

The Syntax and Semantics of Prenominals: Construction or Composition?*

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Although the adjunct–complement dichotomy has long been recognized in traditional Chinese linguistic study for the analysis of clausal and verb–phrase structure, research on nominal structure has traditionally recognized only a general *dingyu* or ‘determinative’ category in the pre-nominal position. While most generative works on Chinese syntax have followed the X-bar theory and recognize an adjunct–complement distinction for the noun phrase as well as other phrases, few have offered systematic evidence from Chinese to prove this view. In the meantime, some recent typological works have claimed that for a number of languages with head-final noun phrases, the adjunct–complement distinction does not exist, and that a constructionist view that takes all the clausal prenominal modifiers under an undifferentiated ‘noun-modifying’ category should be adopted.

This paper presents empirical evidence to reaffirm the existence of an adjunct–complement dichotomy in the nominal structure in Chinese as well as other languages. Extensive evidence is amassed supporting the view that only when adjuncts are structurally positioned higher than complements and the semantic component rules apply accordingly can the relevant facts be appropriately explained. We also take up the facts that have been used to support the constructionist approach and show that they in fact do not serve their purpose. We show that the seemingly uniform *de*-constructions are in fact heterogeneous, and that the high degree of interpretive and analytic variability and the apparent lack of appropriate input to relativization have their independent sources not peculiar to nominal structure. Once the independent factors are isolated, the syntax and semantics of the prenominal elements can be derived according to standard procedures.

Key words: adjunct–complement distinction, composition, construction, determinatives, gapless relatives, pre-nominal structure

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1. Introduction

A fundamental view about linguistic structure, long shared by scholars of various theoretical persuasions, makes a formal distinction between an adjunct and a complement, both as satellite constituents around a predicate head. In the clausal and VP domain, adjuncts are those that fulfill the adverbial function of modifying the predicate, while complements are those that satisfy the internal argument requirements of the predicate head (including objects in the form of NPs, and non-object PPs and clauses which are required to make the meanings of the predicate ‘complete’). In generative grammar, this long-held tradition was formally characterized by Chomsky (1970) in terms of his X-bar theory, for both the VP and NP domains, and substantially generalized to other lexical categories such as AP and PP (Jackendoff 1977) and extended to a range of functional categories including IP, CP (Huang 1982; Stowell 1981), DP (Abney 1987), CLP (Tang 1990), etc. For each phrase of any kind, a head–adjunct–complement trichotomy is maintained (in addition to a specifier where it exists).

In the tradition of Chinese grammatical studies, a similar trichotomy has long been held for elements in the clausal and verbal domains. Students and junior linguists are well taught that in Chinese an adjunct comes before the verb and a complement follows it (which is largely correct). Unlike in generative grammar, however, this distinction is not generalized to the nominal and other categories. Instead, for Chinese noun phrases a distinction is simply made between the head noun (which occurs at the end of NP) and the preceding satellites, which are grouped under the undifferentiated term 定語 *dingyu*, literally ‘determinative’. This tradition has been prevalent in the works of most non-generative linguists working on Chinese grammar in China, following Zhu (1961[1999], 1966[1999], 1983[1999], 1984[1999] and other early works). Most generative linguists working on Chinese syntax, on the other hand, have adopted the standard X-Bar-theoretic view that the head–adjunct–complement trichotomy applies to Chinese noun phrases as well. However, relatively little work has been produced that provides explicit independent evidence for the adoption of this view for Chinese syntax.¹

In recent years, several scholars working in the functional-typological tradition have contended that in certain languages with head-final noun phrases (such as Chinese, Japanese and Korean), the adjunct–complement distinction is unnecessary or even inappropriate for the prenominal satellite elements. For example, Comrie (1996, 1998, 2010) and Matsumoto (1988, 1997) have claimed that, in Japanese and Korean, the supposed distinction between relative clauses, clausal noun complements and perception noun complements actually does not exist. Instead, syntactically, they are simply indistinguishable members of a ‘general prenominal modifier’ construction. In addition, LaPolla (2012, 2013) suggests treating the prenominal modifier construction in Chinese as a ‘construction’ in the sense of Construction Grammar (in the works of Fillmore et al. 1988, Goldberg 1995, etc.), whose meaning may go ‘beyond the sum of its parts’. Given the background described in the preceding paragraph, it is fair to say then that the Comrie–Matsumoto–LaPolla view of the matter represents a partial return to Zhu’s early view of *dingyu*—the view that the prenominal satellites constitute a general undifferentiated category of ‘determinatives’.

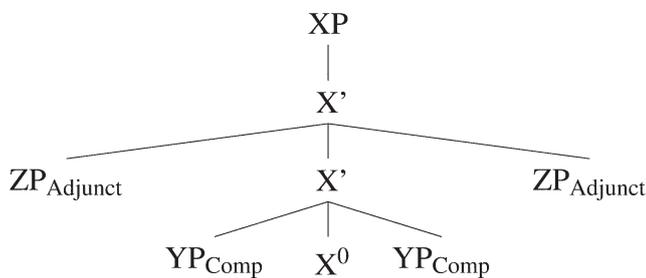
¹ Some recent efforts in this direction include Huang et al. (2000, 2009), Aoun & Li (2003) and Zhang (2008), especially concerning the status of so-called ‘gapless relatives’. Huang et al. (2000) explicitly argue for treating such ‘relatives’ as complements. This is the view we shall follow, as indicated in Section 4 later.

without previous instruction or conscious learning, converges on this pattern of judgment. The inquisitive mind will want to know why. The answer comes from X-bar theory, which makes a distinction between adjuncts and complements by generating them at different structural positions. In particular, while complements are admitted as sisters to the lexical head X^0 , adjuncts are introduced as sisters to the phrasal head X' :

- (3) a. $X' \rightarrow X' YP_{Adjunct}$ (linear order irrelevant)
 b. $X' \rightarrow X^0 ZP_{Comp}$ (linear order irrelevant)

This has the consequence that adjuncts are located higher in the structure than complements, as illustrated in the schema (4):

- (4) Adjuncts occur higher in the tree than complements:



This property of phrase structure puts certain restrictions on how the terminal elements can be linearized ('read off the tree' from left to right). Suppose there is exactly one adjunct and one complement in a given noun phrase, then reading off the tree yields the following four possible linear orders, corresponding exactly to the four grammatical patterns of (2a)–(2d):

- (5) a. head complement adjunct (1-2-3)
 b. adjunct complement head (3-2-1)
 c. complement head adjunct (2-1-3)
 d. adjunct head complement (3-1-2)

Reading off the tree from left to right cannot, however, produce the linear orders represented by (2e) or (2f) with the complement-adjunct-head (2-3-1) or head-adjunct-complement order (1-3-2), as the reader can verify. Given the basic ingredients of X-bar theory, then, the grammatical pattern observed in (2) is explained. Assuming these ingredients to be innate principles of UG, humans are then predisposed to exclude (2e) and (2f) on principled grounds, and the knowledge that (2e) and (2f) are ill-formed need not be learned.²

² In earlier models (e.g. GB and earlier) the X-bar theory and other UG principles were directly taken to be the innate properties of a dedicated Faculty of Language (FL). Hauser et al. (2002) makes a distinction between a narrow and a broad sense of FL, with the broad FL including the narrow FL plus some principles that are not solely dedicated to language use. Chomsky (2005) refers to these non-domain-specific properties as the 'Third Factor'—including principles governing the structure of other human cognitive systems and possibly other general 'laws of nature'. The adjunct–argument distinction and the X-bar principle that governs their order of composition can be seen as a third-factor principle, in the broad sense of FL.

Though UG makes the options in (2a–d) and (5a–d) available, not all languages make use of all the options. Rather, it provides a parameter between [head-final] and [head-initial] (possibly for each category and each of the two rules in (3)). A major area of language variation comes from how language acquirers set the values of the head-parameter.³ As an example, let us turn to the structure of Chinese noun phrases. Given the corresponding lexical items {*xuesheng*, *wuli*, *chang-fa*} in Mandarin for (1), the corresponding six logical possibilities are given in (6):

- | | | | | | |
|-----|-----------|---------------------|-----------------------------------|---------------------|------------------------------|
| (6) | Mandarin: | { <i>xuesheng</i> , | <i>wuli</i> , | <i>changfa-de</i> } | |
| | | <u>student</u> | <u>physics</u> | <u>long-hair-ed</u> | |
| | | 1 | 2 | 3 | |
| | a. | 1 2 3: | * <i>xuesheng wuli changfa-de</i> | | *student physics long-haired |
| | b. | 3 2 1: | <i>changfa-de wuli xuesheng</i> | | long-haired physics student |
| | c. | 2 1 3: | * <i>wuli xuesheng changfa-de</i> | | *physics student long-haired |
| | d. | 3 1 2: | * <i>changfa-de xuesheng wuli</i> | | *long-haired student physics |
| | e. | 2 3 1: | * <i>wuli changfa-de xuesheng</i> | | *physics long-haired student |
| | f. | 1 3 2: | * <i>xuesheng changfa-de wuli</i> | | *student long-haired physics |

But only one possibility is realized, (6b) with the 3-2-1 order. This is exactly as expected, given the well-known fact that Chinese requires its noun phrases to be strictly head-final. Of the two head-final candidates (6b) and (6e), the latter is already excluded by UG, hence only (6b) is grammatical.

We can appreciate the explanatory value of (3) and (4) by looking at a few more examples of head-final noun phrases. The examples in (7a and b) are ambiguous, with *French* and *Chinese* either denoting language names (hence as complements of *teacher*), or denoting the teacher's country of origin (hence as adjuncts). But the ambiguity quickly disappears in (8a and b), each with only the adjunct-complement-head (3-2-1) reading available, exactly as predicted.

- (7) a. a French teacher
b. a Chinese teacher
- (8) a. a French Chinese teacher
b. a Chinese French teacher

³ It should be noted that generative linguistic theory has proceeded considerably beyond the point we are describing. For one thing, there is much consensus among many researchers that macro-parameters like the Head Parameter do not exist as a primitive, but that the locus of variation lies at the micro-parametric differences between items of the functional lexicons of different languages. In particular, the effects of the Head Parameter are the results derived from the aggregation of smaller lexical parametric effects. These new developments for the most part represent attempts at refinements toward theoretical beauty in the sense of, say, Yang (1982). For our purposes, what is important is that Chinese, Japanese, and Korean have somehow taken the head-final option, and this option comes with its consequences, including the pattern (6) for Chinese. For some recent discussions of macro- and micro-parametric theory, see Roberts & Holmberg (2010), Huang (2015) and the many references cited therein.

The same is true of the Chinese examples in (9) and (10), as the reader can verify. In (9a) *Zhangsan* and *Lisi* can each be the photographer (aside from being the possessor), or the one who was photographed. That ambiguity disappears in (9b):

- (9) a. 張三的照片、李四的照片 (ambiguous)
Zhangsan de zhaopian, Lisi de zhaopian.
Zhangsan DE picture Lisi DE picture
'Zhangsan's pictures, Lisi's pictures.'
- b. 張三的李四的照片 (not ambiguous)
Zhangsan de Lisi de zhaopian.
Zhangsan DE Lisi DE picture
'Zhangsan's picture of Lisi.'

