Without Degree Phrase: The Syntax of Chinese 'Phrasal' and 'Clausal' *bi*-Comparatives

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ABSTRACT

This dissertation deals with the syntactic structure of Chinese 'phrasal' and 'clausal' *bi*-comparatives by mainly addressing the following issues from a minimalist perspective: the role of differential phrases, an asymmetry concerning the co-occurrence of some modals and *bi*-phrases, and the obviation of the Condition C effect.

In the first two chapters, I will present a background for the analyses in later chapters, including descriptive properties of Chinese comparatives, a few problems to be discussed, and previous studies. Chapter 3 presents an analysis of some fundamental issues, including the parallelism requirement on the compared constituents, the adverbial status of *bi*-phrases, and Chinese *bi*-comparatives as underlyingly clausal comparatives. Most importantly, I argue that the unavailability of sub-comparatives in Chinese is due to the nature of the complement of the morpheme *bi* – a non-finite clause.

Chapter 4 tackles the syntax of Chinese 'phrasal' *bi*-comparatives. I argue against the prevailing assumption that there is a projection of a Degree Phrase (DegP) in Chinese comparatives. Instead, I will argue for other projections, such as Comparison Predication Phrase (CPredP), Aspect Phrase (AspP), and Focus Phrase (FocP). In particular, I will address an asymmetry concerning the co-occurrence of some modals and *bi*-phrases by resorting to the feature-checking theory.

Chapter 5 deals with the syntax of Chinese 'clausal' *bi*-comparatives by adopting the configuration of Remnant Movement as originally proposed for German. Maintaining the arguments made in Chapter 4 and then taking the information structure of Chinese into account, I will explicate a more complicated phenomenon regarding the co-occurrence of some modals and *bi*-phrases. Furthermore, the cancellation of the Condition C effect in Chinese *bi*-comparatives, as noted before but not well handled, will receive a satisfactory explanation based on Remnant Movement analysis. Chapter 6 is a conclusion.

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In this dissertation, a number of language examples, including Chinese, English, Japanese, German and Italian, are used to support various arguments demonstrated in each chapter. Thus, these examples of sentences are not listed below.

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AUTHOR'S DECLARATION

I declare that this dissertation is a presentation of original work and I am the sole author. This work has not previously been presented for an award at this, or any other, University. All sources are acknowledged as References.

Chapter 1   Introduction

Comparative structures in Mandarin Chinese, for the past few decades, have enjoyed much attention, especially the type of structures involving the use of the morpheme *bi*. The exact nature of *bi*-comparatives is still debatable, evidenced by various views, such as phrasal analysis (e.g., Paul, 1993; Lin, 2009) or clausal analysis (e.g., Liu, 1996; Erlewine, 2017). Leaving these divisive views aside, some phenomena have long been neglected: the optionality of differential phrases, the structural flexibility of *bi*-phrases and the obviation of the Condition C effect, in Chinese *bi*-comparatives. By tackling these issues and taking the information structure of Chinese into account, this thesis aims to provide a formal account for the internal structure of Chinese *bi*-comparatives. In this introductory chapter, I will first outline some descriptive properties of Chinese comparatives. Then, some research questions will be formulated, which is the basis of all the arguments made in later chapters. Finally, I will briefly lay out the organization of each chapter of the dissertation.

1.1.   Descriptive Properties of Chinese *bi*-Comparatives

In this section, I will first describe some general properties of Chinese *bi*-comparatives from three perspectives: the category and number of constituents in *bi*-phrases, constraints on compared phrases and *bi*-phrases, and the type of predicates. Then, I will give a short description of another type of comparatives in Chinese in which the morpheme *bi* is absent, called "bare comparatives" (Xiang, 2005) or "transitive comparatives" (Erlewine, 2007).

1.1.1. Chinese *bi*-comparatives

The most common way of expressing comparative meanings in Mandarin Chinese is to use the morpheme *bi*, which exhibits the pattern schematized as in (1).

(1) <u>The Compared</u> ***bi*** <u>The Standard</u> <u>Predicate</u> (Differential Phrase)

(2) a. Yuehan   bi   Mali   **gao**   (wu   gong-fen).

      John   BI   Mary   tall   five   centimeter

      "John is (five centimeters) taller than Mary."

   b. Yuehan   bi   Mali   **xihuan**   jufaxue.

      John   BI   Mary   like   syntax

      "John likes syntax more than Mary does."

It is generally believed that differential phrases (hereafter, DiffP) in Chinese *bi*-comparatives are optional. One basic requirement for comparison predicates is that they have to be gradable, either adjectives or verbs, as can be seen in the examples in (2a-b) (Li & Thompson, 1981).

1.1.1.1. The Category and Number of Constituents in The *bi*-Phrase

The types of constituents that can be in *bi*-phrases include DPs, AdvPs, PPs, *bei* phrases (i.e., a passive structure), reason clauses or clauses (Liu, 2011), as illustrated by (3a – f) respectively.

(3) a. Yuehan   [bi   <u>Mali</u>]   piaoliang.

      John   BI   Mary   beautiful

      "John is more beautiful than Mary."

   b. Yuehan   jintian   [bi   <u>zuotian</u>]   kaixin.

      John   today   BI   yesterday   happy

      "John is happier today than he was yesterday."

   c. Yuehan   zaijia   [bi   Mali   <u>zaixuexiao</u>]   shufu.

      John   at-home   BI   Mary   at-school   comfortable

      "John feels more comfortable at home than Mary does at school."

   d. Yuehan   bei   fuqin   [bi   <u>bei   muqin</u>]   ma-de   can.

      John   BEI   father   BI   BEI   mother   scold-DE   severely

      "John was scolded more severely by his father than he was scolded by his mother."

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e. Yuehan   yinwei   xi   du   [bi   yinwei   da   ren]   geng

    John   because   take   drug   BI   because   assault   people   even-more

    keneng   zuonao.

    possible   put-into-prison

 "John is more likely to go to prison for taking drugs rather than assaulting other people."

f. Yuehan   chi   fan   [bi   Mali   chi   fan]   kuai.

    John   eat   food   BI   Mary   eat   food   fast

    "John eats food faster than Mary does."

From these examples, it can also be seen that the number of constituents in the standard phrase introduced by the morpheme *bi* can be one, such as (3a), or more than one, such as (3c). Note that, in (3f), the compared phrase and the *bi*-phrase both contain a clause, in which, according to Liu (1996, 2011) and Shi (2001), the constituents form a subject-predicate relation and then belong to a single phrase. Thus, even though surface forms of examples like (3f) consist of more than one constituent introduced by the morpheme *bi*, they are nevertheless classified as having one standard constituent. In short, a range of constituent types can appear in Chinese *bi*-comparatives, and the number of constituents in *bi*-phrases can be one or more than one.

1.1.1.2. The Constraints on The *bi*-Phrase

From the previous section, different types of constituents in Chinese *bi*-comparatives can be compared and the number of constituents in the standard phrase can be one or more than one. In general, four constraints exist among the standard phrase. First, constituents in the *bi*-phrase should be underlyingly parallel to their correlates in the compared phrase in terms of category, syntax and semantics (e.g., Tsao, 1989; Liu, 2011).

(4) a.   Yuehan   bi   Mali   gaoxing.

    John   BI   Mary   happy

    "John is happier than Mary."

b. * Yuehan   bi   zuotian   gaoxing

John   BI   yesterday   happy

"John is happier than yesterday."

The example (4a) describes the comparison between *Yuehan* (John) and *Mali* (Mary) along the dimension of happiness, which can be felicitous in different contexts. Yet, in (4b), *Yuehan* (John) is compared with *zuotian* (yesterday) in terms of their respective degree of happiness, which is semantically ill-formed.

Second, when more than one constituent is involved in the *bi*-phrase, the word order within it is not flexible, but has to be "subject – temporal adjunct – locative adjunct" (Liu, 2011:1775), as demonstrated by the contrasts in (5) and (6).

(5) a. Yuehan   jintian   [bi   Mali   zuotian]   kaixin.

John   today   BI   Mary   yesterday   happy.

"John is happier today than Mary was yesterday."

b. * jintian   Yuehan   [bi   zuotian   Mali]   kaixin.

today   John   BI   yesterday   Mary   happy

(6) a. Yuehan   jintian   zaijia   [bi   Mali   zuotian   zaixuexiao]   kaixin.

John   today   at-home   BI   Mary   yesterday   at-school   happy

"John is happier today at home than Mary was yesterday at school."

b. * jintian   zaijia   Yuehan   [bi   zuotian   zaixuexiao   Mali]   kaixin.

today   at-home   John   BI   yesterday   at-school   Mary   happy

In (5b) and (6b), the word order "temporal adjunct – subject" or "temporal adjunct – locative adjunct – subject" in the *bi*-phrase obviously leads to ungrammaticality.

Third, Chinese *bi*-comparatives disallow subcomparative deletion in the syntax (Tsao, 1989; Erlewine, 2007; Liu, 2011), as illustrated by (7a-b).

(7) a. * zhe   zhang   zhuozi   [bi   na   ba   yizi   kuan]   chang.

       this   CL[1]   desk   BI   that   CL   chair   wide   long

    b. This desk is longer than that chair is wide.

However, subcomparatives are available in the semantics in Chinese comparatives, as in (8).

(8)   zhe   zhang   zhuozi   de[2]   changdu   [bi   na   ba   yizi   de   kuandu]   da

       this   CL   desk   DE   length   BI   that   CL   chair   DE   width   big

       "The length of this desk is bigger than the width of this chair."

Fourth, unlike English, which has embedded comparatives, Chinese does not allow this type of constructions. Consider the contrast between (9a) and (9b) (Xiang, 2005; Erlewine, 2007; Lin, 2009; Liu, 2011).

(9) a. John is taller than Tom thinks Mary is.

    b. * Yuehan   [bi   [Tangmu   renwen   [Mali]]]   gao.

       John   BI   Tom   think   Mary   tall

       Intended meaning: "John is taller than Tom thinks Mary is."

1.1.1.3. The Type of Predicates in Chinese *bi*-Comparatives

In general, there are three types of predicates in Chinese comparatives that can take *bi*-phrases and produce comparative meanings (Liu, et al., 1983; Shi, 2001; Su, 2012). The first type is usually gradable adjectives, which means that properties denoted by the predicate can be measured in some way. However, if an adjective is not scalable, it cannot be the comparison predicate. Consider the following examples.

(10) a. Yuehan   bi   Mali   **piaoliang**.

       John   Bi   Mary   beautiful

       "John is more beautiful than Mary."

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[1] The basic nominal structure in Chinese is as follows: Number + Classifier + Noun (Huang, et al., 2009). Here, "classifier" is abbreviated as CL.
[2] A morpheme indicates genitive forms in Chinese.

b. * Yuehan   bi   Mali   **zhuyao**.

John   BI   Mary   main

Piaoliang (beautiful) in (10a) is a gradable adjective, indicating that the difference between the beautifulness of John and Mary can be measured, while *zhuyao* (main) is a non-scalable adjective in Chinese that renders the comparison between John and Mary impossible.

Verbs can be another type of comparison predicates in Chinese *bi*-comparatives as long as they are scalable, such as emotional verbs, e.g., *xihuan* (like) in (11a) and *taoyan* (hate) in (11b) (Liu, et al., 1983).

(11) a. Yuehan   bi   Mali   **xihuan**   yuyanxue.

John   BI   Mary   like   linguistics

"John likes linguistics more than Mary does."

b. Yuehan   bi   Mali   **taoyan**   shuxue.

John   BI   Mary   hate   mathematics

"John hates mathematics more than Mary does."

Also note that when the comparison predicate is an emotional verb, its object can never be the compared item (Shi, 2001; Liu, 2011), as illustrated by the contrast in (12).

(12) a. John likes dogs more than cats.

b. * Yuehan   bi   **mao**   xihuan   **gou**.

John   BI   cat   like   dog

Non-scalable verbs can also be comparison predicates when certain elements, such as modals, e.g., *neng* (can), or degree adverbs, e.g., *duo* (much), appear in the syntax. In these cases, the presence of a modal (13a) or a degree adverb (13b) would bring about gradability that can be measured, which remedies the grammaticality (Su, 2012).

(13) a. Yuehan   bi   Mali   *(**neng**)   chi   shuiguo.

John   BI   Mary   can   eat   fruit

"John can eat more fruit than Mary does."

b. Yuehan　　　bi　　Mali　　*(**duo**)　　kan-le[3]　　san-ben　　xiaoshuo.

　　John　　　BI　　Mary　　much　　read-ASP　　three-CL　　novels

　　"John has read three more novels than Mary does."

In (13a-b), *chi* (eat) and *kan* (read) per se are not gradable, but a modal or a degree adverb that denotes gradability can help them turn into comparison predicates. In addition, Chinese *bi*-comparatives sometimes resort to a VP as a part of a comparison predicate, such as *you xingqu* (have interest) in (14).

(14) Yuehan　dui　juefaxue　bi　　dui　yuyixue　***geng***　　**you　xingqu**.

　　John　　to　syntax　　BI　　to　semantics　even-more　have　interest

　　"John is even more interested in syntax than semantics."

In this example, as pointed out by Shi (2001), the semantic content of VP – *you xingqu* (have interest) is gradable, which qualifies it as a comparison predicate.

The last type of predicates is complex gradable predicates, since comparatives of this kind are built on a special construction involving the use of the morpheme *de*[4], as illustrated by (15) (Huang, et al., 2009).

(15) Yuehan　　　pao-de　　　kuai.

　　John　　　run-DE　　　fast

　　"John runs very fast."

It has been claimed that, in this case, *kuai* (fast) is a primary predicate and *pao* (run) is a secondary predicate (Huang, 1988). Interestingly, comparatives built on examples like (15) display various surface forms.

(16) a. Yuehan　　[bi　　Mali]　　**pao-de**　　kuai.

　　John　　　BI　　Mary　　run-DE　　fast

　　"John runs faster than Mary."

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[3] An aspect maker in Mandarin Chinese, which usually indicates a perfective state in this case.

[4] This is not the same morpheme indicating genitive form in the example (8), *de* here is a different Chinese character even if they have the same pronunciation.

b. Yuehan   **pao-de**   [bi   Mali]   kuai.

John   run-DE   BI   Mary   fast

"John runs faster than Mary."

The verb in (16a-b) can also be copied, exhibiting verb-copying constructions[5] in Chinese. Consider (17a-b).

(17) a. Yuehan   [bi   Mali]   **pao**   bu   **pao**-de   kuai.

John   BI   Mary   run   step   run-DE   fast

"John runs faster than Mary."

b. Yuehan   **pao**   bu   **pao**-de   [bi   Mali]   kuai.

John   run   step   run-DE   BI   Mary   fast

"John runs faster than Mary."

In these two examples, even if the verb *pao* (run) is copied, the meanings are not changed. However, in terms of the position of the *bi*-phrase, it can precede or follow *pao-de* (run-DE) in (16a-b) and *pao bu pao-de* (run steps run-DE) in (17a-b), but it always precedes *kuai* (fast). Thus, I maintain that *kuai* (fast) is the comparison predicate in this type of constructions, and the structural flexibility of *bi*-phrases is due to certain rules of comparison ellipsis, which will be explicated in later chapters.

1.1.2. Chinese Transitive Comparatives

Another type of Chinese comparatives, called 'bare comparatives' (Xiang, 2005) or 'transitive comparatives' (Erlewine, 2007), exhibits a different word order compared to *bi*-comparatives, along with the absence of the morpheme *bi*, as schematized in (18).

(18) <u>The Compared</u>   <u>Predicate</u>   <u>The Standard</u>   <u>DiffP</u>

(19) Yuehan   gao   Mali   wu   gong-fen.

John   tall   Mary   five   centimeter

"John is five centimeters taller than Mary."

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[5] The internal structure of verb-copy constructions will be explained in Chapter 5.

Based on the example in (19), the comparison predicate precedes the standard phrase; however, in Chinese *bi*-comparatives, the word order is reversed. The differential phrase in this case is obligatory, as always claimed (e.g., Tsao, 1990; Xiang, 2005; Erlewine, 2007). A word of caution is in order here. Not every gradable adjective can be used in transitive comparatives, as shown by the contrasts in (20) and (21).

(20) a. Yuehan   bi   Mali   **xixin**   yidian.

      John   BI   Mary   careful   a bit

      "John is a bit more careful than Mary."

  b. * Yuehan   **xixin**   Mali   yidian.

      John   careful   Mary   a bit

(21) a. zhe-gen   zhuzi   bi   na-gen   zhuzi   **chang**   yidian.

      this-CL   pillar   BI   that-CL   pillar   long   a bit

      "This pillar is a bit longer than that pillar."

  b. zhe-gen   zhuzi   **chang**   na-gen   zhuzi   yidian

      this-CL   pillar   long   that-CL   pillar   a bit

      "This pillar is a bit longer than that pillar."

Contrasts shown above indicate that the selection of gradable adjectives in transitive comparatives is constrained. According to Xiang (2005:165), the adjectives that can be used in both types of Chinese comparative are called "the free adjectives", and the ones that cannot are called "the constrained adjectives". This constraint, at least, suggests that Chinese transitive comparatives are severely restricted, and are not completely interchangeable with Chinese *bi*-comparatives.

1.1.3. Interim Summary

In general, the basic properties of Chinese *bi*-comparatives can be briefly summarized as follows: (A) compared constituents can be DPs, AdvPs, PPs, VPs or clauses, and the number of the constituents in *bi*-phrases can be one or more; (B) the constituents in the standard phrase

should be underlyingly parallel to their correlates in the compared phrase in terms of category, syntax and semantics, and the word order within the compared phrase and the standard phrase is not flexible; (C) subcomparatives and embedded comparatives are disallowed in syntax; (D) three types of comparison predicates exist, including gradable adjectives, verbs (scalable verbs and the combination of a modal or a degree adverb with a non-scalable verb), and complex predicates. In terms of transitive comparatives, the selection of comparison predicates is severely constrained, not entirely interchangeable with Chinese *bi*-comparatives.

1.2. The Problems to be Discussed

Following the basic properties of Chinese *bi*-comparatives outlined above, there arise a number of questions concerning the internal structure of this type of constructions, of which I will select only the ones that are relevant to the present dissertation. To be more specific, I will limit myself mostly to the following sets of phenomena: the optionality of differential phrases, the structural flexibility of *bi*-phrases (i.e., standard phrases), and the obviation of the Condition C effect (Liu, 2014). A satisfying account for these issues is essential for further investigation into the internal structure of Chinese *bi*-comparatives.

To start with, one such question is the optionality of differential phrases in the surface structure, whose importance has been underestimated, as in (2a), repeated in (22a).

(22) a. Yuehan   bi   Mali   **gao**   (wu   gong-fen).

     John   BI   Mary   tall   five   centimeter

     "John is (five centimeters) taller than Mary."

     b. Yuehan   bi   Mali   **gao-le/chu**   wu   gong-fen.

     John   BI   Mary   tall-ASP   five   centimeter

     "John is (five centimeters) taller than Mary."

The contrast between (22a) and (22b) is that while they are essentially the very same structure, in (22b), there is an aspect marker *-le* or *-chu* attached to the comparison predicate, along with

the obligatory presence of a differential phrase. The difference and relatedness in examples like (22a) and (22b) will be accounted for by adopting the functional projection of Aspect Phrase (AspP) in Mandarin Chinese.

Second, *bi*-phrases are structurally flexible when co-occurring with modals, such as *yinggai* (should), which must also be explained.

(23) a. Yuehan   **yinggai**   bi   Mali   gao.

     John   should   BI   Mary   tall

     "John may be taller than Mary."

     b. * Yuehan   bi   Mali   **yinggai**   gao.

       John   BI   Mary   should   tall

       "John may be taller than Mary."

(24) a. Yuehan   **yinggai**   bi   Mali   gao   wu   gongfen.

     John   should   BI   Mary   tall   five   centimeter

     "John may be five centimeters taller than Mary."

     b. Yuehan   bi   Mali   **yinggai**   gao   wu   gongfen.

       John   BI   Mary   should   tall   five   centimeter

       "John may be five centimeters taller than Mary."

As shown by the examples in (23), while co-occurring with the epistemic expression *yinggai* (should), the *bi*-phrase can only follow it if there is no differential phrase; conversely, the presence of a differential phrase, as in (24), seems to permit the structural flexibility of the *bi*-phrase that can either precede or follow the epistemic expression. This phenomenon is more clearly indicated by Chinese 'clausal' *bi*-comparatives, as in (25).

(25) a. Yuehan   **yinggai**   <u>qi</u>   <u>ma</u>   bi   Mali   qi   che   qi-de   kuai   yixie.

       John   should   ride   horse   BI   Mary   ride   bike   ride-DE   fast   a little

       "John may ride horses a little faster than Mary rides bikes."

b. Yuehan <u>qi   ma</u> **yinggai** bi Mali qi che qi-de kuai yixie.

   John ride horse should BI Mary ride bike ride-DE fast a little

   "John may ride horses a little faster than Mary rides bikes."

c. Yuehan <u>qi   ma</u> bi Mali qi che qi-de **yinggai** kuai yixie.

   John ride horse BI Mary ride bike ride-DE should fast a little

   "John may ride horses a little faster than Mary rides bikes."

From these examples, it can be discerned that the *bi*-phrase in (25) is equally structurally flexible. On the other hand, based on the surface structure, the *v*P *qi ma* (ride horse) in the compared phrase may occupy a position higher than that of the modal, as evidenced by (25b) and (25c). Then, it is not unreasonable to assume that Chinese 'clausal' *bi*-comparatives involve *v*P movement in its derivation. In other words, prior to movement, a *v*P may have been undergone sub-extraction of an element out of it, and then the *v*P continues to move upwards in the tree successively, resembling the general configuration of Remnant Movement. This will be explicated further in Chapter 5. With respect to the structural flexibility of *bi*-phrases, its correlation with differential phrases and modals may be an important factor in analyzing the internal structure of Chinese *bi*-comparatives.

Finally, another critical question to be answered is how to account for the obviation of the Condition C effect in Chinese *bi*-comparatives noted by Liu (2014), as shown in (26).

(26) wo jiao ta$_{i/j}$ [bi Yuehan$_i$ jiao wo] duo zuo-le san-jian shi[6].

   I require him BI John require me much do-ASP three-CL work

   "I require him$_{i/j}$ to do three more works than John$_i$ requires me to do."

Following Liu (2011), every constituent in the *bi*-phrase should be c-commanded by its correlate in the compared phrase. Yet, this proposal clearly contradicts the Condition C of Binding Theory, since *Yuehan* (John), as an R-expression, should be free, which indicates that (26) is supposed to be ungrammatical. With respect to the conflict between the requirement of

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[6] According to my informants, the pronoun *ta* (him) can refer to *Yuehan* (John) or someone else under the conversational context.

c-command in Chinese *bi*-comparatives (Liu, 2011) and the Binding Theory, the well-formedness of (26) calls for further explanations. The proposed solution in this thesis may be attributed to *v*P movement mentioned above, showing that the *v*P *jiao ta* (require him) in the compared phrase is not base-generated, but moved from a lower position. In addition, the role of information structure has to be taken into account: the reason why *v*Ps move is that a contrastive relationship between the compared phrase and the standard phrase needs to be established. My analysis hence will crucially differ from covert movement of Degree Phrase (DegP) at LF (e.g., Liu, 1996, 2011, 2018) that assumes the existence of a covert comparative morpheme in Chinese *bi*-comparatives.

The core problem to be dealt with in this dissertation is the syntax of Chinese 'phrasal' and 'clausal' *bi*-comparatives, and all is conducted under a minimalist framework (e.g., Chomsky, 1995, 2001, 2004). Even if much attention has paid to comparative structures, the above-mentioned questions that have not been answered successfully provide meaningful insights for a better formal account of syntactic mechanism of comparatives in Chinese.

1.3. The Organization of the Dissertation

The goal of this dissertation is to address those syntactic issues laid out above by re-analyzing the internal structure of Chinese *bi*-comparatives. In Chapter 2, I will provide an overview of some previous studies regarding the syntactic structure of Chinese *bi*-comparatives. Chapter 3 accounts for some fundamental issues, laying foundations to further analyses in later chapters. Chapter 4 deals with the internal structure of Chinese 'phrasal' *bi*-comparatives, namely the type of constructions involving only one constituent in both the compared phrase and the standard phrase. Chapter 5 investigates the internal structure of Chinese 'clausal' *bi*-comparatives, i.e., those involving more than one constituent in both the compared phrase and standard phrase. Chapter 6 is the conclusion.

Chapter 2　Previous Studies on Chinese *bi*-Comparatives

In this chapter, I offer an overview of some relevant literature on Chinese comparatives, mostly focusing on Chinese *bi*-comparatives. Even if various syntactic structures have been assigned to this type of constructions in Chinese, I will restrict myself to specifically discussing how earlier accounts analyze the role of standard phrases (i.e., *bi*-phrases) and the morpheme *bi*. I will review four views concerning the status of the morpheme *bi*, and further show the problematic aspects that these analyses have.

2.1. *bi* as A Preposition – Liu (1996, 2011)

Liu (1996), based on Larson & May (1990), analyzes Chinese *bi*-comparatives as clausal comparatives by positing that an I' gap exists in *bi*-phrases, which is an instance of antecedent-contained deletion (ACD). Two pieces of evidence are provided to argue for the existence of such an I' gap. Consider the following example first.

(27) Yuehan　　jintian　　[bi　　Mali　　zuotian]　　　kaixin.

　　　John　　　today　　　BI　　Mary　　yesterday　　　happy

　　　"John is happier today than Mary was yesterday."

Since there is no predication relation in the *bi*-phrase in (27), *Mali* (Mary) and *zuotian* (yesterday), according to Liu (1996:222), do not form a syntactic constituent. In addition, the temporal adjunct, *zuotian* (yesterday), also needs to be licensed by T^0 based on Travis' (1988) adjunct licensing theory. Then it is plausible to assume that there is an empty predicate inside the *bi*-phrase.

Another example that supports this claim comes from verb-copy constructions in Chinese.

(28) a. Yuehan   [$_{V1}$ qi]   ma   [$_{V2}$ qi]-de[7]   kuai.

John   ride   horse   ride-DE   fast

"John rides horses very fast."

b. Yuehan   **qi**   ma   [bi   Mali   **qi**   che]   qi-de   kuai.

John   ride   horse   BI   Mary   ride   bike   ride-DE   fast

"John rides horses faster than Mary rides bikes."

c. * Yuehan   **qi**   ma   [bi   Mali   **la**   che]   qi-de   kuai.

John   ride   horse   BI   Mary   pull   cart   ride-DE   fast

"John rides horses faster than Mary pulls a cart."

In verb-copy constructions, such as (28a), it is generally assumed that V$_2$ is a copy of V$_1$ since a verb cannot take more than one kind of complement at a time in Chinese and V$_2$ is the main predicate (e.g., Huang, 1988). With this in mind, if there is no gap in (28b), we could predict that (28c) is grammatical, but the prediction is not borne out even if they have the same structure. Yet, if (28b-c) are assumed to be gapped structures, the ungrammaticality of (28c) can be accounted for by resorting to reconstruction. In gapped constructions, the gap is supposed to be interpreted in the same way as its counterpart in the main clause (Liu, 1996:223), and the reconstruction of (28c) is as follows:

(29) * Yuehan   qi   ma   [bi   [Mali   **la**   che   **qi**-de   kuai]]   qi-de   kuai.

John   ride   horse   BI   Mary   pull   cart   ride-DE   fast   ride-DE   fast

As explained by Huang (1988), two verbs have to be identical with each other. Within the *bi*-phrase, this is obviously not the case, since *qi* (ride) is the main predicate and *la* (pull) is the reduplicated form, which is inconsistent with the basic configuration of very-copy constructions. Thus, Chinese *bi*-comparatives can be reasonably assumed to have a gap in the *bi*-phrase.

Further, Liu (1996:224) argues that the gap in examples like (27) is an empty I'. Evidence for

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[7] The morpheme *de*, suffixed to the verb, introduces a constituent that describes the result or manner of an event (Huang, et., al. 2009). In this case, *kuai* (fast) introduced by *de* represents the manner of the event 'riding horses'.

this argument comes from VP deletion in Chinese, as shown by the contrast in (30).

(30) a. Yuehan   xihuan   jufaxue,   Mali   ye   shi   [VP e].

      John   like   syntax   Mary   also   is

      "John likes syntax, so does Mary."

    b. * Yuehan   xihuan   jufaxue,   Mali   ye   [VP e].

      John   like   syntax   Mary   also

The ungrammaticality of (30b) shows that the auxiliary *shi* (is) has to be inserted after the application of VP deletion. Following this fact, we should predict that the auxiliary *shi* (is) must be able to appear inside the *bi*-phrase if the gap in it is a VP gap. Consider the following examples.

(31) a. Yuehan   jintian   [bi   Mali   zuotian   [e]]   kaixin.

      John   today   BI   Mary   yesterday   happy

      "John is happier today than Mary was yesterday."

    b. * Yuehan   jintian   [bi   Mali   zuotian   shi   [e]]   kaixn.

      John   today   BI   Mary   yesterday   is   happy

It is obvious that our prediction is not borne out. The contrast shown by (30) and (31) motivates Liu's (1996) assumption that (27) is an antecedent-contained I' deletion construction, whose underlying structure is represented in (32).

(32) Yuehan   jintian   [bi   [CP Mali   zuotian   [I' e]]]   kaixin.

    John   today   BI   Mary   yesterday   happy

As can be seen from (32), the absence of a local I' node in the CP inside the *bi*-phrase enables the preposition *bi* to exceptionally case-mark *Mali* (Mary) across the clause boundary. This explains why embedded comparatives are disallowed in Chinese, as can be seen in (33).

(33) * Yuehan   jintian   [bi [CP Tangmu   renwei   [Mali   zuotian   [I' e]]]]   kaixin.

    John   today   BI   Tom   believe   Mary   yesterday   happy

    "John today is happier than Tom believes Mary was yesterday."

In this example, *Mali* (Mary) is too far away to be assigned a case by the morpheme *bi*. Yet, if

the gap inside Chinese *bi*-comparatives is an empty I', substituting this I' with its antecedent predicate in the main clause leads to an infinite regression.

(34) Yuehan   jintian   [bi   Mali   zuotian   [bi   Mali   zuotian   [ᵢ e]   kaixin …]]

     John   today   BI   Mary   yesterday   BI   Mary   yesterday   happy

     kaixin.

     happy

In order to avoid this situation, Liu (1996:229-230) suggests that the *bi*-phrase in (35) forms a unit with the degree adverb *geng*[8] (even-more), functioning like a generalized quantifier over degrees that undergoes QR at LF. There are two pieces of evidence for this hypothesis in Chinese *bi*-comparatives: providing downward entailing environment for the licensing of negative polarity items and allowing the conjunctive readings of disjunctive coordinators.

(35) a. zhuzi   kaihua   [bi   Yuehan   he-guo   ***renhe***   jiu]   geng

     bamboo   blossom   BI   John   drink-ASP   any   wine   even-more

     chang   fasheng.

     often   happen

     "That bamboos blossom occurs more often than that John has drunk any wine."

   b. Yuehan   bi   Tongmu   ***huo***   Mali   geng   kaixin.

     John   BI   Tom   or   Mary   even-more   happy

     i.   "John is happier than both Tom AND Mary."

     ii.   "John is happier than either Tom or Mary."

In (35a), following the quantificational approach (Ladusaw, 1979), comparative constructions offer a downward entailing environment to restrict a universal quantifier, and thus, the negative polarity item *renhe jiu* (any wine) is licensed in the *bi*-phrase. In (35b), the disjunctive coordinator *huo* (or) has a conjunctive reading, as pointed out by Pinkal (1989), the disjunction inside comparative constructions, which is a universal quantifier in semantics, shows the effect of conjunction.

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[8] Please refer to (3e) and (14), in which *geng* is usually treated as a degree adverb, but Liu (1996) regards it as a comparative morpheme.

Built on these assumptions, the QR of the *bi*-phrase in (27) is schematized in (36).

(36) [bi [Mali zuotian [$_{I'}$]]]$_i$ [Yuehan jintian [$_{I'}$ t$_i$ kaixin]].

    BI Mary yesterday John today happy

Under this circumstance, the interpretation of the empty predicate can be obtained by copying the predicate from the main clause – [$_{I'}$ t$_i$ *kaixin*] into the *bi*-phrase without infinite regressions, as in (37).

(37) [bi [Mali zuotian [$_{I'}$ t$_i$ kaixin]]]$_i$ [Yuehan jintian [$_{I'}$ t$_i$ kaixin]].

    BI Mary yesterday happy John today happy

By resorting to the LF-copying analysis, examples like (27) can be explicated successfully based on the hypothesis that the *bi*-phrase is a pre-predicate adjunct, in which an elided clause exists.

Adding to this line of argument, Liu (2011) further develops a hybrid analysis of Chinese *bi*-comparatives, detailing three major assumptions. First, examples with only one constituent in the standard phrase introduced by the morpheme *bi* are classified as phrasal comparatives, while those with more than one constituent in the standard phrase are classified as clausal comparatives. The former does not involve comparative deletion, while the latter obligatorily involves comparative deletion, as exemplified by (38).

(38) a. Yuehan bi **Mali** congming.

       John BI Mary smart

       "John is smarter than Mary."

    b. Yuehan jintian [bi [Mali zuotian ~~kaixin~~]] kaixin.

       John today BI Mary yesterday ~~happy~~ happy

       "John today is happier than Mary was yesterday."

In clausal comparatives, such as (38b), elements that are not in a contrastive relationship with their corresponding correlates in the main clause have to be elided through comparative

deletion. The elided site must be *e*-given in the sense of Merchant (2001, 2004)[9]. Therefore, in line with the requirement of **e(lliptical)-givenness**, the antecedent of the elided site has to be as minimal as possible, which can only contain: (A) a degree variable; (B) a minimal predicate that can form a clause with the standard constituent that is analogous to the minimal clause containing it (Liu, 2011:1787-1788), as illustrated in (39).

(39) a. Yuehan   da   lanqiu   [bi Mali   da   paiqiu   ~~da-de   hao~~]   da-de

      John play basketball BI Mary play volleyball play-DE good play-DE

      haiyao   hao.

       even   good

      "John plays basketball better than Mary plays volleyball."

    b. Yuehan   da   lanqiu   he   paiqiu [bi Mali   da   pingpangqiu

      John play basketball and volleyball BI Mary play table-tennis

      ~~da-de   hao~~]   da-de   **dou**   hao.

      play-DE good play-DE all   good

      "John plays basketball and volleyball all better than Mary plays table tennis."

In (39a), following the condition of **e-givenness**, the elided site in the *bi*-phrase can retrieve the antecedent from the main clause, namely *da-de hao* (play-DE good), even if there is an adverb *haiyao* (even) modifying the main predicate. This also happens to be the elided site in (39b), though a morpheme *dou* (all) modifies the main predicate.

Second, based on Paul's (1993) cyclic c-command condition [10] on Chinese phrasal

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[9] The Focus Condition on Ellipsis (Merchant, 2001, 2004): a constituent α can be elided if α is *e*-given.

(i) *e*-given: An expression X is *e*-given iff X has a salient antecedent A and, modulo existential type-shifting, (A) α entails

      F-clo(X), and (B) X entails F-clo(A).

(ii) The F-closure of α (i.e., F-clo(α)) is the result of replacing all F-marked sub-elements of α with variables of the

      appropriate type.

[10] Cyclic C-command (Paul, 1993:18): A cyclic c-commands B iff:
(i)   A c-commands B, or
(ii)   If C is the minimal cyclic node (NP or S') that dominates A, then C c-commands B.

comparatives, Liu (2011:1788) suggests that the notion of c-command is vital to the construction of Chinese *bi*-comparatives. In other words, standard constituents in *bi*-phrases, either phrasal or clausal comparatives, have to be minimally c-commanded by their corresponding correlates in compared phrases, and have to be parallel to them in terms of category, syntax and semantics. The parallelism requirement and the notion of minimal c-command successfully explain the ungrammaticality of embedded comparatives in Chinese, as in (40).

(40) * Yuehan   jintian   [bi   Tongmu   renwei   [Mali   zuotian]]   kaixin.

       John   today   BI   Tom   believe Mary   yesterday   happy

       "John today is happier than Tom believes Mary was yesterday."

In this case, the constituents in the *bi*-phrase, namely *Tongmu renwei Mali zuotian* (Tom believes Mary yesterday) are not parallel to their corresponding correlates in the main clause, namely *Yuehan jintian* (John today). Then, the presence of *Tongmu renwei* (Tom believes) violates the requirement of minimal c-command between the compared phrase (i.e., John today) and the standard phrase (i.e., Mary yesterday). Hence, the ungrammaticality follows.

Third, Liu (2011) proposes that Chinese *bi*-comparatives have a covert comparative morpheme, GENG, an allomorph of the degree adverb, *geng* (even-more), and that this morpheme only occurs in comparatives without an overt degree adverb. On the basis of the dichotomy of Chinese *bi*-comparatives (i.e., phrasal versus clausal), Liu (2011:1790) assigns two denotations to GENG as follows respectively, adopting Heim's (1985) direct analysis of comparatives.

(41) a. $\| \text{GENG} <a,b>f \|$ is true iff $f(a) > f(b)$

    b. $\| \text{GENG} <P_{<d,t>},Q_{<d,t>}> \|$ is true iff the maximal d s.t $Q(d) \approx 1 >$ the maximal d s.t

       $Q(d) \approx 1$[11]

Under this assumption, a phrasal comparative, e.g., (38a), involves the comparison of two

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[11] The symbol $\approx$ indicates that the Chinese covert comparative morpheme does not presuppose that the properties of the compared objects are true in an absolute sense, when it occurs in "clausal" Chinese *bi*-comparatives (Liu, 2011:1790).

individuals; a clausal comparative, e.g., (38b), involves a comparison of degrees and comparison deletion. Following Heim (1985), the semantic representation of (38a-b) is schematized in (42a-b), respectively.

(42) a. ‖GENG <John, Mary> λxιy [x is y-smart] ‖ =1 iff

   λxιy [x is y-smart] (John) > λxιy [x is y-smart] (John) iff

   ιy [John is y-smart] >ιy [Mary is y-smart]

   b. ‖GENG <(λd.HAPPY (John) ≥/< d), (λd.HAPPY (Mary) ≥/< d)>‖ = 1 iff

   ιy [John is y-happy today] >ιy [Mary is y-happy yesterday]

Though this line of analysis has advantages, it raises some problems as well. First of all, the hypothesis that there is a covert comparative morpheme GENG, an allomorph of the degree adverb *geng* (even-more), appears to be unjustified. Consider the following example in (43).

(43) Yuehan   bi   Mali   geng   youshan.

     John   BI   Mary   even-more   friendly

     "John is even more friendly than Mary."

The presence of the degree adverb *geng* leads to the presupposition that John and Mary are both friendly. When *geng* is absent in (43), this presupposition does not hold any more. If GENG and *geng* are allomorphs, it is then natural to predict that the presence or the absence of *geng* would not affect presuppositions in Chinese comparatives. However, this prediction is not borne out. The stipulation that the covert comparative morpheme GENG does not presuppose that the compared items hold properties denoted by the main predicate in an absolute sense seems to be *ad hoc*.

Moreover, the assumption that *geng* (even more) is responsible for the comparitive meaning in (43) is untenable, as illustrated by (44).

(44) * Yuehan   bi   Mali   geng   gao   wu   gong-fen.

     John   BI   Mary   even-more   tall   five   centimeter

     "John is even five centimeters taller than Mary."

