Projections above NP in Mandarin*

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Abstract
The purpose of this paper is two-fold. First, I show that although Mandarin is an articleless language, its nominal expressions involve structures larger than a Noun Phrase (NP). I argue that two distinct projections, Demonstrative Phrase (DemP) and Unit Phrase (UnitP), should be identified in the structure above NP. Second, based on the proposal, I show that various ambiguous expressions, in fact, involve different levels of nominal structures, and that they can be disambiguated under specific contexts. The data in this paper suggest that classifiers are better analyzed as the head of UnitP that dominates NP (and takes number phrase as its specifier), and that DemP dominates UnitP, structurally. I also argue that true possessors should be distinguished from possessive modifiers, and I show that their structural difference explains the restriction concerning phenomena of extractions. Based on data of the fixed ordering of demonstrative-classifier-noun, the distribution and the interpretation of nominal modifiers, and the phenomena of coordination and nominal-internal ellipsis, I argue that identifying DemP and UnitP helps us explain the restrictions and the distribution of different types of nominal expressions through a unified account.

Keywords: Demonstrative Phrase (DemP), Unit Phrase (UnitP), definite, specific true possessor, nominal modifier, Mandarin

1. Introduction

Since Abney's (1987) DP hypothesis, it is generally assumed that the sequence of article-noun in languages like English is better analyzed as a head-complement structure (i.e., (1)), rather than the traditional Noun Phrase (NP) structure that shows a specifier-head relation (i.e., (2)).

(1) $[_{DP}$ a $[_{NP}$ house]]
(2) $[_{NP}$ a $[_{N'}$ house]]

Dryer (2007) reports that almost all languages have lexical items that are equivalent to the class of demonstrative, but only some languages have articles. This, however, has led linguists to wonder whether the DP layer is universal, whether article-less languages exhibit functional layers above NP, and how similar and different behaviors of nominal expressions can be accounted for in syntax cross-linguistically.

According to Ross's (1967) Left Branch Condition, the leftmost constituent of an NP (e.g., possessor, determiner, and adjective) cannot be extracted. However, Bošković (2005) points out that Serbo-Croatian (SC), an article-less language, contrasts with English in this regard. Example (3) shows that extracting an adjective out of its associated NP is banned in English, but such a movement is allowed in SC.

* I would like to express my gratitude to Yoshihisa Kitagawa and Steven Franks for their insightful and valuable comments and suggestions on the earlier drafts of this paper. The earlier version of this paper was presented at the 6th Annual Linguistics Department Graduate Student Conference, April 13th 2012, Indiana University. I am grateful to the audiences at the meeting for their helpful comments. This version has also benefited from the comments and questions of IULC reviewers Ksenia Zanon, Junghyoe Yoon and Kristopher Ebarb. Mistakes are exclusively my own.

(3) Adjective extraction
a. ***Beautiful**$_i$*, he saw [t_i houses].
b. ***Lijepe**$_i$*, je video [t_i kuće] (Serbo-Croatian)
beautiful is seen house

Proponents of the DP/NP dichotomy often treat Mandarin as an NP language based on the fact that no overt article is available in Mandarin; however, we found that similar to English but unlike SC, Mandarin adjectives cannot be extracted. Example (4) suggests that such A-N sequences in Mandarin may not be as simple as they appear.

(4) a. ***Piaoliang-de**$_i$*, ta kanjian-le [t_i fangzi].[1]
beautiful DE he see-PERF house
'Beautiful houses, he saw.'
b.***Youqu-de**$_i$*, xianran [t_i shu] mai-de hao.
funny DE obviously book sell-RESULT good
'Obviously, interesting books sell well.'

Phenomena related to Binding Conditions also show a similar mismatch. In English, a possessor cannot c-command out of its nominal phrase because of the DP layer, and thus, the co-reference between the object and the possessor (that is inside of the subject) is allowed. That is, Binding Condition B is satisfied in (5) in that *him* is not c-commanded by its antecedent.

(5) **John$_i$**'s father considers **him$_i$** highly intelligent.

Despić (2011) argues that SC, an articleless language, does not have a DP layer above NP, unlike English. Example (6) shows that building the coreference relation between *Markov* 'Marko' and *njega* 'him' incurs ungrammaticality. Despić (2011) argues that possessors in SC are NP adjuncts. Therefore, possessors can c-command out of NP and bind the object; i.e., Binding Condition B is violated.

(6) Serbo-Croatian
***Markov$_i$** otac smatra **njega$_i$** veoma pametnim.
Marko's father$_{NOM}$ consider him$_{ACC}$ very smart
'Marko$_i$'s father considers him$_i$ highly intelligent.'

Mandarin does not have articles; nevertheless, example (7) shows that a reflexive needs to be bound locally, and a possessor cannot bind the reflexive.

(7) Reflexives
*[**Zhangsan$_i$(-de)** nupenyou] zhi ai **taziji$_i$**.
Zhangsan DE girlfriend only love himself
'*Zhangsan's girlfriend only loves himself.'

[1] In this paper, the abbreviations for the glosses used in examples are: CL, classifier; PERF, perfective aspect marker; EXP, experienced aspect marker; NOM, nominative Case; ACC, accusative Case; RESULT, resultative particle; BA, disposal marker; DE, marker of prenominal modifiers.

Examples (8) and (9) show that the coreference between a possessor and an R-expression or a pronoun is allowed. The observation suggests that the "possessor-noun" sequence in examples (7) to (9) may involve structures more complex than an NP.

(8) R-expressions
[**Zhangsan$_i$(-de)** muqin] conglai bu zema **Zhangsan$_i$**.
Zhangsan DE mother never not scold Zhangsan
'Zhangsan$_i$'s mother has never scolded Zhangsan$_i$.'

(9) Pronouns
a. [**Chen-Guanxi$_i$(-de)** feiwen] hai-le **ta$_i$**.
Chen-Guanxi DE scandal destory-PERF him
'Chen-Guanxi$_i$'s scandal destroyed him$_i$.'
b. [**Li-An$_i$(-de)** zuixin-de dianying] hua-le **ta$_i$** hen duo qian.
Li-An DE latest-DE movie cost-PERF him very many money
'Li-An$_i$'s latest movie cost him$_i$ a lot of money.'
c. ?[**Lao-Wang$_i$(-de)** shi nian qian-de zhaopian] xiadao-le **ta$_i$**.
Lao-Wang DE ten year ago-DE picture scare-PERF him
'Lao Wang$_i$'s picture from ten years ago scared him$_i$.'

