

## THE SYNTAX OF BI-COMPARATIVES IN MANDARIN CHINESE\*

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### ABSTRACT

The study attempts to propose a syntactic account of *bi*-comparatives in Mandarin Chinese under the generative framework. *Bi* plays a role reminiscent of a prepositional complementizer projecting a self-completed clause (Hsing 2003, Chung 2006), a preverbal adjunct in the wake of Liu (1996). Following Abney (1987), Kennedy (1997), Kennedy & Merchant (1997), it is suggested that a gradable adjective projects an extended functional structure DegP headed by a degree morpheme in the *bi*-comparative. The adjunction of the *bi*-clause onto the SpecDegP is triggered by the need to saturate and restrict the degree argument of the adjective (Liu 2007ab, 2010c). An adjective or verb phrase within the *bi*-clause is deleted. By studying *bi*-comparatives in depth, this study not only can shed light on the clausal analysis of *bi*-comparatives, but also provide useful data for future research on Comparative Deletion (Bresnan 1973, 1975).

Key words: syntax, *bi*-comparative, clausal comparative, phrasal comparative, Comparative Deletion

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## 1. INTRODUCTION

Comparative constructions with *bi* in Mandarin Chinese have always been a dazzling issue (Chao 1968, Fu 1978, Li and Thompson 1981, Tsao 1989, Hong 1991, Liu 1996, Hsing 2003, Xiang 2005, Chao 2005 and others). It has been a controversial issue whether the *bi*-comparative manifests a phrasal or clausal comparative (cf. Xiang 2005, Chao 2005, Lin 2009, Liu 2010a). In particular, what follows the morpheme *bi* is a simple phrase or a clause under ellipsis. We will argue that a phrasal approach falls short in providing a detailed description of the syntactic and semantic properties of *bi*-comparatives.

This study aims to investigate the characteristics of *bi*-comparatives in Mandarin Chinese, and to offer a clausal analysis of *bi*-comparatives in a generative account. Specifically, in the *bi*-clausal comparative *bi* plays a role reminiscent of a prepositional complementizer projecting a self-completed CP (Hsing 2003, Chung 2006), a preverbal adjunct in the sense of Liu (1996). Following Abney (1987), Kennedy (1997), Kennedy & Merchant (1997), it is suggested that a gradable adjective projects an extended functional structure DegP headed by a degree morpheme in the *bi*-comparative. The adjunction of the *bi*-clause onto the SpecDegP is triggered by the need to saturate and restrict the degree argument of the adjective (Liu 2007ab, 2010c). To embody this assumption, we put forth the [+comparative] feature, an uninterpretable feature to be checked off on the Degree head in syntax. An adjective or verb phrase within the *bi*-clause is deleted.

The paper is organized as follows. In section 2, we briefly review two analyses, viz., Xiang (2005) and Chao (2005). How they argue for the syntactic structures of *bi*-comparative are presented. Although both of them argue for a unified analysis of the *bi*-comparatives and ‘exceed comparative’ (the word order of the comparative construction is X A Y), we would like to suggest that such analyses could lead to a great burden of explanation.<sup>1</sup> In section 3, we exhibit the syntactic and semantic

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<sup>1</sup> In this study, we refer to this construction as the ‘exceed comparative’, a more universal name in a cross-linguistic investigation (cf. Stassen 1985), though our primary interest is the *bi*-comparatives. A similar construal is called the ‘obligatory measuring comparative’ in Mok (1998), the ‘bare comparative’ in Xiang (2005), and the ‘X A (Y) D

characteristics of *bi*-comparatives to pave the way for a generative explanation in section 4. Section 4 primarily discusses the three types of *bi*-comparatives, viz., the typical comparative, the DE-complement comparative and the verbal predicate comparative. The arguments for a clausal manipulation of *bi*-comparatives and the advantages to predict other correlatives are also included in the discussion. In section 5, to intensify our analysis, some arguments to falsify the other two hypotheses (either *bi* is coordinating conjunction or a verb) are proposed. The paper is concluded in section 6.

## 2. LITERATURE REVIEW<sup>2</sup>

### 2.1 Xiang (2005)

While studying *bi*-comparatives, Xiang (2005) discusses another type of superiority comparative as (1) and terms it “the bare comparative”. Xiang points out that in the bare comparative, the measure phrase denoting the differential is obligatorily required, as shown by the contrast between (1a) and (1b).<sup>3</sup>

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comparative’ in Liu (2007b). It is called the ‘transitive comparative’ by Erlewine (2007), recently borrowed by Grano & Kennedy (2010).

<sup>2</sup> See also Fu (1978), Li & Thompson (1981), Paul (1993), Yue-Hashimoto (1996), Lin (2009) and Shi (2001) for relevant discussion of comparative constructions in Mandarin Chinese.

<sup>3</sup> The abbreviations used in this paper are: A: adjective, AP: Adjective Phrase, ASP: aspect marker, BA: Chinese patient marker ‘ba’, BEI: Chinese passive ‘bei’, CL: classifier, com: comparative marker, CON: conjunction, CONP: Conjunction Phrase, DP: Demonstrative Phrase, DE: Chinese modifier marker “DE”, DEGP: Degree Phrase, GEN: genitive marker, NEG: negation, PRT: (sentence final) particle, QUE: question particle, SUF: suffix.

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- (1) a. Zhangsan gao Lisi liang-cun  
 Zhangsan tall Lisi two-inch  
 ‘Zhangsan is two inches taller than Lisi.’  
 b. \*Zhangsan gao Lisi.  
 Zhangsan tall Lisi  
 ‘Int. Zhangsan is taller than Lisi.’

Following Larson (1988), Xiang argues that the argument structure of bare comparatives is similar to an English double-object construction, in the sense that they both have two internal arguments that have to stand in an asymmetric c-commanding relation. Xiang points out that the bare comparatives show variable binding facts that indicate that the referential NP in (2) functioning as the target of comparison should asymmetrically c-command the differential measure phrase as shown below.

- (2) Zhe-gen shengzi chang na-gen shengzi yiban.  
 this-CL rope long that-CL rope half  
 ‘This rope<sub>i</sub> is longer than that rope<sub>j</sub> by half (of that rope\*<sub>i/j</sub>).’

Larson’s (1991) DegP-shell structure is promising to capture the structure of bare comparatives as the DegP-shell structure for English comparatives looks like the VP-shell analysis of English double-object constructions. Xiang therefore proposes a revised DegP-shell structure for the bare comparatives in Mandarin Chinese as illustrated below.

- (3) [<sub>DegP</sub>bi[<sub>AP</sub>Standard]<sub>j</sub>[<sub>A</sub>exceed<sub>k</sub>+predicate[<sub>DegP</sub>Standard]<sub>j</sub>  
 [<sub>Deg</sub>exceed<sub>k</sub>(differential)]]]]

Xiang assumes that the phonetically null degree morpheme *exceed* which merges with the referential NP functioning as the target of comparison and the differential measure phrase first. The phonetically null degree morpheme *exceed* internally merges with the adjective through head movement, and the referential NP *Lisi* moves to the [Spec, AP] position for EPP feature checking. Finally, in order to introduce the external argument, the complex head *exceed-tall* moves to the higher Deg-head through head movement.

## 2.2 Chao (2005)

In general, there is only one constituent that occurs between the comparative morpheme *bi* and the comparison predicate in a phrasal *bi*-comparative in Mandarin Chinese, while at least two constituents occur in a clausal one. An example provided by Chao (2005:33) follows as (4), and a clausal one as (5) (see also Liu 2010a).

- (4)        Zhangsan *bi*                Lisi *gao* (*san gongfen*)  
             Zhangsan COM        Lisi tall (three centimeter)  
             ‘Zhangsan is three centimeters taller than Lisi.’
- (5)        Zhangsan *jintian*    *bi*                Lisi *zuotian*    *gaoxing*  
             Zhangsan today    COM        Lisi yesterday happy  
             ‘Zhangsan is happier today than Lisi was yesterday.’

Chao (2005) argues that phrasal comparatives and clausal comparatives should be distinguished from each other and cannot be derived by the same process. A phrasal comparative is derived from the DOC-comparatives via the syntactic movement, similar to Larson’s (1988) analysis of the Double Object construction (DOC); on the other hand, a clausal comparative is derived by assuming a *bi*-clause that is post-cyclically adjoined to the main clause and that in turn undergoes PF-deletion.

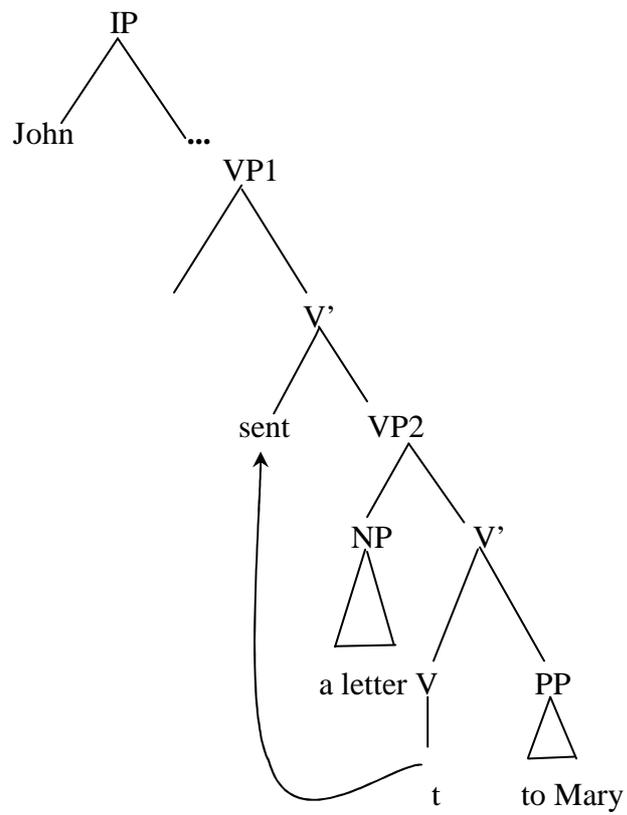
Larson (1988) proposes a VP shell analysis for the structure of the double object construction, and suggests (7) derives from (6) under a dative shift operation. When the indirect object *Mary* is moved forwardly, the verb *sent* loses its inherent case to the direct object *Mary* so that the preposition *to* is deleted. The direct object *a letter* is *dethermatized* as an adjunct, and adjoined to the V’ in VP2. The verb *sent* is moved to the head position of VP1 and assigns case to *Mary* in VP2 in (7).

- (6)        John sent a letter to Mary.  
(7)        John sent Mary a letter.

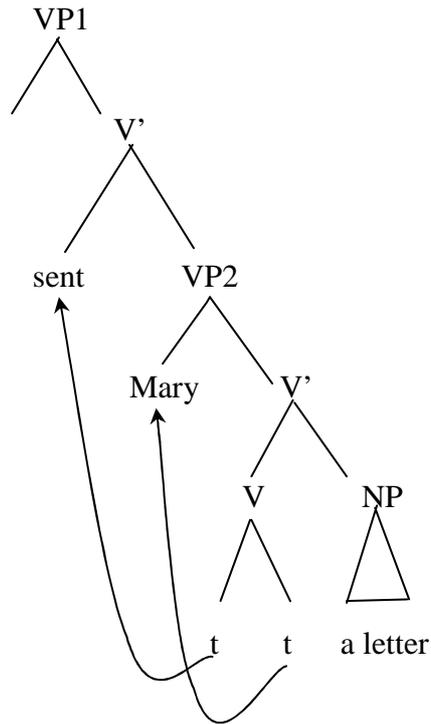
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To specify Larson's VP shell analysis, simplified hierarchical structures of (6) and (7) are offered respectively below.

(8)



(9)



In light of Larson (1988), Chao suggests that the comparative without *bi* is similar to the DOC structure and takes open degree adjectives as the predicate, and the first NP is the comparative datum while the second one indicates the value of the different degree. The DOC-comparative can be regarded as a syntactic behavior of the degree of predicative adjectives. The degree predicative takes two internal arguments, the comparative datum in the Spec of AP, and the value of the comparative degree in the complementation position of the predicative AP. Taking (10) for illustration, it is suggested that the degree predicative adjective is overtly moved to the head of Deg for a feature checking requirement.

(10) [IP Zhangsan [DegP [Deg' gaO [AP Lisi [A' A<sup>0</sup> san gongfen]]]]]

In accounting for a phrasal comparative, Chao assumes that it derives in a way similar to (10). Once the morpheme *bi* occurs, the comparative datum in the Spec of AP moves up to form a PP with *bi*, and the degree predicative adjective is also overtly moved to the head of Deg, as shown in (11).

- (11) [IP Zhangsan [DegP [Deg' [PP bi [NP Lisi<sub>i</sub>]]] [Deg' gao [AP Pro<sub>i</sub> [<sub>A'</sub> A<sup>0</sup> sangongfen]]]]]]

Consequently, the phrasal comparative is derived via two syntactic movements, similar to Larson's (1988) analysis of Double Object Construction (DOC). The *bi*-phrase displays as a preverbal adjunct, and there is no deletion process in the derivation.

