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The Syntactic Structure of Chinese Nominal Phrases

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## Abstract

### The Syntactic Structure of Chinese Nominal Phrases

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The DP Hypothesis proposes that nominal phrases can be analyzed as consisting of Determiner Phrase (DP) on top of Noun Phrase (NP); however, there is a debate on whether this hypothesis works for all languages. Given that previous studies on Chinese leave this question unresolved, this dissertation investigates new empirical evidence to test whether Chinese nominal phrases have DP. Based on various pieces of evidence, I conclude that the structure of Chinese nominal phrases consists of DP on top of NP, which conforms to the DP Hypothesis.

After laying out the research question and previous studies in Chapter 1, Chapter 2 investigates the syntactic structure of Chinese nominal phrases. Based on the assumption that only constituents may undergo ellipsis, this chapter finds that the ellipsis phenomena in Chinese nominal phrases reveal a hierarchical structure within Chinese nominal phrases.

Chapter 3 investigates whether Chinese nominal phrases may bear any structural parallelism to Chinese clauses given that clausal-nominal parallelisms are a motivation for the DP Hypothesis. It is shown that there is a strong parallelism between clauses and nominal phrases in Chinese.

Chapter 4 tests Chinese regarding some typological generalizations that distinguish languages that have DP from languages that do not have DP. The result shows that in most of these generalizations, Chinese patterns with languages that have DP. Although Chinese seems to behave like languages without DP in terms of some of the generalizations (e.g. radical *pro* drop), alternative analyses indicate that this may not be due to the absence of DP.

Chapter 5 examines the properties of Chinese derived nominals (their aspect properties, co-occurrence with numeral-classifier sequences, definiteness) and argues that these properties reveal that the syntactic structure of derived nominals in Chinese includes functional projections such as DP, Classifier Phrase and Number Phrase.

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## Chapter 1 Introduction

The aim of generative syntax is to reveal the universal structure shared by all languages. Within this background, one question under investigation is whether nominal phrases<sup>1</sup> have a universal structure across languages despite the fact that nominal phrases in different languages exhibit variation in terms of word order and functional morphemes contained. One example illustrating the word order difference is that English and French are different in terms of the word order between a noun and an adjective.

- (1) a. the red flower  
 b. le fleur rouge  
 the flower red  
 ‘the red flower’

Another example, which exhibits the difference in terms of functional morphemes contained, is that while Chinese does not have definite articles like *the* in English, Chinese has classifiers (abbreviated as CL in this dissertation) which are obligatory between a numeral and a noun:

- (2) san ben shu  
 three CL book  
 ‘three books’

Given these differences among languages, it is a debate in the syntax literature whether nominal phrases across languages may share the same syntactic structure or not. This dissertation investigates the syntactic structure of nominal phrases in Chinese, and argues that Chinese nominal phrases have a similar syntactic structure as nominal phrases in English. Specifically,

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<sup>1</sup> In this dissertation, I use the term nominal phrases to refer to what is usually called noun phrases.

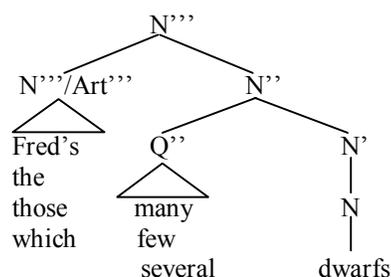
based on a wide range of evidence, I argue that the structure of Chinese nominal phrases contains (minimally) functional projections such as Determiner Phrase and Number Phrase, similar to the syntactic structure of nominal phrases in English. This investigation is relevant to the generative syntax research to the extent that it adds support to the claim that nominal phrases in different languages share the same syntactic structure.

As a general background of this dissertation, this chapter first introduces the motivations for the DP Hypothesis, which were proposed to account for the syntactic structure of nominal phrases. The second section presents a review of those previous studies that have investigated the syntactic structure of Chinese nominal phrases. The last section outlines the subsequent chapters of this dissertation.

## 1.1. The DP Hypothesis

In early years of generative syntax, the structure of nominal phrases was considered as a maximal NP, where the head is N and all prenominal constituents within the nominal phrase are considered as specifiers of different levels. Below is an example from Jackendoff (1977: 104):

(3)

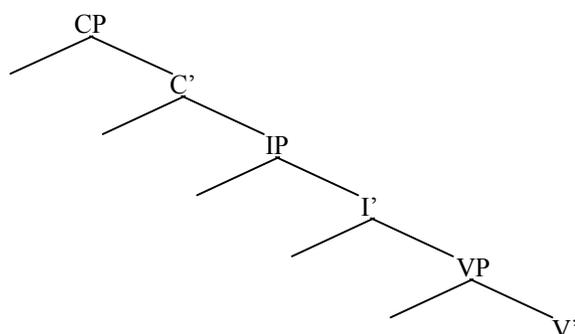


In this structure, constituents like articles, demonstratives and possessive phrases are considered as the specifier of N'''' and quantifiers such as *many* and *few* are considered as the specifier of

N'". One problem with this structure is that possessive phrases are not on a par with determiners (e.g. articles and demonstratives) as the former form an open class but the latter form a closed class. Therefore, it is problematic to list both possessive phrases and determiners under the same category of specifier.

In Chomsky (1986), it was proposed that the X bar notation for lexical categories (specifier-head-complement) can also be extended to functional categories. Following this spirit, the structure of clauses was analyzed as consisting of functional projections on top of Verb Phrase (VP): Complementizer Phrase (CP) and Inflection Phrase (IP):

(4)

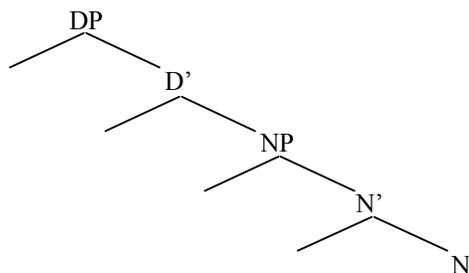


On the other hand, the structure of nominal phrases was still analyzed as (3). The structure in (3) is not parallel to the structure in (4), although it is observed that both clauses and nominal phrases are parallel in many aspects.

Around the 1980s, it was proposed by some studies that the X bar notation should be extended to functional categories in nominal phrases as well. These studies proposed that the structure of nominal phrases contains a functional projection Determiner Phrase (DP) on top of Noun Phrase (NP) (Bernstein, 1993; Bowers, 1987; Brame, 1981, 1982; Cowper, 1987; Hellan, 1986; Horrocks and Stavrou, 1987; Lamontagne and Travis, 1987; Stowell, 1989, 1991; Stroik,

1994; Szabolcsi, 1981, 1987, 1994; Valois, 1991). It is also assumed that the head of DP hosts determiners, which is called the DP hypothesis.

(5)



One of the most cited studies is Abney (1987), which is based on the analysis of the structure of gerundive constructions as follows:

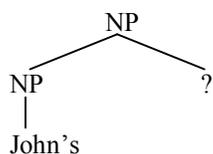
(6) John's building a spaceship

This kind of construction exhibits both nominal and verbal properties. For example, it has a similar distribution as nominal phrases (Abney, 1987: 13):

- (7) a. \*did [that John built a spaceship] upset you?  
 b. did John upset you?  
 c. did [John's building a spaceship] upset you?

This indicates that externally, gerundive constructions should have NP as the top node in their structure (Abney, 1987: 14):

(8)

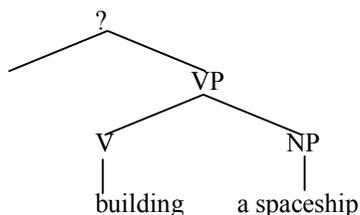


Meanwhile, this kind of construction also contains a VP in its structure because it exhibits some processes that appear only in verb phrases, but not in nominal phrases, for example, Exceptional Case Marking (ECM) and particle movement in verb-particle constructions (Abney, 1987: 15):

- (9) a. \*John's belief Bill to be Caesar Augustus
- b. John believed Bill to be Caesar Augustus.
- c. John's believing Bill to be Caesar Augustus
- (10) a. John's explanation (away) of the problem (away)
- b. John explained (away) the problem (away)
- c. John's explaining (away) the problem (away)

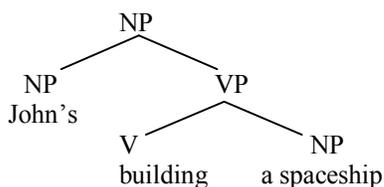
These processes indicate that the structure of gerundive constructions contains a VP (Abney, 1987: 15):

(11)



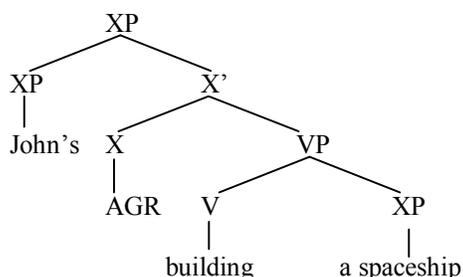
One way of combining the two structures ((8) and (11)) is to have the following structure (Abney, 1987: 15):

(12)



The problem with this structure, however, is that NP does not have an N head, which is against the X bar theory. Therefore, Abney (1987) suggests the following structure for gerundive constructions (Abney, 1987:19):

(13)



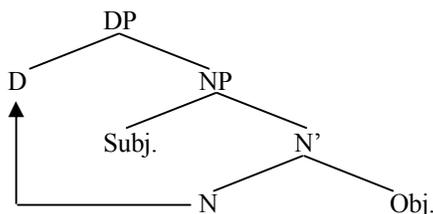
As to the identity of functional category X, Abney assumes that it is D(eterminer). Abney further demonstrates that other nominal phrases also conform to this structure, with determiners (articles, demonstratives, etc.) occupying the head of DP.

Furthermore, some studies proposed that there are more functional projections between DP and NP, parallel to the structure of clauses which consists of more than one functional projection (CP and IP, etc.). One example is Ritter (1991), who argues that between DP and NP, there is a functional projection Number Phrase (NumP), based on the evidence of head movement in Hebrew nominal phrases. In the example below, the subject *dan* 'Dan' must c-command the object *acmo* 'himself' and the head noun *ahavat* 'love' is at the initial position of the phrase (Ritter, 1991: 39).

- (14) a.   ahavat dan et acmo  
           love Dan ACC himself  
           'Dan's love of himself'
- b.   \*ahvat acmo et dan  
           love himself ACC Dan

Ritter assumes that the VSO order in the nominal phrase is derived through the N-to-D movement (Ritter, 1991: 39).

(15)

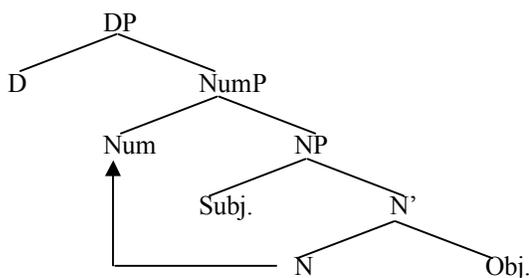


On the other hand, in the nominal phrase below, the definite article occupies the head of DP. Similar to the example in (14), the subject has to c-command the object.

- (16) a.    ha-ahava šel dan et acmo  
           the-love of Dan ACC himself  
           ‘Dan’s love of himself’
- b.    \*ha-ahava šel acmo et dan  
           the-love of himself ACC Dan

Ritter proposes that the phrase in (16a) also involves N movement. Since the article *ha* occupies the head of DP, Ritter proposes that N raises to the head of another functional projection NumP (Ritter, 1991: 43).

(17)



In a similar vein, other studies (Löbel, 1994; Lobeck, 1995, 2005; Picallo, 1991; Rothstein, 1988; Sigurodsson, 1993) propose that the structure of nominal phrases consists of functional projections (e.g. NumP and ClassP) between DP and NP.

## 1.2. The structure of nominal phrases in Chinese

In those studies that argue that nominal structure consists of DP and NP, it is commonly assumed that determiners occupy the head of DP.<sup>2</sup> There is some controversy as to whether languages that do not have definite articles (e.g. Chinese and Japanese, Serbo-Croatian) have DP or not. For example, Fukui (1995) argues that Japanese nominal phrases do not contain functional elements that constitute the projection DP although Furuya (2009) argues that this is not the case. Similarly, although Progovac (1998) argues that Serbo-Croatian has DP in its nominal structure, other studies (Bošković, 2008, 2010a, 2010b; Despic, 2011; Zlatic, 1997) argue that this language does not have DP, based on a sample of typological generalizations.

Since the proposal of the DP hypothesis, some studies have proposed that DP exists in the structure of Chinese nominal phrases. This sub-section will give a brief review of these studies.

Compared with English, one prominent aspect of Mandarin is that its nominal phrases do not have articles. Generally, nominal phrases in Mandarin consist of a demonstrative, a numeral, a classifier and a noun. In addition, a relative clause is also a constituent that occurs very frequently in nominal phrases in Mandarin, and a relative clause is accompanied by a particle *de*.

---

<sup>2</sup> There are different assumptions concerning what elements occupy the head of DP. For example, Abney (1987) assumes that the definite article *the* in English, demonstratives and pronouns occupy the head of DP. Bošković (2008) assumes that only the definite article *the* in English occupies the head of DP.

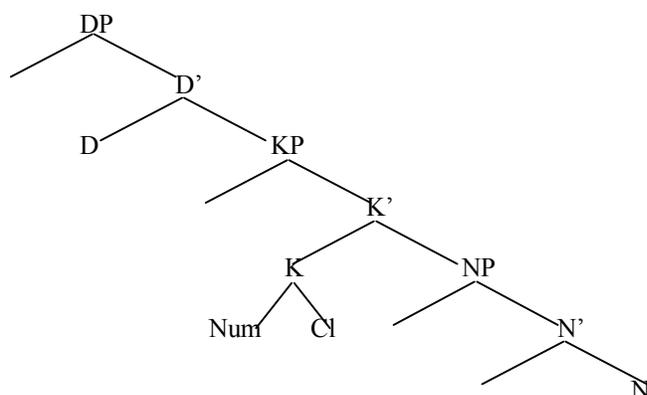
- (18) a. na san duo hua  
 that three Cl flower  
 ‘those three flowers’
- b. Zhangsan mai de shu  
 Zhangsan buy de book  
 ‘the book that Zhangsan bought’

Although numerous studies have proposed that Mandarin nominal phrases have the DP structure and functional projections between DP and NP, they have reached different conclusions regarding what elements head DP and what hierarchical structure nominal phrases have.

### 1.2.1. Tang (1990a, 1990b)

The first study that proposes the DP analysis of Chinese nominal phrases is Tang (1990a, b). Based on Abney’s (1987) DP structure, she proposes the following structure for Chinese nominal phrases (Tang, 1990a: 343).

(19)



She demonstrates that this structure can capture several generalizations about various constituents in Chinese nominal phrases.

First, when a demonstrative or a numeral modifies a noun, a classifier is obligatory ((20), (21) and (22)) (Tang, 1990a: 337-338). On the other hand, a classifier alone cannot modify a noun (23b). When a classifier alone modifies a noun, a demonstrative (20b) or a numeral (23c) is obligatory.

- (20) a. \*na shu  
that book
- b. na ben shu  
that Cl book  
'that book'
- (21) a. \*san shu  
three book
- b. san ben shu  
three Cl book  
'three books'
- (22) a. \*na san shu  
that three book
- b. na san ben shu  
that three Cl book  
'those three books'
- (23) a. shu  
book
- b. \*ben shu  
Cl book

- c. san ben shu  
 three CI book  
 ‘three books’

She postulates that if K is instantiated, both Num and CI must be lexically realized. This can explain why numerals must co-occur with classifiers when modifying nouns ((21) and (22))<sup>3</sup>, and why classifiers typically co-occur with overt numerals (23c). Regarding (20b), where a numeral is not present, Tang adds that this is because a numeral *yi* ‘one’ is deleted at PF. The deletion analysis is supported by the observation that the phrase in (20b) has the same meaning as the phrase *na yi ben shu* ‘that book’ and these two phrases can be used interchangeably.

Second, the order of the demonstrative, the numeral and the classifier is fixed: the demonstrative precedes the numeral, which in turn precedes the classifier (Tang, 1990a: 338). No other word order is allowed.

- (24) a. na san ben shu  
 that three CI book  
 ‘those three books’
- b. \*na ben san shu  
 that CI three book
- c. \*ben na san shu  
 CI that three book
- d. \*ben san na shu  
 CI three that book

---

<sup>3</sup> It seems to me that Tang does not explain why demonstratives must co-occur with classifiers in order to modify nouns.

- e. \*san na ben shu  
 three that CI book
- f. \*san ben na shu  
 three CI that book

Tang explains that this is because the demonstrative-numeral-classifier follows the hierarchical structure in (19).

Third, there exists a kind of agreement or selectional restriction between the classifier and the noun. For example, the noun *shu* ‘book’ must co-occur with the classifier *ben*, not the classifier *tiao* (Tang, 1990a: 339):

- (25) a. yi ben shu  
 one CI book  
 ‘one book’
- b. \*yi tiao shu  
 one CI book

Tang suggests that the agreement relation between the classifier and the noun can be expressed as the selectional relation between the classifier and the noun in the hierarchical structure of (19).

Fourth, only one classifier is allowed (Tang, 1990a: 339).

- (26) \*na ben san ben shu  
 that CI three CI book

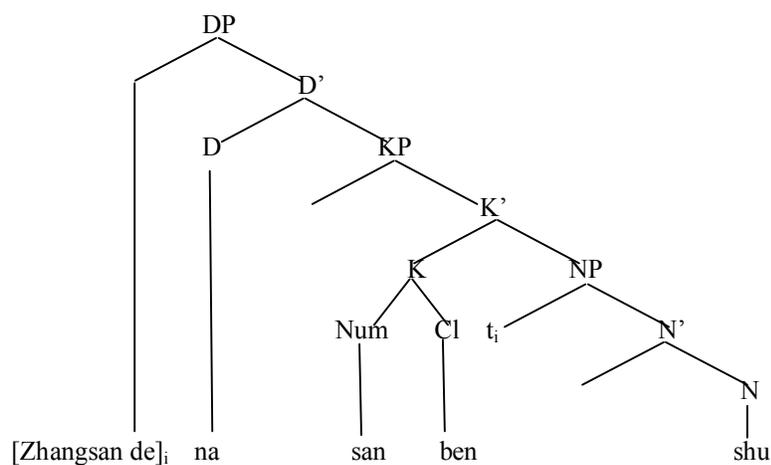
Tang’s explanation is that because in the structure of (19), the classifier appears only inside KP, but not in any other position.

Tang argues that the DP structure in (19) can also explain why the possessive phrase can occur either before the demonstrative or after the classifier, but cannot appear between the demonstrative and the numeral (Tang, 1990a:349):

- (27) a.   Zhangsan de na yi ben shu  
           Zhangsan 's that one Cl book  
           ‘Zhangsan’s that book’
- b.   na yi ben Zhangsan de shu  
           that one Cl Zhangsan 's book  
           ‘that zhangsan’s book’
- c.   \*na Zhangsan de yi ben shu  
           that Zhangsan 's one Cl book

According to Tang, under the structure in (28), the possessive is base generated in Spec NP, where it is assigned the theta role of possessor. In order to explain the positions of the possessive phrase as illustrated in (27a) and (27b), Tang makes two assumptions. Firstly, the possessive phrase can optionally move to Spec KP or Spec DP. Secondly, there is an obligatory movement of K to D. These two assumptions combined leads to the result that there is no difference between a possessive phrase raised to Spec KP and a possessive phrase remaining in Spec NP. For this reason, (27c), where the possessive phrase intervenes between DP and KP, never appears.

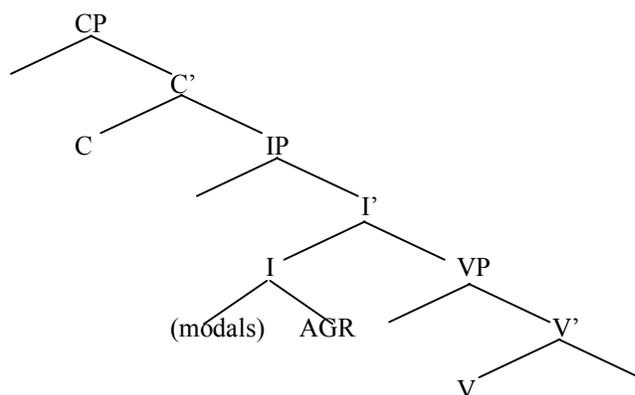
(28)



(Tang, 1990a: 350)

Meanwhile, Tang adds that the DP structure as suggested in (19) can also capture the parallelism between nominals and clauses based on the structure of clauses proposed in (Chomsky, 1986):

(29)



(Tang, 1990a: 340)

A later study (Lin, 1997) evaluates Tang's arguments and points out several weaknesses. According to Lin, the first weakness is that the sentence structure assumed by Tang in (29) is not well supported by some observations in Chinese. For example, some sentence final particles in

Chinese can indicate whether a sentence is a statement or a question (30). Since these particles reflect sentence types, they are assumed to take the scope of the whole sentence to their left and the sentences containing these particles are assumed to be head final (Aoun and Li, 1993). The DP structure proposed by Tang, however, is head-initial. Therefore, in terms of head parameter, there is a mismatch in terms of head directionality between DP and CP in Chinese.

- (30) a.     Zhangsan hui kai feiji le  
           Zhangsan can steer plane SFP  
           ‘Zhangsan can steer a plane.’
- b.     Zhangsan hui kai feiji ma  
           Zhangsan can steer plane SFP  
           ‘Can Zhangsan steer a plane?’

The second weakness lies in Tang’s stipulation of the obligatory movement of K to D to explain why the possessive phrase cannot occur between the demonstrative and the numeral. Lin uses the following example to argue that the K to D movement is not possible (Lin, 1997: 411). In (31a), when *zheme* ‘so’ is combined with a numeral-classifier sequence, its semantic function is to denote the scale of largeness or smallness of the numeral. In this sense, *zheme* is a modifier of the numeral. This in turn implies that *zheme* should be licensed by the head Num and should appear between the demonstrative and the numeral. If the K to D movement occurred in (31a), this would lead to the sequence in (31b), which is unacceptable in Chinese.

- (31) a.     zheme ji ju hua  
           so several Cl word  
           ‘so few words’

- b. \*ji ju zheme hua  
 several CI so word

Thirdly, Lin proposes an alternative analysis regarding the fact that a demonstrative has to co-occur with a numeral and a classifier in order to modify the head noun. Tang argues that this can be captured in terms of selection within the DP structure. Lin argues that demonstratives can be considered as adjuncts licensed by classifiers in the same way that negative polarity items are adjuncts licensed by negation.

### 1.2.2. Cheng and Sybesma (1999, 2005)

Cheng and Sybesma (1999, 2005) argue that classifiers in the two dialects of Chinese (Mandarin and Cantonese) can perform the function of the head of DP. Their claim is based on the interpretations and distributions of different kinds of nominal phrases in Mandarin and Cantonese, as summarized below (M represents Mandarin and C represents Cantonese).

#### (32) A comparison between Mandarin and Cantonese

##### a. Mandarin

	Indefinite	Definite	Generic
Bare noun	postverbal only (33a)	preverbal (34b) and postverbal (33b)	preverbal (34c) and postverbal (33c)
CI+N	postverbal only (35a)	×	×

##### b. Cantonese

	Indefinite	Definite	Generic
Bare noun	postverbal only (37a)	×	postverbal (37b) and preverbal (38b)
CI+N	postverbal only (37d)	preverbal (38c) and postverbal (37c)	×

In Mandarin, bare nouns have three interpretations, depending on where they occur within the sentence. In the postverbal position, bare nouns can be interpreted as indefinite (33a), definite (33b), or generic (33c). In the preverbal position, they can be interpreted as definite (34b) or as generic (34c), but not as indefinite (34a).

- (33) a. Hufei mai shu qu le.  
 Hufei buy book go SFP  
 ‘Hufei went to buy a book (books)’
- b. Hufei he wan le tang.  
 Hufei drink finish LE soup  
 ‘Hufei finished the soup.’
- c. Wo xihuan gou.  
 I like dog  
 ‘I like dogs.’
- (34) a. Gou yao guo malu.  
 dog want cross road  
 ‘The dog wants to cross the road.’  
 Not: ‘A dog wants to cross the road.’
- b. Gou jintian tebie tinghua.  
 dog today very obedient  
 ‘The dog (dogs) was (were) very obedient today.’
- c. Gou ai chi rou  
 dog love eat meat  
 ‘Dogs love to eat meat.’  
 (Cheng and Sybesma, 1999: 510)

In addition, Mandarin has nominal phrases that consist of a classifier and a noun. The examples in (35) show that Mandarin [Cl + N] phrases can be interpreted as indefinite (35a), but not as definite (35b) or generic (35c) (Cheng and Sybesma, 1999: 511).

- (35) a. Wo xiang mai ben shu  
 I want buy Cl book  
 ‘I would like to buy a book’
- b. \*Ta he wan le wan tang  
 he drink finished Perf. Cl<sup>bowl</sup> soup  
 Intended reading: ‘He finished a (specific) bowl of soup.’
- c. \*Wo xihuan wan tang  
 I like Cl<sup>bowl</sup> soup  
 Intended reading: ‘I love a bowl of soup’

Mandarin also has nominal phrases that consist of a sequence of numeral-classifier-noun. They may be interpreted as indefinite, but not as definite or generic.

- (36) a. Wo xiang mai yi ben shu  
 I want buy one Cl book  
 ‘I would like to buy a book’
- b. \*Wo xihuan yi wan tang  
 I like one Cl<sup>bowl</sup> soup  
 Intended reading: ‘I like the/a bowl of soup’

In Cantonese, just as in Mandarin, bare nouns can be indefinite postverbally (37a) but not preverbally (38a), and generic in both positions (37b) and (38b). However, Cantonese bare nouns cannot be interpreted as definite ((37c) and (38c)). Instead of bare nouns, Cantonese uses [Cl+N] to express definiteness, as illustrated in (37c) and (38c). Additionally, the [Cl+N] phrase in Cantonese can also be interpreted as nonspecific indefinite (37d).

- (37) a. Wufei heoi maai syu.  
 Wufei go buy book  
 ‘Wufei went to buy a book (books).’
- b. Ngo zungji gau.  
 I like dog  
 ‘I like dogs.’
- c. Wufei jam-jyun \*(wun) tong la.  
 Wufei drink-finish Cl soup SFP  
 ‘Wufei finished drinking the soup.’
- d. Ngo soeng maai bun syu (lei taai).  
 I want buy Cl book come read  
 ‘I want to buy a book (to read).’  
 (Cheng and Sybesma, 1999: 510-511)
- (38) a. \*Gau soeng gwo maalou.  
 dog want cross road  
 Intended: ‘A dog wants to cross the road.’
- b. Gau zungji sek juk.  
 dog like eat meat  
 ‘Dogs love to eat meat.’
- c. \*(Zek) gau gamjat dakbit tengwaa.  
 Cl dog today special obedient  
 ‘The dog is specially obedient today.’  
 (Cheng and Sybesma, 1999: 510-511)

The Cantonese nominal phrases that consist of a numeral-classifier-noun sequence have the same distribution and interpretation as their counterparts in Mandarin.

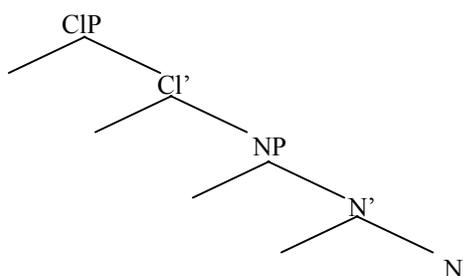
In order to capture the interpretational and distributional properties of nominal phrases in Mandarin and Cantonese, Cheng and Sybesma draw on the analyses of nominal phrases in Longobardi (1994: 616), which observes that bare nouns like *acqua* ‘water’ in Italian can be interpreted as indefinite and are restricted to the postverbal position:

- (39) a. \*acqua viene giù dalle colline.  
           water comes down from-the hills
- b. viene giù acqua dalle colline.  
           comes down water from-the hills
- c. ho preso acqua dalla sorgente.  
           I took water from-the spring

Longobardi presents an analysis where bare nouns in Italian have the DP projection dominating NP, with the head of DP empty. Since an empty D is just like any other empty category in that it must be lexically governed, it explains why bare nouns are restricted to lexically governed positions.

In order to explain the observation that bare nouns in Mandarin and the [Cl+N] noun phrases in Cantonese have the definite interpretation, Cheng and Sybesma claim that these two kinds of nominal phrases share the following structure (Cheng and Sybesma, 1999: 529):

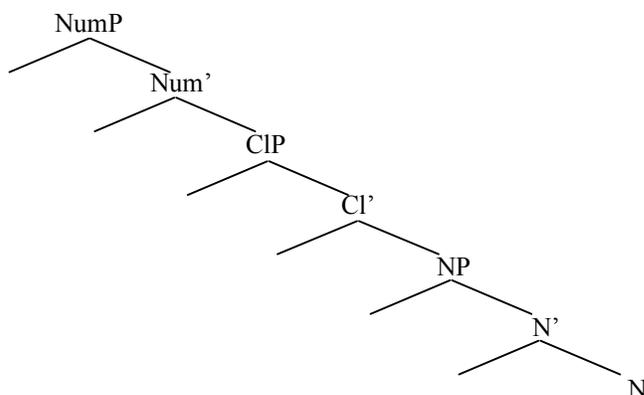
(40)



They suggest that for Mandarin bare nouns having a definite interpretation, there is N to Cl movement, which is covert in Mandarin. On the other hand, for the [Cl+N] noun phrases in Cantonese, the classifier heads the CIP projection and functions like a determiner, which makes the [Cl+N] phrase have the definite interpretation.

For those noun phrases that have the indefinite interpretation in both Mandarin and Cantonese, Cheng and Sybesma suggest that they have the following structure (Cheng and Sybesma, 1999: 529):

(41)



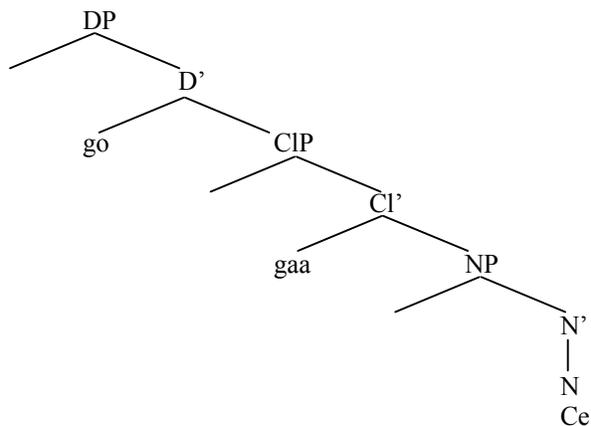
In Mandarin, the nominal phrases that can have the indefinite interpretation include bare nouns, [Cl + N] phrases and [Num + Cl + N] phrases. In Cheng and Sybesma's analysis, those bare nouns that have the indefinite interpretation have empty heads of CIP and NumP. For Mandarin

[CI+N] phrases that have the indefinite interpretation, the head of NumP is empty. Regarding why the presence of NumP is linked to the indefinite interpretation, they suggest the generalization that the indefinite interpretation of nominals in Chinese is linked to the presence of a NumP (the head of which may be overt or nonovert). Cantonese nominal phrases that have the indefinite interpretation (bare nouns and [CI+N] noun phrases) have the same structure as their counterparts in Mandarin.

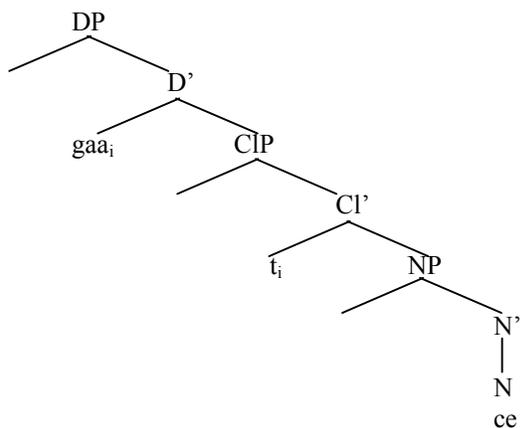
By analyzing the structure of definite noun phrases in Mandarin and Cantonese as the structure in (40), Cheng and Sybesma conclude that classifiers in Mandarin and Cantonese perform the function of a determiner. The classifier performs three functions simultaneously: converting nominal predicates to arguments, singling out individual instances of whatever is described by NP, and yielding the definite interpretation.

Cheng and Sybesma's (1999, 2005) analysis of classifiers is argued against by a recent paper (Wu and Bodomo, 2009). Wu and Bodomo, citing previous studies on classifiers (Borer, 2005a; Chierchia, 1998), argue that the function of classifiers is to provide a unit of measure for nouns in Chinese, which are all mass nouns. Moreover, they argue that it is not classifiers, but demonstratives, that perform the function of yielding the definite interpretation. This is supported by the observation that [CI+N] phrases in Chinese are not invariably definite, because as illustrated in (32), [CI+N] phrases are indefinite in Mandarin but ambiguous in Cantonese. They propose that at least in Cantonese, it is demonstratives that fill the position of DP head, as illustrated in (42a) (Wu and Bodomo, 2009: 499). In cases where the [CI+N] phrase is definite (42b), the head of DP is filled by a classifier that moves to the head of DP, but it is still the head of DP that yields the definite interpretation.

- (42) a. go gaa ce  
 that Cl car  
 'that car'



- b. gaa ce  
 Cl car  
 'that car'



Another criticism leveled against Cheng and Sybesma (1999) is by Aoun and Li (2003). They claim that it is inappropriate to equate a Chinese CIP with an English DP because it would be unexpected that a number projection must precede the CIP in Chinese while it must follow DP in English.

### 1.2.3. Li (1998)

Li (1998) observes that in Mandarin, a nominal phrase that consists of a sequence of numeral + classifier + noun is ambiguous and has different structures depending on its interpretation.

(43) Two structure for Chinese nominal phrases

Structure	Interpretation	Differences		
[ <sub>NumP</sub> San ge xuesheng] three Cl student	the number of students	not co-occur with operators	not antecedent	no scope interaction
[ <sub>DP</sub> [ <sub>NumP</sub> San ge xuesheng]] three Cl student	existence of three students	co-occur with operators	antecedent	scope interaction

In the Chinese linguistics literature, expressions that have the sequence of numeral + classifier + noun are considered as indefinite (Li, 1998: 694) and are generally barred from the subject or topic positions of the sentence (Chao, 1968; Li and Thompson, 1981; Xu, 1995):

- (44) a. \*San ge xuesheng zai xuexiao shoushang le  
           three Cl student in school get hurt ASP
- b. \*San ge xuesheng wo zhidao zai xuexiao shoushang le  
           three Cl student I think in school get hurt ASP

However, Li notes some exceptions where these expressions are in fact allowed in the subject or topic position of the sentence (Li, 1998: 695):

- (45) a. Liang zhang chuang, (wo tingshuo,) ji le wu ge  
           two Cl bed I hear squeeze ASP five Cl  
           ren na shizai shi tai ji le.  
           people that really be too squishy PAR

‘Two beds (, I heard,) were crowded with five people. That was really too squished.’

- b. Liang san ge laoshi jiu ba na qun ye xiaohai kongzhi zhu le.  
 two three CI teacher then BA that group wild children control hold PAR  
 ‘Two or three teachers (sufficed to have) controlled that group of wild kids.’

According to Li, the nominal expressions that appear in the subject position in (45) have one property: they denote the quantity of individuals, instead of the existence of individuals. The example in (45a) expresses the capacity of two beds to accommodate five people and the example in (45b) concerns the number of teachers that it took to control a group of wild children. Li calls this kind of interpretation the quantity-denoting one, in order to distinguish from the indefinite individual-denoting interpretation.

The distinction between the two interpretations is further supported by the following observations. The first is that an individual-denoting interpretation can co-occur with operators that range over individuals, for example, *dou* ‘all’ and *you* ‘have’ (Li, 1998: 698).

- (46) a. San ge xuesheng dou lai zher le.  
 three CI student all come here ASP  
 ‘Three students all came here.’

- b. You san ge xuesheng lai zher le.  
 have three CI student come here ASP  
 ‘There are three students that came here.’

On the other hand, the quantity-denoting interpretation cannot co-occur with these operators (Li, 1998: 698).

- (47) a. \*You san zhi gunzi gou ni da ta ma?  
 have three CI sticks enough you hit him question-partiucle

- b. \*San zhi gunzi dou gou ni da ta ma?  
 three CI sticks all enough you hit him question-particle

The second difference between the two interpretations is that the individual-denoting expression can be allowed as the antecedent of the pronoun or the reflexive while the quantity-denoting expression cannot (Li, 1998: 699):

- (48) a. Wo jiao [liang ge xuesheng]<sub>i</sub> huiqu ba tamen<sub>i</sub> de chezi kai lai.  
 I ask two CI student return BA them de car drive over  
 ‘I ask two students to go back and drive their own car over.’
- b. \*[San ge ren]<sub>i</sub> tai bu qi liang jia ni gei tamen<sub>i</sub> de  
 three CI person lift not up two CI you give them de  
 gangqin  
 piano

The third difference is that individual-denoting expressions can enter into scope relations with one another but quantity-denoting expressions cannot (Li, 1998: 700-701).

- (49) Wo rang san ge ren chi wu wan fan  
 I let three CI people eat five CI rice  
 ‘I let three people to eat five bowls of rice.’

The sentence above may have the interpretation where the amount of rice consumed by three people is fifteen bowls, with ‘three people’ scoping over ‘five bowls of rice’. However, the quantity-denoting expressions in the following example do not enter scope relations with one another so this sentence has only one reading: the amount of rice consumed by three people is five bowls.

- (50) San ge ren, wo zhidao chi-de-wan wu wan fan  
 three CI people I know eat-can-finish five CI rice  
 ‘Three people, I know can finish five bowls of rice.’

Li attributes the interpretational difference between the quantity-denoting expression and the individual-denoting one to the difference in their syntactic structures. Li suggests that the sequence of numeral + classifier + noun has two syntactic structures (Li, 1998: 696):

- (51) a. [NumP san ge xuesheng]  
           three CI student  
       b. [DP [NumP san ge xuesheng]]

If *san ge xuesheng* has the structure in (51a), then it indicates the quantity of students as three; if *san ge xuesheng* has the structure as (51b), it indicates the existence of three students. Moreover, assuming the analysis from Longobardi (1994), Li argues that since the structure of (51b) involves an empty D, the phrase in (51b) must appear in a lexically governed position, for example, as the object of the verb, instead of the subject or the topic of the sentence.

Although Li identifies the contrast between the two interpretations and the structures associated with these two interpretations, respectively, she does not explain what factors determine the quantity-denoting interpretation or the individual-denoting interpretation. Moreover, regarding the structure of the nominal phrase that consists of the numeral-classifier-noun sequence under the indefinite interpretation, Li (1998) presents a different analysis from Cheng and Sybesma (1999). While Li argues that the indefinite interpretation arises from the empty  $D^0$ , Cheng and Sybesma argue that the indefinite reading arises from the presence of NumP.

#### 1.2.4. Li (1999)

Another source of evidence supporting the existence of DP comes from a marker *-men*, which is argued to be a plural marker that is base generated in NumP and realized in D. Li notes the following properties of *-men*:

- (52) a. *-men* can be suffixed to pronouns (53a), proper names (53b) and some common nouns (53c);
- b. Common nouns with *-men* must be interpreted as definite (53c) and in this case, common nouns with *-men* cannot co-occur with a numeral-classifier or another noun (53d);
- c. Attachment of *-men* to proper names yields two different interpretations, a “collective” reading and a “plural” reading (54);
- d. A pronoun/proper name with *-men* can be followed, but not preceded, by an expression that consists of a numeral-classifier sequence and even another noun (the contrast between (55a) and (55b)). For proper names, only the “collective” reading is possible (55a).

- (53) a. Ta men dou lai le  
he-men dou come Perf.  
“All people have come.”
- b. Wo dui XiaoQiang-men san ge ren tebie hao  
I to Xiao Qiang-men three Cl person especially good  
‘I am especially nice to Xiao Qiang (them) three persons.’
- (Li, 1999: 83)

c. Wo qu zhao haizi-men

I go find child-men

‘I will go to find the children.’

(Li, 1999: 78)

d. \*Ta dui xuesheng-men liang ge (ren) tebie hao

he to students-men two Cl person especially good

(Li, 1999: 83)

(54) Wo qing XiaoQiang-men chifan.

I invite Xiao Qiang-men eat

The collective interpretation: ‘I invited Xiao Qiang and two others in the group for a meal.’

The plural interpretation: ‘I invited three people all named/all with the characteristics of Xiao Qiang for a meal.’ (Li, 1999: 84)

(55) a. Wo qing XiaoQiang-men/tamen san ge (ren) chifan.

I invite Xiao Qiang-men/they three Cl person eat

‘I invited Xiao Qiang/them and two others (in the group) for a meal.’

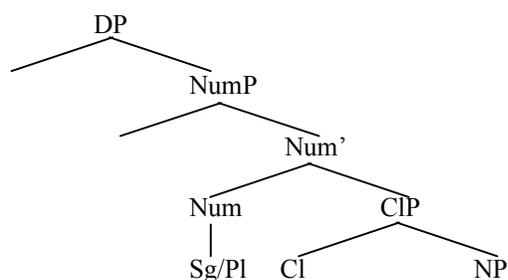
b. \*Wo qing san ge XiaoQiang-men/tamen chifan.

I invite three Cl Xiao Qiang-men/them eat

(Li, 1999: 80)

In order to capture these generalizations about *-men*, Li assumes that nominal phrases in Mandarin have the following structure, where the head of NumP hosts the singular or plural feature (Li, 1999: 86-87):

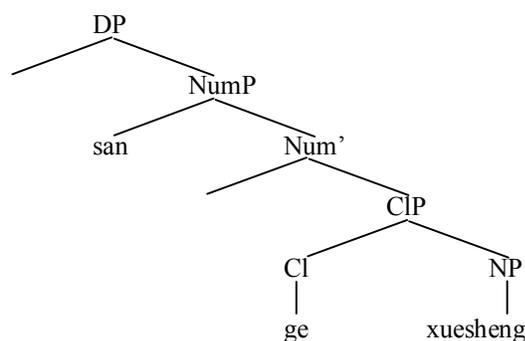
(56) a.



b. san ge xuesheng

three Cl student

'three students'



Li's hypothesis is that under this structure, the plural feature is checked at D and *-men* is the realization of this feature<sup>4</sup>. Li assumes that pronouns and proper names are generated at the head of DP (Abney, 1987; Postal, 1969), and this can explain why *-men* can be suffixed to pronouns (53a) or proper names (53b). This is also the reason why a pronoun/proper name with *-men* can be followed, but not preceded, by an expression that consists of a numeral-classifier sequence and another noun (the contrast between (55a) and (55b)). When the classifier head does not intervene between the Num head and the N head, the common noun, which is generated at N, can move to D in order to become definite. In this case, *-men* is suffixed to the common noun

<sup>4</sup> Li argues that the plural feature in Chinese cannot be checked via the movement of N to Num or the movement of Num to N when a classifier occurs between the numeral and the classifier. This is due to the Head Movement Constraint (Travis, 1984).

(53c), thus driving the definite reading. As to why proper names attached with *-men* yield two different interpretations (54), Li's explanation is that proper names are ambiguous depending on where they are generated in the structure in (56b). A proper name can be generated in D to refer to a definite individual by name. It can also function like a common noun, base-generated in N, and denoting a person(s) with the same name (*I met two Bills at the party. I like the Bill you like*) or denoting a person(s) with the same characteristics (Li, 1999: 84). If a proper name is generated in D, it can be suffixed with *-men*, yielding a collective reading (54a). If a proper name is base-generated in N and moved to D, it yields the plural reading (54b). In (55a), where a proper name with *-men* is followed by an expression that consists of a numeral-classifier sequence, the classifier prevents the proper name generated in N from moving to D. In this case, the proper name must be directly generated in D, thus deriving only the collective reading (55a).

### 1.2.5. Simpson (2001, 2003)

Simpson (2001, 2003) investigates the structure of relative clauses in Chinese and argues that the particle *de*, which appears at the end of a relative clause, is a determiner.

Simpson's arguments are based on Kayne (1994)'s analysis of English relative clauses as being derived in the following way (Simpson, 2003: 75):

- (57) a. the man that I met  
 b. [DP the [CP [C that [IP I met a man]]]] (D-structure)  
 c. [DP the [CP man<sub>i</sub> [C that [IP I met t<sub>i</sub>]]]] (S-structure)

Kayne claims that head-final relative clauses (for example, in Amharic) can be derived in the same way as in (57) except that another movement takes place, that is, the movement of the IP to Spec DP:

(58) [I met]<sub>j</sub> [the [<sub>CP</sub>[<sub>NP</sub> man]<sub>i</sub> [<sub>C</sub><sup>0</sup>[[e]<sub>i</sub>]]]]<sup>5</sup>

Adopting Kayne's analysis of head-final relative clauses, Simpson suggests that we can derive Chinese relative clauses in the same way (Simpson, 2003: 78):

- (59) a. [ \_ qu Beijing] de ren  
           go Beijing de person  
           'the person who went to Beijing'
- b. [<sub>DP</sub> de [<sub>CP</sub> ren<sub>i</sub> [<sub>IP</sub> t<sub>i</sub> qu Beijing]]]
- c. [[<sub>IP</sub> t<sub>i</sub> qu Beijing]<sub>k</sub> [de [<sub>CP</sub> ren<sub>i</sub>] t<sub>k</sub> ]]

One consequence of the analysis in (59) is that the particle *de* has to be analyzed as a determiner, which seems implausible given several differences between *de* and determiners in English such as *the*. Simpson argues, however, that cross-linguistic evidence indicates that *de* has some properties similar to determiners in other languages and therefore can be analyzed as a determiner. One difference between *de* and *the* is that *de* can occur multiple times (60a). However, determiners in Hebrew, Simpson argues, can also occur multiple times (60b) (Simpson, 2003: 80):

- (60) a. Zhangsan de hongse de shu  
           Zhangsan de red de book  
           'Zhangsan's red book'
- b. ha-bayit ha-gadol  
           the-house the-big  
           'the big house'

---

<sup>5</sup> Amharic does not have the equivalent of English *that* so C<sup>0</sup> is null.

Second, *de* does not have any inherent definiteness value (61a), which is contrary to the prototypical property of determiners. Simpson (2003: 80) argues that determiners do not have to contribute any definiteness value. For example, in Albanian (61b), where the insertion of the determiner is reported to be triggered solely by properties of the adjectival stem (Giusti, 1997), a “definite” determiner occurs with the adjective but the whole DP is actually indefinite.

- (61) a. yi ben Zhangsan de shu  
           one Cl Zhangsan de book  
           “Zhangsan’s book”
- b. nje djale i mire  
           a boy the good  
           ‘a good boy’

A third reason against positing *de* as a determiner is that *de* can co-occur with demonstratives (62a), which goes against the English pattern where *the* cannot co-occur with demonstratives. Simpson argues, however, that there are some languages where determiners and demonstratives co-occur, as illustrated in the Greek example (62b) (Simpson, 2003: 80).

- (62) a. Zhangsan de na ben shu  
           Zhangsan de that Cl book  
           ‘Zhangsan’s that book’
- b. afto to oreo to vivlio  
           this the good the book  
           ‘this good book’

Additionally, in contrast to *the*, *de* cannot occur in the initial position of a DP:

- (63) \*de ren  
de person

Simpson argues that this is because the particle *de* is enclitic, needing phonological support (as illustrated in the derivation of the relative clause in (59)), similar to the definite determiner in Romanian (Grosu, 1988):

- (64) potret<sub>i</sub>-ul t<sub>i</sub> une<sub>i</sub> fete  
portrait-the a.Gen. girl  
'the portrait of a girl'

(Simpson, 2003: 84)

Moreover, Simpson cites cross-linguistic evidence to illustrate that determiner-like elements require some other modifying elements to be present, and that it is possible that the primary function of these determiners is to enable a modification relation to be effected. According to Simpson, the particle *de* also performs this function. Additionally, the connection between determiners and noun modification also exists in English. For example, sequences of determiners and quantifiers such as *the every boy* are not normally licensed, but with an additional modifying possessive phrase added, the phrase seems to become quite acceptable, and the determiner is in fact licensed to appear with the quantifier:

- (65) a. \*the every whim  
the every whim [of Margaret Thatcher]

(Simpson, 2003: 91)

Moreover, Simpson's analysis of *de* as a determiner is supported by the ellipsis data provided by Saito et al. (2008: 259, 263). They observe that whenever a constituent attached with

*de* modifies a noun, the head noun can be deleted:

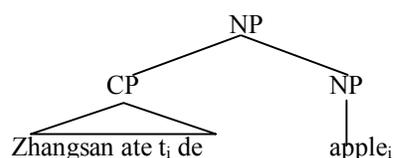
- (66) a. Zhangsan de che bi Lisi de ~~che~~ geng gui  
 Zhangsan de car compare Lisi de car more expensive  
 ‘Zhangsan’s car is more expensive than Lisi’s.’
- b. Luoma de huimie bi Bali de ~~huimie~~ geng canlie  
 Rome de destruction compare Paris de destruction more disastrous  
 ‘Rome’s destruction was more disastrous than Paris’s.’
- c. Wo zuotian kanjian de nanhai bi ni zuotian kanjian  
 I yesterday see de boy than you yesterday see  
 de ~~nanhai~~ geng youqian  
 de boy more rich  
 ‘The boy I saw yesterday is richer than the boy you saw yesterday.’

Based on the assumption that deletion of the complement is allowed only when the Spec position is filled (Lobeck, 1990; Saito and Murasugi, 1990), they argue that the ellipsis data in (66) can be explained if *de* is the head of DP that takes the deleted head noun as the complement.

Although Simpson (2001, 2003) argues that the derivation of relative clauses in Chinese involves DP, some other studies (e.g. Aoun and Li, 2003), propose a different derivation of relative clauses, which does not involve DP.

- (67) a. Zhangsan chi de piguo  
 Zhangsan eat de apple  
 ‘the apple that Zhangsan ate’

b.



According to Aoun and Li, the object of the relative clause CP is relativized and raises out of the relative clause. The raising is supported by reconstruction effects. When the relativized NP contains a reflexive (68) or a pronoun (69), they can be bound by an antecedent in the relative clause (Aoun and Li, 2003: 132-133):

(68) a. Wo jiao Zhangsan quan mei ge ren<sub>i</sub> kai ziji<sub>i</sub> de chezi lai.  
 I ask Zhangsan persuade every Cl person drive self de car come  
 ‘I asked Zhangsan to persuade everyone to drive self’s car over.’

b. [[Wo jiao Zhangsan quan mei ge ren<sub>i</sub> kai t<sub>i</sub> lai de] ziji<sub>i</sub> de chezi].  
 I ask Zhangsan persuade every Cl person drive come de self de car  
 ‘self’s car that I asked Zhangsan to persuade everyone to drive over’

(69) a. Wo xiwang mei ge xuesheng<sub>i</sub> dou neng ba wo gei ta<sub>i</sub>de shu dai lai.  
 I hope every Cl student all can BA I give his book bring come  
 ‘I hope every student<sub>i</sub> can bring the book that I gave to him<sub>i</sub>.’

b. Ni hui kandao [[wo xiwang mei ge xuesheng<sub>i</sub> dou neng dai t<sub>i</sub> lai de]  
 you will see I hope every Cl student all can bring come de  
 wo gei ta<sub>i</sub>de shu].  
 I give his book’  
 ‘You will see the book that I gave to him<sub>i</sub> that I hope every student<sub>i</sub> will bring.’

When the relativized NP is part of an idiom (70), reconstruction also takes place (Aoun and Li,

2003: 138).

(70) [[Ta chi t<sub>i</sub> de] cu<sub>i</sub>] bi shei dou da.

he eat de vinegar compare who all big

‘Literal: The vinegar he eats is greater than anyone else’s.’

‘His jealousy is greater than anyone else’s.’

At the same time, Aoun and Li observe that when the relativized nominal contains a numeral-classifier sequence, which is analyzed as NumP in Li (1998, 1999) and Tang (1990a, 1990b), the relativized nominal cannot be bound by another quantifier in the relative clause (Aoun and Li, 2003: 133).

(71) a. Wo hui zhengli [[mei ge ren dou hui kan t<sub>i</sub> de] san ben shu<sub>i</sub>].

I will arrange every CI person all will read de three CI book

‘I will put the three books (the same 3 books) that everyone will read in order.’

b. [[Mei ge ren dou hui kan t<sub>i</sub> de] san ben shu<sub>i</sub>], wo hui zhengli.

every CI person will all read de three CI book I will arrange

‘The three books (the same 3 books) that everyone will read, I will put in order.’

Based on the contrast between (68), (69) and (70) on the one hand, and (71) on the other hand, Aoun and Li argue that what can be reconstructed in the relative clause is NP.

Moreover, they present evidence to show that in Chinese, the relativized nominal together with the relative clause is NP, as supported by the evidence of conjunction. In Chinese, the connective *jian* ‘and’ can conjoin two properties of a single individual or two activities performed by one individual, but not two expressions that denote individuals. In terms of categories, *jian* connects NPs or VPs.

- (72) a. Wo xiang zhao yi ge mishu jian daziyuan  
 I want to find one CI secretary and typist  
 ‘I want to find a secretary and typist.’
- b. \*Wo xiang zhao yi ge mishu jian yi ge daziyuan  
 I want to find one CI secretary and one CI typist  
 ‘I want to find a secretary and a typist.’

The contrast in (72) indicates that in terms of category, *jian* conjoins two NP but not two DPs.

Thus, they reach two conclusions about relative clauses in Chinese: the relativized nominal is NP, and the relativized nominal together with the relative clause constitute an NP. This leads them to suggest that the relative clause may be an adjunct to the relativized nominal and therefore, they propose the structure of (67) as the derivation of relative clauses in Chinese.