In addition, it is generally acknowledged that bare nouns in Mandarin can express various interpretations that usually require specific morphological markings in other languages. Example (10) (taken from Huang, Li and Li 2009:283 with slight modification of glosses) shows that a bare noun can carry a generic reading (e.g., (10a)), express an indefinite reading (as in (10b)), or express a definite interpretation (e.g., (10c), it may accompany with the speaker's pointing at the referent, the *dog* in question). These facts make us wonder how a simple NP expresses these various interpretations.

(10) Bare nouns with various interpretations
a. **Gou** hen congming. ➔Generic
dog very intelligent
'Dogs are intelligent'
b. Wo kandao **gou**. ➔Indefinite
I see dog
'I saw a dog/dogs.'
c. ?**Gou** pao.zou-le. ➔Definite
dog run.away-PERF
'The dog(s) ran away.'

In the following sections, I only center the discussion on definite and indefinite expressions. I argue that both demonstratives and classifiers are head categories, and that they project Demonstrative Phrase (hence DemP) and Unit Phrase (hence UnitP), respectively. Next, I discuss some phenomena of nominal modifiers and the differences between modifiers and true possessors (Section 3). In Section 4, I show how the current proposal explains ambiguous nominal expressions through a unified account. Last, I briefly conclude this study in Section 5.

2. Projections above NP

2.1 The Proposal

Since Mandarin does not employ a rich morphological marking to signal syntactic operations, the linear order and the scope interpretation of syntactic units are most useful when we try to study its syntax.

In Mandarin, "classifiers" refer to words that serve as unit or measurement of nouns for counting purposes. Some of them have the parallel counting units in English, as in example (12).

(11) a. san wei laoshi
three CL teacher
'three teachers'
b. liang ben shu
two CL book
'two books'

(12) a. san **xiang** shu
three CL.box book
'three boxes of books'
b. three **boxes** of books

c. yi **ping** jiu
one CL.bottle wine
'one bottle of wine'
d. a **bottle** of wine

Example (13) shows that in addition to a bare noun, Demonstrative, Number, and Classifier can co-occur with Noun. When they co-occur, they have to surface in a fixed order. Example (13) shows that only the order of "Dem, Num-CL, N" is allowed, and that these elements cannot surface in any other order to express the neutral and default interpretation of "those three pens."[2]

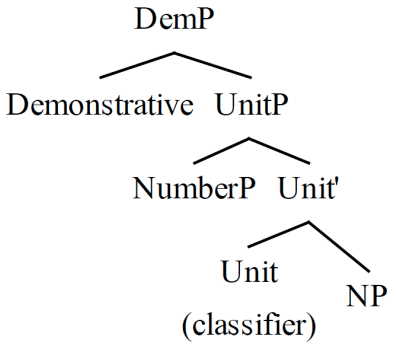
[2] Examples (b) and (e) in (13) may become acceptable, if they are read with a pause as shown in (i). Such phrases express an appositive reading, and not the intended basic reading:
(i) a. na bi # san-zhi
that pen three-classifier
'that (kind of) pen, three of them'
b. bi # na san-zhi
pen that three-classifier
'pens, those three'

(13) a. **Dem** **Num-CL** **N**
na san-zhi bi
that *three-classifier* *pen*
'those three pens'

b. *na bi san-zhi
c. *san-zhi na bi
d. *san-zhi bi na
e. *bi na san-zhi
f. *bi san-zhi na

Given that functional categories tend to occupy specific positions in the structure, and based on examples like (13), I propose that demonstratives and classifiers are head categories that project Demonstrative Phrase (hence DemP) and Unit Phrase (hence UnitP), respectively. Unlike the more commonly adopted structure that has Number Phrase as a distinct projection dominating the classifier phrase and NP (cf. Tang 1990, Li 1999, and Huang et al. 2009), I propose that Number Phrase[3] is the specifier of UnitP, and that DemP dominates UnitP; in turn, DemP and UnitP are structurally higher than NP. My proposed structure is shown in (14).

(14) The proposed structure



The proposal is supported by the facts that numbers alone cannot surface inside of a nominal, but other head elements can, as shown in example (15). If one analyzed a Number Phrase dominating classifier and noun, it is difficult to explain the contrast between (15a-c) and (15d-e), and why the realization of number relies on the classifier (cf. (15e) vs. (15f)).

(15) a. Wo jian-guo **na** **gou**.
I see-EXP that dog
'I have seen that dog.'
b. Wo jian-guo **zhi** **gou**.
I see-EXP CL dog
'I have seen a dog.'

[3] I assume that both numbers and complex numeral phrases, like *chaoguo sanshi* 'more.than thirty' are analyzed as the specifier of UnitP.

c. Wo jian-guo **gou**.
I see-EXP dog
'I have seen dogs/a dog.'

d.*Wo jian-guo ***san*** **gou**.
I see-EXP three dog
'I have seen three dogs.'

e.*Wo jian-guo **na** ***san*** **gou**.
I see-EXP that three dog
'I have seen those three dogs.'

f. Wo jian-guo **na** ***san*.zhi** **gou**.
I see-EXP that three.CL dog
'I have seen those three dogs.'

Furthermore, the distribution of nominal modifiers supports the proposed structure. Mandarin only allows prenominal modifiers. While the distribution of adjectives may be more restricted, relative clauses have a freer distribution (see Tang 1990, Hsieh 2005, and Huang et al. 2009). Example (16) shows that a relative clause can occur before a demonstrative (e.g., (16a)), between a demonstrative and the UnitP (e.g., (16b)), or between a classifier and NP (e.g., (16c)).