In accounting for a clausal comparative, Chao assumes that a *bi*-clause is post-cyclically adjoined to the main clause and then undergoes PF-deletion operation. Both the *bi*-phrase and the *bi*-clause are preverbal adjuncts of the gradable predicate. It is suggested that the comparative datum is a contextually controlled *PRO* in the DET position of AP. Given this, (12) can be derived as (13).

- (12) Zhangsan jintian bi Lisi zuotian gaoxing  
 Zhangsan today COM Lisi yesterday happy  
 'Zhangsan is happier today than Lisi was yesterday.'

- (13) [IP Zhangsan[IP jintian[DegP [Deg' [PP bi [CP Lisi zuotian ~~gaoxing~~]]][Deg' gaoxing[AP Lisi [<sub>A'</sub> A<sup>0</sup>]]]]]]]]

In a word, Chao argues that a phrasal comparative where *bi* takes an NP derives from a DOC-comparative construal via transformation operations, namely a clausal comparative where *bi* takes a CP undergoes PF-deletion operation.

### 2.3 Comments on the previous analysis

Xiang (2005)'s assumption results from a fact that the *bi*-comparative and exceed comparative (the word order of the comparative is Subject-Adjective-Standard) derive from the same underlying structure. Such a hypothesis can be falsified.

The syntactic status of a non-referential measure phrase or degree complement in the two configurations is different, in that in a *bi*-comparative a non-referential measure phrase or degree complement does not occur as an obligatory element, while it is required in an exceed comparative. For example:

- (14) a. Zhangsan        bi            Lisi gao (san gongfeng)  
          Zhangsan        com        Lisi tall three centimeters  
          ‘Zhangsan is taller than Lisi (by three centimeters).’  
       b. Zhangsan gao Lisi \*(san gong feng)  
          Zhangsan tall Lisi three centimeters  
          ‘Zhangsan is taller than Lisi by three centimeters.’

As suggested by Chen-Sheng Liu (p.c.), further evidence against a unified analysis is that if the two constructions are derived from the same underlying structure, it follows that (15b) is a grammatical sentence in contrast to (15a), contrary to fact.

- (15) a. Zhangsan        bi            Lisi haiyao gao san  
          Zhangsan        com        Lisi much tall three  
          gongfeng  
          centimeters  
          ‘Zhangsan is even taller than Lisi by three centimeters.’  
       b. \*Zhangsan        gao Lisi haiyao san gongfeng  
          Zhangsan        tall Lisi much three centimeters

Furthermore, a unified analysis seems to barely hold from a dialectal point of view. Take Hakka for example. Sixian Hakka, a Hakka dialect spoken in Taiwan, illustrates that a degree adverb such as *go* ‘exceed’ in

the *bi*-comparative must be spelled out if we presume that this adverb manipulates the head of the Degree Phrase.<sup>4</sup>

- (16) a. Zhangsan bi Lisi \*(go) pang  
Zhangsan than Lisi exceed fat  
'Zhangsan is fatter than Lisi.' (Sixian Hakka)
- b. Zhangsan bi Lisi \*(go) cungmin  
Zhangsan than Lisi exceed smart  
'Zhangsan is smarter than Lisi.' (Sixian Hakka)

Xiang (2005) argues that if the morpheme *bi* is not merged, the adjective should undergo successive-cyclic movement to the highest degree head. Considering examples such as (16), this movement would be blocked by the intervening overt degree head *go* 'exceed' as a result of violating Relativized Minimality (Rizzi 1991), nevertheless.<sup>5</sup>

Added to this, it could be a stipulation by arguing an AP sandwiched by two DegPs in Xiang (2005), since this could merely cater to providing the landing sites for the head movement. Such an analysis seems to be a priori unattractive for an empirical reason, in that the question arises as to how this assumption is correlated to other constructions, whether or not comparatives. It might further lead one to infer, inter alia, that a Degree Phrase per se projects an Adjective Phrase, if Xiang's revised DegP-shell analysis is on the right track.

On the other hand, Chao (2005) suggests that the *bi*-comparative and the exceed comparative are reminiscent of a DOC; therefore, each of them, on this view, has a similar underlying structure or derivation as a DOC. This hypothesis seems undesirable. Take the construal of the exceed comparative for example. There exists a structural difference between it and a DOC: a DOC has a transfer of possession involved (cf. Larson 1988, Pylkkänen 2002, Marantz 1993), but the exceed

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<sup>4</sup> A similar scenario occurs in Cantonese. See Mok (1998) for discussion.

<sup>5</sup> An exceed comparative in Sixian Hakka can take *go* 'exceed'. For example:

- (i) ngo go pang ng  
I exceed fat you  
'I am fatter than you.'

Special thanks to Jui-Yi Chung and Kai-Yun Peng for being our Hakka informants.

comparative does not. Along this line, a *wh*-nominal can not occur as the ‘object’ of *gao* in (17b), in contrast to (17a).

- (17)     a.   Zhangsan     song       Lisi sheme  
               Zhangsan     give        Lisi what  
               ‘What did Zhangsan give to Lisi?’  
               b.   \*Zhangsan     gao Lisi sheme  
               Zhangsan     tall  Lisi what

In addition, there are two possible word orders for a DOC as seen in (18a) and (18b), but there is only one for the exceed comparative as seen in (18c) and (18d).

- (18)     a.   Zhangsan     song     yi-ben   shu     gei  
               Zhangsan     give     one-CL  book   give  
               Lisi  
               Lisi  
               ‘Zhangsan gave a book to Lisi.’  
               b.   Zhangsan     song     gei Lisi yi-ben   shu  
               Zhangsan     give     give Lisi one-CL  book  
               ‘Zhangsan gave a book to Lisi.’  
               c.   Zhangsan     gao Lisi san       gongfeng  
               Zhangsan     tall Lisi three     centimeter  
               ‘Zhangsan is taller than Lisi by three centimeters.’  
               d.   \*Zhangsan     gao san       gongfeng   Lisi  
               Zhangsan     tall three     centimeter  Lisi  
               ‘Int. Zhangsan is taller than Lisi by three centimeters.’

Briefly put, Chao argues for a phrasal manipulation of bi-comparatives, along a line similar to that of Xiang (2005), though Chao (2005) hypothesizes that Chinese *bi*-comparatives should be divided into phrasal and clausal, but Xiang (2005) argues that all *bi*-comparatives are phrasal.

Bearing on the facts, to assume a non-unified analysis for bi-clausal comparatives and exceed comparatives could be possibly at the expense

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of explanatory power; however, such analysis seems to be a more convincing than a unified one.

Having reviewed and commented on the analyses, let us consider the syntactic and semantic characteristics of *bi*-comparatives in more detail.

### **3. The *BI*-COMPARATIVES IN MANDARIN CHINESE**

Based on a scrutiny of *bi*-comparatives as investigated in Lü et al. (1980), Tsao (1989) and Liu (2004), *bi*-comparatives can be chiefly classified into three types, viz., ‘typical comparative’, ‘DE-complement comparative’ and ‘verbal predicate comparative’. This classification is not an exhaustive list, but characteristics of these three types of *bi*-comparatives are the most frequently discussed in the literature. In this section we attempt to explore their characteristics separately, and in turn offer a unified syntactic analysis for them.

#### **3.1 Typical comparative constructions**

As introduced in previous studies, research on *bi*-comparatives centers on the topic of the comparison predicate (see Li & Thompson 1981, Lü et al. 1980, Tsao 1989, Yue-Hashimoto 1996, Shi 2001, Chung 2006, Lin 2009, Liu 2010a among others). Although the main components of the comparison predicate are debatable, one general observation remains stable. That is, the predicate is usually a gradable adjective. Below we christen such a *bi*-comparative a ‘typical comparative construction’, and exhibit its characteristics.

First, the category of compared constituent can be subject NPs, object NPs, temporal NPs, locative phrases, PPs, VPs and even clauses (Tsao 1989, Shi 2001, Chung 2006, Lin 2009, Liu 2010a and among others).

- (19) Zhangsan bi Lisi kaixin  
Zhangsan com Lisi happy  
'Zhangsan is happier than Lisi.'
- (20) Zhangsan shuxue bi wuli xihuan  
Zhangsan mathematics com physics like  
'Zhangsan likes mathematics more than physics.'
- (21) Zhangsan jintian bi zuotian kaixin  
Zhangsan today com yesterday happy  
'Zhangsan today is happier than yesterday.'  
'Zhangsan is happier today than yesterday.'
- (22) Zhangsan zai jiali bi zai xuexiao kaixin  
Zhangsan at home com at school happy  
'Zhangsan is happier at home than Zhangsan was in school.'  
'Zhangsan is happier at home than at school.'
- (23) Wo dui wo nuer bi dui wo taitai  
I to I daughter com to I wife  
you-xingqu  
have-interest  
'I am more interested in my daughter than in my wife.'
- (24) Kanshu bi xiezi qingsong  
Read com writing easy  
'It is easier to read than to write.'
- (25) Ni lai Hsinchu bi wo qu Taipei kuai  
you come Hsinchu com I go Taipei fast  
'It is faster for you to come to Hsinchu than for me to go to Taipei.'

Second, if *bi* introduces more than one non-object compared constituent, the order in which they occur must be subject-temporal-locative (Tsao 1989, Liu 2010a).<sup>6</sup>

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<sup>6</sup> As an anonymous reviewer points out, the fact that the ordering restriction mimics the ordering in common declarative sentences seems to suggest that there should be a clausal type of derivation of *bi*-comparatives. Thanks to the reviewer for this illuminating and helpful comment.

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- (26) Zhangsan jintian zai jiali bi Lisi  
Zhangsan today at home com Lisi  
zuotian zai xuexiao kaixin  
yesterday at school happy  
'Zhangsan is happier at home today than Lisi was in school  
yesterday.'
- (27) \*Zhangsan zai jiali jintian bi Lisi zai  
Zhangsan at home today com Lisi at  
xuexiao zuotian kaixin  
school yesterday happy  
'Ind. Zhangsan is happier at home today than Lisi was in  
school yesterday.'

Third, a *bi*-clausal comparative does not allow subcomparison (Tsao 1989, Xiang 2005, Lin 2009, Liu 2010a), if we assume an adjunction analysis of *bi*-comparatives (Liu 1996).

- (28) \*Zhe-zhang zhuozi bi na-zhang zhuozi  
this-Cl table com that-Cl table  
chang kuan  
long wide  
'This desk is wider than that table is long.'

Fourth, Xiang (2005), Lin (2009) and Liu (2010a) have suggested that a *bi*-comparative does not allow an embedded standard as in (29), in contrast to the case in (30) in English.

- (29) \*Zhangsan bi Lisi renwei Wangwu kaixin  
'Zhangsan com Lisi think Wangwu happy  
'Zhangsan is happier than Lisi thinks that Wangwu was.'
- (30) 'Zhangsan is happier than Lisi thinks that Wangwu was.'

Fifth, the contrast between (31) and (32) shows that the subject after the morpheme *bi* can be replaced by *Pro* when it is identical to that in the front of the sentence (Tsao 1989).

- (31) Zhangsan jintian bi Zhangsan zuotian shufu  
Zhangsan today com Zhangsan yesterday comfortable  
'Today Zhangsan feels better than Zhangsan was yesterday.'
- (32) Zhangsan<sub>i</sub> jintian bi Pro<sub>i</sub> zuotian shufu  
Zhangsan today com yesterday comfortable  
'Today Zhangsan feels better than Zhangsan was yesterday.'

Sixth, modals which can occur before the morpheme *bi* are mostly epistemic, while those which can occur between the standard and comparison predicate are, for the most part, deontic.

- (33) Zhangsan yinggai bi Lisi kaixin  
Zhangsan should com Lisi happy  
'Zhangsan should be happier than Lisi is.'
- (34) Zhangsan bi Lisi yinggai kaixin yidian  
Zhangsan com Lisi should happy one-little  
'Zhangsan should be a little happier than Lisi is.'

Seventh, the comparison predicate, in most cases, represents a gradable adjective; however, it might at times resort to representing a VP instead. This issue will be further discussed in the subsequent section.<sup>7</sup>

- (35) Zhangsan bi Lisi xihuan da lanqiu  
Zhangsan com Lisi like play basketball  
'Zhangsan likes to play basketball more than Lisi.'
- (36) Zhangsan bi Lisi taoyan shuxue  
Zhangsan com Lisi hate mathematics  
'Zhangsan hates mathematics more than Lisi hates it.'
- (37) Jinnian de shengyi bi qunian de shengyi  
this year PRT business com last year PRT business  
jianshao le  
reduce ASP  
'The business of this year is more decreased than that of last year.'

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<sup>7</sup> Following Liu (2007ab, 2010bc), we believe that there are adjectives in Mandarin Chinese.

Eighth, a *bi*-constituent only occurs between the subject and the predicate, as in (38) and (39). When the *bi*-constituent is between the initial temporal adverbial and the subject, the sentence becomes ungrammatical as in (40) (Shi 2001, Liu 2010a).

- (38) Jinnian Zhou Hua bi qunian pang  
this year Zhou Hua com last year fat  
'Zhou Hua is heavier this year than she was last year.'
- (39) Zhou Hua jinnian bi qunian pang  
Zhou Hua this year com last year fat  
'Zhou Hua is heavier this year than she was last year.'
- (40) \*Jinnian bi qunian Zhou Hua pang  
this year com last year Zhou Hua fat  
'Int. Zhou Hua is heavier this year than she was last year.'