If *geng* is treated as an overt comparative morpheme, a natural question is: why is *geng* incompatible with the differential phrase in (44) in the surface syntax? Thus, based on this problematic assumption, whether there is a covert morpheme GENG acting like its English counterpart *-er* or *more* is an open question. In the meanwhile, it further leads to another question: whether *bi*-phrases form a constituent with *geng* or its covert allomorph, functioning like a generalized quantifier that undergoes QR at LF.

Last but not least, using the notion of minimal c-command, as proposed by Paul (1993), to explain the structure of Chinese *bi*-comparatives is not that effective, as exemplified by (45).

(45) wo   jiao   ta$_{i/j}$ [bi   Yuehan$_i$ jiao   wo]   duo   zuo-le[12]

     I   require   him   BI   John   require   me   much   do-ASP

     san-jian   shi.

     three-CL   work

     "I require him to do three more works than John requires me to do."

This example displays the cancellation of the Condition C effect since *ta* (him) can refer to *Yuehan* (John), as shown by the index. However, according to Liu (2011:1789), "the standard constituents in *bi* clausal comparatives must be minimally c-commanded by their corresponding correlates", which means that *Yuehan* (John) is c-commanded by *ta* (him), namely a direct violation of the Principle C of Binding Theory. This counterexample, in fact, weakens the generalization concerning the role of c-command in describing the structural features of Chinese *bi*-comparatives.

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[12] An aspect marker in Chinese, which usually indicates perfective tense.

2.2. *bi* as A Degree Head or A Light Verb – Xiang (2005) and Erlewine (2007)

Arguing for a phrasal analysis of Chinese comparatives, including *bi*-comparatives and bare comparatives, Xiang (2005) adopts Larson's (1991) DegP-shell analysis for English comparatives and proposes that there are two DegP structures in Chinese comparatives with an AP being sandwiched between them. The example in (46) offers an illustration.

(46) a. Yuehan   gao   Mali   wu   gong-fen.

       John   tall   Mary   five   centimeter

       "John is five centimeters taller than Mary."

b.
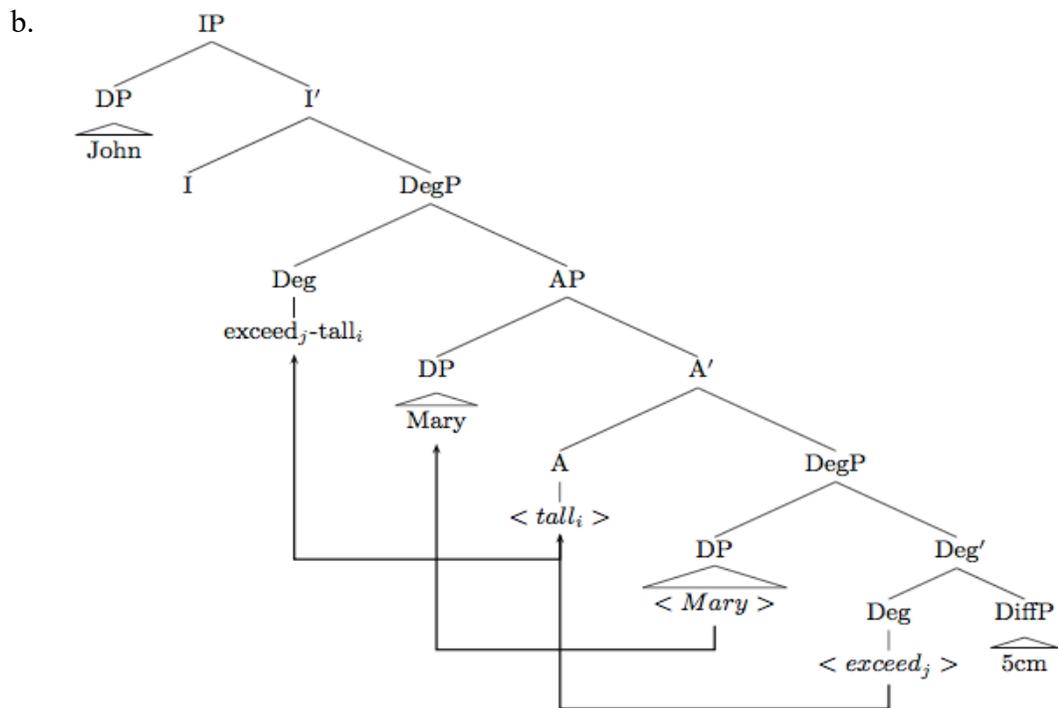
Due to the lack of morphological markings in Chinese comparatives, Xiang (2005:191) advocates that gradable adjectives per se are responsible for establishing two meanings in the structure: adjective and comparative. Thus, she posits that there is an empty null degree morpheme, called *exceed*, merging with two internal arguments, namely, *Mary* and *five centimeters*, as shown by the lower DegP. Then, the null degree morpheme merges with the

adjective internally by head movement. The standard degree argument *Mary* moves to [Spec, AP] to meet the EPP feature, which results in a small clause structure at AP level. Finally, the complex head *exceed-tall* moves to the head of the upper DegP to introduce the external argument *John*. (46b) shows the detailed derivation.

One advantage of this analysis is that it can be extended to Chinese *bi*-comparatives, if the morpheme *bi* is treated as a degree head, as illustrated in (47).

(47) a. Yuehan   bi   Mali   gao   wu   gong-fen.

      John   BI   Mary   tall   five   centimeter

      "John is five centimeters taller than Mary."

b.
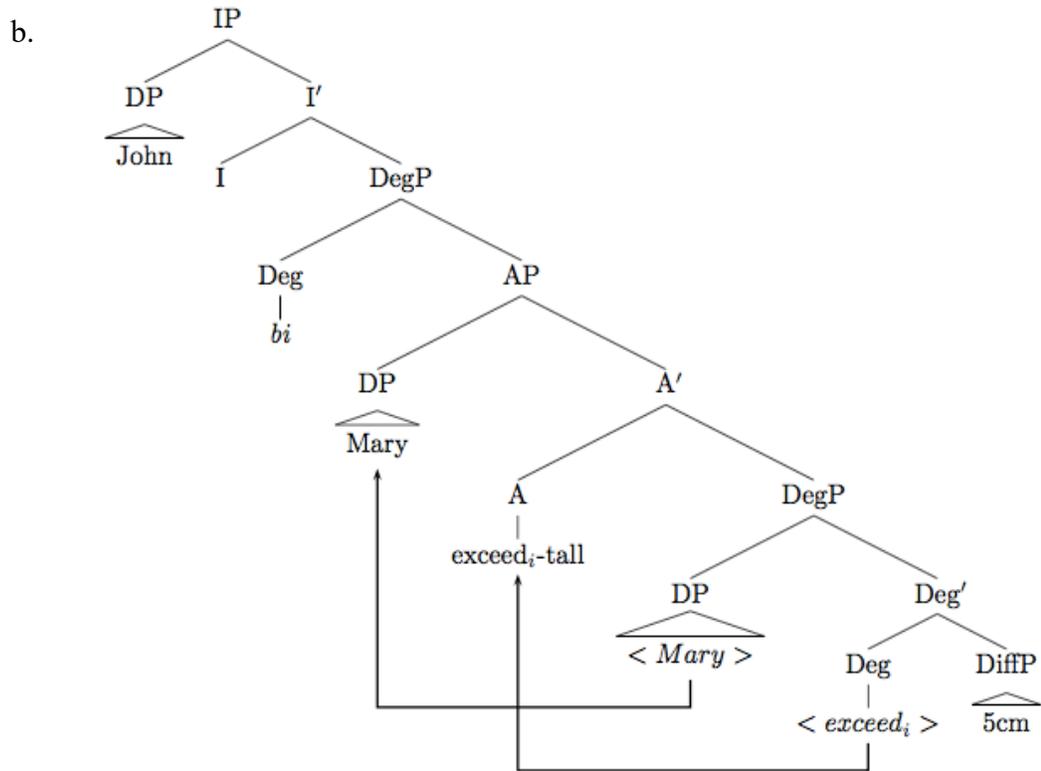
In this case, according to Xiang (2005:192), when the null degree morpheme *exceed* moves to the head of AP, at this point of derivation, the morpheme *bi* is directly merged with AP, projecting the upper DegP, as shown by (47b). Since the head of the upper DegP has been filled by *bi*, the complex head *exceed-tall* does not move to a higher position. Then, the

standard degree argument *Mary* moves to [Spec, AP] to satisfy the EPP feature. The two structures presented in (46b) and (47b) are Xiang's (2005)[13] effort to justify a unified analysis for Chinese comparatives, including *bi*-comparatives and bare comparatives. The central assumption for this analysis is that the comparison predicate is a three-place predicate, relating the external argument, namely the subject, to its two internal argument – the standard degree argument and the differential phrase argument.

One immediate problem arising from this analysis is the hypothesis that Chinese *bi*-comparatives and bare comparatives share the same underlying structure. As mentioned in Chapter 1, the occurrence of gradable adjectives in bare comparatives is highly constrained.

(48) a. Yuehan   bi   Mali   shanliang   yidian.

      John   BI   Mary   kind-hearted   a bit

      "John is a bit more kind-hearted than Mary."

   b. * Yuehan   shanliang   Mali   yidian.

      John   kind-hearted   Mary   a bit

Following Xiang's (2005) analysis, if the morpheme *bi* is absent in (48a), we would predict that the null degree morpheme *exceed* moves to the head of AP, in this case, *shangliang* (kind-hearted), forming a complex head that undergoes head-movement to the upper DegP, as in (46b). The word order of bare comparatives is then derived as in (48b). However, this prediction is apparently not borne out. This may indicate that these two types of comparatives, as in (48a-b), do not share the same underlying structure.

Moreover, the semantic interpretation based on the structures in (46b) and (47b) deviates from the intended comparative meaning. At the AP level, according to Xiang (2005:191), if we take (46a) as an example, when the standard degree argument, i.e., *Mary*, moves to [Spec, AP], it constitutes a small clause with the AP, which leads to the meaning: Mary's tallness exceeds

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[13] There have been some minor changes to the two trees presented in (46b) and (47b), compared to the original ones.

five centimeters. This is contrary to the intended meaning, which should be: Mary's height is exceeded by five centimeters by John's tallness. This is also the case in Chinese *bi*-comparatives.

In addition, one important feature that is not captured by Xiang's (2005) analysis is the optionality of differential phrases in certain cases. Take (47a) as an example, the differential phrase, *wu gong-fen* (five centimeters), is optional. When the differential phrase is absent, the lower DegP cannot be projected. This may be an indication that differential phrases are not internal arguments of the null degree morpheme *exceed*.

In the spirit of Xiang's (2005) DegP shell structure, Erlewine (2007:32) puts forward an analysis for Chinese comparatives, which consists of two novel ideas: a verbal syntax and a neo-Davidsonian eventuality-semantics comparison. First, syntactically, the morpheme *bi* is a light verb, functioning as a functional head subcategorizing for a *v'* which then subcategorizes for a comparison predicate. One important piece of evidence for this proposition is from Xiang (2005:194), that is "instead of being a preposition, *bi* behaves more like a verb". The proposed structure is presented in (49). In order to derive the right word order, *bi* moves to a higher position over the standard.

(49)
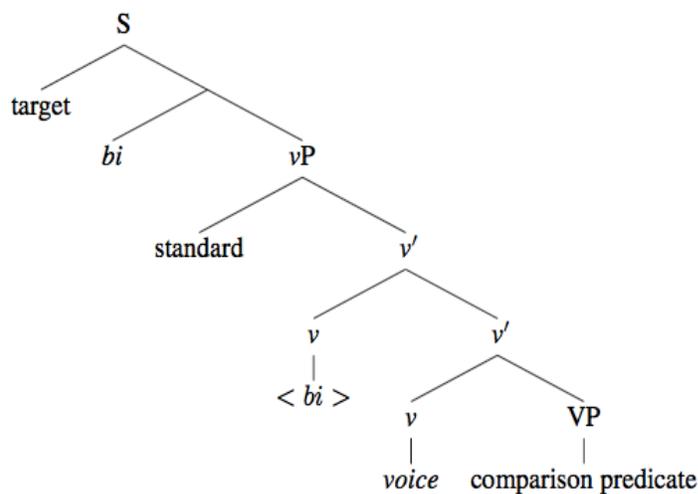
Second, semantically, Erlewine (2007) adopts a neo-Davisonian semantics of voice based on Kratzer (1996), suggesting that a voice v node introduces an eventuality variable ε. He further assumes that predicates only have internal arguments, and that the voice head introduces external arguments as the Agent or Experiencer. Consider the following example, which is a phrasal comparative (e.g., Liu, 2011).

(50) a. Yuehan   bi   Mali   xihuan   Tangmu.

     John   BI   Mary   like   Tom

    "John likes Tom more than Mary does."

b. $\|\text{voice}_{\text{active, experiencer}}\| = \lambda x \lambda \varepsilon . \text{Exp}(x, \varepsilon)$

c.
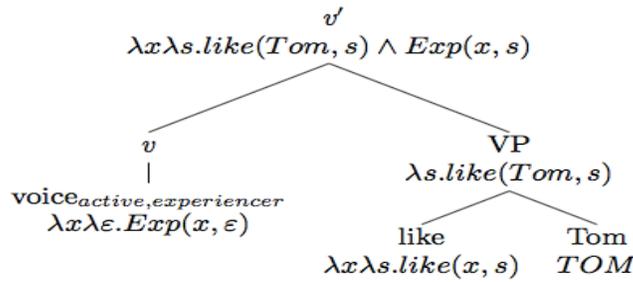
In Erlewine's (2007:33) proposal, the morpheme bi has three functions in semantics:

It uses two eventuality variables, ε_1 and ε_2, and establishes two external arguments (to be selected) as their external arguments, respectively; it existentially binds the standard's eventuality ε_2; and, finally, it establishes the comparative semantics of ε_1 being greater than ε_2 along a scale established by the predicate.

Moreover, instead of using explicit degree variables, Erlewine (2007) defines an intensity ordering relation, i.e., $>>>$, which is used to represent the ordering relation between two eventuality variables, i.e., $\varepsilon_1 >>> \varepsilon_2$. Therefore, the semantics of bi is presented as follows.

(51) $\| bi \| = \lambda G_{<e,<\varepsilon,t>>} . \lambda y \lambda x \lambda \varepsilon_1 . \exists \varepsilon_2 (G(x, \varepsilon_1) \wedge G(y, \varepsilon_2) \wedge \varepsilon_1 >>> \varepsilon_2)$

Based on the above assumptions, the semantic composition of Chinese *bi*-comparatives with verbal predicates, e.g., (50a), is illustrated in (52).

(52)

$$S$$
$$\exists s_1 \exists s_2 (like(TOM, s_1) \land Exp(JOHN, s_1) \land$$
$$like(TOM, s_2) \land Exp(MARY, s_2) \land s_1 \ggg s_2$$

$T_{nonpast}$ $\lambda s_1.\exists s_2(like(TOM, s_1) \land Exp(JOHN, s_1) \land$
$\lambda P_{<\varepsilon,t>}\exists \varepsilon P$ $like(TOM, s_2) \land Exp(MARY, s_2) \land s_1 \ggg s_2)$

DP $\lambda x \lambda s_1.\exists s_2(like(TOM, s_1) \land Exp(x, s_1) \land$
| $like(TOM, s_2) \land Exp(MARY, s_2) \land s_1 \ggg s_2)$
John
JOHN

DP v'
| $\lambda y \lambda x \lambda s_1.\exists s_2(like(TOM, s_1) \land Exp(x, s_1) \land$
Mary $like(TOM, s_2) \land Exp(y, s_2) \land s_1 \ggg s_2$
MARY

v v'
| $\lambda x \lambda s.like(TOM, s) \land Exp(x, s)$
bi
$\lambda G_{<e,<\varepsilon,t>>}\lambda y \lambda x \lambda \varepsilon_1.\exists \varepsilon_2$ comparison-predicate
$(G(x, \varepsilon_1) \land G(y, \varepsilon_2) \land \varepsilon_1 \ggg \varepsilon_2)$
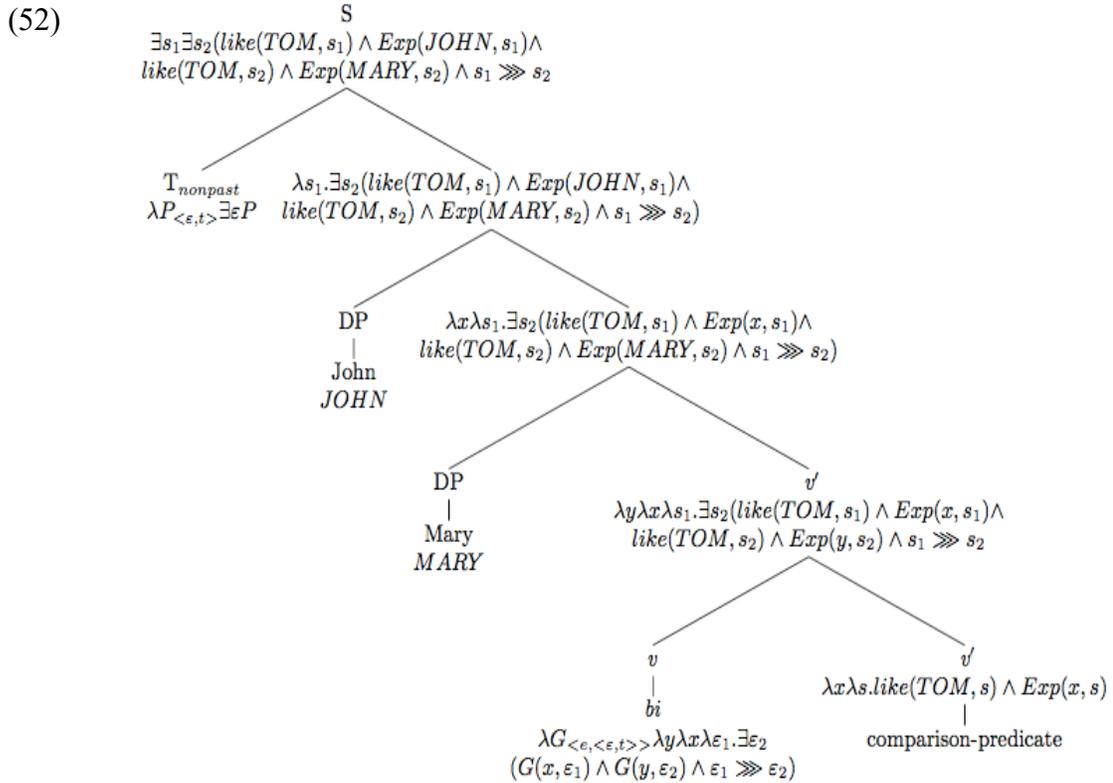
As mentioned before, in (52), the morpheme *bi* moves to a position higher than that of the DP *Mary* to derive the right word order. One advantage of this semantics is that it successfully explicates the Internal Argument Prohibition, namely when the comparison predicate is a scalable verb, its object cannot be compared items, as in (12), repeated below in (53).

(53) a. John likes dogs more than cats.

     b. * Yuehan   bi   **mao**   xihuan   **gou**.

        John   BI   cat   like   dog

Based on the semantics above, *gou* (dog) is to combine with *xihuan* (like) first, which makes it impossible for *dog* to be a free variable. Then, it cannot be bound later by the argument of *bi*.

Clausal comparatives, as in (54), following Erlewine (2007), can be analyzed as the comparison of individuals.

(54) [$_{S1}$ wo   qu]   bi   [$_{S2}$ ni   qu]   hao.

      I   go   BI   you   go   good

      "It would be better if I went than if you went."

In this case, the comparison predicate, *hao* (good), is treated as a proposition-taking predicate. In other words, it takes a proposition with an unsaturated Davidsonian eventuality argument and returns a state description (Kratzer, 2000, 2005). Hence, these predicates are of the semantic type $<<\varepsilon,t>, <s,t>>$, as in (55a) below. In order to compute the semantics of clausal comparatives, another version of the semantics of *bi* is given as follows.

(55) a. $\| \text{ good } \| = \lambda E_{<\varepsilon,t>}\lambda s. \exists\varepsilon \, [good(\varepsilon,s) \wedge E(\varepsilon)]$

    b. $\| bi_{\text{clausal}} \| = \lambda G_{<<\varepsilon,t>, <s,t>>}\lambda F_{<\varepsilon,t>}\lambda E_{<\varepsilon,t>}\lambda s_1. \exists s_2[G(E,s_1) \wedge G(F, s_2) \wedge s_1 >>> s_2]$

Based on the two assumptions in (55), the detailed semantic composition of (54) is presented in (56), and the syntactic derivation of (54) is the same as (52): the morpheme *bi* moves to a higher position over S_2 to derive the right word order.

(56)

S
$\exists s_1\exists s_2(\exists e_1(good(e_1, s_1) \wedge go(e_1) \wedge Ag(1sg, e_1))$
$\wedge \exists e_2(good(e_2, s_2) \wedge go(e_2) \wedge Ag(2sg, e_2)) \wedge s_1 \ggg s_2)$

$T_{nonpast}$
$\lambda P_{<\varepsilon,t>}\exists \varepsilon P(\varepsilon)$

S_1
$\lambda e.go(e) \wedge Ag(1sg, e)$
I go

S_2
$\lambda e.go(e) \wedge Ag(2sg, e)$
you go

v'
$\lambda F_{<\varepsilon,t>}\lambda E_{<\varepsilon,t>}\lambda s_1.\exists s_2$
$(\exists \varepsilon_1(good(\varepsilon_1, s_1) \wedge E(\varepsilon_1))$
$\wedge \exists \varepsilon_2(good(\varepsilon_2, s_2) \wedge F(\varepsilon_2)) \wedge s_1 \ggg s_2)$

v
$bi_{clausal}$
$\lambda G_{<<\varepsilon,t>,<s,t>>}\lambda F_{<\varepsilon,t>}\lambda E_{<\varepsilon,t>}\lambda s_1.\exists s_2$
$(G(E, s_1) \wedge G(F, s_2) \wedge s_1 \ggg s_2)$

VP
$\lambda E_{<\varepsilon,t>}\lambda s.\exists \varepsilon(good(\varepsilon, s)$
$\wedge E(\varepsilon))$
comparison predicate

36

In this case, the comparison predicate *hao* (good) takes *wo qu* (I go) and *ni qu* (you go) as sentential arguments, which must be of type $<<\varepsilon,t>, <s,t>>$. *bi* is a function takes two state variables, s_1 and s_2, as arguments; *bi* existentially binds the standard's state s_2 and then returns a state description in which s_1 is better than s_2 along the scale named by the predicate.

One advantage of this analysis, according to Erlewine (2007:48-49), is that the lack of embedded comparatives in Chinese can be explained.

(57) * Yuehan   bi   Tongmu   renwei   Mali   gao.

       John   BI   Tom   believe   Mary   tall

       "John is taller than Tom believes Mary is."

Three eventualities constructed in (57) are presented in the following:

(58) a. e_1: John's tallness

     b. e_2: Mary's tallness

     c. e_3: Tom's thinking of Mary's tallness

The intended meaning in (57) is: John's tallness exceeds Mary's tallness. However, the two eventualities ordered in comparatives are constrained to those introduced by the entire compared phrase and standard phrase. In this case, the only possible ordering of eventuality is $e_1 >>> e_3$, which rules out embedded comparatives in Chinese.

Although Erlewine's analysis is in many aspects attractive, it is not without problems. First, following the syntactic structure assigned to Chinese *bi*-comparatives, as in (49), *bi* subcategorizes for the comparison predicate, and then moves to a higher position to derive the right word order. However, as suggested by Liu (1996) and Lin (2009:9), there is evidence that *bi* forms a constituent with the standard phrase.

(59) ta-de   shengao   [**bi   wo**]   haiyao   ai,   [**bi   Kebi**]   na   geng

    his   height   BI   I   even   short   BI   Kobe   then   even

    shi   tian   cha   di   yuan.

    is   heaven   differ   ground   far

    "He is much shorter than I am. If compared with Kobe, his height is even like the

    distance between the heaven and the ground."

This example shows that the morpheme *bi* and the standard phrase forms a single constituent, in that they can be used as an independent constituent, e.g., [*bi* + I] and [*bi* + Kobe], which is contrary to Erlewine's claim, i.e., *bi* and the standard phrase are mutually independent.

Second, Lin (2009:14) points out that, in Erlewine's semantics, only lambda-abstracted variables can be compared items, and that only one variable is lambda-abstracted. This assumption will not be able to explain the comparison of multiple topics.

(60) Yuehan   jintian   zaijia   bi   Mali   zuotian   zaixuexiao   kaixin.

    John   today   at-home   BI   Mary   yesterday   at-school   happy

    "John is happy today at home than Mary was yesterday at school."

In this case, what are compared are the happiness of John and Mary at certain time at a certain location. Erlewine's semantics for Chinese comparatives would only capture the ordering relation between John's happiness and Mary's happiness.

A final problem both in Xiang (2005) and Erlewine (2007) is that the absence of standard phrases does not affect the semantic interpretation of comparative structures in some cases, as in (61), attributed to Chao (1968).

(61) A: Yuehan   he   Mali,   shei   gao   yixie?

    John   and   Mary   who   tall   a bit

    "John and Mary, who is a bit taller?"

B: Yuehan   gao   yixie.

     John   tall   a bit

     "John is a bit taller."

In this case, we can still obtain the comparative semantics from the answer in (61B). If *bi* is a degree head or a light verb, it is expected to be always explicit in the syntax to project a DegP or a *v*P, but this prediction is clearly not borne out.

2.3. *bi* as A Comitative – Gu & Guo (2015)

In contrast to earlier accounts just reviewed, Gu & Guo (2015) propose a novel structure for Chinese *bi*-comparatives in which *bi* is treated on a par with a comitative, namely *bi* heads a complex DP consisting of the compared phrase and the standard phrase, as represented in (62).

(62)
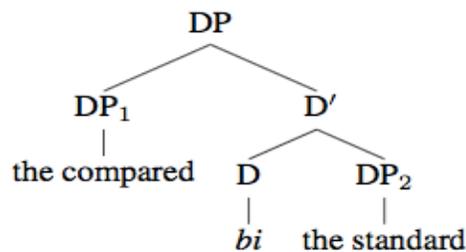
According to Gu & Guo (2015), there are two pieces of evidence to support the proposed structure. First, *bi*-phrases pattern with phrases headed by comitatives in Chinese. Consider the following examples.

(63) a. Yuehan   [bi   Mali]   gao   wu   gong-fen.

     John   BI   Mary   tall   five   centimeter

     "John is five centimeters taller than Mary."

    b. * [bi   Mali]   Yuehan   gao   wu   gong-fen.

     BI   Mary   John   tall   five   centimeter

(64) a. Yuehan   [he   Tangmu]   shi   xiongdi.

      John   with   Tom   is   brother

      "John and Tom are brothers."

    b. * [he   Tangmu]   Yuehan   shi   xiongdi.

      with   Tom   John   is   brother

It can be readily seen from these examples that the fronting of the *bi*-phrase or the phrase headed by the comitative *he* (with) would result in ungrammaticality. This pattern is an important criterion to differentiate them from other prepositional phrases, such as location or source, as in (65) and (66) respectively.

(65) a. Yuehan   [zai   kafeiting]   yudao-le   Mali.

      John   at   café   meet-ASP   Mary

      "John met Mary at a café."

    b. [zai   kafeiting],   Yuehan   yudao-le   Mali.

      at   café   John   meet-ASP   Mary

(66) a. Yuehan   [cong   kafeiting]   mai-le   yi   bei   kafei.

      John   from   café   buy-ASP   one   cup   coffee

      "John bought a cup of coffee from a café."

    b. [cong   kafeiting],   Yuehan   mai-le   yi   bei   kafei.

      from   café   John   buy-ASP   one   cup   coffee

In these examples, the fronting of PPs is possible, which highlights different behaviors of prepositions in that they fall into different semantic subcategories. In addition, in Chinese comparatives of equality, standard phrases are introduced by comitatives.

(67) a. Yuehan   **bi**   Mali   gao.

      John   BI   Mary   tall.

      "John is taller than Mary."

b. Yuehan **he/gen/tong** Mali yiyang gao.

    John   with   Mary   same   tall

    "John is as tall as Mary."

The standard phrases in (67a-b) are introduced by *bi* and *he/gen/tong* (with) respectively, indicating that *bi* shares the same property with comitatives (Gu & Guo, 2015:344).

Second, following Zhang's (2007)[14] analysis of the English symmetrical comitatives, Gu & Guo (2015:347) argue that compared phrases and the standard phrases in Chinese *bi*-comparatives enter into the same thematic relation with comparative predicates. One reason for this claim is that comparatives always require two participants in the same eventuality, namely a plural argument composed of the compared phrase and the standard phrase, which coincides with Zhang's diagnosis of the symmetrical comitatives in English.

(68) John was killed with Bill.

(69) a. dizhen **bi** hongshui geng kepa.

    earthquake   BI   flood   even   terrifying

    "Earthquake is more terrifying than flood."

b. dizhen **he** hongshui yiyang kepa.

    earthquake   with   flood   same   terrifying

    "Earthquake is as terrifying as flood."

In (68), *John* and *Bill* both are the victims of the same killing event. Likewise, *dizhen* (earthquake) and *hongshui* (flood) in (69a-b) both have the same thematic relation with the

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[14] Zhang (2007) identifies two types of comitatives in English, based on Kayne (1994): the symmetrical comitatives and the asymmetrical comitatives, as illustrated by the following two examples respectively.
(i)   John fell in love **with** Mary.
(ii)   John saw an insect **with** his glasses.
In (i), **with**, having several features, including categorical feature [D], number feature [plural] and case feature [case assigning], heads a complex DP, which has the structure like:[DP [DP1 **John**] [D' **with** [DP2 **Mary**]]]. In this case, *with* assigns an Accusative case to *Mary*. Because of the categorical and number feature, the whole phrase likes a nominal that can serve as an external argument of a predicate, base-generated in [Spec, VP]. Since DP2 has received its case from *with*, only DP1 moves out of the Complex DP to check the Nominal case. In (ii), *with* is a regular preposition, heading a PP that is adjoined to the DP, which has the structure like: [DP [DP1 **John** [PP **with** [DP2 **Mary**]]]. In this case, *with* is the head of an adjunct without some features as the *with* in (i). Therefore, the feature of this complex DP is determined by the DP1.

comparison predicate *kepa* (terrifying), further suggesting that *bi* has the same status as comitatives, e.g., *he/gen/tong* (with).

In terms of the comparison predicate, Gu & Guo (2015) assume that there is a functional projection DegP above it, which is presented as follows in (70).

(70)

```
                    DegP
                   /    \
              DiffP      Deg′
                        /    \
          Deg[+/−EXCEED]      AP
                 |
             chu/yiyang
```

By extending Guo's (2012)[15] analysis, it is proposed here that a bound morpheme *-chu* (exceed/surpass) and a free word *yiyang* (same) are two phonological realizations of the Deg head in Chinese, acting as the COMP (comparative) operator that leads to comparative readings of gradable predicates. A differential phrase (DiffP) occupies the specifier position to express the difference value. The [+] feature of the Deg head *EXCEED* is realized by an abstract CHU and its phonological realization *-chu*, indicating the comparatives of superiority; the [-] feature is realized by *yiyang*, indicating the comparatives of equality.

Given the nature of the morpheme *bi* and the assumption of DegP, Gu & Guo (2015:353) assign a syntactic structure to (2a) (repeated in (71a)), as represented in (71b), by adopting the functional projection of Predication Phrase (PredP) (Bowers, 1993).

(71) a. Yuehan   bi   Mali   gao(-*chu*)   wu   gong-fen.

       John   BI   Mary   tall-CHU   five   centimeter

       "John is five centimeters taller than Mary."

---

[15] There are two important aspects in Guo's (2012) analysis of DegPs in Chinese. First, a differential phrase (DiffP) is in [Spec, DegP] to indicate the difference between the two compared items. Second, there is an abstract bound morpheme *CHU* (exceed/surpass) in all Chinese comparatives of superiority, even if it can only have its phonetic realization under certain circumstances, such as when differential phrases are present in the syntax, as in (i).

(i) Yuehan   bi   Mali   gao-***chu***   wu   gongfen.
    John   BI   Mary   tall-CHU   five   centimeter
   "John is five centimeters taller than Mary."

b.

```
                        TP
                    /        \
                 DP₁          T'
                  |         /     \
               Johnₖ      T         PredP
                                 /         \
                              DP            Pred'
                          /       \       /        \
                       DP₁        D'    Pred         DegP
                        |       /    \    |        /       \
                       tₖ      D     DP₂  tallᵢ-chuⱼ   DiffP      Deg'
                              |      |                   |       /     \
                              bi    Mary              5 cm   Deg[+EXCEED]   AP
                                                              |            |
                                                            tᵢtⱼ          tᵢ
```

In this structure, the gradable adjective raises to the Deg head, forming a DegP with the COMP operator -*chu* and then denoting the property of *five centimeters taller*. Then, a complex *tall-chu* is formed, which moves to the head of PredP through head movement where it can saturate the argument of the comparison predicate, namely, the complex DP [DP [DP1 John] [D′ *bi* [DP2 Mary]]]. Since *bi* assigns a Case to DP₂ *Mary*, DP₁ *John* moves to [Spec, TP] to check the Nominative case. After DP₁ moved out, the rest of the complex DP may undergo remnant movement, which explains the structural flexibility of *bi*-phrases, as shown in (72).

(72) a. [DP1 Yuehanᵢ]   *xianran*   [DP [DP1 tᵢ] [D′ bi [DP2 Mali]]]   gao   yixie.

   John   obviously   BI   Mary   tall   a little

   "John is obviously a little taller than Mary."

b. [DP1 Yuehanᵢ]   [DP [DP1 tᵢ] [D′ bi [DP2 Mali]]]   *xianran*   gao   yixie.

   John   BI   Mary   obviously   tall   a little

   "John is obviously a little taller than Mary."

The syntactic structure for the comparatives of equality (e.g., (69b)) is derived in the same way as the comparatives of superiority, as in (71b), apart from three minor differences. First, the phonological realization of the Deg head is a free morpheme, *yiyang* (same). Second, the Deg head in this case signals that the difference between the two compared items is zero. Hence, the DiffP does not have an overt realization. Third, the standard constituents are introduced by comitatives, such as *he/gen/tong* (with), which also assigns a Case to DP_2 in the complex DP. The rest of the derivation process is identical to (71b).

Drawing a parallelism between the morphemes introducing the standard constituents in Chinese comparatives of superiority and equality respectively, namely, *bi* and *he/gen/tong* (with), offers an attractive and unified account, as well as a strong argument that Chinese comparatives are comparison of individuals (Gu & Guo, 2015:357). However, it also raises certain problems. The most evident one is the treatment of the bound morpheme *-chu* as the Deg head, which is more likely to be an aspect marker, as illustrated in (73).

(73) a. Yuehan   bi   Mali   gao-chu   *(wu   gong-fen).

      John   BI   Mary   tall-CHU   five   centimeter

      "John is five centimeters taller than Mary."

    b. Yuehan   bi   Mali   gao-le   *(wu   gong-fen).

      John   BI   Mary   tall-LE   five   centimeter

      "John is five centimeters taller than Mary."

Gu & Guo (2015:352) contend that when [+EXCEED] is phonologically realized by *-chu*, differential phrases should be present in the syntax, as borne out by (73a). If this assumption were correct, we would predict that the morpheme *-le* is also a Deg head in that its presence requires differential phrases to be overt, which is in effect contrary to the status of *-le* as an aspect marker (e.g., Soh, 2014; Liu, 2015). According to Liu (2005), in (74), the co-occurrence of the aspect marker *-le* and the differential phrase *henduo* (much) is to ensure that the event of comparing *hua* (flower) with a covert standard in the context is completed.

(74) zhe-duo   hua   hong-le   henduo.

     this-CL   flower   red-ASP   much

     "This flower is much more red than before."

By extending this argument to (73a-b), the presence of the differential phrase may not be due to the phonological realization of the assumed Deg head, but due to the requirement of Chinese aspect markers, namely, cooperating with the differential phrase to guarantee the completeness of the comparing event (Liu, 2005:218).

Another piece of evidence against Gu & Guo's argument comes from another aspect marker *guo* in Chinese, which conveys a perfect sense, as in (75a).

(75) a. Yuehan   zuotian   chi-**guo**-le   niurou   qiancengmian.

       John   yesterday   eat-GUO-LE   beef   lasagna

       "John had beef lasagna yesterday."

     b. Yuehan   bi   Mali   gao-**chu**-le   *(wu   gong-fen).

       John   BI   Mary   tall-CHU-LE   five   centimeter

       "John is five centimeters taller than Mary."

According to Liu (2015:281), the co-occurrence of *-guo* and *-le* in (75a), in the order of *-guo* preceding *-le*, indicates that "a past experience has been actualized, terminated, and discontinued prior to the current speech time". This is what also happens in (75b), in which *-chu* co-occurs with *-le*. Therefore, a more reasonable conclusion to be made is that the bound morpheme *-chu* is an aspect marker, not a Deg head. A detailed explanation about *-chu* will be presented in Chapter 4.

Second, Gu & Guo's (2015) analysis would encounter a difficulty in deriving the syntactic structures for examples like (3b), repeated below in (76).

(76) Yuehan   jintian   [bi   Mali   zuotian]   kaixin.

      John   today   BI   Mary   yesterday   happy

      "John is happier today than Mary was yesterday."

Following Liu (1996), if *zuotian* (yesterday) is a part of the main clause, (77a) is expected to be grammatical, contrary to fact.

(77) a. * Yuehan   jintian   zuotian   kaixin.

        John   today   yesterday   happy

    b. * Yuehan   jintian.

        John   today

If we follow Gu & Guo's proposal, there is a complex DP in (76), that is, [DP [DP1 John today] [D' *bi* [DP2 Mary yesterday]]]. One serious problem of this structure is that, in Chinese, a modifier always precedes a modifiee (Liu, 2011:1781), which means that *jintin* (today) and *zuotian* (yesterday) do not form a constituent with the two DPs, as in (77b). On the other hand, we could assume that there is a complex DP consisting of *John* and *Mary* in (76). According to the adjunct licensing theory by Travis (1989), the two temporal adverbs are licensed by T and PredP respectively (as in (71b)). Then, the semantic interpretation of the structure assigned to (76) would still indicate the comparison between John and Mary in terms of their happiness, not the comparison between John's happiness **today** and Mary's happiness **yesterday**. Either way, Gu & Guo's (2015) syntactic structure cannot capture multiple topic comparison in Chinese, e.g., (76) (Tsao, 1989).

There is an additional question related to the predication relationship between comparison predicates and complex DPs. According to Gu & Guo (2015:349), in the complex DP [DP [DP1 John] [D' *bi* [DP2 Mary]]], DP1 *John* forms a kind of subtraction relation with DP2 *Mary*, the former being the minuend and the latter subtrahend, and the result is the difference. As Schwarzschild (2005) points out, measure phrases in comparatives are predicated of the gap between two compared items, and tell us the size of that gap. Take (71a) as an example, if the

complex DP denotes a subtraction relation between *John* and *Mary*, and the result is a difference. Then the differential phrase, *5 cm*, is supposed to be predicated of the difference between John's tallness and Mary's tallness. Yet, the semantic interpretation of the structure in (71b) means 'both John and Mary are five centimeters taller', which is completely different from the intended meaning. Thus, it is not clear how the predication relationship between comparison predicates and the two compared items is established.

2.4. *bi* as A Clausal Conjunction – Erlewine (2017)

In line with Liu's (1996) central claim that Chinese *bi*-comparatives are underlyingly clausal, Erlewine (2017) proposes a clausal analysis based on the conjecture that *bi* is a clausal conjunction, as schematized in (78).