They further argue that the analysis of relative clauses as adjuncts can also capture the observation that relative clauses can occur in three positions within the nominal in Chinese:

- (73) a. meiren yao de na shi ben shu  
 nobody like de that ten CI book  
 ‘those ten books that nobody likes’
- b. na meiren yao de shi ben shu  
 that nobody like de ten CI book  
 ‘those ten books that nobody likes’
- c. na shi ben meiren yao de shu  
 that ten CI nobody like de book  
 ‘those ten books that nobody likes’

In sum, previous studies on the structure of Chinese nominal phrases employ different

sources of evidence to argue for the existence of DP in Chinese. Below is a table that summarizes these previous studies.

(74) A summary of the studies that argue for DP in Chinese

Evidence	Conclusions	Counterarguments
Ordering of demonstratives, numerals and classifiers	The fixed ordering can be captured by [DP[KP[NP]]] structure (Tang, 1990a, 1990b))	Demonstratives, numerals and classifiers are not heads of functional projections (DP, KP and NP) (Lin, 1997)
Definite interpretation <i>gou zek gau</i> dog CL dog 'the dog' 'the dog'	On top of NP, there is a CIP projection that performs the function of DP (Cheng and Sybesma, 1999)	Demonstratives but not classifiers are determiners (Wu and Bodomo, 2009)
Indefinite interpretation <i>san ge xuesheng</i> three CL student 'three students'	The empty D is responsible for indefiniteness (Li, 1998)	Indefiniteness is due to the presence of NumP (Cheng and Sybesma, 1999) but not to the empty D
Plural marker <i>-men</i> <i>ta-men haizi-men</i> he <i>-men</i> child- <i>men</i> 'they' 'the children'	<i>-men</i> realizes the number feature at D (Li, 1999b)	
Relative clauses	Relative clauses in Chinese originate from the complement of DP (Simpson, 2001, 2003)	Relative clauses adjoin to NP, having nothing to do with DP (Aoun and Li, 2003)

However, the conclusions reached in these studies are faced by some counterarguments as pointed out by subsequent studies. Therefore, it is still unclear whether Chinese has DP or not. In order to investigate this issue, we need to seek other kinds of evidence by checking Chinese on some basic motivations for DP. This is the task of this dissertation.

### 1.3. The organization of the dissertation

This dissertation is an empirical investigation of the syntactic structure of Chinese nominal phrases and focuses on some specific types of evidence. Chapter 2 attempts to diagnose the internal structure of nominal phrases in Chinese by using ellipsis as a constituency test. As introduced in previous studies, ellipsis targets only constituents and can reveal the internal

structure of nominal phrases. By examining ellipsis patterns within Chinese nominal phrases, Chapter 2 observes that reduplicated adjectives in Chinese can adjoin to different projections as a segment along the hierarchy of nominal phrases, followed by ellipsis of the lower segment of that projection. The ellipsis patterns can be explained by assuming a structure that consists of XP>CIP>NP.

Chapter 3 focuses on clausal/nominal parallelism in Chinese. The parallelism between the clausal structure and the nominal structure was considered as the most important motivation for positing functional projections inside nominal phrases (Abney, 1987; Szabolcsi, 1994). The existence of DP as argued by Tang (1990a, 1990b) is based on the comparison between nominal structure in Chinese and clausal structure in English, which is not a good test since Chinese clauses are not structurally identical to English clauses. This chapter compares clausal phenomena and nominal phenomena in Chinese and notices a close parallelism between clauses and nominal phrases, thus supporting the existence of functional projections in nominal structure in Chinese. Moreover, other properties of Chinese nominal phrases (pied piping phenomena, properties of classifiers and individual-denoting expressions) indicate that the functional projections inside nominal phrases include NumP and DP.

Chapter 4 tests Chinese on those typological generalizations that make a distinction between languages that have DP and languages that do not have DP. Some studies (Bošković, 2008, 2010a, 2010b; Fukui, 1995; Watanabe, 2004) summarize some typological generalizations regarding the contrast between languages that have DP and those that do not. Based on a series of tests, the chapter shows that Chinese behaves like languages that have DP in terms of most of the generalizations.

Chapter 5 examines the structure of derived nominals in Chinese. It first establishes that

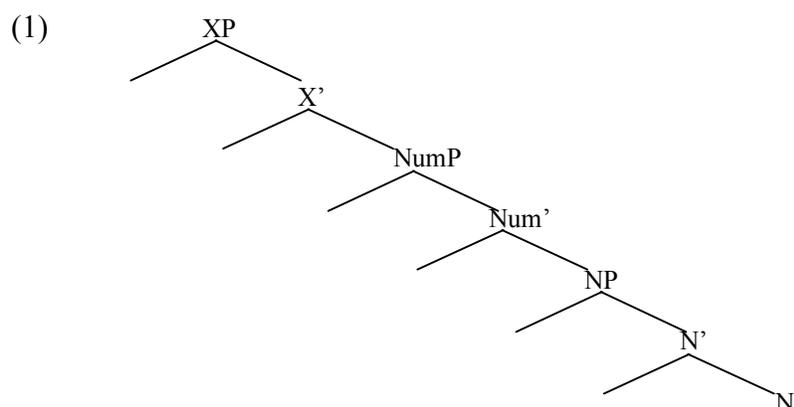
they behave like complex event nominals in the sense of Grimshaw (1990). Furthermore, a detailed examination of their properties indicates that their structure consists of a rich array of functional projections, such as AspP, ClassP, NumP and DP.

Chapter 6 concludes the dissertation.

## Chapter 2      Ellipsis in Chinese nominal phrases

This chapter discusses ellipsis patterns in Chinese nominal phrases as a step towards revealing the internal structure of Chinese nominal phrases. The diagnostic tool used is Noun Phrase (NP) ellipsis. Since NP ellipsis targets either NP or segments adjoined to NP, it can be used to identify the hierarchical structure of nominal phrases (Aljović, 2010; Braver, 2009a, 2009b; Giannakidou and Stavrou, 1999; Lobeck, 1995, 2005; Ticio, 2003, 2005, 2010). Before investigating ellipsis patterns in Chinese nominal phrases, Section 1 presents a brief introduction of the properties of NP ellipsis, in particular its role as a constituency test. Specifically, it has been established that as far as English is concerned, the scope of NP ellipsis includes minimally an N' projection. Moreover, a further use of NP ellipsis as a diagnostic tool for identifying the hierarchy of English nominal phrases is the correlation between the scopes of ellipsis and the different adjunction sites of moved constituents in a construction called Nominal Gapping (NG). This is the focus of Section 2. NG seems to delete only the head N, thus posing a challenge to the generalization that only NPs or segments to NP can be deleted in English. A detailed examination of the properties of NG, however, reveals that it is actually derived through NP ellipsis, following the rightward movement of the remnant. More interesting is that the possible adjunction sites of the moved remnant in this construction can reveal the hierarchical structure of nominal phrases in a similar way that NP ellipsis does. In Section 3, I show that phenomena similar to those in English as discussed in Section 1 and Section 2 also exist in Chinese. First, Chinese nominal phrases allow NP ellipsis displaying the same properties as NP ellipsis in English. Assuming that NP ellipsis targets constituents, the existence of NP ellipsis in Chinese nominal phrases reveals that there is further structure on top of NP. Second, in the same way that

moved remnants in NG may adjoin to different projections along the hierarchical structure of English nominal phrases, reduplicated adjectives in Chinese may also adjoin to different projections along the hierarchy of Chinese nominal phrases. This is evidenced by the observation that there is a correlation between the scopes of ellipsis (which may include nouns, numeral-classifier sequences and demonstratives) and the adjunction sites of reduplicated adjectives. This correlation can be captured by assuming the hierarchical structure shown in (1) for Chinese nominal phrases. Under this structure, reduplicated adjectives can adjoin to different sites and wherever they adjoin, constituents under the adjunction sites can be deleted.



## 2.1. The properties of NP ellipsis

Before discussing ellipsis patterns in Chinese nominal phrases, I will give a brief introduction of NP ellipsis and its properties. The following introduction is based on numerous studies on NP ellipsis (Baker, 1978; Hankamer and Sag, 1976; Lobeck, 1995, 2005; Jackendoff, 1971, 1977; Ross, 1967; Sag, 1976; Sag and Hankamer, 1984).

One typical example of NP ellipsis is given in (2), where *paintings* in the second conjunct is left unpronounced (as indicated by the strikethrough):

- (2) I like both Mary's paintings and John's ~~paintings~~.

In many ways, NP ellipsis is similar to another well-known ellipsis construction, VP ellipsis, as illustrated in (3):

- (3) Tom has eaten a banana but John hasn't ~~eaten a banana~~.

First, both VP ellipsis and NP ellipsis can take place in coordination and subordination (Lobeck, 1995):

- (4) VP ellipsis

- a. John met Mary and Tom did ~~meet Mary~~, too.  
 b. John met Mary although Tom didn't ~~meet Mary~~.

- (5) NP ellipsis

- a. I like Mary's house but Tom likes Sue's ~~house~~ better.  
 b. I like Mary's house although Tom does not like Mary's ~~house~~.

Second, both VP ellipsis and NP ellipsis can be embedded in a finite clause.

- (6) a. Mary has been to that restaurant although (and) Tom thinks that Mary  
 hasn't ~~been to that restaurant~~.  
 b. I like Mary's house and Tom thinks that he likes Mary's ~~house~~, too.

Third, both VP ellipsis and NP ellipsis obey the Backward Anaphora Constraint (BAC) (Goldberg, 2005; Hankamer and Sag, 1976; Langacker, 1969; Postal, 1972; Ross, 1967, 1969; Sag, 1976) which states that an elliptical element cannot both precede and command the antecedent<sup>1</sup>.

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<sup>1</sup> Langacker (1969: 165-167) defines the notion of "command" in the following way. Node A "commands" Node B if (1) neither A nor B dominates the other; and (2) the S-node that most immediately dominates A also dominates B, plus that condition that A is higher than B in the tree structure of the sentence.

(i) [<sub>S</sub>Ralph is much more intelligent than [<sub>S</sub>she looks]].

In this sentence, *Ralph* commands *he* since *Ralph* is dominated by fewer S nodes than *he* is.

## (7) VP ellipsis

- a. Although Tom doesn't ~~like Mary~~, John likes Mary.
- b. \*Tom doesn't ~~like Mary~~ but John likes Mary.

## (8) NP ellipsis

- a. Although Mary's ~~performance~~ is successful, Tom's performance is not.
- b. \*Mary's ~~performance~~ is successful and Tom's performance is, too.

If we assume that the second conjuncts in (7b) and (8b) are further embedded than the first conjuncts in (7b) and (8b), respectively, the deleted constituent in both cases both precedes and commands the antecedent and therefore the sentences are bad in (7b) and (8b).

Fourth, both VP ellipsis and NP ellipsis can apply across utterance boundaries (Williams, 1977).

## (9) VP ellipsis

- A: John caught a big fish.
- B: Yes, but Mary didn't ~~catch a fish~~.

## (10) NP ellipsis

- A: Mary's bicycle is very expensive.
- B: Tom's ~~bicycle~~ is, too.

Fifth, neither VP ellipsis nor NP ellipsis obeys the Complex NP Constraint (Lobeck, 1995: 25; Ross, 1967; Williams, 1977).

- (11) a. The man who likes meat met the woman who doesn't ~~like meat~~.
- b. Mary enjoyed Clinton's speech, but a man who liked Perot's ~~speech~~ hated it.

The table below summarizes the similarities between VP ellipsis and NP ellipsis in English:

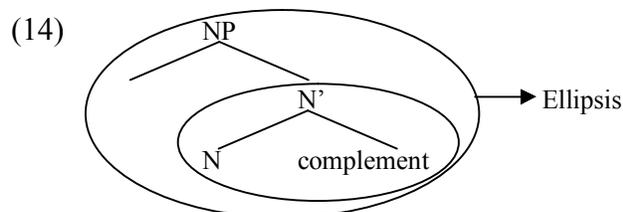
## (12) Common properties of VP ellipsis and NP ellipsis in English

Properties	VP ellipsis	NP ellipsis
Occurs in subordination	Yes	Yes
Embedded in clauses	Yes	Yes
Obeys BAC	Yes	Yes
Across utterances	Yes	Yes
Obeys Complex NP Constraint	No	No

Besides the properties detailed above, NP ellipsis has another property, which is crucially relevant to this chapter. That is, only constituents can undergo the process of ellipsis, which is why many studies have used it as a constituency test (Aljović, 2010; Braver, 2009a, 2009b; Giannakidou and Stavrou, 1999; Lobeck, 1995; Ticio, 2005, 2010). Ross (1967) presented the earliest analysis of NP ellipsis. According to him, NP ellipsis involves an anaphoric *one* substitution and a subsequent ellipsis, as illustrated below:

- (13) a. Mary bought two books on astronomy, and she read [both books on astronomy] last night. (deep structure)
- b. Mary bought two books on astronomy, and she read [both ones] last night. (*one* substitution)
- c. Mary bought two books on astronomy, and she read [both] last night. (*one*'s deletion)

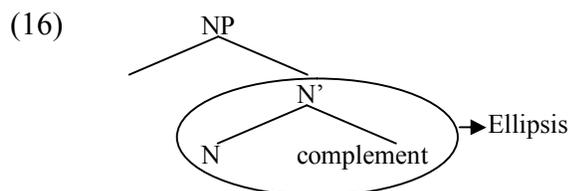
Regarding the scope of *one* substitution, Baker (1978) suggests that it is always N' or NP that is subject to *one* substitution, assuming the following phrase structure:



Although Jackendoff (1977) argues against Ross's substitution and deletion approach, he supports Baker's proposal by noticing the contrast illustrated below:

- (15) a. Although she might order these books on Egyptian art, Mary won't buy those ~~books~~ on Egyptian art.
- b. \*Few students of foreign languages attended the play but all ~~students~~ of chemistry showed up.

In contrast to (15a), (15b) is ungrammatical because the complement of N is not included in the scope of ellipsis. Jackendoff concludes that NP ellipsis must include the projection immediately dominating N and its complement; in other words, the ellipsis should operate on the projection N', assuming the following structure for noun phrases:

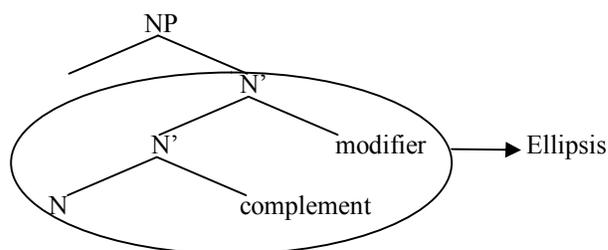


This analysis of the ellipsis scope is further supported by Lobeck (1987), which shows that restrictive modifiers in NP can be optionally included in NP ellipsis.

- (17) a. Even though these cards that her students sent her were funny, Mary enjoyed those ~~cards that her student sent her~~ even more.
- b. Even though these cards that her students set her were funny, Mary liked those ~~cards~~ that her parents gave her even more.

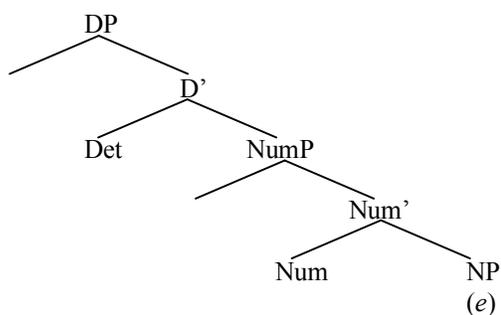
Lobeck assumes that restrictive modifiers can adjoin to an N' higher than that immediately dominating N and its complement, and the projection of the higher N' can undergo ellipsis.

(18)



A later study by Lobeck (1995) argues that NP ellipsis targets phrases and that ellipsis patterns in English support the following structure:

(19)



She adopts the position that there is an empty element ( $e$ ) which is base generated at the site of NP ellipsis. Assuming the principle that empty categories must be properly governed, she argues that this empty element  $e$  is licensed through government by functional heads specified for strong agreement, where she defines strong agreement as follows:

(20) An  $X^0$  is specified for 'strong' agreement iff  $X^0$ , or the phrase or head with which  $X^0$  agrees, morphologically realizes agreement in a productive number of cases.

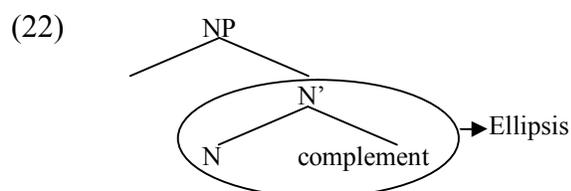
According to Lobeck, this analysis can explain the following ellipsis patterns:

- (21) a. Although she might order [these  $e$ ], Mary won't buy those books on Egyptian art.
- b. Mary's book is boring, but [John's  $e$ ] is interesting.
- c. My sister's two boys are wild but [John's two [ $e$ ]] are really quite well-behaved.

Plural demonstratives (*these* in (21a)) and possessive determiners (*Mary's* in (21b)) are located at Det and specified for strong agreement by [+plural] and [+poss], respectively, so both of them can license *e*. In (21c), *two* is located at Num<sup>0</sup> and is specified for strong agreement by [+plural] so it can also license *e*. Furthermore, Lobeck argues that in (21a) and (21b), Num<sup>0</sup> is empty so *these* and *Mary's* can license empty NP under the Generalized Government Transparency Corollary (GTC).<sup>2</sup>

## 2.2. Remnant movements in Nominal Gapping in English<sup>3</sup>

The review of NP ellipsis in Section 1 reveals that NP ellipsis includes minimally an N' projection, as illustrated below:



However, there exists a construction in English that seems to involve the deletion of only the head noun in the second conjunct, as illustrated below:

(23) John read Bill's book of poems and Mary's ~~book~~ of music.

In the second conjunct, only the head noun *book* is deleted. It is very different from typical NP ellipsis, which involves deletion of a phrase. On the other hand, it is very similar to another

<sup>2</sup> This is a claim made by Baker (1988), which says that an X<sup>0</sup> which is co-indexed with and governs an empty head governs everything that head would govern. In (21a) and (21b), Num<sup>0</sup> is empty but is governed by Det. By GTC, Det can also govern NP and therefore licenses *e*.

<sup>3</sup> This section is adopted from a co-authored article by Masaya Yoshida, David Potter, and myself which was presented at WCCFL 29 in 2011. An expanded version of this part was recently accepted by *Linguistic Inquiry*.

construction, namely, Verbal Gapping (VG), where the head verb in the second conjunct is missing.

(24) John read this book and Mary ~~read~~ that book.

For the sake of exposition, I call examples of the sort illustrated in (23) Nominal Gapping (NG).<sup>4</sup> However, a detailed comparison between the example in (23) and the VG example in (24) reveals that the former is different from VG in many properties. Therefore, it is unlikely that they are derived in the same way. This section argues that (23) is a variant of NP ellipsis based on our study (Yoshida, Wang and Potter, 2012). Specifically, this study argues that NG is derived in two steps: first, the rightward movement of the remnant and second, NP ellipsis that targets NP or a higher functional projection. In other words, the superficial deletion of only the head noun in the second conjunct still conforms to the generalization about the scope of NP ellipsis. Moreover, the derivation of NG constructions exhibits the interaction between NP ellipsis and the movement of remnants because in this construction, remnants can move and adjoin to different projections, followed by ellipsis of the lower segment of the projection. The adjunction sites of moved remnants provide further evidence for the hierarchical structure of nominal phrases in English.

Before discussing how remnants adjoin to different projections within the nominal structure, I will recap the analysis of NG presented in Yoshida, Wang and Potter (2012). Our analysis of NG starts with a comparison between NG and VG. Although superficially similar, these two constructions are different in terms of four properties, as illustrated below.

First, in contrast to VG, NG can take place in both coordination and subordination.

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<sup>4</sup> Here is a brief introduction of the terminology to be used. Constituents that are left intact in the second conjunct in both NG and VG are called remnants (for example, *Mary* and *that book* in 0)) and the corresponding constituents in the first conjunct are called correlates (for example, *John* and *this book* in 0)).

(25) VG

- a. I like this book and/or he ~~likes~~ that book.
- b. \*I like this book although he ~~likes~~ that book.

(26) NG

- a. John will read Bill's book of music and/or Mary's ~~book~~ of poems.
- b. John's book of music will be published because/if Mary's ~~book~~ of poems is successful.

Second, in contrast to VG, which cannot be embedded, NG can be embedded in a variety of constructions.

(27) VG

\*John likes this book and Mary thinks that Tom ~~likes~~ that book.

(28) NG

- a. [John read Bill's books of music] and  
[she says [ that Susan read Mary's ~~books~~ of poems]].
- b. [John met [a man [who read Bill's books of music]]] and  
[Sally met [a girl [who read Mary's ~~books~~ of poems]]].
- c. [John read [Mary's books about [Sue's proof of this theorem]]] and  
[Sally read [Bill's books about [David's ~~proof~~ of that theorem]]].

Moreover, NG differs from VG in terms of two other properties. The first difference concerns the scope of functional words in the first conjunct. In VG, modals and negation, which appear in the first conjunct, can take scope over both conjuncts (McCawley, 1993; Oehrle, 1987; Siegel, 1984, 1987). For example, (29a) may be interpreted as (29b). Similarly, (30a), where the

negation and the verb in the second conjunct are gapped, is interpreted as in (30b), where the negation in the first conjunct takes wide scope over both conjuncts.

- (29) a. James must finish his paper and Sally ~~must finish~~ her book.  
 b. James must finish his paper and Sally must finish her paper too.
- (30) a. Ward can't eat caviar and Sue ~~can't eat~~ beans.  
 b. It's not the case that [Ward can eat caviar and Sue can eat beans].

Although the nominal domain does not involve modals or negation, we may assume that numerals are generated above the core NP projection (Lobeck, 1995; Ritter, 1991) in the same way as negation and modals in clausal projections. If VG and NG involve the same derivation, it is expected that numerals can be shared by the two conjuncts in NG. This expectation, however, is not borne out. For example, in both the two phrases in (31b), the “three reasons in total” interpretation is not available. Rather, only the “more than three reasons” interpretation or the “six reasons in total” interpretation is available.<sup>5</sup>

- (31) a. Mary's three reasons for anger and her husband's reasons for depression  
 b. Mary's three reasons for anger and her husband's ~~reasons~~ for depression.

This then suggests that the very structural configuration that is instrumental to the derivation of VG in terms of the coordination of small conjuncts does not seem to be available in the NG context.

Second, VG allows so-called cross-conjunct binding (Johnson, 1996/2004; Kennedy; 2001; Lin, 2000). That is, the subject in the antecedent constituent can bind (and thus c-command) the subject in the gapped constituent but not the subject of a non-gapped conjunct. And the cross conjunct binding is available only when the verb in the second conjunct is gapped.

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<sup>5</sup> We consulted 13 native speakers of English and they all agreed with this judgment.

- (32) a. Not every girl<sub>1</sub> ate a green banana, and her<sub>1</sub> mother (\*ate) a ripe one.  
 b. \*Not every girl<sub>1</sub> ate a green banana, and her<sub>1</sub> mother did too.

In NG, however, cross-conjunct binding is possible regardless of whether the head noun in the second conjunct is gapped or not.

- (33) Not every doctor<sub>1</sub>'s knowledge of tax law or his<sub>1</sub> accountant's (knowledge) of medicine is reliable.

Furthermore, cross-conjunct binding is available even if the head noun in the second conjunct is embedded inside another nominal phrase as in (34). Although the examples in (34) are complicated, many speakers do not report an acceptability difference between the gapped and the non-gapped examples.<sup>6</sup>

- (34) a. Not every doctor<sub>1</sub>'s knowledge of tax law or his<sub>1</sub> accountant's comments about the doctor's (knowledge) of tax law is useful.  
 b. No semanticist<sub>1</sub>'s opinion of syntacticians' attitudes towards morphology and his<sub>1</sub> students' opinion of phonologists' (attitudes) towards sociolinguistics were both expressed inappropriately.

Additionally, it appears that this binding pattern is possible even in non-coordination contexts:

- (35) [No parent]<sub>1</sub>'s attitude toward politics should bias [his<sub>1</sub> children's (attitude) toward religion].

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<sup>6</sup> We consulted 10 native speakers of English for the judgment of (34) and (35). For (34a), 7 out of 10 accepted it and 3 did not. For (34b), 8 accepted it and 2 did not. For (35), 8 accepted it and 2 did not.

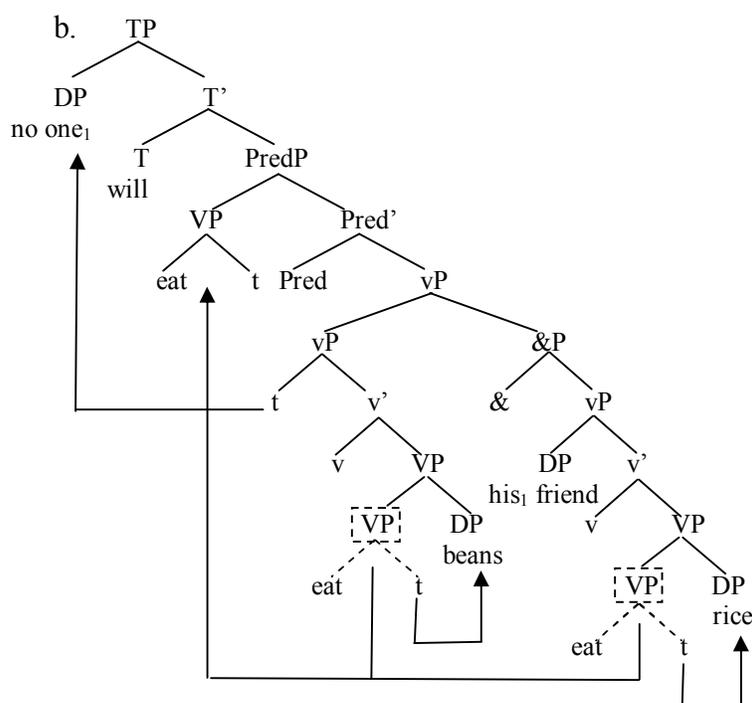
The table below summarizes the differences between VG and NG:

(36) Differences between VG and NG

Properties	VG	NG
Occurs in subordination	No	Yes
Embedability	No	Yes
Wide scope of functional words in the first conjunct	Yes	No
Cross-conjunct binding depends on gapping	Yes	No

Based on these differences between NG and VG, we claim that NG and VG must be derived in different ways. Regarding VG, we assume Johnson's Across-the-Board (ATB) movement analysis (Johnson, 1996/2004, 2009). Regarding NG, we claim that it has the same derivation as NP ellipsis. The following example illustrates the derivation of Verb gapping under the ATB (VP-movement<sup>7</sup>) analysis:

(37) a. No one will eat beans and his friend ~~eat~~ rice.



<sup>7</sup> The earlier studies by Johnson (1994, 2000) proposed the ATB verb movement. His more recent studies (Johnson, 1996/2004, 2009) adopt the ATB VP movement analysis, which is assumed in this dissertation.

Under this analysis, the appearance of the gap in VG arises from the ATB movement of the VPs out of the conjoined vPs to the specifier of a higher functional projection PredP. Prior to the ATB movement, the second remnant *rice* and the second correlate *beans* have raised rightward from their respective VPs, thereby remaining in their respective conjuncts. In addition, the subject of the antecedent constituent moves to Spec TP. The subject in the gapped constituent remains in Spec vP.<sup>8</sup> As Johnson (2009) notes, this analysis is able to explain several aspects of VG. First, VG cannot take place in subordination because ATB movement is only possible in coordination structures (Bošković and Franks, 2000; Hornstein and Nunes, 2002; Munn, 1999; Williams, 1978). Cross conjunct binding follows as well. The subject of the antecedent constituent moves to Spec TP, a position from which it c-commands the coordinate structure, including the remnant subject in the gapped constituent. Finally, modals and negation are predicted to be able to take wide scope, as they would c-command the entire coordinate structure, as well as the ATB-moved VP, which lands in Spec PredP.<sup>9</sup>

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<sup>8</sup> This violates the Coordinate Structure Constraint (CSC) (Ross, 1967). However, Johnson (1996/2004) and Lin (2000) show that A-movement may violate CSC.

<sup>9</sup> The ATB-VP-movement analysis, however, cannot capture the observation that VG cannot be embedded in a finite clause. VG structures are derived by the ATB movement of the VP from a position within each conjunct to a higher landing site, Spec PredP. However, as discussed by Huang (1993) and Takano (1995), the movement of VP in English can be long-distance.

- (i) a. [<sub>VP</sub> Criticize himself], John thought Bill would not t<sub>VP</sub>.  
 b. [<sub>VP</sub> Talk to friends of each other], they said we should not t<sub>VP</sub>.  
 (Huang, 1993: 107)

Thus, the ATB VG analysis incorrectly predicts that it is possible for a VP from an embedded clause to feed ATB VP-movement, and that VG can be applied across subordinated clauses, contrary to the fact. But if we adopt Johnson's earlier analysis (1994, 2000), that is, the ATB-verb-movement analysis, then this property of VG can be captured quite elegantly: head-movement is bounded to a finite clause in English, due to Head Movement Constraint (Baker, 1988; Travis, 1984) or Relativised Minimality (Rizzi, 1990), and thus VG, which is assumed to involve the head-movement, is also bounded to a finite clause. Johnson's (2009) most recent analysis does not have a clear solution to this problem. However, because the landing site of the VP-movement is PredP, we speculate that it is possible that this locality effect of Gapping follows from the distribution of PredP and the properties of remnant VP-movement.

Since NG does not exhibit any of the properties that motivate the ATB VP analysis of Verb gapping, there will be problems if we apply the ATB movement analysis to NG. First, ATB movement must take place in coordination and this is contradictory to the observation that NG can also take place in subordination.

(38) John's book of music will be published because/if Mary's ~~book~~ of poems is successful.

Second, the fact that NG can be embedded raises a serious problem with ATB analysis if we apply it to the NG example as in (28), reproduced below.

- (28) a. [John met [a man [who read Bill's books of music]]] and  
[Sally met [a girl [who read Mary's ~~books~~ of poems]]].
- b. [John met [a man [who read Bill's books of music]]] and  
[Sally met [a girl [who read Mary's ~~books~~ of poems]]].
- c. [John read [Mary's books about [Sue's proof of this theorem]]] and  
[Sally read [Bill's books about [David's ~~proof~~ of that theorem]]].

Under Johnson's analysis, the movement of *books* in (28b) must cross a relative clause island (Ross, 1967). Similarly, in an example like (28c), the movement of *proof* must cross a specific DP, which is also an island in English (Fiengo and Higginbotham, 1981; Davies and Dubinsky, 2003).

Third, it is difficult to apply the ATB movement analysis to NG because the scope of quantifiers in the first conjunct interacts with NG in a different way from that in VG. In VG, modals and negation in the first conjunct scope over both conjuncts because modals and negation are in a structural position that c-commands both conjuncts. If we assume that numerals are generated above NP, and if numerals are also in a structural position that c-commands both

conjuncts, we would expect each of the sentences in (31) to have a reading in which there are three reasons in total, but this reading is not available.

Fourth, as we know, the availability of cross conjunct binding in VG is dependent on gapping of the verb in the second conjunct. Under the ATB movement analysis, it is because the c-command relation between the binder and the bindee exists if the verb in the second conjunct is gapped. If we applied this analysis to explain the cross conjunct in NG, then the availability of the cross conjunct binding relation when the noun in the second conjunct is not deleted would be a mystery. However, the cross conjunct binding reading in NG can be explained if we adopt the definition of binding in Reinhart (1987: 155):

(39) A node  $\alpha$  binds a node  $\beta$  iff  $\alpha$  and  $\beta$  share an index and  $\alpha$  either c-commands  $\beta$  or is the specifier of a node that c-commands  $\beta$ .

That is, when a quantified DP appears in the specifier of a DP, it is allowed to bind a pronoun outside the DP even though the Spec DP does not c-command the constituent outside the DP, as illustrated by the following examples:

- (40) a. Every boy<sub>1</sub>'s mother thinks he<sub>1</sub> is a genius. (Reinhart, 1987:155)  
 b. Every senator<sub>1</sub>'s portrait is on his<sub>1</sub> desk. (Hornstein, 1995: 108)

In summary, given that NG is different from VG in terms of the four properties illustrated above, if we assume that VG is derived through ATB-movement, it is impossible to apply the ATB movement analysis to NG.

Given this, the next question is: how is NG derived? We may find the answer to this question from the similarities between NG and NP ellipsis. For example, both NG and NP ellipsis can be applied across coordinators and subordinators and can be freely embedded as we

have seen before ((5b), (6b), (7b) and (28)). Second, their licensing conditions overlap perfectly. The following examples indicate that where NP ellipsis is legitimate, NG is also legitimate.

- (41) a. All  
The books are new, and all ~~books~~ (of music) are on sale.
- b. Demonstratives  
Mary likes those books of poems, but I like these ~~books~~ (of music).
- c. Numerals  
Mary bought three books of poems and I bought six ~~books~~ (of music).
- d. Genitives  
John read Mary's book of poems, and Bill's ~~book~~ (of music) as well.

On the other hand, where NP ellipsis is not licensed, NG is not licensed, either. Typical examples involve determiners and attributive adjectives.

- (42) a. Determiners  
\*John read the/a/every book of music and Mary read the/a/every ~~book~~ (of poems).
- b. Adjectives  
\*John read Mary's long book of poems and Bill's short ~~book~~ (of music).

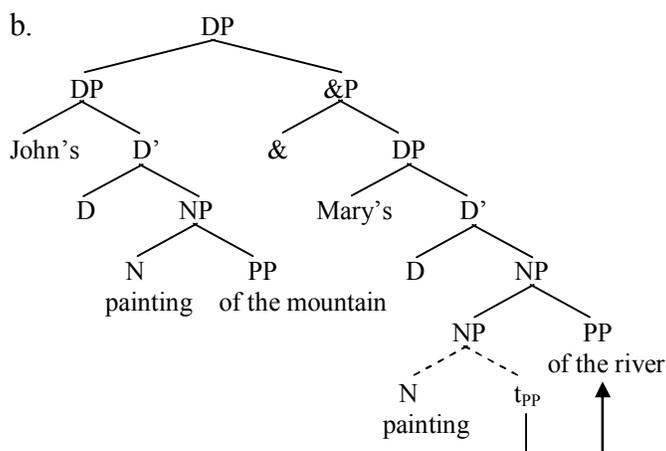
Additionally, if the attributive adjectives are in the superlative form, both NP ellipsis and NG can be licensed, as in (43).

- (43) Superlative adjectives
- a. John read Mary's longest book of poems and Bill's shortest ~~book~~ (of music).

- b. John read Mary's most interesting book of poems and Bill's most boring ~~book~~ (of music).

Given these similarities between NG and NP ellipsis, we argue that the derivation of NG can be explained in terms of ellipsis. Specifically, as illustrated in (44) below, the first step of the derivation is that the remnant *of the river* moves rightward and adjoins to NP.<sup>10</sup> The second step is that NP ellipsis deletes the lower segment of NP on the assumption that NP ellipsis may target a segment of a phrase.

- (44) a. John's painting of the mountain and Mary's ~~painting~~ of the river



<sup>10</sup> Evidence for rightward movement of the complement PP comes from the observation that the preposition cannot be omitted under NG:

- (i) John read Bill's book of music and Mary's ~~book~~ \*(of) poems.

As Jayaseelan (1990) points out in his discussion on the similar restriction on VG, the ban on preposition omission can be easily captured if the remnant in the gapped constituent undergoes rightward movement, as rightward movement in general (as in examples of Heavy NP Shift (HNPS) in (ii)) does not allow preposition stranding (Pesetsky, 1995; Ross, 1967).

- (ii) a. I talked  $t_1$  yesterday [<sub>PP</sub> *about* the man I recently met]<sub>1</sub>.  
 b. \*I talked *about*  $t_1$  yesterday [<sub>DP</sub> the man I recently met]<sub>1</sub>.  
 c. [<sub>DP</sub> A student  $t_1$ ] came to see me yesterday [<sub>PP</sub> with long outrageous hair]<sub>1</sub>.  
 d. \*<sub>[DP</sub> A student with  $t_1$ ] came to see me yesterday [<sub>DP</sub> long outrageous hair]<sub>1</sub>.

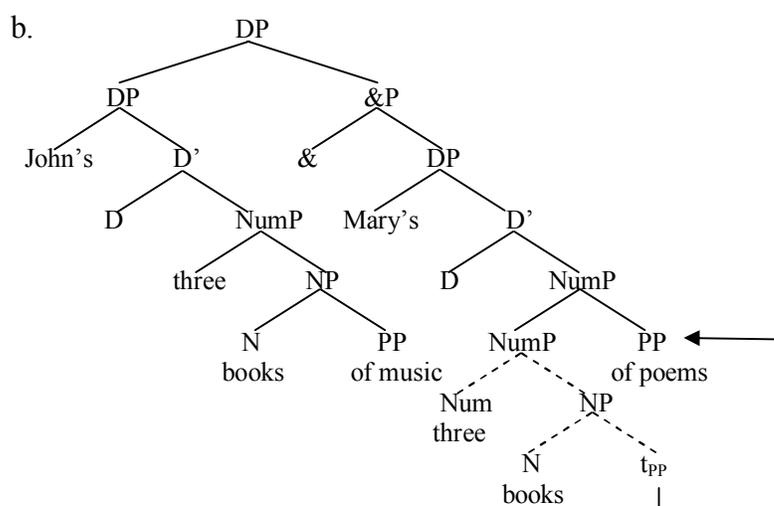
If, on the other hand, the remnant PP in NG undergoes leftward movement, which generally allows P-stranding in English, as the examples in (iii) show, it would be unclear why the omission of the preposition is not possible under NG, i.e., the PP containing the trace of the moved NP could be elided together with the larger NP.

- (iii) a. [<sub>DP</sub> Which man]<sub>1</sub> did you talk about  $t_1$ ?  
 b. [<sub>DP</sub> What branch of physics]<sub>1</sub> are you a student of  $t_1$ ?

Based on these observations, we conclude that NG involves NPE following rightward movement of the PP-remnant.

One characteristic of the derivation of NG is that the remnant (in this case, PP) moves and adjoins to NP. Since NP ellipsis can target a segment created by the adjunction of a phrase to a projection, the lower segment of this projection can be deleted. A detailed examination of interpretations of different variants of NG further indicates that the remnant can adjoin to different positions as well. For example, the remnant PP can be adjoined to a higher projection on top of NP, NumP, which is illustrated as below:

(45) a. John's three books of music and Mary's ~~three books~~ of poems



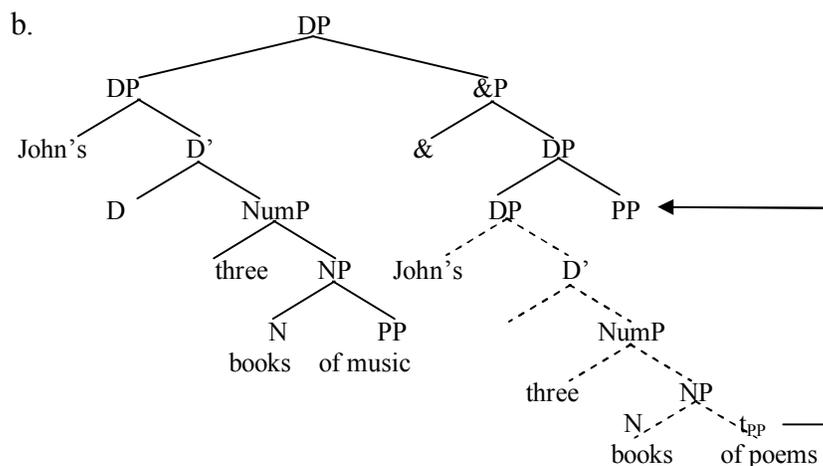
In (45), the remnant PP *of poems* moves and adjoins to NumP, and then the whole NumP is deleted. Support for this NumP ellipsis derivation comes from the interpretation of the numerals *three*. Although the numeral *three* in (45a) is missing, this numeral is still interpreted inside the ellipsis scope and therefore (45) means that there are six books in total.

Moreover, the remnant PP can also move and adjoin to a higher functional projection above NumP, which is evidenced by the interpretation of the following phrase:

(46) John's three books (each) of music and John's ~~three books~~ of poems

The example in (46) can mean six books, with three of them about music and another three of them about poems. This interpretation supports the following derivation:

(47) a. John's three books of music and ~~John's three books~~ of poems

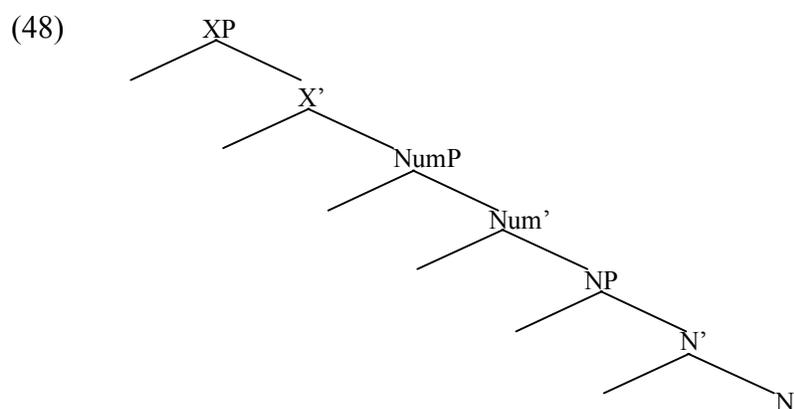


In (47), the remnant PP moves and adjoins to a projection higher than NumP. We have illustrated that the remnant PP in NG can move and adjoin to different sites, i.e., NP, NumP and DP. These three possible adjunction sites of the remnant indicate that nominal phrases should have a hierarchical structure, which minimally consists of NP, NumP and DP in order to capture the relation between the possible scope of numerals and the structure of NG.

To summarize, this section examined the NG construction in English that seems to delete only the head noun of the second conjunct, which would challenge the generalization established in Section 1 that the scope of NP ellipsis in English includes minimally an N' projection. A detailed examination of the properties of NG indicates that it is actually a variant of NP ellipsis. Moreover, one property of this construction is that remnants can move and adjoin to different projections within the hierarchical structure of nominal phrases, followed by NP ellipsis. The interaction between the adjunction sites of moved remnants and NP ellipsis provides further evidence for the hierarchical structure of English nominal phrases.

### 2.3. Ellipsis in Chinese nominal phrases

The previous two sections have established that NP ellipsis (and the ellipsis in NG constructions) can be used as a constituency test to reveal the hierarchical structure of nominal phrases in English. This section examines similar phenomena in Chinese, attempting to reveal the hierarchical structure of Chinese nominal phrases. Specifically, I show that Chinese nominal phrases are similar to English nominal phrases in two ways. First, Chinese nominal phrases allow NP ellipsis, indicating that there is further structure on top of NP, if we assume that NP ellipsis targets phrases. Second, similar to NG constructions in English where moved remnants can adjoin to different projections along the structural hierarchy of nominal phrases, modifiers (e.g. reduplicated adjectives) in Chinese can also adjoin to different projections along the hierarchical structure of nominal phrases. Moreover, after reduplicated adjectives adjoin to a projection as a segment, everything under that segment can be deleted. Therefore, there is a correlation between the adjunction sites of reduplicated adjectives and the scope of ellipsis. This correlation, together with NP ellipsis, supports a structure of Chinese nominal phrases that consists of three projections as below:



This section starts by summarizing three NP ellipsis generalizations in Chinese nominal phrases. It is followed by a comparison between NP ellipsis and VP ellipsis in Chinese, which indicates that NP ellipsis does in fact involve ellipsis based on similarity to VP ellipsis. Subsection 2.3.2. demonstrates that there is a correlation between the scope of ellipsis and the adjunction sites of reduplicated adjectives.

### 2.3.1. NP ellipsis in Chinese

Although there have not been many studies on ellipsis in Chinese nominal phrases, two ellipsis patterns have been established. Firstly, when a NP is preceded by a classifier, the noun phrases can be deleted (Cheng and Sybesma, 2009), whether the classifier is preceded by a numeral or a demonstrative.

- (49) a. Zhangsan mai le san ben shu, Lisi mai le si ben ~~shu~~.  
 Zhangsan buy Perf.<sup>11</sup>three Cl book Lisi buy Perf. four Cl book  
 ‘Zhangsan bought three books and Lisi bought four books’
- b. Wo xihuan zhe ge xiangjiao, ta xihuan na ge ~~xiangjiao~~.  
 I like this Cl banana he like that Cl banana  
 ‘I like this banana and he likes that banana.’

The second generalization is that a modifier (specifically, those modifiers that indicate possession, arguments, location and time) suffixed with *-de* can precede NP ellipsis (Saito, et al, 2008: 259).

- (50) a. Zhangsan de che bi Lisi de ~~che~~ geng gui.  
 Zhangsan de car compare Lisi de car more expensive  
 ‘Zhangsan’s car is more expensive than Lisi’s.’

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<sup>11</sup> In this dissertation, I gloss the morpheme *le* as a perfective marker.

- b. Luoma de huimie bi Bali de ~~huimie~~ geng canlie.  
 Rome de destruction compare Paris de destruction more disastrous  
 ‘Rome’s destruction was more disastrous than Paris’s.’
- c. Taipei de jiaotong bi Dongjing de ~~jiaotong~~ geng luan.  
 Taipei de traffic compare Tokyo de traffic more messy  
 ‘Taipei’s traffic is worse than Tokyo’s.’

Another ellipsis generalization not reported previously is that a NP can be deleted if it is preceded by a demonstrative suffixed by a morpheme *-xie*.

(51) Wo xihuan zhe-xie xiangjiao, ta xihuan na-xie ~~xiangjiao~~.

I like these banana he like those banana

‘I like these bananas and he likes those bananas.’

So far, we have the following generalizations:

(52) A noun phrase can be deleted if it is immediately preceded by one of the following constituents: a classifier, a modifier suffixed with *-de* or a demonstrative suffixed with *-xie*.

Before proceeding to discuss more patterns of ellipsis in Chinese nominal phrases, it is important to clarify that the deletion patterns reported in (49), (50) and (51) involve ellipsis, that is, they exhibit the properties of ellipsis as demonstrated in Section 1. Cross-linguistically, VP ellipsis is a relatively well-known and uncontroversial ellipsis phenomenon. Therefore it makes sense to compare NP ellipsis to VP ellipsis. Indeed, this is what Section 1 has done, which shows that NP ellipsis in English bears similarities to VP ellipsis in English. Similarly, in order to show that NP ellipsis in Chinese involves ellipsis, I will show that it is similar to VP ellipsis in Chinese. It is observed in some studies on Verb Phrase ellipsis in Chinese (Ai, 2006; Su, 2008) that verb phrases immediately following some functional words (modals, etc.) can be deleted.

(53) a. Zhangsan hui shuo fayu, Lisi ye hui ~~shuo~~ ~~fayu~~.  
 Zhangsan can speak French Lisi also can speak French  
 ‘Zhangsan can speak French, and Lisi can too.’

b. Zhangsan bu keneng qu le Shanghai,  
 Zhangsan not might go Perf. Shanghai  
 Lisi ye bu keneng ~~qu~~ ~~le~~ ~~Shanghai~~.  
 Lisi also not might go Perf. Shanghai  
 ‘Zhangsan might not have gone to Shanghai. Zhangsan might not, either.’

Arguably, VP ellipsis in Chinese exhibits the properties of VP ellipsis in English. First, VP ellipsis in Chinese can take place in both coordination and subordination.

(54) a. Ta neng xie shu, wo ye neng ~~xie~~ ~~shu~~.  
 he can write books I too can write book  
 ‘He can write books and I can, too.’

b. Jiran ta neng xie shu, wo ye neng ~~xie~~ ~~shu~~.  
 since he can write books I too can write book  
 ‘Since he can write books, I can, too.’

Second, VP ellipsis can be embedded in tensed clauses.

(55) Zhangsan hu qu gongyuan, wo juede Lisi ye hui ~~qu~~ ~~gongyuan~~.  
 Zhangsan will go to park I think Lisi too will go to park  
 ‘Zhangsan will go to the park, and I think that Lisi will, too.’

Third, VP ellipsis obeys the Backward Anaphora Constraint.

- (56) a. Suiran Zhangsan neng ~~xie-shu~~, wo neng xie shu.  
 although Zhangsan can write book I can write book  
 ‘Although Zhangsan can, I can write books.’
- b. \*Wo neng ~~xie-shu~~, Zhangsan neng xie shu.  
 I can write book Zhangsan can write book

Fourth, VP ellipsis can occur across utterance boundaries.

- (57) A: Zhangsan keyi kai che dai wo qu.  
 Zhangsan may drive car take me go  
 ‘Zhangsan may drive me there.’
- B: Lisi ye keyi ~~kai che dai wo qu~~.  
 Lisi too can drive car take me go  
 ‘Lisi may, too.’

Fifth, VP ellipsis does not obey the Complex NP Constraint.

- (58) Haoduo nianqing ren dou bu yuanyi qu nongcun,  
 many young people all not would like go rural area  
 danshi qeshi you jige yuanyi ~~qu nongcun~~ de ren.  
 but really have several would like go rural area de people  
 ‘Many young people do not like going to rural areas but there are several people  
 that would like to.’

Given that VP ellipsis in Chinese exhibits typical properties of ellipsis, I compare NP Ellipsis in Chinese and VP ellipsis in Chinese. The result of the comparison indicates that NP ellipsis in Chinese does show similarity to VP ellipsis in Chinese in the way that NP ellipsis in English is similar to VP ellipsis in English.

First, similar to VP ellipsis in Chinese, NP ellipsis in Chinese can also take place in both coordination and subordination.

- (59) Zhangsan mai le san bang zhurou,  
 Zhangsan buy Perf. three pound pork  
 yinwei Lisi mai le liang bang ~~zhurou~~.  
 because Lisi buy Perf. two pound pork  
 ‘Zhangsan bought three pounds of pork and Lisi bought two pounds.’

Second, NP ellipsis in Chinese can be embedded in a finite clause, exactly as VP ellipsis can.

- (60) Zhangsan xihuan zhe duo hua,  
 Zhangsan like this Cl flower  
 wo juede Lisi geng xihuan na duo ~~hua~~.  
 I think Lisi more like that Cl flower  
 ‘Zhangsan likes this flower and I think that Lisi likes that one more.’

Third, NP ellipsis in Chinese obeys the Backward Anaphora Constraint.

- (61) a. Suiran zhe duo ~~hua~~ hen gui, na duo hua hen pianyi.  
 though this Cl flower very expensive that Cl flower very cheap  
 ‘Although this is very expensive, that flower is very cheap.’  
 b. \*Zhe duo ~~hua~~ hen gui, na duo hua hen pianyi.  
 this Cl flower very expensive that Cl flower very cheap

Fourth, VP ellipsis may cross utterance boundaries.

- (62) A: Zhangsan xihuan zhe duo hua.  
 Zhangsan like this Cl flower  
 ‘Zhangsan likes this flower.’

B: Wo xihuan na duo ~~hua~~.

I like that CI flower

‘I like that flower.’

Fifth, ellipsis in Chinese nominal phrases does not obey the Complex NP Constraint.

- (63) Hendo ren dou mai le san duo hua danshi wo qeshi  
 many people all buy Perf. three CI flower but I indeed  
 kanjian le yixie yi duo ~~hua~~ ye mei mai de ren.  
 see Perf. some one CI flower even not buy de people  
 ‘Many people have bought two flowers each, but I did see some people who  
 did not buy any.’

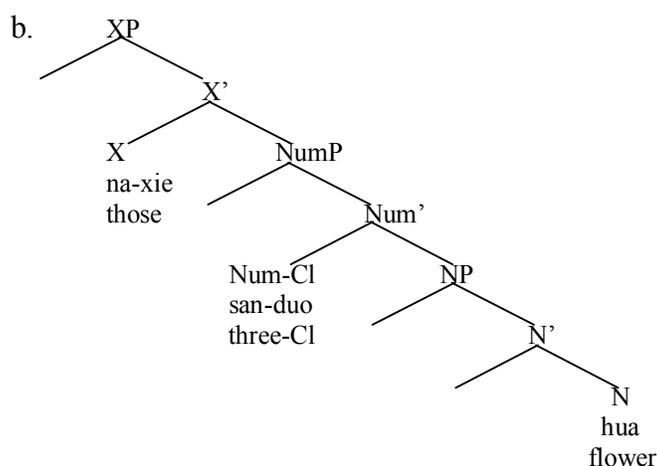
The comparison between NP ellipsis in Chinese and VP ellipsis in Chinese indicates that these two constructions exhibit typical properties of ellipsis, so we conclude that NP ellipsis in Chinese does in fact involve ellipsis. The table below summarizes the common properties of VP ellipsis and NP ellipsis in Chinese.

- (64) Common properties of VP ellipsis and NP ellipsis in Chinese

Properties	VP ellipsis	NP ellipsis
Occurs in subordination	Yes	Yes
Embedded in clauses	Yes	Yes
Obeys BAC	Yes	Yes
Across utterances	Yes	Yes
Obeys Complex NP Constraint	No	No

To explain the NP ellipsis generalizations in (52), I assume that nominal phrases in Chinese have the following structure (Tang, 1990a, 1990b):

- (65) a. na san duo hua  
 that three CI flower  
 ‘those three flowers’



In the structure above, on top of NP, there is a NumP, which is headed by numeral-classifier sequences.<sup>12</sup> Based on the assumption that ellipsis targets constituents, this can explain why noun phrases that follow classifiers can be deleted, as seen in (49). Moreover, I assume that there is a further projection on top of NumP, which can host such elements like demonstratives suffixed with *-xie*.<sup>13</sup> When a NP is immediately preceded by a demonstrative suffixed with *-xie*, the noun phrase is the complement of XP (on the assumption that NumP is empty) and the NP as a constituent can be deleted, as in (51). Regarding why modifiers suffixed with *-de* can precede NP ellipsis, I propose that these modifiers can adjoin to NP as a segment, and therefore, the lower segment of NP can be deleted, as seen in (50).

### 2.3.2. The correlation between positions of reduplicated adjectives and ellipsis scopes

The structure in (65) is further supported by evidence from the interaction between the scopes of ellipsis and the positions of modifiers. Specifically, in the same way that remnants move to different positions in English NG constructions (Section 2), reduplicated adjectives in Chinese may adjoin to different projections along the hierarchy of nominal phrases. Whenever

<sup>12</sup> Since a numeral and a classifier always co-occur, I assume that both of them occupy the head of NumP.

