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混合型分析下之漢語「比」字句研究

The logo of National Taiwan Normal University is a circular emblem with a stylized design. It features a central character '師' (Shi) in a yellow circle, surrounded by a purple and white geometric pattern. The text 'A Hybrid Analysis of Bi-Comparatives in Mandarin Chinese' is overlaid on the logo.

A Hybrid Analysis of *Bi*-Comparatives
in Mandarin Chinese

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摘要

本論文旨在研究漢語中的「比」字比較句。主要關注的是直接型分析 (DA) 和刪略型分析 (RA) 兩派別在分析「比」後組成成分之底層結構上的爭論。

直接型分析認為「比」後組成成分的底層結構正是我們在表面上所看到的。簡而言之，直接型分析不認為「比」字比較句中牽涉比較句刪略之運作，也就是說在直接型分析角度之下，「比」字比較句的底層結構中只有一個比較謂語的標記。然而，本文發現直接型分析無法解釋某些底層結構需要包含兩個比較謂語標記之「比」字比較句，例如帶有前置賓語、長被字句、把字句以及動詞複製結構之「比」字比較句。

另一方面，刪略型分析則認為「比」後組成成分含有比其表面結構更豐富的底層結構。換句話說，刪略型分析認定「比」字比較句刪減了「比」後組成成分內部的比較謂語。然而，正如 Xiang (2003) 所指出的，刪略型分析遇到了三個問題：「比」字比較句缺乏次比較結構，「比」字比較句缺乏嵌入式比較標準，以及「比」字比較句中「都」的分佈。儘管 Erlewine (2017) 和 Hsieh (2017) 都在他們的文章中為這三個問題提供了一些解決方案，但本文發現他們的分析也存在一些尚待解決的問題。

此外，Liu (2011) 更提出了一種混合型分析，他主張漢語有兩種類型的「比」字比較句：短語型「比」字比較句和子句型「比」字比較句。Liu (2011) 提供了一些標準來區分這兩種類型的「比」字比較句，但本文認為他的分類標準需要進行一些修改。

本論文提出一種修正版混合型分析，其中包含兩個主要論點：首先，本文認為兩種「比」字比較句之分類取決於「比」後組成成分是否形成一個完整的成分；其次，在修正版混合型分析中，「比」字比較句缺乏嵌入式比較標準以及「比」字比較句中「都」的分佈這兩個問題可以分別利用「比」字比較句無嵌入約束和句法上的疊詞脫落來解釋。

關鍵詞：「比」字比較句，直接型分析，刪略型分析，混合型分析，「比」字比較句

無嵌入約束，句法疊詞脫落

ABSTRACT

The thesis aims to investigate the *bi*-comparatives in Mandarin. The main focus is on the debate between the Direct Analysis (DA) and the Reduction Analysis (RA) in terms of the analysis of the underlying structure of the post-*bi* constituent.

On the one hand, the Direct Analysis claims that the underlying structure of the post-*bi* constituent is just what we see on the surface. In short, DA does not assume the operation of comparative deletion in a *bi*-comparative, which means that under DA, there is only one token of the predicate of comparison in the underlying structure. However, it is found that DA fails to account for certain cases of *bi*-comparatives which need two tokens of the comparison predicate in the underlying structure, such as *bi*-comparatives with preposed objects, *bei* long passives, *ba* disposal constructions, and verb copying constructions.

On the other hand, the Reduction Analysis argues that the post-*bi* constituent involves a structure richer than its surface structure. In other words, RA assumes the operation of comparative deletion, which elides the predicate of comparison inside the post-*bi* constituents. However, as pointed out in Xiang (2003), RA encounters three problems: the lack of subcomparatives, the lack of embedded standards, and the distribution of *dou* in *bi*-comparatives. Although Erlewine (2017) and Hsieh (2017) offer some solutions to the three problems in their proposal, this thesis finds that their analyses are not without problem.

Besides DA and RA, Liu (2011) proposes a Hybrid Analysis, which advocates that there are two types of *bi*-comparatives: phrasal and clausal *bi*-comparatives. Some criteria are provided in Liu (2011) to distinguish between these two types of *bi*-comparatives, but this thesis argues that the criteria for the distinction need some modifications.

A revised Hybrid Analysis is proposed in this thesis, and there are two major arguments in the current proposal. First, the distinction between the two types of *bi*-comparatives depends on whether the post-*bi* constituent(s) form a complete constituent or not. Second, the lack of embedded standards and the distribution of *dou* in *bi*-comparatives are accounted for by means of the No Embedding Constraint for *bi*-comparatives and syntactic haplology respectively under the revised Hybrid Analysis.

Keywords: *bi*-comparatives, the Direct Analysis, the Reduction Analysis, the Hybrid Analysis, the No Embedding Constraint for *bi*-comparatives, syntactic haplology

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CHAPTER 1 Introduction

In most languages, comparative constructions are essential in daily conversations. For instance, whenever two degrees, A and B in terms of certain dimension are put together, three kinds of possible relation between them arise: $A > B$ (the superior comparison), $A < B$ (the inferior comparison), $A = B$ (the equal comparison). Each of the three relations is exemplified respectively with Chinese data below.

(1) a. Zhangsan bi Lisi (geng) gao

Zhangsan BI Lisi more tall

‘Zhangsan is taller than Lisi is.’

b. Zhangsan mei(you)/buru Lisi (name) gao

Zhangsan not/not as Lisi (that) tall

‘Zhangsan is less tall than Lisi is.’

c. Zhangsan gen Lisi yiyang gao

Zhangsan with Lisi the same tall

‘Zhangsan is as tall as Lisi is.’

The three kinds of comparative constructions above in Mandarin Chinese can be further categorized into two types, with (1a) on the one hand and (1b) and (1c) on the other hand. The former type is termed as *bi*-comparatives and the latter is comparatives without the *bi* morpheme. The focus of my thesis is on the syntax of *bi*-comparatives in Mandarin. The research on *bi*-comparatives has become a popular issue in Chinese syntax in recent years and many researchers have dedicated themselves to it, including Tsao (1989), Liu (1996, 2011), Xiang (2003, 2005), Erlewine (2007, 2017), Lin (2009), and Hsieh (2017), among others.

Although this topic has been addressed quite a lot in previous studies, the answer to a central and debatable question on this topic have not reached a consensus. According to Li and Thompson (1981), comparative constructions in Mandarin Chinese can be formulated as the pattern shown in (2).

(2) X comparison word Y (adverb) dimension (Li and Thompson, 1981)

In a *bi*-comparative, the morpheme *bi* occupies the position of the comparison word in the formula. *X* is the target of comparison, and *Y* stands for the standard of comparison, which is

also called “post-*bi* constituent”. In this thesis, the term “post-*bi* constituent” is defined as “the sequence of words between *bi* and the predicate of comparison”. The predicate of comparison provides the dimension of the comparison event. Sometimes, a degree adverb *geng* ‘more’ appears before the predicate of comparison. The heated-debating question centers on the syntactic status of the *Y* part in this formula; that is, what is the underlying syntactic structure of the post-*bi* constituent in *bi*-comparatives?

This question concerns the distinction between phrasal and clausal comparatives. In Heim (1985), a comparative is “clausal” when *than* is followed by a clause, as shown in (3a). On the other hand, in a “phrasal” comparative, what follows *than* is a single phrase, such as (3b).

(3) a. I have listened to this more often than you have.

b. He can't be taller than himself.

For Mandarin *bi*-comparatives, the standard of comparison that we see on the surface is often a single phrase (DP). In previous studies, this kind of *bi*-comparatives are considered phrasal.

An example is given in (4a). By contrast, in the literature, a clausal *bi*-comparative is exemplified in (4b), where the standard of comparison is formed by more than one phrase.

(4) a. Zhangsan bi Lisi gao

Zhangsan BI Lisi tall

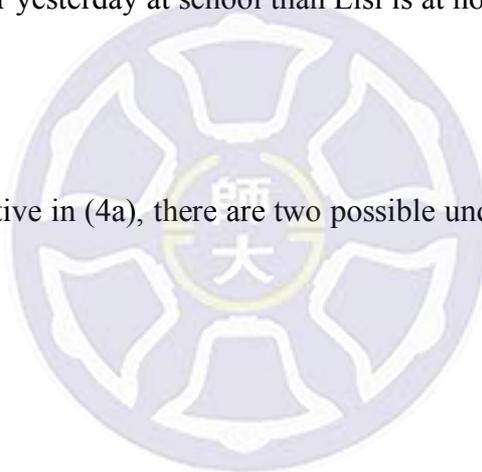
‘Zhangsan is taller than Lisi.’

b. Zhangsan zuotian zai xuexiao bi Lisi jintian zai jiali kaixin

Zhangsan yesterday at school BI Lisi today at home happy

‘Zhangsan was happier yesterday at school than Lisi is at home today.’

For the phrasal *bi*-comparative in (4a), there are two possible underlying structures, as shown in (5a) and (5b).



(5) a. Zhangsan bi [DP Lisi] gao

b. Zhangsan bi [CP Lisi ~~gao~~] gao

The underlying structure in (5a) is a phrasal analysis of the phrasal *bi*-comparative in (4a); however, the structure in (5b), where the post-*bi* constituent contains the predicate of comparison, demonstrates a clausal analysis of (4b). The difference between the two

underlying structures in (5) is exactly what the question of heated-debate question is about: what is the underlying syntactic structure of the post-*bi* constituent in a *bi*-comparative? In other words, for a *bi*-comparative like (4a), which underlying structure, (5a) or (5b), is correct?

To find out the answer to this question, three major analyses have been proposed in the literature. One is the Reduction Analysis (RA)¹, which argues that the post-*bi* constituent involves a structure richer than its surface structure. In other words, if the *bi*-constituent is a phrase on the surface, it actually undergoes comparative deletion; another analysis claims that the underlying structure of the *bi*-constituent is exactly what we see on the surface. This proposal is known as the Direct Analysis (DA)² in the literature; and the other proposal is made in Liu (2011), which suggests that both RA and DA are necessary in accounting for *bi*-comparatives, and it is thus called the Hybrid Analysis. However, it is shown in the current study that the proposals above are not without their problems in capturing the properties of *bi*-comparatives in Mandarin Chinese.

On the one hand, DA fails to explain *bi*-comparatives that require two tokens of predicate of comparison in the underlying structure, for example, *bi*-comparatives containing *bei* passive constructions, *ba* disposal constructions, and object-preposing constructions. On the other hand,

¹ The Reduction Analysis is often termed as the “clausal” analysis in most previous studies.

² The Direct Analysis is often termed as the “phrasal” analysis in most previous studies.

there are three major problems encountered by RA in previous studies, including the lack of the subcomparative, the lack of the embedded standard, and the distribution of the quantificational adverb *dou* in *bi*-comparative constructions. Although Hsieh (2017) and Erlewine (2017) propose some possible solution to these problems, arguing that RA can still be adopted in the analysis of *bi*-comparatives in Chinese, I provide some evidence in this thesis to show that their proposals are still unable to deal with the problems in question. Moreover, the current study also reveals that the Hybrid Analysis in Liu (2011) is problematic in terms of the distinction between phrasal and clausal *bi*-comparatives as well as in some of the solution to the three problems of RA.

In this thesis, I would like to propose a revised Hybrid Analysis, which is mainly based on Liu's Hybrid Analysis, with some modifications made. A new distinction between phrasal and clausal *bi*-comparatives is provided in my proposal. In addition, the two problems, the lack of embedded standards and the distribution of *dou* in *bi*-comparatives, are re-analyzed by means of the No Embedding Constraint for *bi*-comparatives and syntactic haplology respectively.

The rest of this thesis is organized as follows. A detailed review of previous studies in the Direct Analysis, the Reduction Analysis, and the Hybrid Analysis is given in Chapter 2, in

which I also point out the problems of Hsieh (2017), Erlewine (2017), and Liu (2011). Then,

Chapter 3 presents my analysis of Chinese *bi*-comparatives under the revised Hybrid Analysis.

Finally, the thesis is concluded with Chapter 4.



CHAPTER 2 Literature Review

Among the previous studies on comparative constructions, there are two major camps which differ in their analyses of the syntactic structure of the standard constituent in phrasal comparatives, where the standard is composed of only one simply DP in the surface structure. One is the Direct Analysis (DA), and the other is the Reduction Analysis (RA). In addition to these two camps, another camp, called the Hybrid Analysis, is proposed in Liu (2011). In this chapter, I review some previous studies on the *bi*-comparatives in Mandarin Chinese. All of them are presented in different sections according to the camp that they belong to: the Direct Analysis (§2.1), the Reduction Analysis (§2.2), and the Hybrid Analysis (§2.3).

2.1 The Direct Analysis

For advocates of the Direct Analysis, the underlying structure of the *bi*-constituent in a phrasal comparative is exactly what we see on the surface, namely, a simple DP. No comparative deletion operations are involved in the derivation. The representatives of this analysis include Paul (1993), Xiang (2003, 2005), Erlewine (2007), and Lin (2009).

2.1.1 Paul (1993)

In view of the problems faced by the deletion analysis proposed in L. Li (1986, 1989), Paul proposed an alternative account which is based on the notion of c-command (1) and cyclic c-command (2):

(1) C-command (Lasnik & Uriagereka, 1988):

For A, B nodes in a tree, A c-commands B iff every branching node dominating A dominates B, and neither A nor B dominates the other.

