THE SYNTAX OF BI-COMPARATIVES IN MANDARIN CHINESE

Cheng-Chieh Su
National Tsing Hua University

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.1 In section 3, we exhibit the syntactic and semantic

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1 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

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).
(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 is longer than that rope by half (of that rope*ij).’

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)  
    [DegP bi[AP Standard j exceed +predicate [DegP Standard, j exceed s(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.
To specify Larson’s VP shell analysis, simplified hierarchical structures of (6) and (7) are offered respectively below.

(8)
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) \[
[\text{IP} \text{Zhangsan} [\text{DegP} [\text{Deg' gao} [\text{AP Lisi} [\text{A'} A^0 \text{san gongfen}]]]]]
\]
In accounting for a phrasal comparative, Chao assumes that it derives in a way similar to (10). Once the morpheme \textit{bi} occurs, the comparative datum in the Spec of AP moves up to form a PP with \textit{bi}, and the degree predicative adjective is also overtly moved to the head of Deg, as shown in (11).

(11) \[
\begin{array}{c}
[IP \text{Zhangsan} \left[\text{DegP} \left[\text{Deg'} \left[\text{PP} \text{bi} \left[\text{NP Lisi}_i\right]\right]\right]\right]\left[\text{Deg'} \text{gao} \left[\text{AP Pro}_i \left[\lambda A^0 \text{sangongfen}\right]\right]\right]\right]\]
\end{array}
\]

Consequently, the phrasal comparative is derived via two syntactic movements, similar to Larson’s (1988) analysis of Double Object Construction (DOC). The \textit{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 \textit{bi}-clause is post-cyclically adjoined to the main clause and then undergoes PF-deletion operation. Both the \textit{bi}-phrase and the \textit{bi}-clause are preverbal adjuncts of the gradable predicate. It is suggested that the comparative datum is a contextually controlled \textit{PRO} in the DET position of AP. Given this, (12) can be derived as (13).

(12) \begin{align*}
\text{Zhangsan jintian} & \text{bi} & \text{Lisi zuotian gaoxing} \\
\text{Zhangsan today} & \text{COM} & \text{Lisi yesterday happy} \\
\text{‘Zhangsan is happier today than Lisi was yesterday.’}
\end{align*}

(13) \[
\begin{array}{c}
[IP \text{Zhangsan} \left[\text{DegP} \left[\text{Deg'} \left[\text{PP} \text{bi} \left[\text{CP Lisi zuotian gaoxing}\right]\right]\right]\right]\left[\text{Deg'} \text{gaoxing} \left[\text{AP Lisi} \left[\lambda A^0 \right]\right]\right]\right]\right]\]
\end{array}
\]

In a word, Chao argues that a phrasal comparative where \textit{bi} takes an NP derives from a DOC-comparative construal via transformation operations, namely a clausal comparative where \textit{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:

\[(14)\]
\[
\text{a. Zhangsan } \text{bi } \text{Lisi gao (san gongfeng)} \\
\text{Zhangsan com Lisi tall three centimeters} \\
\text{‘Zhangsan is taller than Lisi (by three centimeters).’}
\]
\[
\text{b. Zhangsan gao Lisi *(san gongfeng)} \\
\text{Zhangsan tall Lisi three centimeters} \\
\text{‘Zhangsan is taller than Lisi by three centimeters.’}
\]

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.

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

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.4

(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.5

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

4 A similar scenario occurs in Cantonese. See Mok (1998) for discussion.
5 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.’