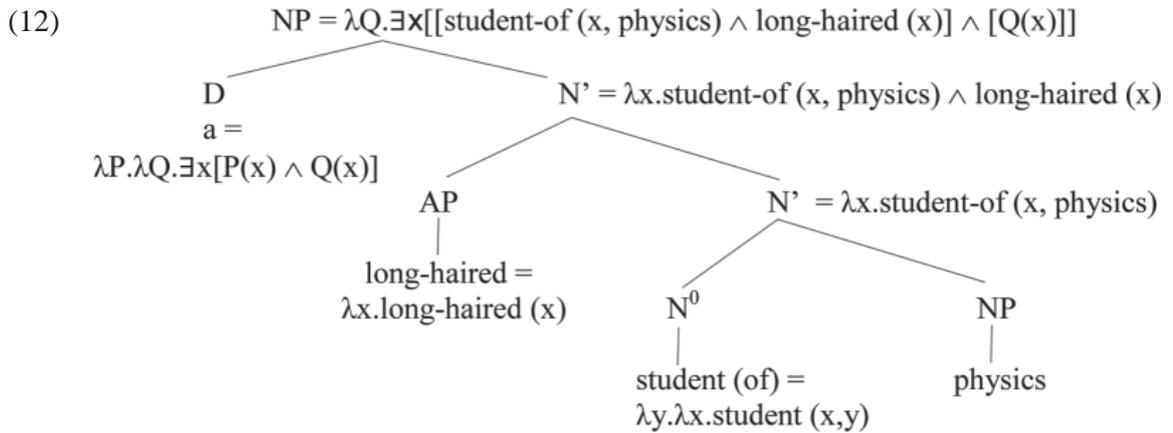
And the same point shows in a contrast in grammaticality in (10).

- (10) a. 英國的中文老師
yingguo de zhongwen laoshi
England DE Chinese teacher
'The English Chinese teacher.'
- b. *中文的英國老師
*zhongwen de yingguo laoshi
Chinese DE England teacher

And so on. Thus the basic ingredients of X-bar theory capture an important universal property of human language structure. In addition, they help to provide appropriate input for semantic interpretation, according to the Fregean Principle of Compositionality, stated by Partee (1984[2004]:153) below:

- (11) The meaning of an expression is a function of the meanings of its parts and the way they are syntactically combined.

A rigorous field of formal semantics has been developed to execute the Fregean principle, computing the meanings of expressions alongside their syntactic structures of the type illustrated above, according to which a head composes with a complement to yield a meaning that then composes with an adjunct, etc. One way to compute the truth-conditional meaning of our NP, *a long-haired student of physics*, is via a typed lambda calculus as illustrated in (12):



Working from the bottom up, the noun *student* has the semantics ‘ $\lambda y. \lambda x. \text{student}(x, y)$ ’, meaning that it is a transitive noun, a two-place predicate with arguments x, y , such that x is a student of y —in the same way that *study* is a transitive verb in the familiar sense. When *physics* is taken to serve as the second argument (=complement) y , we have a one-place predicate in the form of an N' phrase, denoting the set of entities that are students of physics. In the meantime, the adjunct *long-haired* is also a one-place predicate, denoting the set of entities that have the property of being long-haired. When the adjunct AP predicate is combined with the N' -predicate, we derive a larger N' , a modified predicate denoting the set of entities that form the intersection of the two sets, in which each member is both a student of physics and has long hair. At this point, the indefinite article *a* comes in, as a generalized quantifier, $\lambda P. \lambda Q. \exists x [P(x) \wedge Q(x)]$. Skipping some technical details, when the quantifier combines with the N' predicate, the resulting noun phrase on the top line in (12) *a long-haired student of physics* says that there exists an x who is a long-haired student of physics, such that any predicate Q (e.g. ‘is smart’) that combines with the phrase is true of that x .

If instead of a quantifier we have the definite article, *the*, whose semantics may simply be the denotation of an entity with a given property P as in (13a), the expression with the article would denote the entity x such that x is a long-haired student of physics as in (13b):⁴

- (13) a. *the* = $\lambda P. \iota x P(x)$
 b. *the long-haired physics student* = $\iota x (\text{student-of}(x, \text{physics}) \ \& \ \text{long-haired}(x))$

Another way to compose the meanings of phrasal expressions is by computing their semantic types from the semantic types of their parts according to their modes of combination:

⁴ Or, we may incorporate Russell’s treatment that includes both existential and uniqueness assertions, with the more fancy (i)–(ii):

(i) $[[\text{the}]] = \lambda P. \lambda Q. \exists x [(P(x) \wedge \forall y (P(y) \rightarrow y=x)) \wedge Q(x)]$
 (ii) *the long-haired student of physics* = $\lambda Q. \exists x [(\text{student-of}(x, \text{physics}) \wedge \text{long-haired}(x)) \wedge \forall y (\text{student-of}(y, \text{physics}) \ \& \ \text{long-haired}(y)) \rightarrow y=x) \wedge Q(x)]$

- (14) a. student (of): $\langle e, \langle e, t \rangle \rangle$
 b. physics: e
 c. student of physics: $\langle e, t \rangle$
 d. long-haired: $\langle e, t \rangle$
 e. long-haired student of physics: $\langle e, t \rangle$
 f. the: $\langle \langle e, t \rangle, e \rangle$
 g. the long-haired student of physics: e
 h. a: $\langle \langle e, t \rangle, \langle \langle e, t \rangle, t \rangle \rangle$
 i. a long-haired student of physics: $\langle \langle e, t \rangle, t \rangle$

Thus, transitive *student* is a function as in (14a) which, when applied to the entity *physics* (14b), will yield the predicate (14c), *student of physics*, which is a function of type $\langle e, t \rangle$. The combination of (14c) with (14d) yields another predicate of type $\langle e, t \rangle$ as in (14e). If this predicate were to combine with an entity (e.g. John), we would have a proposition. A definite article, however, is a function of type $\langle \langle e, t \rangle, e \rangle$ which, when applied to a predicate (of type $\langle e, t \rangle$), yields an entity (14f). The result of applying the predicate *long-haired student of physics* to the determiner *the*, then, yields an entity-denoting expression as in (14g). In the event of a quantifier like *a*, we would have a complex function as indicated in (14h), which says that when applied to a predicate like *long-haired student of physics*, it will yield another function of type $\langle \langle e, t \rangle, t \rangle$ as in (14i). If (14i) is applied to another predicate (say ‘is smart’), a proposition of type t will result.

And so on. Regardless of whether all details are clear from the above, it should be evident that we need to make a crucial distinction between complements and adjuncts, both to account for the patterns of grammaticality observed and to derive appropriate meanings of phrases from their parts and the way the parts are structured. A transitive predicate must combine with a complement in order to become an intransitive predicate of type $\langle e, t \rangle$, so it can now combine with an adjunct, which is also a predicate of type $\langle e, t \rangle$. Aside from the vocabulary items and their associated lexical semantics, there is no need to learn, or memorize, how grammatically constructed expressions are appropriately mapped to their meanings. One main exception to the Fregean principle, of course, is the existence of idiomatic phrases like *kick the bucket*, which does not mean simply $\lambda x. \lambda y. kick(x, y)$, whose second argument is the denotation of *the bucket*. Such phrases must be learned and put in the speaker’s encyclopedic storage. The cases we are dealing with here are not idioms, however, and their syntax and semantics are completely rule-governed.

3. The general noun-modifying clause hypothesis

Let us now turn to noun phrases with prenominal clausal satellites. As indicated above, Comrie (1996, 1998, 2010), Matsumoto (1997), etc., have recently argued for the existence of a class of languages where clausal sub-constituents of NP—relative clauses, noun-complement clauses and perception noun complements—have the same structure, termed a unified, undifferentiated ‘noun-modifying construction’. LaPolla (2012, 2013) adopts the same view in developing an argument for a ‘constructionist’ view of grammar for Chinese. Speaking of the relation between the ‘noun-modifying clause’ and the head, LaPolla (2013:50) writes:

There is no understood co-referential argument in the modifying clause, and while the first element modifies the second element, the relationship between the two can vary... Semantically they can have a function similar to that of restrictive clauses in English... Once we start looking at the uses of this construction, we find that there are many possibilities, and in some cases the head might be said to be an argument of the clause, but in many cases it clearly isn't, and also whether there is a referring expression acting as head or not the interpretation of the referent of the modifying clause relies on inference from context, so the possibility of the head being omitted cannot be used as a criterion for distinguishing noun complements from relative clauses, and the construction cannot be used for determining grammatical relations.

In support of the above claim, LaPolla (2013) gives a list of examples illustrating the freedom and variability of interpretation (which we shall take up in §5). Given the range of possible uses of this construction, he then reasons that:

[R]ather than trying to artificially divide the possibilities into one or the other choice in the traditional dichotomy of relative clause and noun complement, and also trying to determine strict subcategorization frames or argument structure and relations, in Chinese we can simply follow a constructionist approach and recognize a single clausal modifying construction. (p. 50)

The idea of a general noun-modifying construction actually comes close to the traditional view in Chinese grammatical study, which named everything preceding the head noun as a 定語 *digyu* 'determinative', which can be an NP, a pronoun, a numeral-classifier phrase, an adjective phrase, a verb phrase, or a whole clause. Under the last category, Zhu (1984[1999]:18–20) includes examples like the following, where a clause is immediately followed by *de*, with no reference to the adjunct–complement dichotomy:⁵

- (15) 這些都是古代人民留給我們的珍貴遺產。(slightly adapted)
 Zhexie dou shi gudai renmin liu-gei women de zhengui yichan.
 these all be ancient people leave-for us DE precious heritage
 'These are all the precious heritage that our ancestors have left for us.'
- (16) 穿紅衣服的那個孩子
 chuan hong yifu de na ge haizi
 wear red clothes DE that CL child
 'The child who was wearing red clothing.'

⁵ In subsequent work Zhu (1983[1999]) made a distinction between two types of clausal determinative, dubbed 自指 *zizhi* 'self-referring' and 轉指 *zhuanzhi* 'shifted-referring', still without reference to the complement–adjunct dichotomy. There is some overlap in the two dichotomies, but they are for entirely different purposes.

- (17) 聖陶談到他作小說的態度，常喜歡說：我只是如實地寫。(《朱自清文集》)
Shengtao tandao ta zuo xiaoshuo de taidu, ...
Shengtao discuss he make novel DE attitude
‘[When] Shengtao discusses his attitude toward novel writing, ...’
- (18) 現在曉得他講道理的時候，不但唇邊還抹著人油，而且心裡還滿裝著吃人的意思
...。(《魯迅選集》)
Xianzai xiaode ta jiang daoli de shihou, bu-dan ...
now know he talk reason DE time, not-only
‘Now [I] see that at the time he talks reason, not only ...’

Thus in the prevalent traditional literature, the complement–adjunct distinction does not hold of the nominal domain, though it does hold of the clausal and verbal domains—where adjuncts and complements are respectively identified by their preverbal and postverbal positions.⁶

In the next section, I shall present extensive evidence in favor of the claim that an adjunct–complement distinction exists and must be recognized for the internal structure of nominal phrases.

4. Arguments for a structural distinction between prenominal modifiers

4.1 Evidence from word order

We have already seen above that in Chinese, with the head in final position, nominal adjuncts must precede complements, in the 3-2-1 order. Let us now consider clausal adjuncts and complements. In (19a) we have a relative clause whose object is relativized, and in (19b) we have a noun complement clause:

- (19) a. 我們正在考慮的問題 (relative clause)
[_{RC} women zhengzai kaolü de] wenti
we right-at consider DE question
‘the question that we are considering right now’
- b. 要不要擴大招生的問題 (noun complement)
[_{NC} yao-bu-yao kuoda zhaosheng de] wenti
want-not-want expand recruit-student DE question
‘the question whether we should increase student enrollment’

⁶ Although the latter view is largely correct for our purposes, it in fact blurs certain important details. For one thing, in Chinese the frequentative and durative expressions (*yi ci* ‘once’, *liang tian* ‘two days’, etc.) normally occur post-verbally, but they are actually (low) adjuncts across which the verb has moved (cf. Tang 1990). For another, certain preverbal constituents (such as outer objects introduced by *ba*, or certain applicative objects introduced by *gei*) are actually arguments (in some cases ‘non-core’ arguments).

