom problem-Acc solved method
'the method_i Mary solved the problem e_i'
- d. *[[Mary-ga [John-ga e_i mondai-o toita to] omotteiru] hoo_i]
Mary-Nom John-Nom problem-Acc C think method
'the method_i Mary thinks [that John solved the problem e_i]'

Murasugi (1991) argues that the relativization of manner/reason adjuncts is not true relativization given that a **true** relative clause contains a gap. She argues the expressions in (12) do not contain a gap and that the acceptable expressions in (12a, c) are just like other gapless cases:

- (13) [[sakana-ga yakeru] nioi]
fish-Nom burn smell
'the smell that a fish burns (the smell of fish-burning)'

The interpretation of (12a), for instance, parallels the English (14). Such examples are derived by base-generation.

- (14) the reason for John's leaving

The unacceptable examples in (12b,d) cannot be base-generated with a *pro* in place of the adjunct gap 'e' in the embedded clause, because a *pro* appears only in argument positions. Indeed, a stronger claim has been made: Japanese relative clauses simply are not derived by any type of movement. The following example from Hoji (1985, discussed in Murasugi 2000) shows the lack of reconstruction in cases involving an anaphor:

- (15) *_[NP] [John_i-ga e_j taipu-sita] [zibun_i-no ronbun]_j]
John-Nom typed self-Gen paper
'self_i's paper that John_i typed'

These observations support the claim that Japanese relative clauses are not derived by movement of any kind and do not contain an operator.

When relevant Chinese facts are considered, however, the correlated properties just mentioned do not fall out as predicted. Word order facts would suggest that Chinese should be like Japanese. On the other hand, most of the other related properties suggest that Chinese should be more like English. The mixture of the clustering of properties raises doubt on the correctness of the typological claims we have just seen.

3. Correlated properties?

A first look at Chinese relative constructions may suggest that they are just like their Japanese counterparts. Like Japanese that only allows a relative clause to precede the relative head, Chinese also requires a relative clause to precede the relative head. In other words, Chinese should belong to the Japanese type of languages and have the structure in (6), according to Fukui and Takano's typology. If Chinese has the structure in (6), should we, then, expect Chinese relative clauses to have the properties in 2.1.-2.4? Unfortunately, if we examine the facts concerning Chinese relative constructions more carefully, we find that almost all the predictions are not born out.

3.1. Relativization processes

Before demonstrating how the predictions in 2.1-2.4 are not true with Chinese relative clauses, we begin with the discussion on how relative clauses are formed in Chinese.

3.1.1. Movement

There is evidence that relativization in Chinese can be derived from movement of the relative head directly (see Schachter 1973, Vergnaud, 1974, Kayne 1994). For instance, part of an idiomatic expression can become a relative head:

- (16) a. [[ta kai t_i de] dao_i] dou hen chenggong (kai-dao 'open knife
he open De knife all very successful =operate')
'All the operations he performed were successful.'
- b. [[ta chi t_i de] cu_i] bi bieren duo. (chi-cu 'eat vinegar= be jealous')
he eat De vinegar compare others more
'He is more jealous than the others.'
- c. [[ta you t_i de] mo_i] meiren ting-de-dong. (you-mo, translitera-
he hu- De -mor nobody listen-able-understand tion of *humor*)
'Nobody can understand his humor.'

Long distance movement is possible and the movement is sensitive to island conditions:

- (17) a. [[ta renwei [wo yinggai kai t_i] de] dao_i] dou hen nan.
he think I should open De knife all very difficult
'The operations that he thinks I should perform are all difficult.'
- a'. *[[ta kai e] hen zhongyao de] dao] ---subject island
he open very important De knife
'the operation that it is important that he performs.'
- b. [[ta renwei [wo keyi chi t_i] de] cu_i] hai bu zhi zhexie.
he think I can eat De vinegar still not only these
'The vinegar that he thinks I can eat is even more than this
(=He thinks I can be even more jealous).'
- b'. *[[ruguo ta chi t_i, wo hui hen shengqi de] cu_i] ---adjunct island
if he eat I will very angry De vinegar
- c. [[ta renwei [wo keyi you t_i] de] mo_i] you henduo.