(2) Cyclic C-command (Huang, 1982):

A cyclic c-commands B iff:

- a. A c-commands B, or
- b. If C is the minimal cyclic node (NP or S') that dominates A, then C c-commands B.

The main proposal of Paul (1993) is that there must be a c-command relation between the two terms of comparisons in a *bi-comparative*; to be more precise, the first term of comparison (the target of comparison) must cyclic c-command the standard of comparison. She claims that, with this requirement, the unacceptable sentence (3) can be successfully ruled out.

(3) Ta jintian bi (*ta) zuotian gaoxing

he today BI he yesterday happy

‘He is happier today than yesterday.’

(4) Ta jintian bi ni zuotian mang

he today BI you yesterday busy

‘He is busier today than you were yesterday.’

According to Paul, the presence of *ta* ‘he’ after *bi* will block the c-command relation between *jintian* ‘today’ and *zuotian* ‘yesterday’, which then causes the unacceptability of (3). However, the same account fails to explain why (4) is grammatical. When we replace the *ta* ‘he’ after *bi* with *ni* ‘you’, the sentence is predicted to be ungrammatical under the c-command condition, which is contrary to the fact. Thus, Paul’s (1993) analysis cannot explain the contrast between (3) and (4) above.

Finally, there is one point worth noticing in Paul (1993). She claims that the standard of comparison can also be a sentence. In other words, she thinks that *bi* can take a clausal element as its complement, as shown in (5) below:

(5) Ta xie xiaoshuo bi wo xie shi xie de kuai
 he write novel BI I write poem write DE fast
 ‘He writes novels faster than I write poems.’

2.1.2 Xiang (2003)

Arguing against the proposal in Liu (1996), which suggests that the *bi*-constituent be analyzed as an elided CP containing an I' gap, Xiang (2003) proposes the phrasal analysis of *bi*-comparatives in Mandarin Chinese. The post-*bi* constituent is analyzed as a simple DP, as shown below in (6). Moreover, Xiang (2003) adopts the direct analysis in Heim (1985) and Kennedy (1997) to derive the semantics of phrasal comparatives in Chinese.

(6) Zhangsan [PP bi [DP Lisi]] gaoxing
 Zhangsan BI Lisi happy
 ‘Zhangsan is happier than Lisi.’

Significantly, three problems encountered by the clausal analysis are presented in Xiang (2003) to claim that the phrasal analysis is more adequate than the clausal one in terms of the analysis of phrasal comparatives in Chinese. To begin with, following Chomsky's (1977) analysis, Xiang (2003) argues that *wh*-movement is involved in comparative constructions³ which are claimed to contain degree variables by researchers in support of the clausal analysis. Since long-distance *wh*-movement is generally allowed in Chinese, it is expected that it is also allowed in *bi*-comparatives under the clausal analysis. However, it turns out that *bi*-comparatives disallow long-distance *wh*-movement. This shows that the clausal analysis makes wrong prediction in terms of long-distance *wh*-movement in *bi*-comparatives. This problem is illustrated with the contrast between the English example in (7) and the Chinese example in (8).

(7) John is taller than [_{CP} Op_i [_{CP} Max thought [_{CP} Bill is t_i]]].

(8) *Zhangsan bi Wangwu renwei Lisi zuotian gaoxing

Zhangsan BI Wangwu think Lisi yesterday happy

Intended: 'Zhangsan is happier than Wangwu thought Lisi was yesterday.'

³ The *wh*-movement involved in comparative constructions is the movement of the degree operator (Op), as shown in (7).

Under the clausal analysis, the two sentences in (7) and (8) above are analyzed as comparatives with an embedded standard. As can be seen, both of the two standards of comparison *Bill* and *Lisi* occur in an embedded clause. Chinese is different from English in that it doesn't allow embedded standards, but English clausal comparatives do. This contrast cannot be accounted for by the clausal analysis, which predicts that (8) is grammatical. However, it is not a problem for the phrasal analysis. By adopting the phrasal analysis, it is claimed that the standard of comparison in *bi*-comparatives is actually a DP rather than a CP; therefore, embedded standards, which are certainly CPs, are disallowed in *bi*-comparatives.

The second problem faced by the clausal analysis is that, contrary to English, Chinese *bi*-comparatives lack subdeletion (subcomparative), as demonstrated in (9) and (10a) below.

(9) The table is longer than [_{CP} the door is wide].

(10) a. *Zhuozi bi [_{CP} men kuan] chang
 table BI door wide long

Intended: 'The table is longer than the door is wide.'

b. Zhangsan bi [_{CP} Lisi ~~gao~~⁴] gao

Zhangsan BI Lisi tall tall

‘Zhangsan is taller than Lisi is.’

In the English subcomparative construction (9), *than* takes a full CP as its complement; however, (10a), which also takes a full CP *men kuan* ‘the door is wide’, is ungrammatical. Then, compare (10a) with (10b), where *bi* takes an elided CP. The fact that (10b) but not (10a) is grammatical seems to suggest that the comparative morpheme *bi* in Chinese can only take elided CPs. Examples in (9) and (10) show the problem of subcomparatives for the clausal analysis. First, it is in conflict with the prediction of the clausal analysis, which claims that the post-*bi* constituent is a clause rather than a simple phrase. Furthermore, as pointed out by Xiang, generally speaking, a full CP is an unmarked construction, and an elided CP is marked. It is hard to explain why *bi* in Chinese tends to take a marked construction as its complement instead of an unmarked one. According to Xiang (2003), this problem is circumvented in the phrasal analysis, which can directly rule out (10) by arguing that what *bi* can take is actually a DP.

⁴ Striking-through indicates deletion of the identical elements on the surface.

The behavior of the Chinese distributor *dou* in *bi*-comparative constructions is the third problem of the clausal analysis. Following Lin (1998), Xiang (2003) makes two claims: first of all, there is a leftness constraint of *dou*, which regulates that the licenser of *dou* must be at the left side of *dou*. Moreover, in most cases, if the subject is quantified by a strong quantifier like *mei-ge* ‘every’, the presence of *dou* is obligatory. With these two constraints, Xiang (2003) finds that when *dou* appears in a *bi*-comparative construction, the clausal analysis will make incorrect predictions, as shown in (11) and (12).

(11) Mei-ge-nanhaizi **dou** bi [CP mei-ge-nuhaizi **gao**] gao
 every-CL-boy all BI every-CL-girl tall tall

‘Every boy is taller than every girl.’

(12) * Mei-ge-nanhaizi **dou** bi [CP mei-ge-nuhaizi **dou** **gao**] gao
 every-CL-boy all BI every-CL-girl all tall tall

Intended: ‘Every boy is taller than every girl.’

The clausal analysis will predict (11) to be ungrammatical and (12) to be grammatical.

However, the facts are the opposite. Under the clausal analysis, *mei-ge-nuhaizi* ‘every girl’

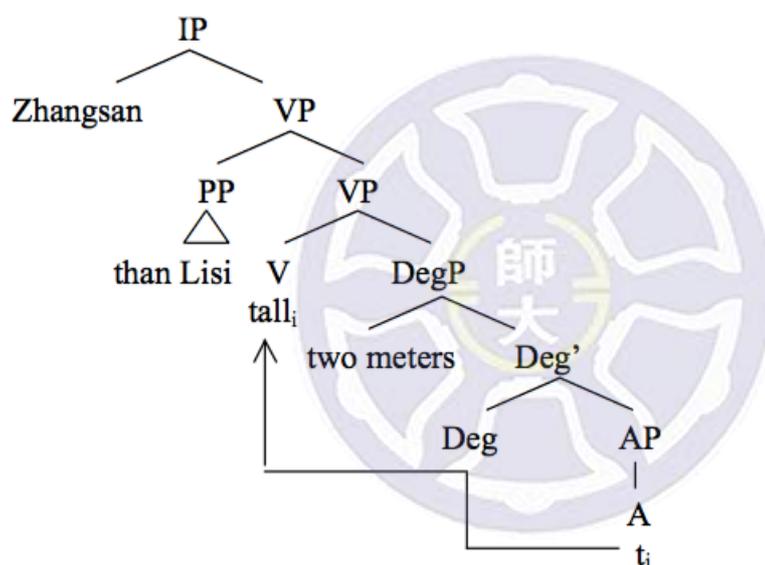
serves as the subject of the CP complement; therefore, the occurrence of *dou* after it should be legitimate. Nevertheless, (12) shows that *dou* cannot appear after *mei-ge-nuhaizi* ‘every girl’ in the post-*bi* constituent. On the other hand, according to Xiang (2003), the examples in (11) and (12) can be captured with the phrasal analysis. Under the phrasal analysis, the post-*bi* constituent *mei-ge-nuhaizi* ‘every girl’ in (11) and (12) is only a DP rather than the subject of the CP complement. Thus, the only *dou* in (11) as well as the first *dou* in (12) are licensed by the matrix subject *mei-ge-nanhaizi* ‘every boy’, and the second *dou* in (12) is unnecessary because *mei-ge-nuhaizi* ‘every girl’ is not a subject at all.

With the three problems faced by the clausal analysis, Xiang (2003) proposes that we should adopt the phrasal analysis for the phrasal comparatives in Chinese instead of the clausal analysis claimed in Liu (1996). Besides, Xiang (2003) provides an obligatory A-to-V movement analysis to account for the contrast in (13) in Chinese comparatives, as shown below.

- (13) a. Zhangsan bi Lisi gao liang-mi
 Zhangsan BI Lisi tall two-meter
 ‘Zhangsan is two meters taller than Lisi.’
- b. *Zhangsan bi Lisi liang-mi gao
 Zhangsan BI Lisi two-meter tall

As can be seen, the measure phrase *liang-mi* ‘two-meter’ cannot precede the predicate *gao* ‘tall’, or it will lead to ungrammaticality in (13b). Xiang (2003) provides an account for this phenomenon by arguing that the movement of the predicate from A to V is obligatory in Chinese comparatives, as illustrated in (14).

(14)



Since the V head is obligatorily occupied by the moved predicate from A⁵, it is impossible for the measure phrase to precede the predicate.

⁵ Xiang (2003) argues that the movement is obligatory in order to satisfy the locality constraint and to derive the correct interpretation of the sentence.

2.1.3 Xiang (2005)

In her dissertation, Xiang (2005) explores several issues about comparative constructions in English and Chinese. Generally speaking, there are two major parts in her study. The semantic section involves the licensing of quantifiers and Negative Polarity Items (NPI) in comparatives, and the syntactic section discusses the existence of the degree argument and the structure of comparative constructions. Here I would like to mainly focus on the syntactic structure she proposed for bi-comparatives and some topics of NPI licensing, which involves the discussion of *dou*. I will start with the NPI issue first and then turn to her syntactic proposal later.

According to Xiang (2005), the most typical example of NPI in English is *any*, whose closest Chinese counterpart is Existential Polarity *Wh*-phrases (EPW), such as *shei* ‘who’⁶. As we can see in (15), EPWs cannot be licensed in *bi*-comparatives.

(15) *Ta bi shei gao yidian
 he BI who tall a little

Intended: ‘He is taller than anybody.’

⁶ Here, I retain the term NPI/EPW for *shei* ‘who’ in order to be consistent with Xiang (2005). Actually, it will be better to term *shei* ‘who’ in the following relevant data in this section as non-interrogative indefinite *wh*-words rather than NPI or EPW used in Xiang (2005). A more appropriate example of NPI in Mandarin is *renhe* ‘any’.

However, with the help of *dou*, comparative constructions become a legitimate environment that can license EPW in Chinese, as shown in (16).

- (16) Zhangsan bi shei **dou** gao yidian
Zhangsan BI who all tall a little
'Zhangsan is a little taller than anybody.'

Moreover, Xiang points out that the existential indefinite *wh*-phrase *shei* 'who' here is interpreted as a universal quantifier. She suggests that this should be attributed to the semantics of *dou*. Her analysis of *dou* is presented in (17).

(17) a. *Dou* operates on events

- b. *Dou*: (i) Presupposes a set of alternative events which are ordered on a contextually determined scale
(ii) Asserts the event on the top of the scale is true

Xiang (2005) argues that *dou* licenses NPIs through a scale. In example (16) above, the scale is provided by the adjectival predicate *gao* 'tall', and the alternative events are derived

by putting a focus on the NPI. All the events are ordered on the scale of height. Then, *dou* functions to pick out and assert the event on the top of the scale, namely, the least likely event, to be true. In the comparative context, the least likely event is a superlative. Take (16) as an example, the event on the top of the scale of height is that *Zhangsan* is taller than the tallest person in the context. Thus, by scalar implicature, we can infer that *Zhangsan* is taller than everybody in the context. This explains how the universal interpretation of the indefinite *wh*-phrase *shei* ‘who’ is derived. To sum up, NPIs in Chinese comparatives are licensed through the scale given by the predicate as well as the function of *dou* to pick out the least likely events from the alternative events ordered on the scale.