### 3.2 DE-complement comparatives

As Chao (1968), Lü et al. (1980), Zhu (1982), Li & Thompson (1981), Huang (1988, 2006) and others have noticed, there is a special construction employing a suffix *-de* agglutinated with a verbal or adjectival element to represent a descriptive complement construction as in (41), or a resultative complement construction as in (42) (refer to Huang 1988).

- (41) Zhangsan pao de kuai  
Zhangsan run DE fast  
'Zhangsan runs faster than I.'
- (42) Tamen ku de shoupa dou shi le  
they cry DE handkerchief all wet ASP  
'They cried so much that even the handkerchief got wet.'

Generally, it is the descriptive complement construction that can possibly co-occur with the *bi*-comparative rather than the resultative complement construction, as shown in (43) and (44). In this study we

would like to dub such a construction ‘DE-complement comparative’ and to delve further into this construction.

- (43)      Zhangsan      bi    wo    pao    de    kuai  
              Zhangsan      com I    run    DE    fast  
              ‘Zhangsan runs faster than I.’
- (44)      \*Tamen    bi    wo    ku    de    shoupa      dou    shi  
              they      com I    cry    DE    handkerchief    all    wet  
              le  
              ASP

First, scholars have noted that the DE-complement comparatives are special in their various appearances (cf. Lü et al.1980, Tsao 1989 among others).

- (45)      a.    Zhangsan      pao    de    bi    wo    kuai  
              Zhangsan      run    DE    com I    fast  
              ‘Zhangsan runs faster than I.’
- b.    Zhangsan      bi    wo    pao    de    kuai  
              Zhangsan      com I    run    DE    fast  
              ‘Zhangsan runs faster than I.’
- (46)      a.    Zhangsan      chi    de    bi    wo    kuai  
              Zhangsan      eat    DE    com I    fast  
              ‘Zhangsan eats faster than I.’
- b.    Zhangsan      bi    wo    chi    de    kuai  
              Zhangsan      com I    eat    DE    fast  
              ‘Zhangsan eats faster than I.’
- (47)      a.    Zhangsan      zhuan      de    bi    wo    duo  
              Zhangsan      earn      DE    com I    many  
              ‘Zhangsan earns more money than I.’
- b.    Zhangsan      bi    wo    zhuan      de    duo  
              Zhangsan      com I    earn      DE    many  
              ‘Zhangsan earns more money than I.’

Second, when the verb is repeated, the *bi*-constituent can be syntactically treated as an adjunct adjoined to three positions (Tsao

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1989), in accordance with Liu (1996)'s adjunct manipulation of *bi*-comparatives.

- (48) Zhangsan [bi wo] pao bu pao de kuai  
Zhangsan com I run step run DE fast  
'Zhangsan runs faster than I.'
- (49) Zhangsan pao bu [bi wo (pao bu)] pao de kuai  
Zhangsan run step com I run DE fast DE fast  
'Zhangsan runs faster than I.'
- (50) Zhangsan pao bu pao de [bi wo] kuai  
Zhangsan run step run DE com I fast  
'Zhangsan runs faster than I.'

Third, a verb-copying construction seems to oppose the assumption that compared constituents can not occur post-verbally.

- (51) \*Wo ai zhenli bi wo de laoshi  
I love truth com I PART teacher  
'Int. I love truth more than I love my teacher.'  
(Yue-Hashimoto 1971)
- (52) Wo ai zhenli bi ai wo de laoshi  
I love truth com love I PRT teacher  
ai de duo  
love DE many  
'I love truth more than (I love) my teacher.' (Tsao 1989)

Yue-Hashimoto (1971) suggests that compared constituents can not occur post-verbally as evidenced in (51). Li & Thompson (1981) and Tsao (1989) have already noticed that (51) would not be ruled out by employing a verb-copying construction, illustrated by (52).

Fourth, (53) suggests that an object can be compared in a DE-complement construal by employing the *ba*-construction in a DE-complement (Tsao 1989).

- (53)      Ta   ba   qian      bi      (ba) shengming      kan  
           he   BA   money   com      BA   life              see  
           de   zhong  
           DE   heavy  
           ‘He regards money as more important than life.’

### 3.3 Verbal predicate comparatives

A verbal comparison predicate is firstly investigated in-depth in Lü et al. (1980). We name this construction ‘verbal predicate comparative’. In what follows, we will show at least five characteristics of this construal.

First, in general, a *bi*-comparative can have a verbal predicate.

- (54)      Zhangsan bi   Lisi xihuan      mao  
           Zhangsan com Lisi like      cat  
           ‘Zhangsan likes cats more than Lisi likes them.’  
           (55)      Zhangsan bi   Lisi taoyan      shuxue  
           Zhangsan com Lisi hate      mathematics  
           ‘Zhangsan hates mathematics more than Lisi hates it.’

Second, the verbal predicates are prone to be stative or psyche verbs which should denote the gradability; otherwise, the sentences are ill-formed. This prediction is borne out, and therefore, sentences such as (56) and (57) are not grammatical.

- (56)      \*Wo      de      shengri      hui      bi      ni      de  
           my      GEN      birthday      will      com      you      GEN  
           dao  
           arrive  
           (57)      \*Ta   bi      ni      zuo      shengyi  
           he   com   you   do   business

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Nevertheless, (58) can be remedied by augmenting a degree adverb.

- (58) Wo de shengri hui bi ni de  
my GEN birthday will com you GEN  
\*(zao) dao  
early arrive  
'My birthday comes earlier than yours.'

Also, (59) can be grammatical by adding a modal auxiliary, suggesting that a modal per se can be gradable to some extent.

- (59) Ta bi ni \*(hui) zuo shengyi  
he com you can do business  
'He knows how to do business more than you do.'

In fact, *bi*-comparatives with a modal auxiliary such as (59) are not abundant.

It is suggested that (56) and (57) are ill-formed due to the gradability of the comparison predicate. *Dao* 'arrive' and *Zuo* 'do' per se are not gradable or scalable *in being qualified* as a comparison predicate, if an adverb such as *haiyao* 'much', *zao* 'early', *xian* 'early', *wan* 'late', *nan* 'difficult', *rongyi* 'easy' or *duo* 'more' that denotes gradability modifies the verb. For example:

- (60) Zhangsan jintian bi Lisi \*(wan) dao  
Zhangsan today com Lisi late come  
'Today Zhangsan came later than Lisi.'
- (61) Zhangsan de taitai bi wo \*(xian)  
Zhangsan GEN wife com I early  
huaiyun  
to-become-pregnant  
'Zhangsan's wife became pregnant earlier than I.'

There is a selectional restriction between the degree adverb and the verbal predicate; however, this issue will not be taken up in this study.

Third, it is worth noticing that when a comparative has a state or

psyche verb as the head of its predicate, a *bi*-comparative can not compare a direct object in its post-verbal position (Yue-Hashimoto 1971, Tsao 1989).

- (62)      Wo    bi    Zhangsan      xihuan    gou  
          I    com Zhangsan      like        dog  
          ‘I like dogs more than Zhangsan likes them.’  
          ‘No: I like dogs more than I like Zhangsan.’

Direct objects can be compared constituents when they are fronted (Tsao 1989).

- (63)      Zhangsan      shuxue          bi          wuli      xihuan  
          Zhangsan      mathematics    com        physics    like  
          ‘Zhangsan likes mathematics more than physics.’

There is an occurrence constraint on the comparison predicate. It seems that only when the predicate is a psyche verb can it be considered a grammatical sentence.

- (64)      Zhangsan      shuxue          bi          wuli      xihuan  
          Zhangsan      mathematics    com        physics    like  
          ‘Zhangsan likes mathematics more than physics.’  
(65)      \*Zhangsan      daishu          bi          jihe      du  
          Zhangsan      algebra        com        geometry    read

However, the requirement on the predicate seems to lack descriptive adequacy as the following instances are illegitimate.

- (66) \*Zhangsan mama bi baba haipa  
Zhangsan mother com father scare  
'Int. Zhangsan scares his mother more than his father.'
- (67) \*Zhangsan xiaohai bi taitai  
Zhangsan children com wife  
guanxin  
concern  
'Int. Zhangsan is concerned about his children more than his wife.'
- (68) \*Zhangsan gongzuo bi jiating danxin  
Zhangsan occupation com family worry  
'Int. Zhangsan worries his occupation more than his family.'

We have only found grammatical sentences when the predicate is *xihuan* 'like'. An object-preposed comparative is hardly justified, since the configuration is incompatible with all the psyche verbs. Thus, we attribute this co-occurrence restriction to idiosyncratic properties of the verb *xihuan* 'like', as we have not found evidence that shows that a particular class of psyche verbs can occur in object-preposed comparative constructions. As Tsao (1989) has indicated, if the object is fronted, the object can be compared.

Fourth, a *bi*-constituent only occurs legitimately within the range between the subject and the predicate (or the manner/degree adverb if the predicate is modified by a manner/degree adverb) (see Shi 2001, Liu 2010a).

- (69) Zhangsan      bi    Lisi      geng      xiaoxin-de  
 Zhangsan      com Lisi      GENG      carefully  
 jiancha    zuoye  
 check    assignment  
 ‘Zhangsan checks his assignments more carefully than  
 Lisi does.’
- (70) \*Zhangsan      geng      bi    Lisi    xiaoxin-de  
 Zhangsan      GENG      com Lisi    carefully  
 jiancha    zuoye  
 check    assignment  
 ‘Int. Zhangsan checks his assignments more carefully  
 than Lisi does.’
- (71) \*Zhangsan      geng      xiaoxin-de bi    Lisi jiancha  
 Zhangsan      GENG      carefully com Lisi check  
 zuoye  
 assignment  
 ‘Int. Zhangsan checks his assignments more carefully than  
 Lisi does.’

The following sentences further imply that the *bi*-constituent can occur between the subject and the manner/degree adverb (not the predicate). In (72) and (73), the *bi*-constituent occurs between the subject and the degree adverb *geng* ‘GENG’.

- (72) Zhangsan yongyou    bi    Lisi (geng)    duo      de  
 Zhangsan have      com Lisi GENG    many    PRT  
 mao  
 cat  
 ‘Zhangsan has more cats than Lisi has.’
- (73) Zhangsan mai le    bi    Lisi (geng)    duo      de  
 Zhangsan buy ASP com Lisi GENG    many    PRT  
 xie  
 shoe  
 ‘Zhangsan bought more shoes than Lisi did.’

The distribution restriction on *bi*-constituent can be limited to within the range between the subject and the (covert) modifying manner/degree adverb. It follows that the *bi*-constituent can possibly occur inside a DP.

Fifth, a verb which denotes a meaning of gradability in its lexical content is allowed to be the comparison predicate (cf. Liu 2004). For example:

- (74) Jinnian de chanliang bi qunian  
this year GEN production com last year  
tigao le yi-bei  
rise ASP double  
'The production of this year has risen to double that of last year's.'

- (75) Jinnian de chanliang bi qunian  
this year GEN production com last year  
zengjia le yi-bei  
increase ASP double  
'The production of this year has increased by double that of last year's.'

Verbs such as *tigao* 'rise', *zengjia* 'increase', *jianshao* 'decrease', *xiajiang* 'go down', *jiandi* 'decrease' and so on are prone to be the comparison predicates. The predicate usually co-exists with the aspect marker *le* 'ASP' and a non-referential measure phrase. The aspect marker *le* 'ASP' seems to be obligatory; otherwise, the sentence is odd.

- (76) Jinnian de chanliang bi qunian  
this year GEN production com last year  
zengjia le  
increase ASP  
'The production of this year increases than that of last year.'

- (77)      ?Jinnian    de    chanliang                    bi            qunian  
          this year   GEN   production                com        last year  
          zengjia    yi-bei  
          increase   double  
          ‘The production of this year increases one time than that of  
          last year.’

We have not figured out why the aspect marker *le* ‘ASP’ is obligatory while a non-referential measure phrase is not. The resolution of this point awaits further information in the future.

On the strength of the insights stemming from previous studies, the present paper attempts to propose a clausal analysis of *bi*-comparatives. A *wh*-manipulation of comparatives proposed by Chomsky (1977) makes possible the establishment of a richer analysis of comparative constructions (Kennedy 2002, Kennedy & Merchant 2000). In what follows, to reach higher explanatory adequacy of the *bi*-comparatives in Mandarin Chinese, we will exploit the *wh*-construction approach and provide an account of the data.

## 4. PROPOSAL

### 4.1 Arguments for a Clausal Analysis of *bi*-Comparatives

Before offering our proposal, we shall introduce the standard *or* (??) perhaps the most persuasive argument raised by Chomsky (1977). Illuminating *wh*-movement phenomena, Chomsky (1977) argues that comparative constructions essentially have properties of *wh*-movement on the grounds that the postulated rules for relatives and questions can simply extend to comparative constructions.<sup>8</sup> Chomsky begins with the data with the overt moved form in a dialect of English:

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<sup>8</sup> The rule of *wh*-movement has the following general characteristics (from Chomsky 1977):

- a. it leaves a gap
- b. where there is a bridge, there is an apparent violation of subadjacency, PIC (Phase Impenetrability Condition), and SSC (Sentential Subject Condition)
- c. it observes CNPC (Complex NP Constraint)

- (78) John is taller than [what<sub>i</sub> Mary is t<sub>i</sub>].  
(79) John is taller than [what<sub>i</sub> Mary told us that Bill is t<sub>i</sub>].