(78)
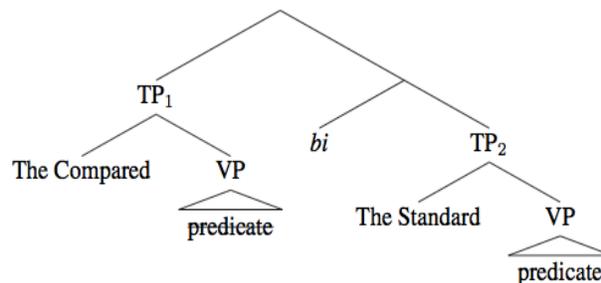
Erlewine (2017) explains the configuration by positing that there are two instances of the gradable predicate, with one forming a clause with the compared phrase $-TP_1$ and another one with the standard phrase $- TP_2$. In order to derive the right word order, Erlewine (2017:10) motivates a rule that only allows the predicate within TP_2 to be pronounced, called Comparative Deletion Requirement (CDR), as in (79).

(79) **Comparative Deletion Requirement (CDR)**

In a *bi*-comparative, elide a local predicate[16] of the target TP[17] under identity with a local predicate of the standard TP. If the target TP has no elidable local predicate, the derivation is illicit.

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[16] The definition of **a local predicate** (Erlewine, 2017:11) is as follows: given a TP β, α is a local predicate of β iff (a) α is a VP or a predicative AP, (b) β dominates α, and (c) there is no TP which is dominated by β and dominates α.
[17] The target TP refers to the TP formed by the compared phrase and one instance of the gradable predicate.

The configuration in (78) and CDR in (79) are illustrated by applying them to examples like (2a), repeated below in (80).

(80) a. Yuehan   bi   Mali   gao.

    John   BI   Mary   tall

    "John is taller than Mary."

b.
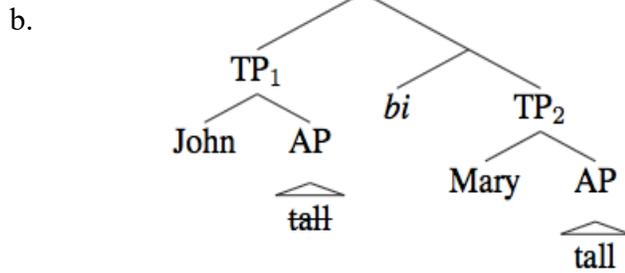
In this example, syntactically, two instances of *tall* form two clauses with *John* and *Mary* respectively, TP₁ and TP₂, and then TP₁ and TP₂ are conjoined by *bi*. Following the requirement of CDR, *tall*, as a local predicate of TP₁, is elided since it is under identity with *tall* in TP₂, which yields the correct word order. Semantically, *bi* is a two-place comparative operator, taking two degree expressions of the type <d,t> and returning that the maximum degree of D₁ is greater than the maximum degree of D₂. In addition, Erlewine (2017:13) also proposes a rule of ***Degree Last***; namely, all gradable adjectives have a denotation available where they take the degree argument last. Thus, *tall* in (80a) would of the type <e,<d,t>>. The semantic composition of (80a) is illustrated as follows:

(81) a. $\| \, bi \, \| = \lambda D_{2<d,t>}.\lambda D_{1<d,t>}.max(D_1) > max(D_2)$

    b.
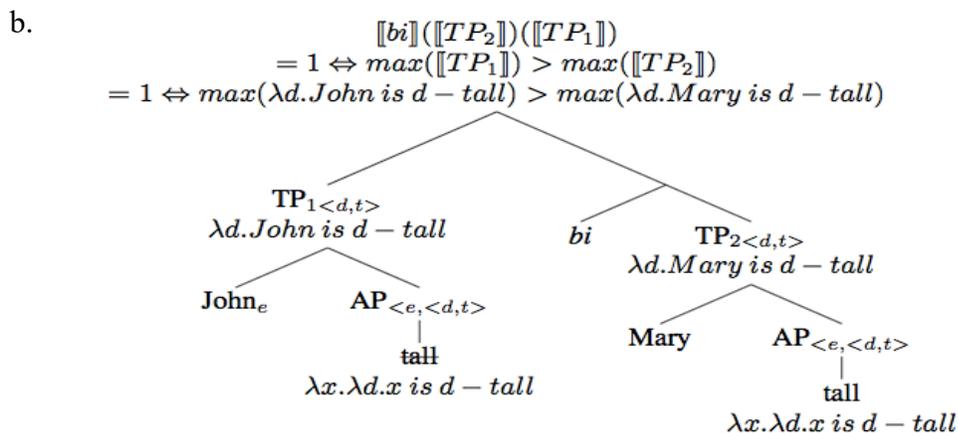
In (81b), TP$_1$ and TP$_2$ are two degree expressions, and *bi* composes with TP$_2$ first and then with TP$_1$. The result is: TP$_1$ describing the height of John is greater than TP$_2$ that describes the height of Mary.

According to Erlewine (2017:14), CDR and the semantics of *bi* also work for Chinese comparatives with a complex predicate, as in (82).

(82) a. Yuehan   bi   Mali   pao-de   kuai.

      John   BI   Mary   run-DE   fast

      "John runs faster than Mary (does)."

    b. Yuehan   pao-de   bi   feiji   kuai.

      John   run-DE   BI   plane   fast

      "John runs faster than {an airplane/the speed of an airplane}."

In (82a), the complex predicate *pao-de kuai* (run-DE fast) is a VP headed by *pao* (run) and modified by the AP *kuai* (fast). The underlying structure for (82a) is as follows.

(83) [TP$_1$ John [VP$_1$ ~~run [DE [AP fast]]~~]] BI [TP$_2$ Mary [VP$_2$ run [DE [AP fast]]]]

In this case, based on CDR, VP$_1$ is under identity with VP$_2$. Thus, VP$_1$ is a local predicate that is deleted, which leads to the right word order. Semantically, the modifier *kuai* (fast)[18] takes the verb as its argument by following the rule of ***Degree Last***, and the truth value of (82a) is composed below.

(84) a. $\| \text{fast} \| = \lambda P_{<e,t>}.\lambda x.\lambda d.P(x)$ is true at the speed of *d*

    b. $\| (82a) \| = 1$ iff *max* (λd. John runs at the speed of *d*) > *max* (λd. Mary runs at the speed of *d*)

As for (82b), on the surface, there is a complex predicate in the compared phrase, and also no corresponding material inside the standard phrase. According to CDR, the derivation of this example is illustrated in the following:

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[18] Erlewine (2017) treats the morpheme *de* as semantically vacuous by following Huang (1988).

(85) [TP1 John [VP1 run [DE ~~[AP fast]~~]] BI [TP2 airplane [AP fast]]

In this case, *John* forms a clause with the complex predicate *pao-de kuai* (run-DE fast), and *airplane* only forms a clause with the predicate *kuai* (fast). Since *kuai* (fast) in TP$_1$ is under identity with its counterpart in TP$_2$, it can be deleted, satisfying CDR.

The configuration in (78), according to Erlewine (2017), offers a straightforward way to explain why Chinese does not have subcomparatives and embedded comparatives, as in (7a) and (9b), repeated in (86a) and (87a) respectively.

(86) a. * zhe   zhang   zhuozi   [bi   na   ba   yizi   kuan]   chang.

        this   CL   desk   BI   that   CL   chair   wide   long

        Intended meaning: "This desk is longer than this chair is wide".

    b. * [TP1 zhe   zhang   zhuozi   **chang**]   BI   [TP2 na   ba   yizi   **kuan**].

        this   CL   desk   long   BI   that   CL   chair   wide

(87) a. * Yuehan   [bi   [Tangmu   renwen   [Mali]]]   gao.

        John   BI   Tom   think   Mary   tall

        Intended meaning: "John is taller than Tom thinks Mary is."

    b. * [TP1 Yuehan   ~~gao~~]   BI   [TP2 Tangmu   renwei   [TP3 Mali   **gao**]]

        John   tall   BI   Tom   believe   Mary   tall

As can be seen from (86b), when the two clauses are conjoined by *bi*, no local predicate (see footnote 16) is deleted in TP$_1$ since the only elidable predicate *chang* (long) does not have an identical antecedent in TP$_2$, which violates CDR. In terms of embedded comparatives like (87a), the antecedent of the elided predicate *gao* (tall) in TP$_1$ is not a locate predicate in TP$_2$, which is actually within the embedded clause TP$_3$. Hence, the deletion of *gao* (tall) in TP$_1$ is not licensed, as illustrated in (87b).

Despite the merits of the analysis proposed by Erlewine (2017), some problems need to be pointed out. First of all, Erlewine argues that two instances of the gradable predicate in

Chinese *bi*-comparatives form two clauses with constituents in the compared phrase and standard phrase respectively before the application of CDR. This actually violates the basic syntactic rule of adjective predication in Chinese. Take (80a) as an example, the underlying structure before applying CDR is as follows:

(88) [$_{TP1}$ John [$_{AP}$ tall]] BI [$_{TP2}$ Mary [$_{AP}$ tall]]

According to Zhu (1982) and Liu (2010), Chinese adjectives cannot appear as predicates in surface syntax unless they occur in complex forms. Consider the contrast in (89).

(89) a. * Yuehan   gao.

      John   tall

       Intended meaning: "John is tall."

    b. Yuehan   hen/feichang   gao.

      John   very/extremely   tall

      "John is (very) tall."

    c. Yuehan   gao-gao   de[19].

      John   tall-tall   DE

      "John is quite tall."

In order for the adjective *gao* (tall) to be a predicate, some syntactic strategies are necessary, such as the presence of a degree adverb in (89b) or the duplication of the adjective in (89c). Adjectives cannot form a grammatical clause with its subject directly, as in (89a). This shows that, in examples like (80a), even if there may be two instances of the gradable adjective, they cannot form independent clauses with the compared phrase and the standard phrase directly.

Second, Erlewine's proposal overlooks the possible occurrences of other elements in Chinese comparatives, such as degree adverbs and differential phrases. His syntactic and semantic analysis may lead to wrong predictions, as illustrated by the following examples.

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[19] Chinese adjectives can be in the form of "adjective +DE", such as *gao* (tall), which can also be *gao-de* (tall-DE).

(90) a. Yuehan   bi   Mali   geng   gao.

  John   BI   Mary   even   tall

  "John is even taller than Mary."

 b. Yuehan   bi   Mali   gao   wu   gong-fen.

  John   BI   Mary   tall   five   centimeter

  "John is five centimeters taller than Mary."

Erlewine's analysis does not specify the treatment of degree adverbs, e.g., *geng* (even) in (90a), and differential phrases, e.g., *wu gong-fen* (five centimeters) in (90b). For instance, in (90a), there are two possibilities in terms of the underlying position of *geng* (even) if we follow Erlewine's proposal.

(91) a. [$_{TP1}$ John   GENG   [$_{AP}$ tall]]   BI   [$_{TP2}$ Mary   [$_{AP}$ tall]]

  b. [$_{TP1}$ John   [$_{AP}$ tall]]   BI   [$_{TP2}$ Mary   GENG   [$_{AP}$ tall]]

In order to derive the right word order, (91b) is the only option, which, in turn, results in a comparative meaning opposed to the intended meaning of (90a). In (91b), TP$_1$ describes the height of John, and TP$_2$ states that Mary's height is much higher. Even though *bi* is a two-place comparative operator, there is no way to derive the truth condition of (90a). This is also the case for (90b), in which Erlewine's proposal erroneously predicts that John is tall, and Mary is five centimeters tall, contrary to fact.

To sum up, the analysis provided by Erlewine (2017) does not take into account a number of phenomena that would be important for gaining a better understanding of how Chinese *bi*-comparatives work. Most importantly, the syntactic and semantic role of *bi* would easily give rise to erroneous predictions about such a construction in Chinese.

2.5. Summary

In this chapter, I reviewed several leading perspectives regarding the analysis of Chinese *bi*-comparatives. First, the dichotomy (i.e., phrasal or clausal) adds more complexity to

syntactic analyses of Chinese *bi*-comparatives, mainly due to the uncertainty of the status of constituents within *bi*-phrases. Then, the morpheme *bi* is analyzed as a preposition, a degree head, a commitative or a conjunction, on the basis of which disparate structures have been assigned to Chinese *bi*-comparatives. However, there are several facts that have not been properly dealt with: the optionality of differential phrases and aspect markers; the fact that subcomparatives are not allowed either following phrasal or clausal analysis. In the next chapter, I will explain some fundamental issues, including the constraints on the compared constituents and the syntactic status of constituents within *bi*-phrases.

Chapter 3   Analysis of Some Fundamental Issues

The aim of this chapter is to lay a foundation to the syntactic analysis of Chinese 'phrasal' and 'clausal' *bi*-comparatives by tackling some basic questions. There are several debatable issues, including phrasal versus clausal, and the status of *bi*-phrases, that lead to various analyses, such as DegP-shell analysis (Xiang, 2005), *v*P-shell analysis (Erlewine, 2007) and a complex DP analysis (Gu & Guo, 2015). While I agree with some of the fundamental assumptions, before getting into the details of my analysis, it is necessary to present my response to those debates, which would play a key role in further explications.

3.1. Constraints on The Compared Constituents

Tsao (1989, 1990) proposes three principles governing comparative deletion (or ellipsis) in Chinese *bi*-comparatives, i.e., the constituents of comparison have to of equal rank – both must be primary, secondary or tertiary[20]. These three principles are illustrated in (92), along with examples listed in (93) (Tsao, 1990:287-308).

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[20] According to Tsao (1979) and Li & Thompson (1981), there is a **primary topic** in Chinese. One prominent quality of primary topics is that it invariably occupies the initial position of the first clause in a topic chain (Tsao, 1989:156). This topic could be a subject, a direct object or an indirect object of a verb in the same clause. Moreover, there is another class of topics called **secondary topic** or non-primary topic (Tsao, 1987a, 1987b), including the second NP of the double nominative construction (i), the *ba* NP in a *ba* construction (ii), the fronted object NP (iii) and the first (V+N) constituent in verb-copy construction (iv).

(i) *Yuehan*   **tui**   hen   chang.
     John   leg   very   long
     "John (topic), (his) leg is long."
(ii) *Yuehan*   ba   **qian**   juan-le.
     John   BA   money   donate-ASP
     "John donated his money."
(iii) *Yuehan*   **shiti**   zuo-wan-le.
     John   exercise   do-finish-ASP
     "John has finished his exercise."
(iv) *Yuehan*   **qi-ma**   qi-de   hen   kuai.
     John   ride-horse   ride-DE   very   fast
     "John rides horses very fast."
In addition, some adverbials, such as time and locative adverbials, are regarded as secondary topics as well. Based on the four examples illustrated above, under normal circumstances, primary topics (e.g., John) precede secondary topics, hence the term "secondary" (Tsao, 1989:158).

(92) a. **The Primary Principle**

Any compared topic, primary or non-primary, can be deleted if it is identical to another topic of equal rank. Only forward deletion, however, is allowed.

b. **The Present-time Deletion Principle**

The topical constituents referring to the present time can be deleted.

c. **The Second Compared Constituent Genitive Deletion Principle**

When a possessive NP occurs as the second of a paired compared constituents, and the possessed NP is identical with that of the first compared constituent, then the possessive marker can be optionally deleted after the possessed NP is deleted by the rule of Identical Elements in a Compared Constituent Deletion.

(93) a. **The Primary Principle**

Yuehan	tui	bi	Mali	~~tui~~	chang.
John	leg	BI	Mary	leg	long.

"John's leg is longer than Mary's."

b. **The Present-time Deletion Principle**

Mali	~~xianzai~~	bi	zhiqian	haokan.
Mary	now	BI	before	beautiful

"Mary now is more beautiful than she was before."

c. **The Second Compared Constituent Genitive Deletion Principle**

Yuehan-de[21]	chengji	bi	Mali-~~de~~	hao.
John-DE	grade	BI	Mary-DE	good

"John's academic performance is better than Mary's."

Although I doubt the conclusiveness of Tsao's generalizations, I take it that one important fact about Chinese comparatives has been revealed quite clearly; namely, compared constituents in compared phrases and standard phrases respectively in Chinese comparatives have to be underlyingly parallel to each other in terms of category, syntax and semantics (also see Liu,

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[21] The morpheme *de* here is a possessive marker.

2011). The following examples provide an illustration.

(94) a. Yuehan   jintian   bi   zuotian   gaoxing.

     John   today   BI   yesterday   happy

     "John today is happier than he was yesterday."

   b. * Yuehan   bi   zuotian   gaoxing.

     John   BI   yesterday   happy

In (94a), what are compared is John's happiness **today** and John's happiness **yesterday**, that is, a comparison of two non-primary topics. Yet, in (94b), what are compared is *John* and *yesterday*, that is, a comparison of one primary topic and one non-primary topic, which obviously leads to ungrammaticality. This parallelism requirement (e.g., Erlewine, 2010) succeeds in ruling out examples of subcomparatives and embedded comparatives, as illustrated in (95).

(95) a. * zhe-zhang   zhuozi   chang   [bi   zhe-ba   yizi]   kuan.

     this-CL   table   long   BI   this-CL   chair   wide

     "This table is longer than this chair is wide."

   b. * zhe-zhang   zhuozi   [bi   zhe-ba   yizi   kuan]   chang.

     this-CL   table   BI   this-CL   chair   wide   long

     "This table is longer than this chair is wide."

   c. * Yuehan   [bi   Tongmu   renwei   Mali]   gao.

     John   BI   Tom   believe   Mary   tall

     "John is taller than Tom believes Mary is."

Following the parallelism requirement, it is apparent in (95a-c) that the constituents in the compared phrase and the standard phrase are of different types, which is why they are unacceptable in Chinese. However, we may erroneously predict that the examples in (96) are grammatical if only following this requirement.

(96) a. * Yuehan   jintian   [bi   Mali   zai-xuexiao]   gaoxing.

       John   today   BI   Mary   at-school   happy

       "John today is happier than Mary was at school."

  b. * Yuehan   mianqian-de[22]   [bi   Mali   xin-gan-qing-yuan-de]

       John   reluctantly   BI   Mary   willingly

       duo   zuo-le   san-jian   shi.

       much   do-ASP   three-CL   work

       "John did three more works more reluctantly than Mary did willingly."

In (96a), *Yuehan jintian* (John today) and *Mali zai-xuexiao* (Mary at school) are of the same type – both composed of a primary topic (subject) and a non-primary topic (adverbial). This is also the case in (96b), in which the compared phrase and the standard phrase are composed of a primary topic (subject) and a non-primary topic (manner adjunct) respectively – "John and Mary" and "*mianqiang-de* (reluctantly) and *xin-gan-qing-yuan-de* (willingly)". The parallelism requirement predicts that both are grammatical, but this prediction is not borne out. Examples like (96a-b) challenge the generalizations made above (Tsao, 1989; Erlewine, 2010; Liu, 2011), but I maintain that they are essentially correct, as attested by a range of data of Chinese comparatives. At this point, I adopt Su's (2015:3) constraint on the compared constituents of Chinese *bi*-comparatives, which is a refined version of Lin's (2009) argument requirement of Chinese comparatives.

(97) **A constraint on the compared constituents of Chinese *bi*-comparatives**

    In a *bi*-comparative, the compared constituent and its correlate must be arguments of the comparison predicate, and both of them must have the same dimension.

Following this constraint, even if *jintian* (today) and *zai-xuexiao* (at-school) are both arguments of *gaoxing* (happy) in (96a), *today* indicates the dimension of time, and *at-school* bears the dimension of space. Hence, the ill-formedness of (96a) follows. (96b) can be easily ruled out since two manner adverbs – *mianqiang-de* (reluctantly) and *xin-gan-qing-yuan-de*

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[22] The morpheme *de* here is attached to the lexeme indicating that it is an adjective or adverb, resembling *–ly* in English.

(willingly) are not arguments of *zuo* (do), since, as pointed out by Lin (2009), manner adjuncts usually take VPs as their arguments, and are analyzed as functions.

The combination of the parallelism requirement (Tsao, 1989; Erlewine, 2010) and the constraint on the compared constituents (Lin, 2009; Su, 2015) points to a fundamental assumption I take for my further analysis: compared constituents in Chinese comparatives are underlyingly parallel to each other in terms of syntax, semantics and category. However, there is still one problem that needs to be dealt with, as in (98).

(98) a. <u>Yuehan-de   shenti</u>   bi   <u>yiqian</u>   hao.

      John-GEN   body   BI   before   good

      "John's health is better than before."

    b. Yuehan   bi   mei-ge   nansheng   dou   gao.

      John   BI   every-CL   boy   all   tall

      "John is taller than every boy."

In (98a), on the surface, the compared phrase involves a genitive DP and the standard phrase a DP adverbial, which are supposed to be incomparable, based on Tsao (1989, 1990). Yet, if we adopt the parallelism requirement, the reconstruction of (98a) is as follows:

(99) [Yuehan   ~~xianzai~~-de   shenti]   bi   [~~Yuehan~~   yiqian-~~de~~   ~~shenti~~]   hao.

     John   current-DE   body   BI   John   previous-DE   body   good

Following the Primary Principle, *Yuehan* (John) and *shenti* (body) in the *bi*-phrase are deleted. *xianzai* (current) is deleted due to the Present Time Principle, and the deletion of the genitive marker *de* in the standard phrase is attributed to the Second Compared Constituent Genitive Deletion Principle. Thus, I disagree with Paul (1993) here, who proposes that constituents introduced by *bi* have to be cyclically c-commanded by their corresponding correlates in the compared phrase. When we apply this requirement to (98a), the DP adverbial is c-commanded by the genitive DP, which would mean that John's health is better than a period of time in the past. This is totally different from the intended meaning, as shown in the English translation.

In (98b), there is a universal quantificational adverb *dou* (all). In Chinese, a universal quantificational DP, such as *mei-ge nansheng* (every boy), must occur with *dou* (all) (Cheng, 1995; Lin, 1998), as illustrated in (100).

(100) mei-ge   nansheng   *(dou)   chi-le   yi-ge   pingguo.

     every-CL   boy   all   eat-ASP   one-CL   apple

      "Every boy had an apple."

When it comes to (98b), it may be easily seen that *dou* (all) is a part of the standard phrase, which does not have a counterpart in the compared phrase. This seems to contradict the parallelism requirement. However, according to Xiang (2008), *dou* is a maximality operator, giving rise to different meanings by applying maximality to a contextually determined plural set. Let's see the following examples first.

(101) a. mei-ge   nansheng   **dou**   bi   Mali   gao.

      every-CL   boy   all   BI   Mary   tall

      "Every boy is taller than Mary."

     b. mei-ge   nansheng   bi   Mali   **dou**   gao.

      every-CL   boy   BI   Mary   all   tall

      "Every boy is taller than Mary."

As shown by (101b), *dou* does not necessarily follow the quantificational DP, but we can still obtain the intended comparative meaning, that is, comparing every boy's tallness with Mary's tallness. I thus argue that, despite the co-occurrence with universal quantificational DPs in standard phrases, as in (98b) and (101a), *dou* does not participate in the comparing event, but only serves as an operator licensing quantificational DPs. Thus, this would not constitute a challenge to the parallelism requirement proposed above.

Concluding this section, compared constituents may appear in different forms. Nevertheless, Chinese *bi*-comparatives exhibit the parallelism requirement, along with a constraint on the compared constituents, requiring them to be compared along the same dimension.

3.2. The Syntactic Status of *bi*-Phrases

It can be discerned from Chapter 2 that the syntactic status of *bi*-phrases in Chinese comparatives is debatable, for instance, *v*Ps (Erlewine, 2007), PPs (Liu, 1996, 2011) and a part of complex DPs (Gu & Guo, 2015). In this section, I will provide two pieces of evidence to show that *bi*-phrases are actually adverbials, acting like degree adverbials that lead to comparative meanings (Shi, 2001; Schwarzschild, 2010).

The first piece of evidence comes from the double nominative structure (Tsao, 1984, 1990) in Chinese, as illustrated by the following examples, adapted from Shi (2001).

(102) a. Yuehan   qizi   hen   piaoliang.

     John   wife   very   beautiful

     "John's wife is very beautiful."

     b. Yuehan   tou   teng.

     John   head   painful

     "John has a headache."

According to Tsao (1984), the first nominative *Yuehan* (John) in (102a-b) is a topic, and the second nominative *qizi* (wife) in (102a) and *tou* (head) in (102b) are subjects. Using an adverb or a modal as a diagnostic can identify the relationship between the two DPs.

(103) a. Yuehan   qizi   ye/yinggai[23]   hen   piaoliang.

     John   wife   also/should   very   beautiful

     "John's wife is also very beautiful/John's wife may be very beautiful."

     b. * Yuehan   ye/yinggai   qizi   hen   piaoliang.

     John   also/should   wife   very   beautiful

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[23] Following the English gloss, *yinggai* can be directly translated as 'should', but it is an epistemic expression in this case, which means "may".

(104) a. Yuehan   you/yinggai   tou   teng.

       John   again/should   head   painful

       "John has a headache again/John may have a headache."

   b. Yuehan   tou   yinggai/you   teng.

       John   head   should/again   painful

Based on (103a-b), it is apparent that the relationship between the two DPs is tight. In other words, these two DPs are inseparable. Then, the addition of an adverb or a modal between the two would result in ungrammaticality. However, this is not the case of (102b), as in (104a-b), in which the relationship between the two DPs is rather loose, and then the re-analysis is allowed. That is why the occurrence of an adverb or a modal is possible and would not affect the grammaticality. Bearing this in mind, let's see whether *bi*-phrases can occur in such a structure. Consider the following examples in (105).

(105) a. Yuehan   [bi   Mali]   tou   teng.

       John   BI   Mary   head   painful

       "John has a headache more serious than Mary."

   a'. Yuehan   tou   [bi   Mali(-de)[24]]   teng.

       John   head   BI   Mary(-DE)   painful

   b. xiang   [bi   xiong]   bizi   chang.

       elephant   BI   bear   nose   long

       "Elephant's trunk is longer than bear's nose."

   b'. xiang   bizi   [bi   xiong(-de)]   chang.

       elephant   nose   BI   bear(-de)   long

The examples in (105) are analogous to (104a-b) in terms of the position of the *bi*-phrase, namely the *bi*-phrase can occur between the two DPs or after the second nominative without resulting in ungrammaticality or semantic ill-formedness. Given the possible appearance of the

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[24] According to my informants' judgment, this sentence shows a tiny variability. Some think that (105a') and (105b') are grammatical even if they are without the genitive morpheme *de*, but others think the genitive morpheme has to be added to the *bi*-phrase that can clearly indicate what are compared. Either case would not affect my overall analysis, namely the position of the *bi*-phrase in these instances.

bi-phrase in two different positions in the double nominative structure, following Shi (2001), it is not implausible to speculate that it functions like an adverb.

The second piece of evidence is attributed to the speaker-oriented adverbs (hereafter SpOAs) in Chinese, such as *dagai* (probably), *xianran* (obviously), and *xingkui* (fortunately).

(106) a. Yuehan   {dagai/xianran/xingkui}   xihuan   yuyanxue.

      John   probably/obviously/fortunately   like   linguistics

      "John probably/obviously/fortunately likes linguistics."

      b. {dagai/xianran/xingkui}   Yuehan   xihuan   yuyanxue.

      probably/obviously/fortunately   John   like   linguistics

      "Probably/ obviously/fortunately John likes linguistics."

These adverbs in (106a-b) show alternate order without affecting grammaticality and the intended meanings, as indicated by the English glosses. This is in contrast to examples that have negations.

(107) a. * Yuehan   bu   {dagai/xianran/xingkui}   xihuan   yuyanxue.

      John   not   probably/obviously/fortunately   like   linguistics

      "John probably/obviously/fortunately does not like linguistics."

      b. Yuehan   {dagai/xianran/xingkui}   bu   xihuan   yuyanxue.

      John   probably/obviously/fortunately   not   like   linguistics

      "John probably/obviously/fortunately does not like linguistics."

The examples in (107a-b)) show that SpOAs obligatorily precede negations. According to Ernst (2008), these adverbs are propositional modifiers, representing speaker's strong commitment to the proposition Q and then requiring that Q be true in all worlds in the speaker's belief model. Let's take *xianran* (obviously) as an example, following Ernst (2008:77).

(108) $\| \textit{xianran} \ (Q) \| =$ a. $\| P \| = 1$ in $M_B(s)$

                          b. $\forall w \in M_B(s)$, $\|$ it is obvious that Q $\| = 1$ in w

M$_B$(s) refers to the speaker's belief model (cf. Giannakidou, 1999). What (108) says is that the proposition Q that *xianran* (obviously) combines with is taken as true in all the worlds in the speaker's belief model. The ill-formedness of (107a) can then be accounted for based on (108), namely, when a proposition P is negated, P could be false in at least one world in the M$_B$(s). Yet, the use of a speaker-oriented adverb requires that Q be true in all worlds in that model. Thus, the resulting representation in (107a) is semantically ill-formed.

While occurring in Chinese *bi*-comparatives, SpOAs demonstrate structural flexibility to some extent, as represented in (109).

(109) a. Yuehan   xianran   bi   Mali   gao   yixie.

        John   obviously   BI   Mary   tall   a little

        "John is obviously a little taller than Mary."

      b. Yuehan   bi   Mali   xianran   gao   yixie.

        John   BI   Mary   obviously   tall   a little

        "John is obviously a little taller than Mary."

(110) a. Yuehan   xianran   bi   Mali   gao.

        John   obviously   BI   Mary   tall

        "John is obviously taller than Mary."

      b. * Yuehan   bi   Mali   xianran   gao.

        John   BI   Mary   obviously   tall

        "John is obviously taller than Mary.

Based on Gu & Guo (2015), [$_{DP}$ [$_{DP1}$John] [$_{D'}$ [$_D$ *bi*] [$_{DP2}$ Mary]]] is a complex DP, and DP$_1$ moves to [Spec, TP] in the matrix clause to check the nominative case and to satisfy the EPP feature. Then the remnant complex DP may be subject to remnant movement, which results in the word order in (109b), schematically:

(111) [$_{DP1}$ Yuehan]$_i$ ▲   xianran [$_{DP}$ [$_{DP1}$ t$_i$] [$_{D'}$ [$_D$ bi] [$_{DP2}$ Mali]]]   gao   yixie.

If the remnant complex DP also undergoes movement to a higher position in (110a), we should expect (110b) to be grammatical, contrary to fact.

It can be readily seen in (109b) that *xianran* minimally takes a proposition: *Yuehan gao yixie* (John is a little taller), following the VP Internal Subject Hypothesis. In (110a), *xianran* minimally takes a proposition: *Yuehan bi Mali gao* (John is taller than Mary). Adopting Schwarzschild (2010), I further contend that the presence of a standard phrase (i.e., the *bi*-phrase) or a differential phrase in the surface syntax, i.e., adjacent to the comparison predicate, leads to a comparative meaning in examples like (109) and (110). In other words, what *xianran* combines with in Chinese *bi*-comparatives is a proposition that minimally has a comparative meaning. If *bi* is a verbal head as suggested by Erlewine (2007), we would expect the *bi*-phrase in (109) and (110) to always appear below the SpOA since the projection of *bi* is where the proposition is formed. At this point, *xianran* must not come into play, but this prediction is not borne out.

Under certain circumstances, as shown by (109a-b), *bi*-phrases may not have to be an integral part of the proposition taken by the SpOAs, which resembles participant PPs in Chinese, including locative, instrumental and other PPs expressing additional roles in an event (Ernst, 2014).

(112) a. Yuehan   **zai-jia**   xianran   hen   gaoxing.

       John   at-home   obviously   very   happy

       "John is obviously very happy at home."

    b. Yuehan   xianran   **zai-jia**   hen   gaoxing.

       John   obviously   at-home   very   happy

       "John is obviously very happy at home."

Ernst (2002) suggests that participant PPs generally attach to *v*P, or even to higher projections, such as modals, tense or other operators that do not indicate the completion of event

representations. In (112a), the minimal proposition that *xianran* combines with is *Yuehan hen gaoxing* (John is very happy), following the VP Internal Subject Hypothesis; whereas, the proposition that *xianran* combines with in (112b) entails the locative PP *zai-jia* (at-home), namely *Yuehan zai-jia hen gaoxing* (John is very happy at home). Drawing on the similarities between the role of participant PPs and the co-occurrence of *bi*-phrases and the SpOAs, it is not unreasonable to conjecture that *bi*-phrases are adverbials, functioning like participant PPs in Chinese that express additional roles in comparing events.

Yet, another issue that may undermine the assumption proposed above is exemplified in (113).

(113) a. Yuehan   xianran   bu   bi   Mali   gao.

  John   obviously   not   BI   Mary   tall

  "John is obviously not taller than Mary."

  b. * Yuehan   bi   Mali   xianran   bu   gao.

  John   BI   Mary   obviously   not   tall

  c. Yuehan   xianran   bu   bi   Mali   gao   yixie.

  John   obviously   not   BI   Mary   tall   a little

  "John is obviously not a little taller than Mary."

  d. * Yuehan   bi   Mali   xianran   bu   gao   yixie.

  John   BI   Mary   obviously   not   tall   a little

If the SpOAs minimally take a proposition that has a comparative meaning in Chinese *bi*-comparatives, we should predict that (113d) is grammatical as the presence of the differential phrase *yixie* (a little) leads to a comparative meaning, as just argued. Yet, this prediction is clearly not borne out. According to Ernst (2008), *xianran* (obviously) in (113c) combines with the proposition Q: *John is a little taller than Mary*, which is true in all the worlds in the speaker's belief model. In (113d), what *xianran* combines with is the proposition: *John is not a little taller*, which does not necessary entail that John is not a little taller than Mary in all the worlds. Hence, the semantic ill-formedness follows.

In summary, based on the position of *bi*-phrases in the double nominative structure, as well as their co-occurrence with respect to the speaker-oriented adverbs, I propose that *bi*-phrases in Chinese comparatives have an adverbial status in the syntax, exhibiting two functions: (i) leading to comparative meanings by being adjacent to comparison predicates; (ii) expressing additional roles in comparing events.

3.3. Chinese *bi*-Comparatives are Clausal Comparatives

Two major types of analyses concerning degree syntax and semantics have been suggested for English comparatives, namely the Reduction Analysis (von Stechow, 1984; Lechner, 2004) and the Direct Analysis (Heim, 1985; Kennedy, 1999). This clausal-phrasal debate has also been extended to Chinese comparatives. Consider (114).

(114) Yuehan   bi   Mali   gao.

       John   BI   Mary   tall

       "John is taller than Mary."

In the spirit of the Reduction Analysis, Liu (1996) suggests that the morpheme *bi* takes a clause as its complement, and there is another occurrence of a gradable predicate inside the *bi*-phrase that is obligatorily deleted. According to Liu's analysis, *Mali* (Mary) in (114) is the subject of the elided predicate, and there is a covert comparative morpheme GENG acting like its counterpart in English *-er* that denotes a two-place predicate, as in (115).

(115) [$_{TP}$ John   [*bi*   [$_{TP}$ Mary ~~tall~~]]   GENG   tall]

Contrary to Liu's clausal analysis, various proposals in line with the Direct Analysis have been proposed, including Xiang (2005), Erlewine (2007) and Lin (2009). I take Lin's analysis as an example here.

(116) [$_{TP}$ John   [$_{AP}$ [$_{DegP}$ [$_{Deg'}$ *bi*   [Mary]]]   tall]

As can be seen from (116), Lin (2009) argues that *bi* forms a constituent with the standard of comparison *Mary* that adjoins to AP. *bi* is the head of the DegP and responsible for producing

the comparative meaning. One important characteristic shared by the phrasal analysis is that no reduction operation is involved. One critical argument for this type of analysis is the unavailability of sub-comparatives in Chinese, as has been illustrated in (7), repeated in (117).

(117) a. * zhe   zhang   zhuozi   [bi   na   ba   yizi   kuan]   chang.

        this   CL   desk   BI   that   CL   chair   wide   long

    b. This desk is longer than that chair is wide.

Following the Direct Analysis, the ungrammaticality of (117) can be explained straightforwardly since the marker *bi* does not take a clause as its complement. For the Reduction Analysis, (117) is a challenge that has not been solved satisfactorily. The in-depth comparison of these two analyses is beyond the scope of this dissertation. In this section, I will provide three pieces of evidence to show that Chinese *bi*-comparatives are potentially clausal comparatives, in line with Liu (1996, 2011) and Erlewine (2017). However, unlike previous assumptions, I will further adopt the idea that the morpheme *bi* takes a non-finite clause as its complement based on Hsieh (2017).

The long-distance dependency of Chinese bare reflexive *ziji* (self) and its blocking effect provide the first piece of evidence, following Hsieh (2015). In general, the reference of *ziji*, unlike English, is not bound by the locality requirement, i.e., its antecedents can be far from it.

(118) a. Yuehan$_i$ juede   Mali$_j$ chongbai   ziji$_{i/j}$.

        John   think   Mary   adore   self

        "John$_i$ thinks that Mary$_j$ adores self$_{i/j}$."

    b. Yuehan$_i$ juede   wo$_j$ chongbai   ziji$_{*i/j}$.

        John   think   I   adore   self

        "John$_i$ thinks that Mary$_j$ adores self$_{*i/j}$."

The example in (118a) indicates that *ziji* can either refer to a local antecedent *Mali* (Mary) or a non-local antecedent *Yuehan* (John). The long-distance co-reference could be blocked if all the possible antecedents for *ziji* do not agree in person feature. In (118b), *Yuehan* (John) and *wo* (I)

are two possible antecedents, but the former differs from the latter in person. Under this circumstance, only local co-reference is allowed (Huang, et al., 2009). However, the scenario is different when it comes to Chinese *bi*-comparatives containing the reflexive *ziji*, which usually leads to a sloppy reading.

(119) Yuehan$_i$ bi   wo$_j$ dui   ziji$_{i/j}$ hao.

      John   BI   I   to   self   good

      "John$_i$ is better to himself$_i$ than I$_j$ am to myself$_j$."

Following Hsieh (2015:93), the sloppy reading of (119) can be explained in a straightforward way if we assume that there are two occurrences of the gradable predicate and *ziji*, whose possible LFs[25] are represented in (120).

(120) LF$_1$: …[$_{vP}$ [bi   wo$_j$ dui   ziji$_j$ hao]   [$_{vP}$ Yuehan$_i$ dui   ziji$_i$ hao]]

    *LF$_2$: …[$_{vP}$ [bi   wo   dui   ziji$_i$ hao]   [$_{vP}$ Yuehan$_i$ dui   ziji$_i$ hao]]

According to Hsieh (2015:86), "the syntactic subject in an adjoined constituent that differs from the matrix subject may block the long-distance co-reference". That is why LF$_2$ is unavailable. If this analysis is on the right track, LF$_1$ shows that each occurrence of *ziji* is locally bound by *Yuehan* (John) and *wo* (I) respectively, giving rise to the sloppy reading. Following the phrasal analysis (e.g., Xiang, 2005; Erlewine, 2007; Lin, 2009), there is only one occurrence of the gradable predicate and *ziji*. Since the co-reference of *ziji* with the matrix subject is blocked due to different person feature between possible antecedents, it is syntactically impossible to derive the sloppy reading.

The second argument comes from comparatives involving passives[26].

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[25] Hsieh (2015) assumes that the *bi*-phrase is left-adjoined to *v*P, basically following Liu (1996).

[26] According to Huang, et al. (2009:112), passive sentences in Chinese involve the passive morpheme *bei*, as illustrated by the following examples.

(i) Yuehan   bei   Mali   ma-le.
    John   BEI   Mary   scold-ASP
     "John was scolded by Mary."

(ii) Yuehan   bei   ma-le.
    John   BEI   scold-ASP
     "John was scolded."