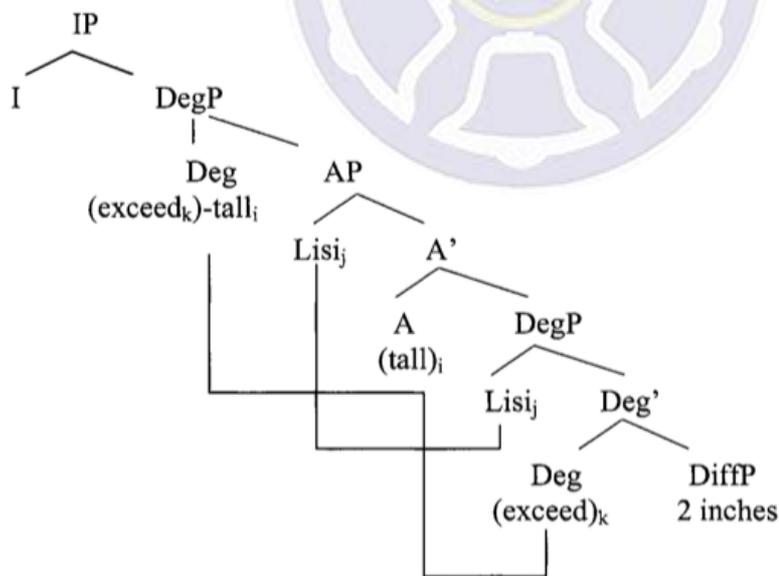
In the syntax part, after establishing the status of the degree argument⁷, Xiang moves on to propose the syntactic structure of comparatives. First of all, following the arguments in Xiang (2003), Xiang (2005) suggests that Chinese phrasal comparatives and clausal comparatives should be distinguished, and that the phrasal comparatives have to be analyzed with the phrasal analysis, instead of the clausal analysis that involves comparative deletion.

⁷ Xiang (2005) uses two pieces of evidence to support the existence of the degree argument. One is comparatives involving Antecedent Contained Deletion (ADC) constructions; the other pertains to the Definiteness Effect (cf. Beck, 1996). As both of them are not directly relevant to the focus of this thesis, please refer to Xiang (2005) for the argumentation.

Second, based on the DegP-shell structure in Larson (1991), Xiang makes some revisions and proposes her DegP-shell structure for both bare comparatives⁸ and *bi*-comparatives in Mandarin Chinese. Larson’s DegP-shell structure comes from the VP-shell analysis of the double object constructions. For a bare comparative like (18a) below, Xiang provides the structure in (18b).

(18) a. Wo gao Lisi liang-cun
 I tall Lisi two-inch
 ‘I am two inches taller than Lisi.’

b.



⁸ The term “bare comparatives” is used in Xiang (2005) to refer to Chinese comparatives in which the predicate of comparison takes the standard of comparison as its complement. In this case, the predicate of comparison behaves like a transitive verb. Therefore, it is also called “transitive comparatives” in other studies. Please refer to (18) for an example for bare comparatives.

As we can see in this structure, there are two DegPs, and the lower one is headed by a phonetically null degree morpheme, *exceed*⁹. During the derivation, this morpheme moves to the head of AP to combine with the gradable adjective. The standard of comparison *Lisi* is base-generated in the specifier position of the lower DegP, and then moves to [Spec, AP] to check for the EPP feature at the AP level. In this way, the surface word order can be derived. Finally, the combination of the gradable adjective and *exceed* moves to the head of the higher DegP via head movement in order to introduce the external argument.

As for *bi*-comparatives like (19a), its structure is given by Xiang in (19b). The structure in (19b) is quite similar to what we have seen in (18b), and the only difference is that after the degree morpheme *exceed* moves to combine with the adjective, instead of moving further to the higher DegP, it stays in the head of AP. Then, *bi*-insertion is applied at the higher Degree head. In other words, *bi* is externally merged with the AP and projects the higher DegP. As a result, the word order of the *bi*-comparative is derived.

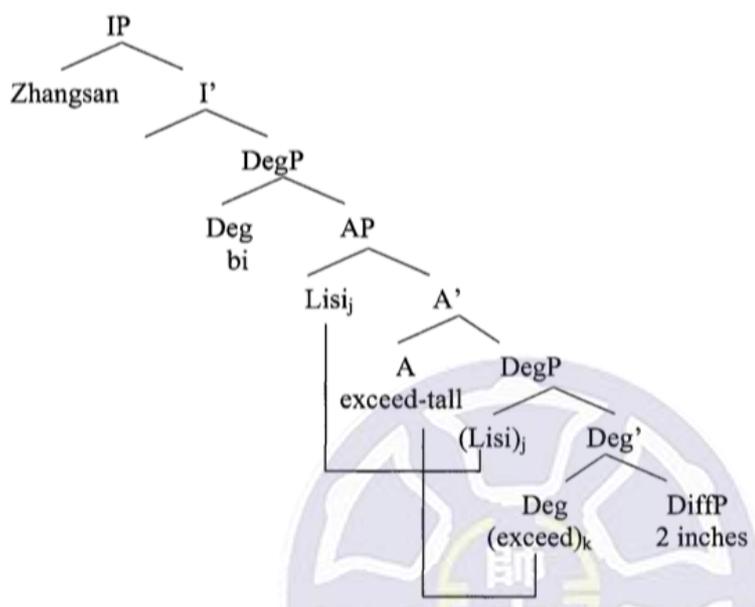
⁹ According to Xiang (2005), the assumption of the phonetically null degree morpheme *exceed* comes from the lexical decomposition approach (cf. Hale and Keyser 1993, 2002, Huang 1997, Lin 2001). However, she does not provide any argument for positing that *exceed* occupies the head of the lower DegP.

(19) a. Zhangsan bi Lisi gao liang-cun

Zhangsan BI Lisi tall two-inch

‘Zhangsan is two inches taller than Lisi.’

b.



The most significant advantage of Xiang’s (2005) proposal is that the structure of bare comparatives and *bi*-comparatives are derived from a unified structure. That is, we can generate bare comparatives and *bi*-comparatives from an identical structure. However, (19b) indicates that *bi* and the post-*bi* standard DP do not form a constituent in the current proposal. As pointed out by Xiang herself, this may be challenged by the arguments in Liu (1996) and Xiang (2003), where the *bi*-constituent is analyzed as a pre-verbal adjunct.¹⁰

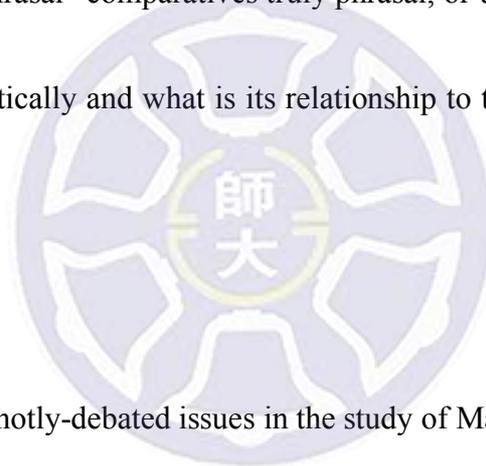
¹⁰ Please refer to Xiang (2005) and the review of Erlewine (2007) in §2.1.4 below for arguments against the adjunct analysis of the *bi*-constituent. For arguments in support of the adjunct analysis, please refer to Liu (1996), Lin (2009) and Shi (2001).

2.1.4 Erlewine (2007)

In his thesis, Erlewine presents his proposal for Mandarin *bi*-comparatives, in which he suggests a verbal syntax and a novel neo-Davidsonian semantics. There are totally five questions that Erlewine (2007) aims to address, and I will focus on two of them since they are more related to the focus of this thesis. They are listed in (20).

(20) Q1: Are Mandarin “phrasal” comparatives truly phrasal, or underlying clausal?

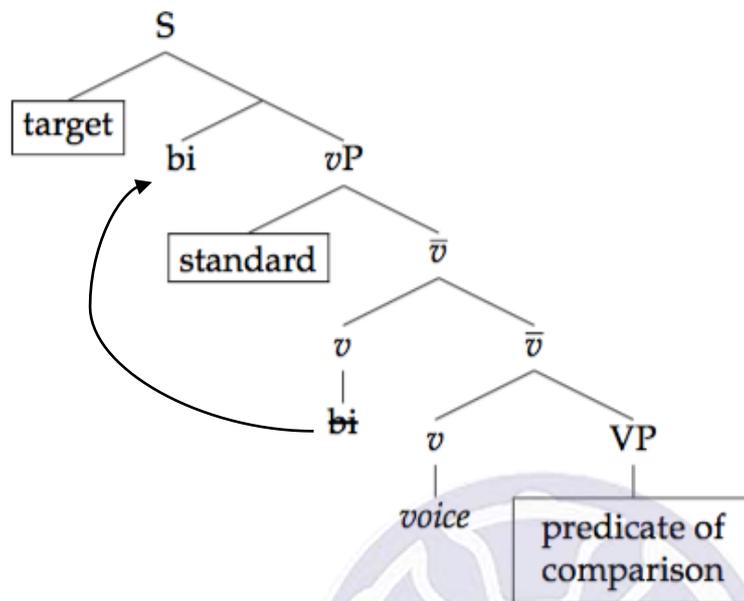
Q2: What is *bi* syntactically and what is its relationship to the standard and predicate of comparison?



The two questions are two hotly-debated issues in the study of Mandarin *bi*-comparatives, and they are also more complicated. I will summarize Erlewine’s answer and discussion of these two questions in the following paragraphs.

Erlewine’s (2007) proposal contains two major parts, a syntax part and a semantics part. I will start with his verbal syntax proposal. Enlightened by Larson’s (1991) analysis of the double-object construction, Erlewine (2007) takes *bi* as a verbal functional head, and it is part of the extended projection of VP, as shown by the syntactic structure he proposes in (21).

(21)



In this structure, *bi* takes a v' , in which the voice head subcategorizes for the predicate of comparison. Then, *bi* moves out of vP to a higher position to get the correct word order. In Erlewine (2007), this vP -shell comparative structure gains support from the following pieces of evidence.

First of all, in order to show his proposed structure is on the right track, Erlewine (2007) must consider and refute Liu's (1996) proposal that *bi* and the standard form a PP adjunct. He provides the negative sentences in (22) and (23) as evidence.

(22) a. *Zhangsan bu dui Mali diu qiu

Zhangsan Neg toward Mary throw ball

b. Zhangsan dui Mali bu diu qiu

Zhangsan toward Mary Neg throw ball

‘Zhangsan does not throw balls toward Mary.’

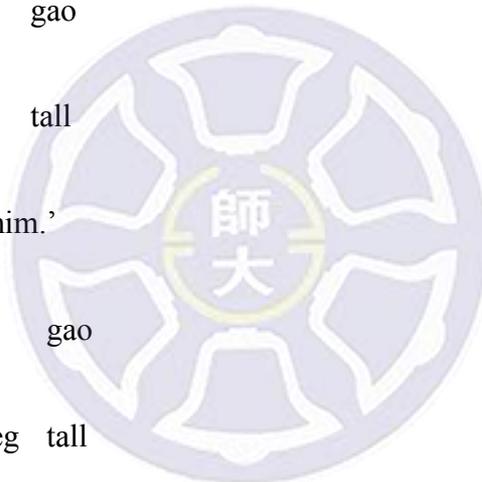
(23) a. wo bu bi ta gao

I Neg BI he tall

‘I am not taller than him.’

b. *wo bi ta bu gao

I BI he Neg tall



With the different distribution of negation in (22) and (23), Erlewine (2007) claims that we cannot analyze the *bi*-phrase as an instance of PP adjunct like *dui Mali* ‘toward Mary’ in (22). However, my judgment of (22) and the judgment from several native speakers are quite different from his. For me, (22a) is much better than (22b). Hence, it is possible that this piece of evidence cannot be used to argue against Liu’s (1996) proposal.

The second piece of evidence comes from the distributive quantifier *ge* ‘each’. Soh (2005)

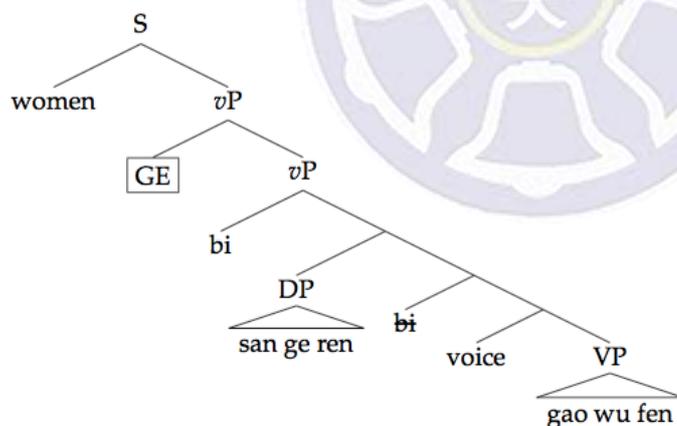
concludes that there are two possible positions for *ge* ‘each’ to adjoin to, *vP* and *VP*. Following

this logic, Erlewine (2007) claims that if the two positions in the *bi*-comparatives are available

for *ge*, the *vP*-shell structure is supported. This is borne out in (24) and (25).