<sup>13</sup> Based on Abney's (1987) assumption that demonstratives in English can be the head of DP, Tang (1990a, 1990b) assumes that demonstratives in Chinese are also at the head of DP. Further evidence comes from the fact that *zhexie* 'these' or *naxie* 'those' must precede numeral-classifier sequences.

they adjoin to a projection as a segment, the lower segment of the projection can be deleted, assuming that a segment of a phrase can be deleted. The deleted constituent may include demonstratives, numerals, classifiers and nouns. In other words, there is a correlation between the scopes of ellipsis and the adjunction sites of reduplicated adjectives. This correlation can be captured by the hierarchical structure in (65).

Let us first take a look at the basic properties of reduplicated adjectives in Chinese. It is observed that in Chinese, some monosyllabic adjectives, which indicate color, shape and size, etc., can modify nouns with optional presence of the particle *de*:

(66) Zhangsan mai le yi duo hong (de) hua.

Zhangsan buy Perf. one Cl red de flower

‘Zhangsan bought a red flower.’

When these adjectives are reduplicated, they cannot modify nouns directly. Instead, the particle *de* must intervene between the reduplicated adjective and the modified noun:

(67) Zhangsan mai le yi duo hong hong \*(de) hua.

Zhangsan buy Perf. one Cl red red de flower

‘Zhangsan bought a very red flower.’<sup>14</sup>

As introduced at the beginning of this section, constituents that follow reduplicated adjectives may be deleted and the scopes of ellipsis correlate with the adjunction sites of reduplicated adjectives.

First, in cases where adjectives modify nouns without the presence of *de*, the adjective and the noun must be deleted together.

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<sup>14</sup> In Chinese, reduplicated adjectives describe things in a more lively, or vivid, or more intensified manner (Chao, 1968; Huang, 2006; Li and Thompson, 1981). In this study, these are translated as ‘very...’.

- (68) \*Zhangsan mai le yi duo hong hua, wo mai le yi duo huang ~~hua~~.  
 Zhangsan buy Perf. one Cl red flower I buy Perf. one Cl yellow flower  
 Intended: ‘Zhangsan bought a red flower and I bought a yellow one.’

Second, conforming to the generalization in (50), noun phrases following adjectives suffixed with *de* can be deleted.

- (69) a. Zhangsan mai le yi ge da da de xigua,  
 Zhangsan buy Perf. one Cl big big de water melon  
 Lisi mai le yi ge xiao xiao de ~~xigua~~.  
 Lisi buy Perf. one Cl small small de water melon  
 ‘Zhangsan bought a very big water melon and Lisi bought a very small water melon.’

Third, when a numeral-classifier sequence immediately precedes a reduplicated adjective suffixed with *-de*, the reduplicated adjective together with the noun phrase can be deleted.

- (70) Wo xiang mai zhe san jian hong hong de chenyi,  
 I want buy this three Cl red red de shirt  
 ta xiang mai na si jian ~~hong hong de chenyi~~.  
 he want buy that four Cl red red de shirt  
 ‘He wants to buy these three very red shirts and he wants to buy those four very red shirts.’

Fourth, when a reduplicated adjective suffixed with *-de* immediately precedes a numeral-classifier-noun constituent, the latter can be deleted.

(71) Nabian da da de san kuai shitou dangzhu le qulu,

there huge huge de three Cl stone block Perf. way

zheli xiao xiao de ~~san kuai shitou~~ ze bu aishi.

here small small de three Cl stone but not block the way

‘The three very huge stones over there block the way, but the three very small stones here do not.’

Fifth, when reduplicated adjective precedes a sequence which consists of a demonstrative, a numeral, a classifier and a noun, the whole constituent that follows the reduplicated adjective can be deleted.

(72) Ta mai le hong hong de zhe liang duo hua,

he buy Perf. red red de this two Cl flower

wo mai le lan lan de ~~zhe liang duo hua~~.

I buy Perf. blue blue de this two Cl flower

‘He bought these two very red flowers and I bought these two very blue flowers.’

So far, we have the following generalizations about ellipsis patterns in Chinese nominal phrases:

(73) a. NP ellipsis can be licensed if the deleted NP is immediately preceded by one of the following constituents: a classifier, a modifier suffixed with *-de* or a demonstrative suffixed with *-xie*.

b. When a numeral-classifier sequence immediately precedes a reduplicated adjective suffixed with *-de*, the reduplicated adjective together with the noun phrase can be deleted.

c. When a reduplicated adjective suffixed with *-de* immediately precedes a

numeral-classifier-noun sequence, the latter can be deleted.

d. When reduplicated adjective precedes a sequence which consists of a demonstrative, a numeral, a classifier and a noun, the whole constituent that follows the reduplicated adjective can be deleted.

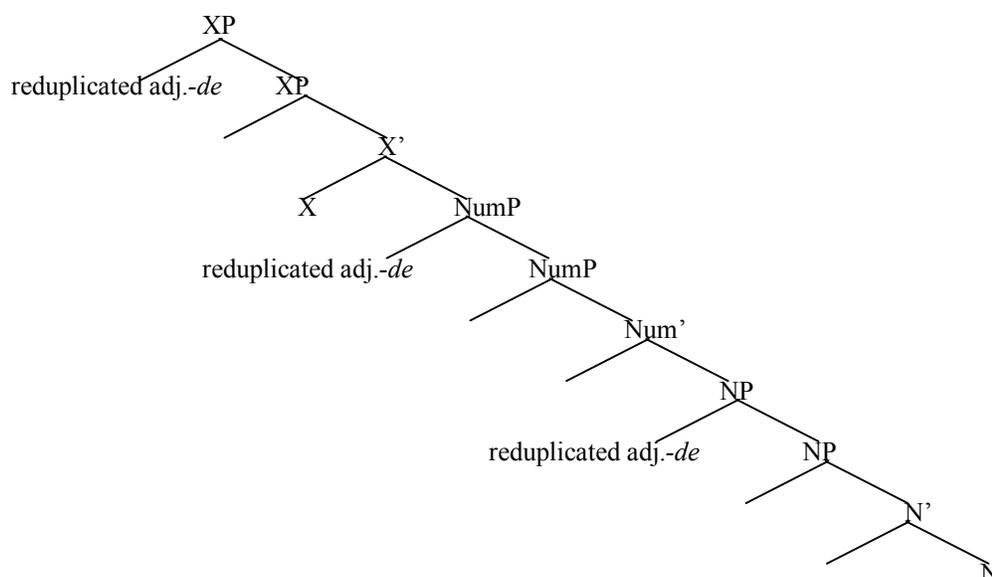
(74) Ellipsis patterns in Chinese

Positions of adjectives	Scopes of ellipsis
Classifier + NP	NP
Demonstrative- <i>xie</i> + NP	NP
Reduplicated adjective- <i>de</i> + NP	NP
Numeral-classifier + reduplicated adjective- <i>de</i> + NP	Reduplicated adjective- <i>de</i> + NP
Reduplicated adjective- <i>de</i> + numeral-classifier + NP	Numeral-classifier + NP
Reduplicated adjectives- <i>de</i> + demonstrative-numeral-classifier + NP	Demonstrative-numeral-classifier + NP

Under the structure in (65), I further assume that modifiers with *-de* suffixed can adjoin to

three positions: XP, NumP and NP.

(75)



Since both the numeral-classifier sequence and the modifier with *-de* attached are on top of NP, NP as a constituent can be deleted. This can explain why an NP immediately following either of them can be deleted<sup>15</sup>.

Regarding the generalizations in b, c and d of (73), I offer the following explanations, illustrated in (77).

(76)

b. When a numeral-classifier sequence immediately precedes a reduplicated adjective suffixed with *-de*, the reduplicated adjective together with the noun phrase can be deleted. This is because NP, with the adjoined reduplicated adjective, is dominated by NumP. Deletion of all the constituents below NumP is allowed, as illustrated by the process of Ellipsis I.

c. When a modifier suffixed with *-de* immediately precedes a numeral-classifier-noun sequence, the latter can be deleted. This is because when a reduplicated adjective suffixed with *-de* adjoins to NumP, deletion of all the constituents below NumP is possible, as illustrated by the process of Ellipsis II.

d. When reduplicated adjective precedes a sequence which consists of a demonstrative, a numeral, a classifier and a noun, the whole constituent that follows the reduplicated adjective can be deleted. This is because reduplicated adjectives suffixed with *de* may adjoin to XP, so everything under the adjoined XP is deleted, as indicated by Ellipsis III below.

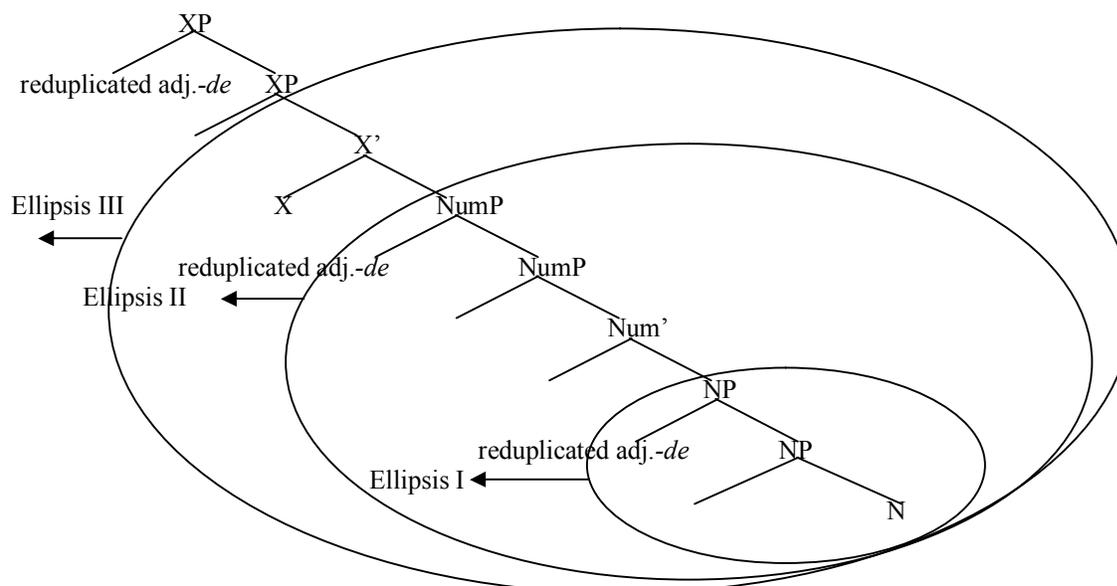
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<sup>15</sup> A question arises regarding why the following sentence is bad:

(i) Wo xihuan huang hua, ta xihuan lan ~~hua~~.  
I like yellow flower he like blue

I assume that adjectives without *de* such as *huang* ‘yellow’ and *lan* ‘blue’ is inside NP in the structure of (75), therefore, these adjectives cannot be stranded from the head noun by the NP ellipsis process.

(77)



It should be noted here that although the structures assumed in (65) can explain the ellipsis patterns established in this section, it leaves the nature of XP unclear. Some studies (Tang, 1990a, 1990b; Li, 1998, 1999) claim that this XP should be DP while other studies claim that there is no DP in Chinese. Subsequent chapters will be devoted to investigating the nature of this XP.

## 2.4. Conclusion

This chapter diagnosed the internal structure of nominal phrases in Chinese by using ellipsis as a constituency test. After an overview of the properties of NP ellipsis, I argued that NP ellipsis can reveal the hierarchical structure of nominal phrases, which is illustrated by NP ellipsis phenomena in English and Chinese. The hierarchical structure of nominal phrases can be diagnosed by another test, which exists in both English and Chinese: the correlation between

adjunction sites of remnants (as in English NG constructions) and reduplicated adjectives in Chinese and the scopes of ellipsis. In the nominal gapping constructions in English, the remnant can move and adjoin to different sites along the hierarchy of nominal phrases, which is followed by ellipsis of the lower segment. In Chinese, reduplicated adjectives can adjoin to different projections as a segment along the hierarchy of nominal phrases, followed by ellipsis of the lower segment of that projection. The ellipsis patterns can be explained by assuming a structure that consists of  $XP > NumP > NP$ . In the following chapters, I will argue that this XP is DP.

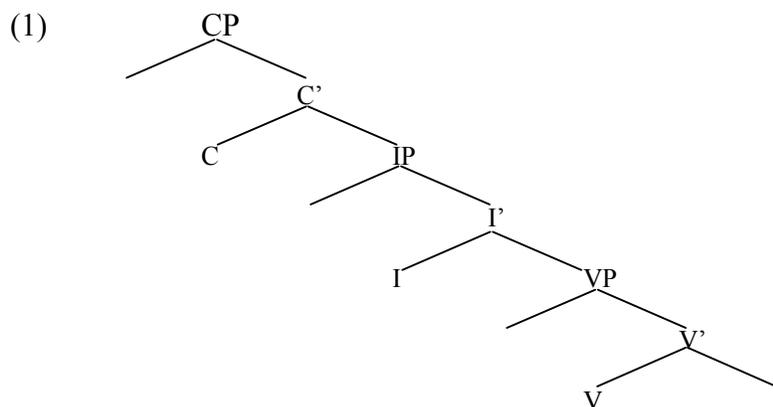
## **Chapter 3 Parallelisms between clauses and nominal phrases**

This chapter examines the structure of Chinese nominal phrases from another perspective, that is, the structural parallelisms between nominal phrases and clauses in Chinese. The structural parallelisms between nominal phrases and clauses were one of the earliest motivations for positing Determiner Phrase (DP) on top of Noun Phrase (NP) in nominal phrases of other languages, such as English (Abney, 1987), Greek (Horrocks and Stavrou, 1987) and Hungarian (Szabolcsi, 1981, 1983, 1987, 1994). This chapter investigates the question of whether Chinese exhibits any of the parallelisms between clauses and nominal phrases that have been attested in languages that have DP. Any parallelisms that hold in Chinese could lend support to the existence of some functional projection in Chinese nominal structure. This chapter begins with Section 1, which reviews previous studies that have attested structural parallelisms between nominal phrases and sentences in other languages. Section 2 is devoted to revealing parallelisms between sentences and nominal phrases in Chinese. A detailed examination of the properties of nominal phrases in Chinese supports the existence of functional projections (DP and NumP) in Chinese.

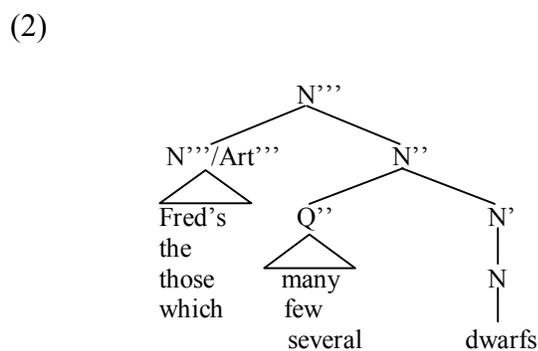
### **3.1. Parallelisms between clauses and nominal phrases**

#### **3.1.1. The pre-DP analysis of nominal phrases**

In the history of generative syntax, clauses and nominal phrases were once standardly analyzed as having different structures. On one hand, clauses were analyzed as consisting of two functional projections over Verb Phrase (VP) (Chomsky, 1986):



On the other hand, nominal phrases were analyzed as in the following structure (Jackendoff, 1977: 104):



In this structure, constituents like articles, demonstratives and possessive phrases are considered as the specifier of  $N'''$  and quantifiers such as *many* and *few* are considered as the specifier of  $N''$ .

In the structure of clauses illustrated in (1), there are two functional projections over VP. But in the nominal structure (2), the top node is Noun Phrase, which is a lexical category. These two different structures predict that clauses and nominal phrases should behave differently. However, more recent studies have shown that these two constructions have parallel properties, as illustrated in the following section.

### 3.1.2. The DP hypothesis and parallelisms between clauses and nominal phrases

The structure in (1) and the structure in (2) are not parallel enough to capture similarities between clauses and nominal phrases reported in previous studies (Abney, 1987; Fukui, 2003). It has been noticed in many previous studies that nominal phrases and clauses exhibit structural parallelisms, which indicates that the structure of nominal phrases should also contain functional projections on top of NP<sup>1</sup>. First, both clauses and nominal phrases are similar in terms of their external distribution, as both can occur as the subject or the direct object (Lees, 1960: 59). In (3), *that John came* is the subject, in the same way that *John* is the subject inside the nominal phrase.

- (3) a. That John came surprised me.  
 b. John surprised me.
- (4) a. I know that John came.  
 b. I know John.

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<sup>1</sup> However, Bruening (2009) has proposed counter evidence against this claim. One asymmetry pointed out by him is in terms of complement selection. Verbs that select for clausal complements select only elements that are high in the structure of clauses (complementizers and infinitive markers etc.).

- (i) Questions versus declaratives:  
 a. Sue thinks that the world is flat.  
 b. \*Sue thinks whether the world is flat.  
 c. \*Sue wonders that the world is flat.  
 d. Sue wonders whether the world is flat.

In these cases, for example, *think* selects a clausal complement introduced by the complementizer *that* but not by *whether*. The verb *wonder* selects a clausal complement introduced by the complementizers *whether*, but not by *that*.

- (ii) Finite versus nonfinite:  
 a. Bertrand wants the world to be flat.  
 b. \*Bertrand wants that the world is flat.

In these cases, the verb *want* selects a complement introduced by *to* but not by *that*.

On the other hand, verbs that select nominal arguments only select the head noun but never select for particular determiners, or numbers, or possessors. Instead, they select only for particular head nouns.

A second asymmetry is in terms of form determination. In the clausal domain, each head determines the form of the head of its complement:

- (iii) C determines I (finite vs. nonfinite):  
 a. I would like for the Jamaicans to win.  
 b. I expect that the Jamaicans will win.

In the nominal domain, however, the form of everything else is determined by the head noun:

- (iv) a. too many/\*much people  
 b. too much/\*many rice

In (4), both the clause *that John came* and *John* may function as the object.

Both clauses and nominal phrases may take internal and external arguments (Lees, 1960: 66). For example, *Neo* and *Rome* are the arguments taken by *destroy* in the clause in (5a). On the other hand, *Rome* and *Neo* are arguments taken by *destruction* inside the nominal phrase in (5b).

- (5) a. That Neo destroyed Rome dismayed the Senate.  
 b. Neo's destruction of Rome dismayed the Senate.

Clauses and nominal phrases are also similar in terms of setting up for binding domains. For example, in both the clause and the nominal phrase in (6), *himself* must be bound by *John* (Abney, 1987: 25).

- (6) a. John<sub>i</sub> portrayed himself<sub>i</sub>.  
 b. John<sub>i</sub>'s portrayal of himself<sub>i</sub>.

Moreover, in both the clause and the nominal phrase in (7), the pronoun *him* cannot be bound by *John*.

- (7) a. \*John<sub>i</sub> portrayed him<sub>i</sub>.  
 b. \*John<sub>i</sub>'s portrayal of him<sub>i</sub>

These two constructions are also similar in terms of control relations (Abney, 1987: 25). As illustrated by the examples in (8), the pronoun *his* contained in the adjuncts of both clauses ((8a)) and nominal phrases ((8b)) can be controlled by either *John* or *Bill*. But the PRO contained in the adjuncts of both clauses and nominal phrases can only be controlled by the subject *John* (9a-b) not by the object *Bill* (9c-d).

- (8) a. John criticized Bill<sub>j</sub> after his<sub>j</sub> talk  
 b. John's criticism of Bill<sub>j</sub> after his<sub>j</sub> talk  
 c. John<sub>j</sub> criticized Bill after his<sub>j</sub> talk

- d. John<sub>j</sub>'s criticism of Bill after his<sub>j</sub> talk
- (9) a. John<sub>j</sub> criticized Bill after PRO<sub>j</sub> talking
- b. John<sub>j</sub>'s criticism of Bill after PRO<sub>j</sub> talking
- c. \*John criticized Bill<sub>j</sub> after PRO<sub>j</sub> talking<sup>2</sup>
- d. \*John's criticism of Bill<sub>j</sub> after PRO<sub>j</sub> talking

These general similarities lead to the hypothesis that clauses and nominal phrases may in fact have a similar structure.

Besides these general similarities, previous studies have presented evidence from other languages than English, which further supports the existence of functional projections on top of NP. One piece of evidence comes from agreement phenomena in nominal phrases. Abney (1987: 28) reports that in Yup'ik, nouns agree with their possessors and that the same agreement morpheme appears on verbs, too, when the subject agrees with the verb. The agreement can support a projection on top of NP.

- (10) a. angute-t kiputaa-t.  
man Pl. buy it Pl.  
'The men (Pl.) bought it.'
- b. angute-t kuiga-t  
man Pl. river Pl.  
'the men's river'

As is shown in the example above, the morpheme *-t*, which indicates plurality, appears in both the clause and the nominal phrase.

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<sup>2</sup> On the other hand, some English native speakers feel that the following control patterns are acceptable:

- (i) a. John criticize Bill<sub>j</sub> for PRO<sub>j</sub> talking.  
b. John's criticism of Bill<sub>j</sub> for PRO<sub>j</sub> talking

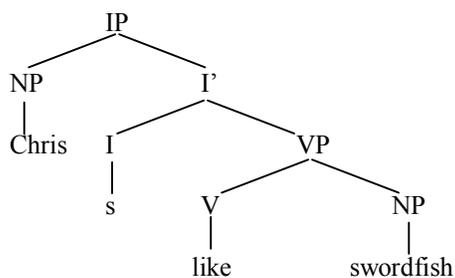
In the tradition of generative syntax, it is assumed that agreement between the subject and the verb in clauses is due to the functional projection on top of VP (Baker, 1988, 2008; Belletti, 2003; Chomsky, 1981, 1986). The following examples indicate that agreement between the subject and the verb is not an inherent property of verbs, but of the functional category Tense/Infl that dominates VP (Baker, 2008: 34).

- (11) a. Chris likes swordfish.  
 b. For Chris to like(\*s) swordfish (would be unfortunate).  
 c. Chris does not like(\*s) swordfish.

As indicated in the examples above, agreement is on the verb when Tense/Infl is finite (11a), but not when Tense/Infl is non-finite (11b). When Tense/Infl is separate from the main verb by an intervening negation, agreement shows up on the Tense/Infl position, but not on the verb (11c).

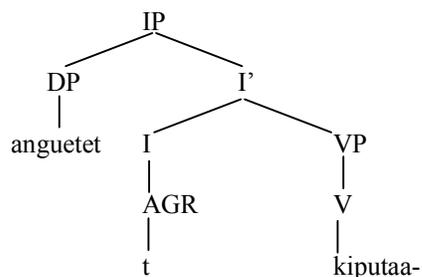
This kind of agreement relation is expressed in the following configuration:

(12)

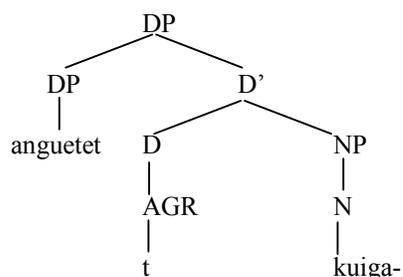


Drawing an analogue to the structure of sentences that consists of AgrP on top of VP, Abney concludes that there is a functional projection DP on top of NP and that determiners instantiate DP. The same agreement phenomena in clauses and nominal phrases in Yup'ik can be accounted for by the following parallel structures:

(13) a.



b.

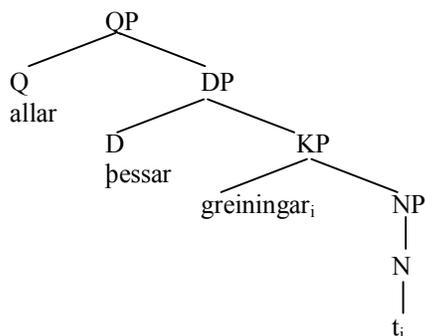


The proposal of DP by Abney to account for agreement phenomena opened the possibility that there is some functional projection over NP inside the nominal structure although DP in Abney's work was replaced by some other functional projection between DP and NP in later studies (e.g. NumP in Ritter, 1991).

The proposal of functional projections inside nominal structure was adopted by later studies to explain the agreement phenomena in other languages (Bosque and Picallo, 1996; Carstens, 2000; Mallen, 1997). For example, when analyzing the case concord in Icelandic noun phrases (14), Sigurodsson (1993: 191) proposes that there is a Kase Phrase between DP and NP such that the noun moves to K to get its case features checked (Chomsky, 1991, 1992).

(14) a.      allar þessar greiningar  
               all    these    analyses  
               (Nom) (Nom) (Nom)

b.



Moreover, movements (both head movement and phrase movement) in nominal phrases indicate the existence of functional projections.

For example, Szabolcsi (1981, 1983, 1987, 1994) observes that possessor phrases in Hungarian can be moved to a position higher than NP, which is DP. In Hungarian, possessor phrases may bear two kinds of cases, nominative and dative. These two kinds of possessor phrases are also different in terms of their position relative to the article *a* 'the' (Szabolcsi, 1994: 1). While the nominative possessor follows the article, the dative possessor phrase precedes the article.

- (15) a. (a) Mari kalap-ja -i  
 the Mari(-NOM) hat -POSS-Pl(-3SG)  
 'Mari's hats'
- b. Mari-nak a kalap-ja -i  
 Mari-DAT the hat -POSS-Pl(-3SG)  
 'Mari's hats'

These two kinds of possessor phrases are also different in terms of extraction properties (Szabolcsi, 1994: 2). While the nominative possessor phrase cannot be extracted, the dative possessor phrase can be extracted.

- (16) a. \*Mari fekete volt a kalap-ja.  
 Mari(-NOM) black was the hat -POSS(-3SG-NOM)  
 ‘Mari’s hat was black.’
- b. Mari-nak fekete volt a kalap-ja.  
 Mari-DAT black was the hat -POSS(-3SG-NOM)  
 ‘Mari’s hat was black.’

Szabolcsi argues that these two kinds of possessor phrases are generated in two different positions. The nominative possessor phrase is generated within the Inflection Noun Phrase (INP)<sup>3</sup>. The dative possessor phrase can be moved to Spec DP, which is an operator position<sup>4</sup>. From this position, it can be moved out of DP and thus gets extracted.

- (17) a. [DP a [INP Mari (NOM) [IN' kalap-ja-i]]]  
 b. [DP Mari<sub>i</sub> (DAT) a [INP t<sub>i</sub> [IN' kalap-ja-i]]]  
 c. Mari<sub>i</sub> (DAT) [DP t<sub>i</sub> a [INP t<sub>i</sub> [IN' kalap-ja-i]]]

Phrase movement in Greek may also provide evidence for the specifier position of DP (Horrocks and Stavrou, 1987). They observe that focus-induced movements can occur in both

<sup>3</sup> Szabolcsi (1983: 89-90; 1987) argues that there is an Inflection Phrase within nominal phrases in Hungarian based on the agreement phenomena in possessive constructions.

- (i) (a) Mari- $\emptyset$  vendég-e- $\emptyset$   
 (the) Mary-nom guest-poss-3sg  
 ‘Mary’s guest’
- (ii) Mari- $\emptyset$  alud- t- $\emptyset$   
 Mary-nom sleep-past-3sg  
 ‘Mary slept.’

<sup>4</sup> The Spec DP is an operator because bare operator possessors must move to this position (Szabolcsi, 1994: 21).

- (i) a. \*ki kalap-ja  
 who(-NOM) hat -POSS.3SG  
 b. ki- $\text{nek}_i$  a t<sub>i</sub> kalap-ja  
 who-DAT the hat -POSS.3SG  
 ‘whose (interrog.) hat’

clauses and nominal phrases. Some constituents (*tis Afrodhitis*) can be moved in clauses for the reason of being focused (Horrocks and Stavrou, 1987: 86).

- (18) a. Edhose to vradio tis Afrodhitis  
 gave-3SG the prize the-GEN Aphrodite-GEN  
 ‘He gave the prize to Aphrodite.’
- b. Tis Afrodhitis edhose to vradio.  
 the-GEN Afrodhitis-GEN gave-3SG the prize  
 ‘To Aphrodite he gave the prize.’

Correspondingly, some constituents within nominal phrases can also be moved when they are focused (Horrocks and Stavrou, 1987: 86).

- (19) a. to vivlio afto  
 the book this  
 ‘this book’
- b. afto to vivlio
- (20) a. to vivlio tu Chomsky  
 the book the-GEN Chomsky
- b. tu Chomsky to vivlio

Moreover, *wh* phrases in sentences and nominal phrases evince similar movements (Horrocks and Stavrou, 1987: 89). The sentence in (21a) is an echo question since the *wh* phrase *ti* (‘what’) does not move. In (21b), the *wh* phrase is fronted.

- (21) a. Ekane ti?  
 Did-3SG what  
 ‘He did what?’

- b. Ti ekane?  
 what did-3SG  
 ‘What did he do?’

In nominal phrases, *wh* phrase may also be fronted.

- (22) a. to vivlio tinos  
 the book who-GEN  
 ‘whose book?’
- b. tinos to vivlio  
 who-GEN the book  
 ‘whose book?’

Meanwhile, Horrocks and Stavrou argue that *wh* movement in Greek nominal phrases provides evidence for the existence of the Spec DP position. The examples in (23) illustrate how *tinós* ‘who’ moves to the sentence initial position (Horrocks and Stavrou, 1987: 89).

- (23) a. Mu ipes [<sub>CP</sub> pos dhjavases [<sub>DP</sub> to vivlio tinos]]?  
 me-GEN said-2SG that read-2SG the book who-GEN  
 ‘You told me you read whose book?’
- b. Mu ipes [<sub>CP</sub> pos dhjavases [<sub>DP</sub> tinosisi to vivlio ti]]?
- c. [<sub>CP</sub> [<sub>DP</sub> To vivlio tinos]<sub>j</sub> mu ipes [<sub>CP</sub> t<sub>j</sub> pos dhjavases t<sub>j</sub>]]?
- d. [<sub>CP</sub> [<sub>DP</sub> Tinosi to vivlio ti]<sub>j</sub> mu ipes [<sub>CP</sub> t<sub>j</sub> pos dhjavases t<sub>j</sub>]]?
- e. [<sub>CP</sub> [Tinos]<sub>i</sub> mu ipes [<sub>CP</sub> t<sub>j</sub> pos dhjavases [<sub>DP</sub> ti to vivlio ti]]]?

It is generally assumed that movement proceeds via intermediate landing sites (Chomsky, 1993, 1995). In (23c), the movement of *to vivlio tinós* proceeds through the specifier position of the lower CP and this position is the landing site for its further movement to the sentence initial

position. If we assume that DP corresponds to CP, then the specifier of DP may also have the same function. As is shown in (23d), the specifier of DP may function as a landing site for the movement of *tinós* from its base generated position to the sentence initial position (23e).

A similar movement may also take place in English (Alexiadou, et al., 2007: 84). As is shown in (24b), within the fronted DP *how important a decision*, the adjective *wh* phrase *how important* precedes the indefinite article *a*. Meanwhile, (24c) indicates that the pre-article position of *important* in (24b) is not the usual position for an adjective. It may be assumed that there is a DP-internal *wh* movement, that is, the AP *how important* in (24b) is moved and occupies the specifier position of DP.

- (24) a. [AP How important] is this decision?  
 b. [DP [AP [How important] a decision] is this?  
 c. This is [DP a [AP very important] decision].

Another similarity between clauses and nominal phrases is the existence of head movement, as illustrated by the relative position of adjectives and adverbs. In French, adverbs follow the modified verbs in clauses (Pollock, 1989: 367) and adjectives follow the modified nouns (Bernstein, 1993: 23; Pollock, 1989: 367).

- (25) a. Mes amis aiment tous Marie.  
 my friends love all Mary  
 ‘My friends all love Mary.’  
 b. une table longue  
 a table long  
 ‘a long table’

In Pollock (1989), it is proposed that in the structure of French clauses, verbs may raise to a higher position, thus crossing the adverb (26a). In a similar vein, Bernstein (1993: 23) suggests that nouns in French nominal phrases may raise to a higher position (26b).

(26) Mes amis aiment<sub>i</sub> tous t<sub>i</sub> Marie.

my friends love all Mary

‘My friends all love Mary.’

b. une table<sub>i</sub> longue t<sub>i</sub>

a table long

‘a long table’

In addition to these parallelisms, which reveal the existence of some functional projection over NP in nominal structure, studies also indicate that nominal structure may consist of two functional projections on top of NP, exactly like the clausal structure, which consists of two functional projections on top of VP. Evidence comes from the analysis of two kinds of noun phrases in Hebrew. The first kind is simple construct state (CS) noun phrases (27), where a genitive phrase which is not overtly case marked follows the head noun (Ritter, 1991: 38):

(27) a. ʃir ha-cipor

song the –bird

‘the bird’s song’

b. axilat dan et ha-tapuax

eating Dan ACC the–apple

‘Dan’s eating of the apple’

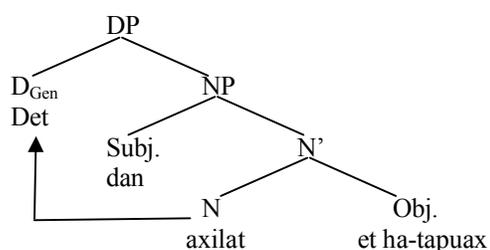
Ritter notices that in CS noun phrases the subject asymmetrically binds the object (Ritter, 1991: 39):

- (28) a. ahavat dan<sub>i</sub> et acmo<sub>i</sub>  
 love Dan ACC himself  
 ‘Dan’s love of himself’
- b. \*ahavat acmo<sub>i</sub> et dan<sub>i</sub>

Ritter assumes that the Noun-Subject-Object order in noun phrases is similar to VSO order in languages like Welsh and Irish, where the verb raises to a functional head over the verb.

Therefore, she proposes that during the derivation of the Noun-Subject-Object order, the noun raises to a functional head, which is Det, assuming that CS noun phrases contain a phonetically null determiner ( $D_{gen}$ ) which is constrained to assign genitive case to a noun phrase on its right (Ritter, 1991: 39):

(29)



The hypothesis that the head that the noun raises to is Det is supported by the fact that the  $D_{gen}$  in CS noun phrases can not co-occur with the definite article *ha* (Ritter, 1991: 40):

- (30) \*ha-beyt ha-mora  
 the-house the-teacher

However, the structure in (29) for CS noun phrases is problematic for free genitive (FG) noun phrases, where a genitive phrase case marked by *šel* follows the head noun (Ritter, 1991: 42):

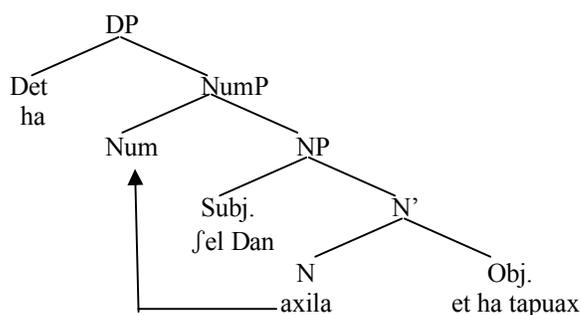
- (31) ha-bayit *ʃel* ha-mora  
 the –house of the teacher  
 ‘the teacher’s house’

Another characteristic of FG noun phrases is that the head noun is preceded by the definite article *ha*. In FG noun phrases, the subject asymmetrically binds the object, as in CS noun phrases (Ritter, 1991: 43):

- (32) a. ha-ahava *ʃel* dan<sub>i</sub> et acmo<sub>i</sub>  
 the-love of Dan ACC himself  
 ‘Dan’s love of himself’  
 b. \*ha-ahava *ʃel* acmo<sub>i</sub> et dan<sub>i</sub>

Ritter suggests that FG noun phrases also involve the raising of the head noun to a functional head. Due to the presence of *ha*, which occupies the Det head, Ritter suggests that the functional head that the noun raises to is the head of Number Phrase, which provides number specification (singular or plural) through inflection (Ritter, 1991: 43):

- (33) ha-axila *ʃel* dan et ha tapuax  
 the eating of Dan ACC the apple  
 ‘Dans’ eating of the apple’



Moreover, the NumP in the structure in (33) is parallel to IP in the clausal structure since NumP is related to agreement phenomena in CS noun phrases, where quantifiers head NumP (Ritter, 1991: 55-56).

- (34) a.    ʃney ha-yeladim  
           two the-boys  
           ‘the two boys’
- b.    ʃney yeladim gdolim  
           two boys big  
           ‘two big boys’

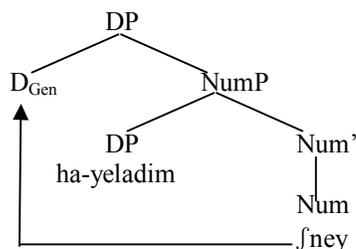
As in other CS noun phrases, the definiteness of the whole noun phrase is determined by the definiteness of the genitive phrase. In (34a), the genitive phrase *ha-yeladim* is definite, so the whole CS noun phrase is definite. On the other hand, the genitive phrase *yeladim gdolim* is indefinite, so the whole CS noun phrase is indefinite (34b). Ritter (1991: 45) suggests the following structure for (34a)<sup>5</sup>:

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<sup>5</sup> According to Ritter, the DP *ha-yeladim* is moved to Spec NumP because in both CS noun phrases and FG noun phrases that take arguments, the DP that functions as the subject precedes an adjective. Assuming that adjectives are generated as NP adjuncts and remain in their D-structure position, the subject DP must move out of NP to a position where it can be assigned the genitive case (Ritter, 1991: 44-46).

- (i) a.    axilat dan ha-menumeset et ha-uga           (CS)  
       eating Dan the-polite   ACC the-cake  
       ‘Dna’s polite eating of the cake’
- b.    ha-axila ha-menumeset ʃel dan et ha-uga       (FG)  
       the-eating the polite   of Dan ACC the-cake  
       ‘Dan’s polite eating of the cake’

(35)



First, *ha-yeladim* can be assigned a structural genitive case by  $D_{Gen}$  since they are adjacent to each other. Second, the fact that the definiteness of the CS noun phrase is determined by that of the genitive phrase can be captured by the Spec-Head relation under NumP.

This section discussed a few parallelisms between nominal phrases and clauses, which support the hypothesis that clauses and nominal phrases may have a similar hierarchical structure. If sentences are analyzed as consisting of functional projections on top of VP, these parallelisms may provide evidence for functional categories on top of NP.

### 3.2. Parallelisms between clauses and nominal phrases in Chinese

The previous section reviews several similarities between clauses and nominal phrases as the evidence for functional projections in nominal structure, this section turns to investigate whether there are any similarities between nominal phrases and clauses in Chinese, with the aim of attesting functional projections in the nominal structure in Chinese. First, I will review some general similarities that exist between nominal phrases and clauses in Chinese (in terms of e.g. external distribution, permitting arguments, binding and control relations, dropping of the subject or the object). Subsequently, I will review some other pieces of evidence of clausal/nominal

parallelisms, which point to the existence of functional projections inside nominal structure in Chinese.

First, nominal phrases and clauses have similar external distributions. In the same way that *Lisi si le* ‘Lisi died’ appears as the object of a clause in (36a), the nominal phrase *zhe ge xiaoxi* ‘this piece of news’ also appears as the object of the clause in (36b).

- (36) a. Zhangsan tingshuo Lisi si le.  
           Zhangsan hear Lisi die Perf.  
           ‘Zhangsan heard that Lisi died.’
- b. Zhangsan tingshuo le zhe ge xiaoxi.  
           Zhangsan hear Perf. this Cl news  
           ‘Zhangsan heard this piece of news.’

Second, both clauses and nominal phrases may allow external and internal arguments. In the clause in (37a), the verb *diaocha* ‘investigate’ takes two arguments, *Zhangsan* and *zhe ge anjian* ‘this case’. In the nominal phrase in (37b), the noun *jiaocha* ‘investigation’ also takes two arguments *Zhangsan* and *zhe ge anjian* ‘this case’, although *zhe ge anjian* is preceded by a preposition *dui*.

- (37) a. Zhangsan diaocha le zhe ge anjian  
           Zhangsan investigate Perf. this Cl case  
           ‘Zhangsan investigated Lisi/this case’
- b. Zhangsan dui zhe ge anjian de diaocha  
           Zhangsan dui<sup>6</sup> this Cl case de investigation  
           ‘Zhangsan’s investigation of this case’

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<sup>6</sup> As explained in Chapter 5, I keep the word *dui* unglossed.

Third, clauses and nominal phrases in Chinese set up a binding domain for reflexives and pronouns. In both the clause the nominal phrase in (38), the subject *Zhangsan* binds the reflexive object *taziji* ‘himself’, which indicates that there is a hierarchical relation between the subject and the object. But pronouns cannot be bound by the subject *Zhangsan* either in clauses or in nominal phrases (39).

- (38) a.    Zhangsan<sub>i</sub> piping le taziji<sub>i</sub>.  
           Zhangsan criticize Perf. himself  
           ‘Zhangsan criticized himself’
- b.    Zhangsan<sub>i</sub> dui taziji<sub>i</sub> de piping  
           Zhangsan dui himself de criticism  
           ‘Zhangsan’s criticism of himself’
- (39) a.    \*Zhangsan<sub>i</sub> piping le ta<sub>i</sub>.  
           Zhangsan criticize Perf. he  
           ‘Zhangsan’s criticism of himself’
- b.    \*Zhangsan<sub>i</sub> dui ta<sub>i</sub> de piping  
           Zhangsan dui he de criticism

Fourth, both nominal phrases and clauses in Chinese exhibit similar control relations, similar to the control relations found in English ((8) and (9)). In the clause in (40a), the pronoun *ta* contained in the adjunct can be bound either by the subject *Zhangsan* or by the object *Lisi* but the PRO contained in the adjunct must be controlled by the subject *Zhangsan* (40b). The same control pattern is also observed in the nominal counterparts in (41).

- (40) a.  $Ta_{i/j}$  de jianghua yihou Zhangsan<sub>i</sub> piping le Lisi<sub>j</sub>.  
 his de talk after Zhangsan criticize Perf. Lisi  
 ‘Zhangsan<sub>i</sub> criticized Lisi<sub>j</sub> after his<sub>i/j</sub> talk.’
- b.  $PRO_{i/*j}$  jianghua yihou Zhangsan<sub>i</sub> piping le Lisi<sub>j</sub>  
 talk after Zhangsan criticize Perf. Lisi  
 ‘Zhangsan<sub>i</sub> criticized Lisi<sub>j</sub> after  $PRO_{i/*j}$  talking.’
- (41) a.  $Ta_{i/j}$  de jianghua yihou Zhangsan<sub>i</sub> dui Lisi<sub>j</sub> de piping  
 his de talk after Zhangsan dui Lisi de criticism  
 ‘Zhangsan<sub>i</sub>’s criticism of Lisi<sub>j</sub> after his<sub>i/j</sub> talk’
- b.  $PRO_{i/*j}$  jianghua yihou Zhangsan<sub>i</sub> dui Lisi<sub>j</sub> de piping  
 talk after Zhangsan dui Lisi de criticism  
 ‘Zhangsan<sub>i</sub>’s criticism of Lisi<sub>j</sub> after  $PRO_{i/*j}$  talking.’

Another similarity between clauses and nominal phrases in Chinese is that the pronominal subject may be dropped in both constructions. It is observed that Chinese clauses may drop a pronominal subject and/or a pronominal object (Huang, 1987, 1989, 1991).

- (42) a. Zhangsan kanjian Lisi le ma?  
 Zhangsan see Lisi Asp Q  
 ‘Has Zhangsan seen Lisi?’
- b. (Ta) kanjian (ta) le.  
 he see he Asp  
 ‘He saw him.’

In cases of those nominal phrases that correspond to the clauses, the subject or the object may also be dropped.

- (43) a. Zhangsan dui Lisi de piping  
 Zhangsan dui Lisi de criticism  
 ‘Zhangsan’s criticism of Lisi’
- b. dui Lisi de piping  
 dui Lisi de criticism  
 ‘criticism of Lisi’
- c. Zhangsan de piping  
 Zhangsan de criticism  
 ‘Zhangsan’s criticism’

In addition to these general similarities between clauses and nominal phrases in Chinese, there are some other similarities between clauses and nominal phrases in Chinese, which point to the existence of functional projections in Chinese nominal phrases. For example, similar ellipsis patterns in Chinese clauses and nominal phrases can indicate some functional projections in both the clausal structure and the nominal structure. For example, it is reported in Su (2008) that a verb phrase which follows a modal verb can be deleted (e.g. *shuo fayu* ‘speak French’ as in (44a)), which indicates the presence of a functional projection headed by the modal verb. In a similar manner, a noun phrase which follows a numeral-classifier sequence can be deleted (*jiu shu* ‘old book’ as in (44b)), which indicates the presence of a functional projection headed by the numeral-classifier sequence.

- (44) a. Zhangsan hui shuo fayu, Lisi ye hui ~~shuo fayu~~.  
 Zhangsan can speak French Lisi also can speak French  
 ‘Zhangsan can speak French, and Lisi can, too.’

- b. Zhangsan mai le san ben jiu shu. Wo mai le si ben ~~jiu~~ shu.  
 Zhangsan buy Perf. three Cl old book I buy Perf. four Cl old book  
 ‘Zhangsan bought three books and I bought four old books.’

Chinese is different from Indo-European languages in that it does not have much morphological agreement as in Yup’ik (10) (Baker, 2008). However, this does not mean that there is no agreement phenomenon in Chinese at all. One obvious agreement relation exists between a classifier and a noun in Chinese. Generally, a classifier can only modify a restricted class of nouns based on semantic congruity (Huang, et al, 2009; Tang, 1990b).

- (45) a. yi ben shu  
 one Cl book  
 ‘a book’
- b. yi kuai shitou  
 one Cl stone  
 ‘a stone’
- c. \*yi kuai shu
- d. \*yi ben shitou

Based on the agreement between a classifier and a noun, Tang (1990b) proposes that there is a functional projection named Classifier Phrase (CLP) that regulates this kind of agreement relation.

Regarding movements within nominal phrases, it is observed that some constituents may move to the left periphery of the entire nominal phrase in Chinese, which indicates that in the structure of nominal phrases in Chinese, there is a position for the moved constituents. For example, Xu (1995) reports the movement pattern, as follows:

(46) Wo mai le [niurou]<sub>i</sub> san bang t<sub>i</sub>, [zhurou]<sub>j</sub> san bang t<sub>j</sub>.

I buy Perf. beef three pound pork three pound

‘I bought three pounds of beef and three pounds of pork.’

Similar to (46), the following sentence is another case showing movement inside nominal phrases.

(47) a. Wo mai le [<sub>DP</sub> san bang xinxian niurou].

I buy Perf. three pound fresh beef

b. Wo mai le [<sub>DP</sub> [xinxian niurou]<sub>i</sub> [<sub>D'</sub> san bang t<sub>i</sub>]].

I buy Perf. fresh beef three pound

Both: ‘I bought three pounds of fresh beef.’

I assume that the moved constituent *xinxian niurou* ‘fresh beef’ in (47b) moves a position in the left periphery of structure of the nominal phrase.

This is parallel to the movement of constituents inside clauses.

(48) a. [<sub>CP</sub> [<sub>IP</sub> Wo zui xihuan zhe ben shu]].

I most like this Cl book

b. [<sub>CP</sub> [Zhe ben shu]<sub>i</sub>, [<sub>C'</sub> [<sub>CP</sub> wo zui xihuan t<sub>i</sub>]]].

this Cl book I most like

Both: ‘I like this book the best.’

In (48a), the nominal phrase *zhe ben shu* ‘this’ is moved to the left periphery of the entire clause, which provides evidence for the CP Spec, which hosts the moved nominal phrase.

Second, similar to the Greek examples in (23) where constituents within nominal phrases may undergo extraction, some extraction patterns from within nominal phrases are also observed in Chinese. For example, Zhang (2006: 8-9) observes that extractability of noun phrases in

Chinese depends on the position of modifiers in the nominal phrases where extraction takes place. Specifically, she observes that modifiers suffixed with *de* may appear in two positions, either before or after the numeral-classifier sequence:

- (49) a.     guanyu Xizang de liang ben lishishu  
           about    Tibet    de two    Cl history book
- b.     liang ben guanyu Xizang de lishishu  
           two    Cl    about    Tibet    de history book

Both literally mean: ‘two history books about Tibet’

Although both phrases have the literal meaning of two history books about Tibet, they are different in terms of specificity. While (49a) is exclusively specific, (49b) is ambiguous in specificity. This contrast is illustrated by their distributional difference: while the former can appear as the subject of a clause, the latter cannot (Zhang, 2006: 5).

- (50) a.     Akiu yiwei xue wuli de san ge xuesheng dao le.  
           Akiu think study physics de three Cl student arrive Perf.  
           ‘Akiu thought that three students who study physics arrived.’
- b.     \*Akiu yiwei san ge xue wuli de xuesheng dao le.  
           Akiu think three Cl study physics de student arrive Perf.

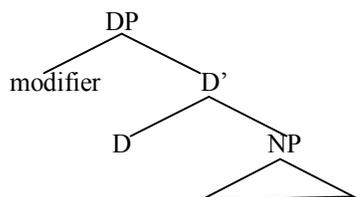
Zhang explains that these two kinds of nominal phrases are also different in terms of structure.

The phrase in (49a) contains a DP on top of NP, where modifiers may occupy the specifier of DP (Cinque, 1994; Zamparelli, 2000). The phrase in (49b) is NP<sup>7</sup>.

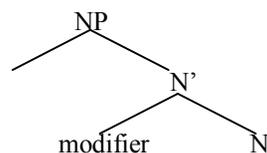
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<sup>7</sup> Regarding how the structural difference between (51a) and (51b) can explain the contrast in terms of specificity between (49a) and (49b), Zhang adopts two assumptions by Zamparelli (2000): the specific reading of a nominal is related to a higher position of the determiner and an abstract functional head can be licensed if a modifier of the appropriate type is generated or moved into its specifier. The high position of the modifier is responsible for the exclusive specific reading of (49a). In contrast, the modifier of (49b) is in a low position, and the specificity of (49b)

(51) a. The structure of (49a)



b. The structure of (49b)



The structural difference between these two phrases is further supported by the opposite extraction possibilities (Zhang, 2006: 8-9). As is illustrated below in (52), the noun phrase *lishishu* ‘history book’ can be extracted out of the nominal phrase that has NP as the top node.

(52) a. Akiu du guo le liang ben guanyu Xizang de lishishu.

Akiu read Exp. Perf. two Cl about Tibet de history book

‘Akiu has read two history books on Tibet.’

b. Akiu (xingkui) [lishishu]<sub>i</sub> du guo le liang ben guanyu Xizang de t<sub>i</sub>.

Akiu fortunately history book read Exp. Perf. two Cl about Tibet de

‘Akiu has (fortunately) read two history books on Tibet.’

c. [Lishishu]<sub>i</sub> Akiu (xingkui) du guo le liang ben guanyu Xizang de t<sub>i</sub>.

history book Akiu fortunately read Exp. Perf. two Cl about Tibet de

‘Akiu has (fortunately) read two history books on Tibet.’

However, the noun phrase cannot be extracted out of the nominal phrase that has DP on top of NP:

(53) a. Akiu du guo le guanyu Xizang de liang ben lishishu.

Akiu read Exp. Perf. about Tibet de two Cl history book

‘Akiu has read two history books on Tibet.’

---

is under-specified and can be determined by the context such as the semantic type of the selecting verb (Zhang, 2006: 11-12).

- b. \*Akiu (xingkui) lishishu du guo le guanyu Xizang de liang ben  
t<sub>i</sub>.
- c. \*Lishishu Akiu (xingkui) du guo le guanyu Xizang de liang ben t<sub>i</sub>.

Extraction out of the nominal phrase in (53) is not possible because the modifier *guanyu Xizang de* ‘about Tibet’ occupies the specifier of DP, which blocks the extraction of the noun phrase *lishishu* ‘history book’.

An extraction blocking phenomenon, which is similar to those in (53), is also reported by Kim (2004: 258):

- (54) a. ?Zhangsan xihuan [<sub>NP</sub> xie shei xie de shu] ne?  
Zhangsan like CI who write de book particle  
‘Zhangsan likes books written by whom?’
- b. \*Zhangsan xihuan [<sub>DP</sub> na-xie shei xie de shu] ne?  
Zhangsan like that-CI who write de book particle  
‘Zhangsan likes those books written by whom?’

It is reported that *wh*-phrases in Chinese undergo QR at LF (Huang, 1982). In both clauses in (54), the *wh* phrase has to be extracted out of the nominal phrase in order to be interpreted at LF. While the extraction of the *wh* phrase out of the indefinite nominal in (54a), which is NP, is possible (although not perfect), the extraction of the *wh* phrase out of the definite nominal phrase in (54b), which is DP, is not possible.

Meanwhile, possessor extraction also supports the existence of DP in nominal phrases in Chinese. Hsu (2009: 95) observes that possessors within nominal phrases may be extracted.

- (55) a. Wo mingming kanjian le na zhi tuzi de erduo!  
 I obviously see Perf. that Cl rabbit de ear  
 ‘I see that rabbit’s ear obviously.’
- b. [Na zhi tuzi]<sub>i</sub>, wo mingming kanjian le [t<sub>i</sub> erduo]!<sup>8</sup>  
 that Cl rabbit I obviously see Perf. ear  
 ‘It is true of that rabbit that I saw its ears!’

Hsu explains that the extraction of *na zhi tuzi* ‘that rabbit’ proceeds through the Spec of DP and moves further to the sentence initial position. This analysis is further supported by the observation that if the Spec DP is occupied by some other constituent, then extraction cannot take place.

Besides the evidence presented above, piped piping phenomena in Chinese also support the existence of DP in nominal phrases. Before turning to Chinese, let us see some piped piping phenomena in English, which are reported by Cowper (1987: 322):

- (56) a. I wonder who<sub>i</sub> they gave the prize to t<sub>i</sub>.  
 b. I wonder [which people]<sub>i</sub> they worked with t<sub>i</sub>.  
 c. I wonder [with which people]<sub>i</sub> they worked t<sub>i</sub>.  
 d. \*I wonder [a book about whom]<sub>i</sub> he read t<sub>i</sub>.