(16) a. [$_{DEMP}$ [$_{RC}$ **meiren yao de]** *na* shi ben shu]
nobody like DE *that* ten CL book
'those ten books, which nobody likes'

b. [$_{DEMP}$ *na* [$_{UNITP}$ [$_{RC}$ **meiren yao de]** *shi ben* shu]]
that nobody like DE ten CL book
'those ten books that nobody likes'

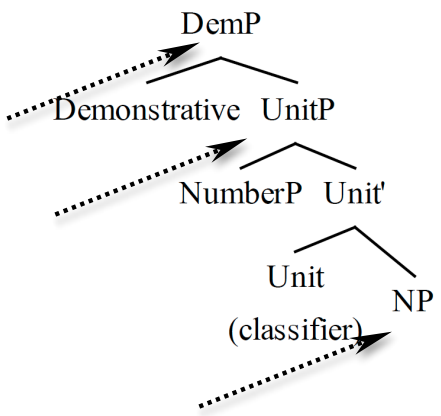
c. [$_{DEMP}$ na [$_{UNITP}$ shi *ben* [$_{NP}$ [$_{RC}$ **meiren yao de]** *shu*]]]
that ten CL nobody like DE book
'those ten of books that nobody likes'

However, a relative clause never intervenes between a number phrase and a classifier, as in (17).

(17) *[$_{DEMP}$ na [$_{UNITP}$ shi [$_{RC}$ **meiren yao de]** ben [$_{NP}$ shu]]]
that ten nobody like DE CL book
'those ten books that nobody likes'

In the tree diagram (18), the dotted arrows indicate the permitted positions of relative clauses inside of a complex nominal.

(18)



Based on the proposed structure, in the next section, I show that the realization of UnitP changes the semantic core of the entire nominal interpretation, which suggests that it is a distinct functional projection that dominates NP, and next, I will show that demonstratives in Mandarin have functions similar to determiners in English, besides semantically expressing "definiteness."

2.2 UnitP

In the literature on Mandarin nominal structures, number is often analyzed as the head of number phrase, dominating the classifier phrase or accommodating classifier inside of the number phrase, in order to account for plurality (cf. Cheng and Sybesma 1999, Huang et al. 2009, Li 1999, Tang 1990, among others). For instance, example (19) shows that changing the number from *yi* 'one' to *si* 'four' changes the interpretation of the whole nominal from 'one student' to 'four students.

(19) a. Zhangsan jiao-guo ***yi*** ge xuesheng.
Zhangsan teach-EXP one CL student
'Zhangsan has taught one student.'
b. Zhangsan jiao-guo ***si*** ge xuesheng.
Zhangsan teach-EXP four CL student
'Zhangsan has taught four students.'

However, if number and classifier projected distinct projections, one may wonder why a number phrase alone, without the classifier phrase, cannot occur inside of a nominal (e.g., (15d-e)), and why a modifier never occurs between "the number phrase" and "the classifier phrase" (e.g., (17)). In addition, the number phrase is not always required. Example (20) shows that when the number is 'one', this number can be omitted, and the classifier alone serves for the counting/measuring function.

(20) Zhangsan jiao-guo ***ge*** xuesheng.
Zhangsan teach-EXP CL student
'Zhangsan has taught a student.'

Hsieh (2008:67) reports when the classifier is duplicated, it signals plurality, even without the presence of the number (e.g., (21)).

(21) Zhangsan ***ge-ge*** xuesheng dou hen congming.
Zhangsan CL-CL student all very smart
'Zhangsan's students all very smart.'

Therefore, I propose that classifier is the head of "a Unit Phrase" which expresses the core unit for counting or measuring of the noun at issue. This proposal is supported by the facts that different classifiers represent different grouping ideas, which is independent of number and noun. In other words, NP alone or simply positing number phrase and NP cannot express how nouns are categorized in different senses. Example (22) demonstrates this point.

(22) a. Zhangsan jiao-guo yi ***ge*** xuesheng.
Zhangsan teach-EXP one CL.person student
'Zhangsan has taught ***one*** student.'
b. Zhangsan jiao-guo yi ***quen*** xuesheng.
Zhangsan teach-EXP one CL.group student
'Zhangsan has taught ***a group of*** students.'
c. Zhangsan jiao-guo yi ***xie*** xuesheng.
Zhangsan teach-EXP one CL.approximate.amount student
'Zhangsan has taught ***some (numbers of)*** students.'

The proposed structure in (18) directly associates the selectional restriction between classifier and noun through a head-complement relation. Example (23) shows that the classifier of *chuang* 'bed' has to be *zhang* 'CL.flat.item', but cannot be *zhi* 'CL.stick.shape', which is the designated classifier of nouns in a stick-shape, e.g., *bi* 'pen'.

(23) a. liang ***zhang*** chuang
two CL.flat.item bed
'two beds'
b. *liang ***zhi*** chuang
two CL.stick.shape bed
'two beds'
c. liang ***zhi*** bi
two CL.stick.shape pen
'two pens'

Given the proposal, one may infer that when the UnitP is projected as the highest projection of a nominal, such a nominal only denotes quantity of a unit, and that such an expression would not be referential. The conjecture is born out. Example (24) shows that the quantity-denoting adverb *yigong* 'altogether' is not compatible with a referential DemP, but only with UnitP. Example (25) with another quantity-denoting adverb, *dayue* 'approximately', shows the same contrast.

(24) a. Ta ***yigong*** mai-le [UnitP wu ben shu].
he **altogether** buy-PERF five CL book
'He bought altogether five books.'

b.# Ta ***yigong*** mai-le [$_{DemP}$ zhe wu ben shu].
he **altogether** buy-PERF this five CL book
'He bought altogether these five books.'

(25) a. Ta ***dayue*** mai-le [$_{UnitP}$ wu ben shu].
he **approximately** buy-PERF five CL book
'He bought approximately five books.'
b.# Ta ***dayue*** mai-le [$_{DemP}$ zhe wu ben shu].
he **approximately** buy-PERF this five CL book
'He bought approximately these five books.'

Moreover, UnitP cannot co-refer with or bind a pronoun but a DemP can. The contrast in example (26) shows that a UnitP is not referential, whereas a DemP is. This contrast echoes the proposed structure, where the DemP is responsible for definiteness and referentiality and UnitP defines the measurement of noun.