he think I can hu- De -mor have much
 'The -mor he thinks I can hu- is a lot (=The humor he thinks I can
 make is a lot).'

c'. *[[[[[t_j kai t_i de] ren_j] zai zher de] dao_i] ---complex NP island
 open De man at here De knife

The possibility of a relative head being part of an idiomatic expression in the relative clause suggests that the relative head has been raised from the relative clause. This derivation is not the only available option, however. In the following instances, the relative head cannot be moved directly from inside the relative clause because the relative head is nominal and the corresponding expression in the relative clause is a PP:

(18) a. ta xiu che de **na-ge fangfa**.
 he fix car De that-Cl method
 'the way (how) he fixed the car'

a'. ta **yong na-ge fangfa** xiu che.
 he use that-Cl method fix car
 'He fixed the car at that place.'

b. ta xiu che de **na-ge liuyou**.
 he fix car De that-Cl reason
 'the reason why he fixed the car'

b'. ta **yinwei na-ge liyou** xiu che.
 he because that-Cl reason fix car
 'He fixed the car because of that reason.'

Ning (1993) argues that a Chinese relative clause can be derived by a null operator movement that is equivalent to *wh*-movement in the formation of English relative constructions. Evidence for an operator movement comes from the fact that Chinese relative clauses are acceptable only when they correspond to English relative clauses that can have a single-word relative pronoun (without an accompanying preposition, such as *with which*). For instance, the acceptable Chinese relative clauses in (20) must correspond to English relative clauses like (19) which contain a relative pronoun.

(19) a. the man **who** came here
 b. the work **which** he did
 c. the place **where** he went
 d. the time **when** he left
 e. the way that (**how**) he fixed the car¹¹
 f. the reason **why** he left

(20) a. lai zher de ren
 come here De man
 'the man who came here'

b. ta zuo de gongzuo

¹¹ According to Ning (1993, 53), *the way how* is only acceptable in some dialects.

he do De work
'the work which he did'

c. ta qu de difang
he go De place
'the place where he went'

d. ta likai de shijian
he leave De time
'the time when he left'

e. ta xiu che de fangfa
he fix car De way
'the way that (how) he fixed the car'

f. ta likai de yuanyin
he leave De reason
'the reason why he left'

On the other hand, Chinese does not have a counterpart of such English relative clauses as those in (21) where the relative pronoun must occur with a preposition:

- (21) a. the girl with whom she danced
b. the dog behind which he walked
c. the pliers with which he fixed the car

(22) a. *[ta tiaowu de] guniang
he danced De girl

b. *[ta zou de] gou
he walked De dog

c. *[ta xiu che de] qianzi
he fix car De pliers

Ning argues that the relativization in (22a-c) is not acceptable when the corresponding English sentences in (21a-c) cannot just make use of a single-word *wh*-operator and a preposition needs to occur with the *wh*-operator. Ning concludes that relativization in Chinese must involve movement of a null operator which is equivalent to a *wh*-operator in English. (21a-c) require one more element than a *wh*-operator; they therefore do not have acceptable counterparts in Chinese.

Further evidence for the existence of movement comes from the locality conditions that such structures are sensitive to. The sentences in (23) show that long distance movement is possible.

(23) a. zhe jiu shi [[wo tingshuo [ta yao qu baifang t_i] de] ren_i].
this exactly is I hear he want go visit De person
'This is the person who I heard he was going to visit'

b. zhe jiu shi [[women juede [ta yinggai qu t_i nianshu] de] difang_i]
this exactly is we feel he should go study De place

'This is the place where we feel he should go study'

- c. zhe jiu shi [[ta renwei [nimen t_i yinggai likai] de] yuanyin_i]
this exactly is he think you should leave De reason
'This is the reason why he thinks you should leave'

The following sentences show the relevance of island conditions.