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

(17)  
<table>
<thead>
<tr>
<th>a. Zhangsan song Lisi sheme</th>
<th>b. *Zhangsan gao Lisi sheme</th>
</tr>
</thead>
<tbody>
<tr>
<td>Zhangsan give Lisi what</td>
<td>Zhangsan tall Lisi what</td>
</tr>
<tr>
<td>‘What did Zhangsan give to Lisi?’</td>
<td></td>
</tr>
</tbody>
</table>

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)  
<table>
<thead>
<tr>
<th>a. Zhangsan song yi-ben shu gei</th>
<th>b. Zhangsan song gei Lisi yi-ben shu</th>
</tr>
</thead>
<tbody>
<tr>
<td>Zhangsan give one-CL book give</td>
<td>Zhangsan give Lisi one-CL book</td>
</tr>
<tr>
<td>Lisi</td>
<td></td>
</tr>
<tr>
<td>‘Zhangsan gave a book to Lisi.’</td>
<td>‘Zhangsan gave a book to Lisi.’</td>
</tr>
<tr>
<td>c. Zhangsan gao Lisi san gongfeng</td>
<td>d. *Zhangsan gao san gongfeng Lisi</td>
</tr>
<tr>
<td>Zhangsan tall Lisi three centimeter</td>
<td>Zhangsan tall three centimeter Lisi</td>
</tr>
<tr>
<td>‘Zhangsan is taller than Lisi by three centimeters.’</td>
<td>‘Int. Zhangsan is taller than Lisi by three centimeters.’</td>
</tr>
</tbody>
</table>

Briefly put, Chao argues for a phrasal manipulation of bi-comparatives, along a line similar to that of Xiang (2005), though Chao (2005) hypotheses 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
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).6

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6 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.

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.

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).
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(31)  Zhangsan jintian bi Zhangsan zuotian shufu
Zhangsan today com Zhangsan yesterday comfortable
‘Today Zhangsan feels better than Zhangsan was yesterday.’

(32)  Zhangsan, jintian bi Pro, 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.7

(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.’

7 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)  
\[
\begin{align*}
  \text{Zhangsan } & \text{ bi wo pao de kuai} \\
  \text{Zhangsan } & \text{ com I run DE fast}
\end{align*}
\]
‘Zhangsan runs faster than I.’

(44)  
\[
\begin{align*}
  \text{*Tamen } & \text{ bi wo ku de shoupa dou shi} \\
  \text{they } & \text{ com I cry DE handkerchief all wet le}
\end{align*}
\]
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)  
\[
\begin{align*}
  \text{a. Zhangsan } & \text{ pao de bi wo kuai} \\
  \text{Zhangsan } & \text{ run DE com I fast}
\end{align*}
\]
‘Zhangsan runs faster than I.’

\[
\begin{align*}
  \text{b. Zhangsan } & \text{ bi wo pao de kuai} \\
  \text{Zhangsan } & \text{ com I run DE fast}
\end{align*}
\]
‘Zhangsan runs faster than I.’

(46)  
\[
\begin{align*}
  \text{a. Zhangsan } & \text{ chi de bi wo kuai} \\
  \text{Zhangsan } & \text{ eat DE com I fast}
\end{align*}
\]
‘Zhangsan eats faster than I.’

\[
\begin{align*}
  \text{b. Zhangsan } & \text{ bi wo chi de kuai} \\
  \text{Zhangsan } & \text{ com I eat DE fast}
\end{align*}
\]
‘Zhangsan eats faster than I.’

(47)  
\[
\begin{align*}
  \text{a. Zhangsan } & \text{ zhuan de bi wo duo} \\
  \text{Zhangsan } & \text{ earn DE com I many}
\end{align*}
\]
‘Zhangsan earns more money than I.’

\[
\begin{align*}
  \text{b. Zhangsan } & \text{ bi wo zhuan de duo} \\
  \text{Zhangsan } & \text{ com I earn DE many}
\end{align*}
\]
‘Zhangsan earns more money than I.’

Second, when the verb is repeated, the \textit{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 PART 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 dao my GEN birthday will com you GEN arrive
(57) *Ta bi ni zuo shengyi he com you do business
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.
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
‘Zhangsan checks his assignments more carefully than
Lisi does.’