His proposal stems from the observation that the comparative formation is subject to the movement constraints.

- (80) John is taller than Mary told us that Bill is.  
(81) \*John is taller than Q<sub>+wh</sub> [<sub>CP</sub> Mary knows [<sub>NP</sub> the fact [<sub>CP</sub> that Bill is]]].  
(82) \*<sub>CP</sub>John is taller than Q<sub>+wh</sub> [<sub>CP</sub> Mary wonder [<sub>CP</sub> how he was five years ago]].

(80) shows that the cyclic movement is allowed in a comparative formation. Both (81) and (82) are ruled out by Subjacency. This approach deduces the comparative formation to a more general *wh*-configuration.

Evidence from other (or non-standard) English dialects shows a contrast in island sensitivity.

- (83) Mary isn't the same as [<sub>CP</sub> she was five years ago]  
(84) Mary isn't the same as [<sub>CP</sub> John believes [<sub>CP</sub> that Bill claimed [<sub>CP</sub> that she was five years ago]]]  
(85) \*<sub>CP</sub>Mary isn't the same as [<sub>CP</sub> John believes [<sub>NP</sub> Bill's claim [<sub>CP</sub> that she was five years ago]]]

Providing pieces of evidence in favor of the movement analysis, Chomsky maintains that *wh*-movement is involved to bind a degree variable in a comparative construction. Hence, (86) has a structure like (87):

- (86) John is happier than Bill is.  
(87) John is happier than [<sub>CP</sub> OP<sub>i</sub> Bill is d<sub>i</sub>-much happy]

---

d. it observes *wh*-island constraints

To derive a comparative construction, the degree variable is under an operator movement. The moved element is phonologically null, rather than a deleted *wh*-phrase, according to Chomsky.

- (88) John is happier than [<sub>CP</sub> Op<sub>i</sub> Bill is d<sub>i</sub>-\_\_\_]

More importantly, Chomsky proposes that many dialects of American English have comparatives such as (89).

- (89) Mary isn't different than what<sub>i</sub> John believes that Bill claimed that she was t<sub>i</sub> five years ago. (from Chomsky 1977:88)

On the basis of an examination of a variety of construction types (e.g., topicalization, clefts, *wh*-interrogatives, relatives), Chomsky argues that each of these constructions is characterized by the application of a general movement schema, which moves a *wh*-constituent to Comp (i.e., [Spec, CP]). He further argues that all *wh*-movement processes that apply in a local fashion between a moved phrase and a source position are the result of the successive cyclic application of local movement steps, i.e., Comp to Comp. Accordingly, Chomsky suggests that comparative constructions are formed by a single rule, say *wh*-movement, as under such an analysis can we retain a fairly general explanation for *wh*-related phenomena.

Now we turn to the debate concerning the phrasal or clausal analysis of comparatives. Comparative constructions in English can be descriptively divided into two types depending on the category of the phrase following *than*.

- (90) a. John is taller than Bill is. (clausal)  
b. John is taller than Bill. (phrasal)

In a clausal comparative it is thought to involve a CP-complement to the preposition *than*, with a *wh*-operator in [Spec, CP] binding a degree variable in the comparative clause (Chomsky 1977). The gradable predicate is obligatorily deleted under identity with the matrix predicate, known as Comparative Deletion (Bresnan 1973, 1975) as indicated in (91).

(91) John is taller [than [<sub>CP</sub> OP<sub>i</sub> Bill is x<sub>i</sub>-~~tall~~ ]]

There have been two approaches to a phrasal analysis. One is the reduced clause analysis (cf. Lechner 2001), which argues that phrasal comparatives always have a full clausal structure masked by deletion or ellipsis. The other one is the direct analysis (cf. Heim 1982, Napoli 1983) under which at least some phrasal comparatives do not involve deletion or ellipsis at all. Rather, *than* has a DP complement.

Given this, we cannot conclude which approach is the right one for all comparatives. Accordingly, the question of what constitutes the best analysis for comparatives seems open. In this study we argue for a clausal analysis of *bi*-comparatives, in a similar vein to Fu (1978), Tsao (1989), Hung (1991), Hsing (2003) and Chung (2006).

Before entertaining an analysis of a *bi*-clausal comparative in the following, three premises should be taken into consideration: (i) in a *bi*-clausal comparative *bi* plays a role reminiscent of a prepositional complementizer projecting a self-completed CP (Hsing 2003, Chung 2006), a preverbal adjunct in the wake of Liu (1996). (ii) following Abney (1987), and Kennedy (1997) and Kennedy & Merchant (1997), we assume that a gradable adjective projects an extended functional structure headed by a degree morpheme. The *bi*-clause exhibits an operator-variable construction in which a degree operator binds a degree variable (Liu 2010a). Semantically, the operator must be in SpecCP in order to denote a description of degree, and to derive the right interpretation for the comparative clause, in the same way that a null operator in a relative must be in SpecCP to derive the interpretation for a relative clause (see Kennedy 1997, 2002, Kennedy & Merchant 1997).<sup>9</sup> (iii) an adjective or verb phrase within the *bi*-clause is deleted at PF (Bresnan 1973, 1975). (92) and (93) illustrate our assumptions.

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<sup>9</sup> Concerning the syntax of CD (Comparative Deletion), Kennedy & Merchant (2000) assume a version of the movement analysis in which a comparative involves *wh*-movement of a phonologically null DegP (see also Kennedy 1999, Chomsky 1977). Resolving CD (Comparative Deletion) and CSD (Comparative Subdeletion), Kennedy (2002) assumes that all clausal comparatives in English involve A-bar movement of the compared constituent to the specifier of the clausal complement of *than* (i.e., SpecCP), but that the two constructions differ in when this movement applies.

- (92) Ta [CP Op<sub>i</sub> [bi [TPWO [DegP [Deg d<sub>i</sub>][AP ~~kaixin~~]]]]] kaixin  
 (93) Ta zuotian zai xuexiao [CP OP<sub>i</sub>[ bi [TPWO jintian zai jiali  
 [DegP [d<sub>i</sub>][AP ~~kaixin~~]]]]] kaixin

The arguments for a *bi*-clausal analysis derive from the following facts.

First, previous studies such as Xiang (2005) might undergenerate, ruling out a grammatical sentence as (94).

- (94) Zhangsan pao de [bi lao hu pao de] kuai  
 Zhangsan run DE com old tiger run DE fast  
 ‘Zhangsan runs faster than a tiger.’

Assuming an adjunction manipulation of *bi*-comparatives (Liu 1996), one might deem that *lao hu pao de* ‘old tiger run DE’ is a constituent under a phrasal analysis of *bi*-comparatives. There is at least one constituency test to disprove this postulation. If *lao hu pao de* ‘old tiger run DE’ was a constituent, (96) would be grammatical in contrast to (95).

- (95) Shi Zhangsan pao de hen kuai, bu shi lao hu  
 be Zhangsan run DE very fast not be old tiger  
pao de hen kuai  
 run DE very fast  
 ‘It is Zhangsan that runs fast, not the tiger.’  
 (96) \*Shi Zhangsan pao de hen kuai, bu shi lao hu  
 be Zhangsan run DE very fast not be old tiger  
pao de  
 run DE  
 ‘Int. It is Zhangsan running fast, not the tiger.’

As noted, *lao hu pao de* ‘old tiger run DE’ is arguably not a constituent, suggesting that (94) could be derived from an underlying structure like (97).<sup>10</sup>

<sup>10</sup> An anonymous reviewer suggests that the unacceptability might arise from other interfering factors such as conditions on deletion. (95) and (96) are used to present a cleft

- (97) Zhangsan pao de [CP Op<sub>i</sub> [bi[TP lao hu pao  
 Zhangsan run DE com old tiger run  
 de [DegP d<sub>i</sub> kuai]]] kuai  
 DE fast fast  
 ‘Zhangsan runs faster than a tiger.’

Second, our line of reasoning in support of a clausal analysis of *bi*-comparatives comes from a direct observation that what *bi* takes could be larger than a phrase due to the cases such as *wo zai taiwan sannian* in (98) and *wo jintian zai jiali* in (99) (cf. Shi 2001).

- (98) Ni zai meiguo yi-nian bi wo zai taiwan  
 you at America one-year com I at Taiwan  
 san-nian zhuan de duo  
 three-year earn DE many  
 ‘You earned more money in one year in America than I  
 earned in three years in Taiwan.’
- (99) Ta zuotian zai xuexiao bi wo jintian zai  
 he yesterday at school com I today at  
 jiali kaixin  
 home happy  
 ‘He was happier at school yesterday than I am at home today.’  
 (Tsao 1989)

What interests us is the syntactic status of the *bi*-constituent in question. Assuming a phrasal analysis of *bi*-comparatives, in effect, can not provide a satisfactory explanation of all *bi*-comparatives.

Third, another piece of evidence originates from the head-final property of Chinese (Huang 1982). As we have seen, *bi* can introduce three compared constituents (Tsao 1989, Liu 2010a).

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or pseudo-cleft test (a sort of constituency test). One could assume a deletion approach for data such as (96), but we might need evidence to affirm that there is a deletion operation in a cleft or pseudo-cleft in Chinese. Recently, Wang and Wu (2006) have argued that the motivation to delete any part of a pseudo-cleft or cleft is unclear and unconstrained.

- (100) Zhangsan      zuotian    zai    xuexiao    bi    Zhangsan  
 Zhangsan      yesterday at    school    com    Zhangsan  
 jintian    zai    jiali      kaixin  
 today    at    home      happy  
 ‘Zhangsan was happier at school yesterday than Zhangsan is  
 at home today.’

Under a clausal analysis, (100) can be derived as (101), where *Zhangsan* after the morpheme *bi* is replaced by *Pro*, and the predicate *kaixin* ‘happy’ within the *bi*-clause is deleted.

- (101) Zhangsan<sub>i</sub> zuotian    zai    xuexiao    [<sub>CP</sub>bi [<sub>TP</sub>Pro<sub>i</sub>    jintian  
 Zhangsan yesterday at    school      com      today  
 zai    jiali      [<sub>DegP</sub> ~~kaixin~~]]] kaixin  
 at    home      happy      happy  
 ‘Zhangsan was happier at school yesterday than Zhangsan is at  
 home today.’

Provided that Chinese noun phrases are strictly head-final (Huang 1982), *jintian* ‘today’, *zai jiali* ‘at home’ are not post-nominal modifiers. The only possibility is that modifiers such as *jintian* ‘today’, *zai jiali* ‘at home’ precede the elided AP, as depicted in (101).

These adjuncts can not be post-nominal modifiers either in an existential construction.

- (102) a. Wo    jiao      guo      yige xuesheng hen  
 I    teach    ASP      one student    very  
 smart  
 congming  
 ‘I taught a student who is smart.’  
 b. \*Wo    jiao      guo      yige xuesheng zuotian  
 I    teach    ASP      one student    yesterday  
 ‘Int. I taught a student yesterday.’  
 c. \*Wo    jiao      guo      yige xuesheng zai jiali  
 I    teach    ASP      one student    at home  
 ‘I taught a student at home.’

According to Huang (1987), (102a) is a type of existential construction and generally involves a verb with the existential suffix *-guo*. *Hen congming* ‘very smart’ manipulates a post-nominal modifier as in (102a) (cf. Huang 1987); however, *zuotian* ‘yesterday’ or *zai jiali* ‘at home’ does not, if it replaces *hen congming* ‘very smart’ in (102b) or (102c). Again, modifiers such as *jintian* ‘today’, *zuotian* ‘yesterday’, *zai jiali* ‘at home’ are preverbal adjuncts in Mandarin Chinese, which supports a clausal analysis of the *bi*-comparatives and hosts the following instances.

- (103) Zhangsan<sub>i</sub> zuotian [<sub>CP</sub>bi [<sub>TP</sub> Pro<sub>i</sub> jintian [<sub>DegP</sub> ~~kaixin~~]]]  
 Zhangsan yesterday com today happy  
 kaixin  
 happy  
 ‘Zhangsan was happier yesterday than Zhangsan is today.’
- (104) Zhangsan<sub>i</sub> zai xuexiao [<sub>CP</sub>bi [<sub>TP</sub>Pro<sub>i</sub> zai jiali [<sub>DegP</sub>  
 Zhangsan at school com at home  
~~kaixin~~]]] kaixin  
 happy happy  
 ‘Zhangsan is happier at school than Zhangsan is at home.’

Fourth, via a correlation to the Focus Intervention Effect (see Yang 2009, Beck 2006, Kim 2002) can a *bi*-clausal comparative define itself (Liu 2010a).