The example (i) is the same as (121a), in which the passive morpheme is followed by a DP and a VP, whereas in the example (ii), *bei* is followed by a VP directly. Interested readers are referred to Huang et al. (2009) for a detailed analysis.

(121) a. Yuehan   bei   daoshi   piping-le

John   BEI   supervisor   criticize-ASP

"John was criticized by his supervisor."

b. [TP John BEI [TP OP$_i$ [TP supervisor criticize t$_i$]]

In Chinese passives like (121a), the morpheme *bei* is usually regarded as a light verb, selecting a DP as its subject and a clause as its complement. Thus, passive structures involve A-bar movement of an embedded null object to the left periphery of the embedded TP, as shown in (121b), from where it is predicated on the matrix subject (Feng, 1995; Huang, et al., 2009). Now, let's consider the comparatives involving passives as the compared constituents.

(122) Yuehan   bei   daoshi   bi   bei   baba   piping-de   geng   can.

John   BEI   supervisor   BI   BEI   father   criticize-DE   even   severe

"John was criticized by his supervisor more severely than by his father."

Erlewine (2017) argues that two occurrences of the null operator movement exist in (122), both originating from the same comparison predicate, *piping* (criticize). Though I disagree with the overall syntactic structure he assigns to (122), I have the same opinion as to what happens inside the *bi*-phrase; namely, there is another instance of the comparison predicate, *piping* (criticize) inside it. Based on the parallelism requirement for the compared constituents I motivated in the section 3.1, the underlying structure after comparison deletion is as follows.

(123) a. [Yuehan   bei   daoshi]   [bi   [~~Yuehan~~   bei   baba]]

John   BEI   supervisor   BI   John   BEI   father

b. [bi   [TP ~~Yuehan~~   bei   OP$_i$ [TP baba   ~~piping-de~~   ~~t$_i$~~   ~~d-can~~]]]

BI   John   BEI   father   criticize-DE   severe

Following the Primary Principle (Tsao, 1989, 1990), *Yuehan* (John) inside the *bi*-phrase could be elided, as in (123a). As argued by Huang et al. (2009), the passive morpheme *bei* selects a DP as its subject predicated on the matrix subject and then subcategorizes for a clause. Then, it is not implausible to expect that the *bi*-phrase in (122) has the underlying structure as shown in

(123b), in which there is an A-bar movement of a null object originating from the embedded TP. The surface form of the two compared constituents in (122) is due to the rules of comparison deletion. Yet, under the phrasal analysis, it is predicted that there is no null operator movement inside the *bi*-phrase. According to Liu (2011) and Erlewine (2017), different from the *by*-phrase in English, *bei* and the following DP do not form a constituent, which means that they are not introduced together by *bi*. This is contrary to the phrasal analysis, according to which constituents within *bi*-phrases are introduced by *bi* together.

The third argument stems from the structural flexibility of *bi*-phrases, as shown in (124) and (125).

(124) a. Yuehan **yinggai** [bi Mali] gao wu gong-fen.

         John should BI Mary tall five centimeter

       "John may be five centimeters taller than Mary."

     b. Yuehan [bi Mali] **yinggai** gao wu gong-fen.

         John BI Mary should tall five centimeter

(125) a. Yuehan **yinggai** [bi Mali] gao.

         John should BI Mary tall

       "John may be taller than Mary."

     b. * Yuehan [bi Mali] **yinggai** gao.

         John BI Mary should tall

In (124) and (125), the modal *yinggai* (should) is used as a diagnostic to show that, when there is a differential phrase, the *bi*-phrase can be in a position higher than that of the modal. However, when the differential phrase is absent, the *bi*-phrase is not allowed to be flexible, as shown by the grammaticality contrast in (125a-b). Then a natural question to ask is why this is the case. In semantics, gradable adjectives map objects onto to an abstract representation of measurement formalized as sets of values (e.g., Kennedy, 1999; Solt, 2015). In other words, there is a degree argument inside the gradable adjective that needs to be saturated (Creswell,

1977; von Stechow, 1984; Kennedy & McNally, 2005). Following this assumption, Liu (2010) suggests that the degree argument of gradable adjectives in Chinese *bi*-comparatives has to be θ-bound by *bi*-phrases. For instance, in (125a), [*bi* Mary] denotes a degree *d* θ-binding the degree argument of the gradable adjective *gao* (tall).

Adding to this line of argument, I adopt the proposal that measure phrases, like *wu gong-fen* (five centimeters), can also bind the degree argument of gradable adjectives (Schwardzschild, 2005). Consequently, when there is a differential phrase, as shown by (124a-b), I propose that the degree argument of gradable adjectives in Chinese *bi*-comparatives can be θ-bound by *bi*-phrases or differential phrases or both. When the differential phrase binds that degree argument, the *bi*-phrase is free to move and adjoin to a higher projection, such as (124b). However, in (125a), since the *bi*-phrase has to θ-bind the degree argument locally, it means that it is not free to move any more, as indicated by the ungrammaticality in (125b).

That *bi*-phrases may undergo movement under certain conditions points to the fact that they denote a degree *d* that θ-binds the degree argument of gradable predicates. This offers strong support to the claim that the morpheme *bi* in effect subcategorizes for a clause-like structure. If this analysis is on the right track, we should expect that, as long as the degree argument of gradable predicates is θ-bound, either a differential phrase or a degree adverb, the *bi*-phrase is free to move. This expectation is borne out in (126).

(126) a. Yuehan   yinggai   [bi   Mali]   **geng**   gao.

       John   should   BI   Mary   even-more   tall

       "John may be even taller than Mary."

    b. Yuehan   [bi   Mali]   yinggai   **geng**   gao.

       John   BI   Mary   should   even-more   tall

       "John may be even taller than Mary."

If the degree argument is bound by the degree adverb *geng* (even-more), then the *bi*-phrase

may move up to a position higher than that of the modal *yinggai* (should), as shown by (126b). If we follow the phrasal analysis, namely, there is only one instance of the gradable predicate, it is impossible for the *bi*-phrase in (124) and (125) to denote a degree *d* since the morpheme *bi* takes a DP as its complement.

One obvious challenge to the clausal analysis is how to explain the unavailability of sub-comparatives and embedded comparatives in Chinese, as in (127) and (128), repeated from (7) and (9) respectively.

(127) a. This desk is longer than that chair is wide.

     b. * zhe   zhang   zhuozi   [bi   na   ba   yizi   kuan]   chang.

        this   CL   desk   BI   that   CL   chair   wide   long

(128) a. John is taller than Tom thinks Mary is.

     b. * Yuehan   [bi   [Tangmu   renwen   [Mali]]]   gao.

        John   BI   Tom   think   Mary   tall

        "John is taller than Tom thinks Mary is."

Instead of assuming that *bi* subcategorizes for a full-fledged CP as in English, I extend Hsieh's (2017) proposal that the complement of the morpheme *bi* is a small clause and short of all the higher projections, and further argue that *bi* takes a non-finite TP as complement involving *rescue-by-PF-deletion* mechanism (Bošković, 2011).

Following Wurmbrand's (2014) definition of Agree[27], Hsieh (2017) proposes that verbal heads in Chinese, such as V and A, carry an unvalued feature [uT] that needs to be valued by entering into an Agree relationship with the closest valued T-feature. This idea can be

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[27] Wurmbrand (2014) adopts the following definition of Agree.

A feature F on α is valued by a feature F on β iff:

(i)   β c-commands α, and

(ii)   α is accessible to β;

(iii)   α does value a feature of β.

Along with this idea, on the one hand, the functional heads (e.g., modal, passive, perfect, etc.) have an interpretable tense feature – [iT], typically valued. On the other hand, verbal heads have an uninterpretable feature – [uT], typically unvalued. Since unvalued features are disallowed at the interface, such as PF or LF, they must enter into an Agree relationship with the closest valued feature.

extended to Chinese *bi*-comparatives, such as (22a), repeated in (129).

(129) a. Yuehan   [bi   Mali]   gao.

      John   BI   Mary   tall

      "John is taller than Mary."

    b. [$_{TP}$ [$_{DP}$ John]$_i$ [$_{T'}$ T [$_{vP}$ [*bi* Mary] [$_{vP}$ [$_{DP}$ t$_i$] [$_{v'}$ v^0 [$_{AP}$ [$_A$ tall]]]]]]]

               [*i*T]   [*u*T]

    c. [$_{TP}$ [$_{DP}$ John]$_i$ [$_{T'}$ T [$_{vP}$ [$_{PP}$ [$_P$ *bi*] [$_{vP}$ [$_{DP}$ Mary] [$_{v'}$ v^0 [$_{AP}$ [$_A$ tall]]]]] [$_{vP}$ t$_i$ tall]]]]

               [*i*T]   [*u*T]
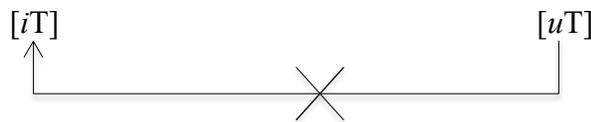
In (129a), the gradable adjective *gao* (tall) in the matrix clause, as a verbal head, carries an uninterpretable feature [*u*T] that has to be valued. Thus, to prevent the spell-out from crashing at PF, Hsieh (2017:276) advocates that *gao* (tall) must undergo Agree with the head of TP – T, which has an interpretable feature [*i*T], a feature that is typically valued (Wurmbrand, 2014), as illustrated in (129b). Based on the premise that Chinese comparatives are clausal comparatives, there is another occurrence of the gradable adjective *gao* (tall) in the *bi*-phrase, also carrying an uninterpretable feature [*u*T] that needs to be valued. Since the complement of *bi* is a small clause, lacking some higher projections (e.g., TP), the only way for the feature [*u*T] of *gao* (tall) to be valued is to enter into an Agree relationship with the head of T in the matrix clause. However, the *bi*-phrase, as an adverbial, constitutes an island that blocks feature valuation (Hsieh, 2017:278), as shown in (129c). Then, PF-deletion of the unvalued feature of *gao* (tall) inside the *bi*-phrase would rescue the derivation of Chinese *bi*-comparatives from crashing (e.g., Lasnik, 1995; Bošković, 2011), which may be the reason why the gradable predicate inside the *bi*-phrase of Chinese comparatives is obligatorily deleted.

Following this line of argument, the unavailability of sub-comparatives and embedded comparatives can be accounted for straightforwardly. The derivation of (127b) and (128b) is

schematized as follows.

(130) a. * zhe   zhang   zhuozi   [bi   na   ba   yizi   **kuan**]   chang.

        this   CL   desk   BI   that   CL   chair   wide   long

        Intended meaning: "This table is longer than that chair is wide."

    b. [$_{TP}$ [$_{DP}$ this desk] [$_{T'}$ T [$_{vP}$ [$_{PP}$ [$_{P}$ *bi*] [$_{vP}$ [$_{DP}$ that chair] [$_{v'}$ v^0 [$_{AP}$ [$_{A}$ **wide**]]]]] [$_{vP}$ t$_i$ long]]]]

                    [*i*T]   [*u*T]
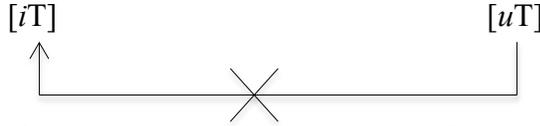
(131) a. * Yuehan   [bi   [Tangmu   **renwen**   [Mali]]]   gao.

        John   BI   Tom   think   Mary   tall

        Intended meaning: "John is taller than Tom thinks Mary is."

    b. [$_{TP}$ [$_{DP}$ John] [$_{T'}$ T [$_{PP}$ [$_{P}$ *bi*] [$_{vP}$ [$_{DP}$ Tom] [$_{v'}$ v^0 [$_{VP}$ [$_{V}$ **think**] [$_{vP}$ Mary tall]]]]]] [$_{vP}$ t$_i$ tall]]

                [*i*T]   [*u*T]
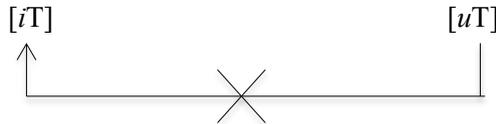
According to Hsieh (2017:279-280), in the case of sub-comparatives, the overt realization of a gradable predicate inside the *bi*-phrase, as in (130a), bears an unvalued feature [*u*T] that cannot be valued by the closest T bearing a valued feature since *bi* subcategorizes for a small clause and the *bi*-phrase is an island blocking the Agree relation between the verbal head inside it and T of the matrix clause. Hence, the derivation will crash if there is no PF-deletion, as illustrated in (130b). Likewise, when it comes to embedded comparatives, such as (131a), the verbal head *renwei* (think) inside the *bi*-phrase carries an unvalued feature [*u*T] that is neither valued by the closest T nor deleted at PF. This then leads to ungrammaticality.

Hsieh's (2017) small clause analysis works quite well for examples like (129a), but when it comes to comparatives with multiple topics, it seems problematic, such as (132).

(132) Yuehan   jitian   zaijia   [bi   Mali   zuotian   zaixuexiao]   kaixin.

      John   today   at-home   BI   Mary   yesterday   at-school   happy

    "John is happier today at home than Mary was yesterday at school."

If the morpheme *bi* takes a small clause as its complement, the structure of this small clause may look like (133).

(133)

```
                    vP
            _____|_____
         AdvP                vP
          |            _____|_____
      yesterday      PP              vP
                     |          _____|_____
                 at-school    DP            v′
                             |         _____|_____
                           Mary       v          VP
                                    __|__      ___|___
                                   V    v     V      AP
                                   |         < happy > |
                                 happy              A′
                                                    |
                                                    A
                                                    |
                                                 < happy >
```
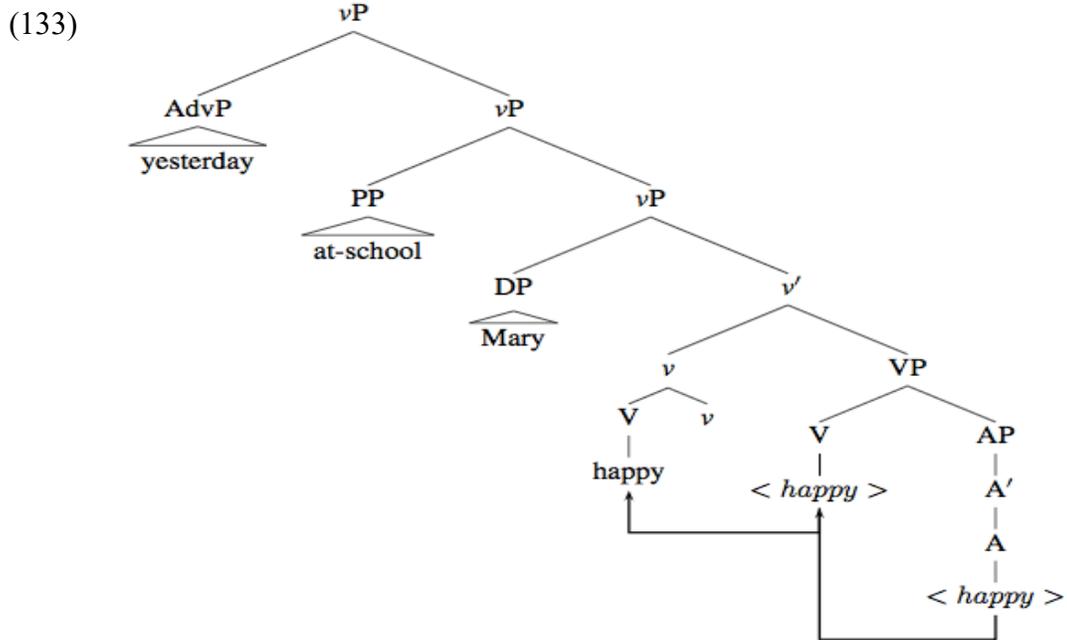
The structure in (133) is in line with the small clause hypothesis (e.g., Stowell, 1981; Citko, 2011). Yet it is not possible to derive the right word order inside the *bi*-phrase, which should be "Mary yesterday at school". Facing this problem, I still adopt the arguments made by Hsieh (2017), but extend his argument by further postulating that the morpheme *bi* in effect takes a non-finite clause[28] as its complement. The defective T in the complement clause of *bi* has these properties: it has an EPP feature which causes the subject to raise to [Spec, TP], but it cannot license the Agree relation with the predicate. Evidence for this argument comes from the following examples.

(134) a. shu   tongchang   [bi   cao]   gao-(le)   henduo.

      Tree   usually   BI   grass   tall-(LE)   much

      "Trees are usually much higher than grasses."

   *b. shu   tongchang   [bi   cao-le]   gao-(le)   henduo.

      Tree   usually   BI   grass-LE   tall-(LE)   much

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[28] Following Lin (2011), I take it that Chinese exhibits the contrast between finiteness and non-finiteness.

(135) a. wo pao-le yi xiaoshi [bi ta pao liang xiaoshi] pao-de yuan.

       I run-LE one hour BI he run two hour run-DE far

       "I run farther in one hour than he runs in two hours."

       b. wo pao-le yi xiaoshi [bi ta pao-le liang xiaoshi] pao-de yuan.

       I run-LE one hour BI he run-LE two hour run-DE far

       "I ran farther in one hour than he ran in two hours."

In these examples, the aspect marker -*le*, which usually marks perfect aspect in Chinese (Liu, 2015), is taken as an example. Chinese 'phrasal' *bi*-comparatives, as shown in (134), obviously disallow the presence of -*le* in the *bi*-phrase. However, the scenario seems different in Chinese 'clausal' *bi*-comparatives, in which -*le* is licensed, as in (135b). Before presenting my argument, it is worth noting that -*le* can occur in non-finite clauses.

(136) a. Yuehan quan Mali$_i$ [PRO$_i$ qu yingguo xuexi yuyanxue].

       John persuade Mary$_i$ PRO$_i$ go Britain study linguistics

       "John persuaded Mary to study linguistics in UK."

       b. Yuehan quan Mali$_i$ [PRO$_i$ mai-le yi-ben xiaoshuo].

       John persuade Mary PRO$_i$ buy-ASP one-CL novel

       "John persuaded Mary to buy one novel."

quan (persuade) is an object-control predicate in Chinese (Huang, 1988), which takes a non-finite clause as its complement, as shown by (136a). -*le* is generally regarded as an aspectual particle indicating the completion of an event described by the verb[29], the presence of which is licensed by a finite T node above it in syntactic structure (e.g., Shen, 2004). Yet, the example in (136b) shows that the verbal suffix -*le* can occur in a non-finite clause, and this is evidence that -*le* may not be able to serve as an indicator for the finiteness of a clause in all cases. To solve this dilemma, it has been suggested that -*le* is in fact a realization marker,

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[29] Consider this example:

(1) Yuehan zuotian xie-le yi-feng xin.

     John yesterday write-ASP one-CL letter

     "John wrote a letter yesterday."

In this example, -*le* signals the completion of the event: the action of John writing a letter. Without this morpheme, the sentence would not express a completed event.

denoting the realization of an event without specific reference to a time (Sybesma, 1997; Hu, Pan, & Xu, 2001; Lin, 2003). Thus, the grammaticality of (136b) follows. Adopting this argument, I conjecture that *-le* does not function as an indicator of the finiteness in (135b), but only serves a realization marker that denoting the realization of the event: the action of Mary running for two hours.

If *bi* takes a non-finite clause as its complement, *gao* (tall) in (129a) and *kaixin* (happy) in (132) will thus be unlicensed, resulting in ungrammaticality. Following *rescue-by-PF-deletion* mechanism (Bošković, 2011), I propose that PF-deletion is obligatory: delete as small a constituent as possible, but enough to avoid a violation. Take (132) as an example, an overt occurrence of *kaixin* (happy) inside the *bi*-phrase has to be deleted as it cannot be licensed by any T, which corresponds to *v'* in (137).

(137)
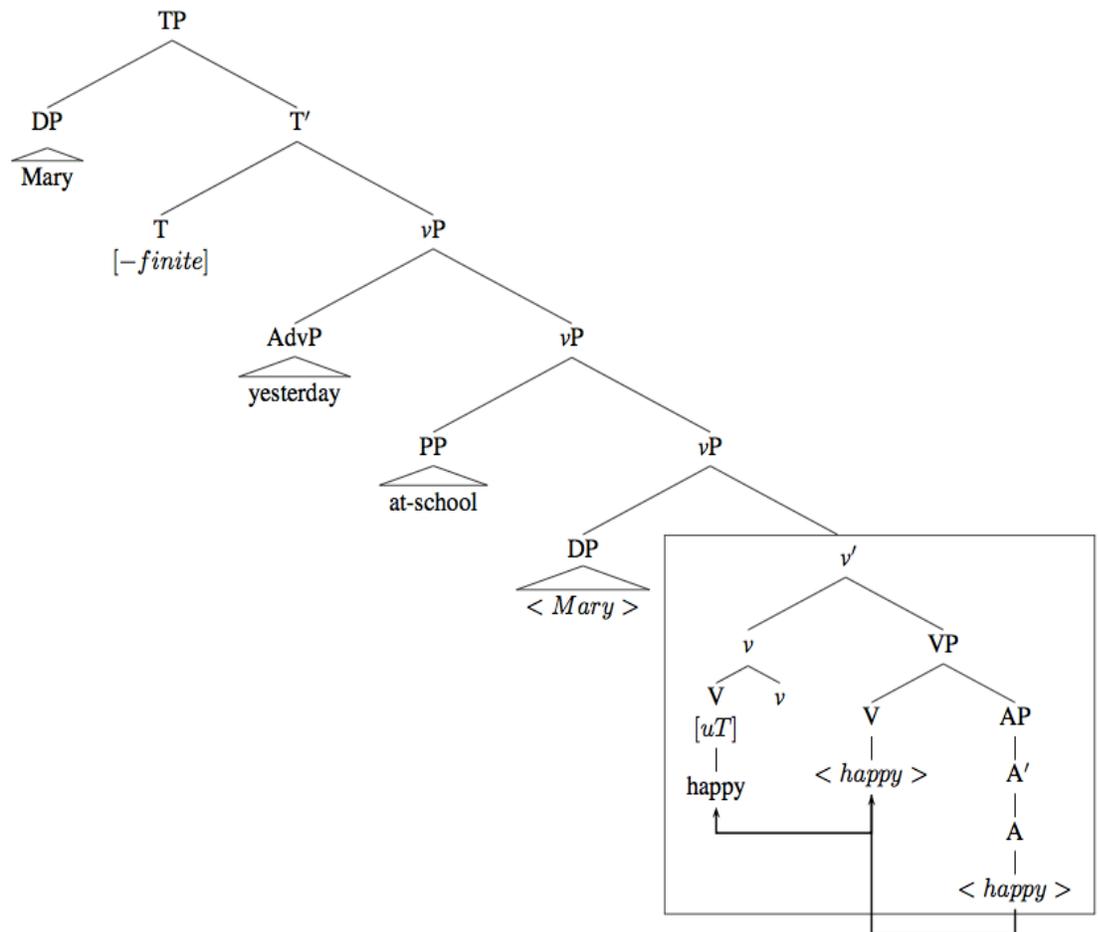
The structure in (137) suggests that the adjective *happy* needs to Agree with a finite T so that its uninterpretable feature [uT] can be valued. Nevertheless, this cannot be done given the defective T inside the *bi*-phrase and the intervention of the *bi*-phrase as an island. Thus, what is elided inside the *bi*-phrase is *v'* containing the unlicensed *happy*, as indicated by the box, which saves the derivation from crashing after the Spell-Out.

3.4. Summary

To sum up, I have argued that Chinese *bi*-comparatives have two fundamental properties: constituents in the standard phrase are parallel to their counterparts in the compared phrase in terms of syntax, semantic and category; *bi*-phrases have an adverbial status in the syntax, resembling participant PPs that express additional roles in events. Further, I continue arguing that Chinese *bi*-comparatives are clausal comparatives by resorting to three major phenomena: comparatives involving the reflexive *ziji* (self) and passives, and the structural flexibility of *bi*-phrases under certain conditions. In addition, I extend Hsieh's (2017) proposal and further postulate that the standard marker *bi* in Chinese comparatives selects a non-finite clause as its complement, in which the defective T lacks the feature [iT] to value the unvalued feature that verbal heads inside *bi*-phrases carry. This argument provides valid support to explain why Chinese disallows sub-comparatives and embedded comparatives.

Chapter 4　The Syntax of Chinese 'Phrasal' *bi*-Comparatives

Based on those fundamental issues analyzed in Chapter 3, this chapter aims at assigning a syntactic structure to Chinese 'phrasal' *bi*-comparatives, namely comparatives with only one constituent in the standard phrase (Liu, 2011). By using 'phrasal', I do not mean that Chinese *bi*-comparatives are phrasal comparatives, but mean comparatives like (138).

(138) Yuehan　　　[bi　　Mali]　　gao.

　　　John　　　BI　　Mary　　tall

　　　"John is taller than Mary."

Even if there is only one constituent in the *bi*-phrase, I maintain that the complement of *bi* in (138) is a reduced clause. Besides, it can be readily seen that differential phrases (DiffP) are not obligatory. The optionality of differential phrases in Chinese *bi*-comparatives has been usually underestimated, since its absence obviously does not affect the grammaticality. However, in this chapter, I will demonstrate that the presence of a differential phrase signals another projection – Aspect Phrase (AspP) – in Chinese comparatives, following the split CP structure (Rizzi, 1997).

In addition, that adjectives in Chinese are unmarked motivates a prevailing assumption that there is a covert comparative morpheme responsible for establishing comparative meanings, namely a projection of DegP headed by that covert comparative morpheme (e.g., Liu, 1996, 2011, 2018; Su, 2012). Disagreeing with such a claim, I will argue that there is no projection of DegP based on cross-semantic parameters in comparative structures (Beck et al., 2004; Beck et al., 2010). Finally, by combining my arguments for AspP and against DegP, I will motivate a new syntactic structure for Chinese 'phrasal' *bi*-comparatives.

4.1. Differential Phrases in Chinese *bi*-Comparatives

The example in (138), repeated in (139a), means "John's height exceeds Mary's". The presence of a differential phrase in the syntax is taken to be a way of indicating the gap that spans from Mary's height up to John's (Schwardzschild, 2005). Consider the contrast in the following examples.

(139) a. Yuehan   bi   Mali   gao.

        John   BI   Mary   tall

        "John is taller than Mary."

    b. Yuehan   bi   Mali   gao   **wu**   **gong-fen**.

        John   BI   Mary   tall   five   centimeter

        "John is five centimeters taller than Mary."

From (139b), we can easily know that the difference between John's height and Mary's height is five centimeters. However, unlike English comparatives, the occurrence of a differential phrase in Chinese *bi*-comparatives may be accompanied by aspect markers.

(140) a. John is five centimeters taller than Mary.

    b. Yuehan   bi   Mali   gao-*le*   wu   gong-fen.

        John   BI   Mary   tall-ASP   five   centimeter

        "John is five centimeters taller than Mary."

    c. Yuehan   bi   Mali   gao-*chu*   wu   gong-fen.

        John   BI   Mary   tall-ASP   five   centimeter

        "John is five centimeters taller than Mary."

As shown by (140b-c), two aspect markers, *-le* and *-chu*, are compatible with Chinese *bi*-comparatives. Such a compatibility naturally leads to a question: what is the role of aspect markers here?

Generally, in English, information about aspect is formally marked in verbs, such as BE V-*ing* and V-*en*, which usually express progressive and perfective aspect respectively. In Chinese,

several aspect markers [30] are used to make the distinction between perfective and non-perfective aspect. The aspect marker *-le* in (140b), according to Liu (2015), as a suffix, is attached to a verb stem indicating that the action denoted by the verb is actualized or terminated. Consider the following examples in (141).

(141) a. Yuehan   zuotian   **da-*le***   Tangmu.

       John   yesterday   hit-ASP   Tom

       "John hit Tom yesterday."

    b. Yuehan   ganggang   cong   tushuguan   **jie-*le***   yi-ben   shu.

       John   just   from   library   borrow-ASP   one-CL   book

       "John just borrowed a book from the library."

Verbs, *da* (hit) and *jie* (borrow), in (141a-b) respectively, involve a dynamic action. As Liu (2015) suggests, the compatibility of these two verbs with *-le* is attributed to the fact that the events denoted by the verbs are realized or terminated by a reference time in the discourse context. Adjectives in Chinese are usually treated as verbal heads (e.g., Hsieh, 2017), and then we would expect that *-le* is also compatible with adjectives in some cases. This prediction is borne out.

(142) a. Yuehan   **gao-*le***.

       John   tall-ASP

       "John has become taller."

    b. Yezi   **lü-*le***.

     leaves   green-ASP

     "Leaves have become greener."

Despite the compatibility between the aspect marker and the adjectives in (142a-b), as pointed out by Liu (2005), *-le* here only means that an action or a state is realized or initiated. The two adjectives, i.e., *gao* (tall) and *lü* (green), are gradable adjectives. Based on Kennedy &

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[30] In Mandarin Chinese, *le* and *guo* usually indicate perfective aspect, whereas *zai* and *zhe* indicate non-perfective aspect. A detailed discussion of these aspect markers is beyond the scope of this dissertation. Interested readers are referred to Li & Thompson (1981), Smith (1991), and Liu (2015) for a more comprehensive analysis.

McNally (2005), a gradable adjective implies a comparison between a standard and the argument of the adjective along a dimension denoted by that adjective. Hence, for examples like (142), the role of the aspect marker -*le* is that a comparing event denoted by the gradable adjective is actualized or initiated (e.g., Liu, 2005; Liu, 2015).

As for the morpheme -*chu*, Gu & Guo (2015) treat it as an overt realization of the Deg head in Chinese *bi*-comparatives. One argument they made is that the presence of -*chu* obligatorily requires the presence of a differential phrase. Consider the contrast in (143).

(143) a. Yuehan   bi   Mali   gao-***chu***   wu   gong-fen.

      John   BI   Mary   tall-CHU   five   centimeter

      "John is five centimeters taller than Mary."

    b. * Yuehan   bi   Mali   gao-***chu***.

      John   BI   Mary   tall-CHU

    Intended meaning: "John is taller than Mary."

Though plausible, this argument would incorrectly predict that the morpheme -*le* mentioned above is also a Deg head since its presence is obligatorily accompanied by a differential phrase, contrary to fact. According to The Dictionary of Modern Chinese (1998:64), when attached to the verb, -*chu* may express the completion of an action denoted by the verb.

(144) a. Yuehan   zuotian   jihua-***chu***   yi-fen   fangan.

      John   yesterday   draft-CHU   one-CL   project

      "John drafted a project yesterday."

    b. Yuehan   yiqian   wei   zuguo   zuo-***chu***   gongxian.

      John   previously   for   home-country   make-CHU   contribution

      "John previously made a contribution to his home country."

The morpheme -*chu* in (144a-b) is functionally compatible with the corresponding verbs, expressing that the events are terminated by a reference time, which acts in the same way as the morpheme -*le* in this aspect.

Another piece of evidence to support the argument that -*chu* is in fact an aspect marker comes from the co-occurrence of two aspect markers, namely when they are suffixed to one verb stem simultaneously.

(145) a. Yuehan   zuotian   jihua-***guo-le***   yi-fen   fangan.

        John   yesterday   draft-GUO-LE   one-CL   project

        "John drafted a project yesterday."

      b. Yuehan   zuotian   jihua-***chu-le***   yi-fen   fangan.

        John   yesterday   draft-CHU-LE   one-CL   project

        "John drafted a project yesterday."

      c. Yuehan   bi   Mali   gao-***chu-le***   wu   gong-fen.

        John   BI   Mary   tall-CHU-LE   five   centimeter

        "John is five centimeters taller than Mary."

The morpheme -*guo*, based on Liu (2015), is an aspect marker denoting a past and discontinuous experience that occurs prior to a reference time. When co-occurring with -*le*, it indicates a past experience that has been actualized, terminated and discontinued prior to the current speech time (Liu, 2015:281). In (145a), the action of "drafting a project" has been realized and terminated in the past, which is also the case in (145b) when -*chu* co-occurs with -*le*. In addition, when it comes to Chinese *bi*-comparatives, the co-occurrence of -*chu* and -*le* is also possible, as in (145c), which further shows that the morpheme -*chu* should be treated as an aspect marker, at least on a par with -*le*. Following Gu & Guo's (2015) proposal, we would predict that the combination of -*chu* and -*le* is a Deg head, which seems untenable.

Based on the analysis made above, I argue that both -*chu* and -*le*, suffixed to the gradable adjectives in (140b-c), are two aspect markers, signaling that the comparing events denoted by the gradable adjectives have been initiated (Liu, 2005; Kennedy & McNally, 2005). Another question that needs to be dealt with is why the differential phrase obligatorily co-occurs with the two aspect markers in Chinese *bi*-comparatives. Before proceeding, let's consider the

following examples.

(146) a. zhe-duo   hua   hong-*le*.

　　　this-CL   flower   red-ASP

　　　"This flower has become red."

　　b. zhe-duo   hua   hong-*le*   **yidian**.

　　　this-CL   flower   red-ASP   a bit

　　　"This flower is a bit redder than before."

In (146a), when the aspect marker -*le* is attached to the adjective *hong* (red), according to Liu (2005), it only indicates that the comparing event implied by the gradable adjective has been initiated. However, the presence of a differential phrase, as in (146b), suggests that the comparing event implied has been completed. In other words, the aspect marker cooperates with the differential phrase to guarantee the completeness of the comparing event denoted by the gradable adjective.

In the spirit of Liu (2005), as well as the contrast shown by (146a-b), the difference between (2a) and (2b), repeated in (147), can be explained.

(147) a. Yuehan   bi   Mali   gao.

　　　John   BI   Mary   tall

　　　"John is taller than Mary."

　　b. Yuehan   bi   Mali   gao   **wu**   **gong-fen**.

　　　John   BI   Mary   tall   five   centimeter

　　　"John is five centimeters taller than Mary."

Due to the presence of the differential phrase in (147b), I propose that there is an aspect marker suffixed to the gradable adjective, which can be overt or covert in the syntax. Based on this proposal, the reason why differential phrases obligatorily co-occur with aspect markers is that it may function like an "indicator light". In other words, when an aspect marker indicates that the comparing event denoted by the gradable predicate has been initiated, the presence of

a differential phrase signals that the comparing event has been completed.

According to the analysis presented above, I have argued that the occurrence of a differential phrase in Chinese *bi*-comparatives is accompanied by an aspect marker, which is either overt or covert. On the basis of this argument, I further propose that, following Liu (2004), there is an Aspect Phrase (hereafter AspP) above *v*P in Chinese *bi*-comparatives, whose position is fixed, as illustrated in (148).

(148) a. Yuehan   da-*le*   Tangmu.

      John   hit-ASP   Tom

      "John hit Tom."

b.

```
                        TP
                 ┌──────┴──────┐
               DP              T'
              John_i      ┌────┴────┐
                          T        AspP
                      ┌────────┴────────┐
                    Pro_i              Asp'
                              ┌────────┴────────┐
                           hit-le              vP
                                        ┌───────┴───────┐
                                       DP              v'
                                    < John_i >   ┌──────┴──────┐
                                                 v            VP
                                              ┌──┴──┐     ┌────┴────┐
                                              V    v      V        DP
                                            < hit >     < hit >    Tom
```
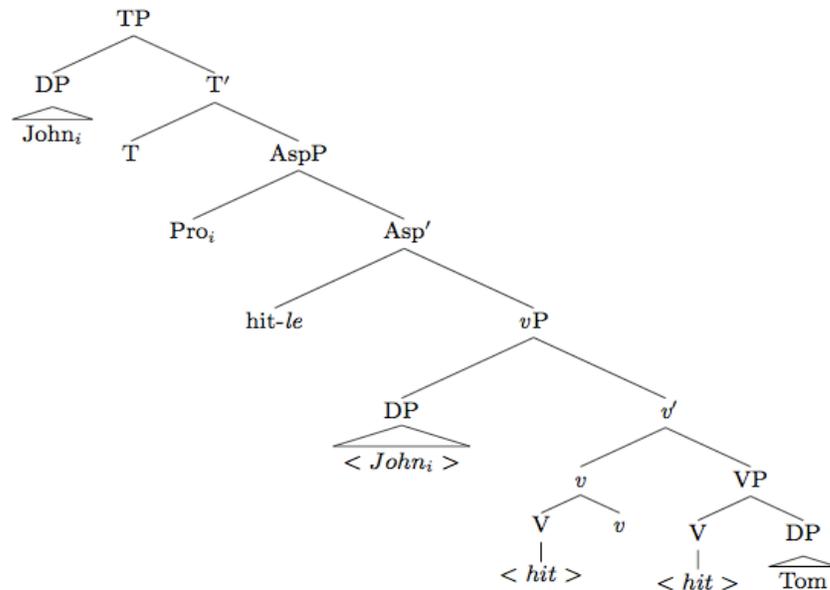
Liu (2004) suggests that verbs, such as *da* (hit) in (148a), undergo a head-movement to the head of AspP to derive the right word order, as represented in (148b). While I agree with the projection of AspP above *v*P, movement of the matrix predicate to the head of AspP would encounter difficulty in explaining the control structure in Chinese.

(149) a. Yuehan   yaoqing   Tangmu   zuo-*le*   yi-ci   yanjiang.

      John   invite   Tom   deliver-ASP   one-CL   speech

      "John invited Tom to deliver a speech."

b. * Yuehan   yaoqing-***le***   Tangmu   zuo   yi-ci   yanjiang.

John   invite-ASP   Tom   deliver   one-CL   speech

According to Grano (2013), *yaoqing* (invite), as an object control verb, takes a clausal complement, which is a *v*P, not a TP with other higher functional projections (e.g., tense and aspect). If we follow Liu's (2004) proposal, we would expect (149b), in which the matrix verb *yaoqing* (invite) moves to the head of AspP, to be grammatical, contrary to fact. The detailed analysis of how Aspect Phrase works in Chinese is beyond the scope of this dissertation. Under this circumstance, I just adopt Liu's (2004) basic idea that there is a projection of an AspP above *v*P in Chinese. In the meanwhile, I will then propose that aspect markers are base-generated in Chinese and then attached to verbal heads, following Gu (1993), Pesetsky & Torrego (2006), Grano (2013) and Wurmbrand (2014).

In Chinese *bi*-comparatives, I have argued that there are two aspect markers *-le* and *-chu* that are functionally compatible with gradable predicates. The co-occurrence of aspect markers (either overt or covert) and differential phrases signals that the comparing event denoted by the gradable predicate has been completed. Thus, I propose that these two aspect markers function like a realization marker (e.g., Liu, 2005; Liu, 2015). When the differential phrase is present in the syntax, as in (147), the gradable predicates enter into the derivation aspectually suffixed by *-u* (whose overt realizations are *-le* and *-chu*), in which case it bears an uninterpretable and valued A feature – [*u*A:PERF]. In addition, Aspect enters into the derivation without overt phonological material, in which case it has an interpretable and unvalued A feature – [*i*A:__]. The A feature on Asp acts like a probe, which is valued as PERF via an Agree relation with the gradable predicate, then the uninterpretable feature [*u*A:PERF] on the gradable predicate is deleted. When the differential phrase is absent, as in (2a), following Smith (1991) and Grano (2013), the A feature on Asp receives a default feature [NEUT]. The proposal is schematized in (150).

(150) a. Asp [*i*A:__] … V–μ [*u*A: PERF] ➔ Asp [*i*A:PERF] … V–μ [~~*u*A: PREF~~]

b. Asp [*i*A:__] … V ➔ Asp [*i*A:NEUT] … V

Concluding this section, I have argued that the difference between comparatives with and without differential phrases can be attributed to the role of aspect markers in Chinese. This argument then lays the foundations to the proposal of an AspP in Chinese *bi*-comparatives, which is also an important part of the syntactic structure I will assign to the comparatives in later sections.