- (24) a. *zhe jiu shi [[[ni xihuan [t_i pengyou] de] ren_i]
this exactly is you like friend De person
'This is the person who you like (his) friend.'
- b. *zhe jiu shi [[[[ta xihuan [t_i nian guo shu] de] ren] de] difang_i]
this exactly is he like read Asp book De person De place
'This is the place where he likes the person that has studied
(there)'
- c. *zhe jiu shi [[[ruguo ta t_i shengqi] ni hui bu gaoxing] de]
this exactly is if he angry you will not happy De
yuanyin_i
reason
'This is the reason(x) that you will not be happy if he gets angry
(because of) x'

(24a) is a violation of the left branch condition, (24b), the complex NP constraint and (24c), the adjunct island constraint.

Even though there are sentences which may suggest relativization does not obey island conditions, such as (25), apparent violations always involve an island in a subject position (or a topic position, see Gasde and Paul 1998).

- (25) [[[t_i chuan de] yifu] hen piaoling de] nage ren_i
wear De clothes very pretty De that-Cl person
'the person_i that the clothes that (she_i) is wearing are pretty.'

When the island occurs in an object position, the effect of island conditions reappears:

- (26) *[wo xihuan [[t_i chuan de] yifu] de] nage ren_i
I like wear De clothes De that-Cl person
'the person_i that I like the clothes that (she_i) is wearing'

Certainly, we do not want to claim that island conditions are relevant in some cases but not in some others. The acceptability of (25) should be due to some other derivation than movement. Indeed, this is what Huang (1982) argues for. He claims that Chinese allows an empty *pro*, which is subject to an identification condition: a *pro* must be identified by the most local *c*-commanding antecedent. In (25), the most local *c*-commanding antecedent is the relative head. In (26), the most local *c*-commanding antecedent is the subject of the relative clause. A *pro*, thus, is properly identified in (25) but not so in (26). The contrast between (25) and (26) argues for the relevance of island conditions when movement applies and the existence of a properly-bound *pro* when movement does not apply.

Note that for all those unacceptable sentences ruled out by island conditions or by the identification requirement on a *pro*, an overt pronoun in place of the empty category makes these sentences acceptable.¹²

- (27) a. zhe jiu shi [[[ni xihuan [ta_i pengyou] de] ren_i]
 this exactly is you like friend De person
 'This is the person who you like his friend.'
- b. zhe jiu shi [[[ta xihuan [zai na_i nian guo shu] de] ren de]
 this exactly is he like at there read Asp book person De
 difang_i]
 place
 'This is the place where he likes the person that studies (there).'
- c. [wo xihuan [[ta_i chuan de] yifu]] de] nage ren_i
 I like she wear De clothes De that-CI person
 'the person_i that I like the clothes that she_i is wearing.'

There is still another possibility to derive relative clauses --- those without a gap or a resumptive pronoun in the relative clause, the so-called gapless relative clauses. This is illustrated by the following examples:¹³

- (28) a. zhe jiu shi [[ta kao-shi de] jieguo]
 this exactly is he take-exam De result
 'The is the result of his exam-taking.'
- b. zhe jiu shi [[ta chang-ge de] shengyin]
 this exactly is he sing-song De voice
 'This is his singing voice (the voice with which he sings).'
- c. zhe jiu shi [[ta zuo-e de] houguo]
 this exactly is he do-evil De consequence
 'This is the consequence of his evil-doings.'
- d. zhe jiu shi [[ta sha zhe-ge xiaohai de] jiama]

¹² Note that, even though there are no pronouns corresponding *zenme/ruhe* 'how' for *fangfa* 'way, method', *yangzi* 'manner' and *weishenme* 'why' for *yuanyin/liyou* 'reason', it is possible to use the relevant *wh*-words as "resumptive" expressions (see Li 2001 for an account of such the distribution and constraints of such "resumptive" *wh*):

- (i) ta **ruhe/zenme**_i xiu che de fangfa_i, meiren zhidao.
 he how fix car De method nobody know
 'Nobody knows the way (how) he fixed the car.'
- (ii) ta **weishenme**_i bu lai de yuanyin_i, meiren zhidao.
 he why not come De reason nobody know
 'Nobody knows why he fixed the car.'