- (105) \*Ta zhiyou zuotian [<sub>CP</sub> Op<sub>i</sub> [bi [<sub>TP</sub>WO [<sub>FP</sub> zhiyou  
 he only yesterday com I only  
 jintian] [<sub>DegP</sub> d<sub>i</sub> ~~kaixin~~]]]] kaixin  
 today happy happy

Liu (2010a) suggests that in (105) the degree operator binds the degree variable in syntax, and that both the degree operator and the focus phrase *zhiyou zuotian* ‘only yesterday’ involve focus semantic value since both of them denote a set of alternatives. The ungrammaticality of

(105) is due to the focus intervention effect brought up by *zhiyou zuotian* ‘only yesterday’, indicating that there is a *bi*-clausal comparative involving degree comparison in syntax.

Fifth, Huang et al. (2009:137) advocates that the Chinese long passive involves the main verb *bei* with a clausal complement which undergoes null-operator movement and type-shifts into a property predicated on the Experiencer subject. Liu (2010a) suggests that this configuration might exemplify a clausal analysis of *bi*-comparatives.

- (106)     [<sub>TP</sub>Zhangsan<sub>i</sub> [<sub>V</sub> *bei* [<sub>TP</sub> Lisi[<sub>CP</sub>[ *bi* [<sub>TP</sub>Pro<sub>i</sub> *bei*  
           Zhangsan     BEI     Lisi     com     BEI  
           Wangwu ~~da~~ ~~de~~ ~~can~~]]] [da     de   can]]]]  
           Wangwu beat DE miserably beat     DE miserably  
           ‘Zhangsan<sub>i</sub> was beaten more miserably by Lisi than he<sub>i</sub> was  
           by Wangwu.’

Sixth, it is generally agreed that English comparatives allow constructions, where the main clause and the *than*-clause are both full clauses.

- (107)     This table is wider than that desk is long.  
 (108)     This river is wider than that stream is long.

In contrast, a Chinese equivalent is ungrammatical.

- (109)     \*Zhezhang     zhuozi     kuan bi             nazhang   zhuozi  
           this-Cl       table       wide com       that-Cl   table  
           chang  
           long  
           ‘Int. This desk is wider than that table is long.’  
 (110)     \*Zhe tiao he    kuan bi             na tiao   xi       chang  
           this-Cl   river wide com       that-Cl   stream   long  
           ‘Int. This river is wider than that stream is long.’

Nonetheless, (111) could be an acceptable translation of (107), and (112) of (108). (refer to Liu 2010b).

- (111) Nazhang zhuozi (hen)chang (danshi) zhezhang  
 that-Cl table HEN long but this-Cl  
 zhuozi geng kuan  
 table GENG wide  
 ‘That table is (very) long, but this desk is even wider than that table is long.’
- (112) Na tiao xi (hen) chang (danshi) zhe tiao he  
 that Cl stream HEN long but this-Cl river  
 geng kuan  
 GENG wide  
 ‘That stream is (very) long, but this river is even wider than that stream is long.’

Crucially, we would like to suggest that in addition to a juxtapositional clausal comparative such as (111) suggested by Liu (2010b), an adpositional *bi*-clausal comparative also exists in Mandarin Chinese. A fact that can not be overlooked is that there is a condition on an adpositional *bi*-clausal comparative in Mandarin Chinese. That is, only when the comparison predicate (the gradable term) to the two clauses is identical can the adjunction clausal comparative be allowed.

- (113) Ta [CP Op<sub>i</sub> [bi [TP wo [DegP d<sub>i</sub> ~~kaixin~~]]]] kaixin  
 he com I happy happy  
 ‘He is happier than I.’
- (114) Ta zutian zai xuexiao [CP Op<sub>i</sub> [bi [TP wo jintian  
 he yesterday at school com I today  
 zai jiali [DegP d<sub>i</sub> ~~kaixin~~]]]] kaixin  
 at home happy happy  
 ‘He was happier at school yesterday than I am at home today.’

The comparison predicate *kaixin* ‘happy’ within the *bi*-clause must be identical to that of the main predicate. This can explain why there is no direct evidence for the existence of *bi*-clausal comparatives in Mandarin Chinese. Since the deletion operation must apply to

*bi*-comparatives, the morpheme *bi* is never followed by a full clause.

One may question that it is ad hoc for the comparison predicate in the main clause and the *bi*-clause to be identical. Note, however, that this is not a first-and-last condition on comparative constructions. In English, Comparative Deletion must apply when the adjective or adverb within the comparative clause is the same as the one in the main clause (Bresnan 1973, 1975).

- (115) John is taller than Bill is (\*tall)  
(116) John runs faster than Bill runs (\*fast)

Moreover, if (117) is grammatical, then it must result from (117a) not (117b) through a deletion rule.

- (117) John's car is wider than Bill's motorcycle is.  
a. John's car is wider than Bill's motorcycle is ~~wide~~.  
b. \*John's car is wider than Bill's motorcycle is ~~long~~.

(117) further suggests that Comparative Deletion only targets the dimensional adjective when the adjective in the main clause and in the comparative clause is the same. Namely, the scale implied by the two dimensional adjectives must be the same.

In (118) no deletion rule is invoked, for the reason that the two dimensional adjectives are not identical.

- (118) John's car is wider than Bill's motorcycle is \*(longer).

In Mandarin Chinese what casts a complexion on the matter is that a comparison predicate is subject to a prohibition—the comparison predicate to the main clause and comparative clause must be identical. Put another way, there is an identity requirement for Comparative Deletion in the *bi*-comparatives.

A prohibition on the identity of the comparison predicate of a *bi*-comparative could be manipulated as a constraint under a constraint-based formalization, to the extent that such a constraint would

possibly outrank all the others. An Optimality Theoretic framework to account for comparatives would be a topic worthy of research. It will not be treated in the study, however.<sup>11</sup> In summary, (119) refers to our line of reasoning.

(119) Clausal comparative in Chinese and English

	Comparative deletion	Identical comparison predicate	Example
<b>Juxtaposition comparative</b>	no	optional	Zhangsan (hen) gao, Lisi geng gao
			Nazhang zhuozi (hen) chang, (danshi) zhezhang zhuozi geng kuan
	no	This table is wider than that desk is long.	
	yes	yes	John is taller than Bill is <del>tall</del> .
<b>Adposition comparative</b>	yes	yes	Zhangsan [bi Lisi <del>gao</del> ] (geng) gao

#### 4.2 Exemplification

We have described the three types of *bi*-comparatives, viz., the typical comparative (*Zhangsan bi Lisi kaixin* ‘Zhangsan is happier than Lisi’), the DE-complement comparative (*Zhangsan bi Lisi pao de kuai* ‘Zhangsan runs faster than Lisi’) and the verbal predicate comparative (*Zhangsan bi Lisi mai le (geng) duo de xie* ‘Zhangsan bought more shoes than Lisi’). We would like to provide a unifying account of the three comparatives under a clausal analysis in the following.

<sup>11</sup> For an Optimality Theoretic explanation of Comparative Deletion and Subdeletion, see Kennedy (2002).

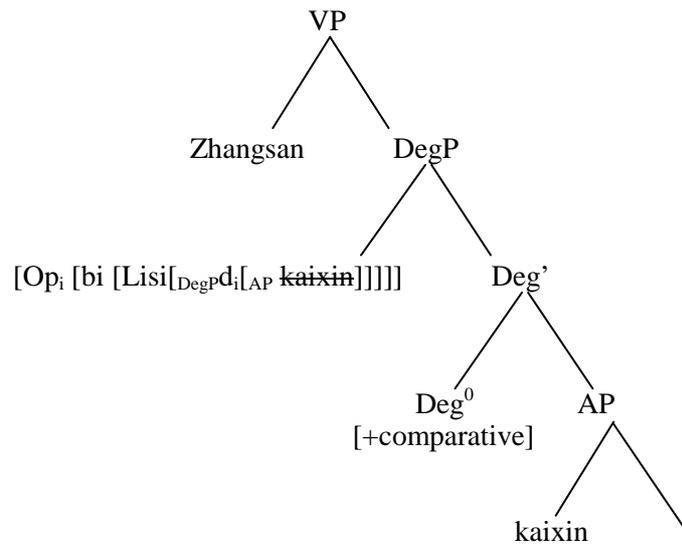
### 4.2.1 Typical comparatives

For the typical comparative, a syntactic structure of (120) is represented as (121), in the sense of Liu (1996), Hsing (2003) and Chung (2006).

- (120) Zhangsan bi Lisi kaixin  
 Zhangsan com Lisi happy  
 ‘Zhangsan is happier than Lisi.’
- (121) Zhangsan<sub>[CP Op<sub>i</sub> [bi [TP Lisi [DegP d<sub>i</sub> [AP kaixin]]]]]</sub> kaixin

Below is a tree structure of (121).

- (122) Zhangsan bi Lisi kaixin



Assuming that there is a [+comparative] feature (uninterpretable feature) on the Degree head, (122) indicates that the self-completed *bi*-clause is adjoined onto the SpecDegP to check off this feature. The theoretical significance of such a feature-checking mechanism is that we can not only explain why the construal denotes a comparison event, but

also why it suffices to saturate and restrict the degree argument of the adjective in the *bi*-comparative in syntax.<sup>12</sup> The degree operator binds the degree variable inside the *bi*-clause to attain the description of a degree. As a complementizer, *bi* functions to introduce a clause containing more than one constituent in a contrastive relation to their corresponding correlates.<sup>13</sup>

We shall account for the relation between the antecedent in the main predicate and the deleted constituent in the adjunct clause. A condition proposed by Lechner (2001) is that a filter consists in the Comparative Deletion Scope Condition in (123), which encodes a structural condition on the scope of the comparative XP relative to the CD-site:

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<sup>12</sup> The degree argument of Chinese gradable adjectives, at the least, can be restricted by comparatives, degree adverbs, measure phrases, reduplication morphology, (contrastive) focus, or the sentence final particle *le* (Liu 2007ab, 2010c), as the examples below illustrate.

- |       |   |        |                |              |        |      |
|-------|---|--------|----------------|--------------|--------|------|
| (i)   | Zhe-duo   | hua    | bi             | na-duo       | hua    | hong |
|       | this-CL   | flower | comp           | that-CL      | flower | red  |
|       | 'This flower is redder than that one.'  |        |                |              |        |      |
| (ii)  | Zhe-duo   | hua    | hong,          | na-duo       | huang  |      |
|       | this-CL   | flower | red            | that-CL      | yellow |      |
|       | 'This flower is red, but that one is yellow.'   |        |                |              |        |      |
| (iii) | Zhe-duo   | hua    | hen/feichang   |              | hong   |      |
|       | this-CL   | flower | very/extremely |              | red    |      |
|       | 'This flower is very/extremely red.'  |        |                |              |        |      |
| (iv)  | Zhe-duo   | hua    | hong-hong-de   |              |        |      |
|       | this-CL   | flower | red-red-DE     |              |        |      |
|       | 'This flower is really red.'  |        |                |              |        |      |
| (v)   | Zhe-duo   | hua    | hong-le        | yi-dianer    |        |      |
|       | this-CL   | flower | red-ASP        | a-little bit |        |      |
|       | 'This flower is a little bit redder than before/the standard value of redness assumed by people for the flower/some specific flower.' |        |                |              |        |      |
| (vi)  | Zhe-duo   | hua    | hong           | le           |        |      |
|       | this-CL   | flower | red            | SFP          |        |      |
|       | 'This flower has gotten red.'   |        |                |              |        |      |

<sup>13</sup> Concerning the syntactic structures of comparatives, there are three possible configurations, to wit, Coordination, Adjunction and Predication analyses (see Chao 2005, Chung 2006 for discussion).

- (123) THE COMPARATIVE DELETION SCOPE CONDITION  
The comparative has to take scope over (c-command) the CD site at LF.

The condition represents a more general restriction on empty operator constructions (relative clauses, comparatives, tough-movement, etc.) which requires that the gap and the operator be c-commanded by their respective licensing category. Relative clauses, *than*-XPs and complements of tough-adjectives can for instance be fronted only if the head of the construction (in boldface) pied-pipes the category containing the empty operator chain (from Lechner 2001):

- (124) a. John saw a **man** [Op who t wore a green cap].  
b. A **man** [Op who t wore a green cap], John saw.  
c. \*[Op Who t wore a green cap], John saw a **man**
- (125) a. John bought more **books** [than Op Mary had read t].  
b. More **books** [than Op Mary had read t], John bought.  
c. \*[Op Than Mary had read t], John bought more **books**
- (126) a. John is **tough** [Op to beat t in chess].  
b. (. . . and) **tough** [Op to beat t in chess], John is  
c. \*(. . . and) [Op to beat t in chess], John is **tough**

An adjunction manipulation of *bi*-clausal comparatives would be obviated by the general condition proposed by Lechner (2001). A plausible solution is to rely on semantics, though our primary goal in this study is to conduct a syntactic analysis of the *bi*-comparatives.