In the latter example, it is reasonable to take *yao-bu-yao kuoda zhaosheng* ‘whether to increase student enrollment’ as a complement of *wenti* ‘question’, just as it would be a complement of the verb *wen* ‘ask’.

Let us now put these two clauses together before the same head *wenti* ‘question’. Exactly as predicted, only the 3-2-1 order is allowed.

- (20) a. 我們正在考慮的(那個)要不要擴大招生的問題 (RC-NC = 321)
 [_{RC} women zhengzai kaolü de] (na-ge) [_{NC} yao-bu-yao kuoda
 we currently consider DE that-CL want-not-want expand
 zhaosheng de] wenti
 recruitment DE question
 ‘the question whether to increase student enrollment that we are considering’
- b. *要不要擴大招生的(那個)我們正在考慮的問題 (*NC-RC = 231)
 * [_{NC} yao-bu-yao kuoda zhaosheng de] (na-ge) [_{RC} women zhengzai
 want-not-want expand recruitment DE that-CL we currently
 kaolü de] wenti
 consider DE question

Similarly, compare the following:

- (21) a. 她提出來的想法 (relative clause)
 [_{RC} ta ti-chulai de] xiangfa
 she proposed DE idea
 ‘the idea that she proposed’
- b. 讓兒子出國留學的想法 (noun complement)
 [_{NC} rang erzi chuguo liuxue de] xiangfa
 let son go-abroad study DE idea
 ‘the idea to let her son go and study abroad’
- (22) a. 她提出來的讓兒子出國留學的想法 (RC-NC = 321)
 [_{RC} ta ti-chulai de] [_{NC} rang erzi chuguo liuxue de] xiangfa
 she proposed DE let son go-abroad study DE idea
 ‘the idea to let her son go study abroad that she proposed’
- b. *讓兒子出國留學的她提出來的想法 (*NC-RC = 231)
 * [_{NC} rang erzi chuguo liuxue de] [_{RC} ta ti-chulai de] xiangfa
 let son go-abroad study DE she proposed DE idea

The contrasts we observe can be explained by reference to the adjunct–complement distinction, in exactly the same way that the simpler facts in §2 were explained (via X-bar theory and the

principle of compositionality), but not if these clauses are all lumped together as ‘general noun-modifying clauses’.⁷

Of course, one may still wonder why the building of syntactic structure and the principle of composition should follow the order as prescribed. It is not hard to think of a natural explanation, ascribable to the nature of human cognition. By definition, complements compose with their heads first so that the heads’ predicate meanings will be ‘complete’ for further interaction with other predicates (such as adjuncts). In type-theoretic semantics, this is captured by the idea that a transitive predicate with an open object position is a function of type $\langle e, \langle e, t \rangle \rangle$ while an adjunct is of type $\langle e, t \rangle$, and the two functions cannot compose either by function application or predicate modification because of a type mismatch.

That complements come before adjuncts in composing with their heads can also be seen as a special case of a more general principle, namely, for constituents describing the intrinsic properties of a head noun to compose before constituents describing transient properties related to the outside. This reminds us of the distinction between individual-level and stage-level adjectives, made famous by Larson (1998):

(23) The visible visible stars include Capella.

As Larson observed, the sentence does not introduce a tautological assertion. The second occurrence of *visible* describes an inherent property of certain stars while the first describes their transient property (e.g. at the time of speaking or a particular star gazing event), not the other way around. (These facts should remind us of examples like *an English English teacher*, where the two senses of *English* follow a strict order.) Thus just as (23) is not tautological, nor is (24) a contradiction, as it may describe a very natural fact on a cloudy night, though (25) may sound surprising even if uttered on a clear, starry night:

(24) The invisible visible stars include Capella.

(25) ?The visible invisible stars include Capella.

In the same vein, it has been observed by Larson & Takahashi (2004), Del Gobbo (2005), Hsieh (2005) and Lin (2008) that individual-level relative clauses and stage-level relative clauses in Japanese, Korean and Chinese are strictly ordered so that individual-level relatives must compose first with their heads before stage-level relatives. The following examples (slightly adapted) are provided by Del Gobbo (2005) and cited in Lin (2008):

⁷ It has sometimes been observed that (generally single-word) adjectives may occur immediately before the head noun but after a complement, e.g.:

(i) 讓兒子到火星上留學的奇怪想法
rang erzi dao huoxing-shang liuxue de qiguai xiangfa
let son go Mars-on study DE strange thought
‘the strange thought of having his son go to Mars for study abroad.’

In such a case, a reasonable assumption is that the adjective *qiguai* ‘strange’ composes first with the head noun to form a complex (or compound) noun ‘strange thought’ (or ‘fantasy’).

- (26) a. 我昨天看見的喜歡音樂的人
 [_{RC} wo zuotian kanjian de] [_{RC} xihuan yinyue de] ren
 I yesterday saw DE like music DE person
 ‘the person who likes music who I saw yesterday’
- b. *喜歡音樂的我昨天看見的人
 * [_{RC} xihuan yinyue de] [_{RC} wo zuotian kanjian de] ren
 like music DE I yesterday saw DE person

We shall not go into details in this area, but simply recognize that the adjunct–complement order can be part of a more general property of conceptual structure, possibly ascribable to the ‘third factor’ in the sense of Chomsky (2005). Indeed, given the finer structural distinction between adjuncts as amply demonstrated in these works, it would be a total mystery if complements were not distinguishable from adjuncts.

4.2 Evidence from subcategorization

Just as verbs may be subcategorized as transitive or intransitive, some nouns may define binary relations and take clauses as their complements, while others are intransitive and do not take complements. But all nouns can take relative clauses. For example, *wuban* ‘dancing partner’ may be seen as a transitive noun selecting an event of dancing as its complement, whereas *nühai* ‘girl’ is entirely intransitive. This shows up in the following contrast:⁸

- (27) a. 張三跳舞的舞伴
 [_{NC} Zhangsan tiao-wu de] wuban
 Zhangsan dance DE partner
 ‘Zhangsan’s dancing partner’
- b. *張三跳舞的女孩
 * [_{NC} Zhangsan tiao-wu de] nühai
 Zhangsan dance DE girl

The ungrammaticality of (27b) arises because *nühai* ‘girl’ does not select a complement. That is, while *wuban* may be (optionally) of semantic type <v, <e,t>> (v denoting an event), *nühai* is strictly a predicate of type <e, t>. They do not differ, however, in being able to co-occur with relative clauses. The examples in (28) are minimally different from (27) in the addition of *gen* ‘with’, thus creating a subject gap bound by the head under relativization:

⁸ The contrast illustrated in (27) was first observed in Ning (1993). Huang et al. (2000) took this contrast as evidence for treating (27a) as a case of noun-complementation. This view is followed and developed more fully here.

- (28) a. 跟張三跳舞的舞伴
[_{RC} — gen Zhangsan tiao-wu de] wuban
with Zhangsan dance DE partner
‘the partner who danced with Zhangsan’
- b. 跟張三跳舞的女孩
[_{RC} — gen Zhangsan tiao-wu de] nühai
with Zhangsan dance DE girl
‘the girl who danced with Zhangsan’

Note in this connection that a host of prenominal clauses that have sometimes been referred to as ‘gapless relatives’ are simply noun complements. The head nouns include (but are not limited to) those denoting propositional attitudes and perceptions.⁹

- (29) a. 李四彈鋼琴的聲音
Lisi tan gangqin de shengyin
Lisi play piano DE sound
‘the sound of Lisi playing the piano’
- b. 樓下烤魚的氣味
louxia kao yu de qiwei
downstairs grill fish DE smell
‘the smell of [someone] grilling fish downstairs’
- (30) a. 張三殺人的價碼
Zhangsan sha ren de jiama
Zhangsan kill person DE price-tag
‘the price tag for Zhangsan to kill someone’
- b. 李四貪污公款的代價
Lisi tanwu gongkuan de daijia
Lisi embezzle public-funds DE price
‘the price of Lisi’s having embezzled public funds’
- (31) a. 他下棋的對手
ta xiaqi de duishou
he play-chess DE opponent
‘his opponent in playing chess’

⁹ The earliest examples of this type appeared in Tang (1979:243f, 289). Tsai (1997) calls these ‘sloppy relatives’. Zhang (2008) proposes treating them as subjects rather than complements. We return to this briefly later, in the Appendix.

- b. 我開車的技巧
 wo kai che de jiqiao
 I drive car DE skill
 ‘my skill of driving’
- (32) a. 李四辭職的消息
 Lisi cizhi de xiaoxi
 Lisi resign DE news
 ‘the news that Lisi resigned’
- b. 他們離婚的謠言
 tamen lihun de yaoyan
 they divorce DE rumor
 ‘the rumor that they got divorced’

Except for those in (32), most of these examples do not translate into a complement *that*-clause in English, but correspond to *of*-PPs, as indicated in the translations given above (e.g. *the sound of Lisi playing the piano*—just like the *of*-PP in *student of physics*, *destruction of the city*, etc.) Note that *of*-insertion only applies to complements but not to real relative clauses:¹⁰

- (33) a. the girl **that** John danced with __ last night
 b. *the girl **of** John’s dancing with __ last night
- (34) a. the piano that John played __ this morning
 b. *the piano of John’s playing __ this morning
- (35) a. the money that John stole __ from my room
 b. *the money of John’s stealing __ from my room

In short, in this section we have seen that noun complements must be distinguished from relatives since their distribution is restricted by the transitivity of a given head noun, while relative clauses are free from such considerations. Since many transitive head nouns are often optionally so,¹¹ they may sometimes occur with relative clauses alone. Zhu (1983[1999]) observed that (36) is ambiguous between—in our terms—complementation and relativization:

¹⁰ When a given head noun relates to a clausal adjunct (e.g. time, place, manner, reason), the associated clause may be a relative clause with an adjunct gap, or a gapless clause as a complement. Thus in English we have both (i) and (ii):

- (i) the time of John’s playing the piano, the reason of Bill’s arriving late, etc.
 (ii) the day when John gave his piano concert, the place where we met, the reason why Bill arrived late.

It can be shown that these two structures behave consistently as complements and relative clauses, respectively, with respect to the tests discussed in the text. But for simplicity’s sake, in our discussion we shall avoid nominal heads referring to clausal adjuncts.

¹¹ For example, *the discussion*, *the investigation*, etc., may occur without a complement, while the corresponding verbs strictly require their objects: **John discussed*, **John investigated*.

- (36) 這就是他反對的辦法
zhe jiushi [_{NC/RC} ta fandui de] banfa
this is he oppose DE method
a. ‘this is his method of opposing [someone’s proposition]’
b. ‘this is the method that he objected to’

We can disambiguate (36) by adding another clause of the same form with a slight adjustment:

- (37) 這就是我(所)反對的他反對別人的辦法。
Zhe jiushi [_{RC} wo (suo) fandui de] [_{NC} ta fandui bieren de] banfa.
this is I SUO oppose DE he oppose others DE method
‘This is his way of opposing others that I objected to.’

Even though somewhat awkward, the sentence is interpreted only in the 3-2-1 order, as shown. This case should remind the reader of our discussion of (7) and (8), where *a Chinese teacher* and *a French teacher* are each ambiguous, but *a Chinese French teacher* and *a French Chinese teacher* are not.