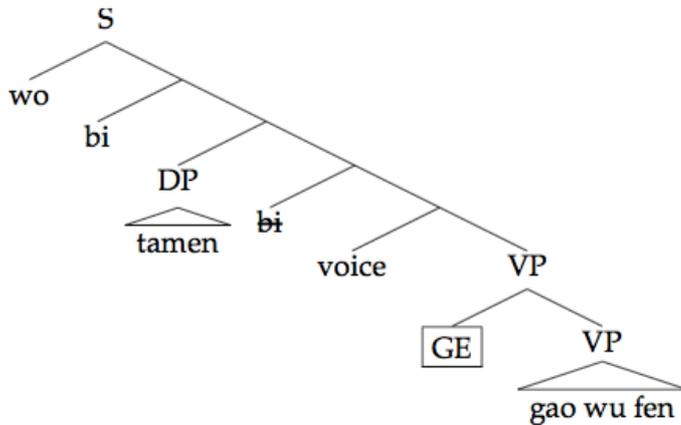
- (24) a. Women *ge* *bi* *san-ge* *ren* *gao* *wu* *fen*
 we each BI three-CL person high five points
 ‘Each of us were five points higher than three people.’

b.



- (25) a. Wo *bi* *tamen* *ge* *gao* *wu* *fen*
 I BI they each high five points
 ‘I was five points higher than each of them.’

b.



From the grammaticality of the two sentences, Erlewine argues that *ge* is licensed in the two positions, which suggests the existence of *vP* and *VP* in the *bi*-comparatives.

The binding constraint of the Mandarin bare reflexive *ziji* serves as the third piece of evidence in Erlewine (2007). The interaction between *ziji* and *bi*-comparatives is illustrated with (26).

(26) Zhangsan_i bi Lisi_j xihuan ziji_{i/j}

Zhangsan BI Lisi like self

Reading 1: ‘Zhangsan_i likes himself_i more than Lisi_j likes himself_j.’

Reading 2: ‘Zhangsan_i likes himself_i more than Lisi_j likes him_i.’

Since *ziji* is a reflexive pronoun, the availability of Reading 1, in which *ziji* refers back to *Lisi*, indicates that the standard *c*-commands the predicate of comparison. This *c*-command relation is captured in the tree structure presented in (21).

Finally, Erlewine's (2007) claims that his verbal syntax of comparative also gains support from passivization, as shown in the following contrast.

- (27) a. Zhangsan bi Lisi (geng) bei Mali zunjing
 Zhangsan BI Lisi more BEI Mary respect
 'Zhangsan is respected by Mary more than Lisi is.'
- b. *Zhangsan bei Mali bi Lisi zunjing
 Zhangsan BEI Mary BI Lisi respect

As shown in (27), *bei* only occurs after *bi*. Erlewine uses this observation to support the *vP*-shell structure, where the position of *bi* is higher than the voice head.

Now we turn to the other major part in Erlewine's (2007) proposal, a novel neo-Davidsonian event-semantics of comparison. In this proposal, Erlewine (2007: 32) suggests that the functional head *bi* has the following three functions: (a) it uses two eventuality

variables, ϵ_1 and ϵ_2 , and establishes two external arguments as their external arguments, respectively, (b) it existentially binds the standard's eventuality ϵ_2 , and (c) it establishes the comparative semantics of ϵ_1 being greater than ϵ_2 along a scale established by the predicate.

With this semantics, Erlewine (2007) argues that the lack of embedded standards can be well-explained. He provides an explanation based on the neo-Davidsonian event-semantics of comparison. An example is given in (28), and the three events that are involved in the semantics of (28) are listed in (29).

(28) *Zhangsan chi fan bi [Lisi renwei [Wangwu zuo e]] kuai¹¹
 Zhangsan eat rice BI Lisi think Wangwu cook kuai

Intended: 'Zhangsan eats rice faster than Lisi thinks Wangwu makes.'

(29) a. e_1 : Zhangsan's fastness of eating

e_2 : Wangwu's fastness of cooking

e_3 : Lisi's thinking of e_2 as "intense"

¹¹ e here stands for the empty object that is of the same form as the object in the target clause. Note that this sentence is ungrammatical whether the object is overtly realized (i.e. as *fan*) or not.

According to Erlewine (2007), sentence (28) contains the three events in (29). The intended meaning of (28) requires $e_1 > e_2$ ($>$ defines an intensity ordering); however, in comparatives with an embedded standard, the only possible meaning is restricted to $e_1 > e_3$ because what are compared in (28) should be the entire target and standard of comparison. This is contrary to the fact, so the lack of embedded standards in Mandarin comparatives is explained.

To sum up, Erlewine's (2007) answers to the two questions in (20) suggest that *bi* is a functional head that is part of the extended VP projection, and that we should not apply the clausal analysis to the phrasal comparatives. In other words, the underlying structure of a phrasal comparative is just a single phrase rather than a clause as claimed in Liu (1996). Moreover, Erlewine (2007) makes a significant contribution in bringing the compositional semantics (his neo-Davidsonian eventuality-semantics) of *bi*-comparatives into being. Under his semantic proposal, the lack of embedded standards can be derived.

2.1.5 Lin (2009)

Starting with an overview of superiority comparatives in English as well as some basic data of Chinese *bi*-comparatives presented in Tsao (1989), Lin (2009) reviews and argues against several previous studies on *bi*-comparatives first. Then, he discusses the syntax of *bi*-

comparatives and the semantics of *bi*. Since this thesis mainly focuses on the syntactic structure of *bi*-comparatives, I will skip the semantic part and summarize Lin’s syntactic analysis in detail in the following paragraphs.

To begin with, in order to explain the difference in grammaticality between (30) on the one hand and (31) & (32) on the other hand, Lin (2009) claims that *bi*-comparatives in Mandarin Chinese is an argument-dependent comparison; in other words, both the target of comparison and the standard of comparison have to be arguments of the gradable predicate.

This contrast is shown below:

(30) *Zhe-zhang zhuozi bi na-zhang zhuozi chang kuan
 this-CL table BI that-CL desk long wide

Intended: ‘This table is wider than that desk is long.’

(31) [CP Ni qu] bi [CP wo qu] hao
 you go BI I go good

‘It’s better for you to go than for me to go.’

(32) [CP Ta zai tushuguan nian shu] bi [CP ta zai jiali nian shu] renzhen
he at library read book BI he at home read book serious

‘He studies more seriously in the library than he does at home.’

According to Lin (2009), sentence (30) is ungrammatical because the two compared items are not arguments of the predicate. It is quite difficult to treat *na-zhang zhuozi chang* ‘that desk is long’ as the argument of *kuan* ‘wide’. As for (31), both CPs are arguments of the predicate *hao* ‘good’, which can take sentential subjects. At first glance, the example in (32) seems not to fit Lin’s analysis. However, following Davidson (1967), Lin (2009) suggests if we assume that verbs can have event arguments, the two CPs in (32) can be regarded as the event arguments of the predicate *renzhen* ‘serious’. In this way, that (32) is grammatical can be explained with Lin’s proposal.

Based on the contrast above, Lin proposes the Argument requirement of Chinese comparative, as presented in (33).

(33) Argument requirement of Chinese comparatives

In Mandarin Chinese, compared constituents must be arguments of a gradable predicate of comparison.

With this requirement, Lin (2009) successfully accounts for the fact that adjuncts such as manner adverbs and reason clauses are not comparable, as shown in (34).

(34) a. *Wo-de shengri hui manmandi bi kuaikuaidi dao
 my birthday will slowly BI quickly arrive

Intended: ‘My birthday will come more slowly than quickly.’

b. *Mama yinwei Xiaoming shuohuang bi yinwei ta tou
 mother because Xiaoming say-lie BI because he steal
 qian geng shengqi
 money more angry

Intended: ‘Mother was angry more because Xiaoming told a lie than because he stole money.’

Furthermore, another point worth mentioning in Lin (2009) is that he treats time and location expressions as arguments of the main predicate. Therefore, times and locations are comparable, as illustrated in (35). According to Lin (2009), this proposal gains support from the phenomena

of Chinese *wh*-extraction discussed in Tsai (1994). Besides, with respect to the issue of tense and aspect, time is often considered an argument of the predicate, which is demonstrated in Lin (2003, 2006).

(35) a. Ta jintian bi zuotian shufu
 he today BI yesterday feel-good

‘He feels better today than he did yesterday.’

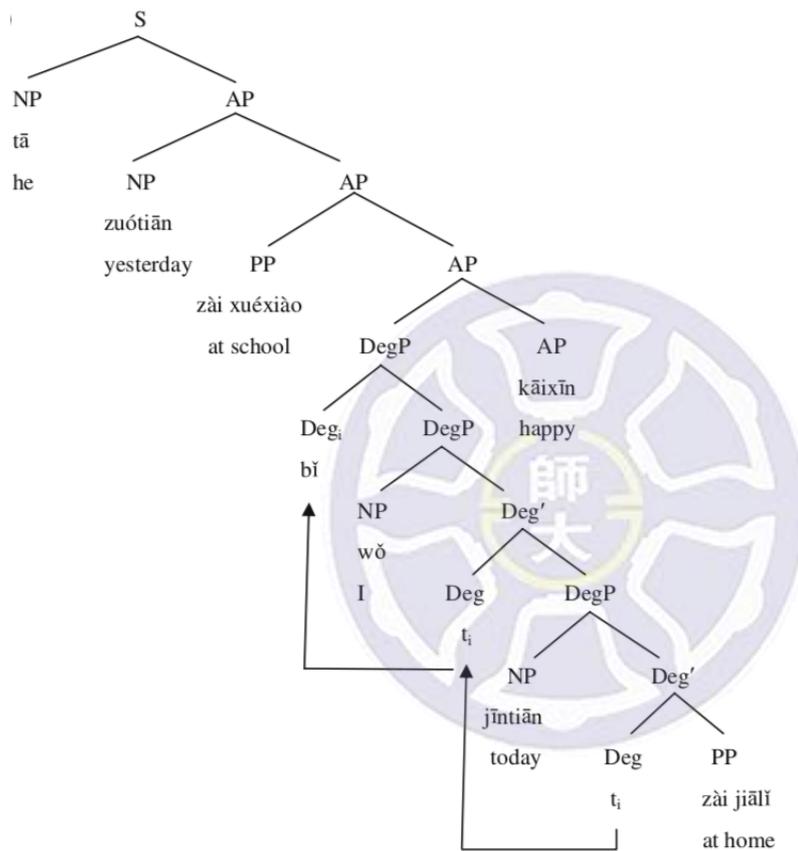
b. Ta zai xuexiao bi zai jiali kuaile
 he at school BI at home happy

‘He is happier at school than at home.’

After proposing the Argument requirement of Chinese comparatives, Lin (2009) presents a syntactic structure for *bi*-comparatives which can be seen as a variant of the structures proposed in Xiang (2005) and Erlewine (2007). In this proposal, *bi* is analyzed as a functional Degree head, and it can move to other Degree heads. Those Degree heads together with their complements and specifiers form a DegP-shell, which serves as an adjunct adjoined to the

predicate of comparison. With this structure, the triple-topic comparison¹² in Tsao (1989) can be well-explained, as shown in (36).

(36)



Here, we can see that *bi* is base-generated under the lowest Degree head, and then undergoes

¹² Tsao (1989) adopts a topic-comment approach to analyze *bi*-comparatives. It is claimed that both the target of comparison and the standard of comparison should be topics of an equal rank. According to Tsao (1978, 1979, 1982), we can make a distinction between primary and non-primary topic based on some qualities shared by primary topics in Chinese. The term “triple-topic comparison” refers to comparative sentences that involve three pairs of topics, one primary one and two non-primary ones. An example of triple-topic comparison is given in (i) below:

- (i) Ta zuotian zai xuexiao bi wo jintian zai jiali kaixin
 he yesterday at school BI I today at home happy
 ‘He was happier yesterday at school than I am today at home.’

two head-to-head movements to the highest Degree head. Lin (2009) analyzes *bi* as a dyadic degree operator. This means that *bi* can quantify over more than one indefinite, just like an adverb of quantification. Thus, Lin's proposal can be dubbed a dyadic DegP-shell analysis.

To summarize, Lin (2009) is an advocate of the Direct Analysis since there is only one token of the gradable predicate and that no comparative deletion occurs in the derivation. However, although Lin's (2009) proposal can adopt a phrasal analysis to deal with sentences of triple comparison that are often regarded as instances of clausal comparatives, it is not without problems.

As pointed out in Liu (2011), Lin's analysis will encounter the following three problems. First of all, the comparison between two reason clauses in *bi*-comparatives (example (37)) are grammatical and acceptable for the 23 native speakers Liu consulted.

(37) Mama yinwei Xiaoming shuohuang bi baba yinwei ta tou
mother because Xiaoming say-lie BI father because he steal
dongxi haiyao shengqi
things even angry

'His mother gets angry more because Xiaoming lies than his father gets angry because he steals things.'

I also checked with some native speakers about the sentence in (37). Most of them consider (37) grammatical and acceptable. Only few of them think (37) is grammatical but unnatural. In this way, Lin's (2009) Argument requirement of Chinese comparatives is challenged since non-arguments like reason clauses seem to be comparable.

The second problem of Lin (2009) presented in Liu (2011) concerns the following example, which is an object-preposing construction.