In order to make sure that the embedded clauses introduced by *wonder* are questions, previous studies have proposed that the CP projection of embedded clauses must contain a [+wh] element,<sup>9</sup> as illustrated in the structure below:

- (57) I wonder [<sub>CP</sub>[which people]<sub>i</sub> [<sub>C</sub>[+wh]] [<sub>IP</sub> they worked with t<sub>i</sub>]].

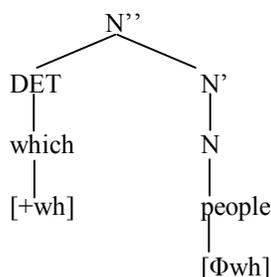
<sup>8</sup> Hsu (2009) does not explain why *de* is not present in (55b).

<sup>9</sup> This idea was introduced as early as in Chomsky (1973) and Aoun, et al (1981). In Lasnik and Saito (1984), it is expressed as a filter:

(i) \*Comp, unless it contains [+wh] element.

Given this, the question arises as to how the phrase *which people* acquires the [+wh] feature of *which* since *people* does not have such a feature. Cowper adopts the following structure for *which people*:

(58)



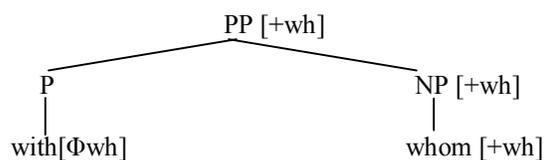
The word *people* does not have any [+/-wh] feature specification. The [+wh] feature of *which* may percolate from DET to N'' based on her definition of the percolation convention:

(59) In a structure [ $\alpha$   $\beta\gamma$ ] or [ $\alpha$   $\gamma\beta$ ],  $\alpha$  a projection of  $\beta$ , features from  $\gamma$  will percolate to  $\alpha$  iff  $\beta$  is not specified for those features.

This convention assumes that features normally percolate from the head of a category to its projections and allows features from other constituents to percolate only when the head does not bear those features. In (58), the head of N'' is not specified for the [+/-wh] feature, therefore, the [+wh] feature of DET may percolate to N'', which makes the pied piping in (57) grammatical.

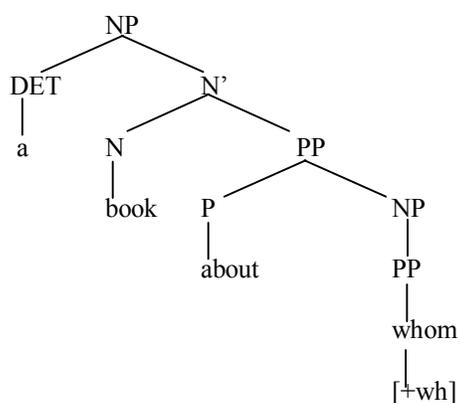
Cowper also assumes that prepositions, like nouns, are not specified for the [+/-wh] feature. By the percolation convention in (59), the [+wh] feature will percolate from an NP to a dominating PP, which makes (56c) grammatical.

(60)



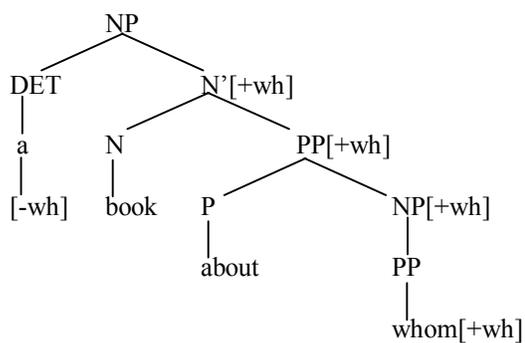
This kind of analysis encounters problems with the unacceptability of (56d) if the pied piped phrase *a book about whom* is assumed to have the following structure:

(61)



Since N and P are not specified for [+/-wh], the [+wh] feature on *whom* will percolate to the dominating N':

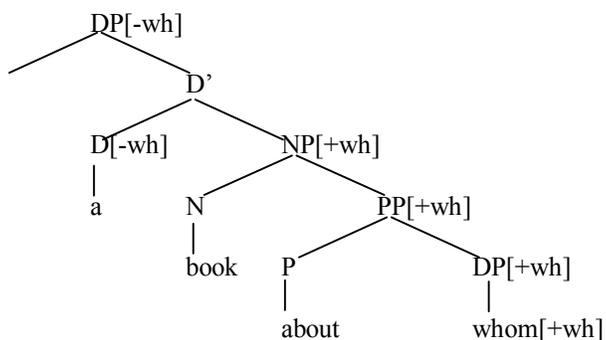
(62)



According to the percolation convention in (59), the [+wh] feature on N', being the head feature, will percolate to NP, which predicts that the sentence in (56d) should be grammatical, which is

contrary to the fact. In order to solve this problem, Cowper proposes that determiners head a functional projection on top of NP, thus giving rise to the following structure with percolation of the [+wh] feature.

(63)



The [+wh] feature of *whom* percolates up to NP. The [-wh] feature of *a* percolates to DP.

Therefore, the [-wh] feature of the DP is not compatible with the [+wh] feature of the embedded question, which correctly predicts that the sentence in (56d) is not acceptable.

(64) \*I wonder  $[_{CP}[_{DP[-wh]}a \text{ book about whom}]_i [_{C[+wh]}] [_{IP} \text{ he read } t_i]]$ .

Interestingly, the same acceptability contrast as shown in (56) also exists in Chinese:

(65) a. Wo xiang-zhidao tamen ba liwu gei le shei.

I wonder they Prep. gift give Perf. who

‘I wonder who they gave the gift to.’

b. Wo xiang-zhidao tamen zai gen na-xie ren jianghua.

I wonder they are with which people talk

‘I wonder with which people they are talking.’

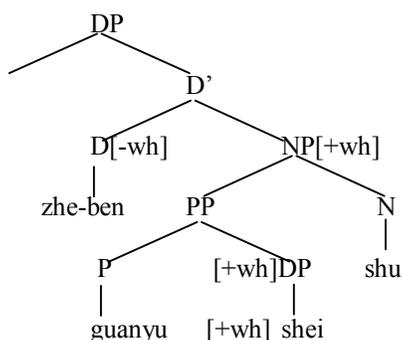
- c. \*Wo xiang-zhidao ta du le zhe ben guanyu shei de shu.  
 I wonder he read Perf. this Cl about who de book  
 ‘I wonder this book about whom he has read.’

If we assume that the [+/-wh] feature is universally a semantic feature at LF but is not relevant to overt syntax for Chinese and that the percolation convention in (59) also applies at LF (Cowper, 1987), the sentences in (65) may have the following LF presentations, respectively:

- (66) a. Wo xiang-zhidao [CP[DP[+wh]shei]<sub>i</sub> [C[+wh]] [IP tamen ba liwu gei le t<sub>i</sub>]].  
 b. Wo xiang-zhidao [CP[DP[+wh] na-xie ren]<sub>i</sub> [C[+wh]] [IP tamen zai gen t<sub>i</sub> jianghua]].  
 c. \*Wo xiang-zhidao [CP[DP[-wh] zhe ben guanyu shei de shu]<sub>i</sub> [C[+wh]] [IP ta du le t<sub>i</sub>]].

Specifically regarding (66c), we assume that the demonstrative *zhe* instantiates DP. Therefore, similar to (63), the [-wh] feature of *zhe* percolates to DP, which is incompatible with the [+wh] feature of the Comp of the embedded question.

(67)



Thus, the pied piping phenomena in Chinese add support to the existence of DP.

In addition to the evidence reviewed that supports the existence of DP in Chinese nominal phrases, other evidence supports the existence of another function projection inside

nominal phrases, that is, the projection responsible for number. It is observed in Bouchard (2002) that across languages, number represents a semantic category that signals the cardinality of a set of entities: in other words, number is a way to “atomize a set and provide access to individuals” (Bouchard, 2002: 41). Different languages use different means to atomize a set of entities. For example, Chinese uses classifiers (Alexiadou et al., 2007). Cheng and Sybesma (1999: 514) observe that there are two classes of classifiers. While some classifiers create a unit of measure, like *ping* in (68a), some classifiers name a unit for counting things, like *zhi* in (68b).

- (68) a.     san   ping   jiu  
           three bottle liquor  
           ‘three bottles of liquor’
- b.     san   zhi   bi  
           three CI pen  
           ‘three pens’

They suggest that classifiers constitute a functional projection between DP and NP in the nominal structure in Chinese.

### 3.3. Conclusion

Given that a very strong motivation for posting DP inside nominal structure is structural parallelism between clauses and nominal phrase, this chapter reviews the parallelisms between clauses and nominal phrases that have been attested in previous studies. After reviewing these parallelisms in Section 1, Section 2 tests Chinese regarding these parallelisms. The conclusion is that Chinese nominal phrases may contain functional projections on top of NP. Thus, in the same

way that clauses contains CP and IP on top of VP, nominal phrases in Chinese contain DP and NumP on top of NP.

## **Chapter 4 Chinese nominal phrases from a typological point of view**

This chapter examines the availability of DP in nominal phrases in Chinese from the perspective of Principles and Parameters theory, which may deduce a cluster of properties from a single linguistic parameter. Some typological studies (Bošković, 2005, 2008, 2010a, 2010b; Bošković and Gajewski, 2010; Fukui, 1986, 1988, 1995, 2003; Watanabe, 2004) suggest a classification of languages into those that have DP vs. those that do not have DP. Furthermore, these two classes of languages may exhibit some systematic differences, which may be deduced from the presence or absence of DP. These systematic differences as generalized in these works offer a helpful tool for investigating whether Chinese has DP. If Chinese has DP, it should behave like those languages that have DP in terms of these generalizations. If Chinese does not have DP, then it should pattern like languages that do not have DP. Therefore, some insight regarding the question of whether Chinese has DP can be gained by testing Chinese on these generalizations.

This chapter begins with a brief introduction of the parametric account of language classification, with the Null Subject Parameter as an illustrating example. Subsequent sections focus on testing Chinese on the generalizations proposed in previous studies. Section 2 is devoted to testing Chinese regarding the generalizations proposed by Bošković (2005, 2008, 2010a, 2010b) and Bošković and Gajewski (2010). According to Bošković (2008: 2, Fn2), languages that have definite articles have DP while languages that do not have definite articles do not have DP. Moreover, based on a survey of a large number of languages, these works

discover systematic differences between languages that have definite articles and languages that do not. These systematic differences, according to these studies, can be attributed to a single parameter (i.e. presence vs. absence of definite articles), which constitutes DP, although the link between the presence vs. absence of DP and some of these generalizations remains unexplained. Bošković tests Chinese in terms of some of these differences and he classifies Chinese with those languages without DP. This section is devoted to further testing of Chinese regarding the generalizations that are applicable to Chinese, especially those generalizations that Bošković has offered an explanation for. After illustrating the generalizations proposed by Bošković in the first subsection, the second subsection will test Chinese in terms of two generalizations (extraction and the interpretation of *most*) through experiments. The section will end by discussing the behavior of Chinese with regards to other generalizations that Bošković has explained.

Section 3 will test Chinese regarding a generalization proposed in Watanabe (2004), which involves the head internal relative clause and the (in)determiner system. Section 4 will test Chinese on a typological generalization proposed in Fukui (1995). Each section begins with the summary of these generalizations and then tests Chinese regarding these generalizations.

A series of tests conducted on Chinese regarding these typological generalizations leads to a conclusion that it is very likely that Chinese has DP. The results of testing Chinese on these typological generalizations are twofold. First, some results (e.g. of testing Chinese on modifier extraction) strongly indicate that Chinese has DP as part of the nominal structure. Second, some other results, which seem to work against assuming DP in Chinese nominal structure (e.g. radical *pro* drop in Chinese) are argued to involve alternative analyses, which do not contradict the claim that there is DP in Chinese nominal phrases.

#### **4.1. The parametric account of language variations**

The works by Bošković, Gajewski, Watanabe and Fukui regarding the differences between languages that have DP vs. those that do not have DP are based on the Principles and Parameters framework, which was first proposed in Chomsky (1981) and expanded in later works. This approach to characterizing the initial state of the language faculty is a step in the direction of achieving explanatory adequacy. Chomsky (1964) defines three levels of adequacy for a linguistic theory, observational, descriptive and explanatory. An observationally adequate grammar presents the data correctly and a descriptively adequate grammar “specifies the observed data... in terms of significant generalizations that express underlying regularities in the language” (pp 28). Explanatory adequacy can “be interpreted as asserting that data of the observed kind will enable a speaker whose intrinsic capacities are as represented in the general theory to construct for himself a grammar that characterizes exactly this intuition.” In order to achieve explanatory adequacy, the Principles and Parameters approach attempts to reduce descriptive generalizations to two categories: language invariant principles (including parameters) and language particular specifications of parameter values. Under this approach, a syntactic feature of a language is due to setting a certain parameter to a particular value (Chomsky, 1995; Roberts and Holmberg, 2010). In this way, the interaction of principles and parameter values may give rise to all the linguistic phenomena, in the same way that atoms combined in different ways can give rise to different substances (Baker, 2001; Comrie, 1989). On the other hand, this approach also has typological implications since language typology and language variation may be expressed in terms of parameter setting. Under this approach, if one language is different from another regarding a property, then we may say that these two

languages set the parameter in question to two opposite values. Moreover, if each parameter value setting gives rise to a cluster of linguistic properties, an aspect of the poverty of the stimulus can also be explained: that is, by mastering a particular parameter value setting, children may acquire some other properties of their mother tongue, which may not be easily accessible (Roberts and Holmberg, 2010)<sup>1</sup>.

Under the guidance of the Principles and Parameters framework, a number of studies have been devoted to discovering basic parameters that may deduce a cluster of other properties of the language in question. One of the most important parameters that have been found is the Null Subject Parameter (Chomsky, 1981, 1982; Rizzi, 1982). The basic observation as reported in Rizzi (1982; 117) is that Null Subject Languages (NSLs), like Italian, allow phonetically null subjects to occur in tensed clauses while other languages (non-NLS languages), like English, do not:<sup>2</sup>

- (1) a. *e* verrà  
       will come  
       b. \**e* will come

Moreover, two other properties systematically correlate with the null subject property. The first is that Italian has a free process of subject inversion but English does not (Rizzi, 1982; 117):

- (2) a. *e* Verrà Gianni.  
       will come Gianni  
       b. \**e* will come Gianni

---

<sup>1</sup> On the other hand, it is noted that empirically it has been hard to find grammatical phenomena that cluster around a single parametric value (Hornstein, 2009: 164). For example, some studies that followed Rizzi (1982) found that the Null Subject Parameter still underpredicts the class of possible languages (Gilligan, 1987; Newmeyer, 2004, 2005; Safir, 1985).

<sup>2</sup> Rizzi uses *e* to represent the null subject, which is adopted in this chapter.

The second property is that while English shows COMP-trace effects, Italian does not (Rizzi, 1982; 117):

- (3) a. Chi<sub>i</sub> credi che t<sub>i</sub> verrà?  
 Who you-think that will-come?
- b. \*Who<sub>i</sub> do you think that e<sub>i</sub> will come?

These two languages exhibit a cluster of other properties, all of which are related to the subject of a tensed clause. Some works (Baker, 2001; Chomsky, 1981; Rizzi, 1982) propose that all of these different properties as exhibited by these two groups of languages are attributable to a parameter, that is, whether the subject of tensed clause can be null or not.

According to Rizzi (1982), the difference between Italian and English lies in the fact that languages vary with respect to the governing property of verbal inflection. The verbal inflection (INFL) in Italian has (clitic-like) pronominal properties and is specified with the feature [+pronoun]. Defined in this way, INFL in Italian can properly govern the null subject<sup>3</sup>. On the other hand, the verbal inflection in English does not have this property, and therefore does not allow a null subject. The property of INFL in Italian can also deduce the other two properties of Italian.

Assuming that subject inversion in Italian in (2) has the following structure (Rizzi, 1982: 132):

- (4) e<sub>i</sub> INFL<sub>i</sub> [<sub>VP</sub> [<sub>VP</sub> verrà] Gianni<sub>i</sub>]

---

<sup>3</sup> Rizzi (1982: 173) adopts the following definition of “proper government”:

$\alpha$  properly governs  $\beta$  iff  $\alpha$  governs  $\beta$  and

I.  $\alpha$  is a lexical category, or

II.  $\alpha$  is coindexed with  $\beta$ .

Government is defined in the following way:

“ $\alpha$  properly governs  $\beta$  iff  $\alpha$  c-commands  $\beta$  and no major category or major category boundary intervenes between  $\alpha$  and  $\beta$ .”

The null subject can be properly governed by INFL. In this structure, INFL is interpreted on par with the *dummy* presentational *there* in English. *Gianni* receives case from INFL according to the following convention (Rizzi, 1982: 133):

(5) In the structure

...dummy<sub>i</sub> ... NP<sub>i</sub>

where NP<sub>i</sub> is coindexed with and in the domain of dummy<sub>i</sub>, copy the Case of dummy<sub>i</sub> on NP<sub>i</sub>.

But if subject inversion took place in English, then the null subject would not be properly governed.

The absence of COMP-trace effects in (3) can also be deduced from the pronominal property of INFL. Rizzi suggests that the sentence in (3a) is derived in two steps: first, movement of the embedded subject to the right in the embedded cycle and then *wh*-extraction from the postverbal position (Rizzi, 1982: 147):

(6) [COMP chi<sub>i</sub>] credi [S<sub>i</sub> che e<sub>i</sub> INFL<sub>i</sub> verrà e<sub>i</sub>]

Under this derivation, the the preverbal trace is properly governed by INFL and the postverbal trace is governed by the verb. The same derivation can not be applied to English because the preverbal *e* cannot be properly governed by INFL. The difference between Italian and English regarding COMP-trace effects can also be deduced from the pronominal property of INFL.

The example of Null Subject Parameter illustrates the way that the Principles and Parameters theory works to explain how complex patterns of variations among languages can be reduced to minimal differences in the parametric choices (Rizzi, 1982). Following the same vein, subsequent works attempted to reveal more parameters, for example, the verb movement

parameter (Pollock, 1989), the configurationality parameter (Hale, 1983), the polysynthesis parameter (Baker, 1996), etc. In this sense, the works by Bošković and Gajewski, Watanabe, and Fukui, which are aimed at deriving the differences between two groups of languages from the parameter revolving around the presence or absence of definite articles, are a discovery of a new parameter.

## **4.2. Language differences due to definite articles**

In a series of works, Bošković and Gajewski (Bošković, 2005, 2008, 2010a, 2010b; Bošković and Gajewski, 2010) argue that languages can be divided into two groups, those that have definite articles and those that do not. Assuming that definite articles constitute DP (Bošković, 2008: 2, Fn2), they argue that the former group of languages have DP but the latter group of languages do not have DP. Moreover, they found out that these two groups of languages are different in terms of some properties, which can be reduced to the presence or absence of definite articles. A brief introduction of these systematic differences together with the explanation of how these differences may be deduced from the presence/absence of DP is as follows.

### **4.2.1. Generalizations proposed by Bošković**

#### **4.2.1.1. Extraction**

One generalization proposed by Bošković is concerned with the relation between extractability of adjective phrases or preposition phrases on the one hand and presence vs. absence of DP on the other hand.

(7) Only languages without articles may allow left branch extraction

For example, English does not allow extraction of prenominal adjectives but Serbo-Croatian, which does not have articles, allows left branch extraction.

- (8) a. \*Expensive/That<sub>i</sub> he saw [t<sub>i</sub> car]  
 b. Skupa<sub>i</sub> /Ta<sub>i</sub> je vidio [t<sub>i</sub> kola] (Serbo-Croatian)  
 expensive/that is seen car

(9) Only languages without articles may allow adjunct extraction out of NPs.

It is illustrated by the following contrast between English and Serbo-Croatian.

- (10) a. \*[From which city]<sub>i</sub> did Peter meet [<sub>NP</sub> girls t<sub>i</sub>]  
 b. [Iz kojeg grada]<sub>i</sub> je Ivan sreo [<sub>NP</sub> djevojke t<sub>i</sub>]  
 ‘From which city did Ivan meet girls?’

Bošković (2005, 2010a, 2010b) and Bošković and Gajewski (2010) present an account to explain how the generalizations in (7) and (9) can be deduced from the presence/absence of DP.

The explanation is based on the following assumptions<sup>4</sup>:

- (1) Adjective phrases and preposition phrases are adjuncts to NP, i.e. adjective phrases and preposition phrases have the structure of [<sub>NP</sub> AP/PP [<sub>NP</sub> NP]]
- (2) DP but not NP is a phase and therefore, XP can move out of DP only if XP moves to Spec DP first<sup>5</sup>.
- (3) The anti-locality hypothesis requires Move to cross at least one full phrasal boundary (not just a segment) (Grohmann, 2003)

In DP languages like English, adjective phrases must move to Spec DP since DP is a phase. But this kind of movement is banned because this movement only crosses a segment of

<sup>4</sup> Regarding why English does not allow extraction of adjectives but Serbo-Croatian does, Bošković offers another account on the assumption that adjectives in English take NP as the complement (Abney, 1987) and adjectives in Serbo-Croatian are located in the specifier of NP. Adjective extraction is banned in English because the adjective is not a constituent to the exclusion of NP in the structure of [<sub>DP</sub> D [<sub>AP</sub> A [<sub>NP</sub> N]]] in English.

<sup>5</sup> In Chomsky (2001), a phase is a relatively complete chunk of derivation that is relevant to the LF and PF interfaces. According to Phase Impenetrability Constraint (PIC) proposed by Chomsky, XP can move out of a phase only if XP moves to the specifier position of the phase first.

NP, which does not count as a phrasal boundary. In languages that do not have DP, the PIC/anti-locality problem does not apply when the adjunct AP/PP is moved.

- (11) a. English: [DP        D [NP [AP new][NP scissors]]]
- 
- b. Serbo-Croatian: [NP [AP new] scissors]
- 

#### 4.2.1.2. The interpretation of *most*

Bošković observes the following generalization regarding the interpretation of *most* across languages.

- (12) Only languages with articles allow the majority reading of *most*

- (13) a. Bill owns most Radiohead albums.

‘Bill owns more than half of the Radiohead albums.’

(the majority reading)

- b. Bill owns the most Radiohead albums.

‘Bill owns more Radiohead albums than any relevant alternative individual does.’

(the relative reading)

The same ambiguity also applies to German:

- (14) Die meisten Leute trinken Bier.

the most people drink beer.

- a. ‘More than half of the people drink beer.’ (the majority reading)

- b. ‘More people drink beer than any other drink.’ (the relative reading)

In Bošković and Gajewski’s explanation, *most* consists of *many* and *-est* (Hackl, 2009).

While *many* is a semantic type of  $\langle d, \langle \langle e, t \rangle, \langle e, t \rangle \rangle \rangle$ , *-est* has a semantic type  $\langle \langle d, \langle e, t \rangle \rangle, \langle e, t \rangle \rangle$ .

Due to type mismatch between *many* and *-est*, *-est* has to undergo Quantifier Raising. The two landing sites of *-est* give rise to the two readings of *most* in English:

- (15) a. Bill owns [DP [NP *-est*<sub>i</sub> [NP [AP t<sub>i</sub> many] [NP Radiohead albums]]]]  
 ‘Bill owns more than half of the Radiohead albums.’ (the majority reading)
- b. Bill [*-est*<sub>i</sub> [owns [DP the [NP [AP t<sub>i</sub> many] [NP Radiohead albums]]]]].  
 ‘Bill owns more Radiohead albums than any relevant alternative individual does.’  
 (the relative reading)

In languages that do not have DP, NP functions as the argument. Bošković and Gajewski adopt Chomsky (1986)’s assumption that adjunction to arguments is banned, therefore the movement of *-est* to adjoin to NP is not available, as illustrated by the example in English (16a). The only landing site for *-est* is beneath the subject, leading to the relative reading.

- (16) a. The majority reading  
 Bill owns [DP [NP *-est*<sub>i</sub> [NP [AP t<sub>i</sub> many] [NP Radiohead albums]]]]  

- b. The relative reading  
 Bill [*-est*<sub>i</sub> [owns [DP the [NP [AP t<sub>i</sub> many] [NP Radiohead albums]]]]].

#### 4.2.1.3. Scrambling

Bošković makes the following generalization regarding the relation between scrambling and definite articles:

- (17) Only languages without articles may allow long distance scrambling.

The typical form of long distance scrambling exists in Japanese. In Japanese, a *wh*-phrase can be interpreted only if it is within a CP headed by a + *wh* C (Harada, 1972), which is called the Wh-Q constraint (Saito and Fukui, 1998: 441):

- (18) a. [IPJohn-ga [CP[IPdare-ga sono hon -o katta] ka] siritagatteiru] (koto)  
 John-Nom who-Nom that book-Acc bought Q want-to-know  
 ‘[John wants to know [Q [who bought that book]]].’
- b. \*[IPDare-ga [CP[IP John-ga sono hon-o katta] ka] siritagatteiru] (koto)  
 who-Nom John-Nom that book-Acc bought Q want-to-know fact  
 ‘[Who wants to know [Q[John bought that book]]].’

A typical case of long distance scrambling is like (19b) (Saito, 2004: 145), where the *wh* phrase *dono hon-o* is out of the CP where it takes scope. The acceptability judgment indicates that (19b) is only slightly marginal and much better than (18b).

- (19) a. [IP John-ga [CP[IPMary-ga dono hon-o yonda] ka] siritagatteiru] (koto)  
 John-Nom Mary-Nom which book–Acc read Q want-to-know fact  
 ‘[John wants to know [Q [Mary read which book]]]’
- b. ?dono hon-o<sub>i</sub> [IPJohn-ga [CP[IPMary-ga t<sub>i</sub> yonda] ka] siritagatteiru] (koto)  
 which book–Acc<sub>i</sub> John-Nom Mary-Nom read Q want-to-know fact  
 ‘[Which book<sub>i</sub>, John wants to know [Q[Mary read t<sub>i</sub>]]]’

In Saito (1989), it is suggested that Japanese scrambling can be undone in LF. Then, the *wh*-phrase in (19b) can be within the embedded CP at LF, satisfying the Wh-Q constraint. This “LF undoing property” was later named the radical reconstruction property of scrambling.

Regarding how the presence/absence of DP may deduce the scramblability property, Bošković claims that this is due to the difference between Japanese and English since in English  $\theta$ -features must be checked overtly, in contrast to Japanese, where  $\theta$ -features can be checked covertly. He adopts the analysis of scrambling presented in Bošković and Takahashi (1998). According to them, scrambled constituents are base-generated in the surface non- $\theta$ -positions and

adjoin to a functional projection (i.e. IP) in the structure of clauses. The scrambled constituents undergo obligatory movement at LF to their  $\theta$ -positions in LF,  $\theta$ -features driving the movement. The derivation is unavailable in English, where  $\theta$ -features are strong, hence must be checked in overt syntax. This contrast between Japanese and English is connected to the DP/NP contrast. In Japanese, it is NPs which are base-generated in the surface non- $\theta$ -positions and adjoin to IP. If there were scrambling in English, it would be DPs which would adjoin to IP. According to Bošković (1997), adjunction of a functional projection (i.e. DP) to IP not motivated by checking of  $\theta$ -features is not possible but adjunction of a lexical category (i.e. NP) to IP not motivated by checking of  $\theta$ -features is possible.

#### 4.2.1.4. Negative raising

Bošković's next generalization is about the relation between negative raising and definite articles.

(20) Languages without articles disallow negative raising (NR), and languages with articles allow it.

An example of negative raising is given in (21), where negation can be taken either in the matrix clause or in the embedded clause:

(21) John does not believe she is smart.

The possibility where negation is taken in the embedded clause is confirmed by the strict clausemate Negative Polarity Items (NPIs). For example, *until* and *at least* in English are NPIs because they require negation and NPIs to occur in the same clause:

(22) a. John didn't leave/\*left until yesterday.

b. John hasn't/\*has visited her in at least two years.

(23) a. \*John didn't claim [that Mary would leave [<sub>NPI</sub> until tomorrow]]

- b. \*John doesn't claim [that Mary has visited her [<sub>NPI</sub> in at least two years]]

In the two examples below, *until* and *at least* can occur in the embedded clause although negation occurs in the matrix clause.

- (24) a. John didn't believe [that Mary would leave [<sub>NPI</sub> until tomorrow]]  
 b. John doesn't believe [that Mary has visited her [<sub>NPI</sub> in at least two years]]

In Bošković and Gajewski (2010), it is proposed that negative raising predicates (e.g. *believe*) have the following representation:

- (25) the  $(BELIEVE_a)$  = the sum of all the worlds compatible with a's beliefs

Moreover, they assume that these predicates also involve the following presupposition:

- (26) *Mary believes that p* presupposes that

All worlds in  $BELIEVE_{Mary}$  are p-worlds or no world in  $BELIEVE_{Mary}$  is a p-world

(Excluded Middle (EM) Presupposition)

Given that the EM is a presupposition, the negated form *Mary does not believe that p* also involves this presupposition:

- (27) *Mary does not believe that p*

Presuppose: All worlds in  $BELIEVE_{Mary}$  are p-worlds or no world in  $BELIEVE_{Mary}$  is a p-world

Therefore, the assertion (not all worlds in  $BELIEVE_{Mary}$  are p-worlds) and the presupposition in (27) together entail the following interpretation, where negation is interpreted in the embedded clause:

- (28) No worlds in  $BELIEVE_{Mary}$  is a p-world (i.e. Mary believes that not-p)

The generalization in (20) follows from the semantics of negative raising predicates (e.g. *believe*), and these predicates crucially use definite articles to construct a world-sum denoting predicate (25). Lack of a definite article prevents the construction of the semantics in (25).

#### 4.2.1.5. Double genitive arguments

(29) Languages without articles do not allow transitive nominals with two genitives.

Below are two examples of transitives with two genitives from English and German (Willim, 2000):

- (30) a. John's reconstruction of an 18<sup>th</sup>-century French village  
 b. Hannibals Zerstorung der Stadt  
 Hannibal's destruction of the city

Bošković's reasoning is that either NP or DP can provide one Spec position for the genitive. Languages that do not have DP can only license a single genitive, which is licensed by NP.

#### 4.2.1.6. Clitic doubling

(31) Only languages with articles may allow clitic doubling.

Typical examples of clitic doubling are as below:

- (32) a. Lo vimos a Juan  
 Him we-saw a Juan  
 'we saw Juan.' (Anagnostopoulou, 2005 : 520)
- b. Ana e<sub>i</sub> lexoi letrën<sub>i</sub> deri në fund.  
 Ana.the<sub>NOM</sub> 3<sub>s, CL, ACC</sub> read letter.the<sub>ACC</sub> until in end  
 'Ana read the letter until the end.' (Kallulli and Tasmowski, 2008: 2)

Bošković explains that there is an Agree relation between the clitic and the nominal phrase corresponding to the clitic, and this relation involves the D feature. This kind of Agree relation is not possible in languages that do not have articles.

#### 4.2.1.7. Sequence of Tense phenomena

Assuming a parallelism between DP and TP, Bošković argues that if languages without articles do not have DP, then it is predicted that these languages do not have TP, which is evidenced by the lack of the Sequence of Tense (SOT) phenomenon. Therefore, the following generalization follows:

(33) Languages without articles do not show SOT.

The representative example of SOT phenomena is the following sentence. The stative predicate *being ill* is embedded under a past-tensed complement clause, and this embedded predicate is temporally simultaneous with the matrix predicate *say* (Enç, 1987; Ogihara, 1989:71-72).

(34) John said that Mary was ill.

#### 4.2.1.8. Number morphology and radical *pro*-drop

(35) Number morphology may not be obligatory only in NP languages

By this, Bošković means that at least some nouns in NP languages can be interpreted as plural in the absence of plural morphology.

(36) Radical *pro*-drop is possible only in NP languages.

By radical *pro*-drop, Bošković means productive argumental *pro* drop of both subjects and objects in the absence of rich verbal agreement.

Bošković gives a unified account of the relation of these two generalizations ((35) and (36)) to presence/absence of DP by adopting the following condition:

(37) The number feature of D must be morphologically realized.

According to him, this condition captures the generalization in (35) by requiring morphological realization of number morphology in DP languages, leaving it up to the morphological properties of the language/relevant lexical items to determine whether number morphology will be realized

in NP languages. In the case of phonologically null *pro* as in Spanish, number morphology cannot be realized on either D or N. To be consistent with (37), rich verbal morphology is present in Spanish, giving the appearance of licensing *pro*-drop by verbal morphology. The “licensing” condition is irrelevant in NP languages because these languages do not have the DP layer.

#### 4.2.1.9. Superiority effects

(38) Multiple-*wh* fronting (MWF) languages without articles do not show superiority effects.

The contrast between Bulgarian (39a) and Serbo-Croatian (39b) illustrates this generalization. In both languages, multiple *wh* phrases must move overtly to the front of the sentence. Bulgarian, which has articles, shows superiority effect as the *wh* subject must precede the *wh* object (39a). On the other hand, Serbo-Croatian, which does not have articles, the *wh* subject does not have to precede the *wh* object (39b).

- (39) a. Koj kogo viñda/\*Kogo koj viñda? (Bulgarian)  
       who whom sees
- b. Ko koga vidi/Koga ko vidi? (Serbo-Croatian)  
       who whom sees

According to Bošković, MWF languages that show superiority effect move all *wh* phrases to Spec CP while those MWF languages that do not show superiority effect move *wh* phrases to a lower position (Bošković, 1999, 2002). This difference arises because the D feature is crucially involved in moving the *wh* phrase to Spec CP based on the assumption of the DP/CP parallelism.

#### 4.2.1.10. Island sensitivity of head-internal relative clauses

(40) Head-internal relatives display island sensitivity in languages without articles, but not in languages with articles.

Both Lakhotā (41a) and Japanese (41b) have head-internal relative clauses (HIRC) (Watanabe, 2004:64, 66).

- (41) a. [[Mary owiža wa kaḡe] ki] he ophewathu.  
 Mary quilt a make the DEM I-buy  
 ‘I bought the quilt that Mary made.’
- b. John-wa [<sub>NP</sub>[Mary-ga ringo-o kattedkita]-no]-o tabeta  
 John-Top Mary-Nom apples-Acc bought-NM-Acc ate  
 ‘John ate the apples that Mary bought.’

The difference between the two languages is that in Lakhotā, which has articles, one HIRC can be embedded inside another HIRC (42) but this is not possible in Japanese (43) (Watanabe, 2004: 63-64).

- (42) [[Wichota wowapi wa yawa pi cha] ob wo?uglaka pi ki] he L.A. Times e.  
 many-people paper a read PL ind with we-speak PL the that L.A. Times be  
 ‘The newspaper that we talk to many people who read (it) is the L.A. Times.’
- (43) \*[John-ga [MIT-no gakusei-ga subarashii ronbun-o kaita no]-o  
 John-Nom MIT-Gen student-Nom excellent paper-ACC wrote C°-Acc  
 posuto-doku-toshite saiyoushite-ita no]-no shuppan-ga okureta.  
 post-doc-as adopted-had C°-Gen publish-Nom was-delayed  
 ‘Publication of an excellent paper which John had hired as a post-doc an MIT  
 student who wrote (it) was delayed.’

Bošković adopts Bonneau’s (1992) proposal that in Lakhotā, the D that comes with an HIRC is the unselective binder of its head. Since the D is missing in Japanese, HIRCs in Japanese employ movement/feature checking, which is subject to locality.

#### 4.2.1.11. Interpretation of possessives

(44) Possessors may induce an exhaustivity presupposition only in DP languages.

It is observed by Partee (2006) that the phrase in English (45a) presupposes that Zhangsan has exactly three sweaters. On the other hand, there is no such exhaustivity presupposition in the Chinese counterpart (45b).

- (45) a. Zhangsan's three sweaters  
 b. Zhangsan de [san jian maoxianyi]  
 Zhangsan de<sub>POSS</sub> three Cl sweater  
 'Zhangsan's three sweaters'

Bošković takes Lyons (1999)'s explanation that DP projection is responsible for the presupposition of uniqueness/exhaustivity.

#### 4.2.1.12. Some unexplained generalizations

There are several other generalizations listed in (Bošković, 2010a, 2010b) but Bošković does not attempt to give an analysis.

The first generalization is stated as below:

(46) Elements undergoing focus movement are subject to a verb adjacency requirement only in DP languages.

What Bošković means is that in languages that require movement of focalized elements, the focalized argument has to be adjacent to the verb. Bulgarian, which has articles, requires that the focalized argument be adjacent to the verb but Serbo-Croatian, which does not have articles, does not have this requirement (words in capital stand for focus).

- (47) a. Bulgarian  
 \*KARTINATA Ivan podari na Maria.  
 painting-the (foc) Ivan give-as-a-present-PT.3P.SG to Maria  
 ‘Ivan gave Maria the painting as a present.’
- b. KARTINATA podari Ivan na Maria.  
 painting-the (foc) give-as-a-present-PT.3P.SG Ivan to Maria

- (48) Serbo-Croatian  
 JOVANA (Petar) savjetuje.  
 Jovan-ACC Petar-NOM advises  
 ‘Petar is advising Jovan.’

Another generalization is concerned with the morphology of negative constituents:

- (49) Negative constituents must be marked for focus in NP languages.

- (50) n+i+ko i+ko  
 neg+even+who even+who  
 ‘noone/anyone’ (Serbo-Croatian)

Another generalization is about scope ambiguity.

- (51) Someone loves everyone.

It is observed that *everyone* takes wide scope over *someone*, which is called the inverse scope reading. In languages that do not have DP, this reading is not available.

- (52) Inverse scope is unavailable in NP languages in examples like (51).

Bošković observes the following generalization:

- (53) Obligatory nominal classifier systems are available only in NP languages.

Another generalization is concerned with the availability of the negative concord reading. Bošković uses Italian as an example. In (54a), when two negative elements (one is a simple negative constituent *non* and the other a complex negative constituent *nessuno/nessuno studente*) co-occur in the same sentence, the whole sentence is still negative. When both negative constituents are complex as in (54b), which contains *nessuno studente* and *nessun libro/niente*, the whole sentence resolves to a positive reading.

- (54) a. Non ho visto nessuno/nessuno studente.  
       NEG have seen nobody/no student  
       ‘I didn’t see anybody/any students.’ (negative concord only)
- b. Nessuno studente ha letto nessun libro/niente.  
       no student has read no book/nothing (double negation only)

Bošković reports that other languages that have DP also behave like Italian, where a sentence that contains multiple complex negative constituents does not have a negative reading while in NP languages, a sentence that contains multiple complex negative constituents still has a negative reading, therefore the following observation:

- (55) The negative concord reading may be absent with multiple complex negative constituents only in DP negative concord languages.

#### 4.2.2. Testing Chinese regarding Bošković’s generalizations

Given the generalizations summarized in Section 1, this section will test Chinese on these generalizations. Bošković does mention Chinese when he introduces some of the generalizations although he does not release details about what specific tests that he has used for examining Chinese. He reports that Chinese patterns with languages that have no DP regarding some generalizations. Please refer to Appendix C to see what generalizations Bošković has tested

Chinese on. On closer examination, the behavior of Chinese as reported by Bošković does not conform to the intuition of Chinese native speakers who I have consulted. Therefore, in order to get a more complete picture of how Chinese behaves regarding these generalizations, I tested Chinese on all the relevant generalizations that Bošković has given a detailed account for. On the other hand, there are a few generalizations (as listed in Section 4.2.1.12) whose links to DP are not explained by Bošković. Meanwhile, a few of the generalizations that he has proposed do not apply to Chinese, for example, the superiority effects of multiple *wh* fronting<sup>6</sup> and island sensitivity of head internal relative clauses<sup>7</sup>. Therefore, the following section will test Chinese on only those generalizations that have an explanation and apply to Chinese.

#### 4.2.2.1. The experiment testing extraction of modifiers in Chinese

In order to test whether Chinese allows extraction of modifiers, I did an acceptability judgment experiment. The experiment involves a three by two design. The first factor is what kind of modifier is extracted, be it adjectives with no *de* attached, adjectives with *de* attached, or prepositional phrases. The second factor is whether the modifier is extracted, either the whole nominal phrase is moved (therefore no extraction of modifier) or only the modifier is moved (extraction of modifier). Below is a sample set of the six conditions:

(56) a. adjectives without *de* / no extraction of modifier

Hong hua, ta kanjian le.

red flower he see Perf.

---

<sup>6</sup> In Chinese, multiple *wh* phrases do not move overtly, therefore, the generalization in (38) does not apply to Chinese (p.c. with Bošković).

(i) Zhangsan xiang-zhidao shui mai le shenme  
 Zhangsan wonder who buy Perf. what  
 ‘Zhangsan wonders who bought what.’

<sup>7</sup> In Section 3, I report a study by Zhang (2008), which claims that Chinese has head internal relative clauses, which are not sensitive to island constraint.

- b. adjectives without *de*/extraction of modifier  
 Hong, ta kanjian le hua.  
 red he see Perf. flower
- (57) a. adjectives with *de* / no extraction of modifier  
 Hong hong de hua, ta kanjian le.  
 red red de flower he see Perf
- b. adjectives with *de* /extraction of modifier  
 Hong hong de, ta kanjian le hua  
 red red de he see Perf. flower
- (58) a. preposition phrases/ no extraction of modifier  
 Zhuozi shang de hua, ta kanjian le  
 table on de flower he see Perf.
- b. preposition phrases/extraction of modifier  
 Zhuozi shang de, ta kanjian le hua  
 table on de he see Perf. flower

Twelve sets of stimuli across the six conditions were distributed among six lists in a Latin Square design. Each participant saw one of the lists intermixed with thirty six fillers in a pseudorandom order. All the thirty-six filler sentences involved the manipulation of the relative ordering of two modifiers before a noun. In some of the sentences, the ordering was acceptable but in some others, the ordering was not acceptable. The ratio of the acceptable to unacceptable among all the stimuli was 5: 4. Participants were asked to rate the acceptability of the stimuli along a 1 to 7 scale (1 means that the sentence is not acceptable at all and 7 means that the sentence is the most acceptable). Altogether twenty-four Mandarin native speakers participated

in the experiment as volunteer subjects. They were divided into six groups and each group did one of the six lists of the stimuli. The experiment was implemented on Google Docs, with the participants rating presented stimuli.

### **The predictions**

If Chinese allows extraction, then the sentences which involve extraction of modifiers as in (56b), (57b) or (58b), should not be significantly different from the sentences which do not involve extraction of modifiers as in (56a), (57a) and (58a) in terms of acceptability.

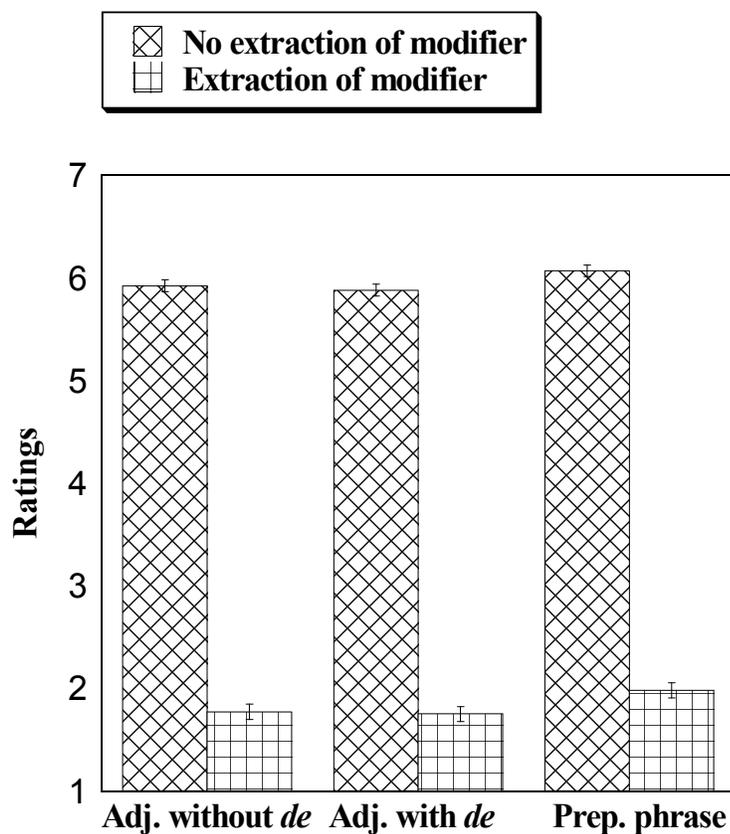
If Chinese does not allow extraction, then the sentences which involve extraction of modifiers as in (56b), (57b) or (58b) should be significantly lower than the sentences which do not involve extraction of modifiers as in (56a), (57a) and (58a) in terms of acceptability.

### **The results**

Mean acceptability ratings in all conditions were entered into a repeated-measures ANOVA, with modifier type (adjectives without *de*, adjectives with *de*, preposition phrases) and (no) extraction of modifier (no extraction of modifier, extraction of modifier) as within-subject factors. There was no main effect of modifier type,  $F_1(2, 46) = 1.91$ ,  $p = 0.16$ ;  $F_2(2, 22) = 3.35$ ,  $p = 0.054$ . There was a main effect of whether the modifier is extracted,  $F_1(1, 23) = 54.98$ ,  $p < 0.001$ ;  $F_2(1, 11) = 21.94$ ,  $p < 0.001$ . There was no significant interaction effect,  $F_1(2, 46) = 1.22$ ,  $p = 0.305$ ;  $F_2(2, 22) = 0.85$ ,  $p = 0.442$ . Pairwise comparisons indicate several contrasts. First, the mean acceptability rating of extraction of adjectives with no *de* (56b) is significantly lower than that of the condition where adjectives with no *de* are not extracted (56a),  $t_1(1,23) = 5.2$ ,  $p < 0.001$ ;  $t_2(1,11) = 25.57$ ,  $p < 0.001$ . Second, the mean acceptability rating of extraction of adjectives with *de* (57b) is significantly lower than that of the condition where adjectives with *de* are not extracted (57a),  $t_1(1,23) = 35.23$ ,  $p < 0.001$ ;  $t_2(1,11) = 24.57$ ,  $p < 0.001$ . Third, the mean acceptability

rating of extraction of preposition phrases (58b) is significantly lower than that of the condition where preposition phrases are not extracted (58a),  $t_1(1,23)=28.50$ ,  $p<0.001$ ;  $t_2(1,11)=36.34$ ,  $p<0.001$ .

Table 1: The acceptability ratings under different conditions<sup>8</sup>



Overall, the experiment indicates that, like English, Chinese does not allow extraction of modifiers, be they adjectives (with *de* or without *de*) or prepositional phrases. According to Bošković's generalization in (7) regarding the relation between extraction of modifiers and DP, Chinese is a language with DP.

<sup>8</sup> Participants were consistent with their ratings on the stimuli in these six conditions. For all participants, their ratings of the sentences that involve extraction of modifiers were lower than the ratings of sentences that do not involve extraction of modifiers. Variances among subjects regarding their ratings in different conditions are listed in Appendix D.

#### 4.2.2.2. The experiment testing the interpretation of quantifiers in Chinese

In Chinese, there are three quantifiers that are close to the meaning of *most* in English. One of them is *zuiduo*, which consists of *zui*, meaning “–est” and *duo*, meaning “many”. The second is *dabufen* and the third is *daduoshu*, which are both translated into English as “most” (Lin, 1998; Liu, 1997). To test whether they are ambiguous between the relative reading and the majority reading, I adopt the truth value judgment paradigm (Crain and Thornton, 1998), testing the interpretations of these three quantifiers. Specifically, I will test their interpretation in the following sentences.

- (59) a. Yuehan du le zuiduo de shu  
           John read Perf. most de book
- b. Yuehan du le dabufen de shu  
           John read Perf. most de book
- c. Yuehan du le daduoshu de shu  
           John read Perf. most de book

The basic task of this experiment is to ask participants to judge whether each of the three sentences is true or false under each of the following two scenarios:

- (60) a. Scenario 1

John, Mary and Peter like reading books in the library of their school. There are one hundred books in the library. John has read seventy of them. Mary has read eighty of them and Peter has read ninety of them.

b. Scenario 2

John, Mary and Peter like reading books in the library of their school. There are one hundred books in the library. John has read thirty of them. Mary has read twenty of them. Peter has read only ten of them.

In Scenario 1 of (60), John has read more than half of the books stored in the library, although the number of books that John has read is not the largest among all the three persons mentioned. This scenario corresponds to the majority reading of *most*. In Scenario 2 of (60), the number of books that John has read is the largest among all the three persons compared, although this number does not exceed half of the books stored in the library. This scenario corresponds to the relative reading of *most*. If any of the three statements in (59) has only the majority reading, then it should be judged as true under Scenario 1 but false under Scenario 2. If any of the three statements in (59) has only the relative reading, then it should be judged as false under Scenario 1 but true under Scenario 2.

### **The procedure**

This is a three by two experiment. The first factor is the type of quantifiers, *zuiduo*, *dabufen* and *daduoshu*. The second factor is the two scenarios, corresponding to the majority and the relative readings, respectively. Twelve sets of stimuli across the six conditions were distributed among six lists in a Latin Square design. Each participant saw one of the lists intermixed with thirty six fillers in a pseudorandom order. The fillers involved the same task as participants decided on whether a sentence is true or not under a scenario. In half of these fillers, the statement was true under the corresponding scenario so the correct response should be Yes. In the other half of them, the statement was false under the corresponding scenario so the correct response was No. Twenty-four Mandarin native speakers participated in the experiment as

volunteer subjects. They were divided into six groups and each group did one of the six lists of the stimuli. In the experiment, each trial included a description of a scenario following by the statement. Both the description of the scenario and the statement were presented in a Powerpoint slide. At the end of the slide, participants were required to choose either Yes or No to decide the truth value of the statement under the corresponding scenario.

### **Predictions**

The dependent variable is the proportion of the “yes” responses to the tested statement. The independent variables are the six conditions that result from the interaction of two factors.

If any of the three quantifiers has the majority reading only, it is predicted that proportion of “yes” responses under Scenario 1 of (60) will be significantly higher than that under Scenario 2 of (60).

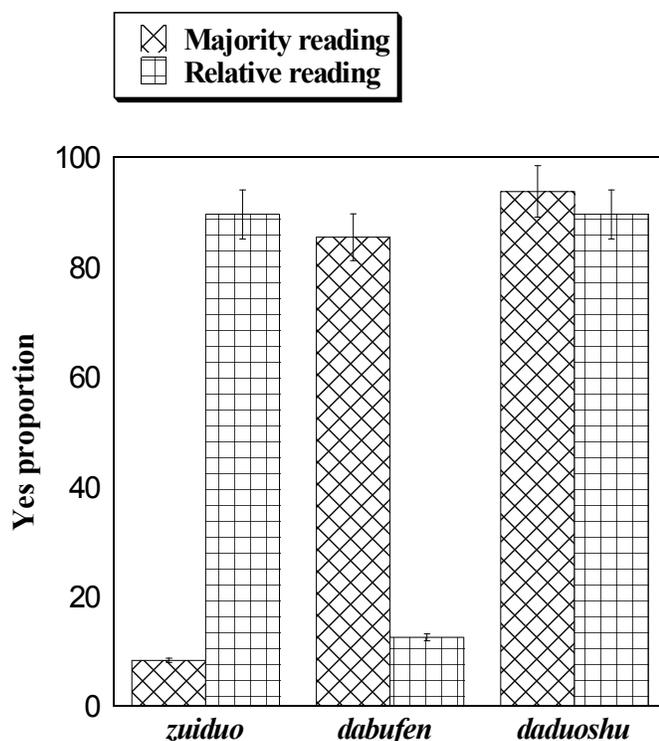
If any of the three quantifiers has the relative reading only, it is predicted that the proportion of “yes” responses will be significantly lower under Scenario 1 of (60) than that under Scenario 2 of (60).

### **The results**

The proportion of “yes” responses under each condition were entered in ANOVA, with quantifier type (*zuiduo*, *dabufen*, *daduoshu*) and two readings (majority, relative) as within-subject factors. There was a significant main effect of quantifier type,  $F_1(2, 46)=115.41$ ,  $p < 0.001$ ;  $F_2(2, 22)=138.34$ ,  $p < 0.001$ . There was no significant main effect of two readings,  $F_1(1, 23)=0.12$ ,  $p=0.732$ ;  $F_2(1, 11)=0.07$ ,  $p < 0.795$ . There was a significant interaction effect,  $F_1(2, 46)=115.50$ ,  $p < 0.001$ ;  $F_2(2, 22)=146.82$ ,  $p < 0.001$ . Pairwise comparisons reveal the following contrasts. First, the proportion of “yes” responses for the quantifier *zuiduo* under the relative reading is significantly higher than that for *zuiduo* under the majority reading,  $t_1(1,$

23)=13.83,  $p < 0.001$ ;  $t_2(1, 11) = 14.94$ ,  $p < 0.001$ . This indicates that the dominant interpretation of *zuiduo* is the relative reading. Second, the proportion of “yes” responses for the quantifier *dabufen* under the majority reading is significantly higher than that for *dabufen* under the relative reading,  $t_1(1, 23) = 8.58$ ,  $p < 0.001$ ;  $t_2(1, 11) = 12.19$ ,  $p < 0.001$ . This means that the dominant interpretation of *dabufen* is the majority reading. Third, the proportion of “yes” responses for the quantifier *daduoshu* under the majority reading is not significantly different from that for *daduoshu* under the relative reading,  $t_1(1, 23) = 0.62$ ,  $p = 0.539$ ;  $t_2(1, 11) = 0.692$ ,  $p = 0.504$ . This indicates that the quantifier *daduoshu* is ambiguous between the two readings.

Table 2: The Yes proportions under different conditions<sup>9</sup>



<sup>9</sup> Regarding the interpretation of the quantifier *zuiduo*, all of them showed higher Yes proportions for the relative reading than for the majority reading. Regarding the interpretation of the quantifier *dabufen*, all the subjects except one subject showed higher Yes proportions for the majority reading than for the relative reading. Regarding the interpretation of the quantifier *daduoshu*, all the subjects showed high Yes proportions for both readings. Individual variances for the three quantifiers are in Appendix D.