4.3 Evidence from the distribution of *suo*

Only relative clauses but not complements allow the use of *suo*, a residue of the object relative pronoun inherited from Classical Chinese. The contrasts between (38) and (39) seem quite sharp:

- (38) a. *張三所跳舞的舞伴
* [_{NC} Zhangsan suo tiaowu de] wuban
Zhangsan SUO dance DE partner
b. *張三所彈鋼琴的聲音
* [_{NC} Zhangsan suo tan gangqin de] shengyin
Zhangsan SUO play piano DE sound
c. *張三所殺人的價碼
* [_{NC} Zhangsan suo sha ren de] jiama
Zhangsan SUO kill person DE price-tag
- (39) a. 張三所跳的舞
[_{RC} Zhangsan suo tiaode] wu
Zhangsan SUO dance DE dance
‘the dance that Zhangsan did’
b. 張三所彈的鋼琴
[_{RC} Zhangsan suo tan de] gangqin
Zhangsan SUO play DE piano
‘the piano that Zhangsan played’

- c. 張三所貪的污
 [_{RC} Zhangsan suo tan de] wu
 Zhangsan SUO embezzle DE dirty-goods
 ‘the dirty fortune that Zhangsan has embezzled’

The appearance of *suo* implies the existence of an object gap in the relative, but a complement is a proposition serving as an argument of the head, thus leaving no room for *suo*.

4.4 Evidence from coordination

A well-known property of coordinate structure is that only constituents of the same kind can be coordinated. The examples below show that noun complements may coordinate with complements (40), and relatives may coordinate with relatives (41):

- (40) a. 張三彈鋼琴跟李四吹口哨的聲音
 [_{NC} Zhangsan tan gangqin] gen [_{NC} Lisi chui koushao] de shengyin
 Zhangsan play piano and Lisi blow whistle DE sound
 ‘the sound of Zhangsan playing piano and Lisi blowing the whistle’
- b. 張三殺人跟李四代考的價碼
 [_{NC} Zhangsan sha ren] gen [_{NC} Lisi dai kao] de jima
 Zhangsan kill person and Lisi substitute exam DE price-tag
 ‘the asking price for Zhangsan to kill someone and for Lisi to sit in an exam for someone else’
- c. 張三貪污跟李四偷竊的後果
 [_{NC} Zhangsan tan-wu] gen [_{NC} Lisi tou-qie] de houguo
 Zhangsan embezzle and Lisi steal DE consequence
 ‘the consequence of Zhangsan’s embezzling and Lisi’s stealing’
- (41) a. 張三所發出來跟李四所聽到的聲音
 [_{RC} Zhangsan suo fa-chulai] gen [_{RC} Lisi suo tingdao] de shengyin
 Zhangsan SUO produce and Lisi SUO heard DE sound
 ‘the sound that Zhangsan produced and that Lisi heard’
- b. 張三所要求跟李四所付出的價碼
 [_{RC} Zhangsan suo yaoqiu] gen [_{RC} Lisi suo fuchu] de jima
 Zhangsan SUO ask and Lisi SUO paid DE price
 ‘the price that Zhangsan asked for and that Lisi paid’
- c. 張三污來的跟李四偷到的東西
 [_{RC} Zhangsan wu-lai de] gen [_{RC} Lisi tou-dao de] dongxi
 Zhangsan embezzle DE and Lisi stole DE thing
 ‘the things that Zhangsan has embezzled and that Lisi has stolen’

But when a relative is coordinated with a complement, ungrammaticality results:

- (42) a. *張三所聽到的跟李四吹口哨的聲音
 *_[RC] Zhangsan suo tingdao de] gen _[NC] Lisi chui koushao de] shengyin.
 Zhangsan SUO heard DE and Lisi blow whistle DE sound
- b. *張三所要求的跟李四代考的價碼
 *_[RC] Zhangsan suo yaoqiu de] gen _[NC] Lisi dai-kao de] jiamā.
 Zhangsan SUO demanded DE and Lisi substitute-exam DE price-tag
- c. *張三付出的跟李四偷竊的代價
 *_[RC] Zhangsan fuchu de] gen _[NC] Lisi touqie de] daijia.
 Zhangsan paid DE and Lisi steal DE price

We can find a parallel pattern with non-clausal satellites in English as well:

- (43) a. a student with gray hair and in black pants
 b. a student of physics and of mathematics
 c. *a student of physics and with gray hair
 d. *a student with gray hair and of physics

Complements and relatives cannot be coordinated because they belong to different semantic types: relatives are predicates (of type $\langle e, t \rangle$) while complements are arguments (of type $\langle e \rangle$, $\langle v \rangle$, or $\langle s, t \rangle$ denoting individuals, events or propositions).¹²

4.5 Evidence from iteration

A noun phrase may be modified by multiple relative clauses, with one stacked on another, but not by multiple complements:

- (44) a. 他發出來的令人害怕的聲音
_[RC] ta fa-chulai de] _[RC] ling ren haipa de] shengyin
 he produce DE cause person afraid DE sound
 ‘the sound that terrified others that he produced’
- b. *他彈鋼琴的我拉小提琴的聲音
 *_[NC] ta tan gangqin de] _[NC] wo la xiaotiqin de] shengyin
 he play piano DE I play violin DE sound

¹² In some cases, different syntactic categories may be coordinated as long as they belong to the same semantic types: *He looks happy and in good spirit; I recommend him to you strongly and with great enthusiasm.*

- (45) a. 長得高高的留著長頭髮的對手
 [_{RC} zhang-de gaogao de] [_{RC} liuzhe chang toufa de] duishou
 grow tall DE keep long hair DE opponent
 ‘the opponent who wears long hair and stands quite tall’
- b. *張三下棋的李四辯論的對手
 * [_{NC} Zhangsan xiaqi de] [_{NC} Lisi bianlun de duishou]
 Zhangsan play-chess DE Lisi debate DE opponent

Again, these contrasts are not unlike that seen below:

- (46) a. the tall, handsome, long-haired student
 b. *the physics chemistry student

Syntactically, these facts directly follow from the X-bar rules in (3), where adjuncts are introduced by the iterative (or recursive) rule $X' \rightarrow X' YP_{\text{Adjunct}}$, with $X' + \text{Adjunct}$ making up another X' , while complements are introduced only by the non-iterative rule $X' \rightarrow X^0 ZP_{\text{Comp}}$. Semantically, adjuncts can be iterated because they function to successively produce subset denotations from supersets, while complements exist only as they are needed to fill argument positions.

4.6 Evidence from long-distance extraction

Another property of relative clauses is that they allow the head to bind a gap at a distance—in (sometimes deeply) embedded clauses:

- (47) a. 這就是那個我聽說李四最喜歡的舞伴。
 Zhe jiushi na-ge [_{RC} wo tingshuo [Lisi zui xihuan __]] de wuban.
 this is that-CL I hear Lisi most like DE partner
 ‘This is the dancing partner that I heard that Lisi likes most.’
- b. *這就是那個我聽說李四跳舞的舞伴。
 *Zhe jiushi na-ge [_{NC} wo tingshuo [Lisi tiaowu]] de wuban.
 this is that-CL I hear Lisi dance DE partner
- (48) a. 這就是張三覺得李四會開出來的價碼。
 Zhe jiushi [_{RC} Zhangsan juede [Lisi hui kai-chulai __]] de jiama.
 this is Zhangsan think Lisi will offer-out DE price-tag
 ‘This is the price that Zhangsan had predicted that Lisi would ask for.’
- b. *這就是張三以為李四代考的價碼。
 *Zhe jiushi [_{NC} Zhangsan yiwei [Lisi dai-kao] de] jiama.
 this is Zhangsan think Lisi substitute-exam DE price-tag

This distinction is again not unexpected. A relative clause contains a term that is related to the head by a relation of co-indexing. The term (interpreted as a variable) may be a trace created by A-bar movement of a relative operator, or a null *pro* or overt resumptive pronoun. The crucial relation that must be established is between the variable and the head. There is no requirement that the variable cannot be located within an embedded clause. In a noun complement construction, the head is to be saturated by the complement as a whole, but not related to any of its subparts, hence not to any element within an embedded clause.

4.7 Evidence from N-bar ellipsis

Relative clauses and complement clauses differ in their ability to undergo ellipsis:

- (49) a. 張三最喜歡的歌反而是李四最討厭的__。
 [_{RC} Zhangsan zui xihuan de ge] fan-er shi [_{RC} Lisi zui taoyan de __].
 Zhangsan most like DE song converse is Lisi most hate DE
 ‘The song that Zhangsan likes most is conversely the one Lisi hates most.’
- b. 跟張三跳舞的女孩比跟李四約會的__高一點。
 [_{RC} gen Zhangsan tiaowu de nühai] bi [_{RC} gen Lisi yuehui de __] gao yidian.
 with Zhangsan dance DE girl than with Lisi date DE tall a-bit
 ‘The girl that Zhangsan danced with is a bit taller than the one Lisi dates.’
- c. 李四彈的鋼琴比他所買得起的__要貴得多。
 [_{RC} Lisi tan de gangqin] bi [_{RC} ta suo mai-de-qi de __] yao gui-de-duo.
 Lisi play DE piano than he suo can-afford DE more expensive-a-lot
 ‘The piano Lisi is playing is a lot more expensive than the one he can afford.’
- (50) a. *張三唱歌的聲音比李四哭的__還難聽。
 *_[NC] Zhangsan chang-ge de shengyin] bi [_{NC} Lisi ku de __] hai nanting.
 Zhangsan sing DE voice than Lisi cry DE more bad-to-hear
 ‘The voice of Zhangsan singing is more horrible than that of Lisi crying.’
- b. *張三殺人的價碼比李四代筆的__更便宜。
 *_[NC] Zhangsan sha-ren de jima] bi [_{NC} Lisi dai-bi de __] geng pianyi.
 Zhangsan kill DE price than Lisi ghost-write DE more cheap
 ‘The asking price for Zhangsan to kill is cheaper than for Lisi to ghost-write.’
- c. *李四貪污的後果比他逃稅的__更難忘。
 *_[NC] Lisi tan-wu de houguo] bi [_{NC} ta tao-shui de __] geng nanwang.
 Lisi embezzle DE conseq. than he evade-tax DE more unforgettable
 ‘The consequence of Lisi’s embezzlement is more unforgettable than that of his tax evasion.’

As shown in (49), the head of a relative clause may be elided, stranding the marker *de*, under identity with a preceding head. But as shown in (50), a similar process cannot occur with a noun complement. Two more contrasting pairs are given below:¹³

- (51) a. 她買的手錶比你買的__好看。
 [_{RC} ta mai de] shoubiao bi [_{RC} ni mai de] __ haokan.
 she buy DE wristwatch than you buy DE good-looking
 ‘The wristwatch she bought is better looking than the one you bought.’
- b. *你買了金錶的事比他買了鑽戒的__更爲誇張。
 *[[_{NC} ni mai-le jin biao de] shi bi [_{NC} ta mai-le zuanjie de] __
 you bought gold watch DE fact than he bought diamond DE
 geng-wei kuazhang.
 more ridiculous
 ‘*The fact that you bought a gold watch is more ridiculous than the one that he bought diamond.’
- (52) a. 這是我想問的問題，不是李四想問的__。
 Zhe shi [_{RC} wo xiang wen de wenti], bu shi [_{RC} Lisi xiang wen de __].
 this be I want ask DE question not be Lisi want ask DE
 ‘This is the question I want to ask, not one that Lisi wants to ask.’
- b. *這不是你能買得起買不起的問題，而是你想不想買的__。
 *Zhe bushi [_{NC} ni mai-de-qi mai-bu-qi de wenti], er shi [_{NC} ni
 this not you can-afford cannot-afford DE question, but be you
 xiang-bu-xiang mai de __].
 want-not-want buy DE
 ‘*This is not a question of whether you can afford it or not, but one of whether you want to buy it.’

This paradigm reminds us of the pattern of *one*-substitution in English, made famous by Radford (1988) citing Hornstein & Lightfoot (1981). As illustrated below, in English the weak pronoun *one* may be used to substitute for *teacher* in (53a), *mathematics teacher* in (53b), or *red-haired mathematics teacher* in (53c), when each of these is preceded by another adjective. But it cannot be used to substitute for the head noun alone in the presence of a complement, as shown in (53d):

- (53) a. the tall *teacher* and the short *one*
 b. the tall *mathematics teacher* and the short *one*
 c. the tall *red-haired mathematics teacher* and the short *one*
 d. *the *mathematics teacher* and the physics *one*

¹³ The contrasts provided in this subsection thus run counter to LaPolla’s claim quoted earlier that ‘the possibility of the head being omitted cannot be used as a criterion for distinguishing noun complements from relative clauses.’