(70) *Zhangsan  geng  bi  Lisi  xiaoxin-de
Zhangsan  GENG  com  Lisi  carefully
jiancha  zuoye
‘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
‘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
‘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’, *jiandao* ‘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.’
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 constrictions (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 constrictions essentially have properties of *wh*-movement on the grounds that the postulated rules for relatives and questions can simply extend to comparative constructions.\(^8\) Chomsky begins with the data with the overt moved form in a dialect of English:

\(^8\) 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 subjacency, PIC (Phase Impenetrability Condition), and SSC (Sentential Subject Condition)
- c. it observes CNPC (Complex NP Constraint)
Cheng-Chieh Su

(78)    John is taller than what Mary is taller than.
(79)    John is taller than what Mary told us that Bill is taller than.

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_{wh}^{+wh} CP Mary knows [ NP the fact [ _ that Bill is]].
(82)    *John is taller than Q_{wh}^{+wh} CP Mary wonder [ CP 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 [ she was five years ago]
(84)    Mary isn’t the same as [ CP John believes [ CP that Bill claimed [ CP that she was five years ago]]]
(85)    *Mary isn’t the same as [ CP John believes [ NP Bill’s claim [ CP 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 [ CP OP Bill is d_{l}-much happy]

d. it observes wh-island constraints

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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 \[\text{\_CP}_\text{Op} \text{Bill is d\_\_\_}\]

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

(89) Mary isn’t different than what John believes that Bill claimed that she was 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).
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). (iii) an adjective or verb phrase within the bi-clause is deleted at PF (Bresnan 1973, 1975). (92) and (93) illustrate our assumptions.

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.
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 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

‘It is Zhangsan that runs fast, not the tiger.’

(96) *Shi Zhangsan pao de hen kuai, bu shi lao hu

‘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).10

10 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
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).

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.
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(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, zuotian zai xuexiao [CP bi [TP Pro, jintian
Zhangsan yesterday at school com today
zai jiali [DegP 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 congrming
‘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, zuotian [CP bi [TP Pro jintian [DegP kaixin]]]
Zhangsan yesterday com today happy
kaixin
happy
‘Zhangsan was happier yesterday than Zhangsan is today.’

(104)  Zhangsan, zai xuexiao [CP bi [TP Pro zai jiali [DegP kaixin]]] kaixin
Zhangsan at school com at home
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 [CP Op_i [bi [TPwo [TP zhiyou he only yesterday com I only jintian] [DegPd, 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.

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

In contrast, a Chinese equivalent is ungrammatical.

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

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. In summary, (119) refers to our line of reasoning.

(119) Clausal comparative in Chinese and English

<table>
<thead>
<tr>
<th>Comparative deletion</th>
<th>Identical comparison predicate</th>
<th>Example</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Juxtaposition comparative</strong></td>
<td></td>
<td></td>
</tr>
<tr>
<td>no</td>
<td>optional</td>
<td>Zhangsan (hen) gao, Lisi geng gao</td>
</tr>
<tr>
<td></td>
<td></td>
<td>Nazhang zhuozi (hen) chang, (danshi) zhezhang zhuozi geng kuan</td>
</tr>
<tr>
<td>no</td>
<td></td>
<td>This table is wider than that desk is long.</td>
</tr>
<tr>
<td>yes</td>
<td>yes</td>
<td>John is taller than Bill is tall.</td>
</tr>
<tr>
<td><strong>Adposition comparative</strong></td>
<td>yes</td>
<td>yes</td>
</tr>
</tbody>
</table>

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.

---

11 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 is happier than Lisi.’

(121)  Zhangsan[CP[Op, bi [TP[Lisi [DegP[di[AP kaixin]]]]]]] kaixin

Below is a tree structure of (121).