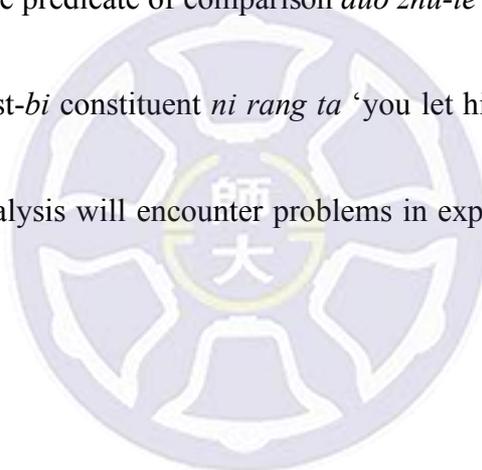
- (38) *Zhangsan shuxue bi Lisi wuli xihuan
 Zhangsan math BI Lisi physics like
 'Zhangsan likes mathematics more than Lisi likes physics.'

Since both *Lisi* and *wuli* 'physics' are arguments of the predicate *xihuan* 'like', the sentence in (38) will turn out to be grammatical under Lin's analysis. However, according to Liu (2011), this sentence is ungrammatical. Again, the Argument requirement of Chinese comparatives fails to account for this example.

Thirdly, Liu (2011) also claims that pivotal constructions in Chinese pose challenges to Lin's (2009) proposal. The example given in Liu (2011) is shown in (39).

(39) Wo rang ni bi ni rang ta duo zhu-le san-tian
 I let you BI you let he many live-ASP three-day
 ‘I let you stay for three more days than you let him.’

As suggested in Tang (2010), pivotal verbs select a VP as their complement. Following this logic, it is impossible for the predicate of comparison *duo zhu-le san-tian* ‘stay for three more days’ to take the whole post-*bi* constituent *ni rang ta* ‘you let him’ as its external argument. Therefore, Lin’s (2009) analysis will encounter problems in explaining pivotal constructions in *bi*-comparatives.



2.1.6 An interim summary of the Direct Analysis

Previous Studies	Major Arguments
Paul (1993)	There must be a c-command relation between the two terms of comparison in a <i>bi</i> -comparative (the target of comparison must cyclic c-command the standard of comparison).
Xiang (2003)	1. The clausal analysis encounters three problems: the lack of embedded standards, the lack of subcomparatives, and the distribution of <i>dou</i> in <i>bi</i> -comparatives. 2. She proposes an obligatory A-to-V movement analysis to explain why the measure phrase cannot precede the predicate.

Xiang (2005)	<ol style="list-style-type: none"> 1. NPIs in Chinese comparatives are licensed through the scale given by the predicate as well as the function of <i>dou</i> to pick out the least likely events from the alternative events. 2. She proposes a DegP-shell structure for <i>bi</i>-comparatives, where the degree morpheme <i>exceed</i> occupies the lower Degree head, and <i>bi</i> is inserted to the higher Degree head.
Erlewine (2007)	<ol style="list-style-type: none"> 1. He suggests a <i>vP</i>-shell structure for <i>bi</i>-comparatives, in which <i>bi</i> is taken as a verbal functional head, and the standard constituent is in the [Spec, <i>vP</i>] position. 2. He accounts for the lack of embedded standards with the novel neo-Davidsonian event-semantics of comparison.
Lin (2009)	<ol style="list-style-type: none"> 1. Lin proposes the Argument requirement of Chinese comparatives which regulates that compared constituents must be arguments of the gradable predicate of comparison. 2. He proposes a dyadic DegP-shell structure for <i>bi</i>-comparatives, in which <i>bi</i> is analyzed as a functional Degree head. The Degree heads together with their complements and specifiers form a DegP-shell, which serves as an adjunct adjoined to the predicate.

2.2 The Reduction Analysis

The Reduction Analysis argues that the *bi*-constituent in the phrasal comparatives in fact involves a structure richer than what appears on the surface. In other words, even if the *bi*-constituent apparently occurs in the form of a phrasal category on the surface, it actually starts out with a larger structure which later undergoes comparative deletion. Thus, it is also called a

deletion-based approach. Previous studies supporting this analysis include Liu (1996), Chung (2006), Erlewine (2017), and Hsieh (2015, 2017). Some problems of the two recent Reduction Analysis, i.e., Erlewine (2017) and Hsieh (2017) are especially pointed out in §2.2.4 and §2.2.5.

2.2.1 Liu (1996)

Following Chomsky's (1995) PF-deletion analysis, Liu (1996) proposes that some comparatives in Mandarin Chinese should be analyzed as antecedent-contained deletion (ACD) constructions, where there is an I' gap. Under this proposal, comparative constructions can be divided into two types, gapped comparative (GC) constructions and non-gapped comparative (NGC) constructions, as shown in (40a) and (40b) respectively.

(40) a. Zhangsan jintian bi Lisi zuotian e gaoxing [GC]

Zhangsan today BI Lisi yesterday happy

'Zhangsan today is happier than Lisi was yesterday.'

b. Zhangsan bi Lisi gao [NGC]

Zhangsan BI Lisi tall

'Zhangsan is taller than Lisi.'

As we can see in (40a), there is an empty element *e* in the *bi*-constituent, which is an I' gap resulting from the deletion at PF. On the other hand, there is no gap found in (40b). Without stating it clearly, Liu (1996) seems to analyze (40b) as a phrasal comparative because of the absence of any gap there.

Two basic assumptions are made in Liu (1996) to argue for his proposal. First of all, he treats *bi* as a preposition forming a prepositional phrase with the post-*bi* constituent, and this PP is seen as a preverbal adjunct. The second assumption is that the comparative marker *bi* has to occur inside the VP-domain. The evidence of this claim comes from sentences in (41) and (42), where the temporal adverb *yizhi* 'always' and the manner adverbial phrase *hen kuai-de* 'very quickly' are used to test the distribution of the *bi*-constituent.

(41) a. Zhangsan **yizhi** bi Lisi gaoxing

Zhangsan always BI Lisi happy

'Zhangsan is always happier than Lisi is.'

b. *Zhangsan bi Lisi **yizhi** gaoxing

Zhangsan BI Lisi always happy

(42) Zhangsan hen **kuaide** bi Lisi duo he-le san bei shui

Zhangsan very quickly BI Lisi more drink-Asp three cup water

‘Zhangsan quickly drank three more cups of water than Lisi did.’

The contrast in the grammaticality of (41a) and (41b) shows that the position of the *bi*-constituent cannot be outside the TP-domain because temporal adverbs are T⁰-licensed (Travis 1988). Furthermore, the *bi*-constituent in (42) occurs after the manner adverbial phrase, which is a VP-domain adverb; thus, it is proved that the *bi*-constituent must occur inside the VP-domain.

With the two assumptions, Liu (1996) makes the following four claims. To begin with, he claims that the syntactic relationship between the two terms of comparison (target and standard of comparison) is not coordination, which is illustrated in (43) with the bare reflexive *ziji* ‘self’.

(43) a. Zhangsan **bi** Mali geng xihuan ziji_{i/j}/*_{i+j}-de haizi

Zhangsan BI Mary more like self DE child

‘Zhangsan_i likes his_i own children more than Mary_j does.’

b. Zhangsan **han** Mary dou xihuan ziji_{i/j/i+j}-de haizi

Zhangsan and Mary all like self DE child

‘Zhangsan_i and Mary_j like their_{i/j/i+j} own children.’

The bare reflex *ziji* ‘self’ in (43b) can refer to both *Zhangsan* and *Lisi*; however, this reading is not available in (43a). The difference between the two sentences lies in the fact that *han* ‘and’ in (43b) is a coordinator, which allows *ziji* ‘self’ to refer to *Zhangsan* and *Lisi* simultaneously (in other words, the children are Zhangsan and Mary’s). Therefore, the impossibility of this reading for (43a) indicates that *bi* is not a coordinator, and coordination does not involve in the *bi*-comparatives.

The second proposal of Liu (1996) is concerned with the existence of the gapped comparative constructions in Mandarin Chinese. He provides two pieces of evidence to argue for this proposal. The example in (40a) is one of them (repeated here as (44)).

(44) Zhangsan jintian [PP *bi* [CP *Lisi* zuotian *e*]] gaoxing

Zhangsan today BI Lisi yesterday happy

‘Zhangsan is happier today than Lisi was yesterday.’

Here, according to Travis (1988), the temporal adverb *zuotian* ‘yesterday’ needs a licenser T^0 , whereas we cannot find any licenser in the CP-complement of *bi* except for the NP *Lisi*, which certainly cannot be a licenser of the temporal adverb. Thus, Liu (1996) suggests that the grammaticality of (44) shows the existence of an empty predicate *e* (a gap) inside the CP-complement, which is an I’ gap.

Comparative constructions built with descriptive complements, as shown in (46), are the second piece of evidence that Liu uses to argue for the GC construction in Mandarin Chinese.

A typical example of the descriptive complement construction is illustrated in (45).

- (45) Lisi [v₁ qi] [NP ma] [v₂ qi]-de [Result hen kuai]
 Lisi ride horse ride-DE very fast

‘Lisi rode horse and rode very fast.’

- (46) a. Zhangsan qi ma [bi [CP Lisi qi niu]] qi-de kuai
 Zhangsan ride horse BI Lisi ride cow ride-DE fast

‘The speed that Zhangsan rides a horse is faster than the speed that Lisi rides a cow.’

- b. *Zhangsan qi ma [bi [CP Lisi gan yang e]] qi-de hao
 Zhangsan ride horse BI Lisi keep sheep ride-DE good

c. * Zhangsan qi ma [bi [CP Lisi gan yang **qi-de hao**]] qi-de hao

Zhangsan ride horse BI Lisi keep sheep ride-DE good ride-DE good

Huang (1989) suggests that the descriptive complement construction be schematized into the pattern V_1 -NP- V_2 -*de*-Result, in which V_1 and NP form a deverbalized adjunct modifying the main verb V_2 , and V_2 should be the reduplicated form of V_1 . Following this pattern, Liu (1996) proposes that by positing the existence of the GC constructions in Mandarin, we can account for the ungrammaticality of (46b). The content of the gap in (46b) must be identical with that of the main predicate. In other words, the reconstructed representation of (46b) is (46c), where the descriptive complement construction, *gan yang qi-de hao*, is the cause of the ungrammaticality since V_2 *qi* ‘ride’ is not identical to V_1 *gan* ‘keep’.

The third proposal in Liu (1996) is about how the I' gap is created. He claims that the gap is not created by movement; instead, it is created by deletion or base-generation. This point is made by means of the contrast between English and Chinese in (47).

(47) a. John is taller [PP than [CP1 O_i [IP Max thinks [CP2 that [Bill is t_i]]]]].

b. *Zhangsan jintian [PP bi [CP Lisi renwei [CP Wangwu zuotian e]]] gaoxing

Zhangsan today BI Lisi think Wangwu yesterday happy

Chomsky (1977) argues that English comparative constructions display the unbounded dependency effect since the empty operator O_i moves to the specifier position of CP_1 , as shown in (47a). In contrast, comparative constructions in Chinese do not display the unbounded dependency, as indicated by the ungrammatical (47b). This suggests that the gap in (47b) is not created by movement. Thus, Liu (1996) proposes that the gap is created either by deletion or by base-generation.

The final and the most essential proposal in Liu (1996) is that the *bi*-clause and the degree adverb *geng* ‘more’ form a syntactic constituent, which may undergo Quantifier Raising (QR) at LF. Liu claims that the infinite regress problem of (48) below can be solved by this proposal.

(48) a. Zhangsan jintian [₁ [_{PP} bi Lisi zuotian [₁ _____]] kaixin]

Zhangsan today BI Lisi yesterday happy

‘Zhangsan today is happier than Lisi was yesterday.’

b. Zhangsan jintian [₁ bi Lisi zuotian [₁ **bi Lisi zuotian** [₁ ___]**kaixin**]]kaixin]

Under Liu's analysis, (48) is an ACD construction, and the I' gap in (48a) is reconstructed with the I' in the matrix clause, as shown in the bold-faced part in (48b). However, the reconstruction operation creates another I' gap, which ends up with the infinite regress. With regard to this problem, Liu (1996) suggests that the problem can be solved by moving the I' gap out of its containing antecedent via QR at LF, as illustrated in (49).

(49) a. [_{PP} bi Lisi zuotian [_{I'} ____]]_i [Zhangsan jintian [_{I'} t_i kaixin]]

b. [_{PP} bi Lisi zuotian [_{I'} t_i **kaixin**]]_i [Zhangsan jintian [_{I'} t_i kaixin]]

The structure in (49a) is derived from (48a) by QR of the *bi*-constituent. Liu claims that after the QR operation of the *bi*-constituent, the reconstruction of the I' gap will no longer create another I' gap, as demonstrated in (49b). Thus, the infinite regress problem can be solved.

2.2.2 Chung (2006)

There are two main concerns in Chung (2006): the syntactic property of *bi* and the syntactic structure of Mandarin *bi*-comparatives. The former involves four possibilities, *bi* as a verb, a preposition, a conjunction, and a complementizer. Chung argues for analyzing *bi* as a

complementizer. As for the latter, she adopts a *geng*-headed comparative construction where the degree adverb *geng* projects a DegP and takes the gradable predicate and the *bi*-clause as its two arguments. Chung's (2006) arguments about the two issues are presented in detail below.