The same pattern is observed with postnominal structures: *one* may stand for a head to the exclusion of an adjunct, but not for a single noun to the exclusion of a complement:

- (54) a. the *student* with gray hair and the *one* with red hair
 b. the *student of physics* from England and the *one* from France
 c. the *student of physics from England* with gray hair and the *one* with black hair
 d. *the *student* of physics and the *one* of mathematics

Given the X-bar system shown in (3) and (4), these facts are elegantly captured and explained by the generalization that the weak pronoun *one* is equivalent to a pronominal N'-phrase; it is not an N⁰ nor an entire NP: *one* = [_{N'} *one*]. Since adjuncts are introduced as sisters of N', any sister of an adjunct can be pronominalized by *one*. On the other hand, since complements are solely introduced as sisters of N⁰, a head noun cannot be *one*-pronominalized to the exclusion of its complement.¹⁴

Returning to the patterns of ellipsis we have just observed in Chinese, the obvious answer is that the Chinese correlate of *one*-pronominalization is nominal ellipsis, which must target N', not N⁰ or whole NPs. The unacceptable (b) cases of (51) and (52) are disallowed because ellipsis has wrongly applied to N⁰ heads.¹⁵

¹⁴ In classical X-bar theory, a head noun alone occurring with an adjunct can be a (non-branching) N' exhaustively dominating an N⁰, so *one*-substitution is permitted in (53a) and (54a). In the extended X-bar theory incorporating DP above NP, the N' would be equivalent to NP. In the 'bare structure' hypothesis of the Minimalist Program, the X/X' distinction cannot be formally expressed in structure, but assumptions about light categories (light verbs, light nouns, etc.) can be exploited to capture the same important linguistic generalization. See Harley (2007) for useful suggestions to deal with this problem, where it is suggested that *one* is a light pronoun of the n⁰ category. Recently Kayne (2015) has treated English pronominal *one* as a 'complex determiner containing a classifier'. In view of Abney's (1987) DP hypothesis, which has its root in Postal (1966[1969]), where definite pronouns are Ds, there is also a point of similarity in these recent treatments of the weak pronoun *one*. To stay focused on the main points of our paper, we shall keep to the classical version of X-bar theory, the one that is more widely known in the wider field.

¹⁵ Li (2013) shows that there are other constructions that do not allow NP-ellipsis with a 'stranded' *de*. For example, under the quantity reading, ellipsis may not leave a *de* stranded in the second conjunct:

- (i) Wo kan-le san-pian de boshi lunwen, ta cai kan-le liang-pian (*de).
 I read three-cl DE doctor thesis he only read three-cl DE
 'I read three doctoral theses; he only read two.'

She convincingly argues that, under the quantity reading, the *de* in the first conjunct is phonologically inserted (akin to *of*-insertion in English examples like *destruction of the city*), and that the ill-formedness of (i) is not due to the impossibility of ellipsis per se, but because the second occurrence of *de* is not allowed without proper phonological motivations. In our cases under consideration, it is likely that the post-complement *de* is also phonologically inserted. However, in our cases the ungrammaticality of (50), (51b) and (52b) must still be due to the impermissible ellipsis, since these sentences remain unacceptable even if the second *de* is deleted.

4.8 Evidence from nominalization

In addition to allowing an N' head to be elided under identity with a preceding head, Chinese relative clauses have the additional property of being able to be nominalized by *de*, but complement clauses do not have this property. The result of this nominalization is that the whole construction becomes an argument that would otherwise fill the gap in the relative:

- (55) a. 來參加比賽的
 [_{NP} [_{RC} lai canjia bisai] de]
 came participate race DE
 'the ones that came to participate in the race'
- b. 他們要買的
 [_{NP} [_{RC} tamen yao mai] de]
 they want buy DE
 'what they want to buy'
- (56) a. *他跳舞的
 * [_{NP} [_{NC} ta tiao-wu] de]
 he dance DE
- b. *李四殺人的
 * [_{NP} [_{NC} Lisi sha-ren] de]
 Lisi kill DE

This property may be seen as independent of the ellipsis phenomenon observed above, as the two examples in (55) are formed without any antecedent for the ellipsis site, although sometimes the difference may be difficult to discern. Li (2012), following Lien (2008), shows that the difference is clear in Taiwanese Southern Min (TSM). In TSM, the form corresponding to *de*, namely *e*, is associated with different tones depending on whether it is a nominalizer or the marker that is stranded after N'-ellipsis. As a nominalizer occurring at the end of a relative clause or AP without a head noun, *e* is underlyingly toneless (hence marked as e_0), as its surface tone value is entirely decided by that of the immediately preceding syllable (by tone spreading):

- (57) a. hit-e tshing ang sann⁵⁵ e₀⁵⁵
 that-CL wear red shirt e₀
 'the one who wears a red blouse'
- b. hit-e tshing ang kun¹³ e₀³³
 that-CL wear red skirt e₀
 'the one who was wearing a red skirt'

- c. hit-e tshing oo kho²¹ e₀¹¹
 that-CL wear black pants e₀
 ‘the one who was wearing black pants’

However, the *e* that occurs before an overt head noun comes with a full tone (tone e₅ with a 13 contour in citation), which undergoes tone sandhi (to tone e₇ with a 33 contour) but retains its citation value under ellipsis. Thus, when each of the examples in (57) ends with an overt head noun *gin-a* ‘child’, we have an invariant sandhi tone e₇³³, whose underlying citation tone is e₅¹³:

- (58) a. hit-e tshing ang sann⁵⁵ e₇³³ gin-a
 that-CL wear red shirt e₅ child
 ‘the child who wears a red blouse’
- b. hit-e tshing ang kun¹³ e₇³³ gin-a
 that-CL wear red skirt e₅ child
 ‘the one who was wearing a red skirt’
- c. hit-e tshing oo kho²¹ e₇³³ gin-a
 that-CL wear black pants e₅ child
 ‘the one who was wearing black pants’

This invariant e₇³³ also appears between a noun complement and its head N⁰ (as in (59) below) as well as between a possessive specifier and its head N’ (as in (60)):

- (59) a. gua thiaobu e₇³³ buphuann
 I dance e₅ partner
 ‘my partner of dancing’
- b. i tshiunn kua e₇³³ siannyim
 he sing song e₅ sound
 ‘the sound of him singing’
- (60) a. tsit-e gin-a e₇³³ khadatshia
 this-CL child e₅ bicycle
 ‘that child’s bicycle’
- b. hautiunn e₇³³ tshu tsin khua
 principle e₅ house real wide
 ‘The principal’s house is really spacious.’

Li (2012:26) notes that under some restricted circumstances, the relative clauses allow both the toneless e₀ and the full-toned e₅ to co-occur:

- (61) i ka gua tso (e₀) e₅ mihkiann long the-khi a.
 he KA I make (e₀) e₅ stuff all take-away PRT
 ‘He took away all the stuff that I made.’
- (62) i ka gua tso e₀ (e₅) ___ long the-khi a.
 he KA I make e₀ (e₅) ___ all take-away PRT
 ‘He took away all that I made.’

Taken together, these facts show that the relative clause may occur, in addition to the full tone e_{5/7}, with a toneless e₀, either by itself or before a full-toned e_{5/7}. Regardless of the details, the crucial point is that under no circumstances is the toneless e₀ able to occur with a complement clause (or with a possessive specifier):

- (63) a. *gua thiaobu e₀ e₇³³ buphuann
 I dance e₀ e₅ partner
 ‘my partner of dancing’
- b. *i tshiunn kua e₀ e₇³³ siannyim
 he sing song e₀ e₅ sound
 ‘the sound of him singing’
- (64) a. *tsit-e gin-a e₀ e₇³³ khatatshia
 this-CL child e₀ e₅ bicycle
 ‘that child’s bicycle’
- b. *hautiunn e₀ e₇³³ tshu tsin khua
 principle e₀ e₅ house real wide
 ‘The principal’s house is really spacious.’

This state of affairs may be explained naturally in the way already provided by Li (2012). The TSM e₀ is a nominalizer. It occurs with a non-nominal category to turn it into a nominal. In the words of Huang (2006) it is a type-shifter of type <<e,t>, e>, which combines with a relative clause predicate <e,t> to yield an argument ‘e’. In Zhu’s (1983[1999]) terminology, this is the TSM counterpart of a 轉指 *zhuanzhi* (or shifted-referring) type of nominalizer *de*₃. (An alternative characterization may be that a clause ending in e₀ are *free* (headless) relative clauses with a zero head.) Since complements (and specifiers) are already referring expressions of type e (or v or <s,t>), they need not (in fact cannot) be further nominalized.

In light of the discussions above, it is clear that Zhu’s (1961[1999]) *de*₃ should be further divided into two, arguably three subcategories: the nominalizing *de*, a functional head selecting a specifier or an adjunct which supports N-bar ellipsis, and an *of*-like element for complements which do not support N-bar ellipsis.

4.9 Cross-linguistic evidence

We have seen a range of phenomena jointly pointing to the adjunct–complement distinction in Chinese. We saw that genetically unrelated languages as different as English and Chinese converge on the same conclusion. It should be expected that the facts we have gathered to support the distinction will find correlates in other languages. Indeed, a number of scholars have already shown that Japanese, Korean and certain other languages with head-final noun phrases do indeed manifest adjunct–complement asymmetries in various ways, in contradiction to the claims of Comrie (1996, 1998, 2010) and Matsumoto (1997). For example, Bugaeva and Whitman (2016) show that Ainu (a language that Comrie has included as exhibiting no adjunct–complement distinctions) systematically marks agreement for noun complements with the head, but does not do so for relative clauses. In addition, they show that while Japanese relative clauses freely allow *no*-pronominalization, noun complements distinctively do not. A parallel asymmetry is found in Korean for the use of *ku kes* pronominalization. Some of their Japanese examples are reproduced below.

- (65) [[_{RC} ryoosi ga yaita] sakana] wa nakunatta ga,
 fisherman NOM grilled fish TOP is-gone but
 [[_{RC} kimi ga yaita] no] wa nakatte iru.
 you NOM grilled NO TOP left is
 ‘The fish that the fisherman grilled is gone, but the one/those you grilled remains.’
- (66) *[[_{NC} pro sanma o yaita] syooko] wa kieta ga,
 saury ACC grilled evidence TOP is.gone but
 [[_{NC} pro iwasi o yaita] no] wa nakotte iru.
 sardines ACC grilled NO TOP left is
 ‘The evidence that someone grilled saury is gone, but the evidence that someone grilled sardines remains.’
- (67) *[[_{NC} pro sanma o yaita] nioi] wa kieta ga,
 saury ACC grilled smell TOP is.gone but
 [[_{NC} pro iwasi o yaita] no] wa nakotte iru.
 sardines ACC grilled NO TOP left is
 ‘The smell of someone grilling saury is gone, but the (smell) of [someone] grilling sardines remains.’

Bugaeva and Whitman demonstrate that the asymmetries illustrated above are completely independent of the choice of head nouns. Thus, if the head nouns in (66) and (67), *syooko* ‘evidence’ and *nioi* ‘smell’ are used with relative clauses, they can both be *no*-pronominalized:

- (68) [[_{RC} Hanako ga mituketa] syooko] wa kieta ga,
 Hanako NOM found evidence TOP is.gone but
 [[_{RC} Taroo ga mituketa] no] wa nokotte iru.
 Taroo NOM found NO TOP left is
 ‘The evidence that Hanako found is gone, but that which Taroo found remains.’