(26) a.*[$_{UnitP}$ **San ge ren**$_i$] tai-bu-qi liang jia ni gei **tamen**$_i$-de gangqin.
three CL man lift-not-up two CL you give them DE piano
'Three people cannot lift two (of the) pianos that you gave to them.' (from Huang et al. 2009:290, modified with the proposed structure)
b. [$_{DemP}$ **Na san ge ren**$_i$] tai-bu-qi liang jia ni gei **tamen**$_i$-de gangqin.
that three CL man lift-not-up two CL you give them DE piano
'Those three people cannot lift two (of the) pianos that you gave to them.'

In sum, I argue that classifiers should be analyzed as the head of UnitP and that the realization of UnitP changes the semantic core of the whole nominal (e.g., examples (20) to (23)). It has been shown that the occurrence of number relies on the Unit head, that quantity denoting adverbs are compatible with UnitP but not with other nominals (e.g., examples (24) and (25)), and that UnitP denoting quantity is not referential, unlike DemP (e.g., example (26)). In the following sub-sections, I discuss the lexical items that can be analyzed as the head of DemP.

2.3 DemP

In this section, I discuss two sets of lexical items—demonstratives and the specific indefinite marker *you*. First, I show that demonstratives can be analyzed as the head of DemP in Mandarin, which is responsible for [+definite, +specific] features. There are examples indicating that DemP has functions similar to DP in English. Second, following Tsai (2004), I suggest that *you* 'existence' can also be analyzed as heading DemP; however, unlike demonstratives, *you* carries [-indefinite, +specific] features. In other words, the occurrence of demonstrative signals [+definite, +specific], whereas the occurrence of the existential marker *you* indicates that the nominal in question is [-indefinite, +specific].

2.3.1 Demonstratives, [+definite, +specific]

The presence of a demonstrative obligatorily marks [+definite, +specific]. As the English translation suggests, when the object contains a demonstrative, it is definite and specific, but when there is no demonstrative, the object is interpreted as indefinite.

(27) a. Wo renshi [**na** san wei laoshi].
I know that three CL teacher
'I know those three teachers.'
b. Wo renshi [san wei laoshi].
I know three CL teacher
'I know three teachers.'

In Mandarin, nominal modifiers are marked with *–de*. Example (28) shows that *–de* is compatible with various phrases and changes them into prenominal modifiers.

(28) a. [$_{UnitP}$ yi-bai yuan]-de kafei
one-hundred dollor DE coffee
'$100 coffee'
b. [$_{NP}$ hong pingguo]-de jiage
red apple DE price
'the price of red apples'
c. [$_{PP}$ yu Zhangsan]-de huimian
with Zhangsan DE interview
'an interview with Zhangsan'
d. [$_{RC}$ wo mai]-de shu
I buy DE book
'books that I bought'
e. [$_{AP}$ piaoliang]-de nuhai
beautiful DE girl
'beautiful girls'
f. [$_{VP}$ chi fan]-de difang
eat rice DE place
'place(s) for dining'

However, unlike other article-less languages that have modifier-like demonstratives, demonstratives in Mandarin are not compatible with the adjectival marker *–de* (e.g., (29)).

(29) a. ***zhe**-de ren
this DE person
'this person'
b. **zhe** ren

In addition to the anaphoric or deictic function that is common for demonstratives across languages (see Lyons 1999, Alexiadou et al. 2007, Dryer 2007, among others), some examples of demonstratives in Mandarin show functions similar to determiners in English. First, they can be demonstrative pronouns.

(30) a. **Zhe** shi yi ben hao shu.
This is one CL good book
'**This** is a good book.'
b. **Na** shi yingwen xiaoshuo.
That is English novel
'**That** is an English novel.'

Second, nominals with a demonstrative are always definite, but not necessarily directly deictic. For instance, example (31) can be uttered in a context without the presence of the referent (*na san wei laoshi* 'those three teachers') in the perceptual space of the speaker and the hearer. The speaker presupposes that there are three teachers that both the speaker and the hearer are familiar with in a relevant discourse, or the speaker presupposes that the hearer can identify them in a relevant discourse.

(31) Wo renshi [**na** san wei laoshi]
I know that three CL teacher
'I know those three teachers.'

In other words, demonstratives signal [+definite, +specific], but they do not have to be physically deictic. Example (32), taken from a recording of talk show *Kangxi Laile*, demonstrates that a demonstrative is used when the referent is not introduced in the preceding context, but its identity is sensible or inferable by both speaker and hearer. In a scenario that a guest in a talk show is asked to describe why he would be getting impatient while waiting for his girlfriend to put on make-up for their date. The guest says:

(32) "She always spends three or four hours, and I can do nothing but wait for her….
Na ge men name da, (danshi) ta jiushi chu-bu-qu!"
That CL door so big but she just out-not-go
'**The** door is so big, but she just could not get out from that door!'

Immediately after the last sentence, the host asks 'Which door? This door or that door?' Everyone laughs. It is because asking *Which door?* is not appropriate in this discourse, since the participants were not building a conversation based on the information of a specific room where the event happened (the place is, in fact, irrelevant). Without prior discourse context, *na ge men* 'that door' is not physically deictic at the present. Examples (27) to (32) show that demonstratives in Mandarin are similar to the determiner category in English.

2.3.2 Indefinite Dem: *You*, [-definite, +specific]

Although there is no indefinite article in Mandarin, Tsai (2004) reports that the existential auxiliary *you* 'exist' has parts of functions grammaticalized as quantifier and determiner. Following Huang (1988), Tsai (2004) argues that the sentence-initial *you* in example (33) is an existential auxiliary, and that examples (34) and (35) involve *you* 'exist' as a partitive quantifier and a determiner, respectively (examples are from Tsai 2004, with bracket notations added).

(33) [$_{\text{Auxiliary}}$ ***You***] [ren] lai-le.
have person come-PERF
'There was a person who came.'

(34) [$_{\text{QuantifierP}}$ ***You***-de ren] lai-le.
some.of-DE person come-PERF
'Some of the people came.'

(35) [$_{\text{DemP}}$ ***You*** xie ren] lai-le.
specific-indefinite CL person come-PERF
'Some people came.'