To begin with, in terms of the syntactic category of *bi*, Chao (1968) argues for treating *bi* as a verb because *bi* can mean “compare” or “compete”. Thus, Chao (1968) proposes that *bi*-comparatives are serial verb constructions. However, Chung (2006) presents many arguments against this proposal. First of all, a verb is usually able to be followed by aspect markers. In contrast, *bi* in *bi*-comparatives is incompatible with aspect markers, as illustrated in (50).

- (50) a. Laoli na le maojin qu xizao
 Laoli take ASP towel go take a bath

‘Laoli took a towel to take a bath.’

- b. tamen yijing bi guo liqi le
 they already compete ASP strength ASP

‘They have already competed for their strength.’

- c. *wo bi guo Lisi geng ai ni
 I BI ASP Lisi more love you

In (51a), *bi*, with its literal verbal meaning ‘compete’, can occur in the V-*yi*-V reduplication form as most verbs do. By contrast, the *bi* in *bi*-comparatives cannot, which again suggests that it is not a verb.

Finally, Chung (2006) argues against taking *bi* as a verb based on the kinds of complements that *bi* can take. In general, a verb takes an NP as its complement. However, *bi* in *bi*-comparatives is able to take NPs, VPs, PPs, CPs, and even non-constituents as its complement. This is demonstrated with the following examples.

(52) a. [PP zai jia] bi [PP zai waimian] geng shushi
 at home BI at outside more comfortable

‘It is more comfortable staying home than staying outside.’

b. [CP ni lai] bi [CP wo qu] geng kuai
 you come BI I go more fast

‘It is faster for you to come than for me to go.’

c. [Zhangsan jintian] bi [ni zuotian] geng shengqi
 Zhangsan today BI you yesterday more angry

‘Zhangsan is angrier today than you were yesterday.’

With the three arguments above, Chung (2006) claims that *bi* in *bi*-comparatives cannot be analyzed as a verb. Then, the second proposal, *bi* as a preposition, is examined. This proposal is adopted by many researchers because *bi* obeys many criteria that McCawley (1992) uses to distinguish prepositions from verbs in Mandarin. Nonetheless, Chung (2006) does not take this viewpoint, and she provides three arguments against this proposal. The first argument is that a prepositional phrase is usually a modifier which is optional. But, the *bi*-constituent is the key element in a *bi*-comparative, not a modifier. This contrast is shown in (53).

- (53) a. wo (gen mama) qu taibei
 I with mother go-to Taipei
 ‘I go to Taipei with my mother.’
- b. wo *(bi ni) gao¹³
 I BI you tall
 ‘I am taller than you.’

¹³ This argument against treating *bi* as a preposition in Chung (2006) may be problematic because (53b) is grammatical without the presence of *bi ni* when it serves as an answer to the question in (i) below:

- (i) A: Nimen, shei gao ne?
 you whi tall SFP
 ‘Which of you is taller?’
 B: Wo gao.
 I tall
 ‘I am taller.’

It is not true that *bi*-comparatives without *bi*-constituents are always ungrammatical; therefore, this argument in Chung (2006) is weak.

As we can see, the omission of the *bi*-constituent makes (53b) unacceptable and even ungrammatical to some native speakers of Mandarin. But, the omission of the PP *gen mama* ‘with mother’ does not cause any problem to (53a).

The second argument against taking *bi* as a preposition is that a preposition usually takes full-constituent complements, but *bi* can take non-constituents as its argument, as shown in (52c) above. This contrast is illustrated in (54).

(54) a. *Zhangsan xihuan zai [taibei jintian]

Zhangsan like at Taipei today

b. [taibei jintian] bi [xinzhu zuotian] re

Taipei today BI Hsinchu yesterday hot

‘It is hotter in Taipei today than in Hsinchu yesterday.’

Chung (2006) makes her third argument against treating *bi* as a preposition from the traditional grammarian viewpoint of prepositions in Mandarin. That is, Chinese prepositions

do not take PPs as their complement. However, *bi* can take PP-complement. This argument is illustrated with the two examples in (55).

(55) a.* Zhangsan dui zai taibei mei yijian

Zhangsan to at Taipei no opinion

b. Zhangsan [PP dui youxi] bi [PP dui shuben] geng youxingqu

Zhangsan to games BI to book more interest

‘Zhangsan is more interested in games than in books.’

As we can see here, unlike the preposition *dui* ‘to’ in (55a), *bi* in (55b) can take a PP as complement. Because of the three arguments above, Chung (2006) does not analyze *bi* as a preposition.

The third proposal of the syntactic category of *bi* claims that *bi* is a conjunction, which is based on the fact that the two compared items in *bi*-comparatives must be semantically parallel; otherwise, the sentence will be unacceptable, as shown in (56).

(56) *Zhangsan bi shuben nuli

Zhangsan BI book work hard

Although both *Zhangsan* and *shuben* ‘book’ are NPs, they are not parallel semantically. Thus, (56) is unacceptable. This is similar to the coordinate construction where the conjuncts have to be parallel syntactically and semantically. However, Chung (2006) argues against the conjunction proposal because a coordination construction does not show ambiguity, but a *bi*-comparative can be ambiguous. See (57) below.

- (57) a. wo ai ta bi ni duo
- I love him BI you many
- (i) ‘I love him more than I love you.’
- (ii) ‘I love him more than you do.’
- b. Zhangsan jiao [Lisi han ni] dou hen younaixin
- Zhangsan teach Lisi and you both very patient
- ‘Zhangsan is very patient in teaching both you and Lisi.’

The *bi*-comparative in (57a) has two possible interpretations; however, the coordination construction in (57b) only gets one interpretation. This shows that *bi* is different from a conjunction.

As presented above, Chung (2006) argues against the first three proposals. She adopts the fourth one, in which *bi* is analyzed as a complementizer. The evidence comes from the fact that the post-*bi* constituent can have tense, as shown in (58).

(58) ta zuotian zai xuexiao bi [TP wo jintian zai jiali] gaoxing
 s/he yesterday at school BI I today at home happy

‘S/He was happier at school yesterday than I am at home today.’

According to Chung (2006), the post-*bi* constituent in (58) is a TP, so it is reasonable to take *bi* as a complementizer that takes a TP as its complement. Moreover, historically, prepositions and complementizers are closely related in both English and Mandarin, which is shown in (59) and (60) below.

(59) a. After graduation, he went abroad.

b. After he graduated, he went abroad.

(60) a. yinwei zhe jian shi, ta shou dao biaoYang
 because this CL event he accept to praise

‘Because of this event, he was praised.’

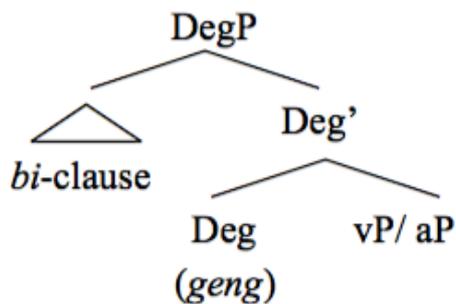
b. yinwei tianqi buhao, women quxiao huodong
 because weather bad we cancel activity

‘Because the weather was bad, we cancel the activity.’

As we can see, in (59a) and (60a), *after* and *yinwei* ‘because’ are both prepositions. On the other hand, they serve as a complementizer in (59b) and (60b). This indicates the close relation between prepositions and complementizers.

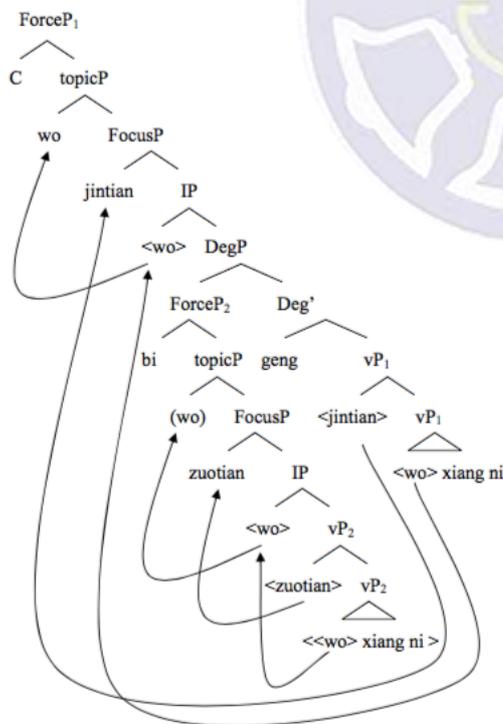
Then, here comes the second issue, the syntactic structure of *bi*-comparatives. Chung (2006) adopts a functional head hypothesis in which *geng* takes the gradable predicate as its internal argument, and the degree *bi*-clause as the specifier to license the projection of DegP, which is demonstrated in (61).

(61)



Moreover, Chung (2006) takes the degree adverb as the Degree head, and she claims that both *bi* and *geng* are core elements in Mandarin *bi*-comparatives. The degree adverb *geng* takes vP/AP as the complement and projects into DegP, in which *bi* selects gradable comparative clauses as its complement. With the adoption of the functional head hypothesis and the assumption above, Chung (2006) provides the tree structure in (62)¹⁴ for Mandarin *bi*-comparatives. Here, Chung (2006) follows Rizzi (1997) and decomposes CP into the following projections: ForceP > TopicP* > FocusP > TopicP* > FiniteP > IP.

(62)



¹⁴ In Travis (1988), temporal adverbs, such as *jintian* ‘today’ and *zuotian* ‘yesterday’, are claimed to be T⁰-licensed. Following this logic, we find that the position of the temporal adverbs *jintian* and *zuotian* are placed too low in the structure provided by Chung (2006).

2.2.3 Hsieh (2015)

In this remark, Hsieh argues for the Reduction Analysis based on the data concerning the long-distance dependency of the Mandarin bare reflexive *ziji* ‘self’ in embedded comparatives. The data suggests that the Reduction Analysis is better than the Direct Analysis in accounting for the long-distance reflexives and blocking effect.

Starting with the review of some previous studies, such as Huang & Tang (1989), Cole & Sung (1994), Cole & Wang (1996), on the bare reflexive *ziji* in Mandarin, Hsieh (2015) summarizes the generalizations in (63).

- (63) a. The dependency of the Chinese bare reflexive *ziji* shows subject orientation.¹⁵
- b. In an embedded subordination structure, the subject of the embedded adjoined constituent that does not share the same person feature with the matrix subject blocks

¹⁵ As discussed in Hsieh (2015), the generalization that *ziji* ‘self’ is subject-oriented is far from uncontroversial. A counter example from Chen (1992) is also provided by him, repeated below.

- (i) Yisheng_i tixing Laowang_j chaoshide tianqi dui ziji_{i/j}-de shenti bu-hao
doctor remind Laowang humid weather to self-POSS body not-good
‘The doctor_i reminds Laowang_j that the humid weather is bad for self_{i/j}’s body.’

The bare reflexive *ziji* ‘self’ in (i) can corefer with the subject *yisheng* ‘doctor’ or the indirect object *Laowang*, which indicates that *ziji* ‘self’ is not absolutely subject-oriented.

To maintain his claim that *ziji* ‘self’ is subject-oriented, Hsieh (2015) provides an alternative analysis for (i), which is based on Battistella & Xu (1990). It is pointed out that *ziji* ‘self’ can be used as a generic pronoun, just like the arbitrary PRO or the generic pronoun *one* in English. Hsieh (2015) then suggests that (i) is a generic use of *ziji* ‘self’, and that it should be distinguished with the reflexive one. In this way, (i) won’t be a counter example to the generalization in (63a). For more details about the discussion on *ziji* ‘self’, please refer to Hsieh (2015) and references cited there.

the coreference of *ziji* in the embedded adjoined constituent and the matrix subject.

- c. The indirect object of a double-object construction and the PP complement do not trigger the blocking effect.

According to generalization (63a), only subjects can be the possible antecedent of *ziji*, as shown in (64). As we can see in (64), both the matrix subject *Wangwu* and the embedded subject *Zhangsan* can be the antecedent of *ziji*. In contrast, the indirect object *Lisi* cannot serve as the antecedent.

(64) Wangwu_i renwei Zhangsan_j gei-le Lisi_k yi-pian guanyu ziji_{i/j/*k}-de wenzhang

Wangwu think Zhangsan give-PFV Lisi one-CL about self-POSS article

‘Wangwu_i thinks that Zhangsan_j gave Lisi_k an article about self_{i/j/*k}.’

Generalization (63b) indicates that the long-distance dependency of *ziji* is possible only when all the possible antecedents agree in the person feature, as illustrated in the contrast of (65a) and (65b).

(65) a. Wangwu_i renwei Zhangsan_j xihuan ziji_{i/j}

Wangwu think Zhangsan like self

‘Wangwu_i thinks that Zhangsan_j likes self_{i/j}.’

b. Wangwu_i renwei wo_j xihuan ziji_{*i/j}

Wangwu think I like self

‘Wangwu_i thinks that I_j likes self_{*i/j}.’

The difference between (65a) and (65b) lies in the embedded subject. If the third person subject *Zhangsan* is changed into the first person subject *wo*, it becomes impossible for *ziji* to refer back to the remote possible antecedent *Zhangsan*. This contrast shows the blocking effect summarized in (63b).