The experiment indicates that one quantifier in Chinese, *daduoshu*, behaves like *most* in English, since *daduoshu* is ambiguous between the majority reading and the relative reading. According to Bošković's explanation of the relation between DP and the majority reading of *most* in English, it is likely that Chinese has the DP projection on top of NP so that the superlative morpheme can adjoin either to NP or to a position underneath the subject. The presence of a superlative morpheme in the quantifier *daduoshu* is supported by the fact that it cannot be modified by the superlative adverb *zui* 'most'. To sum up, the quantifier *daduoshu* may be considered as being composed of a morpheme meaning 'many' and a superlative morpheme meaning '-est':

(61) Yuehan du le daduoshu de shu.

John read Perf. most de book

a. The majority reading

Zhangsan read [<sub>DP</sub> [<sub>NP</sub> -est<sub>i</sub> [<sub>NP</sub> [<sub>AP</sub> t<sub>i</sub> many] [<sub>NP</sub> books]]]]

b. The relative reading

Zhangsan [-est<sub>i</sub> [read [<sub>DP</sub> [<sub>NP</sub> [<sub>AP</sub> t<sub>i</sub> many de] [<sub>NP</sub> books]]]]].

One note here is regarding how the majority reading of *dabufen* is derived. One speculation is that the majority reading is derived through the morphemes contained in *dabufen* as it consists of two morphemes, *da* 'big' and *bufen* 'portion'. Compositionally, the whole word means a very big portion, which implies more than half.

#### 4.2.2.3. Testing long distance scrambling in Chinese

In Chinese, a *wh* phrase cannot be outside the interrogative CP where the *wh* phrase should take scope. In the example below, the matrix verb *xiang-zhidao* 'wonder' must take an

interrogative embedded CP, where the *wh* phrase *shui* ‘who’ takes scope. In this respect, Chinese is similar to the Wh-Q constraint in Japanese.

- (62) a. Zhangsan xiang-zhidao shui mai le na ben shu  
 Zhangsan wonder who buy Perf. that CI book  
 ‘Zhangsan wonders who has bought that book.’
- b. \*Shui Zhangsan xiang-zhidao mai le na ben shu  
 who Zhangsan wonder buy Perf. that CI book  
 ‘What does Zhangsan wonder has bought that book.’

But in contrast to Japanese, the counterpart of (19b) is equally bad as (62b):

- (63) a. Zhangsan xiang-zhidao Lisi mai le na ben shu  
 Zhangsan wonder Lisi buy Perf. which CI book  
 ‘Zhangsan knows that Lisi has bought which book.’
- b. \*Na ben shu Zhangsan xiang-zhidao Lisi mai le  
 which CI book Zhangsan wonder Lisi buy Perf.  
 ‘Which book, Zhangsan wants to know Lisi bought.’

In conclusion, Chinese does not allow long distance scrambling.

#### 4.2.2.4. Testing whether Chinese allows negative raising

To test whether Chinese allows NR, I use *renhe* ‘any’<sup>10</sup>, which behaves like an NPI (Wang and Hsieh, 1996). For example, it is observed that *renhe* and negation must occur in the same clause:

<sup>10</sup> In Chinese is another NPI *shenme* ‘what’. Neither *shenme* nor *renhe* appears in affirmative sentences (Kuo, 2003: 26):

- (i) a. Zhangsan meiyou chi renhe dongxi.  
 Zhangsan not-have eat any thing  
 ‘Zhangsan did not eat anything.’

- (64) a. Ta shengcheng Zhangsan mei<sup>11</sup> zuo guo renhe huai shi  
 he claim Zhangsan not do Perf. any bad thing  
 ‘He claims that Zhangsan hasn’t done any bad thing.’
- b. \*Ta mei shengcheng Zhangsan zuo guo renhe huai shi  
 he not claim Zhangsan do Perf. any bad thing

When the verb in the matrix clause in (64) is replaced by *xiangxin* ‘believe’, *renhe* and negation can be separated by a tensed clause boundary:

- (65) a. Ta xiangxin Zhangsan mei zuo guo renhe huai shi  
 he believe Zhangsan not do Perf. any bad thing  
 ‘He believes that Zhangsan has not done any bad thing.’
- b. Ta bu xiangxin Zhangsan zuo guo renhe huai shi  
 he not believe Zhangsan do Perf. any bad thing  
 ‘He does not believe that Zhangsan has done any bad thing.’

The acceptability of both sentences in (65) indicates that Chinese allows NR.

- 
- b. \*Zhangsan chi le renhen dongxi.  
 Zhangsan eat-PF any thing  
 ‘Zhangsan ate anything.’
- c. Zhangsan bu gan cong zheli nazhou shenme.  
 Zhangsan not dare from here take-away what  
 ‘Zhangsan dare not take away something/anything from here.’
- d. \*Zhangsan gan cong zheli nazhou shenme.  
 Zhangsan dare from here take-away what

This study does not use *shenme* as an NPI because the distribution of *shenme* is much broader than that of *renhe*. For example, while *renhe* can not appear in tentative or uncertain contexts, *shenme* can:

- (ii) a. \*Ta dagai xihan renhe dongzi.  
 he probably like any thing
- b. Ta dagai xihuan shenme.  
 He probably like what  
 ‘He probably likes something.’  
 (Kuo, 2003: 46)

<sup>11</sup> In Chinese, both *mei* and *bu* mean negation.

#### 4.2.2.5. Testing double genitive arguments in Chinese

The example below indicates that Chinese does allow a transitive nominal to take two genitives:

- (66) *deguo de dui bolan de zhanling*  
 Germany de dui<sup>12</sup> Poland de occupation  
 ‘Germany’s occupation of Poland’

In this example, the two phrases *deguo de* ‘Germany’s’ and *dui bolan de* ‘’ are genitive phrases that function as the agent and the theme of the derived nominal *zhanling* ‘occupation’.

#### 4.2.2.6. Testing double clitics in Chinese

It is reported by some studies (Chiu, 1995; Ting, 2003) that in Chinese, a particle *suo* can function as a clitic that has the same index as the object of a transitive verb inside a relative clause:

- (67) *Lisi suo<sub>i</sub> mai de [na ben shu]<sub>i</sub>*  
 Lisi suo buy de that CI book  
 ‘the book that Lisi bought’

The occurrence of *suo* is similar to Albanian, where clitic doubling occurs in relative clauses:

- (68) *lexova një libër që e mora në bibliotekë*  
 read-I a book that 3<sub>s,CL,ACC</sub> got-I in library  
 ‘I read a book that I got from the library.’ (Kallulli, 2008: 241)

#### 4.2.2.7. Testing Sequence of Tense phenomena in Chinese

It is reported that in Chinese, the embedded stative predicate is simultaneous with the past-tensed matrix verb (Lin, 2006: 24):

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<sup>12</sup> As explained in Chapter 5, I keep the word *dui* unglossed.

- (69) Ganggang zai dengdai miantan deshihou Yuehan shuo  
 just-now Prog wait-for interview while John say  
 ta hen jinzhang  
 he very nervous  
 ‘While John was waiting for the interview a moment ago, he said he was very nervous.’

This example indicates that Chinese exhibits SOT phenomena.

#### 4.2.2.8. Testing radical *pro*-drop in Chinese

Regarding the generalization in (36), it is observed that Chinese allows deletion of both the subject and object pronouns (Huang, 1989: 187):

- (70) Zhangsan kanjian Lisi le ma  
 Zhangsan see Lisi Asp Q  
 ‘Did Zhangsan see Lisi?’
- a. (ta) kanjian (ta) le  
 he see him Perf.  
 ‘(He) saw (him).’
- b. wo xiang (ta) kanjian (ta) le  
 I think he see him Perf.  
 ‘I think that he saw him.’

In terms of radical *pro* drop, it seems that the example in (70) indicates that Chinese patterns with NP languages and does not have DP according to Bošković’s explanation about the relation between radical *pro* drop and NP/DP distinction. But at the same time, the fact that Chinese allows radical *pro*-drop is compatible with another explanation that does not refer to the DP/NP

distinction but to the morphology of pronouns (Neeleman and Szendroi, 2007). The question that arises is whether Chinese *pro* drop is due to the lack of DP or to its morphology of pronouns. I will first introduce Neeleman and Szendroi's (2007) analysis briefly.

Based on an examination of some languages, Neeleman and Szendroi make the generalization that radical *pro* drop requires agglutinating morphology on pronouns. For example, case morphology in Japanese is agglutinating because the pronominal stem *kare* in (71a) is accompanied by separate case morphemes (-*ga* and -*o*). Pronouns in Chinese are also agglutinating since the plural suffix *-men* is attached to singular pronouns like *ta* 'him' (Neeleman and Szendroi, 2007: 679):

- (71) a. Kare-ga kare-o settokusuru. (Japanese)  
           he-NOM he-ACC persuade  
           'He persuades him.'
- b. Ta-men kanjian ta le. (Chinese)  
           he-PL     see     he Perf.  
           'They saw him.'

On the other hand, English pronouns are fusional for case, as '*He saw him*' so pronouns cannot be omitted.

Furthermore, they argue that the correlation between agglutinating morphology of pronouns and the availability of radical *pro* drop can be derived from the following three independently motivated assumptions:

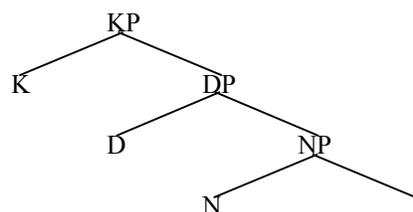
- (72) a. Null arguments are regular pronouns that fail to be spelled out at PF  
           (Perlmutter, 1971);
- b. Pronouns correspond to chunks of structure larger than D or N (Weerman

and Evers-Vermeul, 2002);

- c. The Elsewhere Principle (Kiparsky, 1973), which consists of the following rules:
- (i) All else being equal, a phonological realization of a category C takes priority over a phonological realization of the categories contained in C.
  - (ii) All else being equal, a phonological realization of a category C that spells out more of C's features takes priority over a phonological realization that spells out fewer features.
  - (iii) Optionality results if the phonological realization of a category C spells out fewer of C's features than the phonological realization of the categories contained in C.

Moreover, they adopt the following structure in order to discuss the internal structure of pronouns, where KP represents Case Phrase (Bittner and Hale, 1996; Neeleman and Szendroi, 2007: 680; Neeleman and Weerman, 1999):

(73)



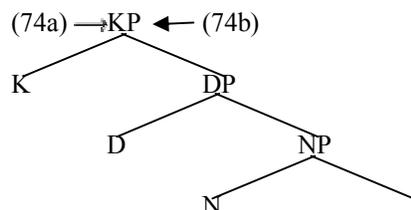
To illustrate their explanation, they use Japanese and English pronouns, which are supposed to have the following spell-out rules (Neeleman and Szendroi, 2007: 687):

- (74)
- a.  $[_{KP} +p, -a] \rightarrow \Phi^{13}$  (radical *pro* drop)
  - b.  $[_{KP} +p, -a, 3, SG, M, ACC] \rightarrow /him/$  (English)
  - c.  $[_{NP} +p, -a, 3, SG, M] \rightarrow /kare/$  (Japanese)
  - d.  $[_K ACC] \rightarrow /o/$  (Japanese)

<sup>13</sup> They use [+p(ronominal), -a(naphoric)] to indicate that KP is a pronoun.

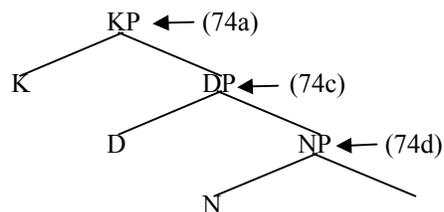
Suppose that both (74a) and (74b) are possible spell-out rules for English pronouns and both rules target the top node in (73):

(75)



According to the second rule of the Elsewhere Principle, (74b) blocks the operation of (74a) since (74b) realizes more features (i.e., Case and  $\phi$ -features) than (74a) does. Therefore, pronouns in English can never be spelled out as *pro* drop. Suppose, on the other hand, that (74a), (74c) and (74d) are possible spell-out rules for Japanese pronouns and these rules target different locations within the structure in (73):

(76)



According to the Elsewhere Principle, neither (74a) nor (74c) blocks each other. On the one hand, (74a) takes priority over (74c) because the former realizes a containing category instead of a contained category, so is more compliant with the first rule of the Elsewhere Principle. On the other hand, (74c) takes priority over (74a) because the former realizes more features (i.e.,  $\phi$ -features) than the latter and is more compliant with the second rule of the Elsewhere Principle. As a result, neither (74a) nor (74c) blocks each other. Therefore, radical *pro* drop rule in (74a) can be realized.

Although Neeleman and Szendroi do not predict that languages that allow radical *pro* drop should be agglutinating for case, these languages may also have separate endings for other nominal features. They claim that Chinese is such an example since in Chinese, the plural morpheme *-men* can be attached to singular pronouns to make them plural (Neeleman and Szendroi, 2007: 689):

- (77) a. [NP +p, -a, 3, SG] → /ta/<sup>14</sup> (Chinese)  
 b. [NP +p, -a, 3, PL] → /ta-men/

According to them, the Chinese has agglutinating morphology for number, which makes *pro* drop in Chinese possible.

It is not conclusive that Chinese *pro* drop is due to the lack of DP as Bošković claims or due to the agglutinating morphology of pronouns as Neeleman and Szendroi claim. However, if the predictions of these two hypotheses are tested against more languages, it may be possible to tease apart these two hypotheses. Basically, the generalization of (36) made by Bošković predicts that if a language allows *pro* drop, it should not have DP, which are typically headed by definite articles. The hypothesis by Neeleman and Szendroi (2007) predicts that if a language allows *pro* drop, this language has the agglutinating morphology for nominal features (like case or number). To test the predictions of these two hypotheses, I use Cheke Holo, which allows radical *pro*-drop (Neeleman and Szendroi, 2007: 678).

- (78) Wasi gu pohe are.  
 wash EMPH clothes those  
 ‘[She] washes the clothes.’

Cheke Holo does have definite articles (White, et al, 1988: xxii):

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<sup>14</sup> The pronoun *ta* has several counterparts in English. It may correspond to *he, him, she, her* and *it*.

- (79) a. hore ia  
       canoe the  
       ‘the canoe’
- b. hore ra  
       canoes the  
       ‘the canoes’

At the same time, this language has agglutinating morphology for number, with some of the spell-out rules for pronouns as below (Neeleman and Szendroi, 2007: 704).:

- (80) [dual] → /pa/            [trial] → /tilo/            [PL] → /hati/; /tilo/  
       [NP +p, -a, 1, SG] → /iara/    [NP +p, -a, 1, PL, INCL] → /ta-/  
       [NP +p, -a, 2, SG] → /iago/    [NP +p, -a, 1, PL, EXCL] → /ge-/

The case of Cheke Holo works against the prediction of Bošković’s generalization in (36) but supports the prediction of Neeleman and Szendroi’s generalization that radical *pro* drop requires agglutinating morphology on pronouns. Since Bošković’s generalization in (36) is only a strong tendency at most, the presence of radical *pro* drop in Chinese does not necessarily mean that Chinese does not have DP.

#### 4.2.2.9. Testing the interpretation of possessives in Chinese

I consulted some Mandarin native speakers, who gave the intuition that the Chinese phrase in (45b) (reproduced as (81b)) does have the presupposition that Zhangsan has exactly three sweaters.

- (81) a. Zhangsan’s three sweaters

- b. Zhangsan de [san jian maoxianyi]  
 Zhangsan de<sub>POSS</sub> three Cl sweater  
 ‘Zhangsan’s three sweaters’

Moreover, Partee (2006, Fn7) acknowledges that some Mandarin native speakers do have this presupposition. Thus, I do not take the interpretation of possessives as particularly helpful test.

In summary, this section tests Chinese on the generalizations that Bošković has explained regarding their connection to the DP/NP distinction. Chinese behaves like DP languages in terms of the following generalizations: extraction ((7) and (9)), the majority reading of *most* ((12)), long distance scrambling ((17)), negative raising ((20)), double genitive arguments ((29)), clitic doubling ((31)), Sequence of Tense ((33)). On the other hand, Chinese behaves like NP languages in terms of obligatory number morphology ((35)), radical *pro*-drop ((36)) and the presence of classifiers (53) though the link between obligatory number morphology/radical *pro*-drop and DP/NP distinction as explained by Bošković may be due to the factor of agglutinating morphology on pronouns (Neeleman and Szendroi, 2007). Meanwhile, the generalization regarding superiority effects of multiple *wh* questions (38) does not apply to Chinese. This section indicates that Chinese patterns with DP languages in terms of most of the generalizations that have been accounted for by Bošković (2005, 2008, 2010a, 2010b) and Bošković and Gajewski (2010).

#### 4.2.2.10. Further discussions and conclusion

Given the conclusion that Chinese behaves like DP languages, the subsequent question is whether there is any difference between Chinese and another language, Serbo-Croatian, which does not have definite articles and does not have DP based on its behaviors regarding the typological

generalizations proposed in Bošković's works. In the works by Bošković (2005, 2008, 2010a, 2010b), Serbo-Croatian does not have DP according to the tests on some generalizations. Moreover, Bošković claims that Serbo-Croatian does not have determiners because some determiner-like items (e.g. demonstratives, *some*, and possessives, given that Serbo-Croatian does not have articles) in this languages behave like adjectives. First, they clearly have the morphology of adjectives (Bošković, 2010b, 13):

- (82) a. *tim*            *nekim*            *mladim*            *djevojkama*  
           those<sub>FEM.PL.INST</sub> some<sub>FEM.PL.INST</sub> young<sub>FEM.PL.INST</sub> girls<sub>FEM.PL.INST</sub>

Second, they occur in typical adjectival positions like the predicate position of a copula (Bošković, 2010b, 13):

- (83) a. \*This book is my  
       b. Ova knjiga je moja  
           this book is my

Third, they allow stacking up (Bošković, 2010b, 13):

- (84) a. \*this my picture  
       b. ta moja slika  
           this my picture

In addition, they often (though not always) fail to induce Specificity effects that English determiners induce (Bošković, 2010b, 13):

- (85) O kojem piscu je pro itao [svaku knjigu/sve knjige/(tu) tvoju knjigu ti]  
       about which writer is read every book/ all books/that your book  
       \*‘About which writer did he read every book/all books/this book of yours?’

Another interesting quirk is that SC possessives cannot be modified by adjectives (Bošković, 2010b, 13):

- (86) \*bogati susjedov konj  
       rich neighbor's horse

This follows if adjectives cannot modify adjectives given that SC possessors are actually adjectives.

In contrast to Serbo-Croatian, determiners in Chinese behave like determiners in English. First, Chinese demonstratives, for example, do not have agreement morphology, in contrast to determiners in Serbo-Croatian. Second, although possessive pronouns in Chinese may occur in the predicate position of a copula, other determiners cannot:

- (87) a. Zhe ben shu shi wo de.  
       this Cl book be my  
       ‘This book is my.’<sup>15</sup>
- b. \*Wo de shu shi hen duo.  
       my de book be very many  
       ‘my books are many’

Third, determiners in Chinese induce Specificity effects that English determiners induce.

- (88) \*Ta du le ni xie de guanyu na ge zuojia de shu?  
       he read Perf. you wrote de about which Cl writer de book  
       \*‘About which writer did he read every book/all books/this book of yours?’

Another difference between Chinese and Serbo-Croatian is that possessives in the former can be modified by adjectives.

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<sup>15</sup> The possessive *wo de* in Chinese is ambiguous because it may translate either as ‘my’ or as ‘mine’.

- (89) hen youqian de linju de fangzi  
 very rich de neighbor de house  
 ‘very rich neighbor’s house’

Moreover, there is a difference between demonstratives and adjectives in Chinese; for example, when modifying a noun, the particle *de* cannot intervene between a demonstrative and the modified noun, but this is possible when an adjective modifies a noun.

- (90) a. zhe (\*de) shu  
 this de book  
 b. hong de shu  
 red de book  
 ‘(a) red book’

Regarding the stacking up of determiners in (84), this test cannot distinguish determiners from adjectives since determiners in Italian can be stacked up (Bernstein, 2001:2).

- (91) a. *il mio libro importante*  
 ‘my important book’  
 b. *il libro importante mio*  
 ‘my important book’

Based on the tests above, it seems that determiners in Chinese are different from those in Serbo-Croatian but similar to those in English. Therefore, I assume that Chinese does have determiners that may project DP, unlike Serbo-Croatian.

In conclusion, this section showed that Chinese is very likely to have DP by testing Chinese in terms of the typological generalizations that Bošković (Bošković, 2005, 2008, 2010a, 2010b; Bošković and Gajewski, 2010) make regarding the link between the presence or absence

of definite articles (and therefore DP) and other properties across a large sample of languages. Bošković gives explanation to some of the generalizations but leaves a few unexplained. If we assume those generalizations which are explained by Bošković are correct, it will be very revealing to test how Chinese behaves in terms of these generalizations. This section examined Chinese regarding all those generalizations that apply to Chinese, especially those generalizations that Bošković has offered an explanation for. The result of the examination of Chinese is in Appendix C to this chapter. Overall, the results indicate that Chinese is very likely to have DP. Furthermore, by comparing with Serbo-Croatian and Chinese in terms of the properties of determiners, I conclude that determiners in Chinese can instantiate DP and do not behave like adjectives.

### **4.3. D and head-internal relative clauses**

This section is devoted to testing Chinese on another typological generalization, i.e. the one proposed in Watanabe (2004), which is about the relation between head internal relative clauses (HIRC) and the (in)determiner system. The basic generalization runs as follows:

(92) The availability of HIRCs depends on the dependency of indeterminates on determiners.

This section will introduce this generalization first, which is followed by another subsection, which tests Chinese regarding this generalization. The conclusion is, as against Watanabe (2004)'s prediction, that Chinese has HIRCs, which implies that Chinese has determiners.

### 4.3.1. The relation among HIRCs, indeterminates and determiners

First, let us see what HIRCs are, using examples in Lakhota and Japanese as follows, with the head of HIRCs highlighted:

- (93) a. [[Mary [**owīža**-wa kaǵe] ki] he opewethu  
 Mary quilt a make the DEM I-buy  
 ‘I bought the quilt that Mary made.’ (Lakhota, Williamson, 1987: 171)
- b. John-wa [[Mary-ga teeburu-no ue-ni **ringo**-o oitekureta] no] –o tenitotta  
 -Top -Nom table-Gen on apple-Acc put Comp-Acc picked up  
 ‘John picked up an apple which Mary (kindly) put on the table.’  
 (Japanese, Hoshi, 1995: 3)

According to Watanabe (2004), one difference between the HIRCs in these two languages is that while Lakhota HIRCs are not sensitive to islands, Japanese HIRCs are sensitive to islands. For example, in Lakhota, the head of a HIRC may be embedded inside another HIRCs but this is not possible in Japanese (Watanabe, 2004: 63-64).

- (94) a. Lakhota  
 [[Wichota **wowapi** wa yawa pi cha] ob wo?uglaka pi ki] he  
 many-people paper a read PL ind with we-speak PL the that  
 L.A. Times e.  
 L.A. Times be  
 ‘The newspaper that we talk to many people who read (it) is the L.A. Times.’

b. Japanese

\*[John-ga [MIT-no gakusei-ga **subarashii ronbun**-o kaita no]-o

John-Nom MIT-Gen student-Nom excellent paper-Acc wrote C-Acc

posuto-doku-toshite saiyoushite-ita no]-no shuppan-ga okureta.

post-doc-as adopted-had C -Gen publish-Nom was-delayed

‘Publication of an excellent paper which John had hired as a post-doc an MIT student who wrote (it) was delayed.’

The contrast between Lakhota and Japanese in terms of island sensitivity of HIRCs mimic the same contrast in *wh*-questions in these two languages<sup>16</sup>: while *wh*-in-situ questions in the former do not exhibit island sensitivity, those in the latter do (Watanabe, 2004: 65-66):

(95) a. Lakhota

[Tuwa takuwe cheya ha ki] Marie inuǵa he?

who why cry DUR C Marie you-ask Q

‘Who did you ask Mary why (he) was crying?’

b. Japanese

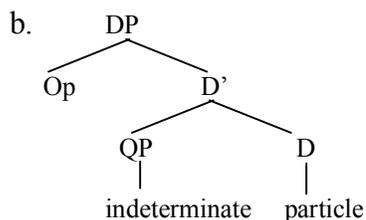
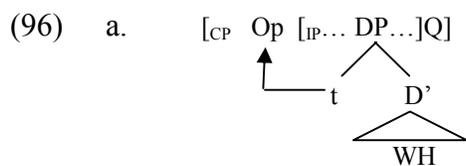
??John-wa [Mary-ga nani-o katta kadooka] Tom-ni tazuneta no?

John-Top Mary-Nom what-Acc bought whether Tom-Dat asked Q

‘What did John ask Tom whether Mary bought?’

Watanabe argues that the island sensitivity effect in Japanese *wh*-questions can be explained if we assume that there is movement in overt syntax. What is moved is the null *wh* operator as in (96a), assuming the structure for *wh*-phrases in Japanese as in (96b) (Watanabe, 1992: 51):

<sup>16</sup> Both languages are *wh*-in-situ languages.



The structure in (96b) is supported by the observation that quantificational particles (*-mo* and *-ka* in the following sentences) must attach to *wh*-elements only (which are indeterminates in Watanabe's term, e.g. *dare* in the following sentences) to form various quantificational expressions (Watanabe, 2004: 61):

- (97) a. Dare-ga ringo-o tabeta no?  
 who-Nom apple-Acc ate Q  
 'Who ate an apple?'
- b. Dare**mo**-ga ringo-o tabeta.  
 everyone-Nom apple-Acc ate  
 'Everyone ate an apple.'
- c. Dare**mo** ringo-o tabe-nak-atta.  
 anyone apple-Acc eat-Neg-Past  
 'No one ate an apple.'
- d. Dare**ka**-ga ringo-o tabeta.  
 someone-Nom apple-Acc ate  
 'Someone ate an apple.'

In Watanabe (2004: 70), the relation between quantificational particles and *wh*-elements in Japanese is explained by the requirement that these quantificational particles must undergo checking with an indeterminate (Chomsky, 2000). Assuming this kind of checking relation, (96a) is recast in the following configuration, in which the D undergoes a checking relation with the C and the QP undergoes a checking with D:

$$(98) \quad [_{CP} [_{IP} \dots [_{DP} [_{QP} \quad D] \dots] C]$$

On the other hand, the absence of island sensitivity in Lakhota *wh*-questions is due to the fact that the question operator is located at the clausal level and unselectively binds an in-situ *wh*-phrase and this binding relation is not sensitive to islands<sup>17</sup>.

$$(99) \quad [_{CP} [_{IP} \dots [_{DP} \textit{wh}] \quad C]$$

Given that the same island (in)sensitivity can be observed in both *wh*-in-situ questions and HIRCs in these two languages, Watanabe extends these two *wh*-question formation mechanisms to HIRCs assuming the following structure for HIRCs (Basilico, 1996; Bonneau, 1992; Kayne, 1994):

$$(100) \quad [_{DP} [_{CP} \dots \textit{head} \dots] D^0]$$

<sup>17</sup> In Lakhota, *wh*-words can also be used as indeterminates because they function as non-*wh* indefinites (Williamson, 1984:255).

- (i) a. Charlotte taku kaġa he?  
Charlotte what make Q  
'What did Charlotte make?'  
'Did Charlotte make something?'  
b. Charlotte taku kaġe.  
Charlotte what make  
'Charlotte made something.'

For example, (ia) is ambiguous between a *wh*-question and a *yes-no* question with an indefinite.

He suggest that HIRCs in Japanese are formed in terms of feature checking between a null determiner and the head of HIRCs and that HIRCs in Lakhota are formed in terms of unselective binding of the head of HIRCs by the determiner<sup>18</sup>:

(101) a. Japanese

[<sub>DP</sub> [<sub>CP</sub> [<sub>IP</sub> ...QP...] C] D (null)]

b. Lakhota

[<sub>DP</sub> [<sub>CP</sub> [<sub>IP</sub> ... NP (D) ...] C] D]

Either through feature checking in Japanese (101a) or through unselective binding in Lakhota (101b), there is a dependency relation between the nominal head of the HIRC and the determiner. Watanabe assumes that this dependency relation is available because both languages have indeterminates (e.g. *dare* in Japanese in (97) and *wh*-words in Lakhota, Fn 14), which rely on other constituents for interpretation. He further assumes that if a language has an indeterminate system, the properties of *wh*-phrases will be generalized to non-*wh* nominals. To sum up, the conclusion reached in Watanabe (2004) is that the availability of HIRCs depends on the dependency of indeterminates on determiners.

Moreover, Watanabe extends this analysis to Chinese and predicts that Chinese does not have determiners. First, he observes that similar to Lakhota, Chinese also has indeterminates since the *wh*-phrase *shenme* ‘what’ in Chinese may be used as non-*wh* indefinites (Watanabe, 2004: 62).

<sup>18</sup> Lakhota has both an indefinite article and a definite article, just like English (Watanabe, 2004: 64):

(i) [wichása ki] [mathó wa] kté.  
 man the bear a kill  
 ‘The man killed a bear.’

- (102) a. ni xiang mai shenme (ne)?  
 you want buy what Q  
 ‘What do you want to buy?’
- b. wo bu xiang mai shenme?  
 I not want buy anything  
 ‘I don’t want to buy anything.’
- c. ni xiang mai shenme ma?  
 you want buy something Q  
 ‘Would you like to buy something?’
- d. ta dagai mai le shenme le?  
 he probably buy Perf something Part  
 ‘He probably bought something.’

Second, it is generally believed that Chinese does not have HIRCs. Given the generalization in (92), in which the availability of HIRCs depends on the dependency of indeterminates on determiners, it is predicted that the absence of HIRCs in Chinese is due to the absence of determiners. Watanabe’s explanation is that this is because Chinese does not have determiners either like those in Lakota or like the quantificational particles in Japanese.

#### **4.3.2. Testing Chinese on Watanabe’s (2004) generalization**

The observation that Chinese does not have HIRCs is challenged by a recent study, which provides evidence that Chinese has HIRCs, thus supporting the conclusion that Chinese has D, which licenses HIRCs. Zhang (2008) argues that the so-called Existential Coda Constructions (ECC) in Chinese traditional grammar show the properties of HIRCs.

- (103) a. Jie shang lai le [<sub>ECC</sub> **yi ge xiaohair** mei chuan xie].  
 street on come Perf one Cl child not wear shoe  
 Roughly: ‘On the street has come a child, who does not wear shoes.’
- b. Baoyu jiao guo [<sub>ECC</sub> **yi ge xuesheng** hen wanpi].  
 Baoyu teach Perf one Cl student very naughty  
 ‘Baoyu taught a student, who was very naughty.’

In both sentences, the whole ECC appears as a single sentence, pronounced with a single intonation unit (Li and Thompson, 1981). The underlined part is called a coda, which describes the state or the property of the bold part, which is an indefinite nominal phrase. Zhang calls the indefinite nominal phrase Pre-Coda Nominal (PCN). ECCs have the following properties, which lead to the conclusion that they are HIRCS.

First, the PCN and the coda form a constituent, which is supported by a few tests. One of them is the binding relation between the PCN and the coda (Zhang, 2008: 15).

- (104) Akiu<sub>i</sub> renshi [yi ge ren<sub>j</sub> zong piping ta-ziji<sub>\*i/j</sub>].  
 Akiu know one Cl person always criticize himself  
 ‘Akiu knows a person, who always criticizes himself.’

If the coda *zong piping ta-ziji* ‘criticize himself’ is the adjunct of the matrix verb *renshi* ‘know’, then *ta-ziji* ‘himself’ should be bound by the matrix subject *Akiu*. But *ta-ziji* ‘himself’ is bound only by the PCN, which indicates that the PCN and the coda form a constituent.

Second, the PCN and the coda form a topic-comment relation. As the comment of a topic must be predicative, so is the coda. In the following examples, the adjective *guoqu* ‘previous’ is not predicative, so it cannot be the coda of the PCN (Zhang, 2008: 17).

(105) a. Wo kanjian le yi wei guoqu de pengyou.

I see Perf. one Cl previous de friend

‘I saw a previous friend of mine.’

b. \*Wo kanjinan le yi wei pengyou guoqu.

I see Perf. one Cl friend previous

Third, ECCs have a similar distribution as typical nominal phrases in that they appear as the object of transitive verbs. More specifically, the matrix verbs that precede ECCs are those that c-select nominals rather than clauses (Zhang, 2008: 29). For example, *renshi* ‘know’ c-select nominals rather than clauses but *renwei* ‘think’ c-select clauses rather than nominals.

(106) a. Wo renshi {yi ge xiaoshuojia/\*Baoyu yexinbobo}

I know one Cl novelist Baoyu ambitious

‘I know {a novelist/that Baoyu is ambitious}.’

b. Wo renwei {\*yi ge xiaoshuojia/Baoyu yexinbobo}

I think one Cl novelist Baoyu ambitious

‘I think {\*a novelist/that Baoyu is ambitious}.’

As is shown below, ECCs must be preceded by *renshi* ‘know’, but not by *renwei* ‘think’.

(107) a. Wo renshi yi ge xiaoshuojia yexinbobo.

I know one Cl novelist ambitious

‘I know a novelist who is ambitious.’

b. \*Wo renwei yi ge xiaoshuojia yexinbobo.

I think one Cl novelist ambitious

Based on these properties, Zhang proposes that ECCs must have the following structure, in which a verb c-selects a DP, which c-selects a CP, which contains the PCN and the coda.

(108) V [<sub>DP</sub> D [<sub>CP</sub> PCN coda]]

This structure can capture the observations that the PCN and the coda form a single constituent and that ECCs must be c-selected by a matrix verb that takes a nominal complement.

In addition, PCNs seem to satisfy the s-selection of matrix verbs. In (109), where the verb *qu* ‘marry’ must s-select a female person, if the PCN is *yi ge nüren* ‘a woman’, the sentence is fine; whereas if the PCN is *yi ge nanren* ‘a man’, the sentence is not acceptable.

(109) Lao Zhang qu le yi ge {nüren/\*nanren} hen hui zuo cai.

Lao Zhang marry Perf one Cl woman/man very can cook dish

Roughly: ‘Lao Zhang married a {woman/\*man}, who cooks well.’

Zhang assumes that a null pronoun, which satisfies the s-selection of the verb and takes the PCN as its antecedent, stays at the Spec of DP.

(110) V [<sub>DP</sub> pronoun<sub>i</sub> D [<sub>CP</sub> PCN<sub>i</sub> coda]]

Zhang further argues that ECCs share with relative clauses a few similarities. One of them is that the dependency relation between the PCN and the coda mimics that between the relative clause and its head (Zhang, 2008: 32):

(111) a. Baoyu mai le ba yusan wo hen xihuan.

Baoyu buy Perf. Cl umbrella I very like

Roughly: Baoyu bought an umbrella, which I like very much.’

b. Baoyu mai le ba wo hen xihuan de yusan.

Baoyu buy Perf. Cl I very like de umbrella

‘Baoyu bought an umbrella which I like very much.’

Both local and long-distance dependencies in clausal codas can be found in RCs (Zhang, 2008: 33). The long-distance dependency in the coda in (112a) is parallel to the long-distance relativization in relative clauses (112b).

- (112) a. Akiu jiao guo yi ge xuesheng [renmen dou shuo shi tiancai].  
 Akiu teach Exp one Cl student people all say be genius  
 Roughly: ‘Akiu taught a student, who people all said was a genius.’
- b. Akiu jiao guo yi ge [renmen dou shuo shi tiancai] de xuesheng.  
 Akiu teach Exp one Cl people all say be genius de student  
 ‘Akiu taught a student who people all said was a genius.’

Another similarity between ECCs and relative clauses is that both allow resumptive pronouns (Zhang, 2008: 33).

- (113) a. Nali you yi zhi bi [Aiyinsitan cengjing yong \*(ta)  
 there have one Cl pen Einstein once with it  
 xie guo lunwen].  
 write Exp paper  
 ‘There is a pen, with which Einstein used to write papers.’
- b. Nali you yi zhi [Aiyinsitan cengjing yong \*(ta)  
 there have one Cl Einstein once with it  
 xie guo lunwen] de bi.  
 write Exp paper de pen  
 ‘There is a pen with which Einstein used to write papers.’

After establishing that ECCs have similarities to relative clauses, Zhang further argues that ECCs are similar to HIRCs in some crucial ways. One of them is that a PCN has no D-element that rejects weak indefinite readings, such as a demonstrative or *meiyige* ‘every’ (Zhang, 2008: 34).

- (114) a. Baoyu jiao guo {yi ge/\*na ge/\*meiyige/\*dabufen} xuesheng  
 Baoyu teach Exp one CI/that CI/ each/ most student  
 hui tan gangqin.  
 can play piano  
 ‘Baoyu taught a student, who could play piano.’

HIRCs in Lakota show a similar effect (Bonneau, 1992: 385):

- (115) [[Mary [owiža wa/\*ki kaǵe] ki] he opewethu  
 Mary quilt a/ the make the DEM I-buy  
 ‘I bought the quilt that Mary made.’

On the other hand, head external relative clauses do not have this restriction (Zhang, 2008: 34):

- (116) Baoyu jiao guo {yi ge/na ge/meiyige/dabufen} hui tan gangqin de xuesheng.  
 Baoyu teach Exp one CI/that CI/ each/ most can play piano de student  
 ‘Baoyu taught {a/that/every/most} student(s) who could play piano.’

Another similarity between ECCs and HIRCs is that the scope of a coda is the whole PCN, whereas in head external relative clauses, the scope of the RC is the only N, excluding the numeral to the left of the N (Zhang, 2008: 36):

(117) a. Shatan shang tang zhe san ge mei chuan yifu de xiaohai.

beach on lie PRG three Cl not wear clothes de child

‘On the beach lay three children who did not wear clothes.’

b. Shatan shang tang zhe san ge xiaohai mei chuan yifu.

beach on lie PRG three Cl child not wear clothes

‘On the beach lay three children, who did not wear clothes.’

The head external relative clause in (117a) restricts the denotation of the modified noun *xiaohai* ‘child,’ so that it is possible for the speaker to make a contrast between the three children and other children in the context. The coda in (117b), however, makes a comment on all the individuals expressed by *san ge xiaohai* ‘three children’. It does not restrict the denotation of *xiaohai*. Something similar to the wide scope of the coda is also observed in HIRCs in Korean (Kim, 2004: 11):

(118) a. Jinho-nun [[ t<sub>i</sub> tomangka-n] -un totwuk<sub>i</sub>]-ul sey myeng capassta.

Jinho-Top run away-IMPRF-REL thief- Acc three Cl caught

‘Jinho caught three (out of possibly many more) thieves who were running away.’

b. Jinho-un [[totwuk<sub>i</sub>-i sey myeng tomangka- n]- un kes<sub>i</sub>]-ul capassta.

Jinho-Top three-Nom thief Cl run away-IMPRF-REL kes-Acc caught

‘(Exactly) three thieves were running away and Jinho caught all of them.’

The head-external relative clause in (118a) will be felicitous even if it is uttered in a context where there were ten thieves running away and John caught only three of them. On the other hand, the HIRC in (118b) will be felicitous only if there were exactly three thieves running away and John caught all of them.

Assuming the structure of HIRCs in Hoshi (1995) and Shimoyama (1999) in which the head of an IHRC is indirectly accessed by the matrix predicate via an E-type pronoun, Zhang (2008: 12) proposes the following structure for ECCs<sup>19</sup>:

- (119) [IP Baoyu [VP jiao guo [DP E-type pronoun<sub>i</sub> D [CP [PCN<sub>yi</sub> ge xuesheng]<sub>i</sub>  
 Baoyu teach Exp one Cl student  
 [coda<sub>hen congming</sub>]]]]]  
 very smart

‘Baoyu taught a student<sub>i</sub>, who is very smart.’

So far, the arguments in Zhang (2008) strongly indicate that Chinese has HIRCs, which contradicts with what is reported in Watanabe (2004), i.e., Chinese does not have HIRCs. If we assume Watanabe (2004)’s generalization concerning the connection between HIRCs and determiners, the presence of HIRCs (ECCs) indicates that Chinese has some kind of determiner. Indeed, Zhang assumes that there is a null D in Chinese, which is licensed by the classifier c-commanded by D given that a classifier must be present in the PCN.

Moreover, Zhang observes that ECCs in Chinese are not sensitive to islands. In the example below (Zhang, 2008: 44), the PCN *yi ge xuesheng* ‘a student’ is related to a gap in the causal adverbial clause, which is a syntactic island but the sentence is still good.

- (120) wo jiao guo yi ge xuesheng yinwei wo piping le  
 I teach Exp one Cl student because I criticize Perf  
 xi-zhuren zong zhao wode mafan.  
 department-chair always find my fault

<sup>19</sup> In ECCs, the PNC is base generated at the left edge of the HIRC. This is similar to HIRCs in other languages, where the head of HIRCs appears at the left edge of HIRCs (Basilico, 1996: 502).

Roughly: ‘I taught a student whom because I criticized him the department chair always find fault with me.’

Zhang concludes that Chinese is similar to Lakhota in terms of the absence of island sensitivity in HIRCs and that unselective binding may be involved in in HIRCs in both languages.

To conclude this section, a detailed examination of ECCs in Chinese by Zhang (2008) indicates that ECCs are actually HIRCs. If we assume Watanabe (2004)’s generalization in (92), i.e., the availability of HIRCs depends on the dependency of indeterminates on determiners, this conclusion implies that Chinese may have a determiner<sup>20</sup>. Second, the similarity of Chinese to Lakhota in terms of absence of island sensitivity in HIRCs indicates that unselective binding is also involved in Chinese HIRCs. Third, if we assume the generalization in Bošković (2008, 2010a, 2010b) that HIRCs are not island-sensitive in languages that have articles, the absence of island sensitivity in Chinese HIRCs indicates that there is DP in Chinese.

#### **4.4. Functional/lexical distinction**

Recent studies by Fukui (1986, 1988, 1995, 2003) propose the idea that lexical categories and functional categories are projected differently. This difference leads to typological differences. While some languages exhibit this distinction, some other languages do not exhibit this distinction, with all categories being projected like lexical categories. Based on a comparative study of English and Japanese, he concludes that while English has functional projections like Determiner Phrase (DP), Japanese does not. This section is aimed at testing Chinese against Fukui’s lexical/functional category distinction, in order to see whether DP exists

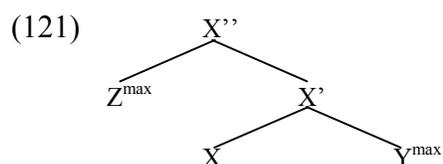
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<sup>20</sup> Recall that Chinese has the indeterminate system as exhibited by *wh*-phrases as in (102).

in Chinese or not. The first subsection introduces the contrast between lexical projections and functional projections according to Fukui (1986, 1995). The second subsection summarizes how this contrast is applied to test Japanese and English. The third subsection applies Fukui's generalizations to Chinese and produces two results. First, Chinese does have words in nominal phrases, which belong to the functional category and this result adds support to the existence of DP in Chinese nominal phrases. Second, NP *pro*-forms in Chinese cannot be further modified, which is similar to English and this, according to Fukui (1995), indicates the presence of DP in Chinese. Additionally, given that there is no restrictive vs. appositive contrast among relative clauses in Chinese, the stackability of relative clauses does not apply to Chinese. Therefore, overall, Chinese behaves like English in terms of Fukui's tests, and Chinese should have DP according to Fukui (1995).

#### 4.4.1. The introduction of Fukui's functional/lexical contrast

In the literature of Generative Grammar, it is assumed that all lexical items in the lexicon, both lexical and functional, are projected in the same way, which conforms to the following X-bar schema (Chomsky, 1970, 1986; Chomsky and Lasnik, 1993):



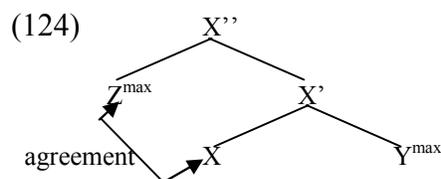
Under this structure, a head takes a maximal projection  $Y^{\max}$  as the complement and these two form an  $X'$  level projection. The  $X'$  level projection takes another maximal projection  $Z^{\max}$  as its specifier and these two form a maximal projection  $XP$ , which is headed by  $X$ . Under this X-bar structure, the specifier is taken by Chomsky as any maximal projections that happen to appear in a given category as the immediate daughter of  $X''$ .

Fukui observes that this uniform projection cannot capture the fact that some categories may allow specifiers to iterate while other categories do not (Fukui and Speas, 1986: 11):

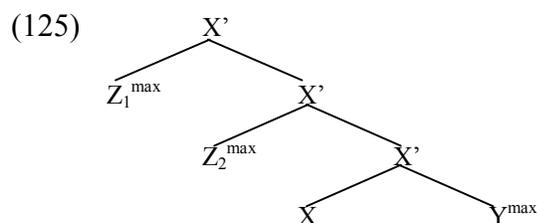
- (122) a. the very very old man  
 b. Mary's big red book  
 c. Susan never could have been eating cabbage.
- (123) a. \*the the old man  
 b. \*yesterday's Chomsky's book  
 c. \*the John's cat

Lexical categories like those in (122), i.e. nouns and verbs, may allow more than one specifier but functional categories like those in (123), i.e. *the* and *'s*, do not. This contrast is not captured by the X bar theory as formulated in Chomsky (1986).

In order to capture this contrast, Fukui proposes the idea of the relativized X bar theory. According to him, there is one property of phrase structure that cannot be determined in the X-bar theory in (121), which is the “closure property” of phrase structure (Fukui, 1995). In other words, not every X head can project to the level of the maximal projection. An X head can project to X'' only if there is an agreement relation holding between the head and the specifier. In the structure in (121), the X head can project to X'' because there is an agreement relation between X and  $Z^{\max}$ , which is located in the specifier of X''. In other words, the agreement relation between the specifier and the head is crucial in determining whether a maximal projection can be closed. Therefore, the X-bar structure in (121) has two forms. If the agreement relation between the specifier and the head holds, the structure should look as follows.



If the agreement relation does not hold, then the structure should look like below.



Under this structure, the  $X$  head does not project up to the level of  $X''$ . Instead, there may be recursive specifiers  $Z_1^{\max}$  and  $Z_2^{\max}$ .

Regarding the question of which structure is projected, Fukui claims that it depends on the lexical items in the lexicon. According to Fukui, items in the lexicon can be divided into two categories, lexical categories (e.g. *table* and *eat*) and functional categories (e.g. *of* and *a*). While lexical categories play an important role in interpreting conceptual aspects of linguistic expressions, the role of functional categories is restricted only to grammatical or computational aspects of linguistic structures (Fukui, 2003: 392). This difference can be rephrased as a difference in terms of the features that lexical categories and functional categories bear respectively. Specifically, lexical categories bear theta roles and have to assign theta roles. Functional categories bear function features<sup>21</sup>, which may attract a maximal projection to move to the specifier position in order to agree with the head. When a lexical head takes a complement and assigns a theta role to this complement, a single-bar level projection is formed. A lexical head may project a single-bar level projection recursively until it assigns theta roles to all

<sup>21</sup> Fukui (1995: 27) claims that function features include nominative Case, assigned by Tense/AGR, genitive Case, assigned by 's, and +Wh, assigned by the Wh feature of a complementizer, etc.

complements. This mode of projecting structures results in (125). On the other hand, a functional head may take a maximal projection as its complement and then takes another maximal projection for the purpose of agreement between the head and the specifier in terms of function features. Up to this point, the whole projection is closed, resulting in the structure in (124). On the assumption that agreement is typically a one-to-one relation, once a functional head takes a maximal projection as its specifier, the projection cannot project anymore. The basic idea of Fukui's relativized X-bar theory is that lexical categories, which do not bear agreement features but have to assign theta roles, project to X' projections recursively, and never project to X'' projections, as shown in (125). Functional categories, which bear agreement features, may project a maximal projection, as is shown in (124).

#### **4.4.2. Projections within nominal phrases in English and Japanese**

Building on the relativized X-bar theory, Fukui compares some functional morphemes (i.e. demonstratives, pronouns, etc.) that appear in nominal phrases in English and Japanese and concludes that, in English, these morphemes belong to the functional category of D but in Japanese, they do not.

According to the relativized X-bar theory, projections headed by lexical categories are never closed, and in other words, they may project to X' recursively. On the other hand, functional projections are closed once they take a maximal projection in the specifier position. In the light of this contrast, Fukui examines the properties of functional words in the two languages.

First, Fukui concludes that nominal phrases in English have the functional projection of D because English exhibits the functional/lexical contrast among lexical items in terms of projecting maximal phrases. On the one hand, some words (e.g. adjectives) in English belong to

the lexical category since more than one adjective may be stacked up as long as these modifiers are appropriately interpreted and licensed (Fukui, 1995: 106):

- (126) a. a red car  
 b. an expensive red car  
 c. a big expensive red car

According to Fukui's criteria, these adjectives never close the maximal projection and can project X' recursively.

On the other hand, function words (i.e. definite articles, demonstratives, etc.) in English cannot project recursively. Articles, demonstratives and the possessive case marker 's in English behave like functional heads because at most one element can appear on the left of these elements (Fukui, 1995: 106).

- (127) a. the book  
 b. \*John the book  
 c. John's lecture  
 d. \*yesterday's John's lecture  
 e. this book  
 f. \*John's this book

According to Fukui's criteria, these items stop projecting after they form a maximal projection. Based on the contrast between (126) and (127), Fukui concludes that in English there is a functional projection DP.

In case of Japanese, Fukui claims that there are no words that can project a maximal phrase and therefore, nominal phrases are always N', instead of NP. First, demonstratives and the

possessive marker in Japanese may allow other constituents to occur to their left (Fukui, 1995: 106-107).

- (128) a. ko-no hon  
           this book
- b. John-no ko-no hon  
           Lit. ‘John’s this book’
- c. akai John-no ko-no hon  
           Lit. ‘red John’s this book’
- (129) a. a-no kuruma  
           Lit: ‘that car’
- b. John-no a-ko kuruma  
           Lit: ‘John’s that car.’
- c. ookina John-no a-no kuruma  
           ‘big John’s that car’
- (130) a. so-no koogi  
           lecture  
           ‘that/the lecture’
- b. Yamada-sensei-no so-no koogi  
           teacher  
           Lit. ‘Prof. Yamada’s that/the lecture’
- c. kyonen-no Yamada-sensei-no so-no koogi  
           last year  
           Lit. ‘last year’s Prof. Yamada’s that/the lecture’

According to Fukui's criteria, demonstratives and the possessive marker in Japanese are more like lexical items as they never stop projecting recursively.

Further evidence indicates that in contrast to English, nominal phrases in Japanese are Noun Phrase, not Determiner Phrase. In English, there is a contrast between NP *pro*-forms (e.g. *it*, *he* and *himself*) and N' *pro*-forms in terms of modifiability. The former do not allow further modification but the latter do (Fukui, 1995: 123).

- (131) a. \*big it  
 b. \*short he  
 c. \*yesterday's himself  
 d. an expensive one

The contrast in (131) can be accounted for if we assume that *it*, *he* and *himself* form a closed projection and therefore cannot be further modified. On the other hand, *one* is an N' *pro*-form and therefore can be further modified.

However, the Japanese counterparts of these words can be modified and, furthermore, there is no non-modifiable NP *pro*-form in Japanese (Fukui, 1995: 124-125)<sup>22</sup>:

- (132) a. *sore* 'it'  
 Tokyo-no biru-no okuzyoo kara mita Haree-suisei-wa  
 Tokyo -Gen building-Gen top from (I)saw Halley's Comet-Top  
 sumoggu-no tame bonyarito nigotte ita ga,  
 smog-Gen due to faintly blurred was but  
 Okinawa-no Naha-de mita *sore*-wa yozora-ni kukkirito kagayaite-ita

<sup>22</sup> Regarding whether pronouns can be modified by relative clauses in English, I checked with some English native speakers and they said that this is possible, especially among young people (personal communication with Brady Clark). Since there is no substantial difference between English and Japanese in terms of this aspect, I will not apply this test to Chinese in Section 4.4.3.

–Gen –in (I)saw it-top night sky-in vividly shining was

Lit. ‘Halley’s Comet that (I) saw from the top of a building in Tokyo was blurred by the smog, but *it that (I) saw in Naha City in Okinawa* was vividly shining in the night sky’

b. *kare* ‘he’

kinoo Taroo-ni atta ka-i?

yesterday Taroo–with met Q

‘Did you see Taro yesterday?’

Un, demo *kinoo-no kare-wa* sukosi yoosu-ga hen-datta

yes but yesterday-Gen he-Top somewhat state-Nom be straight-past

Lit. ‘Yes, but *yesterday’s he* was somewhat strange.’

c. *zibun* ‘self’

kukyoo-ni tatasare-ta Saburoo-wa nan-no kuroo-

hardship-in forced to face-Past Saburoo-Top not any-Gen sufferings-

mo siranakatta *mukasi-no zibun-ni* modoritai-to omotta

even not-know-Past old days-Gen self-to wanted to go back-that thought

Lit. ‘Saburo, who was stranded in hardships, wanted to go back to *old days*’

*himself* who did not know any sufferings’

Restrictive relative clauses in English can stack in English but appositives (non-restrictive) relative clauses cannot<sup>23</sup> (Fukui, 1995:125):

(133) a. people who go to MIT who like math will get jobs

b. \*John, who goes to MIT, who likes math, will get a job.

<sup>23</sup> In Jackendoff (1977: 169), restrictive relative clauses are daughters of N’ and appositives are daughters of N’’’.