¹³ The discussion here is based on an on-going joint work by James Huang, Yafei Li and Audrey Li.

this exactly is he kill this-Cl child De price
'This is the price for him killing the child.'

In such instances, the relative head cannot be related to any position within the relative clause. Instead, it is related to the entire relative clause. Interestingly, such relative clauses are much more limited. The head noun must be related to the entire relative clause, rather than an embedded clause inside the relative. Therefore, (29a) is not acceptable because the voice is unable to be related to the embedded clause within the relative clause. Neither is (29b) acceptable because the consequence is unable to be related to the embedded clause.

(29) a. *zhe jiu shi [[wo xihuan [ta chang-ge] de] shengyin]
this exactly is I like he sing-song De voice
'This is the voice of my liking him singing (with).'

b. *zhe jiu shi [[wo tingshuo [ta zuo-e] de] houguo]
this exactly is I hear-say he do-evil De consequence
'This is the consequence of my hearing him do evil.'

This type of "relative clause" in fact may not be the typical relative clause that we are familiar with. To be more concrete, we note that this pattern, rather than being a counterpart of the English [Head + Relative clause], is more like a head noun with a PP in English, such as [*the price [for him killing the boy]*], [*the sound [of his singing]*], [*the consequence [of his evil doings]*] etc.¹⁴ Just like the English cases where the entire PP bears a direct relation with the head noun, the head noun in (28)-(29) must also be related to the entire "relative clause," rather than a subpart of it (such as an embedded clause, as in (29)). It is a direct modification relation. It is not mediated through the coindexation of the relative head and an operator in the relative clause. (29a-b) can be contrasted with (30a-b), which also contain complex clauses but are acceptable. They are acceptable because the voice is related to my imagination (my imagining him singing with the voice, not necessarily the real voice with which he sings) and the consequence is related to my liking him to do evil:

(30) a. zhe jiu shi [[wo xiangxiang ta chang-ge de] shengyin]
this exactly is I imagine he sing-song De voice
'This is the voice of my imagining him singing (with).'

b. zhe jiu shi [[wo xihuan ta zuo-e de] houguo]
this exactly is I hear-say he do-evil De consequence
'This is the consequence of my liking him to do evil.'

The precise nature of such expressions put aside, it is clear that the type of "relative" clauses in (28) is quite different from the type of relative clauses in (16) or (20).

¹⁴ It is not surprising that the Chinese counterpart of English [NP [P XP]] is [XP *de* NP]. The prepositions in question are generally quite empty: *the sound of his singing*, *the result of his evil doings* etc. Chinese rarely uses such empty prepositions within nominal expressions (except for *dui* that occurs with some complements, see Fu 1994). Chinese always has modifiers to the left of N and English to the right of N. *De* appears after a modifier within a Chinese nominal expression. The question, of course, is whether the prenominal modifier is a tensed clause or a gerundive expression. The distinction is not easily made in Chinese. See Fu (1994) for relevant discussions.

In brief, relative clauses in Chinese are derived in different ways. It can be derived by moving an NP directly to the head position, as in the cases of (16) containing idioms (the promotion analysis proposed by Vergnaud 1974 and Kayne 1994 for English relative clauses). It can be derived by a process similar to *wh*-operator movement in English, as in (20) (the operator movement analysis proposed by Chomsky 1977 for English relative constructions).¹⁵ These movement structures allow long distance dependency relations and are sensitive to island conditions. There are also structures that seem to be generated by a "pseudo" relativization process, as in (28), which is more like the counterpart of the English [N [_{PP} Prep XP]], where the entire PP, rather than a sub-constituent of it, modifies the head noun.¹⁶

If the type of structures in (28) is more like an XP directly modifying a nominal head corresponding to the English structure [N [_{PP} P XP]] (without any movement relation and without a corresponding gap), true relative clauses in Chinese are similar to those in English. They share the properties of long distance movement and island sensitivity.

Having discussed the derivations for Chinese relative clauses, let us turn to each of the generalizations presented in sections 2.1-2.4, which have been claimed to be manifestations of the structure in (6).