The elliptical site within the *bi*-clause is not properly governed by a functional head. However, it must be *e*-given. Semantically, Merchant (2001) argues that there is no structural-identity requirement for ellipsis, neither in overt syntax nor even at LF. Rather, the condition relating to antecedent and ellipsis is semantic.<sup>14</sup>

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<sup>14</sup> E-givenness proposed by Merchant (2001) is a semantic parallelism which demands an ellipsis be licensed under a semantic relation between the elided constituent and its antecedent (see Merchant 2001), while a syntactic parallelism usually demands a strict one-by-one morpho-syntactic identity between the elided constituent and its antecedent (so-called ‘isomorphism’) (see Fiengo and May 1994 and others).

- (127) e-Givenness  
 An expression E counts as e-GIVEN iff E has a salient antecedent A and modulo  $\exists$ -type shifting:
- (i) A entails F-clo(E), and  
 (ii) E entails F-clo(A)
- (128) Focus condition on IP Ellipsis/VP Ellipsis  
 A IP/VP \_\_ can be deleted only if \_\_ is e-GIVEN.

When the total identity holds, the two-way entailment in (127) is directly satisfied.

Assuming that ellipsis involves deletion (see Merchant 2001, Kennedy & Merchant 2000), and thus this requirement for ellipsis is subject to Comparative Deletion in Mandarin Chinese, a *bi*-clausal comparative can satisfy E-givenness, as the following shows:

- (129) Zhangsan<sub>[CP Op<sub>i</sub> [ bi<sub>[TP Lisi<sub>[DegP [d<sub>i</sub>]<sub>[AP ~~kaixin~~]]]]]] kaixin  
 Zhangsan com Lisi happy happy  
 ‘Zhangsan is happier than Lisi.’</sub></sub></sub></sub>
- (130) Zhangsan zai jiali [Op<sub>i</sub>[bi<sub>[TP Lisi[[zai xuexiao  
 Zhangsan at home com Lisi at school  
 [DegP[d<sub>i</sub>]<sub>[AP ~~kaixin~~]]]]]] kaixin  
 happy happy  
 ‘Zhangsan was happier at home than Lisi was in school.’</sub></sub>
- (131) AP<sub>A</sub>’ =  $\exists x. x$  kaixin  
 (132) F-clo(AP<sub>E</sub>) =  $\exists x. x$  kaixin  
 (133) F-clo(AP<sub>A</sub>) =  $\exists x. x$  kaixin

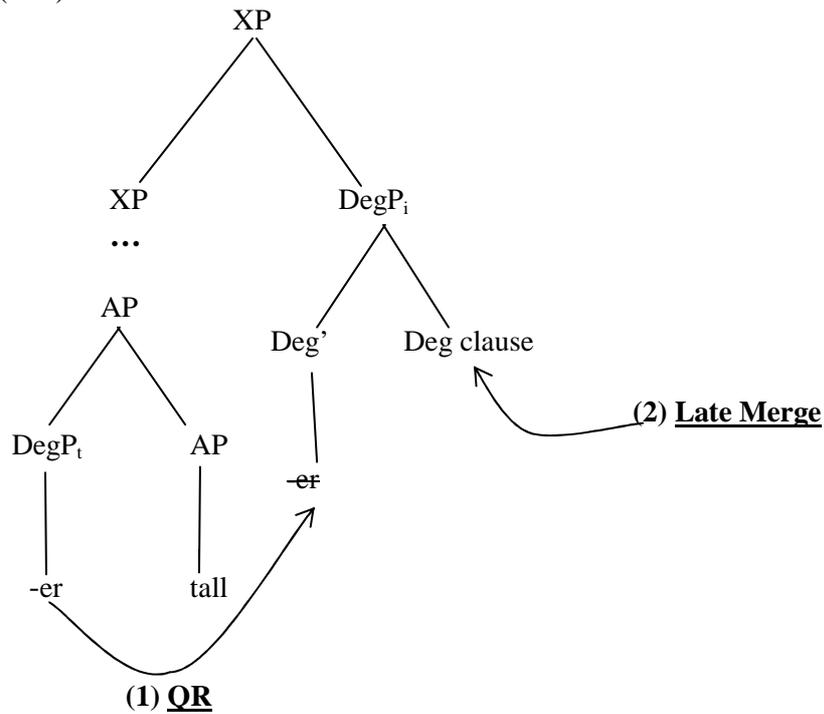
In both (129) and (130), AP<sub>E</sub>’ does entail F-clo(AP<sub>A</sub>), given in (132) and (133), we know that AP<sub>E</sub>’ also entails the F-closure of AP<sub>A</sub>, since the two are identical and mutually entailed.<sup>15</sup>

<sup>15</sup> An anonymous reviewer suggests that if satisfying E-givenness is enough for an elliptical site, do (124c), (125c), and (126c) satisfy E-givenness, even though in these examples the gap and the operator are not c-commanded by their licensing category? In

Apart from the semantic issue, an alternative possibility to explain *bi*-comparatives would be to argue that there exists a complement-to-specifier movement in the formation. However, we do not take it as a preferred option as where to merge the complement characterized by the *bi*-clause is vague. In other words, if this alternation is available, extra assumptions need to be made, resulting in a burden of proof.

It remains to discuss Bhatt & Pancheva (2004)'s well-known argument 'Late Merge'. Bhatt & Pancheva assume that Degree head *-er* and the degree *than*-clause form a degree quantifier argument, which must have a higher scope over the matrix gradable XP.

(134)



this study we simply focus on the linguistic account of *bi*-comparatives in Mandarin Chinese, though the English examples referred to do not seem to satisfy E-givenness. As a well-established semantic identity on (??) ellipsis, E-givenness can elucidate VP ellipsis, sluicing and so on. See Merchant (2001) for discussion.

As shown in (134), *-er* is the head of a DegP which is the specifier of the gradable predicate. Being a quantificational expression, the DegP headed by *-er* undergoes QR to right-adjoin to the maximal projection that contains the gradable predicate, and leaves a copy in the base position. The comparative clause is in turn Late Merge as the complement of the raised unpronounced degree head. The degree head *-er* is interpreted in its scope position, but is pronounced in its base position. They further contend that this explains why on the surface *-er* and the *than*-clause are not pronounced as a constituent, but semantically behave as one degree argument.

Is the *bi*-comparative subject to Late Merge? Liu (2010c) argues that Chinese has a simpler adjectival structure than English. More specifically, English has a QP between the lower adjectival phrase and its functional degree projection (see Bresnan 1973). In contrast, Chinese simply has an adjectival structure introduced by a functional degree projection headed by the positive morpheme without having a QP in-between, as the following shows.

- (135) a. Adjectival phrase in English: [<sub>DegP</sub> [<sub>Deg</sub> [<sub>QP</sub> [<sub>Q</sub> [<sub>AP</sub> [<sub>A</sub>]]]]]]  
 b. Adjectival phrase in Chinese: [<sub>DegP</sub> [<sub>Deg</sub> [<sub>AP</sub> [<sub>A</sub>]]]]

Given this, if the degree phrase within the *bi*-clause undergoes QR, it seems clear that an independently motivated argument is required to object to Liu (2010c).

We have suggested a clausal analysis of *bi*-comparatives under an adjunction approach. A question that hinges upon this is: is the *bi*-clause (or *bi*-phrase in other works) an adjunct? If it is, (137) is grammatical, contrary to fact.

- (136) Zhangsan bi Lisi kaixin  
 Zhangsan com Lisi happy  
 ‘Zhangsan is happier than Lisi.’  
 (137) \*Zhangsan kaixin  
 Zhangsan happy

Liu (2007ab, 2010bc) has dictated that Chinese has the category of adjective, and that it can be defined as follows: a gradable adjective has a degree argument that must be saturated and restricted by comparatives, the *pos* morpheme, degree adverbs, measure phrases, or reduplication morphology (cf. von Stechow 1984, Kennedy & McNally 2005), as the correlative examples below illustrate.

- (138) Zhangsan \*(hen) gao  
Zhangsan very tall  
'Zhangsan is happy.'
- (139) Zhangsan gao \*(yi-bai-bashi gongfang)  
Zhangsan tall one-hundred-eighty centimeter  
'Zhangsan is 180 cm tall.'
- (140) Zhangsan \*(bi Lisi) gao  
Zhangsan com Lisi tall  
'Zhangsan is taller than Lisi.'

It is therefore safe to adjoin the *bi*-clause, as suggested. In other words, the feature checking mechanism ([+comparative] on Deg<sup>0</sup> to be checked off) can be exemplified as a means to saturate and restrict the degree argument of the adjective.

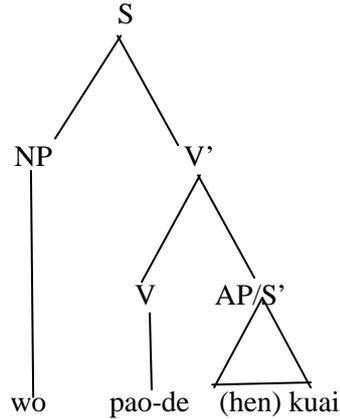
#### 4.2.2 DE-complement comparatives

Before yielding the derivation of DE-complement comparatives, we shall introduce Huang (1988)'s analysis, which lays a syntactic foundation for the DE-complement comparative.<sup>16</sup> Huang (1988) proposes a Secondary Predication analysis of the *V-de* construction in Mandarin Chinese. The *V-de* is the primary predicate and takes a depictive complement as the secondary predicate, as represented below.

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<sup>16</sup> Regarding the status of *-de* in a DE-complement, see Huang (1982) for an analysis of treating *-de* as a complementizer, and Huang (1988, 1992) a verbal suffix. See also Huang, Li & Li (2009) for further discussion.

- (141) wo pao de (hen) kuai  
 I run DE (very) fast  
 'I run (very) fast.'



The *bi*-comparative accommodates such a construal if we consider that the *bi*-comparative is meant to describe a stative event (Lü et al. 1980, Zhu 1982).<sup>17</sup> Adapting a little the structure proposed by Huang (1988), we take the template to derive a DE-complement comparative. A syntactic structure of (142) can be therefore depicted by (143).

- (142) Zhangsan bi wo pao de kuai  
 Zhangsan com I run DE fast  
 'Zhangsan runs faster than I.'

- (143) Zhangsan [<sub>CP</sub>Op<sub>i</sub>[ bi [<sub>TP</sub> wo [<sub>TV</sub> pao-de [<sub>DegP</sub> de [<sub>AP</sub> Proj-  
 Zhangsan com I run DE  
~~kuai~~]]]]]] pao de kuai  
 fast run DE fast  
 'Zhangsan runs faster than I.'

<sup>17</sup> In line with Secondary Predication analysis, Huang (2006) undertakes the structure of resultatives based on the event structure. A resultative is composed of two parts. One of the main-event is represented by an inchoative or causative template, the other is a sub-event which specifies the manner to which the main event occurs. Because the semantic property of the resultative structure is in collusion with the *bi*-comparative, we need mention here only Huang (1988).

Along the same vein, a syntactic structure of (144) can be (145).

- (144) Zhangsan pao de bi wo (pao de) kuai  
 Zhangsan run DE com I run DE fast  
 ‘Zhangsan runs faster than I.’
- (145) Zhangsan pao de [<sub>CP</sub>Op<sub>i</sub> [bi[<sub>TP</sub> wo<sub>j</sub>[<sub>V'</sub>(paode)[<sub>DegP</sub>d<sub>i</sub>[<sub>AP</sub>  
 Zhangsan run DE com I run DE  
 Proj<sub>j</sub>kuai]]]]]]] kuai  
 fast fast  
 ‘Zhangsan runs faster than I.’

As argued earlier, the *bi*-clause is adjoined to the two positions if the main verb is not repeated. One position is between the subject and the comparison predicate; the other is between the main verb and the degree head inside the DE-complement.

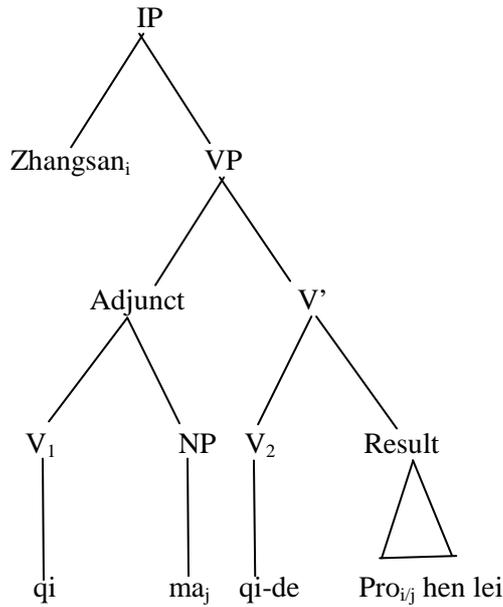
Reciting the derivation, the verb headed by *V-de* (Huang 1988) immediately dominates the AP/S', which is manipulated by the root AP projecting a DegP as a complex structure. *Pro*, merged onto SpecAP, is co-indexed with the comparative subject. The derivationally completed *bi*-clause adjoins to the SpecDegP of the main clause to check off the [+comparative] feature on the degree head. A VP within the *bi*-clause is deleted in (143) and (145), though *pao de* ‘run DE’ can optionally occur in (145).<sup>18</sup>

On the other hand, to initiate a syntactic structure in which there exist three positions for the *bi*-clause to adjoin, we shall briefly review Huang (1992) where the main verb is duplicated in a resultative complement construction.