(i) [N’’’the [N’’man [S’who came to dinner,]] [S’who Bill dislikes]]

But in Japanese, both restrictive relative clauses and appositives can stack (Fukui, 1995:125-126):

(134) a. restrictive

[<sub>NP</sub> [<sub>S</sub> Osaka-(de)-no kokusai-kaigi-ni sanku-suru

Osaka in-Gen international conference-at attend

koto-ni-natte-iru] [<sub>S</sub>Amerika-kara kaette-kita bakari]- no

is supposed to America-from came back just -Gen

gakusya-tati] -wa ima Tokyo-no hoteru-ni tomatte-imasu

scholar-plural Top now Tokyo-Gen hotel-at are staying

Lit. ‘The scholars who are supposed to attend the international conference

in Osaka who just returned from America are now staying at a hotel in

Tokyo.’

b. appositives

[<sub>NP</sub> [<sub>S</sub>Osaka-(de)-no kokusai-kaigi-ni sanku-suru koto-ni-natte-iru]

[<sub>S</sub> Amerika-kara kaette-ki-ta bakari]- no John]-wa ima Tokyo-no

hoteru-ni tomatte-imasu

Lit. ‘John, who is supposed to attend the international conference in Osaka,

who just returned from America, is now staying at a hotel in Tokyo.’

#### 4.4.3. Testing Chinese on the projection of nominal phrases

In this section, I test Chinese with respect to the difference between lexical categories and functional categories in terms of the relativized X-bar theory by Fukui.

Fukui claims that demonstratives in Japanese may be further modified by other constituents. However, this observation is not very accurate because it is observed in Furuya

(2009) that demonstratives with anaphoric interpretations cannot be further modified by constituents. It is observed that demonstratives can be classified into two different uses: deictic use and anaphoric use (Lyons, 1999; Wolter, 2003, 2006). In the deictic use, demonstratives help locate the referent with reference to some entity in the non-linguistic context and in this context, a pointing gesture is appropriate (135a) (Wolter, 2006: 3). In the anaphoric use, demonstratives refer to entities that are already referred to by antecedents (135b) (Wolter, 2006: 4).

(135) a. [In an art gallery, where the speaker points at a painting]

This/That painting is beautiful.

b. A woman<sub>i</sub> entered from stage left. Another woman<sub>j</sub> entered from stage right.

This/That woman<sub>j</sub> was carrying a basket of flowers.

Furuya refutes Fukui's observation that demonstratives in Japanese may be further modified by noting that while demonstratives with deictic use may be further modified on the left periphery (136), demonstratives with anaphoric use cannot (137) (Furuya, 2009: 32-33):

(136) Akai, kono me-o mite.

red this eye-Acc look

'Look at THIS eye in red (and not other objects).'

(137) S: Tentou-de mituketa [hon]-wa 450 datta. Takai to omottakedo...

store-in found book-Top was expensive Comp thought

'The book that I found in the book store was \$450. Although I thought that...'

a. Watasi-wa [sono totemo takai hon]-o katta.

I-Top that very expensive book-Acc bought

'I bought that/the very heavy book.'

- b. \*Watasi-wa [totemo takai [sono hon]]-o katta.  
 I-Top very expensive that book-Acc bought  
 ‘I bought that/the very heavy book.’

Given the scenario in (137S), *sono hon* ‘that/the book’ in (137a, b) anaphorically refers back to the same book that the noun *hon* in (137S) refers to. The anaphoric demonstrative *sono* ‘that’ in (137a) appears in the left periphery of the whole nominal phrase and the whole sentence is acceptable. On the other hand, *sono* ‘that’ is modified by adjectives on its left periphery and therefore, (137b) is bad. Furuya concludes that Fukui is wrong to claim that demonstratives in Japanese uniformly allow further modification in their left periphery and that Japanese demonstratives may occupy different positions depending on their interpretation.

A detailed examination of Chinese demonstratives indicates that they behave like Japanese demonstratives as reported in Furuya (2009), that is, demonstratives in deictic use allow modification (138) while demonstratives in anaphoric use do not (139).

- (138) a. Qiao, you da you hong de na ge luobo!  
 look and big and red de that Cl carrot  
 ‘Look at that big and red carrot!’
- b. Qiao, na ge you da you hong de luobo!  
 look that Cl and big and red de carrot  
 ‘Look at that big and red carrot!’
- (139) S. Wo qunian zai Beijing mai le yi ben hen jiu de lishishu.  
 I last year in Beijing buy Perf. one Cl very old de history book  
 ‘I bought a very old history book in Beijing last year.’

- a. Danshi wo mama bu xihuan na ben hen jiu de shu.  
     but my mother not like that CI very old de book  
     ‘But my mother does not like that very old book.’
- b. \*Danshi wo mama bu xihuan hen jiu de na ben shu.  
     but my mother not like very old de that CI book

In (138), the demonstrative *na* ‘that’ is used as a deictic expression and it can be modified by an adjective. Given the scenario in (139S), the demonstrative *na* ‘that’ in (139a) and (139b) is anaphoric. While (139a), in which the demonstrative precedes an adjective modifier, is acceptable, (139b), where the demonstrative follows an adjective modifier, is not acceptable. Furthermore, those demonstratives that are used anaphorically may be generated at D, in the same way that demonstratives in English are generated.

The second test is whether NP *pro*-forms like pronouns can be further modified. According to Fukui, if NP *pro*-forms like pronouns cannot be further modified, this indicates that they constitute a functional projection, such as DP. If they cannot be further modified, this means that they constitute a lexical projection, such as NP. Fukui observes that while there are NP *pro*-forms in English that cannot be modified, there are no NP *pro*-forms that cannot be modified in Japanese. In case of Chinese, the first observation is that the Chinese counterparts of (131a-c) are ungrammatical, thus patterning with English:

- (140) a. \*da (de) ta  
           big de it  
           \*‘big it’

- b. \*ai (de) ta  
 short de he  
 \*short he
- c. \*zuotian (de) taziji  
 yesterday de himself  
 \*yesterday's himself

Another difference between English and Japanese as noticed by Fukui is that in English, restrictive relative clauses can be stacked but appositive relative clauses cannot but in Japanese, both restrictive and appositive relative clauses can be stacked. This test is crucially based on the distinction between restrictive relative clauses and appositive relative clauses. Some previous studies (Del Gobbo, 2003, 2005, 2007, 2010; Zhang, 2001) on relative clauses in Chinese argue that those relative clauses that modify pronouns and proper names show properties of restrictive relative clauses, and therefore there is no distinction between restrictive relative clauses and appositive relative clauses. As a result, Fukui's test of stackability of relative clauses does not apply to Chinese. Below I will present the evidence cited in previous studies which demonstrates that those relative clauses that modify pronouns and proper names in Chinese show properties of restrictive relative clauses.

The first piece of evidence is that no quantifier in the matrix clause may scope over a pronoun in an appositive relative clauses but this is possible in restrictive relative clauses (Safir, 1986: 672).

- (141) a. \*[Every Christian]<sub>i</sub> forgives John, who harms him<sub>i</sub>.  
 b. [Every Christian]<sub>i</sub> forgives a man who harms him<sub>i</sub>.

In Chinese, Del Gobbo observes, that this scope relation is possible in cases where relative clauses modify pronouns.

- (142) a. [Mei yi ge laoshi]<sub>i</sub> dou jiaoxun buzunzhong ta<sub>i</sub> de woman.  
 every one CI teacher all scold disrespect him de us  
 Lit. ‘Every professor scolded the us who disrespected him.’
- b. [Mei yi ge laoshi]<sub>i</sub> dou jiaoxun buzunzhong ta<sub>i</sub> de xuesheng.  
 every one CI teacher all scold disrespect him de student  
 Lit. ‘Every professor scolded the students who disrespected him.’

Second, when the long-distance anaphor *proprio*, ‘self’, is inside an appositive relative clause, it can only be bound by the ‘head’ of the relative clause. If instead it is inside a restrictive relative clause, it can be bound both by the ‘head’ of the relative and by the matrix subject (Giorgi, 1984: ft. 19):

- (143) Gianni<sub>i</sub> pensa che Mario<sub>j</sub>, che t<sub>j</sub> ama la propria<sub>j/\*i</sub> moglie, sia intelligente.  
 Gianni thinks that Mario that loves the own wife is smart  
 ‘Gianni thinks that Mario, who loves his own wife, is smart.’

In Chinese, the long-distance anaphora *ziji*, ‘self’, can be bound both by the ‘head’ of the relative and by the matrix subject (Del Gobbo, 2005: 300):

- (144) Zhangsan<sub>i</sub> renwei [<sub>RC</sub> ai ziji<sub>j/i</sub> de qizi de] ta<sub>j</sub> hen congming.  
 Zhangsan think love himself de wife de him very smart  
 ‘Zhangsan thinks that he who loves his own wife is smart.’

Third, certain sentence adverbs that generally appear only in matrix clauses also appear in appositive relative clauses. For example, *frankly* can appear inside appositive relative clauses but not in restrictive relative clauses (Emonds, 1979: 239)<sup>24</sup>:

- (145) a. The boys, who have frankly lost their case, should give up.  
 b. \*The boys that have frankly lost their case should give up.

In Chinese, sentence adverbs cannot appear inside the relative clauses that modify pronouns (Del Gobbo, 2003: 92):

- (146) \*[shiyè-shàng shùnbianshuò cōnglái měiyǒu shìbǎi de] wǒmen  
 cause-on by-the-way never not loose de we  
 yídìng huì jìxù fēndòu.  
 certainly will continue fight  
 ‘We, who by the way never lost a cause, will continue to fight.’

To conclude, this section first introduced Fukui’s (1995) typological generalizations regarding the distinction between functional projections and lexical projections. This section also tested Chinese regarding these generalizations and concluded that Chinese nominal phrases may have functional projections. The first result is that Chinese demonstratives in anaphoric use do not allow further modification, thus patterning with English demonstratives and articles. Second, NP *pro*-forms in Chinese cannot be further modified, which is similar to English. Third, since there is no restrictive vs. appositive contrast among relative clauses in Chinese, the stackability of relative clauses does not apply to Chinese.

<sup>24</sup> Some people may accept the following sentence, where *frankly* appears inside a restrictive relative clause:

(1) The man that discussed the article frankly offended everyone.  
 In this sentence, the adverb means ‘in an honest manner’, which is different from the use of *frankly* in (145), which is used to emphasize the truth of the statement made by the speaker.

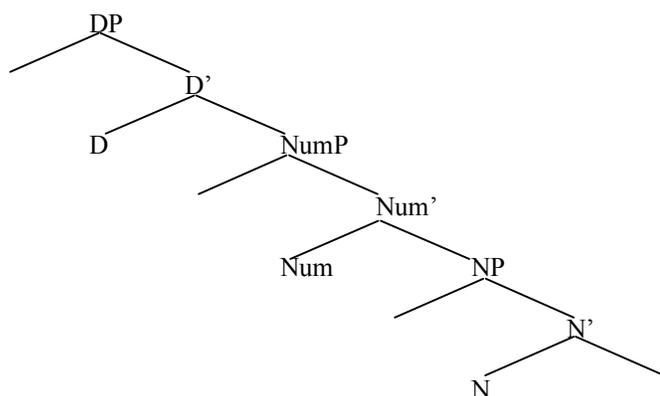
## 4.5. Conclusion

Within the Principles and Parameters framework, this chapter attempted to examine the structure of nominal phrases in Chinese, particularly whether the Chinese nominal structure contains DP, from a typological perspective. Regarding whether languages like Chinese have DP in their nominal structure, there have been studies that propose some typological generalizations (Bošković, 2008, 2010a, 2010b; Bošković and Gajewski, 2010; Fukui, 1995; Watanabe, 2004) and Chinese is reported by some studies (Bošković, 2008, 2010a, 2010b) to behave like a no-DP language in terms of some of these generalizations. This chapter first summarized these generalizations and then tested Chinese regarding these generalizations. The result showed that Chinese is a language that has DP in its nominal structure, which is summarized in Appendix C. First, a series of testings of Chinese on those generalizations which are explained in detail by Bošković and Gajewski indicated that Chinese should be classified as a DP-language. Second, the testing of Chinese regarding Watanabe's generalization showed that Chinese may have a null determiner since it has a construction that is actually a head internal relative clause. Third, the testing of Chinese regarding the generalizations proposed by Fukui did not lend exclusive evidence that Chinese does not have DP. To sum up, with a detailed testing of Chinese on these generalizations, Chinese is most likely to have DP in its nominal structure since it behaves like those languages that have DP in terms of many of the generalizations introduced in this chapter.

## Chapter 5      The structure of derived nominals in Chinese

The previous chapters have established that Chinese nominal phrases in general have the following structure:

(1)



The nominal phrases that the previous chapters have examined contain those nouns that denote concrete objects, as follows:

- (2)    na   san   ben   hong   de   shu  
       that three Cl   red   de book  
       ‘those three red books’

This chapter examines the structure of a kind of nominal construction in Chinese that is different from the nominal phrases in (2). The nominal construction that this chapter focuses on is as follows:

- (3) a. Zhangsan dui<sup>1</sup> Lisi de diaocha  
 Zhangsan dui Lisi de investigation  
 ‘Zhangsan’s investigation of Lisi’
- b. Zhangsan diaocha le Lisi  
 Zhangsan investigate Perf. Lisi  
 ‘Zhangsan investigated Lisi.’

Intuitively, the nominal phrase in (3a) is related to the clause in (3b) in some way. Both (3a) and (3b) contain a word *diaocha*, which denotes ‘the action of doing an investigation’, although the former is a noun and the latter is a verb. In this aspect, the noun *diaocha* ‘investigation’ in (3a) is different from the noun *shu* ‘book’ in (2), which denote a concrete object. Another similarity between the noun *diaocha* in (3a) and the verb *diaocha* in (3b) is that both co-occur with two phrases. One of them is *Zhangsan*, which is the person that performs the action of investigation and the other is *dui Lisi*, which indicates the person that the action of investigation is directed to. On the other hand, the noun ‘book’ does not co-occur with such phrases. Based on a detailed examination of the properties of nominal phrases in (3a), this chapter argues that their structure contains an inventory of functional projections such as DP, ClassP, NumP, thus lending support to the conclusion that Chinese nominal phrases have DP in their structure.

The similarities between examples like (3a) and (3b) have been noted in many other languages as well. This similarity was reported in English by Chomsky (1970), which discussed the relationship between the two constructions below:

- (4) a. John’s destruction of the city  
 b. John destroyed the city.

---

<sup>1</sup> In Mandarin, the most typical use of *dui* is as a preposition, which literally means ‘towards’. Since this is not the meaning as used in this kind of construction, I keep it untranslated in the gloss.

The noun *destruction* in (4a) is derived from the verb *destroy* in (4b). Both (4a) and (4b) take an object-like phrase *the city* and a subject-like phrase *John*. In this chapter, I call nouns such as *destruction* in (4a) and *diaocho* ‘investigation’ in (3a) derived nominals, although other works have different names for them<sup>2</sup>. The syntactic structure of derived nominals and their relation to their verb counterparts were studied as early as Lees (1960) and Chomsky (1970). One special property of derived nominals is that they exhibit a mixture of nominal and verbal properties (Alexiadou et al., 2007). In terms of external distribution, derived nominals are similar to other nominal phrases:

- (5) a. John’s destruction of the city surprised the public.  
 b. The public was surprised by John’s destruction of the city.

Meanwhile, derived nominals also exhibit properties related to verb phrases. Derived nominals in Hebrew admit adverbs (Alexiadou, 2001: 15):

- (6) Harisat ha-cava et ha-kfar be-axzariyut  
 destruction the army acc the village cruelly  
 ‘The army’s destroying the village cruelly’

The mixture of nominal and verbal properties exhibited by derived nominals indicates a structure which embeds a VP inside a DP. VP is responsible for their verbal properties and DP is supposed to be responsible for all nominal properties (Abney, 1987; Alexiadou et al, 2007; Borsley and Kornfilt, 2000; Engelhardt, 2000; Hazout, 1995; Siloni, 1997)<sup>3</sup>. More recent studies of derived nominals across languages (Alexiadou, 2001, 2007; 2010a, 2010b; 2011a, 2011b)

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<sup>2</sup> Chomsky (1970) calls them derived nominals. Grimshaw (1990) calls them complex event nominals. Hazout (1995) calls them action nominalization constructions. Engelhardt (2000) calls them argument-taking nominals. Alexiadou et al (2010) call them argument supporting nominalizations.

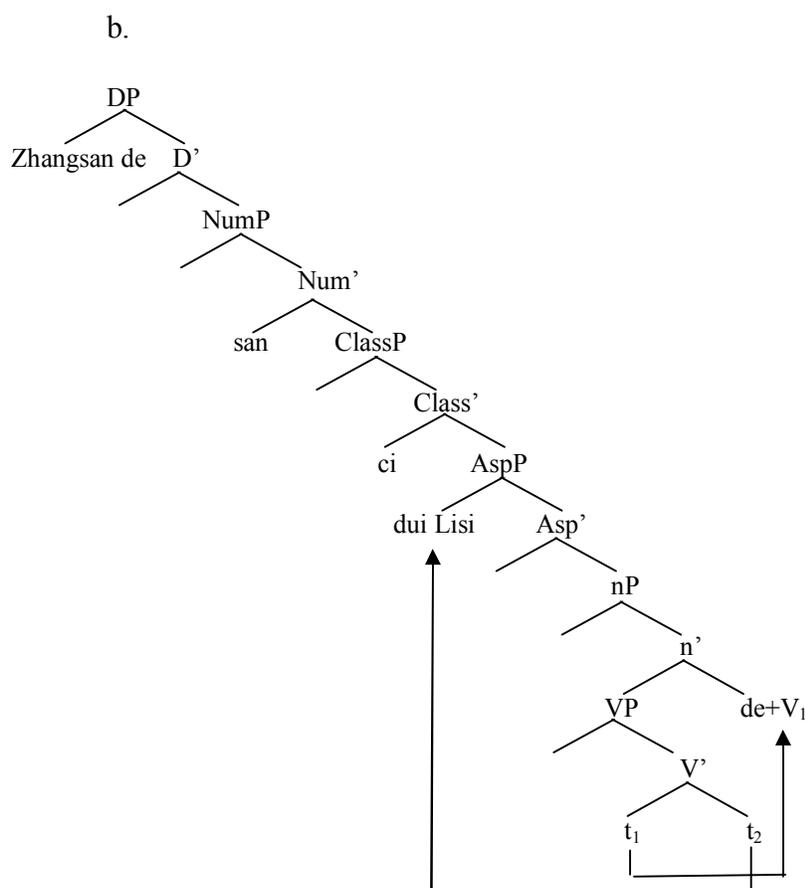
<sup>3</sup> This is the basic assumption of those studies that argue that derived nominals are formed in the syntax component (Alexiadou, 2001, 2011a, 2011b; Borer, 1994, 2005b). This assumption is not adopted by those studies that argue that derived nominals are formed in the lexicon (Chomsky, 1970; Grimshaw, 1990)

have noticed that they exhibit various nominal properties (pluralizability and definiteness, etc.) in the same way as other nominal phrases and therefore, they have a structure with a rich array of functional projections responsible for these nominal properties. Building on these studies, this chapter is aimed at investigating the properties of derived nominals in Chinese and revealing their internal structure. The first study of Chinese derived nominals is Fu (1994), which argues that the syntactic structure of Chinese derived nominals should contain a VP since they show properties related to VP (e.g. allowing VP adjuncts). This VP is embedded under a NP, which explains the external distribution of derived nominals. This chapter focuses on nominal properties of Chinese derived nominals (co-occurrence with numeral-classifier sequences and definiteness properties) and their aspect properties and argues that their structure is richer than just a VP embedded inside a NP<sup>4</sup>. Specifically, this chapter argues for the following structure for Chinese derived nominals:

- (7) a.     Zhangsan de san ci dui Lisi de diaocha  
           Zhangsan de three CI dui Lisi de investigation  
           ‘Zhangsan’s three investigations of Lisi’

---

<sup>4</sup> This chapter is not concerned with a detailed event decomposition of derived nominals (Borer 2005b). The focus is rather on their aspectual properties and, in relation to them, the layers above VP, namely AspectP, ClassP and NumP.



Under this structure, the particle *de* which immediately precedes the derived nominal *diaocha* ‘investigation’ is a nominalizer (Marantz, 2001). The embedded verb *diaocha* raises to this position in order to become a nominalized verb. The phrase *dui Lisi*, which functions as the complement of the derived nominal, is generated inside VP and moves to the specifier of AspP (Borer, 1994). The numeral-classifier sequence realizes ClassP and NumP.

The organization of this chapter is as follows. The first section argues that derived nominals as in (3a) behave like derived nominals in English (4a) and have an event reading in the sense of Grimshaw’s (1990) complex event nominals. This section first introduces the contrast between gerundive nominals and derived nominals in English as identified by Chomsky (1970) and the characteristics of complex event nominals identified by Grimshaw (1990). Finally, this section argues that derived nominals in Chinese have similar properties to complex

event nominals in English. The second section adopts the assumption that there is a VP inside derived nominals in Chinese based on the evidence presented in Fu (1994). Before addressing derived nominals in Chinese, this section presents a brief review of the study by Fu et al (2001), which argues for the presence of VP in the structure of derived nominals in English. Section 3 argues that the structure of Chinese derived nominals also contains other functional projections, such as ClassP, NumP and AspP after reviewing those studies that argue that derived nominals across languages exhibit these functional projections (e.g. Alexiadou et al., 2010). Section 4 argues that the structure of Chinese derived nominals also contains DP in their structure. Section 5 concludes this chapter.

### 5. 1. The event reading of derived nominals in Chinese

Compared with derived nominals in English (8a), derived nominals in Chinese (9a) are not morphologically distinct from the corresponding verb. In general, words in Chinese are not morphologically marked for word class.

- (8) a. John's destruction of the city  
 b. John destroyed the city.
- (9) a. Zhangsan dui Lisi de diaocha  
 Zhangsan dui Lisi de investigation  
 'Zhangsan's investigation of Lisi'
- b. Zhangsan diaocha le Lisi  
 Zhangsan investigate Perf. Lisi  
 'Zhangsan investigated Lisi.'

This section attempts to establish that derived nominals in Chinese behave like derived nominals in English, paving the way for the analysis of their structure in subsequent sections.

### 5.1.1. The characteristics of derived nominals in English

As introduced at the beginning of this chapter, the similarities between (8a) and (8b) were noticed in the early years of generative grammar. In Lees (1960), derived nominals as in (8a) result from a syntactic transformational process which operates on the sentential counterpart as in (8b). This view was challenged by Chomsky (1970), who noticed some differences between derived nominals (10a) and what are called gerundive nominals (10b) by Chomsky (1970: 187)<sup>5</sup>:

- (10) a. John's criticism of the book  
 b. John's criticizing the book

First, compared with gerundive nominals, the productivity of derived nominals is very restricted. For example, many verbs (e.g. *run*, *climb*) do not have a derived nominal counterpart, but nearly all verbs have a gerundive nominal counterpart (e.g. *John's running*, *Tom's climbing the mountain*). Second, the semantic relations between a derived nominal and the associated verb counterpart are very varied and idiosyncratic. These derived nominals have individual ranges of meanings and varied semantic relations to their base forms. For example, the derived nominals *laughter* also means the sound caused by the action of laughing, in addition to the action of laughing. But the semantic relation between a gerundive nominal and the associated verb counterpart is very regular. Third, while derived nominals have the internal structure of a noun phrase, gerundive nominals do not. For example, in contrast to derived nominals, which allow

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<sup>5</sup> In Chomsky (1970), he made a distinction between derived nominals (10a) and gerundive nominals (10b). Meanwhile, it is noted in the literature that gerundive constructions have other variants, among them, the gerundial noun in English (Huddleston and Pullum, 2002):

(i) John's destroying of the city  
 This chapter focuses only on gerundive nominals as in (10b).

articles, demonstratives or articles are not allowed to replace the prenominal genitive *John's* in gerundive nominals (Chomsky, 1970: 187).

- (11) a. The destruction of the manuscript annoyed the author.  
 b. John's destroying the book annoyed us.  
 c. \*That/\*The destroying the book annoyed us.

Moreover, derived nominals can be modified by adjectives but gerundive nominals cannot (Chomsky, 1970: 187):

- (12) a. his prompt answer of the question  
 b. \*his prompt answering the question

Fifth, derived nominals cannot be modified by verb phrase adjuncts while gerundive nominals can (Chomsky, 1970: 193):

- (13) a. \*his criticism of the book before he read it  
 b. his criticizing the book before he read it

Sixth, derived nominals cannot contain aspect but gerundive nominals can. For example, while gerundive nominals may contain the aspect marker *have* (14), there are no derived nominal analogues to it (Chomsky, 1970: 189):

- (14) John's having criticized the play annoyed us.

Seventh, verb-particle constructions in English do not have the derived nominal counterparts but they can undergo the gerundive transformation freely (Chomsky, 1970: 193)

- (15) a. \*his looking of the information up  
 b. his looking up of the information

Another difference is that some transformations that typically occur in sentences (for example, raising to the subject) are barred in derived nominals but are allowed in gerundive nominals (Alexiadou et al. 2007: 482):

- (16) a. John appears to be sick.  
 b. \*John's appearance to be sick  
 c. John's appearing to be sick

Finally, while derived nominals can pluralize (*John's three proofs of the theorem*), gerundive nominals cannot (Chomsky, 1970: 189).

- (17) The differences between derived nominals and gerundive nominals in English

<b>Derived nominals</b>	<b>Gerundive nominals</b>
Limited productivity	Unlimited productivity
Varied semantic relations	Regular semantic relations
Determiners allowed	Determiners not allowed
Adjectives allowed	Adjectives not allowed
Verb phrase adjuncts not allowed	Verb phrase adjuncts allowed
Auxiliaries not allowed	Auxiliaries allowed
Verb-particle constructions not allowed	Verb-particle constructions allowed
Transformations not allowed	Transformations allowed
Pluralizable	Not pluralizable

Moreover, Grimshaw (1990) observes that derived nominals in English are not homogeneous in terms of some properties. Specifically, Grimshaw (1990) claims that derived nominals comprise three distinct classes, complex event nominals, result nominals and simple event nominals. According to her, only complex event nominals behave like verbs in terms of taking arguments obligatorily, in contrast to the other two classes of nominals. Take the word *examination* as an example. It can refer to a concrete entity (a kind of exercise designed to examine people) as a result nominal (18a), which can be replaced by the word *exam*. Or it can refer to an action as a complex event nominal (18b), which must take complements (18c) (Grimshaw, 1990: 49):

- (18) a. The examination/exam was on the table.  
 b. The examination of the patients took a long time.  
 c. \*The exam of the patients took a long time.

Grimshaw provides the following diagnostic tests to distinguish complex event nominals from other nominals<sup>6</sup>, which do not take arguments obligatorily.

The first property of complex event nominals is that they take internal arguments obligatorily. For example, if *the instructor* in the examples below is interpreted as the agent of examination, then it takes an object obligatorily (19b), just as the verb *examine* must take an object (19b) (Grimshaw, 1990: 51).

- (19) a. \*The instructor's examination took a long time.  
 b. The instructor's examination of the papers took a long time.  
 c. The instructor examined \*(the papers).

Meanwhile, Grimshaw notices that some modifiers may force the complex event nominal reading of derived nominals and in this case, unambiguous complex event nominals take internal arguments obligatorily. For example, when complex event nominals are modified by adjectives like *frequent* and *constant*, the internal argument is obligatory (Grimshaw, 1990: 50):

- (20) a. The expression is desirable.  
 b. \*The frequent expression is desirable.  
 c. The frequent expression of one's feelings is desirable.  
 d. We express \*(our feelings)
- (21) a. The assignment is to be avoided.  
 b. \*The constant assignment is to be avoided.

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<sup>6</sup> Grimshaw (1990) specifically focuses on the distinction between complex event nominals and result nominals. So Grimshaw applies the diagnostic tests presented in this section to these two kinds of nominal phrases.

- c. The constant assignment of unsolvable problems is to be avoided.
- d. \*We constantly assign (unsolvable problems)

Moreover, when agent-oriented modifiers co-occur with complex event nominals, the internal argument is obligatory (Grimshaw, 1990: 51-52):

- (22) a. The instructor's intentional/deliberate examination of the papers took a long time.
- b. \*The instructor's intentional/deliberate examination took a long time.

The second distinction between complex event nominals and nominals that cannot take arguments obligatorily is a set of differences in the determiner system. Complex event nominals can co-occur only with the definite article *the* while result nominals may also co-occur with the indefinite article *a*, demonstratives and the numeral *one* (Grimshaw, 1990: 54).

- (23) a. The studied the/an/one/that assignment
- b. The observed the/\*an/\*one/\*that assignment of the problem.

Thirdly, Grimshaw (1990: 54) observes that complex event nominals do not pluralize while result nominals do, in contrast to Chomsky (1970), who claims that derived nominals can pluralize.

- (24) a. The assignments were long.
- b. \*The assignments of the problems took a long time.
- c. The assignment of difficult problems always causes problems.

Fourthly, complex event nominals do not occur predicatively or with equational *be* while result nominals do (Grimshaw, 1990: 55).

- (25) a. That was the/an assignment.
- b. \*That was the/an assignment of the problem.

Fifthly, complex event nominals allow control into an infinitive purpose clause while unambiguous result nominals never allow control (Grimshaw, 1990: 58)<sup>7</sup>.

- (26) a. The book was translated (in order) to make it available to a wider readership.
- b. The translation of the book (in order) to make it available to a wider Readership...
- c. \*The exam in order to determine whether...

Another difference regarding aspectual behavior is that complex event nominals may license aspectual modifiers like *in an hour* (indicating a point of time) and *for six weeks* (indicating a duration) and so on (Grimshaw, 1990: 58):

- (27) a. The total destruction of the city in only two days appalled everyone
- b. \*The total destruction of the city for two days appalled everyone.
- c. The bombing destroyed the city in only two days/\*for two days.
- (28) a. Only observation of the patient for several weeks can determine the most likely...
- b. \*Only observation of the patient in several weeks can determine the most likely...
- c. They observed the patient for several weeks/\*in several weeks

To complete the picture of the properties of derived nominal in English, Davies and Dubinsky (2003: 15-16) observe that complex event nominals allow extraction out of a definite nominal phrase, but result nominals do not.

- (29) a. What did they observe/hear about/remember/decry the production of?
- b. \*Who were the Phillies hoping for the/that victory over?

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<sup>7</sup> Lasnik (1988) and Williams (1985) argue that the controller in such cases is the “event” denoted by the clause or the nominal.

## (30) The differences between complex event nominals and result nominals in English

<b>Complex event nominals</b>	<b>Result nominals</b>
Complements obligatory	Complements not obligatory
Co-occurrence with <i>the</i>	Co-occurrence with demonstratives, numerals
Not pluralizable	Pluralizable
Not as a predicative	As a predicative
Event control allowed	Event control not allowed
Aspectual modifiers allowed	Aspectual modifiers not allowed
Extraction out of definite nominals	No extraction out of definite nominals

According to Grimshaw (1990), complex event nominals have properties different from other nominals because complex event nominals have an event structure, which licenses argument structure. On this view, event nominals select the event argument (Ev) as an external argument (in the sense of Williams, 1981) while result nominals select the referential argument (R) as the external argument. The selection of R leads to a referential reading and the selection of Ev leads to an event reading and this contrast is specified in the lexico-semantic representation of lexical entries.

### 5.1.2. The characteristics of derived nominals in Chinese

This section makes a comparison between derived nominals in Chinese with both gerundive nominals and derived nominals in English. The conclusion is that between gerundive nominals and derived nominals in English, Chinese derived nominals behave like derived nominals, specifically like English's complex event nominals in the sense of Grimshaw (1990). This conclusion paves the way for the subsequent sections, which argues that functional projections present in complex event nominals in other languages (e.g. English) are also found in those in Chinese.

- (31) Zhangsan dui Lisi de diaocha  
 Zhangsan dui Lisi de investigation  
 ‘Zhangsan’s investigation of Lisi’

First, the productivity of derived nominals in Chinese is limited, since not every verb has a derived nominal counterpart.

- (32) a. Zhangsan fanyi le zhe ben xiaoshuo  
 Zhangsan translate Perf. this Cl novel  
 ‘Zhangsan translated this novel’
- b. \*Zhangsan dui zhe ben xiaosuo de fanyi  
 Zhangsan dui this Cl novel de translation

Second, in contrast to gerundive nominals in English, derived nominals in Chinese may also have varied semantic relations to their verb counterparts. For example, one interpretation of the derived nominal *ceyan* ‘test’ denotes an action of testing someone (33a), which can be modified by the predicate *chixu le san tian* ‘last three days’. Meanwhile, *ceyan* ‘test’ has another interpretation, which denotes the result of testing someone.

- (33) a. ta dui Zhangsan de ceyan chixu le san tian.  
 he dui Zhangsan de test last Perf. three day  
 ‘His testing of Zhangsan lasted three days.’
- b. zhe ge ceyan wo hen xihuan.  
 this Cl test I very like  
 ‘This test, I like it.’

Gerundive nominals in English do not have noun phrase structure, as evidenced by the non-co-occurrence with demonstratives or articles. In contrast, derived nominals in Chinese may co-occur with demonstratives, classifiers, etc. which modify nouns.

- (34) zhe san ci dui Lisi de diaocha  
 this three CI dui Lisi de investigation  
 Lit: ‘these three Zhangsan’s investigations of Lisi’

As against gerundive nominals in English, which cannot be modified by adjectives, derived nominals in Chinese may be modified by adjectives.

- (35) Zhangsan jingchang de dui Lisi de piping  
 Zhangsan constant de dui Lisi de criticism  
 ‘Zhangsan’s constant criticism of Lisi’

As opposed to gerundive nominals in English that can be modified by verb phrase adjuncts, derived nominals in Chinese cannot co-occur with constituents which function as adverbs (e.g. adverbial clauses):

- (36) \*Lisi huijia yihou Zhangsan dui Lisi de piping  
 Lisi go home after Zhangsan dui Lisi de criticism

Another difference between gerundive nominals in English and derived nominals in Chinese is that the latter cannot co-occur with aspect markers.

- (37) a. Zhangsan zai piping Lisi.  
 Zhangsan be criticize Lisi  
 ‘Zhangsan is criticizing Lisi.’  
 b. \*Zhangsan zai dui Lisi de piping  
 Zhangsan be dui Lisi de criticism

Although some transformations (e.g. raising to subject) may occur in English gerundive nominals, Chinese derived nominals do not allow raising.

- (38) a.   women keneng piping Lisi.<sup>8</sup>  
           we be possible criticize Lisi  
           ‘It is likely that we criticize Lisi.’
- b.   \*women keneng dui Lisi de piping<sup>9</sup>  
           we be possible dui Lisi de criticism

Another piece of evidence is that in contrast to sentences, which allow resultative V+V compounds, these compounds cannot occur in a sentence’s derived nominal counterpart (Fu, 1994).

- (39) a.   ta da shang le Lisi  
           he hit hurt Perf. Lisi  
           ‘He hit and hurt Lisi.’
- b.   \*ta dui Lisi de da shang  
           he dui Lisi de hit hurt

In contrast to gerundive nominals, which do not pluralize, derived nominals in Chinese may co-occur with numeral-classifier sequences to express plurality.

- (40) Zhangsan de san ci dui Lisi de diaocha  
           Zhangsan de three CI dui Lisi de investigation  
           ‘Zhangsan’s three investigations of Lisi’

<sup>8</sup> Li (1990: 123) argues that *keneng* ‘be possible’ is a raising verb.

<sup>9</sup> In this example, *keneng* cannot be interpreted as an adjective meaning ‘possible’ since adjectives that modify derived nominals in Chinese must go with the particle *de*.

Based on the differences between derived nominals in Chinese and gerundive nominals in English as illustrated above, we conclude that the former do not behave like the latter.

(41) Derived nominals in Chinese as compared to gerundive nominals in English

Derived nominals in English	Derived nominals in Chinese	Gerundive nominals in English
Limited productivity	Limited productivity	Unlimited productivity
Varied semantic relations	Varied semantic relations	Regular semantic relations
Determiners allowed	Demonstratives allowed	Determiners not allowed
Adjectives allowed	Adjectives allowed	Adjectives not allowed
Verb phrase adjuncts not allowed	Verb phrase adjuncts not allowed	Verb phrase adjuncts allowed
Auxiliaries not allowed	Aspect markers not allowed	Auxiliaries allowed
Verb-particle constructions not allowed	Verb-verb constructions not allowed	Verb-particle constructions allowed
Transformations not allowed	Transformations not allowed	Transformations allowed
Pluralizable	Pluralizable	Not pluralizable

Next, let us compare derived nominals in Chinese with complex event nominals in English in terms of the diagnostic tests summarized in Grimshaw (1990). The first characteristic of complex event nominals is that they take internal arguments obligatorily, especially when other constituents force the complex event nominal reading.

(42) a. Zhangsan dui Lisi de piping chixu le hen chang shijian.  
 Zhangsan dui Lisi de criticism last Perf. very long time  
 ‘Zhangsan’s criticism lasted a very long time’

b. \*Zhangsan de piping chixu le hen chang shijian.<sup>10</sup>  
 Zhangsan de criticism last Perf. very long time

In the example above, the verb phrase *chixu le hen chang shijian* ‘last a very long time’ disambiguates *piping* ‘criticism’ to the complex event nominal reading, therefore the internal argument *dui Lisi* ‘dui Lisi’ is obligatory.

<sup>10</sup> I checked the acceptability of this sentence with some Mandarin native speakers and they said that this sentence is not as good as the sentence in (42a).

- (43) a. Zhangsan *lūci/jinchang* de dui Lisi de *piping* hen fanren.  
 Zhangsan frequent/constant de dui Lisi de criticism very annoying  
 ‘Zhangsan’s frequent/constant criticism of Lisi is very annoying.’
- b. \*Zhangsan *lūci/jinchang* de *piping* hen fanren.  
 Zhangsan frequent/constant de criticism very annoying

In the same way, the modifier *lūci/jinchang de* ‘frequent/constant’ forces the complex event nominal reading of *piping* ‘criticism’, and so the internal argument *dui Lisi* ‘dui Lisi’ becomes obligatory.

In addition, when agent-oriented modifiers co-occur with derived nominals, the internal argument is obligatory.

- (44) a. Zhangsan *edu* de dui Lisi de *piping* yinfa le kangyi.  
 Zhangsan malicious de dui Lisi de criticism cause Perf. protest  
 ‘Zhangsan’s malicious criticism of Lisi caused protests.’
- b. \*Zhangsan *edu* de *piping* yinfa le kangyi.  
 Zhangsan intentional de criticism cause Perf. protest

So far, the tests above, which show that when a derived nominal is forced to have a complex event nominal in the sense of Grimshaw (1990), the *dui* phrase is obligatory. I take this evidence as showing that the *dui* phrase is the complement of the derived verb.

In addition, the example in (40) indicates that derived nominals may co-occur with demonstratives, numerals and classifiers, which often modify nouns. This is consistent with Chomsky’s (1970) observation about derived nominals in English.

In contrast to complex event nominals in English, however, derived nominals in Chinese may appear as predicatives.

- (45) zhe jiu shi Zhangsan dui Lisi de piping.  
 this just be Zhangsan dui Lisi de criticism  
 ‘This is Zhangsan’s criticism of Lisi.’

Derived nominals in Chinese allow control into an infinitive adjunct.

- (46) dui Lisi de piping yibian yinqi dajia de zhuyi  
 dui Lisi de criticism to make people de attention  
 ‘the criticism of Lisi in order to make people pay attention’

The following example shows that derived nominal may license aspectual modifiers:

- (47) Zhangsan changda san ge xiaoshi de dui Lisi de piping.  
 Zhangsan as long as three Cl hour de dui Lisi de criticism  
 ‘Zhangsan’s criticism of Lisi for three hours’

Derived nominals in Chinese may allow extraction, which is illustrated with the word *ceyan* ‘test’. As noted in (33), this word is ambiguous between an event reading and a result nominal reading. These two readings are different in terms of extraction.

- (48) a. Zhangsan dui shui de ceyan chixu le san tian?  
 Zhangsan to who de examination last Perf. three day  
 ‘Who has Zhangsan’s examination of lasted three days?’  
 b. \*Zhexie guanyu shenme de ceyan hen rongyi?  
 these about what de test very easy

Moreover, Fu (1994) notes two special properties of Chinese derived nominals. First, classifiers that co-occur with derived nominals in Chinese (e.g. *ci*, *hui* and *bian*) indicate the number of times that something happens repetitively (Fu, 1994: 66). In addition, when a derived nominal co-occur with these classifiers, the internal argument is obligatory.

- (49) a. Zhangsan piping le Lisi si ci/hui/bian.  
Zhangsan criticize Perf. Lisi four Cl  
'Zhangsan criticized Lisi four times.'
- b. zhe si ci/hui/bian Zhangsan dui Lisi de piping hen fanren.  
this four time Zhangsan dui Lisi de criticism very annoying  
Lit: 'these four times of zhangsan's criticism of Lisi is very annoying.'
- c. \*zhe si ci/hui/bian Zhangsan de piping  
this four time Zhangsan de criticism

The second property about derived nominals in Chinese is that they can function as the object of a verb *jinxing*, which means 'do' or 'conduct' (Fu, 1994: 67).

- (50) Zhangsan jinxing le dui Lisi de diaocha  
Zhangsan do/conduct Perf. dui Lisi de investigation  
'Zhangsan conducted the investigation of Lisi.'

(51) Derived nominals in Chinese as compared to complex event nominals in English

Complex event nominals in English	Derived nominals in Chinese	Result nominals in English
Complements obligatory	Complements obligatory	Complements not obligatory
Co-occurrence with <i>the</i>	Co-occurrence with numeral-classifier sequences	Co-occurrence with demonstratives, numerals
Not pluralizable	Pluralizable	Pluralizable
Not as a predicative	As a predicative	As a predicative
Event control allowed	Event control allowed	Event control not allowed
Aspectual modifiers allowed	Aspectual modifiers allowed	aspectual modifiers not allowed
Extraction out of definite nominals	Extraction out of definite nominals	No extraction out of definite nominals
	Co-occurrence with classifiers like <i>ci</i> and <i>hui</i>	
	As the object of <i>jinxing</i> 'process'	

To sum up, a closer examination of the properties of derived nominals in Chinese, particularly in comparison with gerundive nominals and complex event nominals in English,

indicates that derived nominals in Chinese behave like complex event nominals in English in the sense of Grimshaw (1990).

## 5.2. The presence of VP in the structure of derived nominals

According to recent syntactic approaches to the derivation of derived nominals, properties related to verb phrases exhibited by derived nominals are due to the presence of a VP within the syntactic structure of these nominals (Borer, 1994; 1999a, 1999b; 2005b; Borsley and Kornfilt, 2000; Fu, et al., 2001; Hazout, 1991, 1995). That is, these studies postulate a VP inside the structure of derived nominals to account for the properties related to verb phrases. This section first reviews some evidence used in Fu et al (2001) to support the existence of a VP in the structure of derived nominals in English. The second part presents evidence from Fu (1994) for the existence of VP in the structure of Chinese derived nominals.

### 5.2.1. The presence of VP in English derived nominals

Fu et al (2001) notes two pieces of evidence to support the existence of VP inside the structure of what they call *process nominals*<sup>11</sup>. One piece of supporting evidence comes from the fact that these derived nominals may contain adverbs which are typically adjoined to VP. For example, there is a contrast between the two sentences in (52): while the derived nominal *transformation* can be modified by the adverb *rapidly*, the nominal *metamorphosis* (which does not have an event reading) cannot be modified by the same adverb (Fu et al., 2001: 554-555).

(52) a. His transformation into a werewolf so rapidly was unnerving.

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<sup>11</sup> In Fu et al. (2001), they did not give a precise definition of what they mean by process nominals. Basically, they mean words like *explanation* and *exploration*, which are derived from the corresponding verbs. They acknowledge that in most of the cases, Grimshaw's complex event nominals are co-extensive with nouns derived from verbs (pp577), so for the sake of consistency, I use the term 'derived nominals' when introducing their study.

- b. ??His metamorphosis into a werewolf so rapidly was unnerving.

Below are more examples from Fu, et al (2001), where derived nominals are modified by adverbs.

- (53) a. (While) the removal of evidence purposefully (is a crime), the removal of evidence unintentionally (is not).  
 b. (I disapprove of) Jane's resignation so suddenly.  
 c. Collaboration of the witnesses voluntarily (has greatly sped up the process).

On the other hand, sentential adverbs, which are adjoined to IP, are impossible in derived nominals (Fu et al., 2001: 556):

- (54) a. \*His explanation of the problem fortunately to the tenants (did not cause a riot).  
 b. \*His removal of the evidence presumably (promised a lengthy trial).

Their explanation is that derived nominals have a VP structure but not a full sentence structure.

The second piece of evidence for a VP in derived nominals is that the anaphor *doing so* takes as its antecedent another derived nominal (the underlined portion) (Fu et al. 2001: 571):

- (55) a. Sam's destruction of his documents this morning was preceded by Bill's doing so.  
 b. His removal of the garbage in the morning and Sam's doing so in the afternoon were surprising.

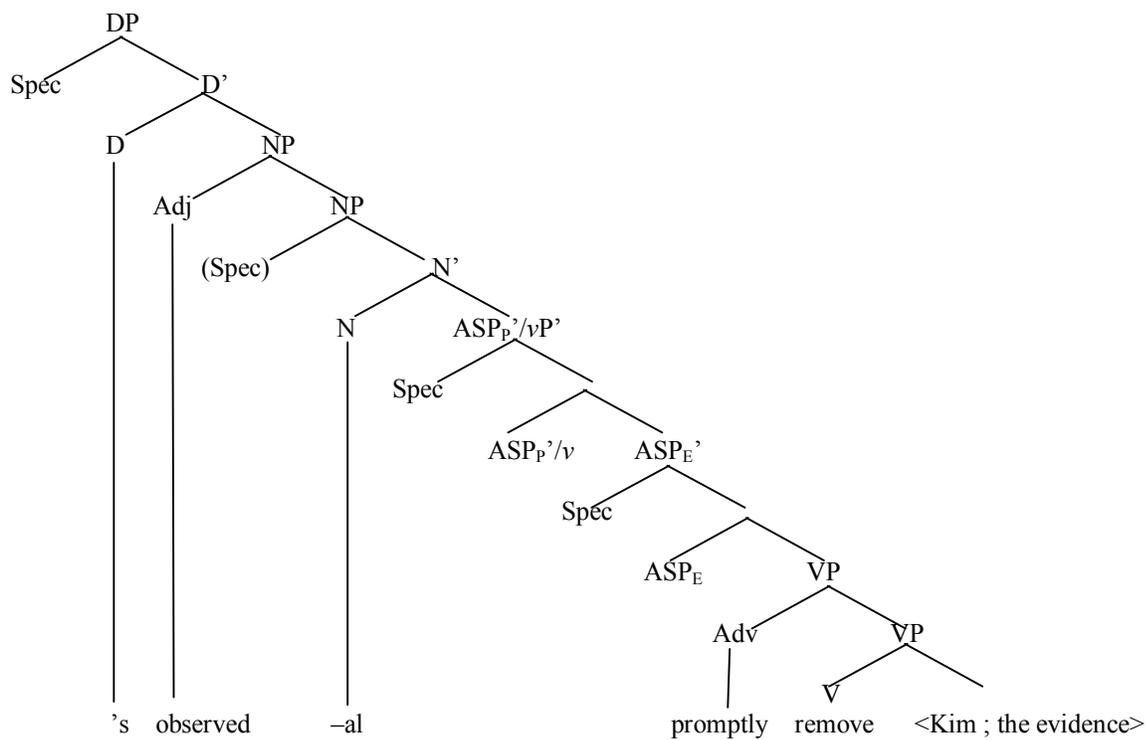
The doing so test indicates the presence of VP because some studies (Fu, et al, 2001: 571; Lakoff and Ross, 1972; Speas, 1990) argue that the antecedent of *do so* (the underlined part) is a VP structure:

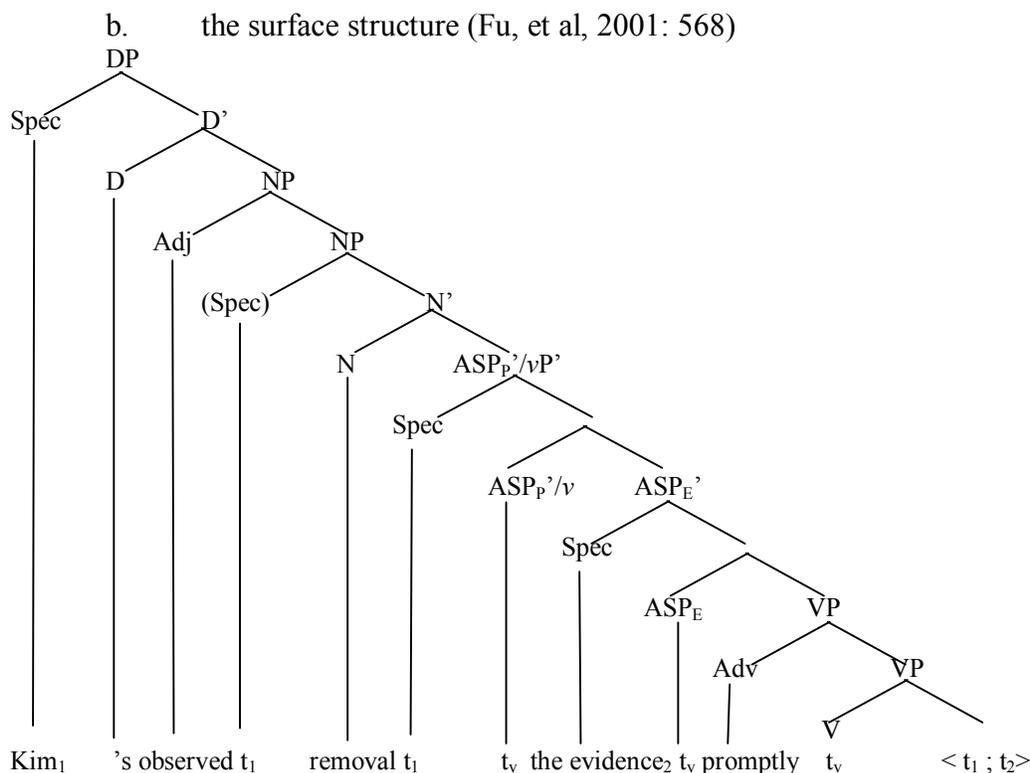
- (56) a. He removed the garbage yesterday and I did so too.  
 b. He removed the garbage yesterday and I did so today.  
 c. \*He moved the green container and I did so the black container.

Assuming that *do so* must have a VP/V' antecedent, Fu et al (2001) argue that the examples in (55) indicate that there must be a VP/V' in the structure of derived nominals.

Furthermore, they propose the following derivation of the derived nominal *Kim's observed removal of the evidence promptly*.

(57) a. the underlying structure (Fu, et al, 2001: 567)





Their assumption is that functional projections denoting aspect<sup>12</sup> are responsible for the interpretation of all direct arguments (Borer, 1994, 1998, 1999b), which is based on the observation that the aspect properties of verb phrases are also influenced by complements of the verb (Borer, 1994: 23).

(58) a. Kim built the house.

b. Kim built houses.

The clause in (58a), containing a definite object, indicates an achievement in the sense of Vendler (1957, 1967), which is finished at a single moment, while the clause in (58b), containing a bare plural object, indicates an activity, which goes on for some time. Borer argues that these aspect distinctions can be denoted by functional projections on top of VP. Specifically, the so-called external arguments are interpreted in the specifier of a functional projection (ASP<sub>P</sub> or

<sup>12</sup> The details about aspect will be introduced in Section 3.1.

alternatively  $v$ ) and internal arguments are interpreted in the specifier of a functional projection that denotes telicity (ASP<sub>E</sub>).

In summary, the study by Fu et al (2001) proposes a syntactic derivation for derived nominals, which includes a VP. The existence of a VP projection has been widely accepted in syntactic approaches to the structure of derived nominals (Alexiadou, 2001; Borer, 1991, 1997, 1999a, 1999b; Engelhardt, 2000; Fu, et al., 2001; Hazout, 1991, 1995; Valois, 1991)

### 5.2.2. The presence of VP in Chinese derived nominals

Fu (1994) is the first study to investigate the structure of derived nominals in Chinese. He observes that they exhibit properties related to verb phrases in clauses and conclude that these properties are derived from an embedded VP in the structure of Chinese derived nominals. He observes similar reconstruction effects for compound reflexives (*taziji* ‘himself’) in both clauses and derived nominals in Chinese. A compound reflexive contained in a fronted VP must be bound by the lower subject of the clause (59a); the same compound reflexive contained in a fronted constituent must be bounded by the subject of the derived nominal (Fu, 1994: 79).

- (59) a. piping taziji\*<sub>i/j</sub>, Zhangsan<sub>i</sub> zhidao Lisi<sub>j</sub> juehui bu hui.  
 criticize himself Zhangsan know Lisi definitely not will  
 ‘Criticize himself\*<sub>i/j</sub>, Zhangsan<sub>i</sub> knows Lisi<sub>j</sub> definitely will not.’
- b. dui tazij\*<sub>i/j</sub> de piping, Zhangsan<sub>i</sub> zhidao Lisi<sub>j</sub> juehui bu hui zuo  
 dui himself de criticism Zhangsan know Lisi never not will do  
 ‘Criticism of himself\*<sub>i/j</sub>, Zhangsan<sub>i</sub> knows that Lisi<sub>j</sub> will never do.’

The example (59a) is taken from Huang (1993:199), which shows that the subject of the embedded clause *Lisi* is base generated inside the fronted VP. In the example (59b), the fronted

constituent *dui taziji de piping* ‘criticism of himself’ exhibits the same reconstruction effect, and Fu argues that this example can indicate that the derived nominal contains a verb phrase.

In addition, Fu (1994) also observes similar word orders among modifiers in clauses and in derived nominals. First, he notices that in derived nominals, the subject phrase has to precede the *dui* phrase, which indicates the complement (Fu, 1994: 86):

- (60) a.     wo tingshuo le Zhangsan dui zhe ge anjian de diaocha  
           I     hear Perf. Zhangsan dui this Cl case de investigation  
           ‘I head of Zhangsan’s investigation of this case.’
- b.     \*wo tingshuo le dui zhe ge anjian Zhangsan de diaocha  
           I     hear Perf. dui this Cl case Zhangsan de investigation

However, the subject and the *dui* phrase may have two orders in clauses (Fu, 1994: 87).