4.2. Against DegP in Chinese *bi*-Comparatives

Concerning the question of how comparative meanings are encoded in Chinese *bi*-comparatives, there are generally two approaches in the literature:

(151) a. **The comparative morpheme-based account**: there is a covert comparative morpheme that expresses the meaning of comparison (e.g., Liu, 2010, 2011; Su, 2012).

b. **The standard marker-based account**: the meaning of comparison is expressed by the standard marker, namely, the morpheme *bi* (e.g., Xiang, 2005; Lin, 2009).

These two approaches differ in their respective assumption about the production of the meaning of comparison, but they both lead to the proposal of a Degree Phrase (hereafter, DegP) in the syntactic structure of Chinese *bi*-comparatives, following Abney (1987), Larson (1991) and Kennedy (1999). In this section, I will argue that, although widely accepted, the projection of DegP in the syntax of Chinese *bi*-comparatives is not, on a closer examination, supported by linguistic evidence that has been adduced in its favor.

4.2.1. The Comparative Morpheme-based Account

Liu (2010, 2011) argues that examples like (152) have a covert comparative morpheme, Ø$_{GENG}$, functioning like its English counterpart *-er* in the semantics.

(152) Yuehan   bi   Mali $\emptyset_{GENG}$ gao.

      John   BI   Mary   tall

      "John is taller than Mary."

Evidence for the assumption of a covert comparative morpheme in Chinese *bi*-comparatives comes from Chinese *geng*-clausal comparatives, as in (153).

(153) a. Yuehan   hen[31]   kaixin,   Mali   **geng**   kaixin.

      John   very   happy   Mary   even   happy

      "John is very happy, and Mary is even happier."

      b. Yuehan   bi   Mali   **geng**   kaixin.

      John   BI   Mary   even   happy

      "John is even happier than Mary."

Note that, as Liu (2010) suggests, one prominent characteristic of the morpheme *geng* (even) is that it presupposes that the properties of the compared objects denoted by the gradable adjective are true in an absolute sense. For instance, the presupposition in (153a-b) is that both John and Mary are happy.

According to Liu (2010:1595–1596), in (153a), the morpheme *hen* (very) is a function that takes two degrees: John's happiness d_1 and the contextually determined standard degree of people's happiness d_2, and then returns a difference between these two degrees, namely $d_1 - d_2$. Such a difference is required to be significant. Likewise, the morpheme *geng* (even) has the same semantic function: the difference between Mary's happiness d_3 and the contextually determined standard degree of people's happiness d_4 is also significant. Moreover, *geng* has to undertake another role – taking $(d_1 - d_2)$ and $(d_3 - d_4)$ as arguments and returning $(d_3 - d_4) > (d_1 - d_2)$. In other words, Liu (2010) takes it that *geng* is a comparative morpheme in Chinese *geng*-clausal comparatives. With these assumptions, Liu further proposes that, despite the syntactic difference on the surface, (153a) and (153b) belong to the same type –

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[31] The degree adverb *hen* (very) in this case can be deleted at the surface, which would not affect the grammaticality of this type of examples.

presupposition comparatives, which means that the presuppositions are both "John and Mary are happy". Consequently, *geng* in (153b) is a comparative morpheme that compares John's happiness and Mary's along the same dimension denoted by the gradable adjective.

That *geng* is a comparative morpheme leads to Liu's (2010, 2011) further proposal that there is a covert comparative morpheme in Chinese *bi*-comparatives, as shown in (152), which denotes a *greater-than* relation between the two compared objects along a certain dimension. The difference between *geng* and $\emptyset_{GENG}$ is that the presence of the former presupposes that the properties of the compared objects denoted by the gradable predicate are true in an absolute sense. This is not necessarily the case for the latter.

One immediate challenge faced by the assumption that *geng* is a comparative morpheme is why it is syntactically incompatible with the differential phrase of conventionalized measurement terms, such as *centimeter* or *pound*. Consider the contrast in (154).

(154) a. Yuehan   bi   Mali   geng   gao   **<u>yixie</u>**.

      John   BI   Mary   even   tall   a bit

      "John is even a bit taller than Mary."

      b. * Yuehan   bi   Mali   geng   gao   **<u>wu</u>**   **<u>gong-fen</u>**.

      John   BI   Mary   even   tall   five   centimeter

      Intended meaning: "John is even five centimeters taller than Mary."

If *geng* is a comparative morpheme, we would expect (154b) to be grammatical, contrary to fact. At this point, it appears that the premise for the assumption that there is a covert comparative morpheme in examples like (152) is problematic. In addition, if Chinese has a null comparative morpheme, it should be always possible to get a comparative meaning in an adjectival sentence if an appropriate context is set up. However, this is not the case, as illustrated by the examples in (155).

(155) A: Yuehan   he   Mali,   shui   gao?

          John   and   Mary,   who   tall

          "John and Mary, who is taller?"

    B: ① Yuehan   **gao**. / ② Yuehan   he   Mali   dou   **gao**.

           John   tall /   John   and   Mary   all   tall

           "John is taller." /   "John and Mary are both tall."

The reply ① in (155B), originally attributed to Chao (1968), has long been treated as valid proof that Chinese has a null comparative morpheme (e.g., Liu, 2010, 2018). However, the reply ② in (155B), proposed by Huang (2016), challenges this view in that there is only a positive meaning available. Adding to this line of argument, in the reply ①, there are several degree adverbs that can be inserted between *Yuehan* (John) and *gao* (tall), which are shown in (156).

(156) A': Yuehan   he   Mali,   shui   gao?

          John   and   Mary,   who   tall

          "John and Mary, who is taller?"

    B': Yuehan   **shao**/   **lüe**   /**po**   gao.

          John   slightly /slightly   / very   tall

          "John is taller."

As can be seen from (156B'), degree adverbs, including *shao* (slightly), *lüe* (slightly) and *po* (very), may occur before the gradable adjective, but the comparative meaning is still maintained. Thus, based on the reply ② in (155B) and (156B'), I argue that Chinese does not have a covert comparative morpheme functioning like its English counterpart *-er*.

Following the covert comparative morpheme-based account, Su (2012) assigns a syntactic structure consisting of a projection of DegP to (152), repeated in (157).

(157) a. Yuehan   bi   Mali   gao.

John   BI   Mary   tall

"John is taller than Mary."

b.

```
                        TP
                      /    \
                   DP        T′
                   /\       /   \
                 John      T      VP
                               /     \
                             DP       DegP
                             /\      /     \
                         < John >   DP      Deg′
                                    /\     /    \
                                bi Mary  Deg    AP
                                         |      |
                                         ∅      A′
                                                |
                                                A
                                                |
                                               tall
```
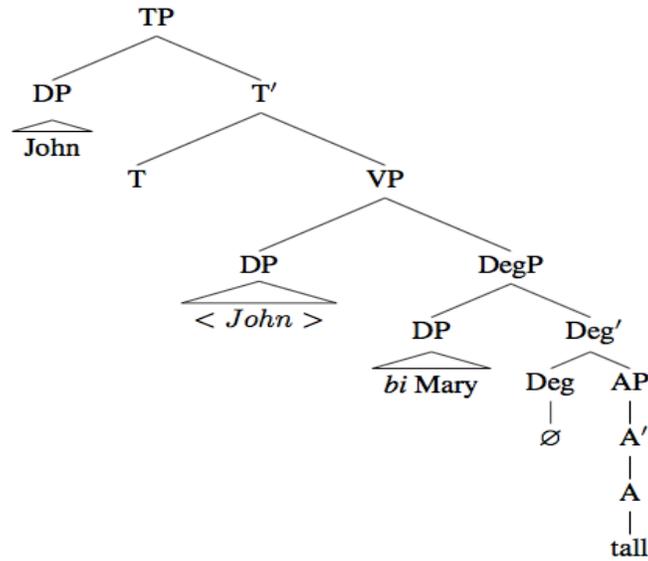
As Su (2012) suggests, the null Degree head, which is in fact a covert comparative morpheme, saturates and restricts the degree argument of the gradable adjective. Apart from the theoretical vulnerability of the covert morpheme-based assumption, as explained above, the structure in (157b) is apparently not able to explain why *bi*-phrases are structurally flexible under certain circumstances, as in (124) in Chapter 3, in which the *bi*-phrase may be in a position higher than that of a modal. Moreover, as I pointed out before, Gu & Guo (2015) mistake the aspect marker -*chu* for a degree head that projects a Degree Phrase, which is theoretically untenable. In a word, the assumption that there is a comparative morpheme, either overt or covert, is not able to sufficiently explicate how comparative meanings in Chinese *bi*-comparatives are encoded, and is also not empirically supported.

4.2.2. The Standard Marker-based Approach

This approach assumes that the standard marker *bi* not only introduces the standard constituents, but also denotes a meaning of comparison (e.g., Xiang, 2005; Lin, 2009). One

advantage of this approach is that, unlike the comparative morpheme-based account, it does not have to stipulate two kinds of comparative morpheme in Chinese. The problems brought about by the complementary distribution of the covert comparative morpheme $\emptyset_{\text{GENG}}$ and the overt comparative morpheme *geng* (even) would not arise.

Xiang (2005) proposes that Chinese *bi*-comparatives have two degree morphemes, *bi* and a null degree morpheme *exceed*, since she argues that gradable adjectives in Chinese, lacking morphological marking, are responsible for establishing two meanings: positive and comparative. The syntactic structure Xiang assigns to (10b), repeated in (158a), is presented in the following.

(158) a. Yuehan   bi   Mali   gao   **wu**   **gong-fen**.

      John   BI   Mary   tall   five   centimeter

      "John is five centimeters taller than Mary."

    b. [$_{TP}$ [$_{DP}$ John] [$_{T'}$ [T] [$_{DegP}$ [$_{Deg}$ *bi*] [$_{AP}$ [$_{DP}$ Mary]$_j$ [$_{A'}$ [$_A$ *exceed*$_i$-tall] [$_{Deg}$ [$_{DP}$ t$_j$]

      [$_{Deg'}$ [$_{Deg}$ t$_i$] [$_{DiffP}$ 5cm]]]]]]]]

As I argued in Chapter 3, there are several problems that arise from this approach. First, differential phrases in examples like (158) are syntactically optional. Under this circumstance, the degree argument of the null degree morpheme *exceed* cannot be saturated. In other words, there is no merging of the lower DegP in the syntax, which may result in a crash in the derivation. Second, semantically, the structure in (158b) leads to a meaning diverging from the intended meaning. According to Xiang (2005), at AP level, it is a small clause, which would mean: Mary's tallness exceeds five centimeters. The overall structure of (158a) in (158b) would then express the following meaning: John's tallness exceeds Mary's whose tallness exceeds five centimeters. This is in contrast with the intended meaning: Mary's tallness is exceeded by John's by five centimeters. Finally, it is not clear how Xiang's (2005) analysis accounts for Chinese *bi*-comparatives with multiple topics (Tsao, 1989, 1990), as in (159).

(159) Yuehan   jintian   zaijia   bi   Mali   zuotian   zaixuexiao   kaixin.

John   today   at-home   BI   Mary   yesterday   at-school   happy

"John is happier today at home than Mary was yesterday at school."

Adopting Xiang's (2005) DegP-shell analysis and arguing for a phrasal analysis for Chinese *bi*-comparatives, Lin (2009) proposes a dyadic DegP-shell analysis for comparatives with multiple topics like (159), as shown in (160). In his analysis, *bi* is analyzed as a dyadic degree operator, which "is like an adverb of quantification in being able to quantify over more than one indefinite" (Lin, 2009:19).

(160)
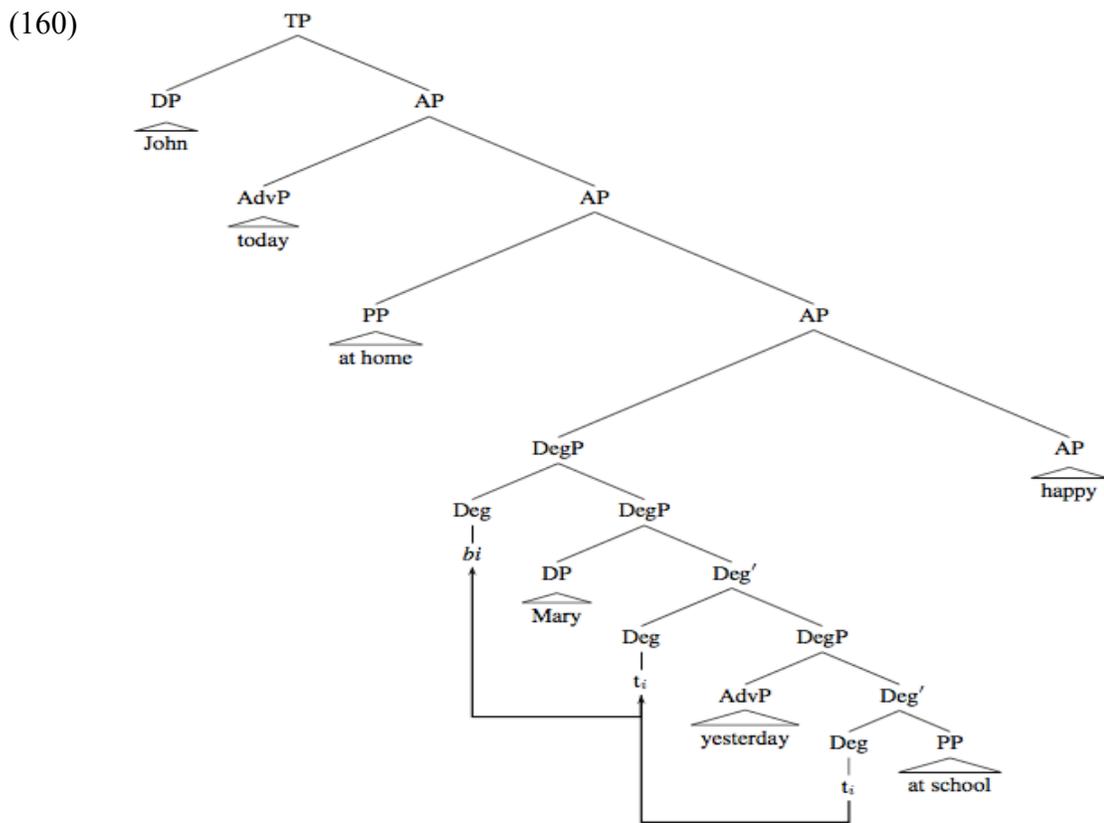
In this syntactic structure, according to Lin (2009:19), *bi* is a functional head that takes the location phrase as the innermost argument at the lowest DegP and then undergoes a successive head movement. The time phrase and DP are the specifiers of recursive DegPs, each of which is introduced by *bi*. The whole *bi*-phrase, as a DegP, is left-adjoined to the predicate of

comparison, based on Liu (1996).

Lin's (2009) proposal does provide a new perspective to account for Chinese *bi*-comparatives with multiple topics. Since the predicate of comparison in (159) is *kaixin* (happy), we would predict that John and Mary are compared along the scale denoted by happiness. If *bi* is dyadic operator, it means that it introduces another two pairs of compared constituents simultaneously along the same scale, namely {today, at-home} and {yesterday, at-school}. One apparent challenge faced by Lin's proposal is that it would predict that these two pairs of constituents are compared along the scale of happiness, which does not make sense at all. While uttering (159), we have the intuition that John and Mary are compared with respect to the scale of happiness in a certain place at a certain time.

Another problem faced both by Xiang (2005) and Lin (2009) is that the absence of *bi*-phrases under certain circumstances would not affect the comparative meaning, as shown in (155) and (156). If *bi* is a degree head denoting a meaning of comparison, it should be always syntactically overt to produce the corresponding meaning, yet this is not always the case in Chinese *bi*-comparatives. On the one hand, assuming *bi* as a degree head may result in semantic ill-formedness, as in Xiang's (2005) DegP-shell analysis. Furthermore, it over-generates compared constituents in Chinese *bi*-comparatives along the scale denoted by the comparison predicate, which does not make sense, as in Lin's (2009) dyadic DegP-shell analysis. Thus, I argue that the empirical evidence supporting *bi* as a degree head that projects a DegP in the syntax is flawed.

4.2.3. The Projection of Comparison Predication Phrase (CPredP)

Based on the arguments above, the comparative morpheme-based account and standard marker-based account both seem to attempt to prove that Chinese *bi*-comparatives and English comparatives are equivalent in some way. This inclination may be a plausible move to reduce

theoretical burden on the analysis of Chinese comparatives. Liu (2018), assuming that there is a covert comparative morpheme in Chinese *bi*-comparatives, claims that the comparative form of Chinese adjectives is derived by combining the adjectival base with the covert comparative morpheme. Under this assumption, Chinese and English use the comparative morphology of gradable adjectives indistinctly. However, a closer examination on cross-linguistic variations in the comparative constructions reveals that this may not be the case.

In terms of cross-linguistic variations in comparative constructions, three parameters have been proposed, including the Degree Semantics Parameter, Degree Abstraction Parameter, and Degree Phrase Parameter (Beck, Oda & Sugisaki, 2004; Beck, et al., 2010).

(161) a. **Degree Semantics Parameter (DSP)**

A language {does/does not} have gradable predicates (type $<d,<e,t>>$ and related), i.e. lexical items that introduce degree arguments.

b. **Degree Abstraction Parameter (DAP)**

A language {does/does not} have binding of degree variable in the syntax.

c. **Degree Phrase Parameter (DegPP)**

The degree argument position of a gradable predicate {may/may not} be overtly filled. Following Beck, et al. (2010), the dependencies between these parameters are described in the following way: determine [DSP] in the first place, if we have a setting [‒DSP], then we must have a setting [‒DAP]; only there is a setting [+DAP], then we would have a setting [+DegPP], namely a DegP in the syntax, since DegPs are operators over degrees.

As shown before, gradable predicates are usually used to construct Chinese *bi*-comparatives, which means Chinese has a setting [+DSP]. According to Krasikova (2008) and Beck, et al. (2010), Chinese has a negative setting of [DAP], which comes from the following empirical evidence: lack of English-like negative island effects, scope interactions, degree questions, measure phrases, sub-comparatives and embedded comparatives.

(162) **a.** *negative island effects*

① * John bought a more expensive cellphone than Mary didn't.

② Yuehan   mai-de   shouji   bi   Mali   mei   mai-de   gui.

John   buy-DE   cellphone   BI   Mary   not   buy-DE   expensive

"John bought a more expensive cellphone than the one Mary didn't buy."

b. *scope interactions*

① (This box of strawberries is 10kg.) The box of strawberries is required to be exactly 5kg heavier than that.

② Yuehan   xuyao   bi   Mali   shao   mai   yixie   caomei.

John   must   BI   Mary   less   buy   some   strawberry

"John has to buy few strawberries that Mary does."

c. *degree questions*

* Yuehan   shi   duo   gao?

John   is   how   tall

"How tall is John?"

d. *measure phrases*

? zhe-xiang   caomei   shi   shi   gongjin   zhong.

this-CL   strawberry   is   ten   kilogram   heavy

"This box of strawberries is 10kg heavy."

e. *sub-comparatives*

* zhe-zhang   zhuozi   [bi   zhe-ba   yizi   kuan]   chang.

this-CL   desk   BI   this-CL   chair   wide   long

Intended meaning: "This desk is longer than this chair is wide."

f. *embedded comparatives*

* Yuehan   bi   [Tangmu   renwei   Mali]   gao.

John   BI   Tom   believe   Mary   tall

Intended meaning: "John is taller than Tom believes Mary is."

According to Rullmann (1995), the ungrammaticality of the English example in (162a) is due to the inability of the degree operator in the embedded clause to pick the maximum degree from the denotation. In other words, the set of degrees such that Mary did not buy a *d*-expensive cellphone does not have a maximum. However, the *bi*-phrase in the Chinese example in (162a) hosts a negation, which does not lead to unacceptability. Likewise, based on Heim (2000), the English example in (162b) exhibits an ambiguity: one reading is that the box of strawberries is exactly 15kg heavy in every acceptable world, implying that it is not allowed to be heavier than 15kg; another reading is that the box of strawberries is exactly 15kg heavy in those acceptable worlds where it is the lightest, leaving open that it is allowed to be heavier than 15kg. This indicates that the comparative morpheme as a degree operator may take scope at LF. However, such an ambiguity does not appear in the Chinese example in (162b), which only means that the minimum amount of strawberries John has to buy is exceeded by the minimum amount of strawberries Mary has to buy.

Beck et al. (2010) suggest that Chinese does not have degree questions or a measure phrase structure, as in (162c-d), which is not necessarily the case.

(163) **a. *degree questions***

> Yuehan you duo gao?
>
> John have how tall
>
> "How tall is John?"

b. *measure phrases*

> zhe-xiang caomei you shi gongjin zhong.
>
> this-CL strawberry have ten kilogram heavy
>
> "This box of strawberries is 10kg heavy."

As shown in these two examples, instead of using a copular to construct degree questions and measure phrase structures, Chinese resorts to an auxiliary verb *you* (have) to form such constructions. Furthermore, as argued in Chapter 3, Chinese comparatives are clausal

comparatives. The unavailability of sub-comparatives and embedded comparatives is due to the non-finite clause structure in *bi*-phrases, in which the unvalued feature of verbal heads cannot be valued, leading to a crash in the derivation, as illustrated in Chapter 3. Even if I agree that Chinese *bi*-comparatives lack negative island effects and scope interactions, the arguments on the unavailability of degree questions, measure phrase structures, sub-comparatives and embedded comparatives seem to be inconclusive. Hence, that Chinese has a negative setting of [DAP] is left open and needs further investigation.

Since the setting of [DAP] in Chinese is not conclusive based on the empirical evidence provided above, if following dependencies argued by Beck, et al. (2010), it seems difficult to determine the setting of [DegPP] in Chinese. Even though this may be the case, I argued above that neither the comparative morpheme-based approach nor the standard marker-based approach is empirically or theoretically supported, leaving the legitimacy of DegP in Chinese open. I take it that the degree argument position of a gradable predicate in Chinese may not be overtly filled; namely, Chinese has a negative setting of [DegPP]. Consequently, the settings of the three parameters in Chinese and English are summarized below, which partly differs from Beck, et al. (2010).

(164) **Three parameters of cross-linguistic variations in Chinese and English comparatives**

	[DSP]	[DAP]	[DegPP]
Chinese	+	?	-
English	+	+	+

Apart from these three parameters, there is a syntactic constraint on Chinese *bi*-comparatives (Su, 2015; Lin, 2009), as illustrated before, repeated below.

(165) **A constraint on the compared constituents of the *bi*-comparatives**

In a *bi*-comparative, the compared constituent and its correlate must be arguments of the comparison predicate, and both of them must have the same dimension.

The above constraint is purely syntactic in the sense that it requires the compared phrase and standard phrase to form a grammatical sentence with the comparison predicate respectively. I use the example (155) to illustrate this, repeated in (166).

(166) a. Yuehan   [bi   Mali]   gao.

     John   BI   Mary   tall

     "John is taller than Mary."

     b. ① Yuehan   hen   gao. / ② Mali   hen   gao.

         John   very   tall /   Mary   very   tall

         "John is tall."   /   "Mary is tall."

As can be seen from (166b), as long as the compared phrase and standard phrase can form a grammatical sentence with the comparison predicate, then they can be compared along the scale denoted by the predicate. This constraint, in effect, is consistent with the basic definition of "predicate", stated in Bowers (2001:299), "a predicate is an unsaturated expression that must combine with an entity expression to form a proposition". In Chapter 3, I argued that Chinese *bi*-comparatives are clausal comparatives, which indicates that the compared phrase and the standard phrase both form a proposition with the comparison predicate respectively. Thus, following theories of predication (Bowers, 1993, 2001; Baker, 2003), I propose that there is a projection of a Comparison Predication Phrase (hereafter CPredP) in Chinese *bi*-comparatives, schematically:

(167)
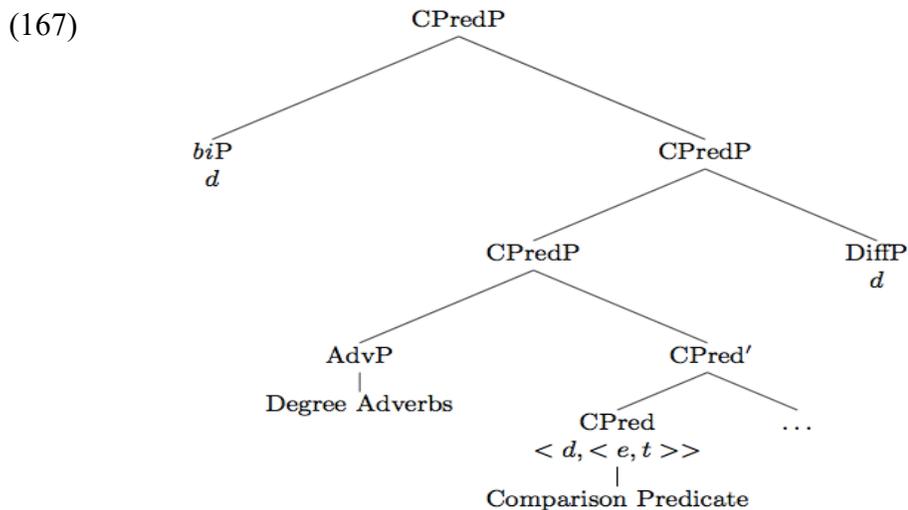
Following Cresswell (1977), von Stechow (1984) and Kennedy & McNally (2005), I assume that there is a degree argument in gradable adjectives when they are comparison predicates. As shown in Chapter 3, *bi*-phrases may be structurally flexible under certain circumstances, namely when that degree argument in the gradable predicate is bound by something else also denoting a degree argument, such as differential phrases (Schwardzschild, 2005). DiffP and *bi*P must be in a position to bind the degree argument of the head of CPredP (e.g., Liu, 2010). When the degree argument of the comparison predicate is bound by a differential phrase locally, I conjecture that the *bi*-phrase is free to move to a higher position since it may be an active goal for a probe bearing a feature that needs to be checked off, which will be explained in later sections.

The structure in (167) may seem to share some similarities with a DegP since DegPs denote predicates of individuals based on the standard assumption, which would meet the semantic criteria identified for Chinese *bi*-phrases. Yet, one prominent characteristic of CPredP is that, in order to produce a comparative meaning, the degree argument *d* in its head (whose logical type is of $<d, <e,t>>$) needs to be θ-bound by something else also designating a type $<d>$ (e.g., *bi*P, DiffP). If adopting DegP, it is obligatory to identify what exactly is the Deg head in Chinese *bi*-comparatives. As argued in section 4.2.2., both the comparative morpheme-based approach and standard marker-based approach are theoretically and empirically deficient. This is an indication that no reliable elements can be the Deg head, as least based on all the evidence demonstrated above.

Another fact that needs to be taken into account is the absence of *bi*-phrases in some cases, such as (155). Under this circumstance, it is possible that there is no projection of DegP at all in the syntax. Thus, one critical difference between DegP and CPredP is that the head of the former is a two-place operator, such as *more/-er* (von Stechow, 1984; Bhatt & Pancheva, 2004), taking target degree descriptions and standard degree descriptions as arguments and

then asserting a relative ordering relation between the two[32]. Yet, it is not the case for the head of CPred, which only acts as a comparison predicate and names the dimension of comparison.

The following example is used to illustrate the structure of CPredP[33] in (167).

(168) a. Yuehan   bi   Mali   geng   gao   yixie.

       John   BI   Maly   even-more   tall   a little

     "John is even a bitter taller than Mary."

   b.$\| gao(tall) \| = \lambda d. \lambda x . x$ is d-tall $<d, <e,t>>$

Two issues need to be clarified before proceeding. First, I take gradable predicates such as *gao* (tall) as a function from entities to degrees of type *d* (Cresswell, 1976). In (168), *gao* (tall) is a one-place gradable predicate, which is of the type $<d,<e,t>>$, first composing with a degree argument and then an individual, as represented in (168b). Second, the occurrence of a differential phrase means that (168a) is a differential comparatives. To cope with this type of constructions, following Morzycki (2015), one additional argument is added to the comparison predicate, which is then of the type $<d,<d,<e,t>>>$[34]. The difference degree denoted by the differential phrase serves to measure the difference between the degree associated with the compared phrase and the degree provided by the *bi*-phrase. The syntax of CPredP of (168a) is as in (169), and the full denotation in (170).

---

[32] In the Direct Analysis (e.g., Heim, 1985; Bhatt & Takahashi, 2011), the head of DegP (i.e., more/-er) is a three-place operator that takes three arguments: the target, standard, and a gradable predicate. The target applied to the gradable predicate exceeds the standard applied to the degree predicate. Note that there is just one instance of the gradable predicate in the syntax in this approach.

[33] I will not go into questions concerning how the formal semantics of Chinese *bi*-comparatives works, which is beyond the scope of this dissertation. It thus requires a separate study. I will simply maintain throughout the dissertation that the degree argument *d* of gradable predicates in Chinese *bi*-comparatives needs to be θ-bound by something else designating a type $<d>$ to produce a comparative meaning. This will be left for future research.

[34] Adopting Morzycki (2015), I maintain that introducing a differential phrase (or a measure phrase) in Chinese *bi*-comparatives does not mean that we have to stipulate two homophonous forms of the comparison predicate, one with a differential argument and one without. It is still possible for a single denotation to accommodate differential phrases, and interested readers are referred to Schwarzschild (2005, 2008), Solt (2009) and Grano & Kennedy (2012) for a detailed analysis.

(169)

TP
$<t>$

DP $<e>$ — John

CPredP $<e,t>$

biP d — bi Mary

CPredP $<d,<e,t>$

CPredP $<d,<d,<e,t>>>$

DiffP d — a little

AdvP $<<d,<d,<e,t>>>,<d,<d,<e,t>>>>$ — even-more

CPred' | CPred $<d,<d,<e,t>>$ | tall
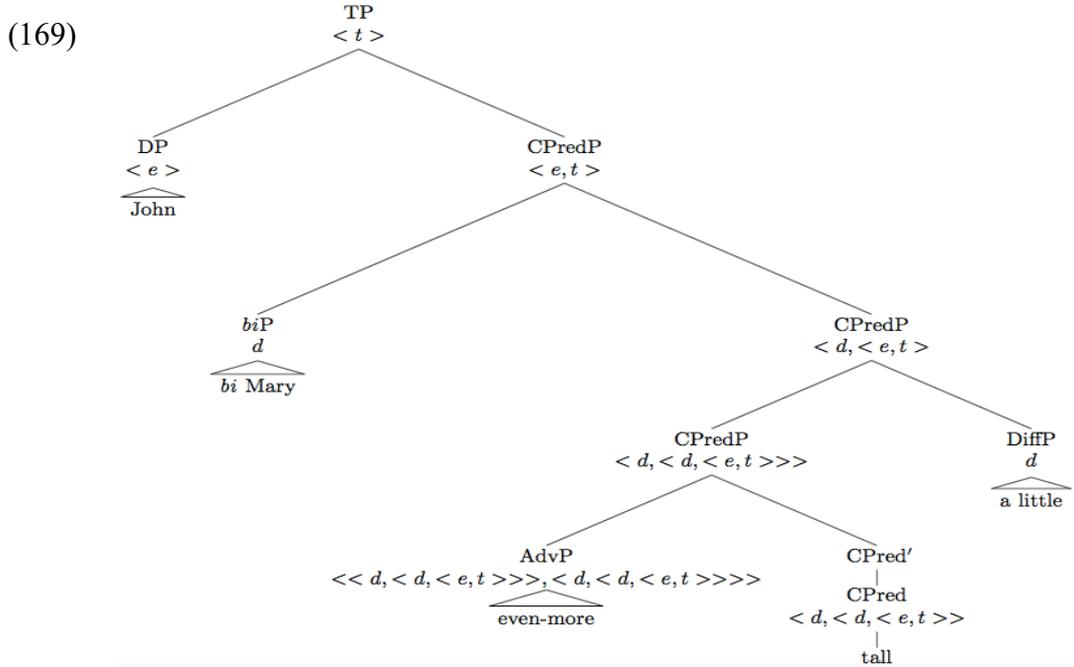
(170) a. [*bi* Mary] [a bit] λd_1. John is d_1-tall

b. || *bi* Mary tall a bit || = || *tall* || (|| *a bit* ||) (|| *bi* Mary is ~~tall~~ ||)

= || *tall* || (**a bit**) (**max** (λd_2 . **tall** (d_2)(**Mary**)))

= $\lambda x_{<e>}$.(**max**(λd_1.**tall**(d_1)(x)))

- **max** (λd_2 . **tall** (d_2)(**Mary**)) $\geq$ **a bit**

c. || *bi* Mary tall a bit || (|| *John* ||) = || *bi* Mary tall a bit || (**John**)

= **max**(λd_1.**tall**(d_1)(John))

- **max** (λd_2 . **tall** (d_2)(**Mary**)) $\geq$ **a bit**

What (170c) expresses is that the maximum degree of John's height must exceed the maximum degree of Mary's height by **a bit**. In other words, this will be true iff the tallness of John exceeds the tallness of Mary, and the difference between their tallness is **a bit.**

Overall, proposing CPredP and eliminating DegP from Chinese comparatives seems to be an unwelcome move. However, it accommodates critical characteristics of Chinese *bi*-comparatives, including a constraint on the compared constituents and the structural flexibility of *bi*-phrases, which are not well-handled in the two traditional approaches.

4.3. The Syntax of Chinese 'Phrasal' *bi*-Comparatives

As noted earlier, there seems to be no positive evidence supporting the projection of a DegP in Chinese comparatives. The assumption that there is a comparative morpheme (overt or covert) or the morpheme *bi* acts as a degree head is not theoretically and empirically supported. Under these circumstances, following Hsieh (2017), I assume that adjectives in Chinese are verbal roots, based on which *v*P structure (e.g., Adger, 2003) will be adopted in the proposed syntactic structure for Chinese *bi*-comparatives, as shown by (171b).

(171) a. Yuehan   feichang   gao.

      John   very   tall

      "John is very tall."

b.
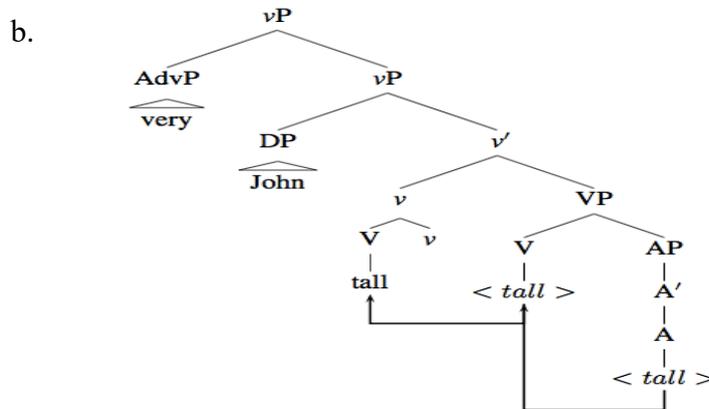
A word of caution is in order here. Grano (2012) and Zhang (2015) both suggest that there is a DegP in the structures expressing positive meaning in Chinese, such as examples like (171a). Yet, as argued above, the existence of DegPs in Chinese *bi*-comparatives is still open to question. Thus, I treat *feichang* (very) as a degree adverb left-adjoined to *v*P rather than as a degree head. One critical reason for adopting a *v*P structure is the direct attachment of aspect markers to gradable adjectives in Chinese *bi*-comparatives, as demonstrated in previous sections, especially when a differential phrase is syntactically visible. This may indicate that gradable adjectives could be verbal roots in some way. The structure presented in (171b) can capture this feature, in which the gradable adjective, *gao* (tall), as the head of AP, undergoes head movement to the head of *v*P.

Another piece of evidence supporting a *v*P structure in Chinese *bi*-comparatives comes from the distributive quantifier *ge* (each) in Chinese. According to Soh (2005:165), there are four conditions that must be met to license the syntactic position of *ge*, as provided in (172).

(172) a. There must be a *v*P or a VP for *ge* to adjoin to.

    b. There must be an indefinite expression c-commanded by *ge*.

    c. There must be a plural argument within the sentence when *ge* adjoins to *v*P,

       and within *v*P when *ge* adjoins to VP.

    d. In a case when *ge* adjoins to *v*P, the event denoted must be complete in the sense

       that all event internal modifiers are included in the projection.

In other words, the ability of *ge* (each) to adjoin to a particular projection is an indication that a *v*P or a VP projection exists. In Chinese *bi*-comparatives, the adjunction of *ge* can be licensed when the gradable predicate is an adjective, as in the following examples.

(173) a. women   liang-ge   bi   qita   liang-ge   ren   **ge**   **gao**   wu   gongfen.

    we   two-CL   BI   other   two-CL   people   each   tall   five   cm

    "We two are five centimeters taller than each of the other two people."

    b. women   liang-ge   **ge**   bi   qita   liang-ge   ren   **gao**   wu   gongfen.

    we   two-CL   each   BI   other   two-CL   people   tall   five   cm

    "We two are five centimeters taller than each of other two people."

    c. women   liang-ge   **ge**   bi   qita   liang-ge   ren   **gao**.

    we   two-CL   each   BI   other   two-CL   people   tall

    "We two are taller than each of other two people."

When there is a differential phrase, as in (173a) and (173b), *ge* can adjoin to two different positions; if there is no differential phrase in the structure, as in (173c), *ge* can only adjoin to a position higher than that of the *bi*-phrase.

Erlewine (2007:37–39) employs the same evidence to prove the existence of *v*P and VP projections in Chinese *bi*-comparatives, in which *bi* projects a *v*P, and the gradable adjective a

VP. On the surface, this assumption seems to fit well with the data presented above. However, as argued before, treating *bi* as a light verb is problematic since the absence of *bi*-phrases under certain circumstances does not necessarily affect the grammaticality and the production of comparative meaning, as in (155). In these cases, *bi* does not project in the syntax at all, which indicates that there is no projection licensing the adjunction of *ge*. In addition, Erlewine (2007:38) contends that *gao wu gongfen* (tall five centimeters) in (173a-b) is a VP. Following his analysis, *gao* (tall) projects a VP, in which the differential phrase is a complement of *gao* (tall). If this were the case, it would predict (173c) to be ungrammatical, contrary to fact. Even if Erlewine's (2007) analysis is untenable, I maintain that the four conditions proposed by Soh (2005) play an important role in arguing for the existence of a *v*P in Chinese *bi*-comparatives. By extending Soh's argument, I propose that, following the extended projection principle (Grimshaw, 2005), *ge* in (173a-c) is licensed by the projection of CPredP, an extended projection of *v*P, as illustrated in (174).