Generalization (63c) is demonstrated in (66). As shown in (66) below, the change from *Lisi* to *wo* in the indirect object position does not cause the blocking effect. The bare reflexive *ziji* can still refer back to the long-distance matrix subject *Wangwu*.

(66) Wangwu_i renwei Zhangsan_j gei Lisi/wo_k yi-pian guanyu ziji_{i/j/*k}-de wenzhang

Wangwu think Zhangsan give Lisi/me one-CL about self-POSS article

‘Wangwu_i thinks that Zhangsan_j gave Lisi/me_k an article about self_{i/j/*k}.’

With these generalizations in (63), Hsieh (2015) presents the crucial paradigm to compare the way the two approaches deal with the data. The paradigm is shown in (67).

(67) a. Zhangsan bi Lisi dui ziji hao

Zhangsan BI Lisi to self good

Sloppy reading: ‘Zhangsan_i is better to himself_i than Lisi_j is to himself_j.’

b. Wangwu renwei Zhangsan bi Lisi dui ziji hao

Wangwu think Zhangsan BI Lisi to self good

LDR reading: ‘Wangwu_i thinks that Zhangsan is better to him_i than Lisi is to him_i.’

Non-LDR reading: ‘Wangwu thinks that Zhangsan_i is better to himself_i than Lisi_j is to himself_j.’

c. Wangwu renwei Zhangsan bi wo dui ziji hao

Wangwu think Zhangsan BI I to self good

*LDR reading: ‘Wangwu_i thinks that Zhangsan is better to self_i than I am to self_i.’

Non-LDR reading: ‘Wangwu thinks that Zhangsan_i is better to self_i than I_j am to self_j.’

Here, the LDR reading refers to the reading in which the bare reflexive *ziji* refers back to the long-distance antecedent *Wangwu*. As we can see in the contrast between (67b) and (67c), when the post-*bi* constituent does not agree with the matrix subject and the embedded subject in person, the blocking effect occurs. Thus, the LDR reading is impossible for (67c). Hsieh (2015) uses the paradigm in (67) to examine which of the two approaches, the Reduction Analysis or the Direct Analysis, can better account for the contrast in (67).

On the one hand, it is shown that the Reduction Analysis can perfectly explain the paradigm in (67). First of all, the sentence in (67a) has the structure and LF in (68).

- (68) a. Surface syntax: [TP Zhangsan_i [vP [bi Lisi ~~dui ziji hao~~] [vP t_i dui ziji hao]]]
- b. LF: ... [vP [bi Lisi_i dui ziji_i hao] [vP Zhangsan_j dui ziji_j hao]]

Since the predicate containing *ziji* appears twice, and that the post-*bi* constituent is treated as a syntactic subject in the Reduction Analysis, the sloppy reading in (67a) can be well-explained.

Then, for (67b), Hsieh provides the structure and its LFs in (69).

- (69) a. Surface syntax: [TP Wangwu [vP renwei [CP [TP Zhangsan_i [vP [bi Lisi ~~dui ziji hao~~] [vP t_i dui ziji hao]]]]]]]

b. LF 1: [TP Wangwu_i... [CP [TP... [vP [bi Lisi dui ziji_i hao] [vP Zhangsan dui ziji_i hao]]]]]]

LF 2: [TP Wangwu... [CP [TP... [vP [bi Lisi_i dui ziji_i hao] [vP Zhangsan_j dui ziji_j hao]]]]]]

As we can see, there are two possible LFs for (67b), and both can be captured in the Reduction Analysis. For LF 1, the two tokens of *ziji* are remotely bound by the matrix subject *Wangwu*; as for LF 2, they are locally bound by *Lisi* and *Zhangsan* respectively. Finally, to account for the blocking of the LDR reading in (67c), Hsieh (2015) gives the following structure and LFs in (70).



(70)a. Surface syntax: [TP Wangwu [VP renwei [CP [TP Zhangsan_i [vP [bi wo ~~dui ziji hao~~] [vP *t_i* dui ziji hao]]]]]]]]

b. *LF 1: [TP Wangwu_i... [CP [TP... [vP [bi wo dui ziji_i hao] [vP Zhangsan dui ziji_i hao]]]]]]

LF 2: [TP Wangwu... [CP [TP... [vP [bi wo_i dui ziji_i hao] [vP Zhangsan_j dui ziji_j hao]]]]]]¹⁶

In LF 1, the reference of *ziji* with the matrix subject *Wangwu* is blocked by the post-*bi* constituent *wo*, which is also a possible antecedent, because of the different person feature.

¹⁶ Prof. Luther Liu (p.c.) points out that it is weird that in the two possible LFs, the subject of the embedded clause *Zhangsan* does not move to the specifier position of the embedded TP, which may cause some problems to Hsieh's analysis.

Hence, the reason for the impossibility of LF 1 for (67c) is accounted for in the Reduction Analysis. As for LF 2, since the two tokens of *ziji* here is locally bound, the blocking effect does not influence the interpretation.

On the other hand, however, the paradigm in (67) indeed poses challenges to the Direct Analysis. Because there is only one predicate in the Direct Analysis, the sloppy reading of (67a) can only be yielded semantically by assuming that the denotation of the gradable predicate is used twice in the truth conditions of a comparative. Moreover, what's important in the Direct Analysis is the assumption that *ziji* denotes a reflexivization function rather than simply a variable, because only in this way can we get the sloppy reading of (67a).

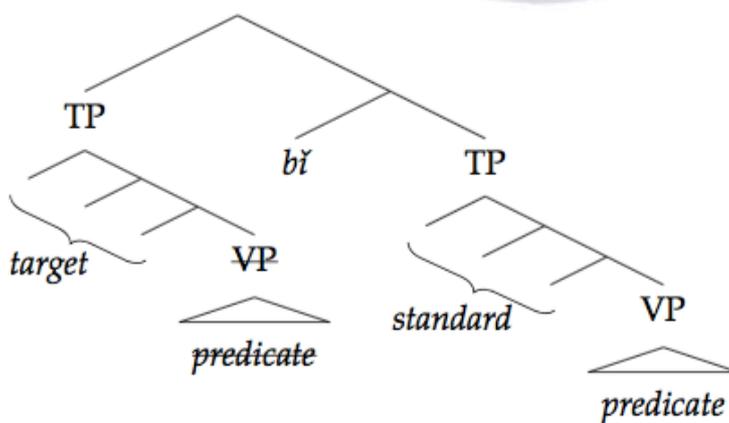
The major problem encountered by the Direct Analysis is its treatment of (67c), where the blocking effect occurs. In the Direct Analysis, the post-*bi* constituent is treated either like an indirect object (Xiang 2005; Erlewine 2007) or like a PP complement (Lin 2009). However, as shown in (63c), the indirect object and the PP complement do not trigger the blocking effect. In order to rule out the LDR reading of (67c), advocates of the Direct Analysis should claim that nominals serving as an indirect object or PP complement will cause the blocking effect, which is contrary to the empirical fact shown in (66) above.

Thus, based on the comparison between the two approaches in terms of the explanation of the long-distance dependency of the bare reflexive *ziji*, Hsieh (2015) suggests that the Reduction Analysis is better than the Direct Analysis.

2.2.4 Erlewine (2017)

Unlike Erlewine (2007), which is in support of the Direct Analysis, Erlewine (2017) argues for the clausal analysis whose essence is that there are two gradable predicates in the syntactic structure of Mandarin *bi*-comparatives and that comparative deletion plays a crucial role in the derivational process. The proposed structure is presented below in (71).

(71)



Here, *bi* is analyzed as a conjunction, taking two TPs in the derivation. As we can see, the target TP is in the specifier position, and the standard TP in the complement position of *bi*. Besides, this proposal is different from Liu (1996) in that comparative deletion occurs in the target TP. According to Erlewine (2017), the predicate inside the target TP must be elided so as to derive the correct surface word order, which is termed by him as the Comparative Deletion Requirement (CDR), as detailed in (72) and (73).

(72) Comparative Deletion Requirement (CDR):

In a *bi* comparative, elide a *local predicate* (73) of the target TP under identity with a local predicate of the standard TP. If the target TP has no elidable local predicate, the derivation is illicit.

(73) Definition: Local predicate

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 .

Based on the description in (72), it is claimed that CDR is obligatory. In other words, without the operation of CDR, a *bi*-comparative is ungrammatical.

Then, Erlewine (2017) adopts this proposal to account for the problems of clausal analysis, the lack of subcomparatives and embedded standards, as shown in (74).

(74) a. *[_{TP1} wo de yizi gao] bi [_{TP2} ni de zhuozi kuan]
I DE chair tall BI you DE table wide

Intended: ‘My chair is taller than your table is wide.’

b. *[_{TP1} Zhangsan_i gao] bi [_{TP2} Lisi renwei [_{TP3} ta_i gao]]
Zhangsan tall BI Lisi think he tall

Intended: ‘Zhangsan is taller than Lisi thinks he is.’

Both (74a) and (74b) can be ruled out by CDR. Firstly, consider (74a), it is ungrammatical because there are no identical local predicates in TP₁ and TP₂. CDR is not satisfied, so the sentence is illicit. Then, consider (74b), although there seems to be an identical predicate *gao* ‘tall’ in the target TP and the standard TP, the second token of *gao* ‘tall’ is embedded in TP₃. Therefore, CDR cannot be applied to this sentence, which causes the ungrammaticality.

To further support his proposal that *bi*-comparatives should be analyzed as involving a clausal conjunction *bi* taking two TPs, Erlewine (2017) provides three additional arguments,

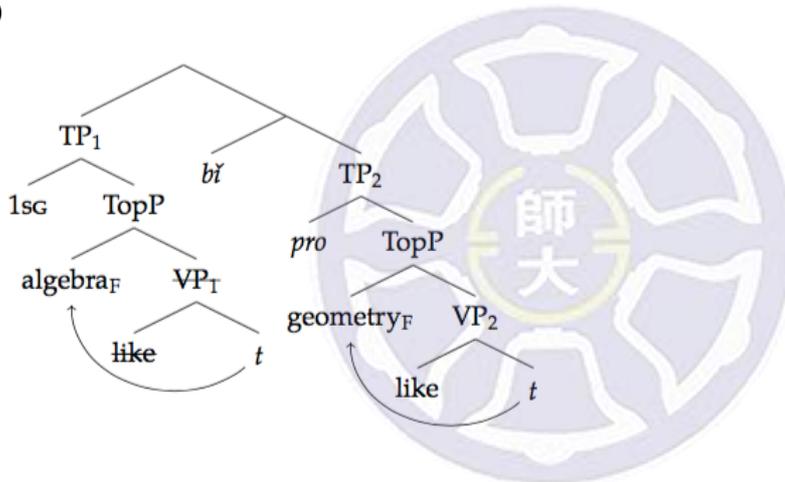
all of which involve movement chains in the derivation. The first one comes from object preposing. The relevant data is shown in (75)¹⁷.

(75) Wo_i daishu bi pro_i jihe xihuan ____

I algebra BI pro geometry like

‘I like algebra more than I like geometry.’

(76)



The blank in (75) refers to the object position of the verb *xihuan* ‘like’. There are two preposed objects *daishu* ‘algebra’ and *jihe* ‘geometry’. However, (75) only contains one token of the verb, and it is impossible for two DPs to occupy the object position of a transitive verb simultaneously. Thus, according to Erlewine (2017), there must be two tokens of the verb

¹⁷ Prof. Luther Liu (p.c.) points out that although (75) is grammatical, the analysis in Erlewine (2017) cannot explain why the following sentence is ungrammatical.

(i) *Zhangsan xianzai wuli bi Lisi yiqian shuxue xihuan
 Zhangsan now physics BI Lisi before mathematics like
 Intended: ‘Zhangsan likes physics now more than Lisi likes mathematics before.’

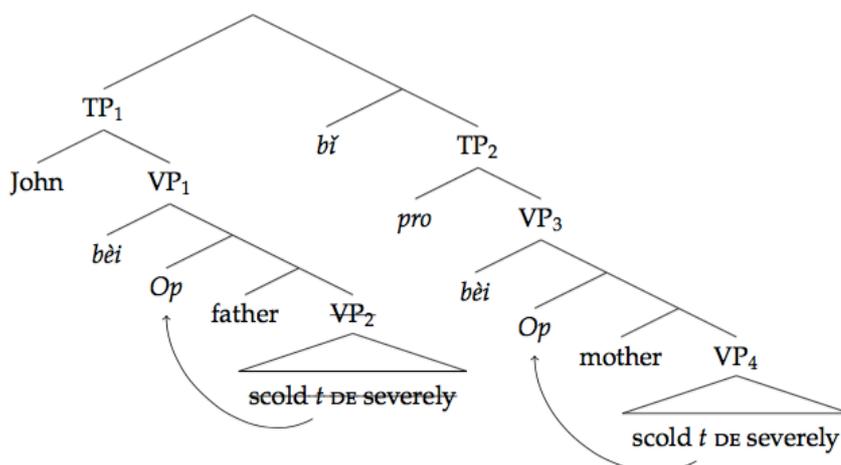
xihuan ‘like’. One of them is in the target TP and the other in the standard TP. This is captured in the structure in (76) above. With the ellipsis of VP₁ in TP₁, (75) is derived. In a phrasal analysis, where there is only one token of the predicate, the data of object preposing cannot be explained.