Tsai indicates that the example in (34) expresses a partitive reading (as suggested in its English translation); that is, the speaker presupposes the existence of a group of people, and the subject of the sentence refers to only part of the group. Example (35) shows that *you* functions as an indefinite specific marker; when it occurs with the classifier *xie*, it is semantically similar to the quantifier *some* in English.

Following Tsai (2004), I suggest that the specific-indefinite marker *you* can be analyzed as an indefinite Dem that projects DemP, and that it is responsible for [-definite, +specific] features. This proposal is supported by the fact that *you* and demonstratives cannot co-occur (e.g., the contrast between (36) and (37)). That is, they carry distinct semantic features and compete for the same position.

(36) a. [$_{\text{DemP}}$ ***Zhe*** san ge xuesheng] hen gao.
this three CL student very tall
'These three students are very tall.'

b. [$_{\text{DemP}}$ ***You*** san ge xuesheng] hen gao.
specific-indefinite three CL student very tall
'Three students are very tall.'

(37) a.* [$_{\text{DemP}}$ ***Zhe you*** san ge xuesheng] hen gao.
this specific-indefinite three CL student very tall

b.* [$_{\text{DemP}}$ ***You*** ***zhe*** san ge xuesheng] hen gao.
specific-indefinite this three CL student very tall

The proposed distinction between UnitP and DemP is further supported by the fact that UnitP alone cannot convey specificity in Mandarin. Therefore, a UnitP cannot serve as a subject when the sentence is realis that requires a fully expressed specific subject, as shown in (38). The contrast between UnitP and DemP shown in examples (38) and (39) argues against Cheng and Sybesma's (1999) proposal that analyzes classifiers in Mandarin as determiners that denote definiteness.

(38) *[$_{\text{UnitP}}$ **ben** **shu**] bu jian-le!
CL book not appear-PERF
'A book/The book disappeared!'

(39) a. [$_{DemP}$ **Na ben shu**] bu jian-le!
That CL book not appear-PERF
'That book/The book disappeared!'
b. [$_{DemP}$ **You ben shu**] bu jian-le!
Specific-indefinite CL book not appear-PERF
'A book disappeared!'

2.4 Supporting Evidence: Nominal Coordination and Ellipsis

The proposed structure (18) echoes the observation on nominal coordination in Mandarin, which is proposed by Aoun and Li (2003). They show that coordinators in Mandarin exhibit categorial restrictions, as summarized in (40).

(40) a. ***jian*** 'and': coordinates two NPs
b. ***he*** 'and': coordinates two DP (= DemP in this paper)

Example (41) shows that when two phrases lower than the classifier are coordinated, *jian* 'and' is used but not other coordinators. Nonetheless, when two conjuncts have demonstratives, only *he* 'and' is allowed (e.g., (42)).

(41) Wo xiang zhao yi *ge* [$_{NP}$ [$_{RC}$ fuze yingwen de] mishu]
I want find one CL charge English DE secretary
jian/*he [$_{NP}$ [$_{RC}$ jiao xiaohai de] jiajiao] .
and teach kid DE tutor
'I want to find a person who can be a secretary that takes care of English (matters) and can be kids' tutor.'

(42) Wo xihuan [$_{DemP}$ [$_{RC}$ fuze yingwen de] *na* yi ge mishu]
I like charge English DE that one CL secretary
*jian/**he** [$_{DemP}$ [$_{RC}$ jiao xiaohai de] *na* yi ge jiajiao] .
and teach kid DE that one CL tutor
'I like the secretary who takes care of English (matters) and the tutor that teaches kids.'

Based on the proposed structure, one would predict that UnitPs can be coordinated. This prediction is borne out. Example (43) shows that a relative clause can scope over both UnitP conjuncts. Similar to DemP, UnitPs are coordinated by *he* 'and', but not by *jian* 'and'.

(43) Wo xihuan na [$_{UnitP}$ [$_{RC}$ fuze yingwen de]
I like that charge English DE
[$_{UnitP}$ san wei mishu] *jian/**he** [$_{UnitP}$ liang wei jiajiao]].
three CL secretary and two CL tutor
'I like those three secretaries who take care of English (matters) and those two tutors who take care of English (matters).'

Furthermore, following Merchant (2001) and assuming that structural identity is respected in ellipsis, I show that sentences with ellipsis support the proposed structure, i.e., the

ellipsis site can be DemP, NP or UnitP. Example (44) shows that the elided part in the second clause can be interpreted as its antecedent, which is a full DemP, *na san jian shangyi* 'those three shirts'.

(44) **DemP**

Wo zhi kandau
I only see
[$_{\textbf{DemP}}$ [$_{\textbf{RC}}$ Xiaomei zuotian mai de] **na san jian shangyi]**, dan wo
Xiaomei yesterday buy DE that three CL shirt but I
mei kandau [$_{\textbf{DemP}}$ [$_{\textbf{RC}}$ ta jintian gang mai de] ~~**na san jian shangyi**~~**]** .
not see she today just buy DE that three CL shirt
'I only see those three shirts that Xiaomei bought yesterday, but I don't see [those three shirts] that she just bought today.'

Next, we can see that when ellipsis takes place inside of a nominal, the internal structure of the nominal is still relevant. Example (45) shows that the elided part can be recovered from its antecedent NP.

(45) **NP**

Wo zhi kandau
I only see
[$_{\text{DemP}}$ [$_{\textbf{RC}}$ Xiaomei zuotian mai de] na san jian [$_{\textbf{NP}}$ **shangyi]**,
Xiaomei yesterday buy DE that three CL shirt
dan wo mei kandau[$_{\text{DemP}}$[$_{\textbf{RC}}$ ta jintian gang mai de] na san jian [$_{\textbf{NP}}$ ~~**shangyi**~~**]].**
but I not see she today just buy DE that three CL shirt.
'I only see those three shirts that Xiaomei bought yesterday, but I don't see those three [shirts] that she just bought today.'

A similar effect can be found with respect to UnitP. Example (46) shows that ellipsis targets the UnitP, which is embedded inside of a DemP.