(174) **The licensing of *ge* (each) in Chinese *bi*-comparatives**
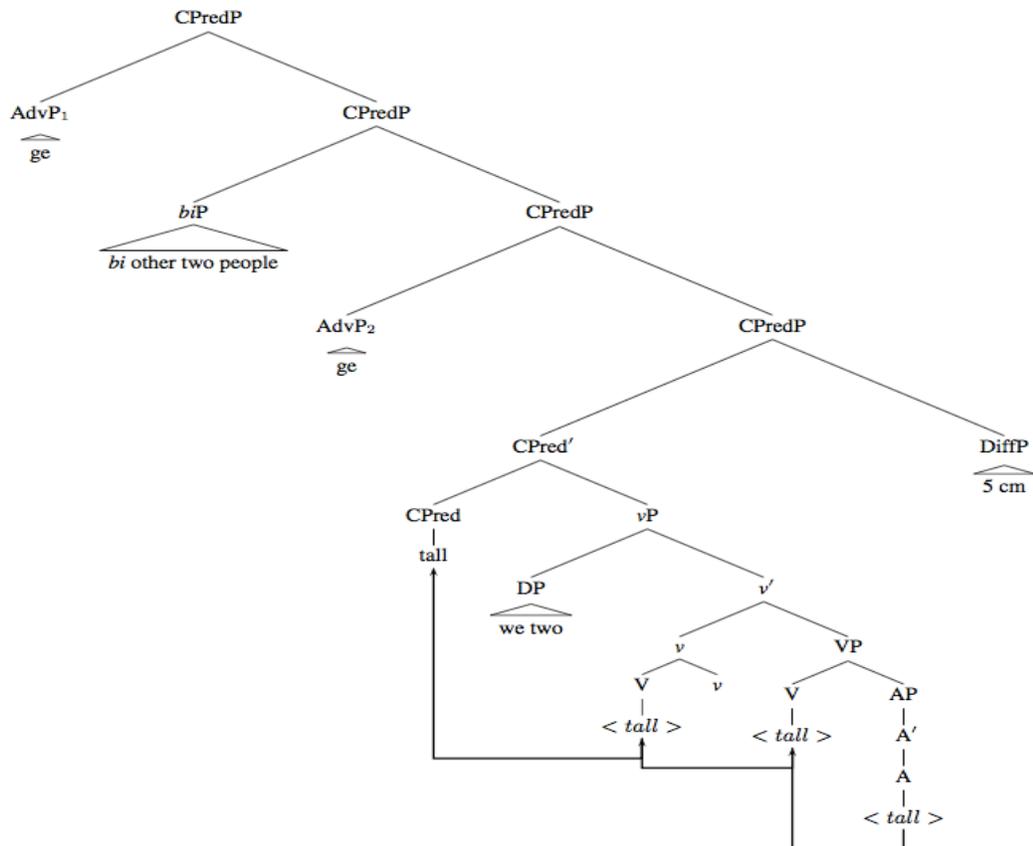
Based on this structure, we can examine how the four conditions proposed by Soh (2005) are met to license the distributive quantifier *ge* (each) in Chinese *bi*-comparatives: *ge* adjoins to CPredP, an extended projection of *v*P, in which the gradable predicate *gao* (tall) undergoes head movement to the head of CPredP – (172a); when there is a differential phrase, as in (173a-b), two possible positions are available for *ge* to adjoin to, AdvP$_1$ and AdvP$_2$, and when there is no differential phrase, as in (173c), AdvP$_1$ is the only available position: either AdvP$_1$ or AdvP$_2$ would c-command an indefinite expression, including *qita liangge ren* (other two people) or *wu gongfen* (5 cm) – (172b); there are plural arguments, *women liangge* (we two) – (172c); finally, all event-internal modifiers are already in the projection of CPredP – (172d). Consequently, evidence from aspect markers that are suffixed to gradable adjectives directly, as well as Soh's (2005) conditions for licensing *ge* (each) in Chinese *bi*-comparatives, strongly motivates the argument that a *v*P projection should be adopted as a unified structure for Chinese *bi*-comparatives.

Additionally, in Chinese *bi*-comparatives, compared constituents in the compared phrase and the standard phrase respectively are in a contrastive relationship (e.g., Liu, 2011).

(175) a. [F YUEHAN] xihuan meiguo, [F MALI] taoyan meiguo.

    John   like   US   Mary   dislike US

    "John likes the US, but Mary dislikes the US."

  b. [F YUEHAN] bi [F MALI] xihuan meiguo.

    John   BI   Mary   like   US

    "John likes the US more than Mary does."

In these two examples, focus is marked with [F]. Following Rooth (1992) and Krifka (2008), I adopt the following definition of Focus:

(176) **The definition of Focus**

  Focus indicates the presence of alternatives that are relevant for the interpretation of linguistic expressions.

According to this definition, we can identify that *Yuehan* (John) in (175a-b) is a focus, since there is an alternative *Mali* (Mary) relevant for the interpretation. More specifically, *Yuehan* (John) is in effect a contrastive focus, which is compatible with the proposal of Kiss (1998), who suggests that a focus is contrastive if there is a complementary alternative set with clearly identifiable elements. In (175a-b), the contrastively focalized *Yuehan* (John) has *Mali* (Mary) as the clearly identifiable element of the alternative set. This indicates that compared constituents in the compared phrase of Chinese *bi*-comparatives, as in (175b), are focus-sensitive (Beaver & Clark, 2008). In order to accommodate this fact, I propose that there is a covert Focus head (represented as OP$_F$) projecting a Focus Phrase (FocP) in Chinese *bi*-comparatives. In line with Rizzi (1997), Belletti (2004), Paul (2005) and Badan & Del Gobbo (2010), I take it that Chinese 'phrasal' *bi*-comparatives involve at least the projections in (177).

(177) TP > FocP > AspP > CPredP > *v*P

Having established the syntactic role of *bi*-phrases (i.e. a degree adverbial) and the structure of gradable adjectives based on the theories of predication in (167), the full syntactic structure of Chinese 'phrasal' *bi*-comparatives now follows. First, Chinese 'phrasal' *bi*-comparatives with differential phrases, such as (178a), are derived as in (178b).

(178) a. Yuehan   bi   Mali   gao   wu   gong-fen.

       John   BI   Mary   tall   five   centimeter

       "John is five centimeters taller than Mary."

b.
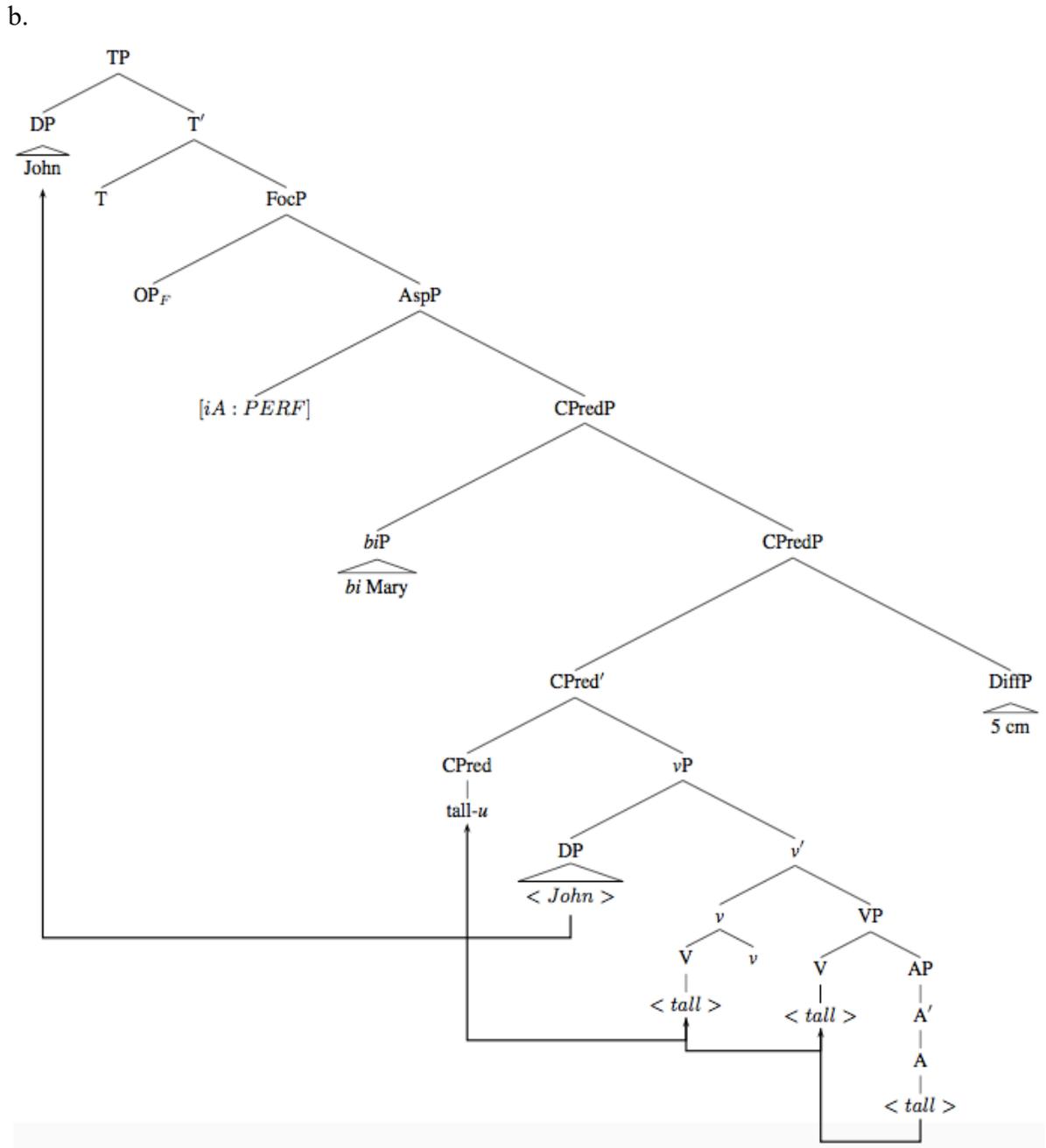
The proposed structure in (178b) is motivated on the following grounds. In terms of the morpheme *bi*, the idea pursued here is that it only functions as a standard marker (Schwardzschild, 2010), introducing compared constituents in the standard phrase. What happens inside the *bi*-phrase is a non-finite clause containing a defective T.

(179)
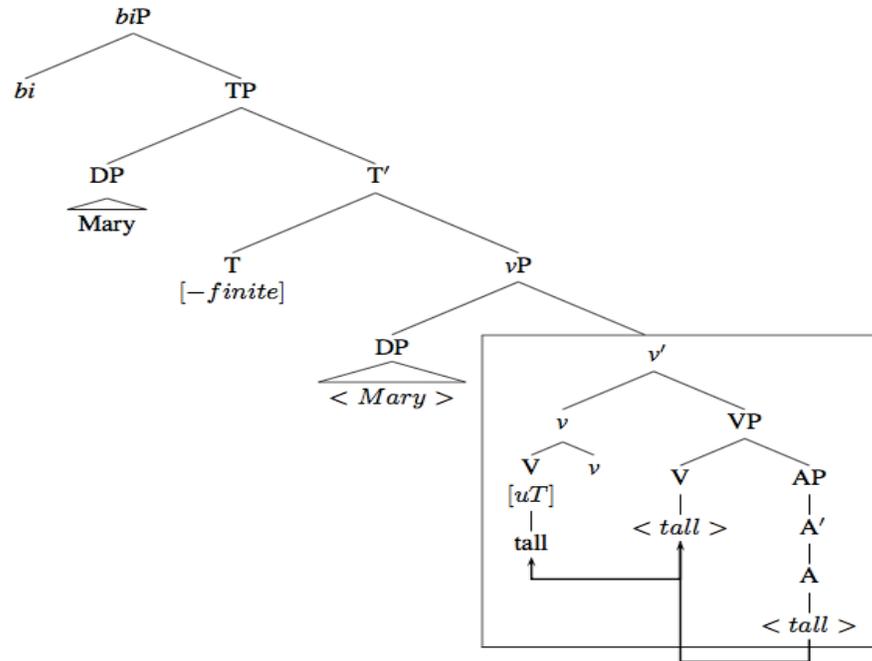
Since Chinese *bi*-comparatives are clausal comparatives, there is an occurrence of the comparison predicate inside the *bi*-phrase, which bears an unvalued feature [*u*T]. Due to the fact that the defective T inside the *bi*-phrase cannot value [*u*T] and the *bi*-phrase as an island intervenes in the Agree relation between [*i*T] of T in the matrix clause and [*u*T] of *tall*, PF-deletion must occur to avoid grammatical violation, as shown by the box in (179) (e.g., Bošković, 2011).

In the matrix clause, the comparison predicate, *gao* (tall), undergoes successive movement to the head of CPredP, naming the dimension of comparison. Note that, as argued before, differential phrases co-occur with aspect markers, such as -*le* or -*chu*, which can be overt or covert, represented here by *u*. Aspect markers are base-generated and attached to the verbal root, *gao* (tall) in this case, and then enter into an Agree relation with the head of AspP that bears an interpretable but an unvalued feature [*i*A:__]. Finally, following my discussion above, compared constituents in the compared phrase are focus-sensitive, which motivates another projection of FocP headed by a covert focus head (i.e., OP$_F$) above AspP.

As for Chinese 'phrasal' *bi*-comparatives without differential phrases, they are derived in the same fashion as the ones with differential phrases, except that the head of AspP has a default feature [*i*A:NEUT]. This type of comparatives, such as (180a), are derived as in (180b).

(180) a. Yuehan   bi   Mali   gao.

      John   BI   Mary   tall

      "John is taller than Mary."

b.
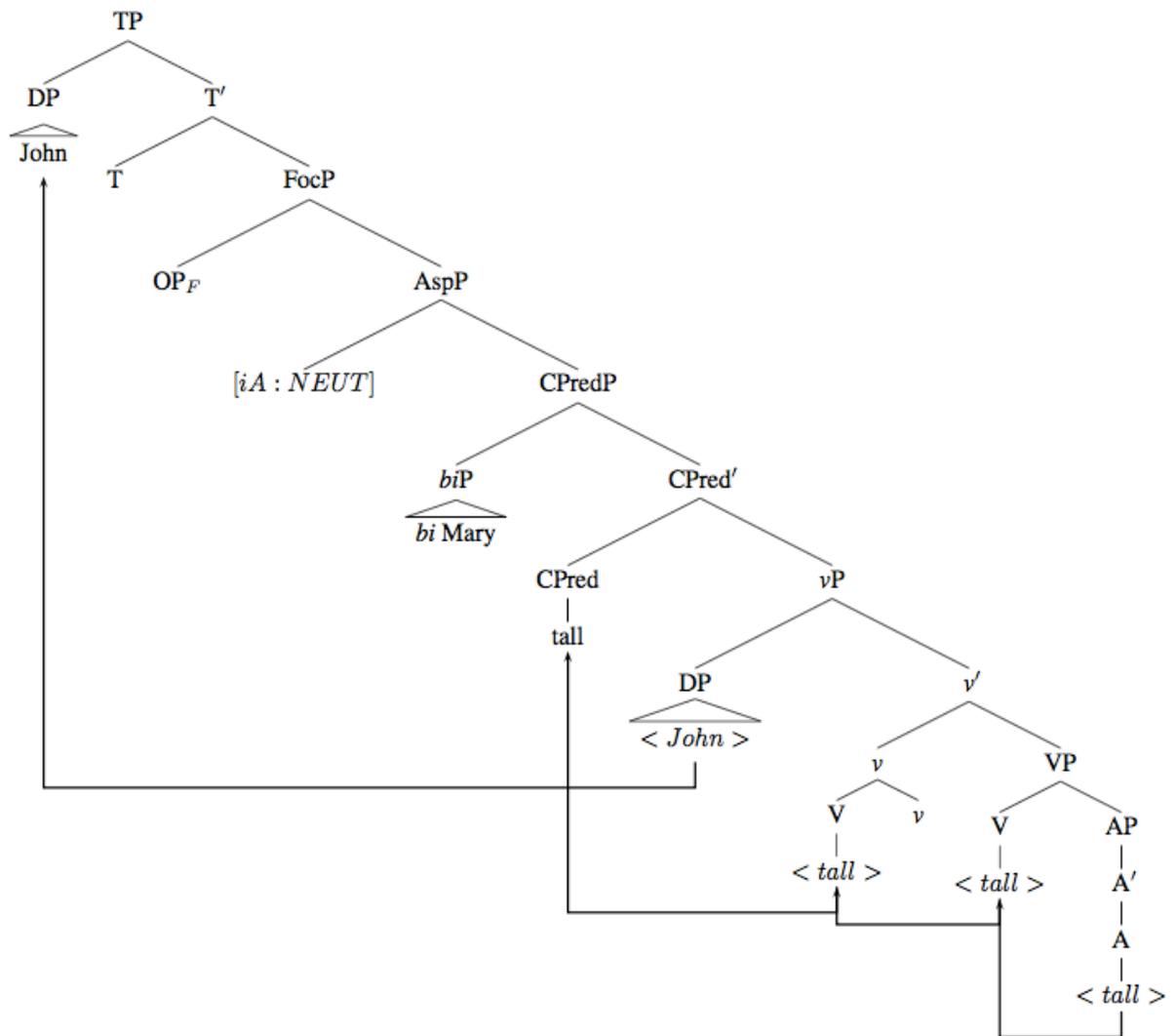
The internal structure of the *bi*-phrase in this case is the same as the representation in (179), in which *rescue-by-PF-deletion* is still applied to save grammaticality, namely another occurrence of the comparison predicate is deleted. According to the argument made in 4.1., the

absence of differential phrases indicates that the head of AspP receives a default neutral feature, represented as [*i*A:NEUT], which renders the structure for those without differential phrases consistent with the projections in (177).

4.4. An Asymmetry in Chinese 'Phrasal' *bi*-Comparatives

The occurrence of epistemic expressions in Chinese 'phrasal' *bi*-comparatives displays an asymmetry, depending on whether there is a differential phrase. Consider (181) and (182).

(181) a. Yuehan **yinggai** bi Mali gao.

    John should BI Mary tall

    "John may be taller than Mary."

    b. * Yuehan bi Mali **yinggai** gao.

    John BI Mary should tall

    Intended meaning: "John may be taller than Mary."

(182) a. Yuehan **yinggai** bi Mali gao wu gongfen.

    John should BI Mary tall five centimeter

    "John may be five centimeters taller than Mary."

    b. Yuehan bi Mali **yinggai** gao wu gongfen.

    John BI Mary should tall five centimeter

    "John may be five centimeters taller than Mary."

In (181) and (182), the epistemic expression, *yinggai* (should), is used as a diagnostic to demonstrate such an asymmetry: when there is a differential phrase, as in (182a-b), the *bi*-phrase may either precede or follow the modal; on the contrary, if the differential phrase is absent, the *bi*-phrase does not show any structural flexibility, as in (181a-b). In Chapter 3, I argued that both *bi*-phrases and differential phrases denote a degree argument *d* θ-binding the degree argument of gradable predicates. The presence of a differential phrase in the structure indicates that the degree argument of the gradable predicate has been θ-bound, and under these circumstances, the *bi*-phrase is free to target a higher position. To make this assumption more

explicit, I propose that comparison predicates in Chinese comparatives bear a strong unvalued comparative feature [*u*Comp*], and *bi*-phrases and differential phrases both have a valued comparative feature [Comp] that values the feature on comparison predicates.

One point is in order before we move on. I assume that epistemic modals in Chinese, such as *yinggai* (should), demonstrate gradability like relative adjectives, following Kratzer (2012), Portner & Rubinstein (2016), and Lassiter (2011, 2017).

(183) a. John should very much be home by now.

b. John should call Mary more than (he should call) Bill.

c. John should be home as much as Mary should.

<div align="right">(Lassiter, 2017)</div>

All these three examples in (183) express epistemic meanings by making use of the modal auxiliary *should*, which is a modal operator (i.e., Portner & Rubinstein, 2016). A single modal expression, according to Kratzer (1977), can produce different meanings, including epistemic and deontic. Such variety of interpretations comes from the fact that modals are world quantifiers and the set of worlds quantified over can be limited in different ways depending on the context. Take (184) as an example.

(184) In view of what is known, the ancestors of the Maoris must have arrived from Tahiti.

<div align="right">(Kratzer, 1977)</div>

As illustrated by Schwarzschild (2010), *in view of what is know*, as an adverbial, represents domain choices, leading to an epistemic reading of *must*. In other words, the domain of *must* is restricted to worlds compatible with *what is known*, in which an epistemic meaning is produced.

Applying this line of argument to the examples in (183), the presence of *should* partitions the worlds into two subsets, separating those worlds, W_1 where *John is possible to be home* from those where *it is not possible for John to be home*, W_2. In (183a), there is a set of degrees

denoted by *should* concerning the possibilities that *John is home* in W_1, and *very much*, as an adverbial, restricts the domain of *should* in which one possibility is intensified and then is much higher than a context-sensitive possibility. In (183b), *should* denotes two sets of degrees concerning two possibilities: P_1 – *John makes a call to Mary* (in the matrix clause), P_2 – *John makes a call to Bill* (in the *than*-clause). The comparative morpheme *more*, if we follow the conventional analysis (e.g., Cresswell, 1977; Kenndy, 1999), imposes an ordering between P_1 and P_2, i.e., $P_1 > P_2$. A similar argument carries over to (183c), which shows that the degree of possibility of *John is home* is equivalent to the degree of possibility of *Mary is home*, namely $P_1 = P_2$.

Likewise, similar arguments have also been provided for other modal expressions, such as *possible*, *probable*, *likely*, and *certain* (Lassiter, 2010); *important*, *crucial*, *should*, and *must* (Portner & Rubinstein, 2016); and *ought* and *should* (Lassiter, 2017). How the formal semantics for these modals works in natural language is beyond the scope of this dissertation, yet one fact deriving from this line of research is that epistemic modals are gradable if appropriate contexts are taken into account, for instance, when they are used in comparative structures (e.g., (183b-c)).

Adopting the argument that modal expressions may denote gradability, I further assume that epistemic modals in Chinese, such as *yinggai* (should), bear an unvalued comparative feature [*u*Comp], which can be checked off by movement of a phrase having a valued comparative feature [Comp]; or epistemic modals can enter into an Agree relation with that phrase. However, a distinction is supposed to be made between *yinggai* (should) and other modal auxiliaries, such as *hui* (can) and *neng* (can).

(185) a. Yuehan **yinggai** bi Mali gao wu gongfen.

         John should BI Mary tall five centimeter

      "John may be five centimeters taller than Mary."

b. Yuehan   bi   Mali   **yinggai**   gao   wu   gongfen.

John   BI   Mary   should   tall   five   centimeter

"John may be five centimeters taller than Mary."

(186) a. Yuehan   bi   Mali   **neng**   chi   yixie.[35]

John   BI   Mary   can   eat   a little.

"John can eat a little more than Mary does."

b. * Yuehan   **neng**   bi   Mali   chi   yixie.

John   can   BI   Mary   eat   a little

"John can eat a little more than Mary does."

Different from *yinggai* (should), when the modal *neng* (can) occurs in Chinese comparatives, it can only be preceded by *bi*-phrases, as shown by the contrast in (186a-b). This leads to my another assumption that *neng* (can) or *hui* (can) bears a strong unvalued feature [uComp*] that needs to be valued by overt movement of a phrase having a valued feature [Comp]. In this case, the *bi*-phrase, bearing a [Comp] feature, overtly moves to [Spec, ModP] to value and delete the unvalued feature from the derivation, i.e., (186a). Otherwise, it would lead to a crash at PF, i.e., (186b).

Based on the assumptions made above, (182a) is assigned the structure in (187).

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[35] When modals like *neng* (can) or *hui* (can) occur in Chinese *bi*-comparatives, comparison predicates are not gradable. Consider the following examples.
(i) Yuehan   bi   Mali   **neng**   chi.
   John   BI   Mary   can   eat
   "John can eat more than Mary does."
(ii) Yuehan   bi   Mali   **hui**   zuo   shengyi.
    John   BI   Mary   can   do   business
    "John knows how to do business more than Mary does."
In these two examples, the comparison predicates *chi* (eat) and *zuo* (do) both are not gradable, but adding a modal auxiliary saves the grammaticality. Thus, in this case, I assume that the comparison predicates do not bear an unvalued feature [uComp*], but the modals do.

(187)

```
TP
├── DP
│   └── John
└── T′
    ├── T
    └── ModP
        ├── Mod
        │   └── should
        │       [uComp]
        └── FocP
            ├── OP_F
            └── AspP
                ├── [iA : PERF]
                └── CPredP
                    ├── biP
                    │   [Comp]
                    │   └── bi Mary
                    └── CPredP
                        ├── CPred′
                        │   ├── CPred
                        │   │   └── tall-u
                        │   │       [uComp*]
                        │   └── vP
                        │       ├── DP
                        │       │   └── < John >
                        │       └── v′
                        │           ├── v
                        │           │   ├── V
                        │           │   │   └── < tall >
                        │           │   └── v
                        │           └── VP
                        │               ├── V
                        │               │   └── < tall >
                        │               └── AP
                        │                   └── A′
                        │                       └── A
                        │                           └── < tall >
                        └── DiffP
                            [Comp]
                            └── 5 cm
```
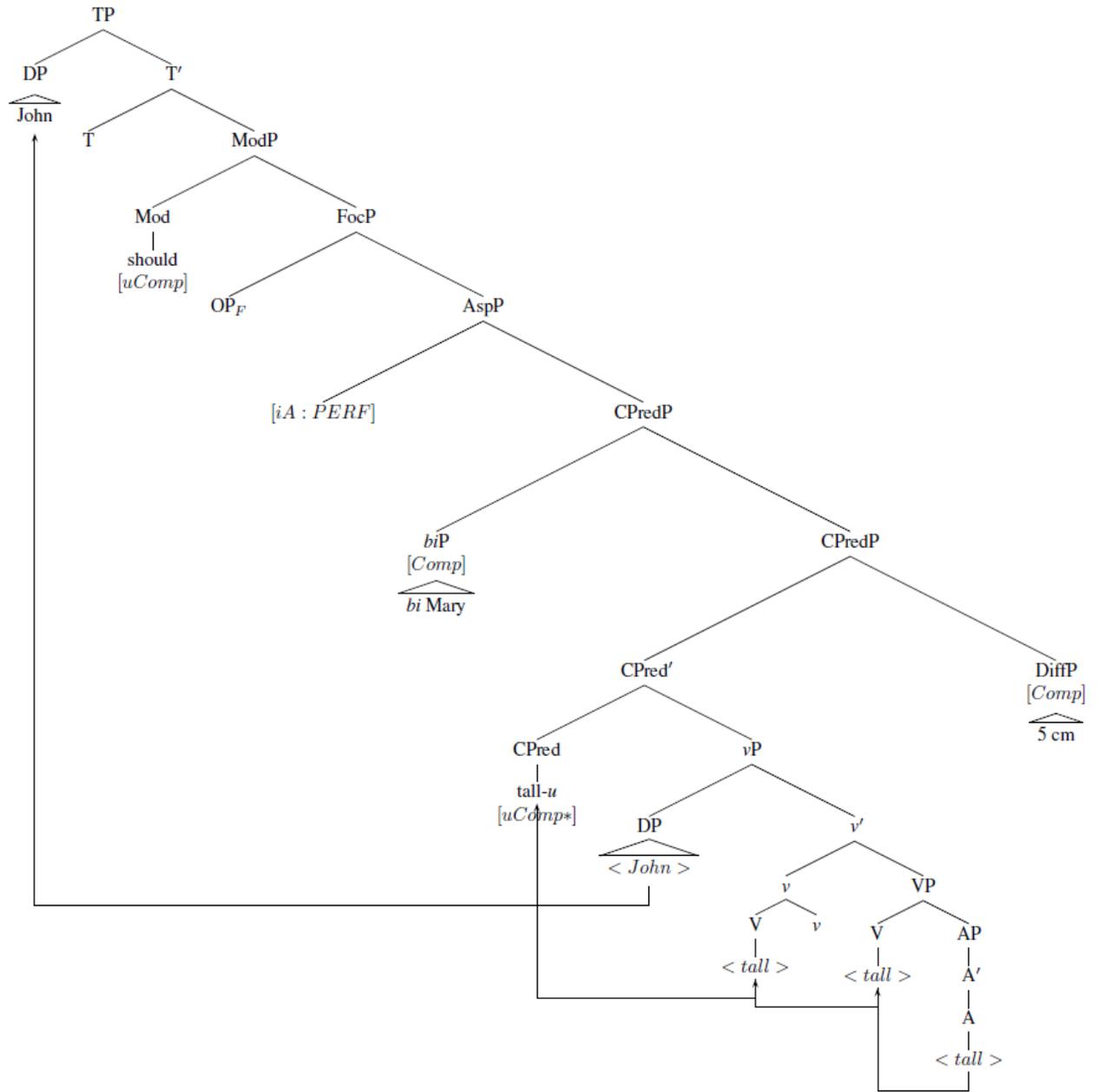
In this case, the comparison predicate *gao* (tall) has a strong unvalued feature [uComp*], which is valued and deleted by the valued feature [Comp] on Differential Phrase (DiffP). Then, there are two choices for the *bi*-phrase[36]: either it stays *in-situ* and enters into an Agree relation with the head of ModP which bears an unvalued feature [uComp] – (182a), or it overtly moves

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[36] The internal structure of the *bi*-phrase is still the same as what is represented in (179), in which *rescue-by-PF-deletion* mechanism is involved to save grammaticality.

to [Spec, ModP] where it values that unvalued feature – (182b). When there is no differential phrase, e.g., (181a), the strong unvalued feature [*u*Comp*] on the comparison predicate can only be valued by the *bi*-phrase. Yet, I propose that one condition needs to be met: the ***Absolute Locality Constraint***, which states that the binding of the degree argument denoted by comparison predicates must be within the projection of CPredP. This would prevent *bi*-phrases from moving out of CPredP to a higher position; in other words, *bi*-phrases can only stay in [Spec, CPredP], given the absence of differential phrases. Likewise, the occurrence of other modals, such as *neng* (can) or *hui* (can), requires *bi*-phrases to overtly move to [Spec, ModP] where the feature [*u*Comp*] can be valued and deleted in the derivation, as shown by (186). With the feature-checking analysis, the asymmetry suggested by (181) and (182) can be well explained and captured, and the same line of argument can carry over to other modals, as in (185).

4.5. Summary

Drawing evidence from aspect markers and cross-linguistic parameters in comparison constructions, I argue for the projection of a Comparison Predication Phrase (CPredP) that can accommodate a range of phenomena in Chinese *bi*-comparatives. In addition, by taking the role of information structure into consideration, the architecture of the domain below IP (or TP) and above *v*P in Chinese *bi*-comparatives includes at least the projections "TP > FocP > AspP > CPredP > *v*P", corresponding partially to the hierarchy of the left periphery postulated by Rizzi (1997) and Paul (2005). Adopting such an architecture explains the structural flexibility of *bi*-phrases when they co-occur with modals, further confirming that Chinese 'phrasal' *bi*-comparatives are essentially clausal comparatives. This syntactic analysis of Chinese 'phrasal' *bi*-comparatives will pave the way for an explication of the internal structure of Chinese 'clausal' *bi*-comparatives, an issue that will be dealt with in the next chapter.

Chapter 5   The Syntax of Chinese 'Clausal' *bi*-Comparatives

In Chapter 4, I argued that Chinese 'phrasal' *bi*-comparatives involve the projection of FocP and AspP that have not been taken into account previously. The question left is how to build this construction into the overall structure of comparatives. In this chapter, I will investigate the syntactic structure of Chinese 'clausal' *bi*-comparatives, namely comparatives involving the comparison of multiple topics, following remnant movement analysis (e.g., Müller, 1998, 2015; Kayne, 1998; Koopman & Szabolcsi, 2000). In contrary to Cheng & Vicente (2013), who claim that Chinese lacks the means to create a remnant VP, I will adopt remnant movement analysis to eliminate some questions arising from previous studies. In particular, this approach can be used to explicate the obviation of the Condition C effect in Chinese *bi*-comparatives, as noted by Liu (2014).

5.1. Remnant Movement

Remnant movement (hereafter, RM), originally proposed to solve some syntactic problems in German (Thiersch, 1985; Besten & Webelhuth, 1990), now has been extended to other languages, such as Japanese, English, Dutch and Italian. In this part, I will explain the basic configurations of RM, as well as one of its constraints, which would lay a foundation to the syntactic analysis of Chinese 'clausal' *bi*-comparatives.

5.1.1. Background

Remnant movement, according to Müller (1998, 2002), is movement of an XP α, an "Incomplete Category", within which extraction of an YP β out of it has taken place prior to the movement of α, as schematized in (188).

(188) [α …t$_β$…] …[…β…[…t$_α$…]]

According to this schematization, the general configuration is that a constituent β moves out of α first, followed by movement of the remnant α with a trace of β inside it. One prominent characteristic of this configuration is that this order of movement leads to the fact that, syntactically, the final position of β is below that of α. Otherwise, ungrammaticality would follow, as shown by the examples in (189).

(189) a. Who$_β$ did you buy [a picture of t$_β$]?

b. * Who$_β$ was [a picture of t$_β$]$_α$ bought t$_α$ (by you) ?

(Hunter, 2012)

Such a contrast is an instance of freezing effects, following Corver (2017); namely, the constituent α is frozen in its derived position, and any extraction out of it is no longer permitted. In (189b), the final position of α is below that of β, which immediately results in ungrammaticality.

Another major characteristic of RM is that the constituent undergoing remnant movement contains a trace of the element which has been extracted earlier, and that trace is unbound after remnant movement occurs. The following examples offer a detailed illustration:

(190) **German**

a. Gelesen   hat   das   Buch   keiner.

    read   has   the   book   no one

     "No one has read the book."

b. [$_{VP}$ t$_i$ Gelesen]$_j$ hat   [$_{TP}$ [das   Buch]$_i$ [$_{TP}$ keiner t$_j$]]

      read   has   the   book   no one

(191) **English**

a. John reads no novels.

b. John [reads t$_i$]$_j$ [no novels]$_i$ t$_j$.

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In order to derive the structure in (190b), argued by Besten & Webelhuth (1990) and Müller (1998), the direct object *das Buch* is scrambled out of VP first, and the remnant VP is topicalized, carrying along the trace of the object. Likewise, Kayne (1998) proposes 'negative preposing analysis' for sentences like (191a). According to this approach, *no novel* is moved leftward out of VP first to [Spec, NegP], which is immediately above VP, and then the remnant VP is fronted which contains the trace of the moved element.

At first glance, this approach seems to be a good fit for both German and English, yet, a distinction is supposed to be made (e.g., Hunter, 2012; Thiersch, 2017). Two operations in (190), i.e., extraction of DP and the fronting of the remnant VP, are independently motivated, which, according to Müller (2002) and Thiersch (2017), involve the combination of scrambling and topicalization. As for the English example in (191), movements are mainly necessitated by the interpretation of the quantifier scope, indicating that the operations involved are not independently motivated by the structural configuration. Consider (192).

(192) I will force you to marry no one.

  a. I will force you [to marry t_i]$_j$ [no one]$_i$ t_j.

  b. I will [force you to marry t_i]$_j$ [no one]$_i$ t_j.

Following Kayne (1998), in (192a), *no one* moves to [Spec, NegP] in the embedded non-finite clause, and the remnant non-finite TP is fronted, which helps derive the "narrow scope negation'. In (192b), *no one* moves to [Spec, NegP] in the matrix clause, accompanied by the fronting of the remnant matrix VP, and then the "wide scope negation" is derived. Such a contrast in German and English indicates that remnant movement may be motivated either by the structural configurations or abstract theoretical assumptions.

5.1.2. Constraints on Remnant Movement

As shown above, German and English examples derived by remnant movement offer an effective way to explain their structural configurations. However, this movement is not

unconstrained. To put this configuration under the context of derivational approach, Hunter (2012:3) raises a constraint on remnant movement, as in (193).

(193) **The 'Just Outside' Constraint (JOC)**

Remnant movement is permitted only if the base position of the remnant is in the same maximal projection as the target position of the extracted sub-constituent.

This constraint, according to Hunter (2012), has been proved quite fruitful in explaining a large number of examples. Consider the following examples.

(194) a. [Arrested t_i by the police]$_j$, John$_i$ was t_j.

b. [Seem t_i to be tall]$_j$, John$_i$ does t_j.

(Hunter, 2012)

c. Japanese

* [Bill-ga t_i sundeiro to]$_j$ [sono mura-ni]$_i$ John-ga t_j omotteiru.

Bill live that that village-in John think

"John thinks that Bill lives in that village."

(Takano, 2000)

(195) German

* daβ [t_i Zu lesen]$_j$ keiner [das Buch]$_i$ t_j versucht hat.

that to read one-one the book tried has

"that no one has tried to read the book."

(Müller, 1996)

In (194a), movement of the sub-constituent *John* targets [Spec, TP], and the base position of the remnant is VP. These two are obviously in the same maximal projection, namely TP, which satisfies JOC and is predicted to be grammatical. The same argument carries over to (194b). However, in (194c), movement of the sub-constituent [*sono mura-ni*] targets a position that is at least above [Spec, TP], since it lands in a position higher than that of *John-ga*, which is in [Spec, TP]. This violates the requirement in (193); namely, the target position of [*sono mura-ni*] and the remnant are not in the same maximal projection. Hence, examples like (194c)

are ruled out in line with JOC. In terms of the ungrammaticality of the German example in (195), the fronted remnant is the complement of the embedded VP, so the target position of *das Buch* (the book) needs to be within this VP, which it is not. This means that examples like (195) are not permitted by JOC.

There are also other constraints accounting for a variety of illicit examples, as summarized in the following:

(196) a. **Unambiguous Domination** (Müller, 1998)

In a structure …[A … [B …] …] …, A and B may not undergo the same kind of movement.

b. **Takano's Generalization** (Takano, 2000)

Remnant Movement of α is impossible if the head of α has moved out of α.

c. **Grewendorf's Generalization** (Grewendorf, 2003, 2015)

Remnant Movement is prohibited unless it is of a higher type than internal movement.

d. **Cecchetto's Generalization** (Cecchetto, 2004)

The extracted sub-constituent can only a position inside the first TP that it encounters, following Phase Impenetrability Condition (PIC).

e. **Takita-Saito Generalization** (Takita, 2010; Saito, 2015)

PF analysis to account for Japanese scrambling and there is no syntactic constraint on the movement created by Japanese scrambling.

Overall, a range of limitations have been put forward to restrict the configurations of RM, which manifests that RM is not only subject to the interaction of similar movement types and the hierarchy properties of movement, but also is related to the derivational approach. In other words, strings represented by the above-mentioned generalization are excluded by RM[37].

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[37] A detailed review of these constraints on remnant movement is beyond the scope of this dissertation. For a complete discussion of how these generalizations work for different languages, such German, Dutch, and Japanese, readers may consult the works cited above.

5.2. VP Movement in Chinese

As noted by Huang (1993), NP and VP both can be fronted in Chinese. Consider the following examples.

(197) a. ziji$_{i/j}$ de   shi,   Yuehan$_i$ xiwang   Mali$_j$ neng   guan-yi-guan.

       self   's   matter   John   hope   Mary   can   care-a-little

       "His own$_{i/j}$ business, John$_i$ hopes that Mary$_j$ will care-for-a-bit."

    b. ziji$_{i/j}$ de   shi,   wo$_i$ zhidao   Yuehan$_j$ hui   chuli.

       self   's   matter   I   know   John   will   handle

       "My$_i$/His$_j$ business, I$_i$ know John$_j$ will handle."

(198) a. piping   ziji$_i$ de   pengyou,   Yuehan$_i$ juedui   bu   hui.

       criticize   self   's   friend   John   definitely   not   will

       "Criticize his own friend, John definitely will not."

    b. piping   ziji$_{*i/j}$ de   pengyou,   Yuehan$_i$ zhidao   Mali$_j$ bu   hui.

       criticize   self   's   friend   John   know   Mary   not   will

       "Criticize her own$_{*i/j}$ friend, John$_i$ knows that Mary$_j$ will not."

While Huang (1993) focuses on explaining the reconstruction possibilities by examining the fronted NPs (197a-b) or the fronted VPs (198a-b) containing reflexives, what concerns us here is that VPs in Chinese can be topicalized, resembling its counterparts in English, as in (194a-b). One obvious difference between the Chinese and English instances is that the topicalized VPs in (194a-b) may be remnant constituents, whereas the fronted VPs in (198a-b) are not.

Yet, a class of examples involving event structures illustrated by Huang (2009) reveals that remnant movement may exist in Chinese.