3.2. Relative pronoun --- null *wh*-operator

It, now, is clear that, even with the order of a relative clause preceding its head, it does not follow that a relative pronoun cannot exist. The data in (18)-(27) argue that at least some relative clauses in Chinese should be derived in the same way as their counterparts in English --- operator movement. If relative clauses in both languages can be derived by the same operator movement process, it casts doubt on the claim that a relative pronoun is possible in one language but impossible in the other. Indeed, the discussion in the previous section favors the existence of an operator, even though it is null. When the moved element corresponds to a *wh*-operator in English, the result of such a relativization is acceptable in Chinese; when the moved element corresponds to a *wh*-operator with a preposition in English (such as *this is the girl with whom I danced*), the relativization is impossible in Chinese.¹⁷

There is further interesting evidence for the existence of a *wh*-operator and *wh*-operator movement, considering the contrast between topicalization and relativization in Chinese.

3.3. Operator movement --- comparison between topicalization and relativization

¹⁵ See Li (2001) for the application of two different strategies to derive relative constructions in Chinese.

¹⁶ Murasugi (1991) notes the locality condition on "gapless" relative clauses in Japanese. She and some other Japanese linguists have taken such relative clauses as the basic construction and tried to derive the other relative clauses by resorting to the same mechanism of non-movement and aboutness licensing. In contrast, we claim that the so-called gapless relative clauses are different from the other relative clauses and should be analyzed separately. Moreover, it is worth pointing out that the so-called gapless relative clauses should be distinguished into two categories: one being a direct XP modifier as shown in the text and the other with a part-whole relation between the head and some nominal in the relative clause. The latter should be subsumed under those relative clauses derived by movement (see Shi 1992, also see Huang 1982 and Li 1990 for movement from an outer object position that bears an affected theta-role). The two types differ in the locality condition, just like the distinction between the two types of constructions discussed in the text. Because of the lack of space, we discuss these issues in a separate work.

¹⁷ Alternatively, it is possible that argument relativization in Chinese is a process of raising of the relative head and only adjunct relativization involves operator movement. See Li (2001).

There are some important differences between topicalization and relativization in Chinese, as noted by Ning (1993). Recall that the sentences in (20a-f) indicate that any argument corresponding to *who*, *which* and any adjunct corresponding to *where*, *when*, *how* and *why* can be relativized. It is only when relativization involves more elements than a *wh*-operator (such as a preposition plus a *wh*-operator, *with whom*, *behind which*, *with which* exemplified in (21)-(22)) that relativization becomes unavailable. In contrast, topicalization is more limited. Although it is quite common for an argument to be topicalized (31a-b), topicalization of an adjunct corresponding to relativization of an adjunct *wh*-operator is not possible:

- (31) a. *zhe chechang, ta bu xiu che.
 this garage he not fix car
 'This garage, he does not fix cars.'
- cf.
- a'. ta bu xiu che de chechang
 he fix car De garage
 'the garage where he fixed cars.'
- b. *nage yuanyin, ta bu xiu che.
 that reason he not fix car
 'That reason, he does not fix cars.'
- cf.
- b'. ta bu xiu che de yuanyin
 he not fix car De reason
 'the reason he does not fix cars'
- c. *nage fangfa, ta xiu hao le nabu che.
 that way he fix well Asp that-Cl car
 'That way, he fixed that car'
- cf.
- c'. ta xiu hao nabu che de fangfa
 he fix well that-Cl car De way
 'the way he fixed tha car'

Based on such contrasts, Ning (1993) argues that topicalization, in contrast to relativization, is not a process of *wh*-operator movement. Rather, it is direct movement of a constituent to the beginning of a sentence. Because it is movement of a constituent straightforwardly, an entire adjunct PP must be moved, not just the object of a P.¹⁸

- (32) a. zai zhe chechang, ta xiu che.
 at this garage he fix car
 'At this garage, he fixed cars.'
- b. wei na yuanyin, ta bu xiu che.
 for that reason he not fix car
 'For that reason, he does not fix cars.'
- c. yong nage fangfa, ta xiu hao le nabu che.