(46) **UnitP**

Ni keyi mai [$_{\text{DemP}}$ na [$_{\textbf{RC}}$ you biaoqian de] [$_{\textbf{UnitP}}$ **san jian shangyi]],**
you can buy that have tag DE three CL shirt
dan bie buy [$_{\text{DemP}}$ na [$_{\textbf{RC}}$ mei you biaoqin de] [$_{\textbf{UnitP}}$ ~~**san jian shangyi**~~**]].**
but not buy that not have tag DE three CL shirt.
'You can buy those three shirts with tags, but do not buy those [three shirts] without tags.'

In sum, the preceding discussion shows that two functional projections should be identified above the NP in Mandarin, i.e., DemP and UnitP. In the following sections, I will discuss possessive expressions and the structure of nominal modifiers.

3. True Possessor vs. Nominal Modifier

3.1 True Possessor is not a Modifier

I argue that a possessor with *–de* is a nominal modifier, but a bare possessor (without *–de*) is the true possessor that only occurs before demonstratives and should be structurally distinguished from nominal modifiers (ModP).

(47) a. Possessive modifier: **Possessor-*de***
b. True possessor: ***bare Possessor***

In the literature, there is not much discussion about how "possession" is structurally realized in a Mandarin nominal. It is generally assumed that possessors take an optional *–de* marker (e.g., (48)). However, Mandarin has no overt Case morphology on other arguments, i.e., no Case maker for nominative, accusative, dative, etc.; one may wonder why the possessor (which is often marked with genitive Case in other languages) is an exception which requires an optional marker.

(48) a. Zhangsan(-de) pengyou
Zhangsan DE friend
'Zhangsan's friend(s)'
b. wo(-de) pengyou
I DE friend
'my friend(s)'

The other approach is to analyze possessors on a par with nominal modifiers, since attributive adjectives that directly modify NPs take optional marker *–de*, and relative clauses always occur with *–de* (e.g., (49)).

(49) a. piaoliang(-de) pengyou
beautiful DE friend
'beautiful friend(s)'
b. meiren yao *(de)
nobody like DE
'that nobody likes'

Given that relative clauses have a freer distribution inside of a nominal (Example (16) is repeated in (50)), we can see that possessive modifiers show the same distribution, as in example (51).

(50) a. [$_{\text{DEMP}}$ **[$_{\text{RC}}$ meiren yao de]** na shi ben shu]
nobody like DE that ten CL book
'those ten books, which nobody likes'
b.?[$_{\text{DEMP}}$ na [$_{\text{UNITP}}$ **[$_{\text{RC}}$ meiren yao de]** shi ben shu]]
that nobody like DE ten CL book
c. [$_{\text{DEMP}}$ na [$_{\text{UNITP}}$ shi ben [$_{\text{NP}}$ **[$_{\text{RC}}$ meiren yao de]** shu]]]
that ten CL nobody like DE book

(51) a. [$_{DEMP}$ **[$_{MODP}$ Wo de]** *na* shi ben shu]
I DE *that* ten CL book
'those ten books of mine'
b.?[$_{DEMP}$ na [$_{UNITP}$ **[$_{MODP}$ Wo de]** shi ben shu]]
that I DE ten CL book
c. [$_{DEMP}$ na [$_{UNITP}$ shi ben [$_{NP}$ **[$_{MODP}$ Wo de]** shu]]]
that ten CL I DE book

However, unlike possessive modifiers and relative clauses, bare possessors can only occur before demonstrative, but not elsewhere inside of a nominal (e.g., (52)). If one assumes that possessors are nominal modifiers in Mandarin, the contrast between (51) and (52) is puzzling.

(52) a. [$_{DEMP}$ **[$_{POSS}$ Wo]** *na* shi ben shu]
I *that* ten CL book
'those ten books of mine'
b.*[$_{DEMP}$ na [$_{UNITP}$ **[$_{POSS}$ Wo]** shi ben shu]]
that I ten CL book
c. *[$_{DEMP}$ na [$_{UNITP}$ shi ben [$_{NP}$ **[$_{POSS}$ Wo]** shu]]]
that ten CL I book

Furthermore, if one analyzes possessors as attributive adjectives that take the optional *–de* marker, the ungrammatical examples in (52) are still left unexplained. Note that attributive adjectives do not need *–de* marker to modify NP directly (e.g., (53)), unlike bare possessors (e.g., (52c)).

(53) [$_{DEMP}$ na [$_{UNITP}$ shi wei [$_{NP}$ **[$_{MODP}$ piaoliang]** nuhai]]]
that ten CL pretty girl
'those ten pretty girls'

Examples (50) to (53) suggest that there is a structural difference between these two types of phrases that express the "possessive" interpretation.

The distinction between *possessive modifiers* and *true possessors* is made even clearer in examples with two possessive phrases. In Hsu (2009), I showed that in order to convey the intended interpretation, 'my three books by Chomsky', only (54) is acceptable, but (55) is not.

(54) [$_{DemP}$ **[$_{POSS}$ wo]** na san ben [$_{NP}$ **[$_{MODP}$ Chomsky-de]** shu **]]**
I that three CL Chomsky DE book
'my three books by Chomsky'

(55) *[$_{DemP}$ **[$_{POSS}$ Chomsky]** na san ben [$_{NP}$ **[$_{MODP}$ wo-de]** shu **]]**
Chomsky that three CL I DE book
'my three books by Chomsky'

In the spirit of Tasseva-Kurktchieva (2005) which states that possessive interpretations can be expressed through different syntactic structures, I argue that true possessors and possessive modifiers should be distinguished structurally in Mandarin. Based on the distributional facts (e.g.,

examples (50) to (53)) and the semantic restrictions (e.g., the contrast between examples (54) and (55)), I propose that all prenominal *–de* phrases are *modifiers* that may have a freer distribution inside of a nominal (though, different positions convey different hierarchical scope interpretations), whereas *true possessors* without *–de* marker always precede demonstratives in Mandarin. The true possessor can be analyzed as the Specifier of DemP[4]. Thus, sitting on the nominal periphery, the true possessor can be extracted, whereas possessive modifiers cannot (e.g., (56)), just like other adjectives.