(199) a. jianyu   li   **fanren**   pao-le   liang-ci.

       prison   inside   prisoner   escape-ASP   two-time

      "Prisoners escaped away from the prison twice."

b. jianyu   li   pao-le   liang-ci   **fanren**.

prison   inside   escape-ASP   two-time   prisoner

"Prisoners escaped away from the prison twice."

c. jianyu   li   liang-ci   pao-le   **fanren**.

prison   inside   two-time   escape-ASP   prisoner

"Prisoners escaped away from the prison twice."

(199a) reflects the canonical word order in Chinese. As argued by Huang (2009:358), (199b) involves event quantification. In other words, there is an event predicate underlying the structure, schematically:

(200) a. jianyu   li   OCCUR   [liang-ci   [pao   fanren]]

prison   inside   two-time   escape   prisoner

b. jianyu   li   pao+OCCUR   [liang-ci   [<pao>   fanren]]

In this case, the underlying event predicate is the one-place predicate OCCUR, which is unaccusative. In Chinese, frequency expressions can appear between verbs and their arguments, which indicates that, in (200a), the verb *pao* (escape) must be raised to a position higher than that of the frequency expression – *liang-ci* (two-time). Such a movement to eventuality predicates helps accomplish the event structure denoted by action verbs, as shown by (200b). Then the word order in (199b) can be derived.

Huang's argument (2009) seems to suggest that main verbs are obligatorily raised to event predicates to derive the right word order. If this is the case, one problem immediately arising from this approach is how to assign a structure to (199c), in which the position of the frequeny expression is higher than that of the verb. Hence, instead of postulating the existence of an event predicate, there could be an alternative: (199b) and (199c) are derived from the canonical word order (i.e., (199a)) by remnant movement.

(201) a. jianyu　　li　　　fanren　　[$_{VP}$ pao-le　　liang-ci].

　　　prison　inside　prisoner　escape-ASP　two-time

　　b. jianyu　　li　　[$_{VP}$ pao-le　　t_i]$_j$　[$_{TP}$ [liang-ci]$_i$　[$_{TP}$ fanren　t_j]].

　　　prison　inside　escape-ASP　　　　two-time　　prisoner

　　c. jianyu　li　[liang-ci]$_i$　[$_{VP}$ pao-le　t_i]$_j$　[$_{TP}$ fanren　t_j] .

　　　prison　inside　two-time　escape-ASP　　prisoner

In (201b), the frequency expression *liang-ci* (two-time) is extracted out of VP first to the edge of TP, and then the remnant VP [$_{VP}$ *pao-le* t_i] (escape away) undergoes movement to a position higher than that of *liang-ci*. This conforms to the JOC, since the target position of the frequency expression is in the same maximal projection with the base position of the remnant VP, namely TP. At the first sight of (201c), one may believe that movement in it violates the JOC, since the target position of *liang-ci* (twice) is at least above TP, which is not in the same maximal projection with the base position of the remnant VP. Interestingly, according to Hunter (2012:38), there are two variants of JOC, which are stated as follows:

(202) a. **The JOC (weak version)**

Remnant movement is permitted only if the base position of the remnant is in the same maximal projection as **the first (remnant-external) landing site** of the extracted sub-constituent.

b. **The JOC (strong version)**

Remnant movement is permitted only if the base position of the remnant is in the same maximal projection as **the final landing site** of the extracted sub-constituent.

With regard to these two versions of the JOC, as suggested by Hunter (2012), the central point is whether the immediate landing site of the extracted sub-constituent is able to rescue the movement of remnant constituents in configurations. Thus, for (201c), my conjecture is that *liang-ci* (twice) first undergoes movement to an immediate position – the edge of TP as what happened in (201b), and movement of the remnant VP [*pao-le* t_i] (escaped away) is permitted. Then, *liang-ci* (twice) moves further to a position outside the maximal projection with the

remnant VP, schematically:

(203) jianyu   li   [liang-ci]$_i$ [$_{VP}$ pao-le   t$_i$]$_j$ [$_{TP}$ t$_i$' [fanren   t$_j$]].

      prison   inside   two-time   escape-ASP   prisoner

Another support that licenses remnant movement in (201c) comes from Cecchetto's generalization (2004). This characterizes the movement of t$_\beta$ as 'very local' in (188), repeated in (204), following Phase Impenetrability Condition (PIC); namely the extracted sub-constituent can only target a position inside the first TP that it encounters.

(204) [α …t$_\beta$…] …[…β…[…t$_\alpha$…]]

(205) a. [Of which book]$_i$ do you remember [how many chapters t$_i$]$_j$ you read?

      b. * [How many chapters t$_i$]$_j$ do you remember [of which book]$_i$ you read?

According to Chomsky (1999), one important principle that determines the Spell-Out is Phase Impenetrability Condition.

(206) **Phase Impenetrability Condition (PIC)**

      In a phase α with head H, the domain of H is not accessible to operations outside α, but only H and its edge.

The grammaticality contrast in (205) can be explained by PIC, whose underlying structure is represented as follows:

(207) [$_{TP1}$ you [$_{VP1}$ remember [$_{TP2}$ you [$_{VP2}$ read [how many chapters [of which book]$_i$]$_j$]]]].

Following Cecchetto (2004), if *of which book* moves to the periphery of VP$_2$ where it can be attracted by the first interrogative COMP$_1$ above TP$_2$, and then it further moves to [Spec, CP$_1$]. At the point of derivation, if *how many chapters* is attracted by the matrix interrogative COMP$_2$, PIC is violated, as shown by the ungrammaticality of (205b). A legitimate way is supposed to be: [*how many of chapters* [*of which book*]] moves to the edge of VP$_2$ where it can be accessed by COMP$_1$, and then it moves to [Spec, CP$_1$]. As the derivation proceeds, *of which book* moves to [Spec, CP$_2$] due to the matrix interrogative COMP$_2$, and PIC is obeyed in this case, as shown by the grammaticality of (205a).

Adding this line of argument to (201c), it is not unreasonable to argue that the frequency expression *liang-ci* (two-time) moves to the periphery of TP first where it fulfills two functions: rescuing the configuration resulting from movement of the remnant VP and observing PIC. It then moves to its final landing site. Therefore, some cases of VP movement can be well explicated by resorting to the configuration of remnant movement, as well as its constraints.

5.3. Remnant Movement in Chinese 'Clausal' *bi*-Comparatives

Having shown the basic configurations of remnant movement and some of its constraints, I approached the internal structure of examples involving event quantification in Chinese by turning to verb movement, which may be an instance of RM. This phenomenon would lend substantial support to the argument that movement of remnant *v*Ps is theoretically possible in Chinese, contrary to Cheng & Vicente (2013). I will then develop an analysis of Chinese 'clausal' *bi*-comparatives by following Müller's (2015) derivational approach to Remnant Movement. Adopting this configuration would further strengthen the claim I proposed in Chapter 4 that gradable predicates in Chinese do not project DegPs.

5.3.1. *v*P Movement in Chinese 'Clausal' *bi*-Comparatives

As mentioned in Chapter 3, *bi*-phrases in Chinese 'phrasal' comparatives show structural flexibility while co-occurring with modals. Consider the following examples.

(208) a. Yuehan **yinggai** bi Mali kaixin yixie.

John should BI Mary happy a little

"John may be a little happier than Mary."

b. Yuehan bi Mali **yinggai** kaixin yixie.

John BI Mary should happy a little

"John may be a little happier than Mary."

(209) a. Yuehan   **zenme**   **hui**   bi   Mali   gao   wu   gong-fen?

       John   how   could   BI   Mary   tall   five   centimeter

       "How did John came to be five centimeters taller than Mary?"

     b. Yuehan   bi   Mali   **zenme**   **hui**   gao   wu   gong-fen?

       John   BI   Mary   how   could   tall   five   centimeters

       "How did John came to be five centimeters taller than Mary?"

In (208), adapted from Su (2012), the epistemic expression *yinggai* (should) (Li, 2004) may occur before the morpheme *bi* (i.e., (208a)) or between the *bi*-phrase and the comparison predicate (i.e., (208b)). In (209), adapted from Gu & Guo (2012), the *bi*-phrase can appear on the either side of *zenme hui*, in which *zenme* resembles "how came to be that" in English, occupying a pre-epistemic position (Tsai & Chang, 2003), and *hui* (could) is a deontic expression.

The similar pattern regarding the structural flexibility of *bi*-phrases can also be identified in Chinese 'clausal' *bi*-comparatives, as exemplified by (210).

(210) a. Yuehan   qi   ma   bi   Mali   qi   che   qi-de   kuai   yixie.

       John   ride   horse   BI   Mary   ride   bike   ride-DE   fast   a little

       "John rides horses a little faster than Mary rides bikes."

     b. Yuehan **yinggai** qi   ma   bi   Mali   qi   che   qi-de   kuai   yixie.

       John   should ride   horse   BI   Mary   ride   bike   ride-DE   fast   a little

       "John may ride horses a little faster than Mary rides bikes."

     c. Yuehan   qi   ma   **yinggai** bi   Mali   qi   che   qi-de   kuai   yixie.

       John   ride   horse   should   BI   Mary   ride   bike   ride-DE   fast   a little

       "John may ride horses a little faster than Mary rides bikes."

     d. Yuehan   qi   ma   bi   Mali   qi   che   qi-de   **yinggai** kuai   yixie.

       John   ride   horse   BI   Mary   ride   bike   ride-DE   should   fast   a little

       "John may ride horses a little faster than Mary rides bikes."

While occurring in examples like (210a), *yinggai* (should) may occupy various positions in the syntax, as represented by (210b-d) respectively. More importantly, the displacement of this modal does not lead to any change in semantics. In (210c-d), *qi ma* (ride horses), as a *v*P, is in a position higher than that of the modal which usually occupies a position higher than *v*P but under T (e.g., Adger, 2003). Then, it is not unreasonable to assume that some part of (210a) may undergo movement since *yinggai* (should) is supposed to scope over the entire construction before any movement.

Before investigating what may move in Chinese 'clausal' *bi*-comparatives, a word is in order here regarding (210a) which involves verb-copy constructions in Chinese. Consider the contrast in (211) first.

(211) a. Yuehan   [VP1 qi   ma]   [VP2 qi-de   hen   kuai].

      John   ride   horse   ride-DE   very   fast

      "John rides horses very fast."

    b. * Yuehan   qi   ma   de   hen   kuai.

       John   ride horse DE   very   fast

The basic configuration of verb-copy constructions (or verb-reduplication) in Chinese refers to the phenomenon illustrated by (211a), where the same verb *qi* (ride) has two occurrences in adjacent VPs, and the lack of such a reduplication would immediately result in ungrammaticality, as in (211b). In terms of the structure for verb-copy constructions like (211a), traditionally, they are analyzed as consisting of two VPs, with VP1 being an adjunct or an adverbial clause and VP2 being the main predication (e.g., Huang, 1988; Shi, 1996). This analysis would be problematic if facing examples including three VPs, as in (212), adapted from Fang & Sells (2007).

(212) Yuehan   [VP1 qi   ma] [VP2 qi-le   yi   tian] [VP3 qi-de   hen   lei].

      John   ride horse ride-ASP one day   ride-DE very tired

      "John rode horses for a day and is/was tired."

We may assume that VP₁ and VP₂ are adjuncts if following Huang (1988). However, according to Fang & Sells (2007), the attachment of the aspect marker *-le* to the head of VP₂ indicates that VP₂ is a verb phrase as VP₃ since *-le* only attaches to the heads in Mandarin Chinese. Another piece of evidence comes from adjunct distributions in such constructions.

(213) Yuehan [zai muchang] [$_{VP1}$ qi ma] [$_{VP2}$ qi-de hen lei].

      John at ranch ride horse ride-DE very tired

      "John rode horses at the ranch and is/was tired."

Generally, an adjunct of a VP usually adjoins to the head of that VP. (213), following Fang & Sells (2007), entails "John rode horses at ranch" and "John is/was very tired at ranch", showing that the adjunct *zai muchang* (at ranch) is distributed to both VP₁ and VP₂. This circumstance strongly suggests that VP₁ and VP₂ are both verb phrases, contrary to traditional perspectives. These two pieces of evidence discussed above lend substantial support to the analysis of (210a), in which *qi ma* (ride horses) is a verb phrase.

In terms of the syntactic structure for examples like (210a), repeated in (214a), Erlewine (2007) offers a solution, roughly represented in (214b).

(214) a. Yuehan qi ma bi Mali qi che qi-de kuai yixie.

      John ride horse BI Mary ride bike ride-DE fast a little

      "John rides horses a little faster than Mary rides bikes."

b.
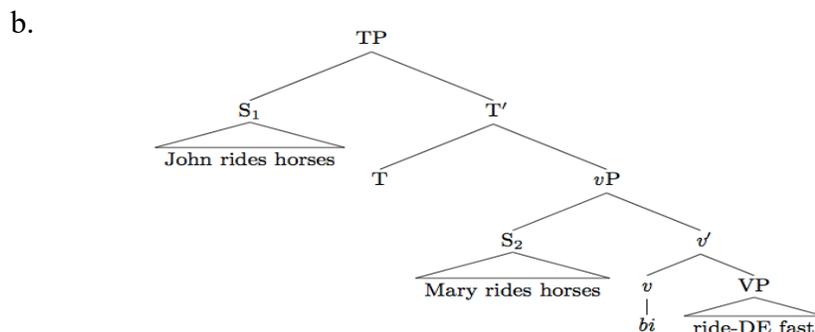
As reviewed in Chapter 3, Erlewine (2007) treats *bi* as a light verb, which obligatorily moves to a position higher than that of the standard constituent (i.e., S₂) to derive the right word order.

In this case, based on the syntactic structure in (214b), the compared phrase *John rides horses* behaves as a sentential argument of the comparison predicate *ride-DE fast*. The underlying assumption for this analysis comes from the traditional view of verb-copy construction, which characterizes the first verb phrase (i.e., *ride horses* in S_1) as an adjunct. However, as just argued, *rides horses* is in fact a VP, which at least indicates that VP *ride-DE fast* does not take a sentential subject. Even if *ride horses* in S_1 is an adjunct, it erroneously predicts that *John* in (214a) forms a constituent with the adjunct, attested by the following two constituency tests.

(215) John quickly finished the assignment.

　　a. ***Cleaving***

　　* It was <u>John quickly</u> that finished the assignment.

　　b. ***Replacement***

　　He finished the assignment.　➔ * *He* refers to *John quickly*.

From these two constituency tests, we can see that *quickly* does not form a constituent with *John*, which invalidates Erlewine's (2007) proposal that *John rides horses* is a sentential argument. Another conspicuous problem from the structure in (214b) is that, prior to moving *bi* above the standard phrase, a modal (e.g., (210b-d)), which is present in the structure, also occupies a position higher than that of the standard phrase. Under this circumstance, it is unclear how Erlewine's analysis can accommodate the fact that modals may appear in different positions in Chinese *bi*-comparatives, as shown by (210b-d).

Having argued that the first verb phrase in verb-copy constructions is in fact a VP, and that previous studies fail to capture the fact that *bi*-phrases are structurally flexible while co-occurring with modals, I propose that Chinese 'clausal' *bi*-comparatives, such as (210a-d), involve movement of the remnant *v*Ps to [Spec, FocP] in the structure. In Chapter 4, I argued that compared constituents in the compared phrase and the standard phrase respectively are in a contrastive relationship; thus, they are two foci in Chinese comparatives, following Rooth (1992), Krifka (2008), and Liu (2011).

(216) a. [F YUEHAN]   bi   [F MALI]   xihuan   meiguo.

       John   BI   Mary   like   US

      "John likes US more than Mary does."

b. [F Yuehan   qi   ma]   bi   [F Mali   qi   che]   qi-de   kuai   yixie.

    John   ride   horse   BI   Mary   ride   bike   ride-DE   fast   a little

    "John rides horses a little faster than Mary rides bikes."

According to Kiss (1998), a focus is contrastive if there is a complementary alternative set with clearly identifiable elements. Following this argument, in (216b), the focalized *John rides horses* has *Mary rides bikes* as the identifiable element of the alternative set. Thus, the contrastive relationship between these two compared constituents is established.

rides horses in the compared phrase in (216b) seems to move from a lower position, and then a natural question to ask is what licenses its movement to a higher position. Before providing my assumption, it is worth noting that such a *v*P-movement resembles Focus Fronting in Italian, as evidenced by the examples in (217) and (218), cited from Bianchi (2015).

(217) A: Gianni   ha   licenziato   Silvia.

    John   has   fired   Sylvia

    "John fired Sylvia."

B: [Lucia] e_2 ha   licenziato __, (non Silvia).

    Lucy   (he)   has   fired   (not Sylvia)

    "It is ***Lucy*** who he fired (not Sylvia)."

(218) A: Maria   ha   detto   [che   le   hanno   regalato   un   braccialetto].

    Mary   has   said   that   her-CL   have.3PL   given   a   bracelet

    "Mary said that they gave her a bracelet."

B: No,   e   ha   detto   [che   [un   anello]   e   le   hanno   regalato __].

    No,   (she)   has   said   that   a   ring   (he)   her.CL   have.3PL   given

    "No, she said that they gave her ***a ring***."

In (217), the focus is on the fronted direct object, i.e., *Lucia* (Lucy), which moves to the periphery of the TP; and in (218), the fronting of the embedded focus, i.e., *un anello* (a ring), which moves to the edge of the embedded TP, is also permitted. As argued by Bianchi (2015:62), what is expressed in (217A) and (218A) is a member of the set of focus alternatives of (217B) and (218B). This would then give rise to the contrast across the utterance. In other words, the fronting of a focus phrase is to help establish contrastive interpretation in the syntax.

According to Neeleman et al. (2009) and Neeleman & Vermeulen (2012), contrastive foci or contrastive topics, bearing a feature [+contrast], may move to a position where the sister of the moved element is the 'domain of contrast' (DoC), as shown by (219).

(219) a. [$_{YP}$ …   XP$_{contrast}$ …]

        part of DoC   contrastive element   part of DoC

   b. XP$_{contrast}$ [YP … t$_{XP}$ …]

      contrastive element   DoC

As (219a) shows, if XP stays *in-situ*, the domain of contrast is a discontinuous constituent consisting of elements preceding and following XP; whereas in (219b), when XP moved to a higher position, its sister YP is now a single syntactic constituent serving as its domain of contrast. Thus, adopting this argument, Szendrői (2017) argues that the motivation for fronting contrastive foci in Italian is to create a syntactic constituent in surface syntax that can mark the domain of contrast. In other words, "the movement ensures that the surface syntactic representation of the contrastive element and its domain of contrast reflect their LF scope relation" (Szendrői, 2017:20).

Likewise, adopting Neeleman et al. (2009), Neeleman & Vermeulen (2012), and Szendrői (2017), I propose that movement of *v*Ps in Chinese 'clausal' *bi*-comparatives can be attributed to the fact that compared constituents in the compared phrase and the standard phrase

respectively need to set up a contrastive relation. In terms of the position of contrastive foci, Belletti (2015:42) assumes that there are two different positions in a clause, "a low *v*P peripheral one dedicated to host new information focus constituents, and a high left peripheral one dedicated to express contrastive focalization." Based on this assumption, I further postulate that the remnant *v*Ps (i.e., after the extraction of the comparison predicate), bearing a feature [+contrast], in the matrix clause of Chinese 'clausal' *bi*-comparatives obligatorily move to a higher position due to two reasons: (i) to establish a contrastive relation with the constituents in *bi*-phrases; (ii) to overtly mark the domain of contrast for the moved element in surface syntax. This proposal will lay the foundations to the detailed derivation of Chinese 'clausal' *bi*-comparatives like (210a) in the next section.

5.3.2. The Derivation of Chinese 'Clausal' *bi*-Comparatives

Based on the discussions in previous sections, Chinese 'clausal' *bi*-comparatives involve movement of a remnant *v*P to a higher position in the structure, in the sense that a contrastive relation between compared constituents in the compared phrase and standard phrase needs to be established to provide contrastive interpretations. In line with this postulation, I will show the detailed derivation of examples like (210a), repeated in (220b).

(220) a. Yuehan   [VP1 qi   ma]   [VP2 qi-de   hen   kuai].

       John   ride horse   ride-DE   very   fast

       "John rides horses very fast."

    b. Yuehan   qi   ma   bi   Mali   qi   che   qi-de   kuai   yixie.

       John   ride horse BI Mary ride bike ride-DE   fast   a little

       "John rides horses a little faster than Mary rides bikes."

As argued before, (220a) is comprised of two VPs, contrary to the traditional views in which VP$_1$ is an adjunct. In terms of the semantics, (220a) yields "object result" reading since, in this case, *ma* (horse) is linked to the predicate *hen kuai* (very fast). Following Cheng (2007), this interpretation is interchangeable with *ba*-constructions in Chinese.

(221) a. Yuehan   qi   ma   qi-de   hen   kuai.

       John   ride   horse   ride-DE   very   fast

       "John rides horses very fast."

       b. Yuehan   **ba**   ma   qi-de   hen   kuai.

       John   BA   horse   ride-DE   very   fast

       "John rides horses and then horses run very fast."

(222) a. Yuehan   kai   che   kai-de   hen   kuai.

       John   drive   car   drive-DE   very   fast

       "John drives cars very fast."

       b. Yuehan   **ba**   che   kai-de   hen   kuai.

       John   BA   car   drive-DE   very   fast

       "John drives cars and then cars' speed is very fast."

The counterparts of (221a) and (222a), i.e., (221b) and (222b) respectively, only have an object-result reading, which supports Sybesma's (1999) assumption about VP$_2$ in (220a):

(223) [$_{VP2}$ ride [$_{deP}$ de^{38} [$_{SC}$ horse fast]]]

For VP$_1$ in (220a), Cheng (2007)[39] proposes that it is the result of verb copying rather than base-generated. In *ba*-constructions, *ba* usually occupies the small *v*; when verb-copying is comparable to this construction, the verb is copied and moved to *v* to replace *ba*. After the verb is raised, its lower copy is fused with *de* in terms of its morphology, which is invisible to Linear Correspondence Axiom (Kayne, 1994) and Chain Reduction (Nunes, 2004). Both copies, therefore, are allowed to be phonologically realized. By adopting Sybesma (1999) and Cheng (2007), I assign a structure to (220a), as represented in (224).

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[38] Sybesma (1999) treats *de* as the head of an Extent Phrase (ExtP/*de*P). In this case, I just adopted *de*P.

[39] Cheng (2007) also discusses examples involving "subject-result" reading, such as

   (1) ta   qi-de   hen   lei.
       He   ride-DE   very   tired.
       "He rode and got very tired."
   (2) shoupa   ku-de   hen   shi.
      Handkerchief   cry-DE   very   wet
       "The handkerchief is wet as a result of crying."

In these two cases, the noun phrases are interpreted as the subject of resultative clauses, which shows a shift to an ergative structure. That means this type of examples has different structures as in (221) and (222). Interested readers are referred to Sybesma (1999) and Cheng (2007) for a detailed analysis.

(224)

```
                          TP
              ┌────────────┴────────────┐
             DP                          T′
             John              ┌──────────┴──────────┐
                               T                     vP
                                         ┌───────────┴───────────┐
                                        DP                        v′
                                      < John >        ┌───────────┴───────────┐
                                                      v                        VP
                                              ┌───────┴──┐         ┌───────────┴───────────┐
                                              V       v          DP                         V′
                                            ride               horse            ┌───────────┴──────────┐
                                                                                V                     deP
                                                                              ride          ┌──────────┴──────────┐
                                                                                           de                     SC
                                                                                           DE           ┌──────────┴──────────┐
                                                                                                       DP                     AP
                                                                                                   < horse >             very fast
```
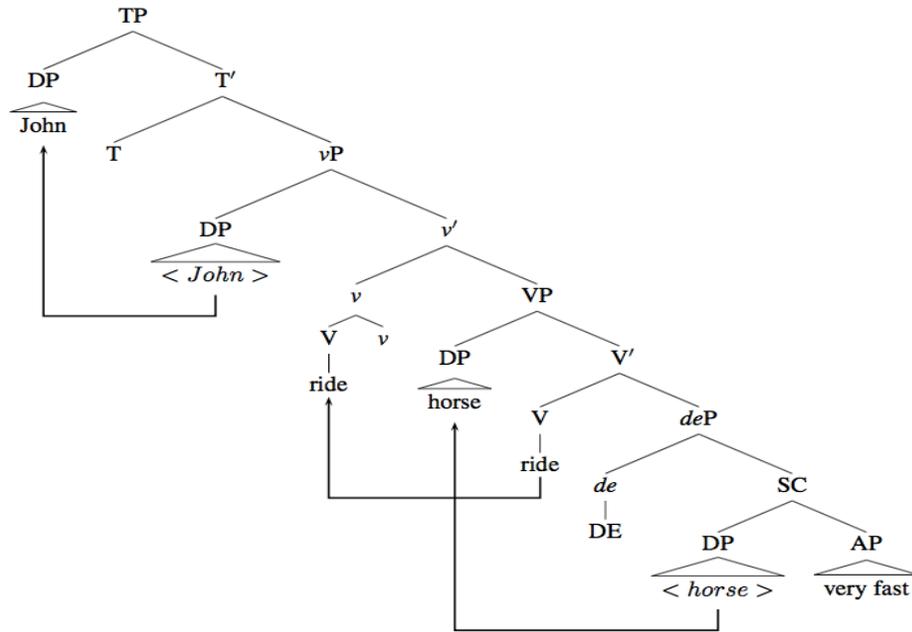
In (224), *ma* (horse) forms with *hen kuai* (very fast) a small clause, producing the right meaning: horses' speed is very fast, and then moves to [Spec, VP]. The verb *qi* (ride) is copied and raised to the small *v*, and the two ends of a movement chain are both phonologically realized.

Based on the structure in (224), we are now equipped to derive a structure for Chinese 'clausal' *bi*-comparatives involving verb-copy constructions. Before that, a word is in order here in terms of examples like (220b). As argued in Chapter 3, compared constituents in the standard phrase have to be parallel to their correlates in the compared phrase in terms of syntax, semantics and category. This assumption is instrumental in obtaining an underlying form for (220b), as shown in (225a).

(225) a. <u>Yuehan</u>   qi   ma   qi-de   bi   <u>Mali</u>   qi   che   qi-de   <u>kuai</u>   yixie.
      John   ride   horse   ride-DE   BI   Mary   ride   bike   ride-DE   fast   a little
      "John rides horses a little faster than Mary rides bikes."

    b. [Yuehan   qi   ma   ~~qi-de~~]   bi   [Mali   qi   che   qi-de]   kuai   yixie.

    c. [Yuehan   qi   ma   ~~qi-de~~]   bi   [Mali   qi   che   ~~qi-de~~]   kuai   yixie.

The two underscored constituents are syntactically and semantically parallel to each other, and the comparison predicate is *kuai* (fast) that names the dimension of comparison. Yet, comparative ellipsis may be involved in examples like (225a), which results in various surface forms, as shown by (225b-c) respectively. It may be attributed to the establishment of a contrastive relation: in (225a), *John rides horses* and *Mary rides bikes* are in a contrastive relation, which indicates that other elements may be optionally deleted without affecting grammaticality[40]. Along with this idea, I propose that Chinese 'clausal' *bi*-comparatives involving verb-copy constructions, like (225a), are assigned a structure in (226).

(226)

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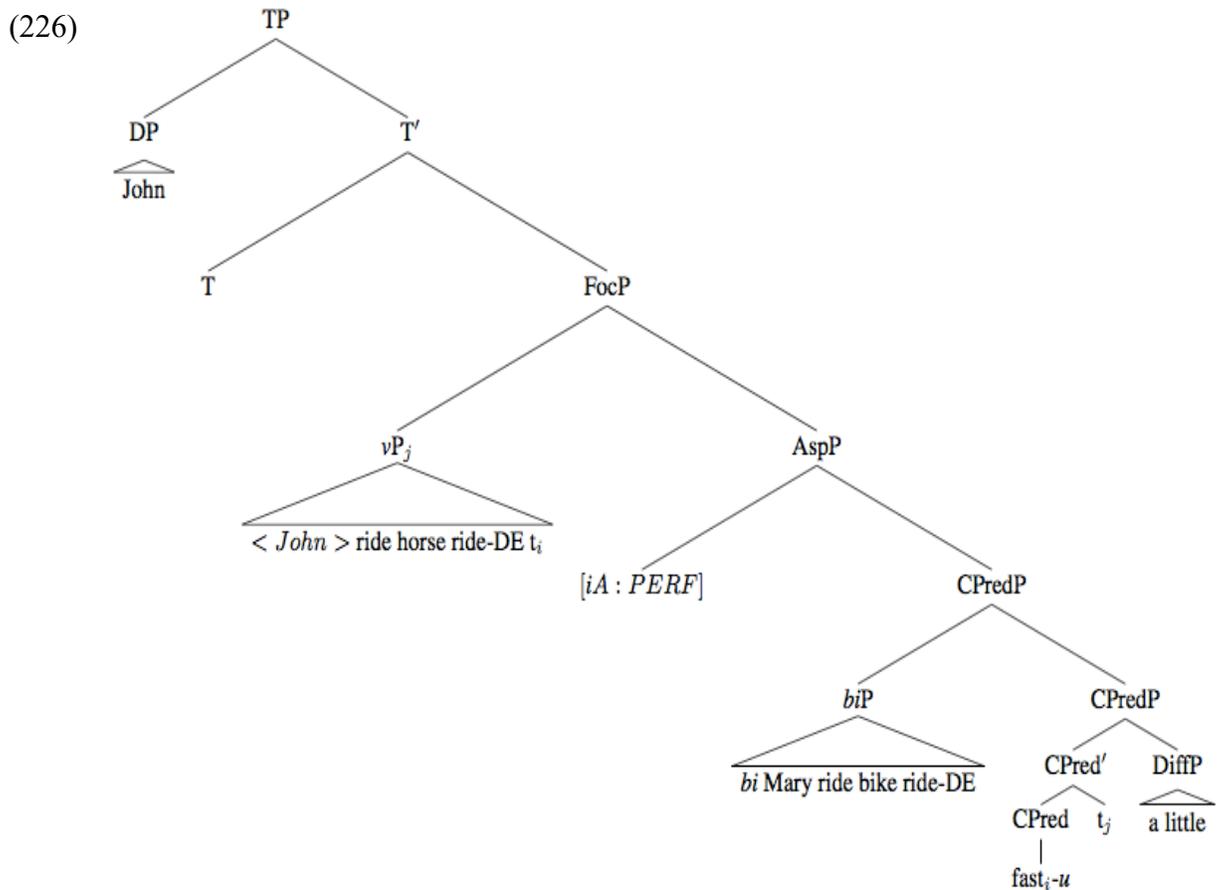
[40] Consider another example involving verb-copy constructions:
(i) a. Yuehan   qi   ma   qi-de   bi   Mali   qi   ma   qi-de   kuai   yixie.
      John   ride   horse ride-DE   BI   Mary   ride   horse   ride-DE fast   a little
      "John rides horses a little faster than Mary does."
    b. [Yuehan ~~qi~~   ~~ma~~   ~~qi-de~~] bi [Mali   qi   ma   qi-de]   kuai   yixie.
    c. [Yuehan   qi   ma   ~~qi-de~~] bi [Mali   qi   ma   qi-de]   kuai   yixie.
    d. [Yuehan   qi   ma   ~~qi-de~~] bi [Mali   qi   ma   ~~qi-de~~] kuai   yixie.
    e. [Yuehan   qi   ma   qi-de]   bi [Mali   ~~qi~~   ~~ma~~   ~~qi-de~~] kuai   yixie.
Based on (b-e), it can be discerned that the example (a) may appear in different surface forms. Thus, it does not undermine the assumption made in Chapter 3 that constituents in the compared phrase and the standard phrase respectively are parallel to each other in terms of syntax, semantics and category. Interested readers are referred to Su (2012) for a detailed analysis.

Let's look at the main structure first. As proposed in Chapter 4, there is a projection of a Comparison Predicate Phrase (CPredP) in Chinese comparatives, following Bowers (1993, 2001) and Baker (2003), the head of which names the dimension of comparison. Hence, *kuai* (fast) undergoes movement from its original position in *v*P to the head of CPredP. Since the comparison predicate is gradable, either a verb or an adjective, having a degree argument that needs to be θ-bound (Liu, 2010), *bi*-phrases or differential phrases denote a degree argument that can bind that degree argument denoted by the head of CPredP locally (cf. Creswell, 1977; von Stechow, 1984; Kennedy & McNally, 2005). This explains why *bi*-phrases and differential phrases are both in [Spec, CPredP]. Due to the parallelism requirement, the presence of *bi*-phrases in the structure is licensed by two conditions: a constituent or constituents compatible with it in terms of syntax, semantics and category while also establishing a contrastive relation, with it. This motivates movement of the remnant *v*P to [Spec, FocP] after the extraction of the comparison predicate. The internal structure of the remnant *v*P is the same as the structure in (224). Also note that the presence of differential phrases guarantees the completeness of comparing events (Liu, 2005). Thus, there is an aspect marker, which is covert in this case, attached to the head of CPredP. If there is no differential phrase, the head of AspP would denote a neutral aspect – [*i*A:NEUTRAL] (Grano, 2013).

The *bi*-phrase part of (226) is also a verb-copy construction, due to the parallelism requirement, whose basic structure is referred to (224). What concerns us here is my previous assumption in Chapter 3 about the complement of the morpheme *bi*, which is a TP with a defective T, having the property of causing the subject to raise to [Spec, TP], but not licensing the Agree relation with the predicate. In order to save PF from crashing, it is obligatory to delete as small a constituent as possible, but enough to avoid grammatical violation, following *rescue-by-PF-deletion* mechanism (Bošković, 2011), as represented in (227).

(227)

biP
bi TP
DP — Mary
T′
T [−finite]
vP
DP < Mary >
v′
v — V — ride, v
VP
DP — bike
V′
V — ride
deP
de — DE
SC
DP < bike >
AP — d-fast
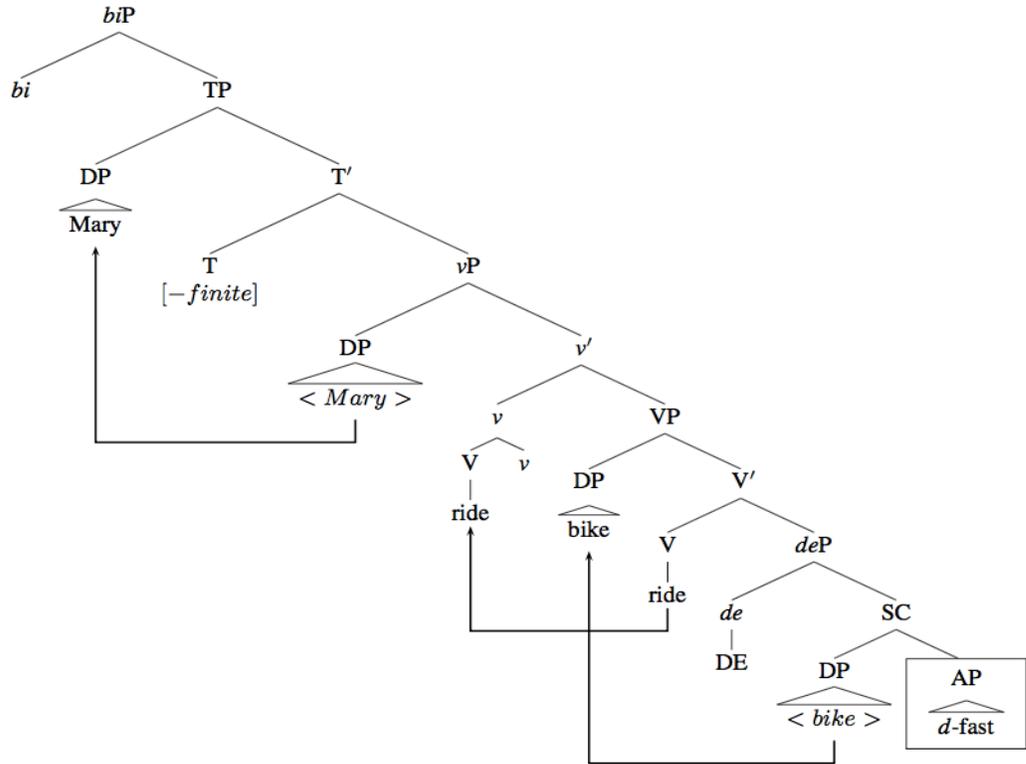
In this case, the overt d-*fast* has to be deleted, which is shown by putting a frame around its projection in (227), to save the structure from crashing as it cannot be licensed by the defective T having a feature [− finite].

5.3.3. Legitimizing RM in Chinese 'Clausal' *bi*-Comparatives

According to the structure in (226), the derivation squares well with the general configuration of Remnant Movement (RM) illustrated in (188): the comparison predicate moves out of *v*P, followed by movement of the remnant *v*P with a trace of the comparison predicate in it. In this section, Müller's (2015) derivational approach to remnant movement configuration (or α-over-β configuration) is adopted to legitimize the structure in (226) that is assigned to Chinese 'clausal' *bi*-comparatives.

In Müller (2015:69-70), three important concepts are proposed to account for the legitimacy of RM following a local derivational approach, which are defined in (228).

(228) a. **Contamination:**

Movement of β from a position within α to a position outside of α values a movement-related feature γ on α with β's index.

b. **Decontamination**:

Movement of β to a criterial position deletes β's index on all movement-related features of items that c-command it.

c. **Index Filter**

A movement-related feature (like [wh], [top]) must not have an index as (part of) its value in a criterial position.

The fundamental idea in Müller (2015) is that extracting β out of α would contaminate α since it provides a defective value for α's movement-related features, such as [wh] and [top]. This defective value is unproblematic as long as a criterial position is not reached, but may lead to derivational crash if it is not removed. The moved β can decontaminate α by removing this defective value when it reaches its own criterial position under c-command. Only under this circumstance, movement of the remnant α to its criterial position is legitimate.

(229)
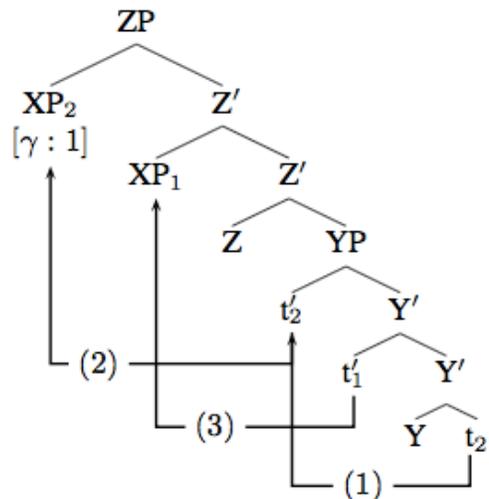
In the first step, XP_1 (β) moves out of XP_2 (α) to [Spec, YP], as shown by t_1', and this movement now contaminates XP_2 by valuing X_2's (the head of XP_2) movement-related feature

(γ) with XP$_1$'s index, represented as [γ:1]. Next, XP$_2$ undergoes intermediate movement to [Spec, YP] and [Spec, ZP], as shown by (1) and (2) respectively[41]. When XP$_1$ moves to [Spec, ZP], if it is its criterial position, as shown by (3), XP$_1$ decontaminates XP$_2$ by removing its index from X$_2$'s movement-related feature since it is c-commanded by XP$_2$. At this point of derivation, XP$_2$ is able to target its criterial position in accordance with the **Index Filter**.