¹⁸ Chinese may use a verb in place of a P in such expressions.

use that way he fix well Asp that-Cl car
 'In that way, he fixed that car'

Such a contrast between topicalization and relativization, in turn, lends support to the claim that relativization in Chinese can be generated by movement of a *wh*-operator.

3.4. Licensing by an "aboutness" condition --- topicalization vs. relativization

The contrast between the pairs of sentences in (31) further argues against resorting to an "aboutness" condition to license relative clauses. Recall that, for Fukui and Takano, relative clauses are licensed by an "aboutness" condition, which also licenses topic structures. If both topicalization and relativization are licensed by an "aboutness" condition, it is not expected that differences exist between these two constructions. Nonetheless, we do find instances which are acceptable in topicalization and unacceptable in relativization structures; we also find instances the other way around. The examples that are acceptable in relativization but not topicalization are illustrated in (31). The other type of examples is shown below:

- (33) a. yu, wo xihuan chi xian yu.
 fish I like eat fresh fish
 'Fish, I like to eat fresh fish.'
- b. *wo xihuan chi xian yu de yu
 I like eat fresh fish De fish
 'the fish that I like to eat fresh fish'

Moreover, it is not clear how an analysis resorting to "aboutness" licensing of relativization can capture the subject-object asymmetry in sentences like (34a-b). On the other hand, the contrast is accommodated by an analysis of movement and existence of *pro* when movement is unavailable.¹⁹

- (34) a. [[nu pengyou hen xihuan wo de] nage ren]
 girl friend very like me De that-Cl person
 'the person whose girl friend likes me'
- b. *[[wo hen xihuan nu pengyou de] nage ren]
 I very like girl friend De that person
 'the person that I like (his) girl friend'

The occurrence of an overt pronoun makes (34b) acceptable:

¹⁹ Such a subject-object asymmetry also exists in topicalization structures:

- (i) a. nage ren, nu pengyou hen xihuan wo.
 that-Cl person girl friend very like m
 'That person, (his) girl friend likes me.'
- b. *nage ren, wo hen xihuan nu pengyou.
 that person I very like girl friend
 'That person, I like (his) girl friend.'

This indicates that a vague "aboutness" condition is not sufficient to accommodate topicalization structures either. See Shi (1992), Ning (1993), Shyu (1994), for instance, for possible accounts.

- (35) [[wo hen xihuan tade nu pengyou de] nage ren]
I like very his girl friend De that person
'the person that I like (his) girl friend.'

3.5. Complementizer and internally headed relative clause

Finally, let us consider the issue of relative complementizers and internally headed relative clauses. Given what have been presented concerning operators and operator movement in the above sections, it is not surprising to find that Chinese again seems to challenge the claims concerning complementizers in relative clauses and internally headed relative clauses in relation to word order in relative constructions. In Chinese, it is not clear that a complementizer does not exist in a relative clause. Some linguists have proposed that *de*, which always follows the relative clause, is a good candidate for a complementizer in a relative clause (see Simpson 1997; also see Li 1990 chapter 2 for relevant discussions). However, it is also possible to regard *de* as just a general modification marker, not bearing any special relation with a relative clause. We will therefore leave this issue for further research. On the other hand, there is more solid evidence against the existence of an internally headed relative clause in Chinese. Such a construction simply does not exist in this language. Indeed, Aoun and Li (1993) argue that the presence of such a construction in Japanese is related to the fact that a quantifier can be moved away from its host - quantifier floating (see Watanabe 1992). Chinese, in contrast, does not allow quantifier floating and does not have internally headed relative clauses. In other words, the possibility of an internally headed relative clause also is related to the possibility of movement (quantifier movement in this case).²⁰ Without elaboration, it suffices to state that internally headed relative clauses do not exist in Chinese.