(56) a. **Zhangsan$_i$** xianran **[t$_i$ shoubi]** hen chang. (see Hsu 2009)
Zhangsan obviously arm very long
'Speaking of Zhangsan, obviously, [his] arms are very long.'
b.***Zhangsan$_i$-de** xiangran **[t$_i$ shoubi]** hen chang.
Zhangsan DE obviously arm very long

In the next section, I discuss some issues concerning the structure of adjectives and why extractions of adjectives are banned in Mandarin.

3.2 Nominal Modifiers

In Section 1, we have seen an interesting contrast between two article-less languages, SC and Mandarin, with respect to the extraction of adjectives from NPs. Those examples are repeated here in (57) and (58). In this section, I would like to propose that the ungrammatical examples are due to the movement of non-constituents.

(57) **Lijepe$_i$**, je video [t$_i$ kuće] (Serbo-Croatian)
beautiful is seen house
'Beautiful, he saw houses.'

(58) a. ***Piaoliang-de$_i$**, ta kanjian-le [t$_i$ fangzi].
beautiful DE he see-PERF house
'Beautiful, he saw houses.'
b.***Youqu-de$_i$**, xianran [t$_i$ shu] mai-de hao.
interesting-DE obviously book sell-RESULT good
'Obviously, interesting books sell well.'

Concerning the phenomena of adjective extractions, Bošković (2005) suggests that two types of analyses can account for the contrast between English and SC, i.e., the Phase analysis and the Constituent analysis. According to the Phase analysis, English does not allow adjective extractions because such movements violate anti-locality (i.e., the movement is too short). However, APs in SC adjoin to the NP periphery, and thus, the extraction of adjectives does not cause structural problems. However, no matter what nominal-internal structure is assumed, the Phase analysis would predict that extractions of adjectives should be allowed in Mandarin (e.g., (60)), contrary to the facts.

[4] The other possible account is to analyze the true possessor as the specifier of an independent Possessor Phrase higher in the nominal structure (see Kayne 1994). I leave the choice open in the current study.

(59) Phase analysis:
English type: *[$_{DP}$ AP$_i$ [$_{D'}$ D [$_{NP}$ t$_i$ N]]]
SC type: [$_{NP}$ AP N]

(60) Mandarin:
English type: [$_{DemP}$ AP$_i$ [$_{Dem'}$ Dem [$_{UnitP}$ Unit [$_{NP}$ t$_i$ N]]]]
SC type: [$_{NP}$ AP N]

On the other hand, following Abney (1987), Bošković (2005) suggests that the A-over-N structure also disallows extractions of adjectives, because such a movement, leaving the complement NP behind, involves moving a non-constituent. In this light, I propose that movement of an adjective in Mandarin is banned because it involves moving a non-constituent.

(61) Constituent analysis:
[$_{DP}$ D [$_{AP}$ A [$_{NP}$ N]]]

Following Hsieh (2005) and Tang (2005), I argue that *–de* projects the Modifier Phrase (ModP), but I depart from their NP adjunction analysis and argue that ModP dominates NP, as shown in example (62).

(62) [$_{ModP}$ youqu [$_{Mod'}$ de [$_{NP}$ shu]]]
interesting DE book
'interesting book(s)'

Assuming the proposal is on the right track, we can see that (complex) adjectives can be coordinated at the specifier position.

(63) Coordination
[$_{ModP}$ (***hen***) ***pianyi*** you (***tebie***) ***youqu*** [$_{Mod'}$ de [$_{NP}$ shu]]]
very cheap and especially interesting DE book
'very cheap and especially interesting book(s)'

When more than one *–de* occurs, the hierarchical interpretation of adjectives is available, as shown in example (64).

(64) [$_{ModP}$ pianyi [$_{Mod'}$ de [$_{ModP}$ youqu [$_{Mod'}$ de [$_{NP}$ shu]]]]
cheap DE interesting DE book
'interesting book(s) that are cheap'

Moreover, it is generally observed that only the head can license ellipsis (see Merchant 2001). Example (65) supports the proposal that *–de* functions as the head, and the ellipsis is allowed.

(65) Zhangsan xihuan [**mian-de** shangyi]; Lisi xihuan [**maoliao-de** ~~shangyi~~].
Zhangsan like cotton DE shirt Lisi like woolen DE shirt
'Zhangsan likes cotton shirts; Lisi likes woolen [shirts].'

Examples with quantifiers also support the proposal. Universal quantifiers, like *everyone*, do not denote a specific referent; they quantify a set of possible referents. Pronouns *his* and *ta* 'his' in example (66) are bound by such quantificational antecedents, *everyone* and *mei ge ren* 'everyone', respectively, and therefore, the pronouns at issue can obtain interpretations from the quantifiers.

(66) a. **Everyone$_i$** loves **his$_i$** mother.
b. [**Mei** **ge** **ren**]$_i$ dou ai **ta$_i$** mama.
every CL person all love his mother
'Everyone loves his mother.'

If we assume such a structural requirement of the quantificational interpretation, example (67) suggests that there is no c-command relation between the quantificational antecedent and the pronoun. That is, the *wh*-phrase and the quantifier are embedded under ModP inside of the nominal, and cannot c-command the pronouns. Sentences (67) and (68) are ungrammatical as predicted by the proposed structure of *–de* phrases, ModP.

(67) *[[[**Shei$_i$**]-de] mama] hen xihuan **ta$_i$**?[5]
who DE mother very like him
'Whose mother likes him?'
(68) *[[[**Mei** **ge** **ren$_i$**] -de] mama] dou hen xihuan **ta$_i$**.
every CL person DE mother all very like him
'Everyone's mother likes him.'

4. Syntax and Interpretation

In the previous sections, I argued that DemP and UnitP should be identified in Mandarin nominals and that the proposed structure (14) can provide a unified account of various facts. In this section, I discuss ambiguous examples and show how such expressions can be explained and disambiguated under the current proposal.

It has been noted that indefinite nominals are ambiguous between the non-specific quantity reading and the indefinite specific reading. In English, example (69a) shows that the quantity phrase *a friend* does not have to be referential, i.e., not referring to any particular referent, whereas in (69b) the speaker comments on a particular referent, although the speaker does not presuppose that the hearer knows the referent.

(69) a. Quantity, non-specific
I was asked to bring **a friend** to the party yesterday.
b. Indefinite, specific
I met **a friend** at the party yesterday.