According to Müller (2015), the structure in (229) applies to the prototypical situation where both XP$_1$ and XP$_2$ undergo two steps of intermediate movement. One possible case[42] under the prototypical configuration that concerns us here is that extraction of XP$_1$ to [Spec, YP] is a criterial movement, and XP$_2$ undergoes intermediate movement to a higher position where it c-commands XP$_1$. Then, the defective value on XP$_2$ can be deleted, and the derivation in this case is legitimate. Following this possibility, I propose that, in Chinese 'clausal' *bi*-comparatives, as in (226), after the extraction of the comparison predicate to the head of CPredP, which is a criterial movement, the remnant *v*P, contaminated and then bearing a defective value, moves to the edge of CPredP where it c-commands the head of CPredP. Under this circumstance, the defective value on the movement-related feature of the remnant *v*P, i.e., [+contrast] (represented by γ), can be removed by criterial movement of the comparison predicate. Then, the remnant *v*P is free to target its criterial position, i.e., [Spec, FocP], which is schematized in (230), based on the example in (220b).

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[41] In the case of multiple movement to phase edges, Müller (2015:71) proposes the following assumptions about the order of operations:
    a.   If α c-commands β in the pre-movement structure, then α moves first and β moves after that, to a lower specifier.
    b.   If α does not c-commands β in the pre-movement structure, the order is not fixed; the second item that moves ends up in a higher specifier.
[42] There are still two possible cases concerning the criterial movement of XP$_1$, XP$_2$ or both XP$_1$ and XP$_2$, and interested readers are referred to Müller (2015) for a detailed analysis.

(230)
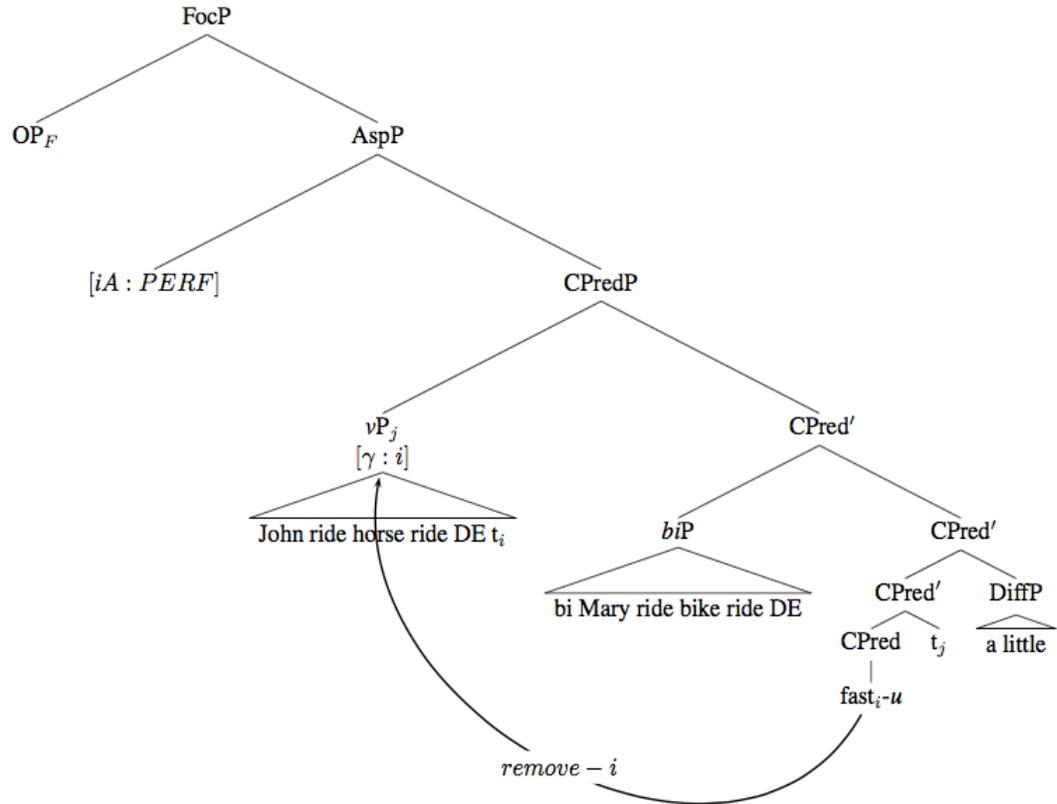
Following Citko (2014) that Predication Phrase is a phase, I extend her idea and further contend that Comparison Predication Phrase (CPredP) in Chinese comparatives is also a phase, which means that movements out of CPredP have to proceed through the edge of CPredP. In (230), when the comparison predicate moves to its criterial position, i.e., the head of CPredP, the remnant vP undergoes a step of intermediate movement to [Spec, CPredP] – the edge of CPredP where it can be decontaminated, under c-command. In other words, $fast_i$ removes the index i from the remnant vP's movement-related feature in line with the **Decontamination** and the **Index Filter**, as shown by the arrow.

Adopting Müller's (2015) derivational approach to remnant movement helps legitimize this configuration in Chinese 'clausal' *bi*-comparatives. What happens next is to identify whether RM in this case is in accordance with some constraints illustrated before. One constraint on remnant movement is **'Just Outside' Constraint (JOC)**, proposed by Hunter (2012).

(231) **The 'Just Outside' Constraint (JOC)**

Remnant movement is permitted only if the base position of the remnant is in the same maximal projection as the target position of the extracted sub-constituent.

In (230), first, the comparison predicate *kuai* (fast) is extracted out of *v*P to the head of CPredP. Then, as shown by (230), the remnant *v*P undergoes intermediate movement to [Spec, CPredP], which seems to violate JOC since *v*P is traditionally regarded as a maximal projection. Yet, as pointed out by Hunter (2010), each maximal projection corresponds to one phrase where other constituents may be adjoined to or be arguments of, suggesting that maximal projection is more appropriately taken to be an interpretive cycle. Take (230) as an example, following the lines of an extended projection by Grimshaw (2005), interpretive cycle by Hunter (2010), and the phasehood of Predication Phrase by Citko (2014), it is not unreasonable to argue that CPredP is a maximal projection, which indicates that the target position of the comparison predicate and the base position of the remnant are indeed in the same maximal projection. If this is on the right track, remnant movement configuration proposed for Chinese 'clausal' *bi*-comparatives complies with the JOC, which is another piece of evidence buttressing the structure in (226).

5.4. An Asymmetry in Chinese 'Clausal' *bi*-Comparatives

As mentioned before, *bi*-phrases in Chinese 'clausal' *bi*-comparatives equally display structural flexibility when co-occurring with modals, as exemplified in (232).

(232) a. Yuehan **yinggai** qi   ma   bi   Mali   qi   che

       John   should   ride   horse   BI   Mary   ride   bike

      qi-de   kuai   yixie.

      ride-DE   fast   a little

      "John rides horses a little faster than Mary rides bikes."

b. Yuehan   qi   ma   **yinggai**   bi   Mali   qi   che

　　 John   ride   horse   should   BI   Mary   ride   bike

　 qi-de   kuai   yixie.

　 ride-DE   fast   a little

"John rides horses a little faster than Mary rides bikes."

c. Yuehan   qi   ma   bi   Mali   qi   che   qi   de

　　 John   ride   horse   BI   Mary   ride   bike   ride   DE

　 yinggai   kuai   yixie.

　 should   fast   a little

"John rides horses a little faster than Mary rides bikes."

All these examples in (232) clearly demonstrate that the epistemic expression *yinggai* (should) may occupy various positions: preceding the compared phrase – (232a), preceding the *bi*-phrase – (232b), and following the *bi*-phrase – (232c). In line with the architecture of the domain below IP and above *v*P area proposed in 4.3., take (232a) as an example, Chinese 'clausal' *bi*-comparatives have at least the following projections:

(233) TP > ModP > FocP > AspP > CPredP > *v*P

Following the arguments made in the Section 4.4., *yinggai* (should), as an epistemic modal, bears a [*u*Comp] feature. In terms of the structural flexibility of *bi*-phrases in Chinese 'phrasal' *bi*-comparatives, when there is a differential phrase, *bi*-phrases, bearing a [Comp] feature, can optionally move to [Spec, ModP] to check off the uninterpretable feature [*u*Comp] on the modal. However, this argument seems to be unsuitable for Chinese 'clausal' *bi*-comparatives in that it would predict (234) to be grammatical.

(234) * Yuehan   bi   Mali   qi   che   qi   de   **yinggai**   qi   ma

　　　　 John   BI   Mary   ride   bike   ride   DE   should   ride   horse

　　 kuai   yixie.

　　 fast   a little

In this example, movement of the *bi*-phrase to [Spec, ModP] unexpectedly gives rise to ungrammaticality.

This may constitute a challenge to the arguments for the asymmetry in Chinese 'phrasal' *bi*-comparatives in Chapter 4. In order to explicate such a dilemma, I will adopt the projection of InTopP (i.e., internal topic phrase, projected by a covert head - OP_Top), as proposed by Paul (2002, 2005, 2015), while maintaining the arguments made in the Section 4.4. Although Chinese has the canonical word order of SVO, object preposing, which is very common in Chinese, leads to an alternative order of SOV (Chen, et al., 2016). Consider (235) below.

(235) a. Yuehan   [**zhongyao**]_InTop   yiqian   yong-guo.

        John   Chinese-medicine   before   use-ASP

        "John has used Chinese medicine before."

    b. Yuehan   [**cai**]_InTop   chi-le,   [**fan**]_InTop   hai   mei   chi.

        John   vegetables   eat-ASP   rice   yet   not   eat

        "John has already eaten the vegetables, but not the rice."

    c. Yuehan   shi   zai   [beijing]_F   luyou,   bu   shi   zai   [xianggang]_F.

        John   is   at   Beijing   travel   not   is   at   Hong Kong

        "John is travelling at Beijing, not at Hong Kong."

In sentences like (235a), adapted from Paul (2005), the object, *zhongyao* (Chinese medicine), is preposed to a position preceded by the subject. Following Paul (2005, 2015), object preposing and focalization in Chinese involve separate constructions with distinct syntactic and semantic properties, which leads to the proposal that preposed objects in Chinese are sentential internal topics. Yet, these two constructions share the same property: both foci and topics can be used contrastively. Both preposed objects in (235b), namely *cai* (vegetables) and *fan* (rice) respectively, are in a contrastive relation, marked by […]_InTop, which resembles the focalized constituents in (235c), called 'bare *shi* focus construction' (Paul & Whitman, 2008; Hole, 2012). The hierarchy of projections concerning internal topics and focalized constituents

that holds for Chinese, according to Paul (2005, 2015), is 'InToP > FocP', as attested by (236).

(236) a. Yuehan   [wufan]$_{InTop}$ shi   zai   [shitang]$_F$ chi-de[43],

     John   lunch   is   at   canteen   eat-DE

     [wancan]$_{InTop}$ shi   zai   [jiali]$_F$ chi-de.

     dinner   is   at   home   eat-DE

     "John had lunch at canteen, and had dinner at home."

     b. * Yuehan   shi   zai   [shitang]$_F$ [wufan]$_{InTop}$ chi-de,

     John   is   at   canteen   lunch   eat-DE

     shi   zai   [jiali]$_F$ [wancan]$_{InTop}$ chi-de.

     is   at   home   dinner   eat-DE

It goes beyond of the scope of this dissertation to have a detailed discussion on how the hierarchy of 'InToP > FocP' is obtained in Chinese. What concerns us here is the contrastive use of topics, which has been validated cross-linguistically. Neeleman et al. (2009:1) motivate the following four-way typology concerning the contrastive elements based on Dutch, Japanese, and Russian:

(237)   **Four-way typology of contrastive elements**

	Topic	**Focus**
Non-contrastive	aboutness topic [topic]	new information focus [focus]
Contrastive	contrastive topic [topic, contrast]	contrastive focus [focus, contrast]

Leaving aside other aspects of information structure, one important fact from the table is that both topic and focus can be interpreted contrastively. As argued previously, compared constituents in Chinese comparatives are in a contrastive relationship. This means that

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[43] According to Hole (2012), the canonical focus cleft construction of Chinese is the '*shi ...de*', as in the following:
(i) Yuehan   shi   zai   beijing   luyou   de.
     John   is   at   Beijing   travel   DE
     "John is travelling in Beijing."
(ii) TOPIC (shi) [[XP]$_{FocP}$ ...]$_{COMMNET}$ de

constituents in the compared phrase and the standard phrase respectively can not only be contrastive foci, but also be contrastive topics. It is then not unreasonable to propose that the left-periphery of Chinese 'clausal' *bi*-comparatives includes at least the projections in (238), following Paul (2002, 2005, 2015) and Neeleman et al. (2009).

(238) TP > InTopP > FocP > AspP > CPredP > *v*P

Another problem that needs to be dealt with is how to fit the position of the epistemic expression *yinggai* (should) with the overall picture in (238). Let's take (236a) as an example if a modal is involved.

(239) a. * Yuehan   **yinggai**   [wufan]**InTop**   shi   zai   [shitang]**F**   chi-de,

John   should   lunch   is   at   canteen   eat-DE

[wancan]**InToP**   shi   zai   [jiali]**F**   chi-de[44].

dinner   is   at   home   eat-DE

"John may have had lunch at canteen, and had dinner at home."

b. Yuehan   [wufan]**InTop**   **yinggai**   shi   zai   [shitang]**F**   chi-de,

John   lunch   should   is   at   canteen   eat-DE

[wancan]**InTop**   shi   zai   [jiali]**F**   chi-de.

dinner   is   at   home   eat-DE

"John may have had lunch at canteen, and had dinner at home."

c. * Yuehan   [wufan]**InTop**   shi   zai   [shitang]**F**   **yinggai**   chi-de,

John   lunch   is   at   canteen   should   eat-DE

[wancan]**InTop**   shi   zai   [jiali]**F**   chi-de.

dinner   is   at   home   eat-DE

"John may have had lunch at canteen, and had dinner at home."

The examples in (239) demonstrate that the epistemic expression *yinggai* (should) can only be in a position between InTopP and FocP, as in (239b); otherwise, ungrammaticality would

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[44] (239a) can be grammatical if *yinggai* (should) denotes a deontic meaning. Interested readers are referred to Ren (2011) for a detailed analysis of the modal *yinggai*. This is another issue that will not be taken up in this dissertation.

follow, either in a position higher than that of InTopP – (239a) or lower than that of FocP – (239c). Thus, when the epistemic expression *should* is involved, the clause-internal left periphery of Chinese 'clausal' *bi*-comparatives includes the projections in the following:

(240) TP > InTopP > ModP > FocP > AspP > CPredP > vP

Based on the architecture in (240), I propose that, when remnant *v*Ps (i.e., after the extraction of the comparison predicate to the head of CPredP) move to the edge of CPredP where they can be decontaminated, there are two criterial positions for the decontaminated *v*Ps, namely [Spec, FocP] and [Spec, InTopP]. Let's take (232a) as an example to illustrate this.

(241)
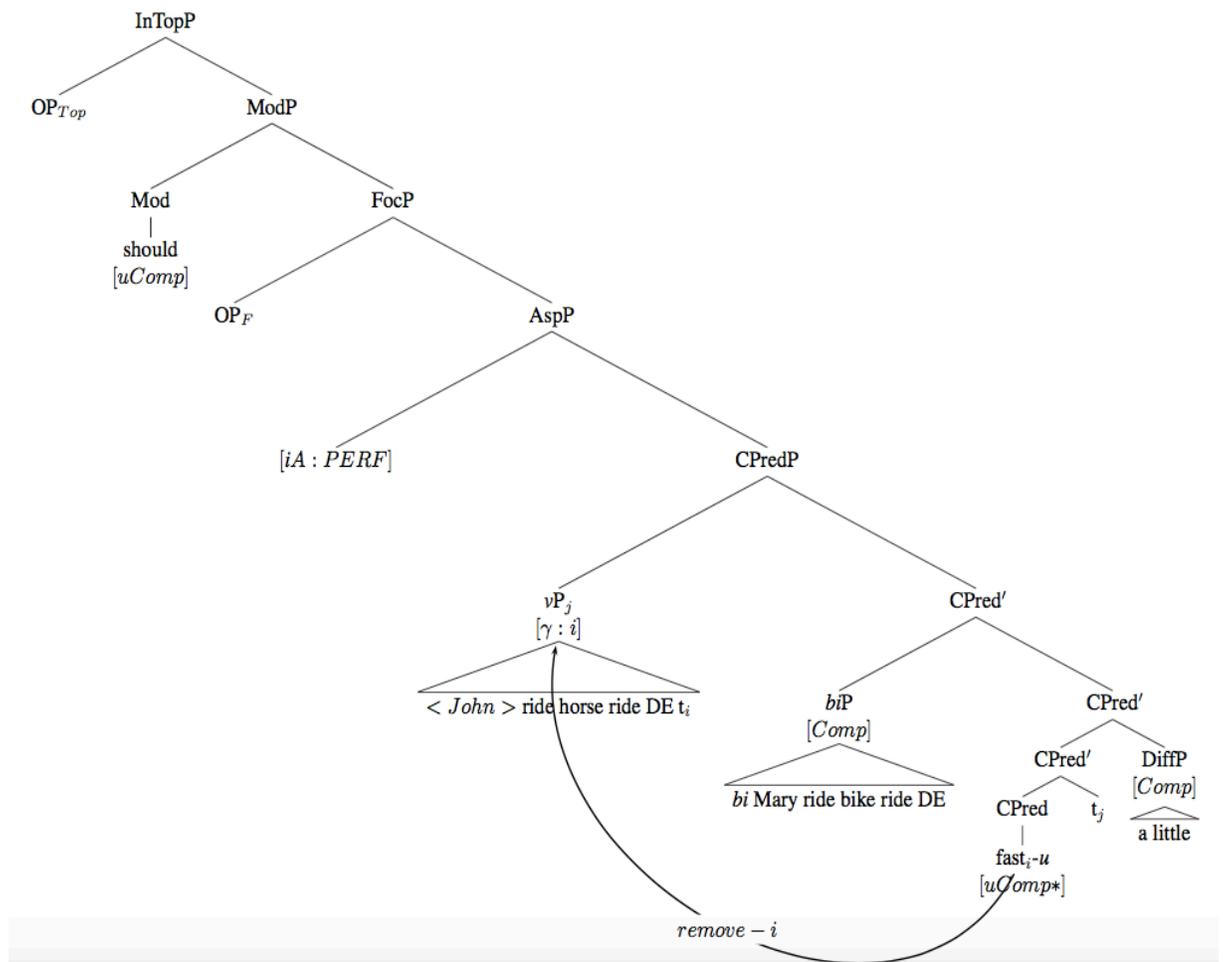
According to the assumption in Chapter 4, the head of CPredP has a strong unvalued feature [*u*Comp*], which is valued and deleted by the valued feature [Comp] on *bi*-phrases or

differential phrases or by both simultaneously. When co-occurring with a gradable modal that also bears an unvalued feature [uComp], there are two choices for the *bi*-phrase: either it stays *in-situ* and enters into an Agree relation with the head of ModP or it overtly moves to [Spec, ModP] where it values that unvalued feature.

In (241)[45], after the remnant vP$_j$ is decontaminated, there are three scenarios: (i) the remnant vP$_j$ may move to its first criterial position – [Spec, FocP], resulting in the word order in (232a); (ii) the remnant vP$_j$ may successively move to its second criterial position – [Spec, InTopP], giving rise to the word order in (232b); (iii) when the remnant vP$_j$ reaches its second criterial position, the *bi*-phrase overtly moves to [Spec, ModP], deriving the word order in (232c). In scenarios (i) and (ii), the *bi*-phrase stays *in-situ* and enters into an Agree relation with the modal; yet in the scenario (iii), the *bi*-phrase values and deletes the unvalued feature on the modal through overt movement since the degree argument of the comparison predicate has already been θ-bound by the differential phrase locally. Movement of the remnant vP is attributed to the need of establishing a contrastive relation for compared constituents in the compared phrase and standard phrase. In other words, the motivation for fronting contrastive foci or contrastive topics is to create a syntactic constituent in surface syntax that can mark the domain of contrast (Neeleman et al., 2009; Neeleman & Vermeulen, 2012; Szendrői, 2017). Overall, by adopting the projection of InTopP in Chinese and maintaining arguments regarding the co-occurrence of gradable modals and *bi*-phrases in Chapter 4, the asymmetry exemplified by (232) can be well explained.

5.5. The Obviation of the Condition C Effect

It has been argued that a DegP (e.g., Kennedy, 1999; Heim, 2000) in English comparatives may undergo quantifier raising (QR) since it can be a quantificational argument of degree predicates. One important piece of evidence supporting covert movement of DegP comes from

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[45] Only the major part of the internal structure for (232a) is shown since only this part is relevant to the analysis made here.

the cancellation of the Condition C effect. See (242), cited from Bhatt & Pencheva (2004).

(242) I will tell him$_i$ a sillier rumor (about Ann) tomorrow than Mary told John$_i$.

According to the Condition C of Binding Theory (Chomsky, 1981), *John*, as an R-expression, should be free. Yet, *John* in this case is bound by *him*, which indicates that (242) is expected to be ungrammatical; given its grammaticality, this expectation is obviously not borne out.

According to Bhatt & Pencheva (2004), the comparative morpheme *-er* is the head of DegP, acting as a sister to the gradable predicate at the initial step of derivation. As a quantificational argument of the degree predicate, DegP undergoes QR and covertly right-adjoins to the maximal projection which is also its scope position. Later in the derivation, the degree clause (*than*-clause) undergoes late merge becoming a sister to the head of DegP. One prominent property of *-er* is that it is pronounced in its base position, but is interpreted in its scope position. Adopting this line of argument, the obviation of the Condition C effect in (242) can be schematized as follows:

(243) I will [[$_{DegP}$ <er> than Mary told John$_i$] [$_{vP}$ tell him$_i$ a [$_{AP}$ [$_{DegP}$ *er*] silly] rumor (about Ann) tomorrow]].

After the degree clause *than Mary told John* undergoes late merge as the argument of DegP headed by *-er*, they two form a constituent functioning like a generalized quantifier over degree and undergoing QR at LF. Under this circumstance, *John* is no longer c-commanded by *him* at LF, i.e., *him* does not bind *John*, and the Condition C effect is therefore obviated.

Likewise, Chinese comparatives also exhibit the obviation of the Condition C effect, as noted by Liu (2014). Consider the example in (244).

(244) wo   jiao   ta$_{i/j}$ [bi   Yuehan$_i$ jiao   wo]   duo   zuo-le   san-jian   shi[46].

   I   require   him   BI   John   require   me   much   do-ASP   three-CL   work

   "I require him$_{i/j}$ to do three more works than John$_i$ requires me to do."

---

[46] According to my informants, the pronoun *ta* (him) can refer to *Yuehan* (John) or someone else under the conversational context.

Examples like (244) are called Differential Verbal Comparatives (Li, 2013), involving a non-gradable comparison predicate that can be coerced into being gradable while modified by a degree adverb. Generally, when a predicate in Chinese comparatives is non-gradable, the ill-formedness would follow. In this case, *zuo* (do), as a comparison predicate, is not gradable, but is modified by the degree adverb *duo* (much) that denotes gradability, and hence the structure is remedied. The selectional restrictions between degree adverbs and non-gradable predicates will not be tackled in this paper.

Before we proceed, a word is in order here regarding the basic structure of the root clause in (244), which is a control structure in Chinese. Let's consider the following examples first.

(245) a. wo   jiao   ta   zuo-*le*   san-jian   shi.

     I   require   him   do-ASP   three-CL   work

   "I require him to do three pieces of works."

    b. * wo   jiao-*le*   ta   zuo   san-jian   shi.

     I   require-ASP   him   do   three-CL   work

   "I require him to do three pieces of works."

    c. * wo   jiao-*le*   ta   zuo-*le*   san-jian   shi.

     I   require-ASP   him   do-ASP   three-CL   work

   "I require him to do three pieces of works."

When the aspect marker *-le* is embedded in a controlled complement, i.e., (245a), it is construed with the matrix clause; whereas, if *-le* is attached to verbs in the matrix clause, or attached to verbs both in the matrix and embedded clause, as in (245b) and (245c) respectively, the ungrammaticality would immediately follow. The contrast between (245a) and (245b-c) motivates the proposal made by Grano (2013:21): in Mandarin, an aspect marker in a controlled complement clause – when grammatical at all – instantiates matrix aspect. This further leads to his another argument: control predicates in Chinese take *v*P complements[47],

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[47] According to Grano (2013), controlled complements in Manradrin are *v*Ps that do not project AspP, whereas non-control clause-embedding predicates take a CP complement. Interested readers are referred to Grano (2013) for a detailed analysis.

which will be adopted for the following analyses.

As reviewed in Chapter 2, previous studies (e.g., Liu, 1996, 2011; Lin, 2009) usually treat *bi*-phrases as pre-predicate adjuncts that left-adjoin to main structures in the syntax. Take (244) as an example, in this case, *zuo* (do), as the comparison predicate, projects a *v*P as the complement of the predicate in the matrix clause – *jiao* (require). Following Grano's (2013) argument, the *v*P structure for the root clause in (244) is represented in (246).

(246)
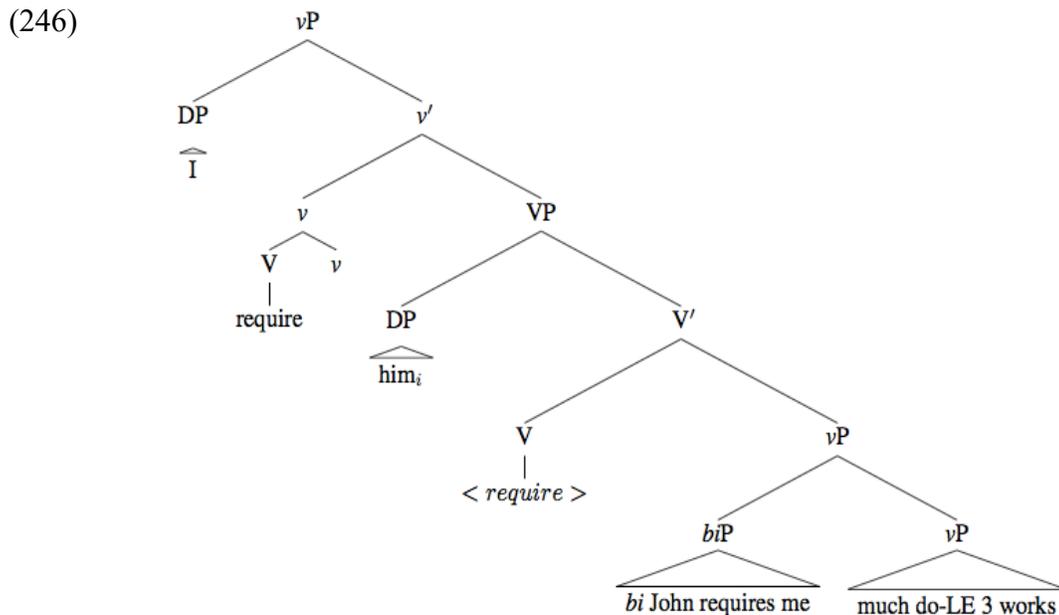
In (246), when the *bi*-phrase left-adjoins to *v*P as a pre-predicate adjunct, as suggested by Liu (1996, 2011) and Lin (2009), *John* is always c-commanded by *him*, which violates the Condition C of Binding Theory. We then should expect (244) to be ungrammatical; however, its grammaticality suggests that this prediction is not borne out, further indicating that the traditional approach is untenable here.

Another way to tackle this problem is to adopt QR along the line of arguments by Bhatt & Pencheva (2004). By drawing parallelism between Chinese comparatives and English

comparatives, Liu (2018) proposes that there is a covert comparative morpheme, *bijiao*[48], in Chinese *bi*-comparatives, projecting a DegP in the syntax. If this is the case, we may predict that this morpheme forms a constituent with the *bi*-phrase, which undergoes quantifier raising.

(247) wo　[[DegP *bijiao*　[bi Yuehan$_i$　jiao　wo]$_k$] [vP jiao　ta$_{i/j}$　t$_k$　duo　zuo-le

　　　I　　　　more　BI John　require　me　require him　　much　do-ASP

　　san-jian　shi]].

　　three-CL　work

The constituent formed by the comparative morpheme *bijiao* and the *bi*-phrase, as a quantified expression, functions like a generalized quantifier over degree that undergoes QR, as in (247). Then it follows that the Condition C effect in (244) is absent. However, two issues arising from this analysis may render this approach problematic. First, as argued in Chapter 4, the assumption that DegPs exist in Chinese comparatives is flawed, mainly due to the fact that Chinese comparatives do not have an overt comparative morpheme filling up the position of the head of DegP and saturating the degree argument denoted by gradable predicates. This leads to a problem that needs attention: what are the scopal elements in Chinese *bi*-comparatives like (220b) and (244), and this may further suggest that there is no empirical evidence supporting the constituency of the comparative morpheme and the *bi*-phrase, especially in terms of the merging site of degree clause. Then, according to Fox's (1995) theory on the economy of QR, there are two possible landing sites for QR movement: one is longer than the other; the longer one exists only if it has an interpretation different from that

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[48] Liu (2018:76) examines the following examples:

(i)　　Yuehan　bijiao　gao.
　　　John　　more　tall
　　　"John is taller than somebody (but it is not necessary for John and that person to be tall)."

(ii)　　Yuehan　bi　Mali　gao.
　　　John　　BI　Mary　tall
　　　"John is taller than Mary."

(iii)　　Yuehan　bi　Mali　(*bijiao)　gao.
　　　John　　BI　Mary　more　tall
　　　Intended meaning: "John is taller than somebody, but it is not necessary for John and that person to be tall."

The degree adverb *bijiao* (more) is regarded as an overt comparative morpheme here that denotes an explicit comparison meaning. Yet, an overt standard comparison is incompatible with *bijiao*, as in (iii). Thus, it motivates Liu's (2018:77) proposal that the covert comparative morpheme BIJIAO (more) occurs in a comparative constructions where the standard of comparsion is introduced by the morpheme *bi*, as in (ii); the overt comparative morpheme *bijiao* (more) occurs in a construction where there is no overt standard of comparison, as in (i). Interested readers are referred to Liu (2018) for a detailed analysis regarding why he treats the degree adverb *bijiao* as a comparative morpheme.

derived by the shorter one. However, if we examine the examples in (210) in which the *bi*-phrase appears in different positions, there exists only one interpretation. That *bi*-phrases covertly move to [Spec, *v*P] in the main structure is obviously not subject to the condition proposed by Fox (1995). Thus, the assumption that *bi*-phrases undergo quantifier raising at LF appears to be theoretically insufficient.

Given the problems discussed above, I adopt RM analysis proposed for Chinese 'clausal' *bi*-comparatives to explain the obviation of the Condition C effect argued by Liu (2014). In this case, *jiao* (require) is a control predicate taking a *v*P as its complement (Grano, 2013), within which *zuo* (do), as the comparison predicate, undergoes movement to the head of CPredP naming the dimension of comparison. Based on the basic structure of CPredP proposed for Chinese *bi*-comparatives in Chapter 4, the *bi*-phrase is in [Spec, CPredP]. In line with Remnant Movement proposed for Chinese 'clausal' *bi*-comparatives in the Section 5.3., the structure assigned to (244) is shown in (248).

(248)

```
                          TP
                       /      \
                    DP          T′
                    |         /    \
                    I        T      InTopP
                           /          \
                      OP_Top           FocP
                                     /      \
                                  vP_k       AspP
                            /          \    /     \
                    < I > require him_i t_j  [iA : PERF]   CPredP
                                                         /        \
                                                      biP          CPredP
                                                  /        \      /      \
                                          bi John_i requires me  CPredP    DiffP
                                                              /      \        \
                                                           AdvP    CPred′    3 works
                                                           |      /    \
                                                         much  CPred   t_k
                                                                |
                                                             do_j-LE
```

153
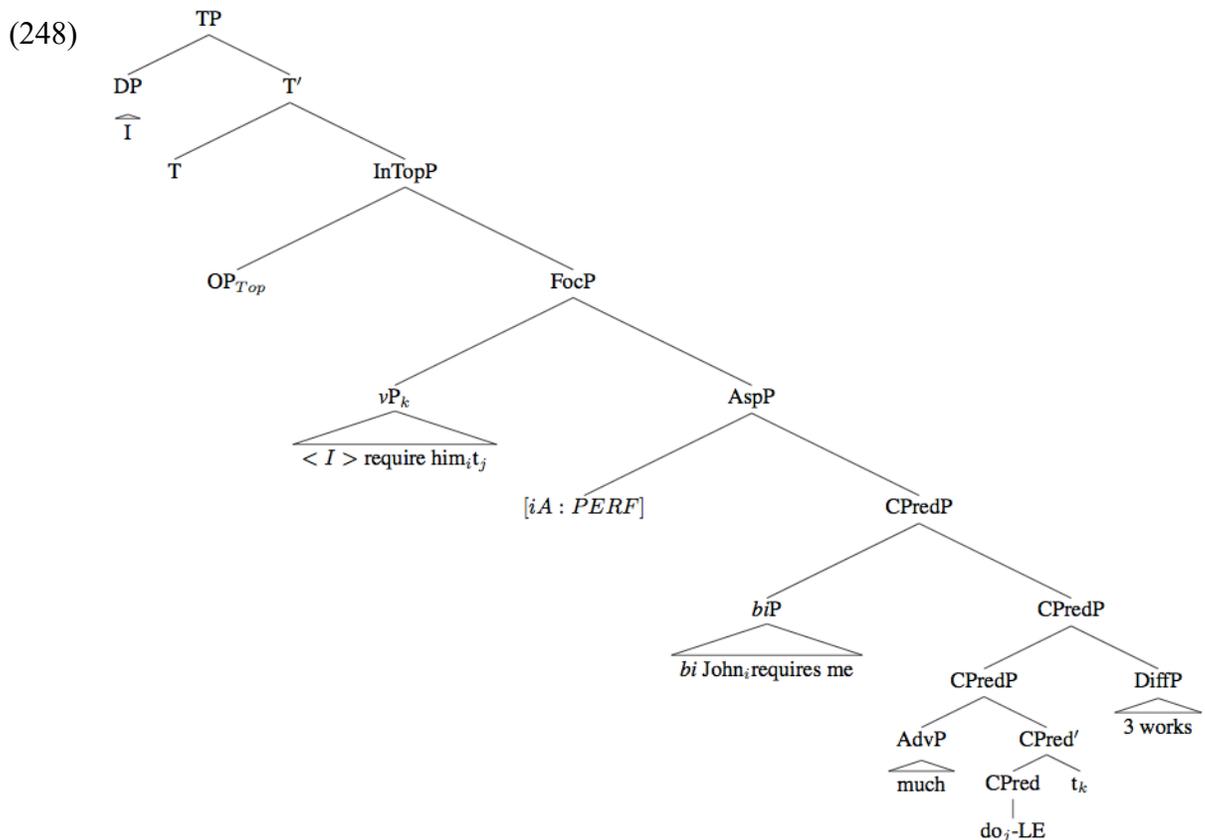
In terms of aspect markers in Chinese, following Grano (2013), the head of AspP has an interpretable feature, i.e., [*i*A:___] in this case, and enters into an Agree relation with the aspect marker that is base-generated to the verb. In (248), the head of AspP agrees with -*le* that is base-generated to *zuo* (do), indicating a perfective aspect – [*i*A: PERF]. In the pre-movement structure, i.e., *v*P is still the complement of the head of CPredP, *him* obviously does not c-command *John*. After the comparison predicate moves to its criterial position, i.e., the head of CPredP, the remnant *v*P undergoes movement to [Spec, FocP] or [Spec, InTopP] where it establishes a contrastive relationship with the *bi*-phrase[49]. When the remnant *v*P is in its criterial position, *him* still does not c-command *John*.

One issue needs to be clarified before concluding this section. It has been pointed out by my examiners that a key point about the Condition C violations assumes that there is a c-command relation between the compared DP and the base DP. According to many previous studies, such as Paul (1993), Liu (1996, 2011), Lin (2009), Su (2012), and Hsieh (2017), constituents in the standard phrase are c-commanded by its correlates in the compared phrase. This means that, in (244), *ta* (him) c-commands *Yuehan* (John), which is the reason why Liu (2014) maintains that there is a cancellation of the Condition C effect in Chinese *bi*-comparatives. In my analysis presented above, *Yuehan* (John) is not c-commanded by *ta* (him), either in the pre-movement or in the post-movement structure. One advantage of my argument above is that it does not resort to covert movement of quantified expressions at LF, which may not be theoretically and empirically supported in Chinese. Therefore, I take it that implementing remnant movement analysis offers direct empirical evidence to explain the obviation of the Condition C effect in Chinese *bi*-comparatives noted by Liu (2014).

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[49] The underlying form of the *bi*-phrase in this example is as follows:
(i) bi   Yuehan   jiao   wo   ~~zuo~~   *d*-~~jian~~   ~~shi~~.
     Bi   John   require   I   do   *d*-CL   work
Based on the Parallelism Requirement argued in Chapter 3, the *bi*-phrase at least has an instance of the comparison predicate – *zuo* (do). Yet, as argued before, the morpheme *bi* takes a non-finite clause as its complement, so *rescue-by-PF-deletion* mechanism is involved to save the structure from being crashed (Bošković, 2011), as shown by the strikethrough.

5.6. Summary

In this chapter, the internal structure and derivation of Chinese 'clausal' *bi*-comparatives are discussed. Based on the configurations of Remnant Movement originally proposed for German (e.g., Müller, 1998, 2015), I proposed that remnant *v*Ps in the matrix clause of Chinese 'clausal' *bi*-comparatives undergo movement, after the extraction of the comparison predicate to the head of CPredP, to a higher position to establish a contrastive relationship with *bi*-phrases, either as contrastive foci or contrastive topics. The motivation for this overt movement is to create a syntactic constituent in surface syntax that can mark the domain of contrast (Neeleman et al., 2009; Neeleman & Vermeulen, 2012; Szendrői, 2017). Arguments demonstrated above are instrumental in explaining several issues that have not been successfully tackled before, including an asymmetry concerning the co-occurrence of modals and *bi*-phrases, and the obviation of the Condition C effect noted by Liu (2014). Overall, the advantage of the analysis proposed in this chapter is that it can account for those previously unnoticed phenomena without resorting to Degree Phrase (DegP).

Chapter 6   Conclusion

One of the primary claims of this dissertation is that Chinese *bi*-comparatives project a Comparison Predication Phrase (CPredP) instead of a Degree Phrase (DegP). By investigating the comparative morpheme-based and the standard marker-based approach, I proposed that these two approaches obviously are not able to account for a range of phenomena satisfactorily, such as the optionality of differential phrases, an asymmetry regarding the co-occurrence of some modals and *bi*-phrases, and the obviation of the Condition C effect (Liu, 2014).

Among several possibilities of how these facts in Chinese *bi*-comparatives are explicated, I pursued an analysis that takes the information structure of Chinese into account, namely the projection of FocP and InTopP, as proposed by Paul (2002, 2005, 2015). I have shown that the proposal covers a range of empirical data of both 'phrasal' and 'clausal' *bi*-comparatives. In particular, the conclusion that the morpheme *bi* takes a non-finite clause as its complement receives a natural explanation while characterizing the asymmetry mentioned above, which further supports the proposal of CPredP.

Another primary claim of this dissertation is that Chinese 'clausal' *bi*-comparatives involve the configuration of Remnant Movement, as originally proposed for German. Following the parallelism requirement, the results of applying this configuration showed that the information structure of Chinese plays a vital role in the left periphery of Chinese *bi*-comparatives. In other words, compared constituents in compared phrases and standard phrases respectively need to establish a contrastive relationship in surface syntax, either as contrastive foci or contrastive topics, by overt movement (e.g., Neeleman, et al., 2009). This argument is a proof that the Condition C effect in Chinese *bi*-comparatives is obviated, as argued by Liu (2014).

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