- (69) [[_{RC} kino kaida] nioi] wa kyooretsu data ga,
 yesterday smelled smell TOP strong was but
 [[_{RC} kyoo kaida] no] wa motto kyooretsu da.
 today smelled NO TOP more strong is
 ‘The smell that [I] smelled yesterday was strong, but the one I smelled today is stronger.’

It is easy to see that these facts reflect exactly the same restriction on *one*-pronominalization in English we have shown with examples (53) and (54): the indefinite pronoun *no* = ‘one’ must substitute for an N', not an N⁰. Alternatively, we might analyze *no* as the correlate of *de* that pops up when ellipsis occurs. Then these facts would fall out under the condition that nominal ellipsis affects N' phrases only, in the same way it does in Chinese. Note that Bugaeva and Whitman's demonstration in (68) and (69) that this restriction is independent of the choice of head nouns is equally well served by the examples we saw in (52).

Obviously, we don't expect all the facts adduced from Chinese in favor of the adjunct-complement distinction to be reproduced in every other language, because independent properties of individual languages may make some relevant diagnostics unavailable—for example the availability of scrambling, extraposition and similar operations in a language could render the word-order test less reliable. Conversely, the evidence from possessive agreement in Ainu and Turkish, as mentioned by Bugaeva and Whitman, will not be available in Chinese, because Chinese does not mark agreement anywhere at all.¹⁶

5. Countering alleged arguments for the constructionist approach

Proponents of the general noun-modifying constructionist approach have based their arguments on three considerations. First is the fact that in the languages with head-final noun phrases the prenominal clauses typically have very similar surface forms. For example, in Chinese they involve apparently the same morpheme *de* and they do not involve the movement of a *wh*-relative pronoun. The second reason is their perceived lack of evidence for extraction in the formation of relative clauses, and given the considerable freedom of pro drop, both clause types can be formed in the same way and be interpreted by inference from context and common sense. The third reason is that there is a wide range of possible interpretations between the clausal constituents and their heads, which would seem to resist any attempt to ‘artificially divide the possibilities into one or the other choice in the traditional dichotomy’ (LaPolla 2013:50).

The first reason, based on surface similarity, cannot be taken too seriously, especially in view of what we have seen in the preceding sections. As soon as we look a bit deeper under the surface, a host of systematic differences can be found that can easily tell them apart. There is no need to repeat what has already been shown, but it is worthwhile to point out that once a given clause is

¹⁶ Whitman (2013), citing Frellesvig & Whitman (2011) and Soga & Fujimura (1978), also points out that in modern written Japanese it is fairly easy to find examples of S-no-NP when the S is a noun complement, but except for a few dubious examples, this is generally impossible when S is a relative clause. This is potential additional evidence for the adjunct-complement distinction.

identified as a relative or a complement by one diagnostic, almost all other diagnostics corroborate the same result. It is worthy of note also that, in fact, even in English and other languages, the same ‘complementizer’ could be used for both relatives and noun complements (e.g. the use of *that*-relatives along with *that*-complements). Also, *of English* and *of French origin* are formally identical PPs, but they hang in different structural positions in *a teacher of English of French origin* due to the adjunct–complement distinction.

The second argument is based on the (dubious) claim that the derivations of both relative clauses and noun complements are the same—they do not involve extraction but only the option of null pronouns. Regardless of whether this is the right claim, however, this matter is somewhat independent of the question of whether relative clauses exist as a distinct category from noun complements in these languages. Even if a relative clause is solely formed by co-indexing a *pro* with the head, it must still be distinguished from a noun complement where such a co-indexing does not exist. And, once so distinguished, their other differential behaviors, as noted in the preceding section, can be predicted. Second, it has been shown by Kornfilt and Vinokurova (2012) that the formal identity of the two clause types in a given language is independent of whether the language allows certain violations of island constraints (see also Whitman 2013). And third, the supposition that relative clauses in Japanese and Korean are formed without movement is in fact controversial, and the same supposition for Chinese is highly dubious. Rather, the truth is that for the languages which allow extensive (though not truly ‘free’) *pro* drop both the movement and the null resumptive pronoun strategies are used, each subject to different restrictions, and each confirmed by their specific diagnostic properties. There is a sizable literature on this, but given the orthogonal nature of this question, we shall leave it for a different occasion. (See Huang 1984 for some early discussion and especially Aoun & Li 2003 and references therein for extensive demonstration of Chinese relatives whose derivation must involve movement. Also see Huang 2013, Huang & Yang 2013 and Liu 2014 for some recent discussions concerning relevant extraction asymmetries that tackle some island-related issues.)

As for the third reason, LaPolla (2012, 2013) has given some nice examples illustrating the variable interpretations of prenominal clauses. These include a number of expressions involving 能寫的 *neng xie de* ‘can write DE’. As he indicates (2013:48–49), this expression can be used to modify a head noun related to an agent or instrument. (The number in square brackets following each example indicates the original number from LaPolla 2013.)

- (70) a. 能寫的人 [ex. (21)]
 [neng xie de] re
 can write DE person
 ‘a person who can write’
- b. 能寫的筆 [ex. (20)]
 [neng xie de] bi
 can write DE pen
 ‘a pen that can write’

Or a head noun related to a theme/patient or a location:

- (71) a. 不能寫的人 [ex. (22)]
 [bu neng xie de] ren
 not can write DE person
 ‘a person that one cannot write about’
- b. 後面能寫的紙 [ex. (19)]
 houmian [neng xie de] zhi
 back can write DE paper
 ‘paper one can write on on the back’

The first two sentences are not extraordinary as they involve simple subject relativization, with the head noun understood as being related to an agentive or instrumental subject position in the relative (also, in English, *This pen can write every color on Earth* (from a commercial on the web) is entirely natural). What is a bit unusual about (71a) is that the head is related to the object of *xie*, and the agent argument is unexpressed. But once we recall that Chinese allows a pronoun to drop (to be unpronounced), these cases can be analyzed as involving object relatives. What remains a bit unusual, by comparison with English, is that *xie* may mean not only ‘write’, but also ‘write about’ (*xie zhe-ge ren* ‘write about this man’)—as shown in (71a), or ‘write on’ (*xie heiban* ‘write on the blackboard’, *xie heiban de houmian* ‘write on the back of the blackboard’). It can take an instrumental object as well (*ta xie maobi* ‘he writes with a brush’). Hence it is also possible to relativize these, as in *ta xie de heiban*, *ta xie de maobi*, etc. In fact, this is part of a wider phenomenon, as illustrated by *ta qie zhe-ba dao* ‘he cuts [with] this knife’, *ta chi fanguan* ‘he eats [at] restaurants’, *ta kai zuobian* ‘he drives on the left side’, *ta kai jiazhao*, *wo kai shenfenzheng* ‘he drives with a driver’s license and I drive with an ID’ (see Lin 2001, and related works).¹⁷ The important point here is that, for each grammatical object relative, we can find a grammatical source where the head fills the object position. Any ‘unexpected’ properties of the relative clause can be reduced to the ‘unexpected’ properties of the source. It is not, in other words, the relative clause’s fault.

Another pair showing the interpretive variability is when a head noun is empty. So [*neng xie de* \emptyset] can mean either the one who can write [something], or the thing that [someone] can write about.

- (72) a. 能說又能寫的 [ex. (24)]
 [neng shuo you neng xie de]
 can speak and can write DE
 ‘those who can speak and write’

¹⁷ Lin (2001) describes this freedom as the ‘unselectiveness’ of arguments in Chinese predicates and attributes it to his Lexicalization Parameter. Basically, while certain parts of the conceptual structure of the verb (e.g. its argument structure) have been lexicalized on the verb in English, in Chinese the verb enters into syntactic component ‘pure’, without those features, and its arguments are introduced by appropriate light verb heads in the syntax. The verb acquires its arguments by combining itself with the light verbs in syntax. In other words, the conceptual structure of a verb in Chinese is not grammaticalized at the lexical level. There is a point of similarity here with LaPolla’s suggestion that the adjunct–complement distinction is not grammaticalized in Chinese, in that, in both accounts, Chinese is taken to be less grammaticalized than, say, English in some respect. Our view is that the adjunct–complement distinction must be made, and the observed interpretive variability can be attributed to the independent source already suggested by Lin.

- b. 能寫的就寫吧 [ex. (25)]
[neng xie de] jiu xie ba
can write DE then write PRT
'Then write whatever you can write (about).'

Again, these examples are not extraordinary once the availability of null pronouns is considered. The situation would be no more extraordinary than the ambiguity of (73) below, where the head noun could be related to either one of the two resumptive pronouns:

- (73) 這就是我叫他別跟他過不去的那個人。
Zhe jiushi [_{RC} wo jiao ta bie gen ta guo-bu-qu de] na-ge ren.
this is I ask him not-to with him pass-not DE that-CL person
a. 'This is the person that I asked not to make life difficult for him.'
b. 'This is the person that I asked him not to make life difficult for.'

In all these above cases, the sequence *neng xie de* can be safely identified as a relative clause, as the distinguishing properties noted in §4 will confirm.

But in example (74) we have a case of complementation:

- (74) 能說又能寫的能力 [ex. (23)]
[_{NC} neng shuo you neng xie de] nengli
can speak also can write DE ability
'the ability to speak and write well'

And it behaves along with (75) and (76) in showing other properties of noun complements:

- (75) 炒飯的聲音 [ex. (16)]
[_{NC} chao fan de] shengyin
fry rice DE sound
'the sound of frying rice'

- (76) 自申請的次年開始適用 [ex. (14)]
zi [_{NC} shenqing de] ci-nian kaishi shiyong
from apply DE next-year begin applicable
'effective from the next-year of applying'

These examples can be so identified by the subcategorization properties of their heads. For example, *ci-nian* 'next year (of)' is necessarily transitive (in Chinese), and *shengyin* 'sound (of)' and *nengli* 'ability (of)' are optionally so (like *student*), and only appropriate clauses may count as their complements. We can also identify them by the word order test, as they must follow relative clauses occurring with them. They cannot be iterated. They cannot be coordinated with relatives. They cannot occur with *suo*. They cannot occur as a nominalization. They cannot be related

long-distance to the head. And they cannot undergo N'-ellipsis. The following examples illustrate the last two properties:

- (77) a. *自張三說申請的次年
 *zi [_{NC} Zhangsan shuo shenqing de] ci-nian ...
 from Zhangsan said apply DE next-year
 Intended: ‘*the year following the application, as Zhangsan prescribed’
- b. *他通知李四炒飯的聲音
 * [_{NC} ta tongzhi Lisi chao fan de] shengyin ...
 he informed Lisi fry rice DE sound
 Intended: ‘*the sound of Lisi frying rice, as he informed him to’
- (78) a. *她能說又能寫的能力跟你能歌又能舞的__
 * [_{NC} ta neng shuo you neng xie de] nengli gen [_{NC} ni neng ge
 he can speak and can write DE ability and you can sing
 you neng wu de] __
 and can dance DE
 ‘His ability to sing and write well, and your ability to sing and dance well.’
- b. *自申請的次年開始適用，到畢業的__停止。
 *zi [_{NC} shenqing de] ci-nian kaishi shiyong, dao [_{NC} biye de] __tingzhi.
 from apply DE next-year begin applicable to graduate DE stop
 ‘Effective from the year after application, until the year after graduation.’