- (61) a.     Zhangsan dui zhe anjian diaocha le san tian.  
           Zhangsan dui this case investigate Perf. three days  
           ‘Zhangsan investigated this case for three days.’
- b.     Dui zhe ge anjian Zhangsan diaocha le san tian.  
           dui this Cl case Zhangsan investigate Perf. three day  
           ‘Regarding this case, Zhangsan investigated three days’

Fu (1994) argues that the *dui* phrase in (61b) is moved to the beginning of the sentence, which is evidenced by the island effect (Fu, 1994: 87).

- (62) a.     wo bu zhidao Zhangsan dui zhe ge anjian diancha de shijian  
           I not know Zhangsan dui this ge case investigate de time  
           ‘I do not know the time that zhangsan spent on investigating this case.’

b. \*wo bu zhidao dui zhe ge anjian Zhangsan diancha de shijian.

I not know dui this CI case Zhangsan investigate de time

The island effect in the case of clauses in (62) means that the *dui* phrase is base generated in a position below the subject. Fu argues that the same order between the subject and the *dui* phrase between derived nominals (60a) and clauses (61a) indicates that the *dui* phrase is base generated after the subject in both nominal phrases and clauses.

Another similarity is that both in derived nominals and in clauses, temporal phrases have to precede other VP-adjuncts (Fu, 1994: 89):

(63) a. wo ting le tamen zuotian he xueshengmen de taolun  
I hear Perf. they yesterday with students de discussion  
'I heard of their discussion with students yesterday.'

b. \*wo ting le tamen he xueshengmen zuotian de taolun  
I hear Perf. they with students yesterday de discussion

(64) a. tamen zuotian he xueshengmen taolun le san ge xiaoshi.  
they yesterday with students discuss Perf. three CI hour  
'They discuss with students for three hours yesterday.'

b. \*tamen he xueshengmen zuotian taolun le san ge xiaoshi.  
they with students yesterday discuss Perf. three CI hour

The similarities between clauses and derived nominals in terms of the properties related to verb phrases indicate that there must be a VP inside the structure of derived nominals.

Meanwhile, Fu also observes one difference between clauses and derived nominals. For example, while duration phrases follow verbs in clauses, duration phrase precede derived verbs. And duration phrases have to follow the *dui*-phrase (Fu, 1994: 90-91).

- (65) a. Zhangsan diaocha le zhe ge anjian liang tian le.  
 Zhangssan investigate Perf. this CI case two day Perf.  
 ‘Zhangsan investigated this case for two days.’
- b. \*Zhangsan liang tian diaocha le zhe ge anjian le.  
 Zhangssan two day investigate Perf. this CI case Perf.
- (66) a. Zhangsan dui zhe ge anjian (de) liang tian de diaocha  
 Zhangsan dui this CI case de two day de investigation  
 ‘Zhangsan’s investigation of this case for two days’
- b. \*Zhangsan liang tian (de) dui zhe ge anjian de diaocha  
 Zhangsan two day de dui this CI case de investigation

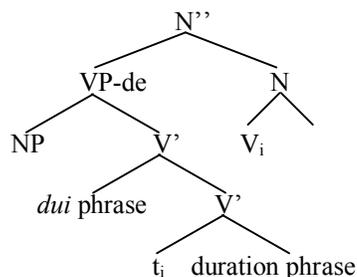
Fu argues that this difference in terms of the word order and the similarities between clauses and nominal phrases indicate an analysis in which the verb in the embedded verb phrase raises to the head of NP, thus leading to the word order concerning the duration phrase. Specifically, Fu (1994: 133) proposes the following structure of Chinese derived nominals<sup>13</sup>.

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<sup>13</sup> Fu (1994: 142) speculates that *dui* phrases occur somewhere inside the embedded VP based on the evidence that *dui* phrases can occur in both clauses and derived nominals, which both contain VP, but not in result nominals, which do not contain VP.

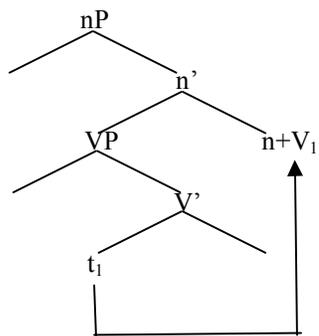
- (i) a. Ta diaocha le zhe ge anjian.  
 he investigate Perf. this CI case  
 ‘He investigated this case.’
- b. Ta jinxing le dui zhe ge anjian de diaocha.  
 he process Perf. dui this CI case de investigation  
 ‘He conducted the investigation of this case.’
- c. ?Ta dui zhe ge anjian de na pian diaocha fabiao le.  
 he dui this CI case de that CI investigation report publish Perf.  
 ‘His investigation report of this case was published.’

(67)



For the purpose of arguments in subsequent sections, I will assume with Fu (1994) that derived nominals in Chinese contains an embedded VP. In contrast to his analysis, I assume that the particle *de*, which marks the following verb as a nominalized verb, heads a projection  $nP$ . This nominalizer introduces a nominal structure and leads to further projections (DP, NumP and ClassP) which account for nominal properties of derived nominals (Alexiadou et al, 2010; Hazout, 1995; Marantz, 2001). Similar to Fu (1994), I assume that the embedded verb may raise to  $n$  through head movement (Travis, 1984) in order to explain the observation that duration phrases in derived nominals occur before the verb. A tentative structure for complex event nominals in Chinese is as follows:

(68)



Building on this structure, I will argue in subsequent sections that derived nominals in Chinese contain further projections, which are responsible for their other properties.

### **5.3. The presence of more functional projections in Chinese derived nominals**

Besides VP inside the structure of derived nominals, it is reported that derived nominals exhibit other properties, which reveal more functional projections in their structure than just VP. For example, the aspect properties of derived nominal have led to positing an AspP on top of VP inside the derived nominal structure (Alexiadou et al., 2010). Moreover, a detailed examination of the nominal properties of derived nominals reveals other functional projections inside the structure of derived nominals. For example, the observation that derived nominals can be pluralized has led to positing ClassP and NumP inside the derived nominal structure (Alexiadou, 2011a, 2011b; Alexiadou et al., 2010; Kamiya, 2001; Martin, 2009). These studies have enriched the internal structure of derived nominals, which was reported by earlier studies to contain only VP for the verbal properties and DP for the nominal properties (Alexiadou, 2001; Borsley and Kornfilt, 2000; Fu et al, 2001). This section examines the aspect and pluralization properties of derived nominals in Chinese and argues that, similar to derived nominals in other languages, their structure contains functional projections such as AspP, ClassP and NumP.

The first subsection presents a brief review of Alexiadou et al. (2010), which examines the interaction between aspect and pluralization of derived nominals across languages and attests such functional projections as AspP, ClassP and NumP. The second subsection examines the aspect properties of Chinese derived nominals and the third subsection focuses on pluralization properties of Chinese derived nominals.

Before introducing the aspect properties of derived nominals, some clarification is needed regarding aspect. In this chapter, I make a distinction between inner (or lexical) aspect and outer

(or grammatical) aspect (Borik, 2002; Verkuyl, 1996)<sup>14</sup>. The former covers distinctions among properties of different event types denoted by different classes of verbs (Dowty, 1979; Vendler, 1957, 1967). Vendler (1957, 1967) proposed a four-way classification of verbs among states, activities, achievements and accomplishments. The following is a brief definition of these four classes of verbs with examples (Alexiadou, 2010a: 502):

- (69) a. activities: events that go on for a time, but do not necessarily terminate at any given point.  
Mary danced for an hour.
- b. accomplishments: events that proceed toward a logically necessary terminus.  
Mary built three houses in a year.
- c. achievements: events that occur at a single moment, and therefore lack continuous tenses (e.g., the progressive).  
The window broke.
- d. states: non-actions that hold for some period of time but lack continuous tenses  
Mary knows the answer.

The outer (or grammatical) aspect focuses on a temporal perspective of the event and covers the perfective and imperfective uses of a verb:

- (70) a. Mary was building a house. (imperfective)  
b. Mary built the house and then sold it. (perfective)

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<sup>14</sup> Smith (1991) employs the distinction between situation aspect and viewpoint aspect to refer to this contrast.

In this chapter, I also assume that telicity is associated with lexical aspect and an event is telic if it involves an endpoint (Alexiadou, 2010a; Rothstein, 2004). On this assumption, both accomplishments and achievements are telic but activities and states are atelic. For example, if John loves Mary, then the event of loving will not (necessarily) come to an end. If John broke a window, the event came to an end once the window was broken. In addition, not only verbs themselves but also other materials in the clause (e.g. the object or adjunct taken by the verb) contribute to the inner aspect (Borer 2005b; Dowty, 1991; Ramchand 2008; Tenny, 1987, 1994; Verkuyl, 1972). I assume with Alexiadou (2010a, 2010b) that it is the VP that encodes inner aspect and AspP on top of VP that encodes outer aspect:

(71) [AspP [VP]]

### 5.3.1. Aspect and pluralization properties in other languages

Alexiadou et al. (2010) compare two nominalization patterns in Romanian, the infinitive and the supine. Below is an illustration of the two nominalization patterns that are derived from the same base verb *citi* ‘read’ (Cornilescu, 2001: 468).

- (72) a. the infinitive  
       *citi-re*  
       read-INF
- b. the supine  
       *citit-ul*  
       read-SUP-the

These two nominalization patterns show very different properties. First, the infinitive can be pluralized but the supine cannot (Alexiadou et al., 2010: 542):

- (73) a. a conduce: conduce-r-e /conduce-r-i  
to drive: drive-INF-F.SG/drive-INF-PL
- b. a conduce: condu-s /\*condu-s-uri  
to drive: drive-SUP/drive-SUP-PL

The second difference concerns other nominal properties, such as gender, case etc. The infinitives have the [+fem] gender, as they have the same singular–plural endings *-e* vs. *-i* just as feminine common nouns (Alexiadou et al, 2010: 542):

- (74) a. cînta-r-e /cîntă -r-i  
sing-INF-F.SG/sing-INF-PL
- b. floar-e /flor-i  
flower-F.SG/flower-PL

But gender distinctions are not as obvious morphologically in the supine as in the infinitive. The supines are traditionally considered to have neuter gender: they have a null ending for singular (like masculine nouns) and *-uri* in the plural (like some feminine nouns).

- (75) weekend – weekend-uri  
weekend – weekends

Another way of illustrating this difference is that the infinitive successfully establishes anaphoric relations with the feminine demonstrative *aceasta*, as illustrated by (76a), while the supine rejects the masculine/neuter syncretic form *acesta* and can only be referred to by the genderless form *asta*, the common anaphor for CPs in Romanian (Alexiadou et al, 2010: 543):

- (76) a. Am vorbit despre interpretarea rolului Hamlet în general.  
‘We spoke about the interpretation.INF of the role of Hamlet in general.’

Se pare ca aceasta/??asta îi consacră indubitabil pe actorii tineri.

‘Apparently, this.F/ ? ?it undoubtedly validates the young actors.’

b. Că Ion a venit, asta ştiu.

‘That Ion came, I know it.’

Another difference is that the supine has defective case declension since in contrast to the infinitive, the supine is unnatural with the genitive case (Alexiadou et al, 2010: 543-544):

(77) a. Alunecările de teren apar din cauza

flows.the of terrain occur from cause

tăierii/\*tăiatului pădurilor.

cut.INF.GEN/cut.SUP.GEN woods.GEN

‘Mudflows occur because woods are being cut down.’

Picallo (2006) argues that gender and declension information, typical to nouns, is hosted by a Classifier Phrase (ClassP) and that the gender features under ClassP are a prerequisite for Number Phrase (NumP). Alexiadou et al (2010) argue that the infinitive contains ClassP and NumP, which are both absent in the supine.

Another difference between the infinitive and the supine concerns their interaction with lexical aspect. For example, the verb phrase which means ‘read the book’ is telic or bounded. While the infinitive preserves the telic or bounded<sup>15</sup> specification of the verb phrase, the supine

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<sup>15</sup> Alexiadou et al (2010) assume that count nouns are similar to telic and perfective events in being BOUNDED, and mass nouns to atelic and imperfective events in being UNBOUNDED (Jackendoff, 1991; Mourelatos, 1978). To illustrate the difference between BOUNDED and UNBOUNDED, according to Jackendoff (1991: 18-19), a count noun, say *apple*, cannot divide its referent up and still get something named by the same count noun, i.e. another apple. By contrast, with a mass noun such as *water*, one can divide its referent up and still get something describable as water (as long as one does not divide it up so small as to break up the molecular structure). The same criterion applies to events versus processes. One cannot divide up the event *The light flashed* and get smaller events describable as *The light flashed*, but one can divide up a process described as *Bill slept* into smaller parts also describable as *Bill slept*. The difference between the two is that the former (bounded entities/ events) can pluralize

changes this specification to unboundedness, thus making the whole supine ungrammatical

(Alexiadou et al., 2010: 546):

(78) Citirea /\*cititul cărții a avut loc ieri /în sala

read.INF.the/read.SUP.the book.GEN has had place yesterday/in

de lectură.

room of reading

‘The reading of the book took place yesterday/in the reading room.’

More evidence that the supine introduces aspect shift (de Swart, 1998) is that with an achievement verb, which is [+bounded], the supine is grammatical and expresses habituality, which is [-bounded] (Alexiadou et al., 2010: 548):

(79) sositul lui Ion cu întârziere la toate întâlnirile importante

arrive.SUP.the the.GEN Ion with delay at all meetings important

‘Ion’s (habit of) arriving late at all important meetings’

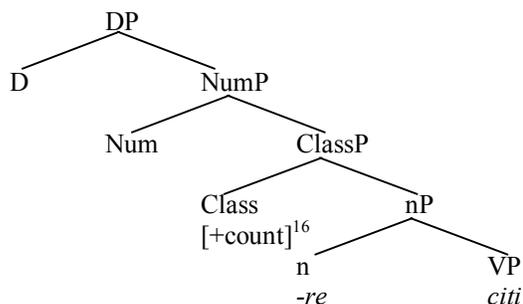
Given that the supine introduces aspect shift, there must be an AspP above VP.

Based on the differences between the infinitive and the supine, Alexiadou et al. (2010: 550) propose the following structures for the infinitive and the supine, respectively.

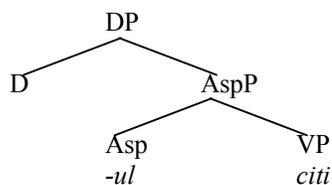
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while the latter (unbounded entities/ events) cannot. They use Jackendoff (1991)’s feature [+bounded] to characterize both nominal and verbal entities with respect to number and aspect.

(80) a. the infinitive



b. the supine



The analysis of the infinitive and the supine suggests three generalizations: that only bounded entities can be pluralized (Jackendoff 1991; Mourelatos 1978), that unbounded events, since they cannot pluralize, do not have ClassP in their structure and that AspP is incompatible with NumP. But the second and third of these generalizations prove not to be correct.

Contrary to the second generalization that unbounded events do not have ClassP, Spanish nominal infinitives (SNIs) indicate that ClassP is still present, even though they cannot pluralize as unbounded event nominals. First, SNIs carry atelic/unbounded aspect, since they systematically reject telic verbs. They are ungrammatical with achievements and accomplishments, as seen in (81a) and (81b). But a typical accomplishment that becomes atelic due to a bare plural argument, as in (81c), is fine. As expected, SNIs also reject pluralization, in (81d) (Alexiadou et al, 2010: 558):

<sup>16</sup> Given that only bounded entities/events can be pluralized, they propose that Class carries the [+count] specification for Class.

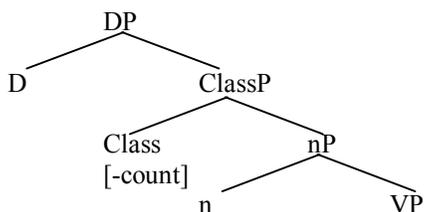
- (81) a. \*El llegar tardí o de Juan nos preocupó a todos.  
 the arrive.INF late of Juan us worried to all
- b. \*El comprar una casa de Juan nos alegró´ .  
 the buy.INF a house of Juan us made.happy
- c. el constante construir casas de los alban~ iles  
 the constant build.INF.SG houses of the workers
- d. \*los (constantes) construieres casas de los alban~ iles  
 the constant build.INF.PL houses of the workers

SNIs carry masculine gender, which indicates the presence of ClassP according to Picallo (2006). In the following example, an SNI headed by the nominalized verb *mirar* ‘gaze’ can be referred to only by the masculine pronoun *él* but not by the default neuter pronoun *ello* (Alexiadou et al., 2010: 559):

- (82) Acostumbrado al dulce mirar de su amada, ya no podía vivir sin él/\*ello.  
 used.to to.the sweet gaze.INF of his beloved now not could live without him/it  
 ‘Used to the sweet gaze of his loved one, he could no longer live without it.’

Since the nominalizer *-r* only selects atelic verbs, the Classifier in SNIs should carry a [-count] specification. Moreover, given that only bounded entities/events can be pluralized, the [-count] specification of Class should block NumP. Alexiadou et al (2010) propose the following structure for SNIs (2010: 560):

- (83) Spanish nominal infinitives (atelic)



Although SNIs do not pluralize, their structure still contains a ClassP, which goes against the generalization based on the supine in Romanian that unbounded events do not have ClassP in their structure.

Furthermore, the generalization that AspP is incompatible with NumP can be shown to be incorrect when considering nominalizations in Polish, a language which exhibits a very rich aspectual morphology. For example, given a bare verb form *czyta* ‘read’, it may be inflected to express either a perfective *prze-czytał* or an imperfective *czytał* aspect, which indicates the presence of AspP. The co-occurrence of these two inflected verb forms with aspectual modifiers (*w dwie godziny* ‘in two hours’ and *przez dwie godziny* ‘for two hours’) is illustrated below (Alexiadou et al, 2010: 563):

- (84) a. Jan przeczytał/\*czytał gazetę w dwie godziny.  
 Jan read.PF /read.IMPF newspaper in two hours  
 ‘Jan read the newspaper in two hours.’
- b. Jan czytał /\*prze-czytał gazetę przez dwie godziny.  
 Jan read.IMPF/read.PF newspaper for two hours  
 ‘Jan read newspapers for two hours.’

In the nominalized form, the nominalizing morpheme *-nie/-cie* preserves the (im)-perfective aspect of the verb (Alexiadou et al., 2010: 563):

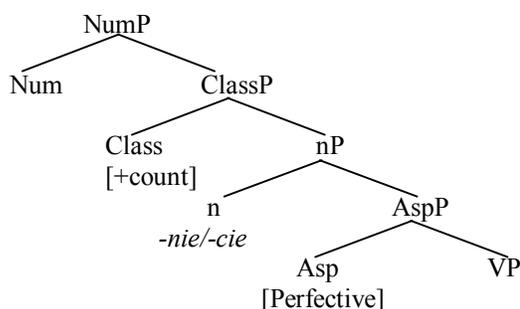
- (85) a. przeczyta-nie/\*czyta-nie gazety w dwie godziny  
 read.PF-NIE /read.IMPF-NIE newspaper.GEN in two hours
- b. czyta-nie /\*prze-czyta-nie gazety przez dwie godziny  
 read.IMPF-NIE/read.PF-NIE newspaper.GEN for two hours

Alexiadou et al (2010) notice that there is a contrast in terms of pluralizability between the perfective and the imperfective after both are nominalized. While the former can be pluralized (86a), the latter cannot (86b) (Alexiadou et al, 2010: 564):

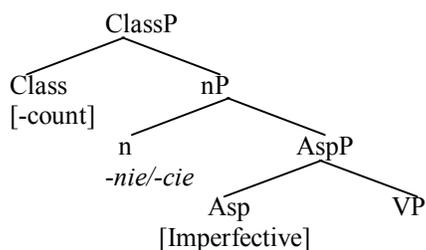
- (86) a.   częste opóźnione przyby-cia       /odejś-cia       pociągu  
           frequent delayed arrive.PF-CIE.PL/depart.PF-CIE.PL train.GEN
- b.   \*częste opóźnione przybywania       /odjeżdżania       pociągu  
           frequent delayed arrive.IMPF.NIE.PL/depart.IMPF.NIE.PL train.GEN

They propose the following structure for Polish nominals introduced by *-nie/-cie*.

- (87) a.   Perfective *-nie/-cie*



- b.   Imperfective *-nie/-cie*



In both (87a) and (87b), aspect markers (e.g. *prze*), which indicate the perfective/imperfective contrast, instantiate AspP. They propose that the nominalizing morpheme *-nie/-cie* instantiates nP. Similar to the Romanian infinitive (80a), the [+count] feature of ClassP in (87a) indicates that only bounded events (perfective) can pluralize and thus can further project to NumP to host

the plural morphology. NumP is not available in (87b) because unbounded events (imperfective) cannot be pluralized and therefore exclude the projection of NumP. As far as (87a) is concerned, its structure contains both AspP and NumP, which challenges the generalization based on Romanian infinitives that AspP and NumP are not compatible. Meanwhile, the analysis of perfective derived nominals in Polish (87a) lends support to the first generalization reached in Alexiadou et al. (2010) that only bounded events may pluralize and therefore project NumP. This forms a contrast with imperfective derived nominals (87b), where unbounded do not pluralize and therefore do not project NumP.

Based on a cross-linguistic analysis of nominalizations, Alexiadou et al (2010) conclude that they may contain a rich array of functional projections in their structure, as summarized below. The parentheses indicate the projections that may be missing in some derived nominals.

(88) DP >((NumP)>ClassP>nP)>(AspP)>VP

### 5.3.2. The aspect properties of verbs in derived nominals in Chinese

This subsection examines the aspectual properties of derived nominals in Chinese. It examines first the aspectual properties of those verbs that are allowed in derived nominals in Chinese and second, what aspectual properties the resulting derived nominal will have. To facilitate our discussion, we will use the following examples of derived nominals.

- (89) a. Zhangsan dui Lisi de diaocha  
 Zhangsan dui Lisi de investigation  
 ‘Zhangsan’s investigation of Lisi’
- b. Zhangsan diaocha le Lisi  
 Zhangsan investigate Perf. Lisi  
 ‘Zhangsan investigated Lisi.’

- (90) a. Zhangsan taolun le zhe ge wenti  
 Zhangsan discuss Perf. this CI question  
 ‘Zhangsan discussed this question.’
- b. Zhangsan dui zhe ge wenti de taolun  
 Zhangsan dui this CI question de discussion  
 ‘Zhangsan’s discussion of this question’

Building on the study of lexical aspect in English (Dowty, 1979; Vendler, 1957, 1967), studies of lexical aspect in Chinese claim that there are five different categories of lexical aspect in Chinese: activities, accomplishments, achievements (especially resultative constructions), states and semelfactives (Li and Bowerman, 1998)<sup>17</sup>.

- (91) a. activity verbs that encode an action with no end point or end result  
*huachuan* ‘row-boat’  
*youyong* ‘swim’
- b. accomplishment verbs that encode a durative process with a local endpoint  
*paojin xiao fangzili* ‘run into the little room’  
*shang louti* ‘go upstairs’
- c. achievement verbs that encode the end result of a punctual situation  
*zhuangdao* ‘hit-break’ (a resultative compound)
- d. Stative verbs that encode the posture of the actor in a situation  
*zuozai yizishang* ‘sit in the chair’  
*zhan zai z[h]uozi-shang* ‘stand on the table’

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<sup>17</sup> It is also suggested in some studies that Chinese has only two lexical aspect categories, activities and states based on the evidence that there are no monomorphemic verbs that can encode accomplishment or achievements (Lin, 2004). Assuming with Alexiadou (2010a, 2010b) that the VP domain corresponds with lexical aspect, the five-way lexical aspect distinction in Li and Bowerman (1998) can be assumed for Chinese.

- e. Semelfactive verbs that encode a punctual but not resultative situation; e.g.,  
*tiao* ‘jump’  
*zhayan* ‘blink’

Regarding what lexical aspect is allowed for verbs that appear in derived nominals, the generalization is that accomplishment verbs can appear in derived nominals. For example, the nominalized verbs such as *diaocha* ‘investigation’ in (89) and *taolun* ‘discussion’ in (90) are accomplishment verbs, as illustrated in the following tests.

An accomplishment is an activity which moves toward a finishing point. Take the verb *diaocha* ‘investigation’ in (89a) as example. The event denoted by *diaocha* ‘investigation’ will continue until the investigation of the case of Lisi is finished. Another way of putting this idea is that accomplishment is a non-cumulative activity. By this, I mean the following. Suppose that Zhangsan starts to investigate Lisi again after finishing an investigation of the same Lisi, then these two investigations are two separate events. Another characteristic of accomplishments is that when they are progressives, they do not have the entailment that Zhangsan has investigated Lisi:

- (92) a. Zhangsan zhengzai diaocha Lisi  
 Zhangsan is investigate Lisi  
 ‘Zhangsan is investigating Lisi.’  
 b. It does not entail that Zhangsan has investigated Lisi.

One contrast between accomplishments and achievements is that when we put an accomplishment verb and an achievement verb into a question such as ‘how long does it take...?’, they have different interpretations as follows:

- (93) a. How long did to take John to recognize Mary? (achievement)

- b. How long did it take before John recognized Mary?
- (94) a. How long did it take John to read *War and Peace*? (accomplishment)
- b. NOT: How long did it take before John read *War and Peace*?

Since *recognize* is an achievement verb, it makes no sense to ask how long a recognition took place, and the only way to interpret (93a) is (93b). On the other hand, *read War and Peace* indicates an accomplishment, which may last some time, therefore (94b) is not an interpretation of (94a).

For the verb *diaocha* ‘investigation’, we see that the question in (95a) should be interpreted as (95b) but not as (95c). This indicates that the verb *diaocha* ‘investigate’ is an accomplishment verb.

- (95) a. Zhangsan diaocha Lisi yong le duochangshijian?  
Zhangsan investigate Lisi take Perf. how long  
‘How long did take Zhangsan to investigate Lisi?’
- b. How long did it take Zhangsan to investigate Lisi?
- c. How long did it take before Zhangsan investigated Lisi?

Another piece of evidence is that accomplishment verbs cannot co-occur with an expression that locates a point of time.

- (96) \*Mary painted a picture at 9 o’clock.

The same goes for verbs like *diaocha* ‘investigate’ and *taolun* ‘discuss’.

- (97) \*Zhangsan jiudianzhong taolun le zhe ge wenti.

Zhangsan at 9 o’clock discuss Perf. this Cl question

Another property of accomplishment verbs is that they co-occur with temporal expressions like ‘in x time’.

(98) John read a book in twenty minutes.

This sentence has the following entailment:

(99) John was reading a book during the twenty minutes.

This test shows that verbs like *diaocha* ‘investigate’ and *taolun* ‘discuss’ work the same way:

(100) Zhangsan ershi fenzhong zhinei taolun le zhe ge wenti.

Zhangsan twenty minute in discuss Perf. this Cl question

‘Zhangsan discussed this question in twenty minutes.’

This sentence has the following entailment:

(101) Zhangsan was discussing this question during the twenty minutes.

Another property is that accomplishment verbs also co-occur with ‘finish’, and verbs like *diaocha* ‘investigate’ can co-occur with ‘finish’.

(102) a. John finished investigating this case.

b. Zhangsan jieshu le diaocha Lisi.

Zhangsan finish Perf. investigate Lisi

‘Zhangsan finished investigating Lisi.’

Moreover, when accomplishment verbs co-occur with ‘stop’, the implication is that the event is interrupted.

(103) a. John stopped reading a book.

b. The event of reading a book was interrupted.

(104) a. Zhangsan tingzhi le taolun zhe ge wenti.

Zhangsan stop Perf. discuss this Cl question

‘Zhangsan stopped discussing this question.’

b. The event of discussing this question was interrupted.

Based on the tests illustrated above, it indicates that the verbs that occur in derived nominals (e.g. *diaocha* ‘investigate’ and *taolun* ‘discuss’) are accomplishment verbs.

After discussing the aspect properties of those verbs that occur in derived nominals, let us see the aspect properties of the resulting derived nominals. Fu (1994) proposes three pieces of evidence to support the claim that derived nominals are atelic.<sup>18</sup> The first piece of evidence is that derived nominals can not co-occur with aspectual markers that indicate telicity, for example, *-guo* and *-le*.

(105) \*Zhangsan dui Lisi de diaocha le

Zhangsan dui Lisi de investigation Perf.

The marker *le* indicates a perfective aspect but it cannot occur in derived nominals in Chinese.

Second, derived nominals in Chinese are incompatible with passivization, which is telic. Anderson (1979) notes that only those objects that undergo a change and are being affected can undergo passivization, as illustrated in the following ungrammatical example (Anderson, 1979: 35):

(106) \*the dinner’s enjoyment by John

As shown in the example below, objects in derived nominals cannot undergo passivization, which indicates that derived nominals in Chinese are not telic:

(107) a. \*zhe zuo chengshi de bei diren de huimie

this CI city de by enemy de destruction

Third, resultative V-V compounds, which are delimited, cannot occur in derived nominals (Fu, 1994: 158).

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<sup>18</sup> He uses the term un-delimited to refer to atelic.

- (108) a. Zhangsan dashang le Lisi  
 Zhangsan hit-hurt Perf. Lisi  
 ‘Zhangsan hit and hurt Lisi.’
- b. \*Zhangsan dui Lisi de dashang  
 Zhangsan dui Lisi de hit-hurt

Moreover, the previous sections have also noted some pieces of evidence that derived nominals are atelic, which are recapped here. First, derived nominals can co-occur with aspectual modifiers which indicate duration.

- (109) Zhangsan changda san ge xiaoshi de dui Lisi de piping  
 Zhangsan as long as three Cl hour de dui Lisi de criticism  
 ‘Zhangsan’s criticism of Lisi for three hours’

On the other hand, derived nominals cannot co-occur with temporal expressions like ‘in x time’.

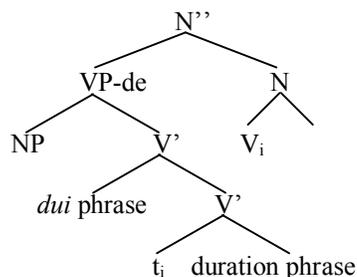
- (110) \*Zhangsan ershi fenzhong zhinei de dui Lisi de piping  
 Zhangsan twenty minutes in de dui Lisi de criticism

Thirdly, derived nominals can co-occur with adjectives that denote ‘frequent’ and ‘constant’.

- (111) Zhangsan jingchang de dui Lisi de piping  
 Zhangsan frequent de dui Lisi de criticism  
 ‘Zhangsan’s frequent criticism of Lisi’

Returning to the structure of derived nominals proposed by Fu (1994) (67), as reproduced below, it cannot capture the atelic aspect of derived nominals in Chinese.

(112)



Based on the diagnostic tests as summarized above, it seems that the derived nominalization construction in Chinese itself can impose its [+telic] aspect feature on the resulting derived nominal. This is similar to the case of the Romanian supine construction, which can impose a [-bounded] aspect feature on whatever verbs that occur in the supine ((78) and (79)). Alexiadou et al (2010) argues that the supine construction contains an AspP inside their structure. In a similar vein, given that the derived nominal construction in Chinese is always [-telic], I assume that there is an AspP on top of VP, which imposes a [-telic]/[-bounded] feature on the derived nominal construction. Building on the structure in (68), I assume that [-telic]/[-bounded] aspect specification on derived nominals is introduced by AspP on top of the embedded VP.

Moreover, I assume that the *dui* phrase, which introduces the complement of the derived nominal, moves to the specifier of AspP based on the assumption that functional projections denoting aspectual distinctions are responsible for the interpretation of complements (Borer, 1994, 1998, 1999b). The presence of *dui* phrases in Spec AspP is supported by the observation that when a *dui* phrase introduces an object of a verb, the whole sentence indicates atelic aspect (Fu, 1994: 145).

(113) a. \*Ta dui zhe ge chengshi jiefang le.

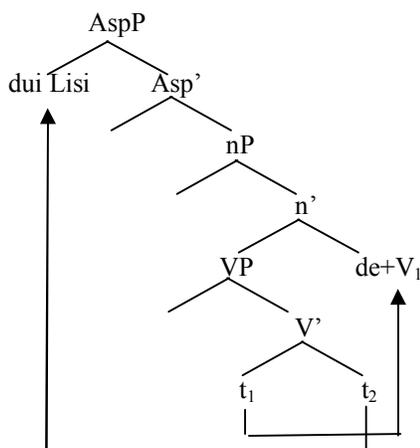
he dui this Cl city liberate Perf.

- b. Ta dui zhe jian shi kaolü le.  
 he dui this Cl matter think Perf.  
 ‘He thought about this matter.’

According to Fu, (113a) is ungrammatical because the object *zhe ge chengshi* ‘this city’ is affected by the verb *jiefang* ‘liberate’ and therefore the whole sentence indicates a telic aspect (Tenny, 1989). On the other hand, in (113b), the object *zhe jian shi* ‘this matter’ is not affected by the verb *kaolü* ‘think’ and therefore the whole sentence indicates an atelic aspect. Given that AspP introduces the [-telic]/[-bounded] aspect, it is plausible that the *dui* phrase ends up in the specifier of AspP.

Since in Chinese complex event nominals, the *dui* phrase always precedes the particle *de*, I assume that in their structure, AspP is on top of nP, which is just opposite to the Polish case in (87a).

(114)



### 5.3.3. The projections of ClassP and NumP in derived nominals in Chinese

In Section 3.1, I presented cases where derived nominals in some languages may pluralize (Alexiadou et al, 2010; Kamiya, 2001; Martin, 2009), and this is taken as evidence that

derived nominals in these languages may contain projections like ClassP and NumP. This section examines the properties of Chinese derived nominals and argues for similar projections (ClassP and NumP) in their structure. Although Chinese does not have productive plural inflections as in English, there are methods that can be used to pluralize nouns in Chinese. These methods can be used for derived nominals, as well. For example, a noun may co-occur with a numeral-classifier sequence that indicates more than one and the numeral-classifier sequence may also occur in derived nominals:

- (115) a.     san ben shu  
               three Cl book  
               ‘three books’
- b.     Zhangsan de san ci dui Lisi de diaocha  
                   Zhangsan de three Cl dui Lisi de investigation  
                   ‘Zhangsan’s three investigations of Lisi’

Another way of expressing plurality is to reduplicate a classifier.

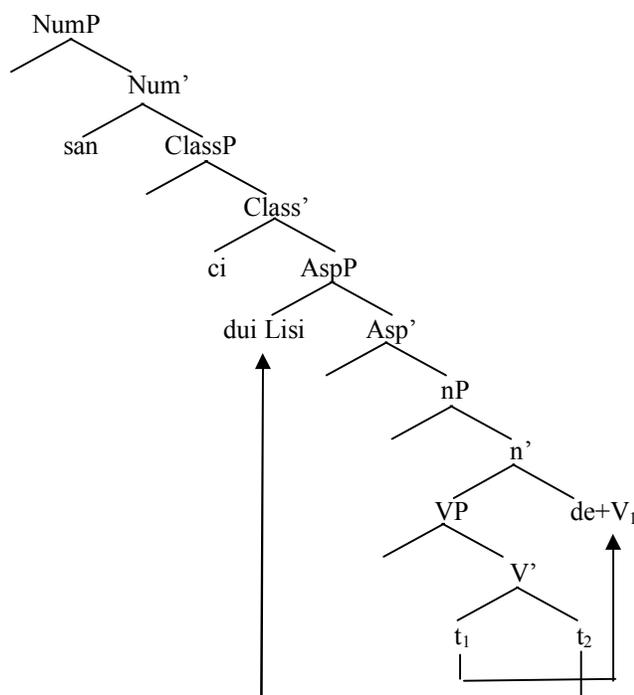
- (116) a.     yi ben ben shu  
               one Cl Cl book  
               ‘many books’
- b.     yi ci ci dui Lisi de piping  
                   one Cl Cl dui Lisi de criticism  
                   ‘numerous times of criticizing Lisi’

Another way of expressing plurality in derived nominals is to attach the element *-xie* to demonstratives:

- (117) Zhangsan de zhexie ci dui Lisi de diaocha  
 Zhangsan de these Cl dui Lisi de investigation  
 ‘Zhangsan’s investigations of Lisi’

If we assume that numerals and classifiers head NumP and ClassP, respectively<sup>19</sup>, then the examples in (115b) and (116b) indicate that derived nominals in Chinese may also contain these two projections, similar to languages like Romanian and Polish (Alexiadou et al, 2010). These two projections are on top of nP as the co-occurrence of derived nominals with numeral-classifier sequences is part of the nominal property.

(118)



This structure is different from the one proposed by Alexiadou et al (2010) for Polish derived nominals (87b). The contrast between (87a) and (87b) for two kinds of derived nominals

<sup>19</sup> In previous chapters, I assume that a numeral-classifier sequence constitutes a single projection NumP. Here I assume that numerals and classifiers constitute their own projections, respectively. But these two distinct assumptions do not make any substantial difference for the following argument.

in Polish indicates that only when AspP is specified as [+bounded], can further projections like ClassP and NumP be available in the derived nominal structure. The derived nominals in Chinese pose a counterexample to this generalization. Since Chinese derived nominals are unbounded in terms of aspect, I posit an AspP with the [-telic]/[-bounded] specification on top of the embedded VP. But as shown in (115b), (116b) and (117b), derived nominals in Chinese can co-occur with numeral-classifier sequences or with other constituents (reduplicated classifiers or *-xie*) that mark plural. The co-occurrence of these constituents is taken as evidence for the presence of ClassP and NumP inside the structure of Chinese derived nominals. Meanwhile, contrary to the structure of (87b), the [-telic]/[-bounded] specification on AspP is still compatible with NumP in Chinese derived nominals.

A further note is that we may observe a similarity in other nominal phrases in Chinese in terms of the co-occurrence of classifiers with [-bounded] entities, as reported in Cheng (1998, 2012).

- (119) a.     san   ben  shu  
               three CI book  
               ‘three books’
- b.     san  bang  rou  
               three pound meat  
               ‘three pounds of meat’

It is observed that in Chinese, nouns like *shu* ‘book’ in (119a), which correspond to count nouns in English, are preceded by count-classifiers such as *ben* (119a). According to Cheng (1998, 2012), these count classifiers may single out one countable discrete unit. On the other hand, nouns in Chinese like *rou* ‘meat’ (119b), which correspond to mass nouns in English, are

preceded by mass-classifiers or massifiers. These mass-classifiers or massifiers just name a unit by which the entity denoted by the noun presents itself. In Chinese, when these nouns are preceded by massifiers, thus creating units for measurement, the resulting construction can be preceded by numerals to indicate a plural number of units of the entity denoted by the noun. The same applies for English, where mass nouns can co-occur with numerals if there are nouns that can create units for measurement. In case of derived nominals in Chinese, although they are atelic or unbounded according to Jackendoff (1991), they can be preceded by numeral-classifier sequences. If we assume with Jackendoff (1991) and Mourelatos (1978) that mass nouns, like atelic verbs, have the [-bounded] feature specification, this indicates that classifiers that precede derived nominals create units for measurement of eventuality, and therefore numerals can co-occur with derived nominals in Chinese. On top of AspP (with the [-bounded] specification) in the structure of Chinese derived nominals as in (118), I propose a ClassP and a NumP. This is contrary to Polish imperfective derived nominals (87b) by Alexiadou et al (2010), which predicts that if ApsP is [-bounded], there cannot be NumP.

To sum up, this section investigated Chinese derived nominals in terms of their aspectual properties of and their co-occurrence with numeral-classifier sequences. These properties indicate functional projections such as AspP, ClassP and NumP in the structure of derived nominals.

#### 5.4. DP in derived nominals in Chinese

The previous section has established that the structure of derived nominals contains functional projections such as AspP, NumP and ClassP. This section examines another property of derived nominals in Chinese, which is evidence for presence of DP in their structure.

The property that this section focuses on is that the whole derived nominal construction matches with the agent argument in terms of definiteness. This is illustrated in the following example.

- (120) a.     Zhangsan dui Lisi de piping  
               Zhangsan dui Lisi de criticism  
               ‘Zhangsan’s criticism of Lisi’
- b.     yi ge ren dui Lisi de piping  
               one Cl person dui Lisi de criticism  
               ‘someone’s criticism of Lisi’

The derived nominal in (120a) is definite while the derived nominal in (120b) is indefinite. This contrast can be seen in the context of existential sentences.

- (121) a.     \*You Zhangsan dui Lisi de piping.  
               have Zhangsan dui Lisi de criticism
- b.     You yi ge ren dui Lisi de piping.  
               have one Cl person dui Lisi de criticism  
               ‘There is someone’s criticism of Lisi’

This contrast may also be observed when they appear as subjects of a sentence.

- (122) a. Zhangsan dui Lisi de piping chongfu le san ci.  
 Zhangsan dui Lisi de criticism repeat Perf. three time  
 ‘Zhangsan’s criticism of Lisi repeated three times.’
- b. \*Yi ge ren dui Lisi de piping chongfu le san ci.  
 one CI person dui Lisi de criticism repeat Perf. three time

These two tests (existential sentences and the subject position of sentences) indicate that the two derived nominals in (120) differ in definiteness. Moreover, the contrast in terms of definiteness arises from the contrast between the agent phrases in the two derived nominals. While the agent phrase in (120a) is the proper name *Zhangsan*, the counterpart in (120b) is the indefinite noun phrase *yi ge ren* ‘someone’.

On the other hand, the definiteness of the internal argument headed by *dui* does not have an impact on the definiteness of the whole derived nominal construction.

- (123) a. \*You Zhangsan dui yi ge ren de piping.  
 have Zhangsan dui one CI person de criticism
- b. You yi ge ren dui ling yi ge ren de piping.  
 have one CI person dui another one CI person de criticism  
 ‘There is someone’s criticism of another one’

This contrast may also be observed when they appear as subjects of a sentence.

- (124) a. Zhangsan dui yi ge ren de piping chongfu le san ci.  
 Zhangsan dui one CI person de criticism repeat Perf. three time  
 ‘Zhangsan’s criticism of Lisi repeated three times.’
- b. \*Yi ge ren dui ling yi ge ren de piping chongfu le san ci.  
 one CI person dui another one CI person de criticism repeat Perf. three time

The interaction between the whole derived nominal construction and the agent in terms of definiteness is similar to what we see in Hebrew (Engelhardt, 2000: 60).

- (125) a.    *taxazit- am šel ha- paršanim*  
           forecast -3PM of   the commentator  
           ‘the commentators’ forecast’
- b.    *tixnum- am šel ha- migdalim*  
           planning 3PM of the       towers  
           ‘the planning of the towers’

It is reported that in Hebrew, the definiteness of the whole noun phrase (Construct State (CS)) is dependent on that of the genitive phrase that indicates the agent of the event (Borer, 1999a, 1999b; Ritter, 1991). For example, in the Construct State noun phrase in (125a), a bare genitive phrase *ha- paršanim* ‘the commentators’, which is not overtly case marked, immediately follows the head noun *taxazit-am* ‘forecast’. Since this genitive phrase is definite, the whole nominal phrase is definite. Specifically, this CS noun phrase is a derived nominal and the genitive phrase is interpreted as the agent of the action denoted by *taxazit-am* ‘forecast’. One property of CS noun phrases in Hebrew is that the complement of a nominalized verb also has an effect on the whole derived nominal in terms of definiteness. For example, the genitive phrase *ha-migdalim* ‘the towers’ in (125b), which is the complement of the nominalized verb *tixnum-am* ‘planning’, is interpreted as definite, and the whole derived nominal is made definite, as well.

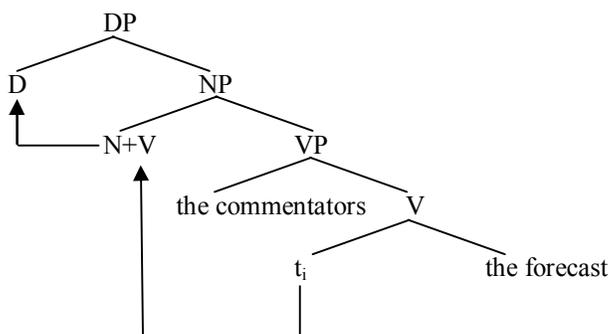
Meanwhile, it is also reported that in English, the definiteness of the genitive possessor phrase also influences the interpretation of the whole noun phrase (Alexiadou, 2005: 788; Barker, 1995; Jackendoff, 1977; Woisetschlaeger, 1983).

- (126) a. She is a nice girl/\*the nice girl/a farmer's daughter.  
 b. There was \*John's book on the table/a man's dog in the garden.

There have been different hypotheses concerning how the definiteness of the genitive phrase may have an impact on the whole nominal phrase (Engelhardt, 2000; Hazout, 1991; Longobardi, 1996; Ritter, 1991). For example, Engelhardt (2000: 60) proposes the following structure for the Hebrew examples in (125).

- (127) a. taxazit- am šel ha- paršanim  
 forecast -3PM of the commentators  
 'the commentators' forecast'

b.



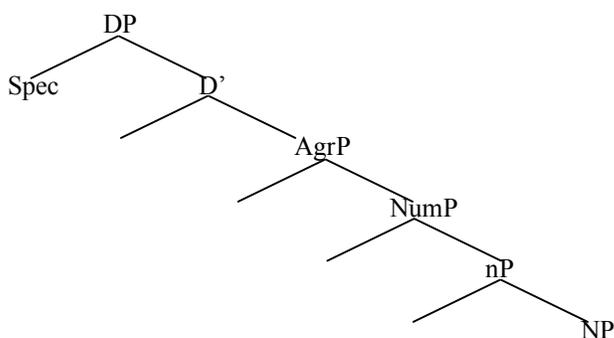
Assuming that DP is responsible for definiteness, he proposes that there is a V-to-N-to-D movement. As a result, the genitive phrase *ha- paršanim* 'the commentators' may enter in an agreement relation with the D head and the D head acquires the definiteness specification from the genitive phrase.

To explain the effect of the genitive phrase on the entire derived nominal, I assume with Engelhardt (2000) and Hazout (1995) that the genitive phrase must have some agreement relation with the DP. I also assume that this DP is a projection on top of the structure of Chinese derived nominals in (118). But the N-to-D movement explanation along the line of Engelhardt

(2000) does not apply to Chinese. The reason is that unlike the Hebrew case in (127), the embedded verb in Chinese derived nominals raises up to the nominalizer *n* but not to *D*.

In order to explain how the genitive phrase may have an impact on the definiteness specification of the whole derived nominal phrase, I adopt Alexiadou's (2005) analysis of the English genitive phrases, which assumes the following structure for nominal phrases in English (Alexiadou, 2005: 791).

(128)

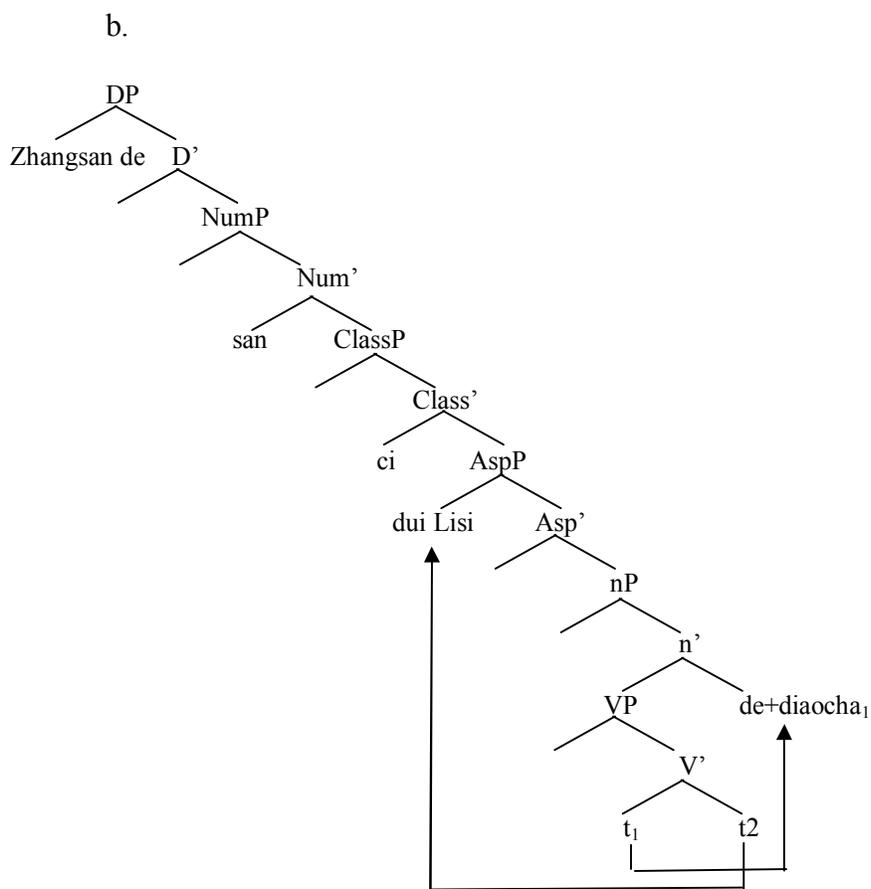


Taking *D* to be the locus of definiteness determination, she assumes that in order for a possessive nominal phrase to be definite, either Spec DP or *D* must be filled. For instance, in the case of (126), the presence of an (in)definite noun phrase in Spec DP is sufficient to mark the whole DP as (in)definite via Spec-head Agreement.

Building on the structure in (128) by Alexiadou (2005), I assume that in the derivation of derived nominals in Chinese, the genitive phrase, which is the subject of derived nominals, raises to DP Spec. As a result, the genitive phrase enters into a Spec-head agreement relation. Since the genitive phrase is definite, the head of DP acquires this definiteness specification from the genitive phrase, thus rendering the whole derived nominal phrase definite. The raising of the subject to DP Spec in Chinese derived nominals is evidenced by the observation that the subject is always the first constituent inside Chinese derived nominals.

In the previous sections of this chapter, I have demonstrated that derived nominals in Chinese contain the functional projections NumP, ClassP and AspP. The effect of definite genitive phrases on the interpretation of the whole derived nominal construction supports the presence of DP as the top node in the structure of derived nominals. Extending the structure of Chinese derived nominals outlined in (118), I propose the following structure for Chinese derived nominals.

- (129) a. Zhangsan san ci dui Lisi de diaocha  
 Zhangsan three Cl dui Lisi de investigation  
 ‘Zhangsan’s three investigations of Lisi’



## 5.5. Conclusion

In this section, I analyzed the structure of derived nominals in Chinese such as (130):

- (130) Zhangsan dui Lisi de piping  
 Zhangsan dui Lisi de criticism  
 ‘Zhangsan’s criticism of Lisi’

First, several diagnostic tests showed that nominal phrases like the above are complex event nominals in the sense of Grimshaw (1990). Second, building on syntactic approaches to the derivation of derived nominals across languages (Alexiadou et al, 2010; Fu, 1994; Fu et al, 2001; Hazout, 1995), which argue that their structure may involve VP, AspP, ClassP, NumP, etc., I examined some properties of derived nominals in Chinese, particularly aspect, pluralization and definiteness. The result of this detailed examination of derived nominals in Chinese leads to the conclusion that they contain a rich structure which consists of VP, AspP, ClassP, NumP and DP. This conclusion is consistent with the conclusion reached in previous chapters, which claims that nominal phrases in Chinese contain functional projections on top of NP, for example, DP and NumP.

## Chapter 6 Conclusion

In this dissertation, I have examined various properties of nominal phrases in Chinese, with the aim of testing their internal syntactic structure. The basic conclusion is that Chinese nominal phrases contain functional projections such as NumP and DP on top of NP. This conclusion refutes the claims made by Bošković (2005, 2008, 2010a, 2010b) and Fukui (1995) about parametric variation of DP and lends support to the proposal that functional projections inside nominal phrases exist universally.

Previous studies on the syntactic structure of nominals in Chinese have argued for the existence of DP in Chinese nominal structure from different perspectives, but none of them are uncontroversial. These studies have failed to provide an adequate justification for DP in Chinese, since these studies have left some empirical motivations for DP unexplored.

This dissertation first examined ellipsis phenomena in Chinese nominal phrases. It found that reduplicated adjectives in Chinese can adjoin to different projections as a segment along the hierarchy of nominal phrases, followed by ellipsis of the lower segment of that projection. The ellipsis patterns can be explained by assuming a structure that consists of three projections, XP>CIP>NP. Secondly, this dissertation examined the parallelisms between clausal structure and nominal structure, given that clausal/nominal parallelism has been a very strong motivation for DP in nominal phrases. Chinese nominal phrases do exhibit structural parallelisms to clauses. Furthermore, both pied piping phenomena associated with *wh*-phrases and extraction patterns indicate the existence of DP in Chinese. The existence of DP in Chinese was further attested through testing Chinese on typological generalizations that make a distinction between languages that have DP vs. languages that do not have DP (Bošković, 2008, 2010a, 2010b; Fukui, 1995;

Watanabe, 2004). For example, Chinese shows similar properties to languages with DP in terms of most generalizations that have been explained by Bošković (2008, 2010a, 2010b). Although Chinese seems to behave like languages without DP in terms of some of the generalizations (e.g. radical *pro* drop), alternative analyses (e.g. Neeleman and Szendroi, 2007) indicate that it may not involve the presence/absence of DP. This dissertation also examined the structure of derived nominals in Chinese. Based on recent syntactic approaches to the derivation of derived nominals, it was argued that derived nominals in Chinese have a syntactic structure which includes a rich array of functional projections such as DP, NumP and ClassP, in addition to AspP.