4. DP projection and word order

We have shown in this work that, although Chinese and Japanese have identical word order concerning relative constructions (head-final), Chinese does not have any of the alleged correlating properties discussed by Fukui and Takano. If word order and other correlated properties are taken to be evidence for the existence of a D projection and an N-to-D movement process in English, Chinese presents a dilemma: the facts concerning word order show that an N in Chinese cannot be raised to D. The alleged consequences of lacking in a D projection and subsequent N-to-D raising, however, are not true in Chinese. Indeed, we showed in section 3 that Chinese relative constructions are not substantially different from their English counterparts with respect to derivational possibilities and conditions. They mainly differ in word order. In other words, despite the similarity in word order with Japanese relative constructions, Chinese relative constructions are not accommodated by an analysis according to which variations in the ordering of a relative clause and its head are to be traced to the difference between the structures in (4) and (6). The alleged correlated properties derived from such a structural difference, thus, become suspicious. The fact that a relative clause precedes its head in

²⁰ The contrast in the possibility of quantifier floating between the two languages is also manifested in other areas of their grammar such as the distribution of a question morpheme associated with a *wh*-element (see Li 1992, Aoun and Li 1993, Cheng 1997, Tsai 1994), or a number+classifier expression being moved from a position close to its related noun (Aoun and Li 1993), etc. For a list and discussion of the correlating properties, see Aoun and Li 1993.

Chinese, thus, cannot argue against the presence of N-to-D raising and cannot argue against the projection of a DP in Chinese.

In fact, we can show that Chinese does project a DP, considering the interpretation of relative constructions in different positions within a Chinese nominal expression. Recall that a DP is an individual-denoting expression and a D is the locus of reference. An N(P), in contrast, is a property-denoting expression. A DP-level modifier, therefore, should modify the reference (or further restrict the reference) and an NP-level modifier should modify the property (i.e., further describe the property). This seems to be the case in the relevant Chinese cases. As argued for in Li (1998, 1999b), demonstratives, which are individual-denoting expressions, are generated in D.²¹ *Zhe yi-ge nuhai* 'this one-Cl girl' has the structure [_{DP} *zhe yi ge* [_{NP} *nuhai*]]. A modifier preceding a demonstrative is to restrict the reference and a modifier preceding the noun is to describe the property (see Lu 1998):

- (36) a. *zhe yi-shuang yishujia de shou*
 this one-Cl artist De hand
 'this pair of artist hands'
- b. *yishujia de zhe yi-shuang shou*
 artist De this one-Cl hand
 'this pair of hands of the artist'

(36a) describes the quality of the hands: they are hands that are artistic. (36b) restricts the reference: the hands belong to the artist, not other people. Huang (1982) notes the contrast and gives examples like the following pair to illustrate the "restrictive" use of a relative clause preceding a demonstrative and the "non-restrictive" use of a relative clause following a demonstrative. The "non-restrictive" use is equivalent to our property-modification function.

- (37) a. *Niuyue, zhe-ge renren dou xihuan de chengshi*
 New York this-Cl everyone all like De city
 'New York, the city that everyone likes'
- b. *??Niuyue, renren dou xihuan de zhe-ge chengshi*
 New York everyone all like De this-Cl city
 'New York, the city that everyone likes'

²¹ One may argue that demonstratives are the head of a demonstrative projection, which is different from a determiner projection. It is clear that there must be a projection above NP (and Classifier Phrase in Chinese, see Li 1998, 1999a,b and Cheng and Sybesma, 1999). The question is whether this projection is a demonstrative phrase or a determiner phrase. In languages like English where determiners and demonstratives are mutually exclusive. It makes sense to claim that a demonstrative phrase is also a determiner phrase. In a language like Chinese which does not have an overt determiner, it is simply a notational matter: what should the projection whose head denotes reference be labeled: a demonstrative phrase or a determiner phrase.

In languages which allow demonstratives and determiners to co-occur, it is less clear whether there are two or just one projection. If a determiner is just an agreement marker on an element in D (a determiner being an expletive, see Vergnaud and Zubizarreta 1992), it is possible to maintain the existence of only one DP whose head is a demonstrative or a determiner or a demonstrative plus an agreement determiner. We leave this issue to further research.

In these examples, the speaker and the hearer know that the city they are discussing is New York. The expression 'that everyone likes' does not restrict the reference of the city. It simply describes the property of this city.²²

The above discussion amounts to saying that a modifier (including a relative clause) can be freely adjoined to D(P) or N(P) and the interpretation varies with where the modifier is adjoined to.