The other examples from LaPolla that may allegedly pose a difficulty are listed below:

- (79) 好吃又不會胖的甜點 [ex. (17)]
 [haochi you buhui pang de] tiandian
 delicious also won't fat DE sweet
 ‘the sweets that are delicious and (when you eat them, you) won't get fat’
- (80) 不用洗手的自動馬桶 [ex. (18)]
 [bu yong xishou de] zidong matong
 no-need wash-hand DE automatic toilet
 ‘a toilet which (after having used it, one) doesn't need to wash (one's) hands’

These examples may seem at first sight to be like (74–76), where it is difficult to find an appropriate ‘gap’, but unlike them, the prenominal clauses here can be identified as relative clauses. For example, both of them may undergo N-bar ellipsis, they allow long-distance binding by their heads, and so on. An example with N-bar ellipsis for (79) is given in (81) and a long-distance version for (80) is given in (82):

- (81) 他們出去買甜點，買不到好吃又不會胖的__。
Tamen chuqu mai tiandian, mai-bu-dao [_{RC} haochi you buhui pang de] __.
they go-out buy sweets cannot-buy delicious also won't fat DE
'They went out to buy sweets, but couldn't find those that are delicious and [you] won't get fat.'
- (82) 他家裝了廣告說不用洗手的自動馬桶。
Ta jia zhuang-le [_{RC} guanggao shuo [bu yong xishou] de] zidong matong.
he home installed commercial say no need wash-hand DE auto toilet
'His family has installed an automatic toilet that the commercials say needs no hand-washing.'

The question is how (81) and (82) may be appropriately derived. In the case of (79) or (81), concern might be raised that the head *tiandian* 'sweets' binds the subject of 'delicious' in the first conjunct of the relative clause, but fails to bind something in the second conjunct. However, it is equally possible to find similar examples in English that are acceptable in spite of their violation of the Coordinate Structure Constraint. We have no trouble identifying it as a relative clause.¹⁸

- (83) I want to buy some sweets that you can eat all day and will not get fat.

So (79) is not particularly extraordinary, either. As for (80), one might simply note that the following sentence is perfectly grammatical (along with its English translation):

- (84) 這種自動馬桶不需要洗手。
Zhe zhong zidong matong bu xuyao xishou.
this kind auto toilet not need wash-hand
'This kind of automatic toilet needs no hand-washing.'

So instead of worrying about the gap in the clause '[you] don't need to wash [your] hands [after using [it]]', we might just treat it as a simple VP and analyze (80) as a simple subject-relativized NP. The subject is 'this toilet' and the VP is 'does not need hand-washing'.

There is another easy way out, if one insists on taking *bu xuyao xishou* as a clause whose subject is a person, not the toilet. In this case, (84) can be treated as a sort of topic-comment sentence: 'This toilet, [you] don't need to wash hands.' We can then take the topic-comment clause as the input for relativization.

The idea that a topic-comment construction can be the input of relativization has in fact been suggested pretty early on, first by Kuno (1973), to account for certain parallel patterns of grammaticality between topicalized and relativized constructions. Decades ago, Tang (1979) also

¹⁸ For the non-native reader, it is useful to note that *pang* 'fat' in (79) and (81) has only the inchoative reading 'get fat', not a causative reading of 'fatten'. For this reason, I have adjusted LaPolla's original translation of (79) accordingly. Thus, these sentences are appropriately likened to English examples like (83).

suggested such an analysis for Mandarin relatives. There are topic-comment sentences that are not natural candidates for sure, such as the celebrated (85) from Li & Thompson (1981):

- (85) 那場火，幸虧消防隊來得早。
 Na-chang huo, xingkuai xiaofangdui lai-de zao.
 that-CL fire, fortunately fire-brigade came early
 ‘That fire, fortunately the fire brigade arrived early.’

This sentence is not an appropriate candidate because it involves a thematic (old-information) topic and the speaker-oriented ‘fortunately’. With a contrastive topic as in (86), relativization becomes natural in (87):

- (86) 這場火消防隊來得早，那場火消防隊來晚了。
 Zhe-chang huo, xiaofangdui lai-de zao; na-chang huo, xiaofangdui lai-wan le.
 this-CL fire fire-brigade came early that-CL fire fire-brigade came-late SFP
 ‘This fire, the fire brigade came early; that fire, the fire brigade came too late.’
- (87) 我親眼看見了消防隊來晚了的那場火。
 Wo qinyan kanjian-le [_{RC} xiaofangdui lai-wan le de] na-chang huo.
 I personally saw fire-brigade came-late SFP DE that-CL fire
 ‘I personally witnessed the fire that the fire brigade arrived too late [for].’

Finally, beside topic-comment sentences as input, it is well known that Chinese also employs sentences with sentential predicates, or double-subject or multiple-subject constructions (as in Teng 1974 for Chinese), more recently dubbed ‘major-subject constructions’ in Sakai (1994) for Japanese. See Whitman (2013) for an account of Japanese and Korean relative clauses capitalizing on the role of the major subjects in licensing apparent gapless relatives. In these cases, the sentence (84) can be treated as a double-subject construction that undergoes subject relativization in (80).

Regardless of whether we take the topic-comment or double-subject construction (or both) as potential input sources for relativization, then, for each relative so derived we can maintain that there is a gap bound to the head, which is a property that also distinguishes it from a noun complement clause. And regardless of whether the details are correct, what is not affected is that relatives and noun complements can be distinguished systematically. When a given construction is identified according to one of the nine distinguishing properties we reviewed in §4, most of the other eight distinguishing properties corroborate to further confirm it as a relative or a complement clause.

6. Conclusion

This paper has shown that the adjunct–complement dichotomy, which is well established for Chinese clausal and VP structure, equally applies to noun phrase structures in Chinese as it does in other languages. In Chinese, nominal adjuncts and complements exhibit a host of differential behaviors, and the observed differences can be elegantly explained by reference to their differences in syntactic structure and the corresponding semantic composition procedure.

We have also seen that, given the distinctions made in syntactic structure, the meanings of the Chinese noun phrases may be computed based on the basic assumptions of formal semantics. There is no need, in other words, to single out a class of clausal ‘noun-modifying constructions’ for special treatment in some languages with head-final noun phrases. A major argument for the constructionist approach is that it is particularly useful in capturing constructions that are non-compositional—such as idiomatic expressions of various sorts, from rigid idioms like *kick the bucket* to constructional idioms like *We can't drill our way out of the problem* (Obama's campaign speech), or *He worked his butt off*. However, the types of examples we have been concerned with are not idioms of either kind, and their meanings can be computed step by step, with syntax and semantics going hand in hand. Indeed, given the high degree of analyticity as its well-known typological property, it is not surprising to see Chinese behaving as an ideal language in exemplifying the principle of compositionality and transparent syntax–semantics mapping, in and outside of the nominal domain (Huang 2015).

There are other important facts of the prenominal constructions that seem to set some languages like Chinese apart from others—including the often observed high degree of variability in interpretation. But in large part, these are independent of the question of the adjunct–complement dichotomy. The availability of extensive pro drop leads to extensive referential ambiguities. The nature of ambiguity, however, is not much different from cases in a non-pro-drop language where overt pronouns are required. For example, in discussing each one of three men, a noun phrase like *the guy he talked to him about in the book he borrowed from his sister* would be unacceptably ambiguous without the help of ‘inference’ from context and other non-linguistic cues. The same is true with a corresponding Chinese example with or without a resumptive pronoun. Because of pro drop, the chances for ambiguity increase particularly because all the missing NPs have the same pronunciation (i.e. non-pronunciation). This is a difference in degree, not in kind. Similarly, the seeming freedom of the identity of a gap comes from the ‘unselectiveness’ of verbs (in the sense of Lin 2001) and from ‘topic-prominence’, both of which hold of the clausal and verbal domains as well. They do not uniquely bear on nominal structure or the adjunct–complement distinction in it.

The methodological moral, then, is that when multiple problems seem to occur it pays to sort them out, isolate their sources, and treat them accordingly. Indeed, as we have shown, when certain independent factors are sorted out, then, instead of being a language in which the adjunct–complement distinction is invalid, Chinese appears to be a language *par excellence* for the demonstration of this universal distinction. This is true when considering some other languages where the evidence is not available or not as strong. For example, the evidence from *suo* relatives (§4.3) is not available to non-Chinese languages. And the word-order effects shown in §4.1 (the 3-2-1 order for prenominals and 1-2-3 for postnominals) are often not as strongly perceived in other languages (e.g. Japanese and English), due to the independent effects of phrase-internal scrambling (in Japanese) and heavy constituent shift (in English).¹⁹ Thus, the syntax of prenominals is yet another area where Chinese offers clear insights into the nature of UG and human cognition in ways that other languages might not.

¹⁹ Masaya Yoshida (pers. comm.) has told me that some gapless RCs in Japanese (in particular the ‘smell relative’ illustrated in §4.9) may license long-distance dependencies, which is unexpected given the discussion in §4.6. This is another indication of potential additional factors that may have obscured certain generalizations. It would of course be of interest to find out what those factors are.

Appendix: More on so-called ‘gapless relatives’: Subjects or complements?

In §4, we treated a host of ‘gapless relatives’ as structures of nominal complementation, taking the head noun in each case as a transitive predicate selecting a clausal complement. This view thus extends the range of noun-complements beyond the familiar type of clausal complements illustrated below:

- (88) a. 他們離婚的謠言 (=32b)
 tamen lihun de yaoyan
 they divorce DE rumor
 ‘the rumor that they got divorced’
- b. 要不要擴大招生的問題 (=19b)
 [_{NC} yao-bu-yao kuoda zhaosheng de] wenti
 want-not-want expand recruit-student DE question
 ‘the question whether we should increase student enrollment’

In these cases, each of the clausal complements denotes a proposition (of type *t*). Each noun (such as ‘rumor’ or ‘question’) takes a proposition as its complement much as the corresponding verb (if any, such as the verbs *rumor* and *question*) also selects for a propositional complement.²⁰

In the case of the gapless RCs we have examined, however, the clausal complements do not denote propositions. In the case of a *wuban* ‘dancing partner (of)’, *shengyin* ‘sound (of)’, *qiwei* ‘smell (of)’, *jiama* ‘asking price (of)’, *jiqiao* ‘skill (of)’, etc., the clausal complements denote events (of type *v*). They may also have individual-denoting complements (e.g. the smell of fish, the sound of wind). We may in fact consider an event *v* as a special type of individual *e*.

In other potential cases, a clausal complement may denote an action rather than an event. Such cases may arise with a head noun like *yitu* ‘intention’:

- (89) 李四進一步向上提升的意圖
 Lisi jinyibu xiangshang tisheng de yitu
 Lisi further upward elevate DE intention
 ‘Lisi’s intention to further strive upward.’

²⁰ Noun-complement clauses are usually distinguished from appositives as in *the fact that ...* constructions. Stowell (1981) made the notable argument that all clausal complements of nouns are appositives (to account for, among other things, the ill-formedness of **John’s certainty to win* under the Empty Category Principle (ECP)). There have been other proposals that treat tensed clausal complements as appositives. In the meantime, Kayne (1994) and some current works have assumed a head-raising analysis for relative clauses, in effect treating the RCs themselves as complements. These proposals have given rise to considerable controversies and useful discussions but they are not of direct concern to this paper, which is specifically about the claim (by Comrie, LaPolla and others) that a number of languages with head-final NPs do not distinguish between relative and complement clauses *while other languages do*.

In view of its meaning, (89) may be analyzed as follows, where *Lisi* is a subject controlling a PRO in the clausal complement:

- (90) Lisi [PRO_i jinyibu xiangshang tisheng de] yitu
 Lisi further upward elevate DE intention

And for a head noun like *jihua* ‘plan’, either an event complement or an action complement (with a controlled PRO) is possible:

- (91) 張三明年出國的計劃
 Zhangsan mingnian chu guo de jihua
 Zhangsan next-year exit country DE plan
 a. The plan for Zhangsan to go abroad next year. (event complement)
 b. Zhangsan’s plan [PRO to go abroad]. (action complement)

In other words, even though in all cases the head nouns may C-select (subcategorize for) a clausal complement as a syntactic category, they may S-select different semantic types (propositions, events or actions). In the interest of a more elegant mapping theory, we might assume that, in fact, three clausal sub-categories are involved: CP for propositions, (non-finite) TP for events, and vP for actions.