[5] Huang (1982) mentioned that Sportiche (1981) has observed that sentences like (67) and (68) are also unacceptable in French, but their English counterparts are grammatical. With respect to English, Kayne (1994) proposes that the quantifier possessor undergoes covert movement to a higher position and from there it can c-command the bound pronoun, and then the bound variable can be construed properly. Since the syntax of quantifiers is beyond the scope of the current study, I refer readers to Kayne (1994) for more detailed discussion.

The same distinction is found in Mandarin. Example (70) shows that the expression *shi ge ren* 'ten people' can convey two different meanings in the object position.

(70) a. Quantity, non-specific
Wo xuyao **shi** **ge** **ren** bang wo.
I need ten CL person help me
'I need ten people to help me.'
b. Indefinite, specific
Wo pengdao-le **shi** **ge** **ren**
I meet-PERF ten CL person
'I have met ten people.'

Recall that UnitP is not referential but DemP is, the following examples show that a quantity non-specific nominal cannot co-refer with or bind a pronoun (e.g., (71)), but an indefinite specific one can (e.g., (72)).

(71) Quantity, non-specific
Wo xuyao **shi ge ren$_i$** . **Tamen$_i$** shi Zhang-jiaoshou-de xuesheng.
I need ten CL person They are Zhang-professor DE student
'I need ten people to help me. They are Professor Zhang's students.'

(72) Indefinite, specific
Wo pengdao-le **shi ge ren$_i$** **. Tamen$_i$** shi Zhang-jiaoshou-de xuesheng.
I meet-PERF ten CL person They are Zhang-professor DE student
'I have met ten people. They are Professor Zhang's students.'

The contrast between (71) and (72) can be captured under the current proposal. I suggest that the indefinite quantity expression in (71) involves a UnitP, but the indefinite specific nominal in (72) involves a DemP where the specificity is expressed by a null Dem. Example (73) shows their structures.

(73) a. [$_{\textbf{UnitP}}$ shi [$_{\text{Unit'}}$ ge [$_{\text{NP}}$ ren]]] ➔(71)
b. [$_{\textbf{DemP}}$ Ø$_{\text{Dem}}$ [$_{\text{UnitP}}$ shi [$_{\text{Unit'}}$ ge [$_{\text{NP}}$ ren]]]] ➔(72)

Last but not least, the interpretations of possession also signal the structural differences that are proposed in this paper. Huang (1982[1998]: 45) points out that while an indefinite phrase, such as (74), "implies (or presupposes) that Zhangsan has more than three books", example (75) "carries no such implication", but "tends to have a referential or specific interpretation."

(74) san ben **Zhangsan-de** shu
three CL Zhangsan DE book
'three of Zhangsan's books'

(75) **Zhangsan-de** san ben shu
Zhangsan DE three CL book
'Zhangsan's three books'

Interestingly, the English example in (76) suggests that *Zhangsan* has exactly three books[6], but its seemingly equivalent expression in Mandarin, e.g., (75), does not force such an interpretation.

(76) Zhangsan's three books

This difference is made clearer in the following examples. Example (77) does not require the reading that Zhangsan has exactly three books. Example (78) demonstrates the same point, since it is uncommon for a person to have only 'one' classmate.

(77) Wo dai-le [**Zhangsan-de san ben shu**]. (Ta jia-li
I bring-PERF Zhangsan DE three CL book He home-in
hai you hen duo ben shu.)
still exist very many CL book
'I have brought three of Zhangsan's books. (He still has many books at home.)'

(78) Wo ting [**wo-de yi ge tongxue**] shuo-guo zhe jian shi.
I hear I DE one CL classmate say-EXP this CL matter
'I have heard my classmate talking about this matter.'

I argue that expressions like (75) involve two different structures, i.e., the possessive modifier *Zhangsan-de* can modify either UnitP (i.e., (79a)) or DemP (e.g., (79b)). As a UnitP, the nominal is not referential, and also allows a partitive reading. When the nominal is a DemP, it means three specific books that Zhangsan has.

(79) a. **Zhangsan-de** [$_{\textbf{UnitP}}$ san ben shu]
Zhangsan DE three CL book
'those three books of Zhangsan's'
b. **Zhangsan-de** [$_{\textbf{DemP}}$ $Ø_{Dem}$ [$_{UnitP}$ san ben shu]
Zhangsan DE three CL book
'Zhangsan's three books'

Such an ambiguity disappears when the expression at issue serves as the subject of an existential sentence that requires a specific subject. It is pointed out by Huang (1982) that 'Zhangsan has exactly three books' is the preferred interpretation in sentences like (80).

(80) Zhangsan-de [$_{\textbf{DemP}}$ $Ø_{Dem}$ san ben shu] zai zhuo-shang.
Zhangsan DE three CL book on table-up
'Zhangsan's three books are on the table.'

5. Concluding Remarks

It is an interesting question how definiteness and specificity are encoded in languages with and without articles. In this paper, I argued that DemP and UnitP should be identified as two distinct projections above NP. The proposed structure accounts for the distribution of

[6] Thank Steven Franks and Joshua Herring for pointing out the interesting aspect of this issue to me.

nominal modifiers, the order of possessor, determiner, number, classifier, and noun, the phenomena of coordination, and the nominal-internal ellipsis. Specifically, I argued that classifiers should be analyzed as the head of UnitP, that the realization of UnitP changes the semantic core of the whole nominal, and that NP is under the scope of UnitP. It was shown that the occurrence of number relies on the Unit head, quantity denoting adverbs are only compatible with UnitP but not with other nominals, and that the scope interpretation of modifier suggests that UnitP dominates NP. I also showed that although there are no articles in Mandarin, demonstratives have several functions that are similar to English determiners, such as denoting pure definiteness without physical deictic interpretation, and serving as a pronoun at the subject position. The result of this paper suggests that although there is no article in Modern Mandarin, functional projections above NP are still available, and that UnitP is responsible for non-referential nominal denoting quantity reading, and DemP marks specificity and definiteness. Based on the proposed analysis, I also demonstrated that seemingly ambiguous expressions in fact involve different internal structures, and that the structure constrains the syntactic behavior, the distribution, and the interpretation of the associated nominal expressions.

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