(122)  Zhangsan bi Lisi kaixin

\[
\begin{array}{c}
\text{VP} \\
\text{Zhangsan} \\
\text{DegP} \\
\text{[Op, bi [Lisi[DegP[di[AP kaixin]]]]]} \\
\text{Deg'} \\
\text{Deg^0} \\
\text{ [+comparative]} \\
\text{AP} \\
\text{kaixin}
\end{array}
\]

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.\textsuperscript{12} 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.\textsuperscript{13}

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:

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

\textsuperscript{12} 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.

\textsuperscript{13} 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).
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(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-XP's 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. 14

14 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).
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)

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:

In both (129) and (130), \( AP'_E \) does entail F-clo(\( AP'_A \)), given in (132) and (133), we know that \( AP'_E \) also entails the F-closure of \( AP'_A \), since the two are identical and mutually entailed.\(^\text{15}\)

\(^{15}\) 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)

```
XP
  /   
XP   DegP_i
    /     
  ...   Deg
     /   
  AP    Deg clause
    |     
DegP_i AP
  |     
-er   tall
```

(2) Late Merge

(1) QR

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: $[\text{DegP} [\text{Deg} [\text{QP} [\text{Q} [\text{AP} [\text{A}]]]]]]$

b. Adjectival phrase in Chinese: $[\text{DegP} [\text{Deg} [\text{AP} [\text{A}]]]]$

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\(^0\) 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. 16 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.

---

16 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.
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). 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  [caOp][  bi  [TP wo  pao de  kuai]]  
Zhangsan  com  I  run  DE  
fast  run  DE  fast  
‘Zhangsan runs faster than I.’

---

17 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 [CP Op x] [bi [TP wox (pao de)] [DegP d] [AP
        Zhangsan run DE com I run DE
        Pro 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).

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.

---

18 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 V₂ is the main verb and V₁-NP sequence serves as a deverbalized adjunct modifying V₂ (see Huang 1982, 1992 for discussion). 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

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19 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)  张三 bi  wo pao bu pao de kuai
       Zhangsan com I run step run DE fast
       ‘Zhangsan runs faster than I.’

(148)  张三[Op][bi][TP wo][VP pao bu][V pao de][AP Pro]
       Zhangsan com I run step run DE
       kuai)]]]]] pao bu pao de kuai
       fast run step run DE fast
       ‘Zhangsan runs faster than I.’

(149)  张三 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)  张三 pao bu [Op][bi][TP wo][VP (pao bu)][V pao de]
       Zhangsan run step com I run step run DE
       d[Pro, kuai)]]]]]] pao de kuai
       fast run DE fast
       ‘Zhangsan runs faster than I.’

(151)  张三 pao bu pao de bi wo kuai
       Zhangsan run step run DE com I fast
       ‘Zhangsan runs faster than I.’

(152)  张三 pao bu pao de [Op][bi][TP wo][VP pao bu]
       Zhangsan run step run DE com I run step
       pao de][Pro kuai)]]]]] kuai
       run DE fast fast
       ‘Zhangsan runs faster than I.’

(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
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
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
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. 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

---

20 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.’

21 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.

\[(158)\]  
\[\text{Zhangsan yongyou bi wo (geng) duo de}\]  
\[\text{Zhangsan have com I GENG many PRT}\]  
\[\text{mao}\]  
\[\text{cat}\]  
\[\text{‘Zhangsan has more cats than I have.’}\]

\[(159)\]  
\[\text{Zhangsan bi wo yongyou (geng) duo de}\]  
\[\text{Zhangsan com I have GENG many PRT}\]  
\[\text{mao}\]  
\[\text{cat}\]  
\[\text{‘Zhangsan has more cats than Lisi has.’}\]

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

\[(160)\]  
\[\text{Zhangsan yongyou [Op[ bi[TP wo[VP yongyou [DP\]}}\]  
\[\text{Zhangsan have com I have}\]  
\[\text{d[duo\] de mao]}\]  
\[\text{geng\] duo de}\]  
\[\text{many PRT cat GENG many PRT}\]  
\[\text{mao}\]  
\[\text{cat}\]  
\[\text{‘Zhangsan has more cats than I have.’}\]