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<sup>18</sup> Comparative Deletion in a *bi*-comparative primarily adheres to Parallelism which is a condition that was firstly raised by Fiengo & May (1994) to argue that the clauses containing an elided VP must be parallel to those containing the antecedent VP.

- (146)    Zhangsan qi    ma            qi    de    hen    lei  
           Zhangsan ride horse        ride DE very lei  
 a.    'Zhangsan rode a horse and Zhangsan was very tired.'  
 b.    'Zhangsan rode a horse and the horse was very tired.'



Huang (1992) argues that in this structure  $V_2$  is the main verb and  $V_1$ -NP sequence serves as a deverbalized adjunct modifying  $V_2$  (see Huang 1982, 1992 for discussion).<sup>19</sup>This configuration is proposed to account for the resultative complement construction in Huang (1992), and there exist subject reading and object reading in (146). Given that the DE-complement comparative we are tackling has some resemblance to the form of this structure, it is not deviant to take into account such a

<sup>19</sup> Cheng (2007) accounts for this construction via Sideward Movement (Nunes 2001) and The Copy Theory of Movement (Chomsky 1993, 1995), in which the main verb *qi* 'ride' in the main predicate is copied into the adjunct with another object (*ma* 'horse' in this case) being built through Sideward Movement. Given that this assumption might further imply that a constituent is allowed to extract out of an adjunct, a violation of CED (Huang 1982), we discard this approach.

construal. Below we make a revised version of Huang (1992) to yield the construction at issue.

- (147) Zhangsan bi wo pao bu pao de kuai  
 Zhangsan com I run step run DE fast  
 ‘Zhangsan runs faster than I.’
- (148) Zhangsan<sub>[CP Op<sub>i</sub> [bi<sub>[TP WO<sub>j</sub> [VP ~~pao bu~~<sub>[V<sub>i</sub> pao de<sub>[DegP d<sub>i</sub> [AP Pro<sub>j</sub> kuai]]]]]]]]]]] pao bu pao de kuai  
 Zhangsan com I run step run DE  
 fast run step run DE fast  
 ‘Zhangsan runs faster than I.’</sub></sub></sub></sub>
- (149) Zhangsan pao bu bi wo (pao bu) pao de kuai  
 Zhangsan run step com I run step run DE fast  
 ‘Zhangsan runs faster than I.’
- (150) Zhangsan pao bu<sub>[CP Op<sub>i</sub> [bi<sub>[TP WO<sub>j</sub> [VP (pao bu)<sub>[V<sub>i</sub> pao de<sub>[DegP d<sub>i</sub> [AP Pro<sub>j</sub> kuai]]]]]]]]]]] pao de kuai  
 Zhangsan run step com I run step run DE  
 fast run DE fast  
 ‘Zhangsan runs faster than I.’</sub></sub></sub></sub>
- (151) Zhangsan pao bu pao de bi wo kuai  
 Zhangsan run step run DE com I fast  
 ‘Zhangsan runs faster than I.’
- (152) Zhangsan pao bu pao de<sub>[CP Op<sub>i</sub> [bi<sub>[TP WO<sub>j</sub> [VP ~~pao bu~~<sub>[V<sub>i</sub> pao de<sub>[DegP d<sub>i</sub> [AP Pro<sub>j</sub> kuai]]]]]]]]]]] kuai  
 Zhangsan run step run DE com I run step  
 run DE fast fast  
 ‘Zhangsan runs faster than I.’</sub></sub></sub></sub>

(148) is the syntactic structure of (147), (150) is of (149), and (152) is of (151). The result clause in Huang (1992) is manipulated as a complex structure, where the root AP projects a DegP. The *bi*-clause is adjoined onto three positions here. One is adjoined onto Spec of DegP; the other two Spec of VP. The [+comparative] feature is checked off on the degree head via a c-commanding relation. By the same token, a VP

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within the *bi*-clause is elided, though *pao bu* ‘run step’ in (150) can be optionally deleted.

Note that in a DE-comparative the adjunction of the *bi*-clause seems not obligatory. For example, (153) is well-formed.

- (153)      Zhangsan (bi Lisi) pao de kuai  
            Zhangsan com Lisi run DE fast  
            ‘Zhangsan runs faster than Lisi.’

Liu (2010c) proposes that the degree argument of Chinese gradable adjectives can be at least restricted by a number of ways (refer to fn. 13). A DE-complement comparative such as (154) or (155) can restrict the degree argument of Chinese gradable adjectives, and denotes a comparison event.

- (154)      Zhangsan \*(tiao de)            gao  
            Zhangsan jump DE            high  
            ‘Zhangsan jumps high (the highness of Zhangsan’s jumping exceeds the standard value of the highness of one’s jumping assumed by people).’
- (155)      Zhangsan \*(tiaode)            yuan  
            Zhangsan jump DE            far  
            ‘Zhangsan jumps far (the farness of Zhangsan’s jumping exceeds the standard value of farness of one’s jumping assumed by people).’

Nevertheless, the adjunction of the *bi*-clause is one of the obligatorily syntactic operations to restrict and saturate the degree argument of the adjective in a DE-complement comparative, especially when the degree head is overtly realized by adverbs such as *geng* ‘GENG’ or *haiiao* ‘much’.

- (156) a. \*Zhangsan pao de geng kuai  
 Zhangsan run DE GENG fast  
 ‘Int. Zhangsan runs even faster than someone’.
- b. Zhangsan bi Lisi pao de geng  
 Zhangsan com Lisi run DE GENG  
 kuai<sup>20</sup>  
 fast  
 ‘Zhangsan runs even faster than Lisi’.
- (157) a. \*Zhangsan pao de haiiao kuai  
 Zhangsan run DE much fast  
 ‘Int.Zhangsan runs much faster than someone’.
- b. Zhangsan bi Lisi pao de haiiao  
 Zhangsan com Lisi run DE much  
 kuai  
 fast  
 ‘Zhangsan runs much faster than Lisi’.

Both (156a) and (157a) are ungrammatical, if the *bi*-constituent (viz., *bi*-clause in our analysis) in each of them is optional. It follows that the adjunction of a *bi*-clause is necessary when a context-sensitive degree adverb occurs.<sup>21</sup> It is a semantic or pragmatic issue whether or not the degree head is overt, but it is well-found to adjoin the *bi*-clause to the

<sup>20</sup> A feasible alternative is to juxtapose a conjunct such as *Lisi pao de hen kuai* ‘Lisi runs fast’ to (156a). For example:

- (i) Lisi pao de hen kuai, (danshi) Zhangsan pao de geng  
 Lisi run DE very fast but Zhangsan run DE even  
 kuai  
 fast

‘Lisi runs fast, but Zhangsan runs even faster than Lisi.’

<sup>21</sup> The degree adverbs should be divided into two groups with respect to the behavior of saturating and restricting the degree argument of an adjective. Degree adverbs such as *geng* ‘GENG’, *haiiao* ‘much’ are context-sensitive; they cannot restrict the degree argument of an adjective unless the *bi*-clause is adjoined or a conjunct is juxtaposed. On the other hand, degree adverbs such as *hen* ‘very’, *feichang* ‘extremely’, *guo* ‘exceed’ which are not context-sensitive are fully competent to saturate and restrict the degree argument of the adjective. See Liu (2010bc) for further discussion.

DE-complement comparative in syntax. It is by virtue of this strength, i.e. adjoining the *bi*-clause, which prevents the derivation from crashing.

#### 4.2.3 Verbal predicate comparatives

As we mentioned earlier, the *bi*-comparatives can have verbal predicates. Significantly, the following sentences illustrate that the *bi*-constituent can occur between the subject and degree adverbs such as *geng* ‘GENG’, and that there are generally two types of verbal predicate comparative.

- (158) Zhangsan yongyou bi wo (geng) duo de  
 Zhangsan have com I GENG many PRT  
 mao  
 cat  
 ‘Zhangsan has more cats than I have.’
- (159) Zhangsan bi wo yongyou (geng) duo de  
 Zhangsan com I have GENG many PRT  
 mao  
 cat  
 ‘Zhangsan has more cats than Lisi has.’

For the first type of verbal predicate comparative, by assumption, (160) can be a syntactic structure of (158).

- (160) Zhangsan yongyou [Op<sub>i</sub>[ bi<sub>[TP</sub>wo<sub>[VP</sub>yongyou<sub>[DP</sub>de  
 Zhangsan have com I have  
~~d<sub>i</sub>[AP~~duo] ~~de~~ ~~mao~~]]]]] (geng) duo de  
 many PRT cat GENG many PRT  
 mao  
 cat  
 ‘Zhangsan has more cats than I have.’

Assuming that the DP is headed by the particle *de* (Ning 1993, Wu 2000), the *bi*-clause adjoins to the SpecDegP, which is merged onto the

SpecDP, when the *bi*-clause occurs between the subject and the degree adverb.<sup>22</sup>

For the second type of verbal predicate comparative, (159) can be derived from (161), where the *bi*-clause occurs between the subject and the predicate.

- (161) Zhangsan [Op<sub>i</sub>[bi<sub>i</sub>[TP<sub>WO</sub>[VP<sub>yongyou</sub>[\_DP<sub>i</sub>[\_DegP<sub>i</sub>[\_AP<sub>duo</sub>]]]]]]—de—  
 Zhangsan com I have many PRT  
 mao]]]]] yongyou (geng) duo de mao  
 cat have GENG many PRT cat  
 ‘Zhangsan has more cats than I have.’

From a derivational point of view, the *bi*-clause in this construction is adjoined onto the SpecVP rather than onto the SpecDegP.

To specify our line of thinking, a diagram showing the division of the two types of constructions is represented below.

(162)

<i>bi</i> -clause	Example
SpecDegP	Zhangsan yongyou [bi wo] (geng) duo de mao
VP adverbial	Zhangsan [bi wo] yongyou (geng) duo de mao

Postulating a DP-internal analysis for a degree phrase seems to fall short of independent support. To strengthen our position, we would like to provide evidence in favor of such a hypothesis.

Language-internal evidence is in support of our line of argumentation. The well-formedness of the following sentences felicitously justifies it.

<sup>22</sup> Considering the syntactic configuration of the particle *de*, one can also consult Tang (2006), Shi (2008). They differ in assuming the representational configuration of *de*.

- (163) Na yi-wei **hen** piaoliang de nuhai  
 that one-CL very pretty PRT girl  
 xianshen le  
 show-up ASP  
 ‘That very pretty girl showed up.’
- (164) Wo zuotian yujian le na yi-wei **hen**  
 I yesterday meet ASP that one-CL very  
 congming de yiren  
 smart PRT artist  
 ‘I met that very smart artist yesterday.’

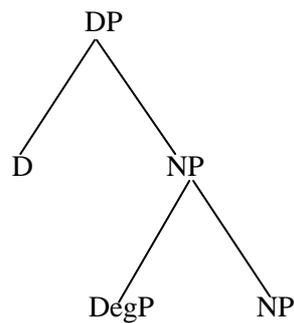
As shown by the degree adverb *hen* ‘very’ (in boldface) in (163) and (164), it is justified to argue for a DegP projection inside a DP.

Another piece of evidence comes from cross-linguistic data. (165) and (166) are illustrative examples in English quoted from the Internet.

- (165) Is it so important to have *those very expensive ring*  
 for wedding?
- (166) How do you feel about *these very unique names*?

To represent an internal structure of the object DPs in italics in the examples above, Svenonius (1992) offers a plausible one as shown below.

(167)



Although one might question whether or not a DP contains a DegP in Mandarin Chinese, the evidence offered suggests that such an assumption is not overstated. How the exact syntactic structure should be represented within a DP is not directly associated with the theme of this study, we will not discuss it further.<sup>23</sup>

In respect to Comparative Deletion, we can see, as argued, that an adjective phrase is elided in the typical comparative, and that in the DE-complement comparative or the verbal predicate comparative a verb phrase is deleted. A diagram associated with Comparative Deletion in the *bi*-comparatives is shown below.

(168)

Construction type	Comparative Deletion	Example
typical comparative	AP	Zhangsan [bi Lisi <del>gao</del> ] gao
DE-complement comparative	VP	Zhangsan [bi Lisi <del>pao de kuai</del> ] pao de kuai
verbal predicate comparatives		Zhangsan [bi Lisi <del>yongyou duo de mao</del> ] yongyou (geng) duo de mao

Our preliminary account discussed here explains an intriguing fact. In (169) the ambiguity of *Bill* (which is either a subject or object of the verb *like*) occurs in English.

- (169) John likes Mary more than Bill.  
 a. John likes Mary more than Bill likes Mary.  
 b. John likes Mary more than John likes Bill.

<sup>23</sup> For the Chinese DP, see Cheng & Sybesma (1999), Huang, Li & Li (2009) for discussion.

We may notice, in passing, that unlike English comparatives, the *bi*-comparatives can not directly target object positions.

- (170) Zhangsan *bi* Lisi *xihuan* Xiaoyu  
 Zhangsan *com* Lisi *like* Xiaoyu  
 a. ‘Zhangsan likes Xiaoyu more than Lisi likes Xiaoyu.’  
 b. No: ‘Zhangsan likes Xiaoyu more than Zhangsan likes Lisi.’