If Li's proposal is correct that a DP is projected and that a definite bare N requires N-to-D raising in Chinese, we would expect a relative clause adjoined to a bare noun to be ambiguous. If a relative clause is adjoined to a bare noun which has been raised from N to D, it should have a restrictive function. If a relative clause is adjoined to a noun staying in N (N-to-D raising not taking place in the case of indefinite nouns), it should describe the property. This prediction seems to be true:

- (38) a. wo xiang zhao (yi-ge) [[hui dazi de] mishu].
 I want find (one-Cl) can type De secretary
 'I want to look for a secretary that can type.'
- b. [[hui dazi de] (na-ge) mishu] huilai le ma?
 can type De (that-Cl) secretary return Asp Q
 'Has the secretary that can type returned?'

The bracketed nominal is indefinite in (38a) and definite in (38b). The relative clause in (38a) is generally interpreted as describing the property of secretaries that I am looking for and the one in (38b), restricting the reference of 'secretary' to the one that can type. The contrast between (39a) and (39b) shows that, if a relative clause restricts the reference of the secretary, the nominal expression is definite (N-to-D raising has applied). If a nominal expression is interpreted as indefinite, the relative clause describes the property:

- (39) a. wo xiang zhao dai shu lai de mishu. ---definite
 I want find bring book come De secretary
 'I want to look for the secretary that brought books here.'
- b. wo xiang zhao dai-guo shu de mishu. ---indefinite
 I want find bring -Asp book De secretary
 'I want to look for secretaries that have brought books here.'

²² The contrast between (37a-b) is not shared by all speakers. This is not surprising. Even though New York should be known to everyone, the speaker may want to more clearly identify the city: New York, the city that I am referring to is the one that everyone likes. 'Everyone likes' restricts the reference of the city and 'the city that everyone likes' is in apposition to New York. The reference-restricting relative clause in (37b), thus, can be acceptable, just like (i) below, where the speaker identifies the relevant student by the relative clause. The restriction restricts the reference of 'student', not 'Zhangsan'.

- (i) Zhangsan, renren dou xihuan de nage (xuesheng)
 Zhangsan everyone all like De that-Cl student
 'Zhangsan, the one (student) that everyone likes'

In (39a), the relative clause 'that brought books here' is used to identify the referent of *mishu* and the nominal expression is interpreted as definite. In (39b), the experiential aspect marker *guo* makes it easier for the relative clause to be interpreted as describing the property. The object in (39b) is interpreted as indefinite.

One further prediction of this proposal is that if a relative clause occurs with a quantity-denoting expression, which does not have a DP projection (see Li 1998), a modifier should modify an N, not a D. That is, we should expect the modifier to precede N immediately (modifying the N(P)). Again, this is borne out by the contrast between the following expressions:

- (40) a. liang-ge shou-xiao de xiaohai jiu gou le.
two-Cl thin-small De child then enough Par.
'Two thin and small children are enough.'
- b. ??shouxiao de liang-ge xiaohai jiu gou le.
thin-small De two-Cl child then enough Par.
'Two thin and small children are enough.'

It is also not surprising that in contexts such as (38a) which prefers an indefinite interpretation of the object, it is much better to place the modifier right before the noun (modifying the noun):

- (41) *wo xiang-zhao [[hui dazi de] yige mishu].
I want-find can type De one-Cl secretary
'I want to look for a secretary that can type.'

Briefly summing up, we claim that a relative clause (and, more generally, a modifier) can be adjoined to a property-denoting N(P) or an individual-denoting D(P), generating different interpretations according to the structure. Note that the word order maintains to be [relative clause + relative head] in both cases. The ordering between a relative clause and its head does not give any indication of whether a DP is projected or whether N-not-D raising has applied. It is the interpretation that gives us an indication of the structure and derivation of nominal expressions with modifiers (including relatives). Because word order is not correlated with the derivation of relative constructions, it is not surprising that Chinese and English share many characteristics in the derivation of relative clauses, even though they differ in their ordering.

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