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
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SpecDP, when the bi-clause occurs between the subject and the degree adverb.\(^{22}\)

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.

\[\begin{align*}
(161) & \quad \text{Zhangsan } \text{[Op][bi[TPwo][VP yongyou [bi [d[duo] de mao]]]]] yongyou (geng) duo de mao cat have GENG many PRT cat 'Zhangsan has more cats than I have.'
\end{align*}\]

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.

\[
\begin{array}{|c|c|}
\hline
\text{bi-clause} & \text{Example} \\
\hline
\text{SpecDegP} & \text{Zhangsan yongyou [bi wo] (geng) duo de mao} \\
\hline
\text{VP adverbial} & \text{Zhangsan [bi wo] yongyou (geng) duo de mao} \\
\hline
\end{array}
\]

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.

\[\begin{align*}
\text{Zhangsan yongyou [bi wo] (geng) duo de mao cat have GENG many PRT cat 'Zhangsan has more cats than I have.'}
\end{align*}\]

\[\begin{align*}
\text{SpecDegP} & \text{adjoined onto the SpecVP rather than onto the SpecDegP.}
\end{align*}\]

\[\begin{align*}
\text{specification of a degree phrase seems to fall short of independent support. To strengthen our position, we would like to provide evidence in favor of such a hypothesis.}
\end{align*}\]

\[\begin{align*}
\text{Language-internal evidence is in support of our line of argumentation. The well-formedness of the following sentences felicitously justifies it.}
\end{align*}\]

\[\begin{align*}
\text{Considering the syntactic configuration of the particle \textit{de}, one can also consult Tang (2006), Shi (2008). They differ in assuming the representational configuration of \textit{de}.}
\end{align*}\]
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.²³

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.

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

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.

²³ 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).24 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 [CP [bi [TP Lisi [DegP d [xihuan Xiaoyu]]]]]
       Zhangsan com Lisi like Xiaoyu
       xihuan Xiaoyu
       like Xiaoyu
       ‘Zhangsan likes Xiaoyu more than Lisi likes Xiaoyu.’

b. *Zhangsan [CP [bi [TP Zhangsan [DegP d [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.

24 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)

\[
\text{ConjP} \quad \text{External conjunct} \quad \text{Conj'} \quad \text{Internal conjunct}
\]

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: 25

---

25 For ease of exposition, we do not show explicitly the labels in the hierarchical structures of the two conjuncts.
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).
However, this analysis is undermined since (i) the surface word order is not correctly derived (*ta zuotian zai xuexiao kaixin bi wo jitian zai jiali). (ii) there is no evidence bearing on any theoretical consideration to copy a constituent from within one conjunct to another. 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).

---

26 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 jiaqian ma?

‘Did you compare the prices for these two houses?’

(177)  Nali you yi-zhi kongque, wo bi gei ni kan

‘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

‘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 hao

‘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).²⁷

---

²⁷ 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)  
\[
\begin{array}{cccc}
\text{Ni} & \text{bi} & \text{bu} & \text{bi} \text{ ta gao?} \\
\text{you com} & \text{NEG com he tall}
\end{array}
\]

‘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)  
\[
\begin{array}{cccc}
\text{Ni} & \text{bi} & \text{ta gao le} & \text{bu shao} \\
\text{You com he tall ASP NEG few}
\end{array}
\]

‘You are taller than him to an extent.’

(182)  
\[
\begin{array}{cccc}
\ast\text{Ni} & \text{bi} & \text{bu} & \text{bi ta gao le bu shao?} \\
\text{You com NEG com he tall ASP NEG few}
\end{array}
\]

‘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.  

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28 See Lin (2009), Liu (2010a) for further discussion.
Cheng-Chieh Su

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Cheng-Chieh Su


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Cheng-Chieh Su
Graduate Institute of Linguistics
National Tsing Hua University
chengchiehsu@gmail.com
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进行了考察與描述，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