Concerning the verbal predicate comparatives, scholars have observed that *bi*-comparatives can not compare direct objects as illustrated by the interpretations in (170) (see Yue-Hashimoto 1971, Tsao 1989 and Liu 2010a).<sup>24</sup> Our *prima facie* analysis might serve to demystify this: a full clause subordinated by *bi* is adjoined onto the SpecVP, and a VP inside the clause is deleted.

- (171) a. Zhangsan [<sub>CP</sub>Op<sub>i</sub>[*bi* [<sub>TP</sub>Lisi [<sub>DegP</sub>d<sub>i</sub> ~~*xihuan* Xiaoyu~~]]]]  
 Zhangsan *com* Lisi *like* Xiaoyu  
*xihuan* Xiaoyu  
*like* Xiaoyu  
 ‘Zhangsan likes Xiaoyu more than Lisi likes Xiaoyu.’  
 b. \*Zhangsan [<sub>CP</sub>Op<sub>i</sub>[*bi* [<sub>TP</sub> ~~Zhangsan~~ [<sub>DegP</sub>d<sub>i</sub> ~~*xihuan*~~]]]]  
 Zhangsan *com* Zhangsan *xihuan*  
 Lisi]]]] *xihuan* Xiaoyu  
 Lisi *like* Xiaoyu  
 ‘Int. Zhangsan likes Xiaoyu more than Zhangsan likes Lisi.’

Compared with (171a), (171b) is an implausible configuration. Comparative Deletion only targets a VP under a clausal analysis in this case, which comes under our assumption.

Hence, the object reading of *Lisi* being not obtained in (170) is elucidated by assuming a clausal analysis of *bi*-comparatives.

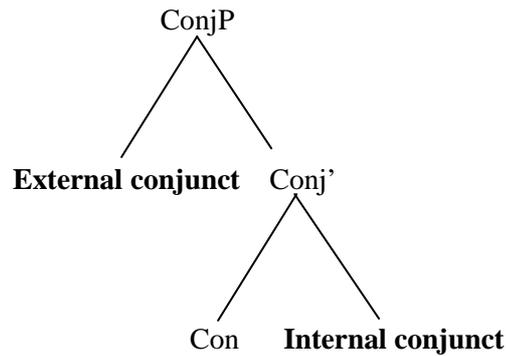
<sup>24</sup> Although direct objects can be compared when they are fronted (Tsao 1989), a *bi*-comparative with fronted compared objects is highly constrained. See Tsao (1989), Lin (2009) and Liu (2010a) for discussion.

## 5. AGAINST TWO ALTERNATIVES

To intensify our analysis, following are arguments to falsify the other two well-recognized hypotheses about *bi*-comparatives.

First, one may think that *bi* is a coordinating conjunction. Assuming *bi* is a coordinating conjunction, we would like to make possible a coordinating status of *bi* in a syntactic configuration proposed in Zhang (2009).

(172)

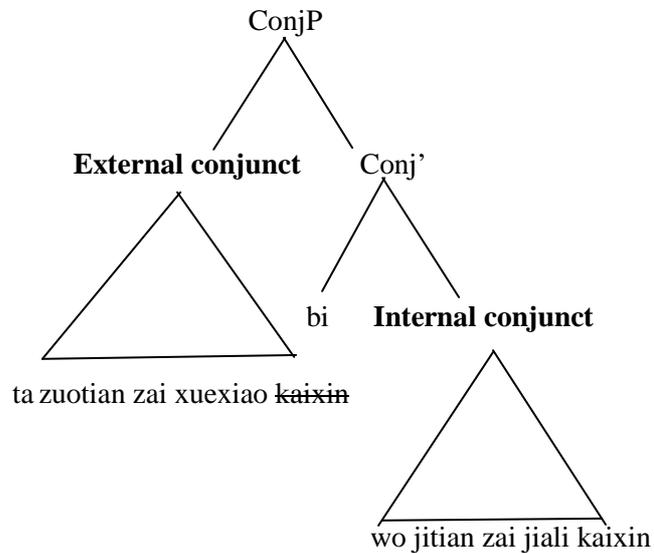


To accommodate her hypothesis to the *bi*-comparative on one hand, and to treat *bi* as the head of a ConjP on the other, we shall consider the main clause as the external conjunct and the compared clause the internal. Supposing that this is a way to instantiate the *bi*-comparative, the embodiment of our idea is illustrated below:<sup>25</sup>

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<sup>25</sup> For ease of exposition, we do not show explicitly the labels in the hierarchical structures of the two conjuncts.

- (173) Ta zuotian zai xuexiao bi wo jintian zai  
 he yesterday at school con I today at  
 jiali kaixin  
 home happy  
 'He was happier in school yesterday than I was at home  
 today.'



Assuming that the two full clauses which are parallel in category, syntactic and semantic are base-generated in the external and internal conjunct respectively, (173) is, if reasonable, completely derived via a deletion process of the comparison predicate (*kaixin* 'happy') within the external conjunct.

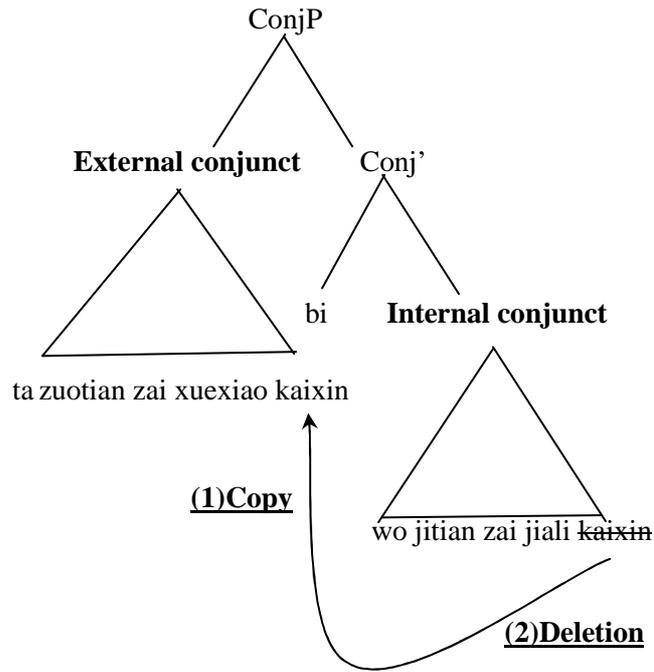
Yet, this analysis presents a major problem. According to Tsao (1989), a deletion process is obligated to occur after the morpheme *bi* (forward deletion). Given this, (174b) is ill-formed as a deletion process does not take place after the morpheme *bi*, in contrast to (174a).

- (174) a. Zhangsan dui Lisi bi ~~dui~~ Wangwu  
Zhangsan to Lisi com to Wangwu  
haiyao hao  
much good  
'Zhangsan treating Lisi is better than Zhangsan treating Wangwu.'
- b. \*Zhangsan ~~dui~~ Lisi bi dui Wangwu  
Zhangsan to Lisi com to Wangwu  
haiyao hao  
much good  
'Int. Zhangsan treating Lisi is better than Zhangsan treating Wangwu.'

To derive the surface word order, the predicate within the external conjunct, in this case, must be deleted, which does not follow the agreement on the direction of the elided site proposed in Tsao (1989).

One could still argue for a coordinating conjunction analysis by copying the predicate from the internal conjunct to the external through The Copy Theory of movement (Chomsky 1993, 1995), and then the copy within the internal conjunct is elided, as represented in (175).

(175)



However, this analysis is undermined since (i) the surface word order is not correctly derived (*\*ta zuotian zai xuexiao kaixin bi wo jintian zai jiali*). (ii) there is no evidence bearing on any theoretical consideration to copy a constituent from within one conjunct to another.<sup>26</sup> As a result, treating *bi* as a coordinating conjunction in a comparative seems to hardly hold.

Second, one might assume that the comparative morpheme *bi* is a verb (cf. Erlewine 2007). *Bi* can be at times used as a verb, as illustrated in (176) and (177).

<sup>26</sup> It is admitted that there should be other alternatives for the *bi*-comparatives under a conjunction analysis other than Zhang (2009). See also Hung (1991) for a GPSG study under a conjunction analysis.

- (176) Ni bi guo zhe liang-jian fangzi de  
 you compare ASP this two-CL house GEN  
 jiaqian ma?  
 price ASP  
 ‘Did you compare the prices for these two houses?’
- (177) Nali you yi-zhi kongque, wo bi gei  
 there have one-CL peacock I indicate give  
 ni kan  
 you see  
 ‘There is a peacock there, and I gesture to indicate it to you.’

These two examples are not comparatives. If *bi* was a verb in a comparative, no deviance would be detected in (178), when it is suffixed with an aspect marker *guo* ‘ASP’.

- (178) \*Zhangsan bi guo Lisi gao  
 Zhangsan com ASP Lisi tall  
 ‘Int. Zhangsan is taller than Lisi.’

If *bi* is the verb in a comparative, two more questions raise. Chen-Sheng Liu (p.c.) points out that, assuming that *bi* is a verb, *bi* might assign Case to a PP, an unexpected predication. For example:

- (179) Zhangsan dui nuer bi dui taitai haiyao  
 Zhangsan to daughter com to wife much  
 hao  
 good  
 ‘Zhangsan treating her daughter is better than Zhangsan treating his wife.’

In (179) *dui taitai* ‘to wife’ forms a PP. A verb can not assign Case to a PP, according to Case Theory (Chomsky 1993).<sup>27</sup>

<sup>27</sup> One might wonder if what follows the verb *bi* is a CP in (179). This assumption could raise an issue: there has been a debate as to whether a verb assigns Case to a CP in Mandarin Chinese (cf. Li 1985, 1990, Tsai 1995, Lin 2011). To avoid controversy on this point, we treat *dui taitai* ‘to wife’ as a PP (see Tsai 1995 for further discussion).

One might still assume the verbal character of the comparative morpheme *bi* by considering the A-not-A questions.

- (180) Ni bi bu bi ta gao?  
you com NEG com he tall  
'Are you taller than him?' (cited from Erlewine 2007:16)

If such an argument was convincing, it would be viable to give a legitimate sentence such as (182), in contrast to (181).

- (181) Ni bi ta gao le bu shao  
You com he tall ASP NEG few  
'You are taller than him to an extent.'
- (182) \*Ni bi bu bi ta gao le bu  
You com NEG com he tall ASP NEG  
shao?  
few  
'Int. Are you taller than him to an extent?'

Given that the morpheme *bi* is semantically vacuous (Liu 2010b), to argue for its verbal nature in a comparative seems to be empirically challenged.

Thus far, we have proposed a clausal analysis of *bi*-comparatives, and a phrasal *bi*-comparative is a reduced clausal comparative, along with explanations on other grounds that could pose problems.

## 6. CONCLUDING REMARKS

We have tried to present as in-depth a description of the characteristics of *bi*-comparatives in Mandarin Chinese as possible. We offered several arguments for a *bi*-clausal hypothesis. We provided a unifying account of the data discussed, viz., of typical comparatives, DE-complement comparatives and verbal predicate comparatives. Assuming an adjunction analysis of *bi*-comparatives, the comparative morpheme *bi* manipulates a prepositional complementizer projecting a

self-completed clause. The adjunction of the *bi*-clause is motivated to saturate and restrict the degree argument of the adjective (Liu 2007ab, 2010c). The *bi*-clause illustrates a construction in which a degree operator binds a degree variable in order to denote a description of degree (Liu 2010a). The comparison predicate inside the *bi*-clause is deleted in line with E-givenness (Merchant 2001). Finally, we offered the theoretical and empirical justifications to falsify the other two hypotheses on the status of the comparative morpheme *bi*.

The generalizations of the *bi*-comparatives laid out in the previous studies might be thought to be far too complex. A clausal analysis of bi-comparatives proposed to account for the generalizations could shed more light on the studies of comparative constructions in Mandarin Chinese. Although this approach has been weakened at least in Xiang (2005), it is suggested that this analysis is highly explanatory for a variety of linguistic facts in *bi*-comparatives.

We hope to devote ourselves to the study of comparative constructions in a unifying way. The topics we try to discuss in the study have not answered many questions. They are not complete and will be best addressed when we spend much time acquainting issues, especially semantics with all that is to follow.<sup>28</sup>

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<sup>28</sup> See Lin (2009), Liu (2010a) for further discussion.

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## 漢語比字比較句的句法分析

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在前人的基礎上，本文主要是從句法的視角探索漢語比字比較句的結構。文章首先對此結構中的句法和語義特徵進行了考察與描述，據此提出此結構為子句比較句的構想。基於其句法表現，“比”可以視為一種具有介詞特性的補語連詞，並投射出一個完整的子句。“比”的功能在於引介比較的對象。結構中的形容詞會投射其程度詞組。“比”所引介的子句加接至程度詞組的指示語位置，藉以滿足與限制形容詞的程度論元。在“比”所引介的子句中，牽涉刪略的成分具有形容詞詞組或動詞詞組的語法屬性。本文的思路一方面支持子句比較句的分析，另一方面可以為比較句刪略的研究提供進一步的參考。

關鍵詞：句法學、比字比較句、子句比較句、詞組比較句、比較句刪略