This dissertation focused exclusively on whether Chinese has the projection DP or not, leaving the question of what lexical items may be the head of DP unresolved. According to Abney (1987), the question of whether a language has DP is independent of the question of what lexical items fill DP. One future expansion of this dissertation is to investigate what elements may fill DP given that DP exists in Chinese. It is generally held that determiners may fill the head of DP although different studies assume different conceptions of determiners. For example, some studies (Abney, 1987; Leu, 2008; Roehrs, 2006) treat definite articles and demonstratives as determiners and may fill the head of DP. On the other hand, Bošković (2008, 2010a, 2010b) and Gillon (2006, 2009) assume that only definite articles like *the* in English may be the head of DP. Moreover, in some studies (Bošković, 2008, 2010a, 2010b; Zlatic, 1997) which claim that some languages lack DP, one supporting argument is that what looks like determiners in these languages are in fact adjectives. Preliminarily, I claimed in Section 4.2.2.10 of Chapter 4 that Chinese does have determiner-like elements. For example, comparing Chinese demonstratives with determiners in two languages, Serbo-Croatian and English, shows that demonstratives in

Chinese behave like determiners in English. In addition, I showed in Section 4.4.3 of Chapter 4 that demonstratives in Chinese (specifically, *na* ‘that’) have two uses, one deictic and the other anaphoric, and that demonstratives in anaphoric use cannot be modified by adjectives, which is similar to determiners in English. It is claimed in Tang (1990a, 1990b) and Wu and Bodomo (2009) that demonstratives in Mandarin and Cantonese are determiners that fill the head position of DP. Subsequent research will focus on the semantics of determiners in Chinese, in comparison to determiners in English. Specifically, one question will be whether determiners in Chinese are associated with features such as definiteness, familiarity, and domain restriction, which are argued to be encoded by determiners across languages (Lyons, 1999; Gillon, 2006, 2009).

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## Appendixes

### A. Sample stimuli for the experiment testing extraction of modifiers in Chinese Conditions

- a: adjectives without *de*/no extraction of modifier
- b: adjectives without *de*/extraction of modifier
- c: adjectives with *de*/no extraction of modifier
- d: adjectives with *de*/extraction of modifier
- e: preposition phrases/no extraction of modifier
- f: preposition phrases/extraction of modifier

#### Group 1

- a. 红玫瑰，他看见了。  
Hong meigui, ta kanjian le.  
red rose he see Perf.
- b. 红，他看见了玫瑰。  
Hong, ta kanjian le meigui.  
red he see Perf. rose
- c. 红的玫瑰，他看见了。  
Hong de meigui, ta kanjian le.  
red de rose he see Perf.
- d. 红的，他看见了玫瑰。  
Hong de, ta kanjian le meigui.  
red de, he see Perf. rose
- e. 花瓶里的玫瑰，他看见了。  
Huaping li de meigui, ta kanjian le.  
vase in de rose he see Perf.
- f. 花瓶里的，他看见了玫瑰。  
Huaping li de, ta kanjian le meigui.  
vase in de he see Perf. rose

#### Group 2

- a. 黄香蕉，他发现了。  
Huang xiangjiao, ta faxian le.  
yellow banana she find Perf.
- b. 黄，他发现了香蕉。  
Huang, ta faxian le xiangjiao.  
big he find Perf. banana
- c. 黄的香蕉，他发现了。  
Huang de xiangjiao, ta faxian le.  
yellow de banana he find Perf.
- d. 黄的，他发现了香蕉。  
Huang de, ta faxian le xiangjiao.  
yellow de he find Perf. banana
- e. 桌子上的香蕉，他发现了。  
Zhuozi shang de xiangjiao, ta faxian le.  
table on de banana he find Perf.

f. 桌子上的，他发现了香蕉。

Zhuozi shang de, ta faxian le xiangjiao.  
table on de he find Perf. banana

### Group 3

a. 空杯子，他扔掉了。

Kong beizi, ta rengdiao le.  
empty glass he discard Perf.

b. 空，他扔掉了杯子。

Kong, ta rengdiao le beizi.  
empty he discard Perf. glass

c. 空的杯子，他扔掉了。

Kong de beizi, ta rengdiao le.  
empty de glass he discard Perf.

d. 空的，他扔掉了杯子。

Kong de, ta rengdiao le beizi.  
empty de he discard Perf. glass

e. 厨房里的杯子，他扔掉了。

Fangjian li de beizi, ta rengdiao le.  
room in de cup he discard Perf.

f. 厨房里的，他扔掉了杯子。

Fangjian li de, ta rengdiao le beizi.  
room in de he discard Perf. cup

### Group 4

a. 大橘子，他拿走了。

Da juzi, ta nazou le.  
big orange he take away Perf.

b. 大，他拿走了橘子。

Da, ta nazou le juzi.  
big he take away Perf. orange

c. 大的橘子，他拿走了。

Da de juzi, ta nazou le.  
big de orange he take away Perf.

d. 大的，他拿走了橘子。

Da de, ta nazou le juzi.  
big de he take away Perf. orange

e. 冰箱里的橘子，他拿走了。

Bingxiang li de juzi, ta nazou le.  
fridge in de orange he take away Perf.

f. 冰箱里的，他拿走了橘子。

Bingxiang li de, ta nazou le juzi.  
fridge in de he take away Perf. orange

### Group 5

a. 白衬衫，他卖掉了。

Bai chenshan, ta maidiao le.  
white shirt he sell Perf.

b. 白, 他卖掉了衬衫。

Bai, ta maiddiao le chenshan.  
white he sell Perf. shirt

c. 白的衬衫, 他卖掉了。

Bai de chenshan, ta maiddiao le.  
white de shirt he sell Perf.

d. 白的, 他卖掉了衬衫。

Bai de, ta maiddiao le chenshan.  
white de he sell Perf. shirt

e. 房间里的衬衫, 他卖掉了。

Fangjian li de chenshan, ta maiddiao le.  
room in de shirt he sell Perf.

f. 房间里的, 他卖掉了衬衫。

Fangjian li de, ta maiddiao le chenshan.  
room in de he sell Perf. shirt

### Group 6

a. 肥鸭子, 他宰了。

Fei yazi, ta zai le.  
fat duck he kill Perf.

b. 肥, 他宰了鸭子。

Fei yazi, ta zai le.  
Fat duck he kill Perf.

c. 肥的鸭子, 他宰了。

Fei de yazi, ta zai le.  
Fat de duck he kill Perf.

d. 肥的, 他宰了鸭子。

Fei de, ta zai le yazi.  
Fat de he kill Perf. duck

e. 笼子里的鸭子, 他宰了。

Longzi in de yazi, ta zai le.  
cage in de duck he kill Perf.

f. 笼子里的, 他宰了鸭子。

Longzi li de, ta zai le yazi.  
cage in de ta kill Perf. duck

### Group 7

a. 黄叶子, 我找到了。

Huang yezi, wo zhaodao le.  
yellow leaf I find Perf.

b. 黄, 我找到了叶子。

Huang, wo zhaodao le yezi.  
yellow I find Perf. leaf

c. 黄的叶子, 我找到了。

Huang de yezi, wo zhaodao le.  
yellow de leaf I find Perf.

d. 黄的, 我找到了叶子。

Huang de, wo zhaodao le.  
yellow de I find Perf.

e. 树上的叶子, 我找到了。

Shu shang de yezi, wo zhaodao le.  
tree on de leaf I find Perf.

f. 树上的, 我找到了叶子。

Shu shang de, wo zhaodao le yezi.  
tree on de I find Perf. leaf

### Group 8

a. 蓝风筝, 我喜欢。

Lan fengzheng, wo xihuan.  
blue kite I like

b. 蓝, 我喜欢风筝。

Lan, wo xihuan fengzheng.  
blue I like kite

c. 蓝的风筝, 我喜欢。

Lan de fengzheng, wo xihuan.  
blue de kite I like

d. 蓝的, 我喜欢风筝。

Lan de, wo xihuan fengzheng.  
blue de I like kite

e. 墙上的风筝, 我喜欢。

Qiang shang de fengzheng, wo xihuan.  
wall on de kite I like

f. 墙上的, 我喜欢风筝。

Qiang shang de, wo xihuan fengzheng.  
wall on de I like kite

### Group 9

a. 绿黄瓜, 我想买。

Lü huanggua, Lisi xiang mai.  
green cucumber Lisi want buy

b. 绿, 我想买黄瓜。

Lü, Lisi xiang mai huanggua.  
green Lisi wants buy cucumber

c. 绿的黄瓜, 我想买。

Lü de huanggua, Lisi xiang mai.  
green de cucumber Lisi want buy

d. 绿的, 我想买黄瓜。

Lü de, Lisi xiang mai huanggua.  
green de Lisi want buy cucumber

e. 超市里的黄瓜, 我想买。

Chaoshi li de huanggua, Lisi xiang mai.  
grocery store in de cucumber Lisi want buy

f. 超市里的，我想买黄瓜。

chaoshi li de, Lisi xiang mai huanggua.  
grocery store in de Lisi want buy cucumber

### Group 10

a. 破雨伞，我不喜欢。

Po yusan, wo bu xihuan.  
broken umbrella I not like

b. 破，我不喜欢雨伞。

Po, wo bu xihuan yusan.  
broken I not like umbrella

c. 破的雨伞，我不喜欢。

Po de yusan, wo bu xihuan.  
broken de umbrella I not like

d. 破的，我不喜欢雨伞。

Po de, wo bu xihuan yusan.  
broken de I not like umbrella

e. 箱子里的雨伞，我不喜欢。

Xiangzi li de yusan, wo bu xihuan.  
box in de umbrella I not like

f. 箱子里的，我不喜欢雨伞。

Xiangzi li de, wo bu xihuan yusan.  
box in de I not like umbrella

### Group 11

a. 新被子，张三拿来了。

Xin beizi, Zhangsan nalai le.  
new quilt Zhangsan bring Perf.

b. 新，张三拿来了被子。

Xin, Zhangsan nalai le beizi.  
new Zhangsan bring Perf. quilt

c. 新的被子，张三拿来了。

Xin de beizi, Zhangsan nalai le.  
new de quilt Zhangsan bring Perf.

d. 新的，张三拿来了被子。

Xin de, Zhangsan nalai le beizi.  
new de Zhangsan bring Perf. quilt

e. 库房里的被子，张三拿来了。

Kufang li de beizi, Zhangsan nalai le.  
store in de quilt Zhangsan bring Perf.

f. 库房里的，张三拿来了被子。

Kufang li de, Zhangsan nalai le beizi.  
store in de Zhangsan bring Perf. quilt

**Group 12**

a. 黑麻雀，我没看见。

Hei maque, wo mei kanjian.

black sparrow I not see

b. 黑，我没看见麻雀。

Hei, wo mei kanjian maque.

black I not see sparrow

c. 黑的麻雀，我没看见。

Hei de maque, wo mei kanjian.

black de sparrow I not see

d. 黑的，我没看见麻雀。

Hei de, wo mei kanjian maque.

black de I not see sparrow

e. 树林里的麻雀，我没看见。

Shulin li de maque, wo mei kanjian.

Forest in de sparrow I not see

f. 树林里的，我没看见麻雀。

Shulin li de, wo mei kanjian maque.

Forest in de I not see sparrow

**Fillers**

1 我发现了干净的漂亮衣服。

wo faxian le ganjing de piaoliang yifu.

I find Perf. clean de beautiful clothes

2 我发现了深大水池。

wo faxian le shen da shuichi.

I find Perf. deep big pool

3 我发现了长长的肥袖子。

Wo faxian le chang chang de fei xiuzi.

I find Perf. long long de loose sleeve

4 我发现了深灰色的裤子。

Wo faxian le shenhuice de chang kuzi.

I find Perf. grey de long pants

5 我发现了黑黑的扁口袋。

Wo faxian le hei hei de bian koudai.

I find Perf. black black de narrow bag

6 我发现了肥肥的大夹克。

Wo faxian le fei fei de da jiake.

I find Perf. loose loose de big jacket

7 我发现了勇敢的黑皮。

Wo faxian le yonggan de hei pi.

I find Perf. brave de black peel

8 我发现了大明确炉子。

Wo faxian le da mingque luzi.

I find Perf. big clear stove

9 我发现了小红红的窗帘。

Wo faxian le xiao hong hong de chuanglian.

I find Perf. small red red de curtain

10 有一根蓝色粗钢笔。

You yi zhi lanse cu gangbi.

have one Cl blue big pen

11 有一顿有幸香早饭。

You yi dun youxing xiang zaofan.

have one Cl fortunate delicious breakfast

12 有一个优秀强电灯泡。

You yi ge youxiu qiang diandengpao.

have one Cl excellent powerful bulb

13 有一个小蓝花盆。

You yi ge xiao lan huapen.

have one Cl small blue flowerpot

14 有一个大大的黑皮箱子。

You yi ge da da de hei pixiang.

have one Cl big big de black leather case

15 有一件善良的崭新的衣服。

You yi jian shangliang de zhanxin de yifu.

have one Cl kind de new de clothing

16 有一些凉爽脏猪肉。

You yixie liangshuang zang zhurou.

have some cool dirty pork

17 有一个小短裤子。

You yi ge xiao duan kuzi.

have one Cl small short pants

18 有一个轻轻的小椅子。

You yi ge qing qing de xiao yizi.

have one Cl light light de small chair

19 我看见了传统严峻布局。

Wo kanjian le chuantong yanjun buju.

I see Perf. traditional severe situation

20 我看见了昨天蓝色的书。

Wo kanjian le zuotian lanse de shu.

I see Perf. yesterday blue de book

21 我看见了基本的烂蔬菜。

Wo kanjian le jiben de lan shucan.

I see Perf. basic de blue vegetable

22 我看见了美味便宜的书。

Wo kanjian le meiwei pianyi de shu.

I see Perf. delicious cheap de book

23 我看见了深深的脏下水道。

Wo kanjian le shen shen de zang xiashuidao.

I see Perf. deep deep de dirty water drain

24 我看见了黄黄的大衬衫。

Wo kanjian le huang huang de da chenshan.

I see Perf. yellow yellow de big shirt

25 我看见了时髦慢慢工具。

Wo kanjian le shimao man man gongju.

I see Perf. fashionable slow slow tool

26 我看见了生动有趣的图画。

Wo kanjian le shengdong youqu de tuhua.

I see Perf. lively interesting de painting

27 我看见了小粗胳膊。

Wo kanjian le xiao cu gebo.

I see Perf. small strong arm

28 我不喜欢急切的脏手。

Wo bu xihuan jiqie de zang shou.

I not like anxious de dirty hand

29 我不喜欢浅浅古的井。

Wo bu xihuan qian qian gu de jing.

I not like shallow shallow old de well

30 我不喜欢严格坏书柜。

Wo bu xihuan yange huai shugui.

I not like strict bad bookshelf

31 我不喜欢小圆圆的椅子。

Wo bu xihuan xiao yuan yuan de yizi.

I not like small round round de table

32 我不喜欢大大圆圆的西瓜。

Wo bu xihuan da da yuan yuan de xigua.

I not like big big round round de watermelon

33 我不喜欢大长沙发。

Wo bu xihuan da chang shafa.

I not like big long sofa

34 我不喜欢小矮书架。

Wo bu xihuan xiao ai shujia.

I not like small short bookshelf

35 我不喜欢轻轻的旧电脑。

Wo bu xihuan qing qing de jiu diannao.

I not like light light de old computer

36 我不喜欢木头沉沉的皮。

Wo bu xihuan mutou shen shen de pi.

I not like wooden heavy heavy de peel

## B. Sample stimuli for the experiment testing the interpretation of quantifiers in Chinese

### Trial 1

#### Scenario 1

约翰，玛丽和彼得喜欢读书。学校图书馆一共有 100 本书。约翰读了其中的 70 本。玛丽读了其中的 80 本。彼得读了其中的 90 本。

John, Mary and Peter like reading books. There are one hundred books in the library of their school. John has read seventy of them. Mary has read eighty of them. Peter has read ninety of them.

#### Scenario 2

约翰，玛丽和彼得喜欢读书。学校图书馆一共有 100 本书。约翰读了其中的 30 本。玛丽读了其中的 20 本。彼得读了其中的 10 本。

John, Mary and Peter like reading books. There are one hundred books in the library of their school. John has read thirty of them. Mary has read twenty of them. Peter has read ten of them.

#### Statements

a. 约翰读了最多的书。

Yuehan du le zuiduo de shu.

John read Perf. most de book

b. 约翰读了大部分的书。

Yuehan du le dabufen de shu.

John read Perf. most de book

c. 约翰读了大多数的书。

Yuehan du le daduoshu de shu.

John read Perf. most de book

### Trial 2

#### Scenario 1

彼得，约翰和玛丽经常看图书馆里的影碟。图书馆里面一共有100个影碟。彼得看了其中的60个。约翰看了其中的80个。玛丽看了其中的90个。

Peter, John and Mary often watch the videos in the library. There are one hundred videos in the library. Peter has watched sixty of them. John has watched eighty of them. Mary has watched ninety of them.

#### Scenario 2

彼得，约翰和玛丽经常看图书馆里的影碟。图书馆里面一共有100个影碟。彼得看了其中的45个。约翰看了其中的25个。玛丽看了其中的15个。

Peter, John and Mary often watch the videos in the library. There are one hundred videos in the library. Peter has watched forty-five of them. John has watched twenty-five of them. Mary has watched fifteen of them.

#### Statements

a. 彼得看了最多的影碟。

Bide kan le zuiduo de yingdie.

Peter watch Perf. most de video

b. 彼得看了大部分的影碟。

Bide kan le dabufen de yingdie.

Peter watch Perf. most de video

c. 彼得看了大多数的影碟。

Bide kan le daduoshu de yingdie.

Peter watch Perf. most de video

**Trial 3****Scenario 1**

玛丽，约翰和彼得喜欢参观北京的旅游景点。北京一共有 120 个旅游景点。玛丽参观了其中的 71 个。约翰参观了其中的 83 个。彼得参观了其中的 90 个。

Mary, Peter and John like visiting the places of interest in Beijing. There are one hundred and twenty places of interest in Beijing. Mary has visited seventy one of them. John has visited eighty three of them. Peter has visited ninety of them.

**Scenario 2**

玛丽，约翰和彼得喜欢参观北京的旅游景点。北京一共有 120 个旅游景点。玛丽参观了其中的 30 个。约翰参观了其中的 20 个。彼得参观了其中的 10 个。

Mary, Peter and John like visiting the places of interest in Beijing. There are one hundred and twenty places of interest in Beijing. Mary has visited thirty of them. Peter has visited twenty of them. Peter has read ten of them.

**Statements**

a. 玛丽参观了最多的景点。

Mali canguan le zuiduo de jingdian.

Mary visit Perf. most de place of interest

b. 玛丽参观了大部分的景点。

Mali canguan le dabufen de jingdian.

Mary visit Perf. most de place of interest

c. 玛丽参观了大多数的景点。

Mali canguan le daduoshu de jingdian.

Mary visit Perf. most de place of interest

**Trial 4****Scenario 1**

张三，李四和王五喜欢听电脑里面存储的歌曲。电脑里面一共存储了200首歌。张三听了120首。李四听了140首。王五听了170首。

Zhangsan, Lisi and Wangwu like listening to songs stored in the computer. There are two hundred songs stored in the computer. Zhangsan has listened to one hundred and twenty songs. Lisi has listened to one hundred and forty of them. Wangwu has listened to one hundred and seventy of them.

**Scenario 2**

张三，李四和王五喜欢听电脑里面存储的歌曲。电脑里面一共存储了200首歌。张三听了70首。李四听了50首。王五听了30首。

Zhangsan, Lisi and Wangwu like listening to songs stored in the computer. There are two hundred songs stored in the computer. Zhangsan has listened to seventy of them. Lisi has listened to fifty of them. Wangwu has listened to thirty of them.

**Statements**

a. 张三听了最多的歌。

Zhangsan ting le zuiduo de ge.

Zhangsan listen Perf. most de song

b. 张三听了大部分的歌。

Zhangsan ting le dabufen de ge.

Zhangsan listen Perf. most de song

c. 张三听了大多数的歌。

Zhangsan ting le daduoshu de ge.

Zhangsan listen Perf. most de song

**Trial 5****Scenario 1**

汤姆，约翰和玛丽喜欢店里的冰激凌。店里一共有 80 种冰激凌。汤姆吃过其中的 60 种。约翰吃过其中的 70 种。玛丽吃过其中的 75 种。

Tom, John and Mary like tasting ice cream in the store. There are eighty kinds of ice cream in the store. Tom has tasted sixty kinds of them. Mary has tasted seventy kinds of them. Mary has tasted seventy five kinds of them.

**Scenario 2**

汤姆，约翰和玛丽喜欢店里的冰激凌。店里一共有 80 种冰激凌。汤姆尝过其中的 30 种。约翰尝过其中的 20 种。玛丽尝过其中的 15 种。

Tom, John and Mary like tasting ice cream in the store. There are eighty kinds of ice cream in the store. Tom has tasted thirty kinds of them. Mary has tasted twenty kinds of them. Mary has tasted fifteen kinds of them.

**Statements**

a. 汤姆吃过最多的冰激凌。

Tangmu chang guo zuiduo de bingiling.

Tom taste Perf. most de ice cream

b. 汤姆吃过大部分的冰激凌。

Tangmu chang guo dabufen de bingiling.

Tom taste Perf. most de ice cream

c. 汤姆吃过大多数的冰激凌。

Tangmu chang guo daduoshu de bingiling.

Tom taste Perf. most de ice cream

**Trial 6****Scenario 1**

小强，小明和小丽选了同一门课。老师指定了 120 本必读书。小强读了 69 本。小明读了 79 本。小丽读了 90 本。

Xiangqiang, Xiaoming and Xiaoli have selected the same course. The lecturer has appointed one hundred and twenty books as required readings. Xiaoqiang read sixty nine books. Xiaoming has read seventy nine books. Xiaoli has read ninety of them.

**Scenario 2**

小强，小明和小丽选了同一门课。老师指定了 120 本必读书。小强读了 39 本。小明读了 29 本。小丽读了 19 本。

Xiangqiang, Xiaoming and Xiaoli have selected the same course. The lecturer has appointed one hundred and twenty books as required readings. Xiaoqiang read thirty nine books. Xiaoming has read twenty nine books. Xiaoli has read nineteen of them.

**Statements**

a. 小强读了最多的书。

Xiaoqiang du le zuiduo de shu.

Xiaoqiang read Perf. most de book

b. 小强读了大部分的书。

Xiaoqiang du le dabufen de shu.

Xiaoqiang read Perf. most de book

c. 小强读了大多数的书。

Xiaoqiang du le daduoshu de shu.

Xiaoqiang read Perf. most de book

**Trial 7****Scenario 1**

花园里有 160 朵花。张三喜欢其中的 90 朵。李四喜欢其中的 110 朵。王五喜欢其中的 130 朵。  
There are one hundred and sixty flowers in the garden. Zhangsan likes ninety of them. Lisi likes one hundred and ten of them. Wangwu likes one hundred and thirty of them.

**Scenario 2**

花园里有 160 朵花。张三喜欢其中的 35 朵。李四喜欢其中的 25 朵。王五喜欢其中的 19 朵。  
There are one hundred and sixty flowers in the garden. Zhangsan likes thirty five of them. Lisi likes twenty five of them. Wangwu likes nineteen of them.

**Statements**

a. 张三喜欢最多的花。

Zhangsan xihuan zuiduo de hua.

Zhangsan like most de flower

b. 张三喜欢大部分的花。

Zhangsan xihuan dabufen de hua.

Zhangsan like most de flower

c. 张三喜欢大多数的花。

Zhangsan xihuan daduoshu de hua.

Zhangsan like most de flower

**Trial 8****Scenario 1**

玛里，约翰和汤姆在商店里看卡片。一共有 60 个卡片。玛里想买其中的 50 个。约翰想买其中的 40 个。汤姆想买其中的 30 个。

Mary, John and Tom are looking at the post cards in the store. There are sixty post cards in the store. Mary wants to buy fifty of them. John wants to buy forty of them. Tom wants to thirty of them.

**Scenario 2**

玛里，约翰和汤姆在商店里看卡片。一共有 60 张卡片。玛里想买其中的 25 张。约翰想买其中的 20 张。汤姆想买其中的 18 张。

Mary, John and Tom are looking at the post cards in the store. There are sixty post cards in the store. Mary wants to buy twenty five of them. John wants to buy twenty of them. Tom wants to eighteen of them.

**Statements**

a. 玛里想买最多的卡片。

Mali xiang mai zuiduo de kapien

Mary want buy most de post card

b. 玛里想买大部分的卡片。

Mali xiang mai dabufen de kapien

Mary want buy most de post card

c. 玛里想买大多数的卡片。

Mali xiang mai daduoshu de kapien

Mary want buy most de post card

**Trial 9****Scenario 1**

张三，李四和王五观看公园里的水牛。一共有 50 头水牛。张三喜欢其中的 30 头。李四喜欢其中的 40 头。王五喜欢其中的 45 头。

Zhangsan, Lisi and Wangwu are watching the buffaloes in the park. There are fifty buffaloes in the park. Zhangsan likes thirty of them. Lisi likes forty of them. Wangwu likes forty five of them.

### Scenario 2

张三，李四和王五观看公园里的水牛。一共有 50 头水牛。张三喜欢其中的 20 头。李四喜欢其中的 17 头。王五喜欢其中的 15 头。

Zhangsan, Lisi and Wangwu are watching the buffaloes in the park. There are fifty buffaloes in the park. Zhangsan likes twenty of them. Lisi likes seventeen of them. Wangwu likes fifteen of them.

### Statements

a. 张三喜欢最多的水牛。

Zhangsan xihuan zuiduo de shuiniu.

Zhangsan like most de buffalo

b. 张三喜欢大部分的水牛。

Zhangsan xihuan dabufen de shuiniu.

Zhangsan like most de buffalo

c. 张三喜欢大多数的水牛。

Zhangsan xihuan dabufen de shuiniu.

Zhangsan like most de buffalo

## Trial 10

### Scenario 1

张三，李四和王五喜欢看山里的猴子。山里一共有 200 只猴子。张三一共看到了 120 只。李四一共看到了 140 只。王五一共看到了 150 只。

Zhangsan, Lisi and Wangwu like watching monkeys in the mountain. There are two hundred monkeys in the mountain. Zhangsan has seen one hundred and twenty monkeys. Lisi has seen one hundred and forty monkeys. Wangwu has seen one hundred and fifty monkeys.

### Scenario 2

张三，李四和王五喜欢看山里的猴子。山里一共有 200 只猴子。张三一共看到了 80 只。李四一共看到了 70 只。王五一共看到了 60 只。

Zhangsan, Lisi and Wangwu like watching monkeys in the mountain. There are two hundred monkeys in the mountain. Zhangsan has seen eighty monkeys. Lisi has seen seventy monkeys. Wangwu has seen sixty monkeys.

### Statements

a. 张三看到了最多的猴子。

Zhangsan kandao le zuiduo de houzi.

Zhangsan see Perf. most de monkey

b. 张三看到了大部分的猴子。

Zhangsan kandao le dabufen de houzi.

Zhangsan see Perf. most de monkey

c. 张三看到了大多数的猴子。

Zhangsan kandao le daduoshu de houzi.

Zhangsan see Perf. most de monkey

## Trial 11

### Scenario 1

彼得，玛丽和汤姆喜欢看成龙排的电影。成龙一共拍了 100 部电影。彼得看过了其中的 65 部。玛丽一共看过了 75 部。汤姆看过了 80 部。

Peter, Mary and Tom like watching the movies starred by Jackie Chan. Jackie has starred one hundred movies. Peter has seen sixty five of them. Mary has watched seventy five of them. Tom has watched eighty of them.

### Scenario 2

彼得，玛丽和汤姆喜欢看成龙排的电影。成龙一共拍了 100 部电影。彼得看过了其中的 32 部。玛丽一共看过了 22 部。汤姆看过了 18 部。

Peter, Mary and Tom like watching the movies starred by Jackie Chan. Jackie has starred one hundred movies. Peter has watched thirty two of them. Mary has watched twenty two of them. Tom has watched eighteen of them.

### Statements

a. 彼得看过了最多的电影。

Bide kanguo le zuiduo de dianying.

Peter watch Perf. most de movie

b. 彼得看过了大部分的电影。

Bide kanguo le dabufen de dianying.

Peter watch Perf. most de movie

c. 彼得看过了大多数的电影。

Bide kanguo le daduoshu de dianying.

Peter watch Perf. most de movie

### Trial 12

#### Scenario 1

小红，小刚和小丽喜欢读鲁迅的小说。鲁迅一共写了 50 部小说。小红读了 30 部。小刚读了 32 部。小丽读了 40 部。

Xiaohong, Xiaogang and Xiaoli like reading books by Lu Xun. Lu Xun has written fifty books. Xiaohong has read thirty of them. Xiaogang has read thirty two of them. Xiaoli has read forty of them.

#### Scenario 2

小红，小刚和小丽喜欢读鲁迅的小说。鲁迅一共写了 50 部小说。小红读了 20 部。小刚读了 15 部。小丽读了 10 部。

Xiaohong, Xiaogang and Xiaoli like reading books by Lu Xun. Lu Xun has written fifty books. Xiaohong has read twenty of them. Xiaogang has read fifteen of them. Xiaoli has read ten of them.

### Statements

a. 小红读了最多的小说。

Xiaohong du le zuiduo de xiaoshu.

Xiaohong read Perf. most de xiaoshu

b. 小红读了大部分的小说。

Xiaohong du le dabufen de xiaoshu.

Xiaohong read Perf. most de xiaoshu

c. 小红读了大多数的小说。

Xiaohong du le daduosu de xiaoshu.

Xiaohong read Perf. most de xiaoshu

### Filler 1

#### Scenario

彼得，约翰和玛丽一共吃了 100 个饺子。Peter 吃了 40 个。John 吃了 35 个。Mary 吃了 25 个。

Peter, John and Mary have eaten one hundred dumplings. Peter has eaten forty. John has eaten thirty five. Mary has eaten twenty five.

### Statement

彼得吃了少一半的饺子。

Peter has eaten less than half of the one hundred dumplings.

### Filler 2

#### Scenario

我们班里一共有 40 个学生。有 26 个人选修了生物课。有 30 个人选修了物理课。有 36 个选修了数学课。

There are forty students in our class. Twenty six of them have selected Biology. Thirty have selected Physics. Thirty six have selected Mathematics.

#### Statement

多一半的人选修了生物课。

More than half of the students have selected Biology.

### Filler 3

#### Scenario

小王，小李和小红一共吃了 80 个苹果。小王吃了 30 个。小李吃了 28 个。小红吃了 22 个。

Xiaowang, Xiaoli and Xiaohong have eaten eighty apples. Xiaowang has eaten thirty of them. Xiaoli has eaten twenty eight of them. Xiaohong has eaten twenty two of them.

#### Statement

小王吃了多一半的苹果。

Xiaowang has eaten more than half of the apples.

### Filler 4

#### Scenario

小张，小王和小李吃盘子里的葡萄。小张吃了 5 个。小王吃了 6 个。小李吃了 7 个。

XiaoZhang, Xiaowang and Xiaoli have eaten some grapes in the plate. Xiaozhang has eaten five grapes. Xiaowang has eaten six grapes. Xiaoli has eaten seven of them.

#### Statement

小张比小王少吃了 3 个葡萄。

Xiaozhang has eaten three fewer grapes than Xiaowang.

### Filler 5

#### Scenario

约翰，彼得和 玛丽每个人都买了一些书。约翰买了 10 本。彼得买了 5 本。玛丽买了 6 本。

John, Peter and Mary have bought some books. John has bought ten books. Peter has bought five. Mary has bought six.

#### Statement

彼得买的书最少。

Peter has bought the fewest books.

### Filler 6

#### Scenario

小强，小刚和小明一起包饺子。小强包了 30 个。小刚包了 40 个。小明包了 20 个。

Xiaoqiang, Xiaogang and Xiaoming made dumplings. Xiaoqiang made 30 dumplings. Xiaogang has made 40 dumplings. Xiaoming has made 20.

#### Statement

小刚包的饺子最多。

Xiaogang has made the largest number of dumplings.

**Filler 7****Scenario**

张三有 3 本书。李四有 2 本书。小王有 4 本书。这些人的这些书我都读了。

Zhangsan has three books. Lisi has two books. Xiaowang has four books. I have read all these books.

**Statement**

我一共读了 9 本书。

I have read nine books in total.

**Filler 8****Scenario**

小张，小李和小王都去钓鱼。小张钓了 10 条。小李钓了 15 条。小王钓了 20 条。

Xiaozhang, Xiaoli and Xiaowang went fishing. Xiaozhang caught ten fish. Xiaoli caught fifteen fish.

Xiaowang has caught twenty fish.

**Statement**

小张钓的鱼比小李钓的鱼多。

Xiaozhang has caught more fish than Xiaoli has.

**Filler 9****Scenario**

小张，小王和小李吃盘子里的杏。小张吃了 5 个。小王吃了 6 个。小李吃了 7 个。

Xiaozhang, Xiaowang and Xiaoli ate some plums in the plate. Xiaozhang has eaten five. Xiaowang has eaten six. Xiaoli has eaten seven.

**Statement**

小张比小王少吃了 2 个杏。

Xiaozhang has eaten two fewer plums than Xiaowang has.

**Filler 10****Scenario**

约翰，彼得和 玛丽每个人都买了一些书。约翰买了 11 本。彼得买了 5 本。玛丽买了 6 本。

John, Peter and Mary have bought some books. John has bought eleven books. Peter has bought five books. Mary has bought six books.

**Statement**

彼得买的书比玛丽多一本。

Peter has bought one book more than Mary has.

**Filler 11****Scenario**

小王，小李和小红喜欢看篮球比赛。小王看了 10 场比赛。小李看了 12 场。小红看了 15 场。

Xiaowang, Xiaoli and Liahong like watching basketball games. Xiaowang has watched ten games. Xiaoli has watched twelve games. Xiaohong has watched fifteen games.

**Statement**

小王看的比赛最少。

Xiaohong has watched the fewest games.

**Filler 12****Scenario**

小张，小李和小王都去钓鱼。小张钓了 10 条。小李钓了 15 条。小王钓了 20 条。

Xiaozhang, Xiaoli and Xiaowang went fishing. Xiaozhang caught ten fish. Xiaoli caught fifteen fish. Xiaowang caught twenty fish.

**Statement**

小张钓的鱼比小李钓的鱼多一条。

Xiaozhang caught one more fish than Xiaoli did.

**Filler 13**

**Scenario**

小张，小王和小李吃盘子里的杏。小张吃了 5 个。小王吃了 6 个。小李吃了 7 个。

Xiaozhang, Xiaowang and Xiaoli ate the plums in the plate. Xiaozhang has eaten five plums. Xiaowang has eaten six plums. Xiaoli has eaten seven plums.

**Statement**

小张比小王多吃了 1 个杏。

Xiaozhang has eaten one more fish than Xiaowang.

**Filler 14**

**Scenario**

彼得，约翰和 玛丽在一起一共吃了 100 个饺子。彼得吃了 40 个。约翰吃了 35 个。玛丽吃了 25 个。

Peter, John and Mary ate one hundred dumplings. Peter ate forty. John ate thirty five. Mary ate twenty five.

**Statement**

彼得吃了多一半的饺子。

Peter ate more than half of the dumplings.

**Filler 15**

**Scenario**

小王，小李和小红喜欢看篮球比赛。小王看了 10 场比赛。小李看了 12 场。小红看了 15 场。

Xiaowang, Xiaoli and Xiaohong like watching basketball games. Xiaowang watched ten. Xiaoli watched twelve. Xiaohong watched fifteen.

**Statement**

小红看的比赛比小李多 3 场。

Xiaohong has watched three games more than Xiaoli.

**Filler 16**

**Scenario**

我们班里一共有 40 个学生。有 26 个人选修了生物课。有 15 个人选修了物理课。有 36 个选修了数学课。

There are forty students in our class. Twenty six of them selected the course of Biology. Fifteen of them selected the course of Physics. 36 of them selected the course of Mathematics.

**Statement**

少一半的人选修了数学课。

Less than half of the students in our class selected the course of Mathematics.

**Filler 17**

**Scenario**

小张，小王和小李吃盘子里的杏。小张吃了 5 个。小王吃了 6 个。小李吃了 7 个。

Xiaozhang, Xiaowang and Xiaoli ate the plums in the plate. Xiaozhang ate five plums. Xiaowang ate six plums. Xiaoli ate seven plums.

**Statement**

小张比小王少吃了 3 个杏。

Xiaozhang ate three fewer plums than Xiaowang.

**Filler 18**

**Scenario**

小王, 小张和小李一起吃饺子。小王吃了 20 个。小张吃了 25 个。小李吃了 35 个。

Xiaowang, Xiaozhang and Xiaoli ate dumplings together. Xiaowang ate twenty dumplings. Xiaozhang ate twenty five dumplings. Xiaoli ate thirty five dumplings.

**Statement**

小李比小王多吃了 15 个。

Xiaoli ate fifteen dumplings more than Xiaowang.

**Filler 19**

**Scenario**

小王, 小李和小红喜欢看篮球比赛。小王看了 10 场比赛。小李看了 12 场。小红看了 15 场。

Xiaowang, Xiaoli and Xiaohong like watching basketball games. Xiaowang watched ten games. Xiaoli watched twelve games. Xiaohong watched fifteen games.

**Statement**

小红看的比赛最少。

Xiaohong watched the smallest number of games.

**Filler 20**

**Scenario**

小张, 小李和小王都去钓鱼。小张钓了 10 条。小李钓了 25 条。小王钓了 20 条。

Xiaozhang, Xiaoli and Xiaowang went fishing. Xiaozhang caught ten fish. Xiaoli caught twenty five fish. Xiaowang caught twenty fish.

**Statement**

小张钓的鱼比小李钓的鱼多 1 条。

Xiaozhang caught one fish more than Xiaoli.

**Filler 21**

**Scenario**

彼得, 约翰和 玛丽在一起一共吃了 100 个饺子。彼得吃了 40 个。约翰吃了 35 个。玛丽吃了 25 个。

Peter, John and Mary ate one hundred dumplings. Peter ate forty of them. John ate thirty five of them. Mary ate twenty five of them.

**Statement**

彼得吃的饺子比约翰吃的多。

Peter has eaten more dumplings than John has.

**Filler 22**

**Scenario**

小王, 小李和小红喜欢看篮球比赛。小王看了 10 场比赛。小李看了 14 场。小红看了 15 场。

Xiaowang, Xiaoli and Xiaohong like watching basketball games. Xiaowang watched ten games. Xiaoli watched fourteen games. Xiaohong watched fifteen games.

**Statement**

小红看的比赛比小李少。

Xiaohong watched fewer games than Xiaoli.

**Filler 23****Scenario**

小张，小王和小李吃盘子里的杏。小张吃了 5 个。小王吃了 6 个。小李吃了 7 个。

Xiaozhang, Xiaowang and Xiaoli ate the plums in the plate. Xiaozhang ate five plums. Xiaowang ate six plums. Xiaoli ate seven plums.

**Statement**

小张比小王少吃了 3 个杏。

Xiaozhang ate three fewer plums than Xiaowang did.

**Filler 24****Scenario**

小王，小李和小红都喜欢看篮球比赛。小王看了 20 场比赛。小李看了 12 场。小红看了 16 场。

Xiaowang, Xiaoli and Xiaohong like watching basketball games. Xiaowang watched twenty games. Xiaoli watched twelve games. Xiaohong watched sixteen games.

**Statement**

小红看的比赛最少。

Xiaohong has watched the smallest number of games.

**Filler 25****Scenario**

小张，小李和小王都去钓鱼。小张钓了 10 条。小李钓了 15 条。小王钓了 20 条。

Xiaozhang, Xiaoli and Xiaowang went fishing. Xiaozhang caught ten fish. Xiaoli caught fifteen fish. Xiaowang caught twenty fish.

**Statement**

小张钓的鱼比小李钓的鱼多 4 条。

Xiaozhang caught four fish more than Xiaoli did.

**Filler 26****Scenario**

约翰，彼得和 玛丽每个人都买了一些书。约翰买了 10 本。彼得买了 5 本。玛丽买了 6 本。

John, Peter and Mary have bought some books. John has bought ten books. Peter has bought five books. Mary has bought six books.

**Statement**

彼得买的书比玛丽多 4 本。

Peter has bought four books more than Mary has.

**Filler 27****Scenario**

我吃了 3 个苹果。小红吃了 4 个苹果。小刚吃了 6 个苹果。

I ate three apples. Xiaohong ate four apples. Xiaogang ate six apples.

**Statement**

我吃的苹果比小刚多。

I have eaten more apples than Xiaogang has.

**Filler 28****Scenario**

小王，小李和小红喜欢看篮球比赛。小王看了 10 场比赛。小李看了 12 场。小红看了 18 场。  
Xiaowang, Xiaoli and Xiaohong like watching basketaball games. Xaiowang watched ten games. Xiaoli watched twevle games. Xiaohong watched eighteen games.

**Statement**

小王看的比赛最少。  
Xiaowang watched the fewest games.

**Filler 29****Scenario**

鲁迅去年写了 4 部小说。他今年写了 5 部小说。  
Lu Xun wrote four novels last year. He wrote five novels this year.

**Statement**

他今年写的小说增加了。  
The number of books that he wrote increased this year.

**Filler 30****Scenario**

小李吃了 3 个苹果。小红吃了 4 个苹果。小刚吃了 6 个苹果。  
Xiaoli ate three apples. Xiaohong ate four apples. Xaioang ate six apples.

**Statement**

小李吃的苹果比小刚少。  
Xiaoli ate fewer apples than Xiaogang did.

**Filler 31****Scenario**

小王，小李和小红喜欢看篮球比赛。小王看了 12 场比赛。小李看了 12 场。小红看了 15 场。  
Xiaowang, Xiaoli and Xiaohong like watching basektaball games. Xiaowang watched twelve games. Xiaoli watched twelve games. Xiaohong watched fifteen games.

**Statement**

小红看的比赛比小李多 3 场。  
Xiaohong watched three games fewer than Xiaoli.

**Filler 32****Scenario**

小王，小张和小李一起吃饺子。小王吃了 20 个。小张吃了 25 个。小李吃了 35 个。  
Xiaowang, Xiaozhang and Xiaoli ate dumplings together. Xiaowang ate twenty dumplings. Xiaozhang ate twenty five dumplings. Xiaoli ate thirty five dumplings.

**Statement**

他们一共吃了 75 个饺子。  
They ate seventy five dumplings in total.

**Filler 33****Scenario**

小王，小李和小红喜欢看篮球比赛。小王看了 10 场比赛。小李看了 12 场。小红看了 15 场。  
Xiaowang, Xiaoli and Xiaohong like watching basketball games. Xiaowang watched ten games. Xiaoli watched twelve games. Xiaohong watched fifteen games.

**Statement**

小红看的比赛和小李一样多。

Xiaohong watched the same number of games as Xiaoli.

**Filler 34****Scenario**

小张, 小李和小王都去钓鱼。小张钓了 10 条。小李钓了 15 条。小王钓了 20 条。

Xiaozhang, Xiaoli and Xiaowang went fishing. Xiaozhang caught ten fish. Xiaoli caught fifteen fish.

Xiaowang caught twenty fish.

**Statement**

小张钓的鱼比小李钓的鱼少 1 条。

Xiaozhang caught one fewer fish than Xiaoli did.

**Filler 35****Scenario**

小王, 小李和小红都喜欢看足球比赛。小王看了 10 场比赛。小李看了 12 场。小红看了 15 场。

Xiaowang, Xiaoli and Xiaohong like watching soccer games. Xiaowang watched ten games. Xiaoli watched twelve games. Xiaohong watched fifteen games.

**Statement**

小红看了少一半的比赛。

Xiaohong watched less than half of the games.

**Filler 36****Scenario**

我吃了 3 个苹果。小红吃了 4 个苹果。小刚吃了 6 个苹果。

I ate three apples. Xiaohong ate four apples. Xiaogang ate six apples.

**Statement**

我吃了多一半的苹果。

I ate more than half of the apples.

### C. Examination of Chinese regarding typological generalizations

#### A. testing Chinese on Bošković's generalizations

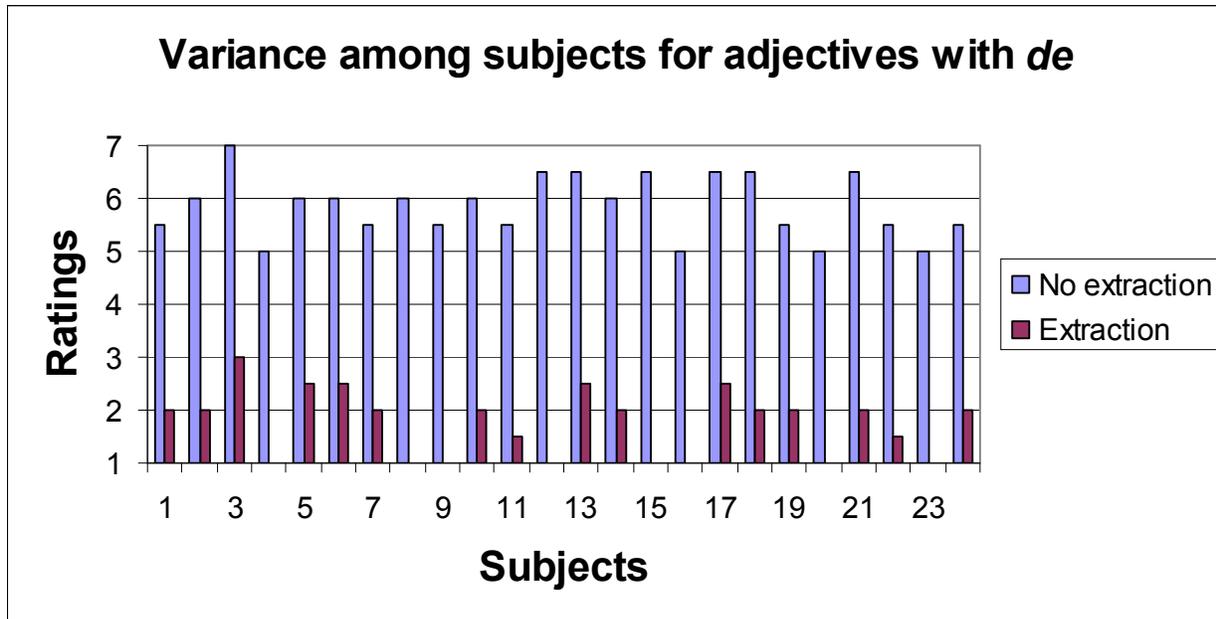
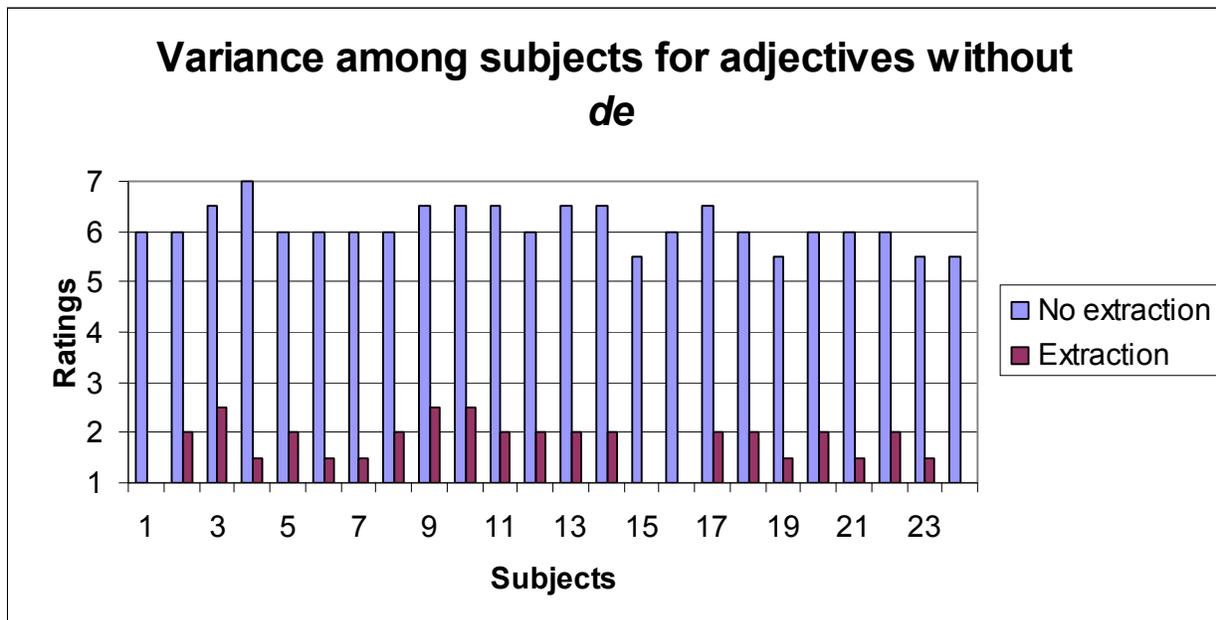
Generalizations	Bošković DP languages	Bošković English	Bošković Chinese	Wang Chinese	Bošković NP languages
<b>Generalizations explained</b>					
Adjective left branch extraction	<b>Disallowed</b>	<b>Disallowed</b>	No mention	<b>Disallowed</b>	<b>Allowed</b>
Adjunct extraction from NP	<b>Disallowed</b>	<b>Disallowed</b>	No mention	<b>Disallowed</b>	<b>Allowed</b>
Majority reading of <i>most</i>	<b>Allowed</b>	<b>Allowed</b>	<b>Disallowed</b>	<b>Allowed</b>	<b>Disallowed</b>
Long distance scrambling	<b>Disallowed</b>	No mention	No mention	<b>Disallowed</b>	<b>Allowed</b>
Negative raising	<b>Allowed</b>	<b>Allowed</b>	<b>Disallowed</b>	<b>Allowed</b>	<b>Disallowed</b>
Double genitive arguments	<b>Allowed</b>	<b>Allowed</b>	<b>Disallowed</b>	<b>Allowed</b>	<b>Disallowed</b>
Clitic doubling	<b>Allowed</b>	No mention	No mention	<b>Allowed</b>	<b>Disallowed</b>
Sequence of Tense	<b>Allowed</b>	<b>Allowed</b>	No mention	<b>Allowed</b>	<b>Disallowed</b>
Exhaustivity presupposition of possessives	<b>Allowed</b>	<b>Allowed</b>	<b>Disallowed</b>	<b>Allowed</b>	<b>Disallowed</b>
Number morphology	<b>Obligatory</b>	No mention	<b>Not obligatory</b>	<b>Not obligatory</b>	<b>Not obligatory</b>
<i>Pro</i> -drop of both subject and object	<b>Disallowed</b>	No mention	<b>Allowed</b>	<b>Allowed</b>	<b>Allowed</b>
<b>Generalizations not explained</b>					
Moved focus adjacent to the verb	<b>Obligatory</b>	No mention	<b>Not obligatory</b>	<b>Not obligatory</b>	<b>Not obligatory</b>
Focus marking of negatives	<b>Not obligatory</b>	No mention	<b>Obligatory</b>	<b>Not obligatory</b>	<b>Obligatory</b>
Inverse quantifier scope	<b>Allowed</b>	<b>Allowed</b>	<b>Disallowed</b>	<b>Disallowed</b>	<b>Disallowed</b>
Classifiers	<b>Not obligatory</b>	Absent	<b>Obligatory</b>	<b>Obligatory</b>	<b>Obligatory</b>
<b>Generalizations not applicable to Chinese</b>					
Superiority effect	<b>Exhibited</b>	No mention	No mention	NA	<b>Not exhibited</b>
Negative concord reading	<b>Absent</b>	No mention	No mention	NA	<b>Not absent</b>

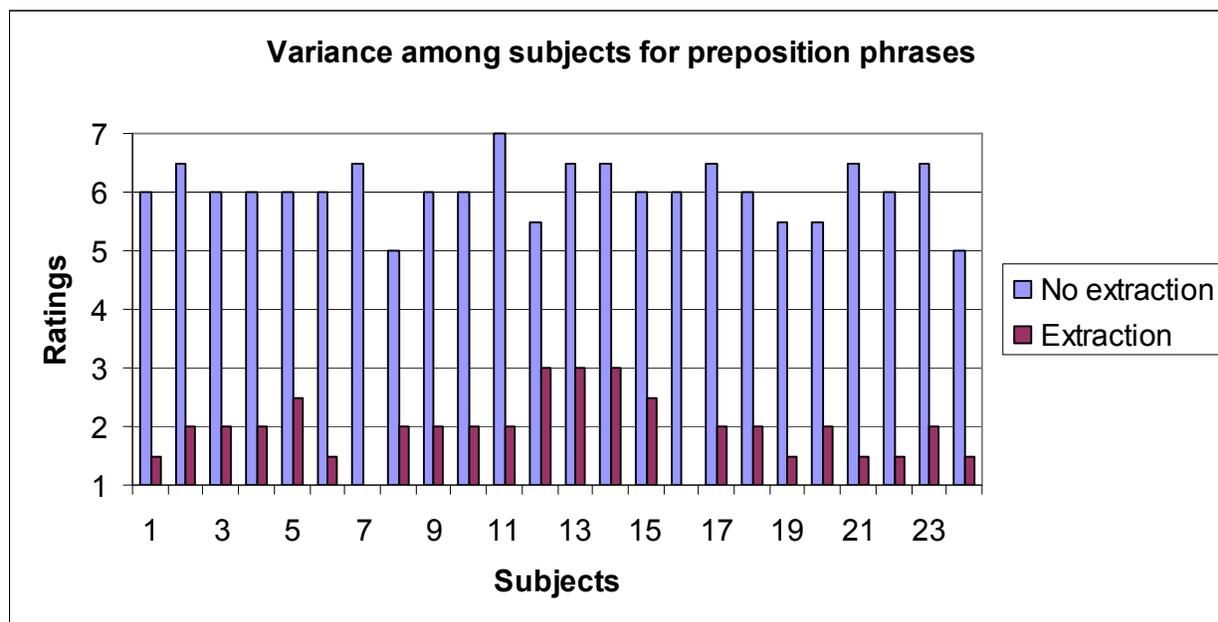
**B. Testing Chinese on the generalizations by Watanabe and Fukui**

	<b>DP languages</b>	<b>Chinese</b>	<b>NP languages</b>
<b>Availability of HIRC</b> s	<b>Yes</b>	<b>Yes</b>	<b>No</b>
<b>Island sensitivity of HIRC</b> s	<b>No</b>	<b>No</b>	
<b>Functional elements in nominal phrases</b>	<b>Yes</b>	<b>Yes</b>	<b>No</b>

### D. Individual variances for two experiments in Chapter 4

#### Experiment 1: Testing the extraction of modifiers in Chinese





**Experiment 2: Testing the interpretation of three quantifiers in Chinese**