With this understanding in mind, let us consider a recent treatment of gapless RCs by Zhang (2008), who has made independent arguments for the treatment of these fake relatives as involving a relational head noun and a clausal argument of that noun. Rather than treating the clause as a complement of the noun (as in Huang et al. 2000, adopted here), she argues for the treatment of the clause as a *subject* of the relational noun. In the rest of this appendix, we shall compare the complement analysis with her proposed subject analysis. It will be concluded that the complement analysis should be retained as empirically and theoretically superior.²¹

As arguments for not treating gapless RCs as complements but as subjects, Zhang (2008:1010) highlights two differences between gapless RCs and ‘normal’ noun complements. First, only the ‘normal’ complement may admit an evaluative adverb:

- (92) a. *我聞到了露露幸虧/居然煮飯的味道。
 Wo wendao-le [Lulu {xingkui/juran} zhu fan de weidao].
 I smell-PRF Lulu fortunately/unexpectedly cook rice DE smell
 Intended: ‘I smelled the smell of Lulu’s {fortunately/unexpectedly} cooking.’
- b. 我聽說了露露居然搶了銀行的報導。
 Wo tingshuo-le [Lulu juran qiang-le yinhang] de baodao.
 I hear-PRF Lulu unexpectedly rob-PRF bank DE report
 ‘I heard the report that Lulu unexpectedly robbed a bank.’

²¹ It goes without saying that whether this conclusion is correct is at a different level of discussion from the main points of the paper. Both the complement and the subject hypotheses agree on the need to recognize a crucial adjunct–argument distinction among prenominal ‘modifiers’.

Second, only a ‘normal’ complement clause may be preceded by an animate Agent in Spec of DP, but not a gapless RC:

- (93) a. 露露的[寶玉發表了論文的謠言]
 Lulu de [Baoyu fabiao-le lunwen de yaoyan]
 Lulu DE Baoyu publish-PRF article DE rumor
 ‘Lulu’s rumor that Baoyu published an article’
- b. *露露的[寶玉彈鋼琴的聲音]
 *Lulu de [Baoyu tan gangqin de shengyin]
 Lulu DE Baoyu play piano DE sound

Zhang took these facts as indicating that the gapless RC occurs in a subject position (whereas the normal complement does not): (92a) is ill-formed because an evaluative adverb is generally excluded from a syntactic island, including a sentential subject, and (93b) is ill-formed because the subject position of *shengyin* ‘sound’ is already occupied by the gapless RC *Baoyu tan gangqin* ‘Baoyu plays piano’, leaving no room for the Agent *Lulu* to its left.

The arguments for the subjecthood of gapless RCs are not compelling, however. Empirically, (92a) is ruled out based on the spurious generalization that an evaluative adverb is not permitted in a syntactic island, including a sentential subject. The following example, however, seems quite acceptable:²²

- (94) [露露居然敢搶銀行] 是不可思議的。
 [Lulu juren gan qiang yinhang] shi bukesiyi-de.
 Lulu unexpected dare rob bank be inconceivable
 ‘That Lulu dared to rob the bank to everyone’s surprise is inconceivable.’

And although (93b) is ill-formed, it becomes well-formed if the internal subject *Baoyu* is replaced with a controlled PRO. The well-formedness of (95) directly denies the subject-position claim for the gapless RC.

- (95) 露露的[PRO彈鋼琴的聲音]
 Lulu de [PRO tan gangqin de shengyin]
 Lulu DE play piano DE sound
 ‘Lulu’s sound of playing the piano’

Theoretically, the facts observed are readily open to alternative explanations. In particular, given our understanding of the C- and S-selection properties as explained above, the contrast between (92a) and (92b) follows from their differences in S-selection properties. (92b) is well-formed because

²² Furthermore, even an NP with a ‘normal’ clausal complement is a syntactic island (a Complex NP island), though it has no problem with an evaluative adverb, as (92b) shows.

the head noun *baodao* ‘report’ selects a proposition (of type *t*) which, like normal propositions may admit evaluative adverbs. On the other hand, in (92a) the head noun ‘smell’ selects an event (of type *v*); since it does not denote a truth value, it cannot be evaluated by an evaluative adverb. In (93a), someone may spread a rumor with a statement (proposition) involving someone else as the subject of that proposition. The ill-formedness of (93b) is easy to understand in view of the well-formed (95): The sound of talking, singing, or playing the piano may be said to be Mary’s sound or voice, as long as it is understood that Mary is the talker, the singer, or player of the piano (i.e. obligatory controlled PRO), but not otherwise. The contrast between (95) and (93b) is clearly seen in English as well: *John’s voice of singing, the voice of John singing*, but **John’s voice of Mary singing*. In each case, the ‘gapless RC’ is a complement clause (gerundive or *Acc-ing*) introduced by *of*.

Another argument Zhang (2008) offered for the subject analysis is that it is purported to be able to explain why Chinese has gapless RCs while English does not. The explanation is based on the supposed generalization that English does not allow tensed clauses in subject position, while Chinese, and presumably other languages with gapless RCs, do. The argument involves a number of assumptions that have not been firmly established and raises additional questions, and so the account is hard to evaluate. Given what we have said about selection, however, there is again a ready alternative explanation for the apparent difference, consistent with our analysis of the gapless RC as a complement.

Under our assumption, English has both normal clausal complements and gapless RCs as clausal complements, just like Chinese. A normal noun-complement is semantically a proposition, and syntactically a CP, introduced by the C *that* if finite, as is normally the case, or *for* if infinitival as in *the plan for John to come*, or a *wh*-phrase for an interrogative complement as in *the question whether he came*, etc. With a gapless RC headed by *sound*, *smell*, etc., the selected clausal complement is an event but not a proposition, and therefore not a CP by assumption, but a (non-finite) TP (under the standard assumption that a tensed TP always implies a CP). There are two possibilities for the non-finite TP. One is the gerundive clause. We then have the English gapless RCs introduced by a preposition like *of*, since gerunds are nominal phrases that need to get/check Case:

- (96) a. the voice of [John’s talking to Mary]
 b. the sound of [Mary’s playing the guitar]
 c. the consequence of [Mary missing the Monday rehearsal]
 d. John’s price-tag for [PRO killing the detective]
 e. Bill’s price for [PRO taking big bribes]
 f. John’s partner of [PRO dancing]
 g. the partner of [John’s dancing]

We see that in each case the gapless passive is located in the complement position, since the subject position of the noun is (or can be) occupied by another DP. In each case, the Agent of the event may directly surface as subject, or is a PRO controlled by the subject of the head noun.

The other possibility for a (bare) non-finite TP without C arises in examples like:

- (97) a. Bill's intention [PRO to take revenge on you]
 b. Mary's promise [PRO to give me a call]

Unlike the gerundive clauses that denote (often completed) events, the bare infinitival clauses denote actions to be carried out.²³ Alternatively, these clauses might be analyzed as vPs. In other words, we see that English and Chinese are very similar, their differences arising from a difference in head directionality. In English, prenominal materials are licensed by D (i.e. the genitive 's, Abney 1987), and postnominal materials are licensed differently depending on their syntactic categories (*that*, *of*, etc.). In Chinese, since all complements and adjuncts are prenominal, they are licensed by a 'generalized' D, namely the multifunctional *de*.

In addition to providing a natural explanation of the observed contrasts and cross-linguistic differences, the complement-based analysis also fares better than the subject-based analysis in the following respects. First, it correctly predicts the possibility of an external subject controlling the PRO subject of gapless relative clause, as already shown in (95), with two instances of *de*, one marking the Agent as subject and one marking the gapless RC as complement. The same point can be made by constructing Chinese examples corresponding to the English examples (96d)–(96f).

Second, the complement-based approach makes the correct prediction that a normal RC must precede, not follow, a gapless RC. We have already seen in §4.1, with examples (20)–(22), that a normal RC must precede a (propositional) noun complement. The following examples show that it must precede a gapless RC (an eventive complement) as well:

- (98) a. 我所聽到的李四彈鋼琴的聲音
 wo suo tingdao de Lisi tan gangqin de shengyin
 I SUO heard DE Lisi play piano DE sound
 'the sound of Lisi playing piano that I heard'
- b. *李四彈鋼琴的我所聽到的聲音
 *Lisi tan gangqin de wo suo tingdao de shengyin
 Lisi play piano DE I SUO heard DE sound
- (99) a. 李四所付出的貪污公款的代價
 Lisi suo fuchu de tanwu gongkuan de daijia
 Lisi SUO paid DE embezzle public-funds DE price
 'the price of having embezzled public funds that Lisi has paid'
- b. *李四貪污公款的他所付出的代價
 *Lisi tanwu gongkuan de ta suo fuchu de daijia
 Lisi embezzle public-funds DE he SUO paid DE price

²³ Compare also *John remembered calling Mary* and *John remembered to call Mary*. See Stowell (1982) and other works for discussion.

This fact is not predicted by the subject analysis of gapless RCs, since a subject typically occurs in the Spec position of NP or DP, preceding normal RCs, which are adjoined to N':²⁴

- (100) 張三的那個在美國就業的兒子
Zhangsan de na-ge zai Meiguo jiu ye de erzi
Zhangsan DE that-CL at America work DE son
'Zhangsan's son who works in the U.S.'

Third, as we have seen in §4.7 and §4.8, a gapless RC (qua complement) cannot license N-bar ellipsis or undergo nominalization with a stranded *de*, while a normal gapped RC (qua adjunct) can. This is again predicted by the complement analysis but not by the subject analysis. In general, N' ellipsis may also strand Possessive *de* subjects, as illustrated below:

- (101) 張三的儿子比李四的高一點。
Zhangsan de erzi bi Lisi de gao yidian.
Zhangsan DE son than Lisi DE tall a-bit
'Zhangsan's son is a bit taller than Lisi's.'

Since a gapless RC does not license N' ellipsis or nominalization, we conclude that it is a complement but not a subject.

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²⁴ Zhang (2008) also notes the requirement illustrated in (98) and (99) but draws an opposite conclusion which, in view of (100), seems unwarranted.

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名詞組前置成份的結構和語義：是構式還是組合？

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長久以來，學者對於漢語句子的主要成分有很清楚的共識：句子有中心語、狀語、補語等成分，狀語（亦稱附加語）在中心語之前，補語在後。在名詞短語方面，傳統上將名詞中心語前面的成分統稱為定語，沒有所謂的補語與狀語之分。當代語法在 X-標損理論之下，則認為這種中心語-補語-附加語的三分法，除了句子和動詞組結構之外，也同樣適用於其他的主要語法範疇如名詞組、形容詞組、介詞組等。一般研究漢語生成語法的學者也都有這樣的認識，雖然很少人為此正式提出句法與語義方面的論據。最近有些研究語言類型的學者主張在漢、日、韓語等名詞中心語後置的語言裡，其前置成分沒有補語、附加語之分，而都歸於一種籠統的名詞修飾語，並進一步將這種結構獨立出來作為一種「構式」來處理，認為一般的句法語義組合規則不適用於這種結構。這種看法等於是又回到了傳統上的「定語」說了。

本文通過實證研究，重申漢語名詞組結構和其他語言一樣，必須區分補語和附加語的不同。文章提供多種證據，說明唯有在適當的詞組結構理論之下將附加語置於補語之上，相關的語言現象才能得到適當的解釋。文章同時檢視若干用來支持構式語法的論點，指出其不足之處，並說明不同「的」字結構的表面相似性、名詞組的指稱多義性、以及表面上不同於其他語言的關係子句等等，都不能支持將它們籠統地歸於一種構式來處理。研究漢語名詞性結構，只要將漢語若干獨立的語法特點隔離出來，就可以看出來名詞組的句法和語義都是遵行一般詞組結構和語義組合規則推導出來的。

關鍵詞：名詞組前置成份，補語與附加語，無空缺疑似關係子句，定語，構式，組合