The second argument is about *bei* long passives. In previous studies, the long passives are argued to involve A’ movement of a null operator from within the predicate to a position between *bei* and the agent. In this way, example (77) serves as another supporting piece of evidence for the clausal analysis.

(77) Zhangsan bei baba bi bei mama ma-de geng can
 Zhangsan BEI father BI BEI mother scold-DE GENG severe

‘Zhangsan was scolded by his father more severely than by his mother.’

(78)



As we can see in (77), there are two contrasting agents of *bei* long passives. Therefore, there must be two null operators moving out of the predicate of comparison, which suggests that two predicates are needed in the derivation of (77). The structure and derivation process of (77) is illustrated in (78) above. Again, with only one predicate assumed, phrasal analyses cannot derive (77). Moreover, *bei* and the agent do not form a constituent, so they cannot be introduced together by *bi* as in the phrasal analyses.

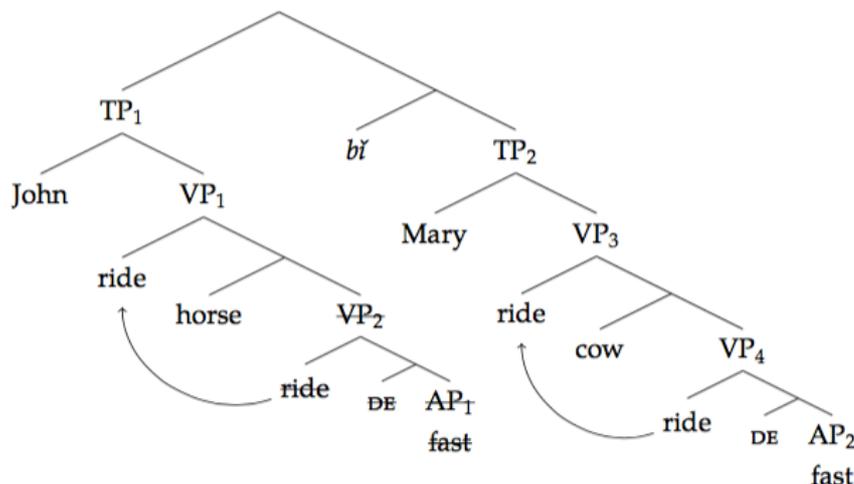
Verb-copy constructions are the third argument provided by Elrewine (2017) to support his clausal analysis. Citing Huang (1988) and Cheng (2007), Elrewine assumes that verb-copy constructions are derived via movement of the verb without deletion of the lower copy. An example is given in (79), with its derivation shown in (80).

(79) Zhangsan qi ma bi Lisi qi niu qi-de kuai

Zhangsan ride horse BI Lisi ride cow ride-DE fast

‘Zhangsan rides horses faster than Lisi rides cows.’

(80)



As shown in (80), the two verbs in TP₁ are the same because they are constructed by verb-copy, and so do the two verbs in TP₂. Then, for ellipsis to operate, it is required that the lower local predicate in TP₁ be identical to that in TP₂. By doing so, CDR is satisfied. According to Erlewine (2017), this is why we see three tokens of *qi* ‘ride’ in the surface structure of (79). Phrasal analyses, again, fail to account for the (79) above.

Based on the proposal as well as the three additional arguments, Erlewine (2017) concludes that *bi*-comparatives in Mandarin Chinese should be analyzed as two clauses conjoined by the comparative morpheme *bi*.

Arguing for a clausal analysis for Chinese *bi*-comparatives, Erlewine’s (2017) proposal is different from other clausal analyses in two assumptions. To begin with, he suggests that *bi* be

categorized as a conjunction which takes two TPs as its arguments.¹⁸ Secondly, he proposes the Comparative Deletion Requirement (CDR) to cope with the two problems of the clausal analyses: the lack of subcomparatives and embedded standards. He also claims that the CDR is obligatory.

However, there are some possible problems of Erlewine's analysis. First of all, he does not provide any supporting evidence to prove that *bi* is a conjunction. Instead, we can find that *bi* and common coordinators do not behave alike. Since Ross (1967), it has been known that a coordinate structure is subject to Coordinate Structure Constraint (CSC) such that no conjunct may be moved nor can any element contained in a conjunct be moved out of that conjunct, as demonstrated in (81) and (82).

(81) a. He will put the chair between [some table] and [some sofa]

b. *[What sofa]_{*i*} will he put the chair between some table and *t_i*?

c. *[What table]_{*i*} will he put the chair between *t_i* and some sofa?

(82) a. [John plays the piano] and [Mary sings the song].

b. *The piano which John plays *t_i* and Mary sings the song is expensive.

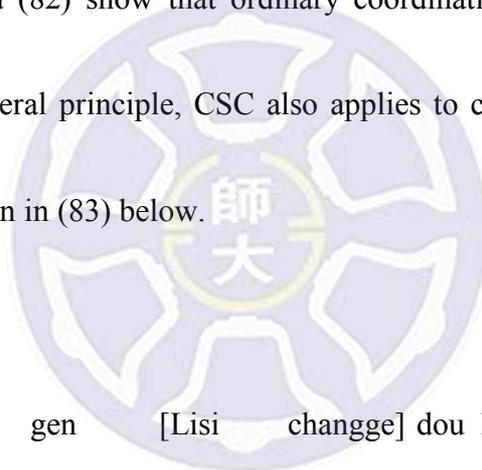
c. *The song which John plays the piano and Mary sings *t_i* sounds touching.

¹⁸ Hong (1991) also proposes a conjunction analysis for *bi*-comparatives, where *bi* is analyzed as the coordinator of the two compared clauses. Moreover, Hong also claims that the main predicate is obligatorily raised; in other words, she takes *bi*-comparatives as one kind of Right-Node Raising (RNR) constructions.

In (81a), two NPs, *some table* and *some sofa*, are coordinated. As we can see in (81b) and (81c), neither of the two conjuncts can be moved; otherwise, the sentence will become ungrammatical.

In (82), two TPs are coordinated (as indicated by the brackets). Again, according to CSC, elements inside a conjunct cannot be moved out, either. As a result, either *the piano* in (82b) or *the song* in (82c) fails to be relativized.

Examples in (81) and (82) show that ordinary coordination constructions in English observe CSC. Being a general principle, CSC also applies to coordination constructions in Mandarin Chinese, as shown in (83) below.



(83) a. [Zhangsan tiaowu] gen [Lisi changge] dou hen bang

Zhangsan dance and Lisi sing all very good

‘Both Zhangsan’s dancing and Lisi’s singing are great.’

b. *Zhangsan_i, laoshishuo, [t_i tiaowu] gen [Lisi changge] dou hen bang

Zhangsan frankly speaking dance and Lisi sing all very good

Intended: ‘Frankly speaking, both Zhangsan’s dancing and Lisi’s singing are great.’

As demonstrated in (83b), the NP inside the first conjunct, *Zhangsan*, cannot be moved out. (The sentential adverb *laoshishuo* ‘frankly speaking’ is used here to assure that *Zhangsan* is indeed moved out of the conjunct.) By contrast, *bi*-comparatives are not subject to CSC, which is illustrated in (84).

(84) a. [Zhangsan tiaoowu] bi [Lisi changge] haiyao hao

Zhangsan dance BI Lisi sing even good

‘Zhangsan’s dancing is much better than Lisi’s singing.’

b. Zhangsan_i, laoshishuo, [t_i tiaoowu] bi [Lisi changge] haiyao hao

Zhangsan frankly speaking dance BI Lisi sing even good

‘Frankly speaking, Zhangsan’s dancing is much better than Lisi’s singing.’

As we can see in (84b), *Zhangsan* can be moved out. This difference serves as the first piece of evidence to show that *bi* is syntactically different from common coordinators such as *gen* ‘and’ in Mandarin.

Moreover, as suggested in Chung (2006) in §2.2.2, *bi*-comparatives behave differently from the ordinary coordinate constructions¹⁹, such as sentences with *han* ‘and’. The comparison between the two constructions is repeated below as (85) and (86).

(85) Wo ai ta bi ni duo
 I love him BI you more

(i) ‘I love him more than I love you.’

(ii) ‘I love him more than you do.’

(86) Zhangsan jiao Lisi han ni dou hen younaixin
 Zhangsan teach Lisi and you both very patient

‘Zhangsan is very patient in teaching both you and Lisi.’

The ordinary coordination construction, the example in (86), does not show any ambiguity and has only one reading. However, the *bi*-comparative, the example in (85), has two possible interpretations and is thus ambiguous. This contrast indicates that although both *bi* and *han* require the two items it connects to be parallel syntactically and semantically, *bi* still shows different behavior from *han* in terms of the interpretations of sentences containing them.

¹⁹ This argument is also seen in Liu (1996), where the difference between *bi* and common coordinators is illustrated with the interpretations of *bi*-comparatives and coordinate constructions containing the bare reflexive *ziji* ‘self’. Please refer back to §2.2.1 for the details.

Therefore, it is hard to claim that *bi* is a conjunction without providing other supporting arguments.²⁰

In addition, there is an essential property of the coordinate constructions: suppose that A and B are the two conjuncts of the coordinator *and*. Then, sentence “A and B” should be equal to sentence “B and A”; in other words, the two conjuncts in a coordinate construction should be exchangeable, as shown in (87).

- (87) a. Wo qu haishi ni qu dou hao
 I go or you go all good
 ‘Either I go (there) or you go (there) is good.’
- b. Ni qu haishi wo qu dou hao
 You go or I go all good
 ‘Either you go (there) or I go (there) is good.’

²⁰ Following Paris (1984), Paul (1993) provides another supporting argument for treating *bi* as a preposition instead of a coordinating conjunction. The main argument is based on the parallel that the post-*bi* NP, just like the NP following a preposition, can be relativized, as shown in (i) below.

- (i) a. Zhangsan bi tai gao de nei-ge nuren jiao Meili
 Zhangsan BI 3SG tall SUB that-CL woman call Mary
 ‘The woman compared to whom Zhangsan is taller is called Mary.’
- b. Zhangsan dui tai shuo zhei-ju hua de nei-ge ren jiao Meili
 Zhangsan towards 3SG speak that-CL word SUB that-CL person call Mary
 ‘The person to whom Zhangsan said these words is called Mary.’

The two sentences containing the coordinator *haishi* ‘or’ in (87) bear the same meaning, which suggests that coordinate constructions allow the conjuncts to be exchanged without changing the meaning of the sentence. However, it is not born out in *bi*-comparatives, as demonstrated in (88).

- (88) a. Wo qu bi ni qu heshi
 I go BI you go appropriate
 ‘It’s more appropriate that I go (there) than you go (there).’
- b. Ni qu bi wo qu heshi
 You go BI I go appropriate
 ‘It’s more appropriate that you go (there) than I go (there).’

As we can see in (88), exchanging the target of comparison *wo qu* ‘I go’ with the standard of comparison *ni qu* ‘you go’ will create a totally opposite meaning. This indicates that *bi* is different from common coordinators. Thus, the contrast between the behavior of *haishi* ‘or’ in (87) and that of *bi* in (88) further argues against Erlewine’s proposal that *bi* is a conjunction.

Another possible problem of Erlewine's (2017) proposal pertains to the CDR. He claims that the CDR is "obligatory" and the comparative constructions will become illicit without CDR. Nevertheless, the operation of comparative deletion seems to be "optional" in other languages. This point can be illustrated with the English example in (89) below.

(89) This door is longer than the table is long.

According to the native English speakers that I consulted with, the sentence in (89) is lengthy but grammatical. They would like to omit either *is long* or *long* inside the *than*-constituent. However, without the omission, the sentence in (89) is still an acceptable and grammatical English sentence.

Based on the formulation Erlewine (2017) provides for the CDR, this requirement is "obligatory" because without it, the sentence will be ungrammatical. Then, following the same logic, comparative deletion is "optional" in English since its presence/absence will not affect the grammaticality of the sentence. Therefore, the CDR cannot be applied to comparative constructions in English. Although the formulation of CDR given in Erlewine (2017) has constrained its application to *bi*-comparatives, it will be better if the requirement can be adopted to as many languages as possible in accounting for relevant constructions.

2.2.5 Hsieh (2017)

Although the proposals in Liu (1996) and Chung (2006) can perfectly account for the examples used in their papers, the three problems encountered by the Reduction Analysis, as presented in Xiang (2003), are still not solved by them. In order to argue for the Reduction Analysis, Hsieh (2017) proposes some possible solutions to these problems, which are summarized as follows.

To begin with, Hsieh suggests that the distribution of *dou* in the *bi*-comparatives can be explained with MaxElide proposed in Merchant (2008), as shown in (90).

(90) MaxElide (Merchant 2008)

Let XP be an elided constituent containing an A²-trace. Let YP be a possible target for ellipsis. YP must not properly contain XP.

In other words, MaxElide regulates that ellipsis always deletes the maximal possible targets.

In this way, the paradigm below in (91) - (93) can be accounted for with MaxElide as well as the appropriate places where *dou* is base-generated.

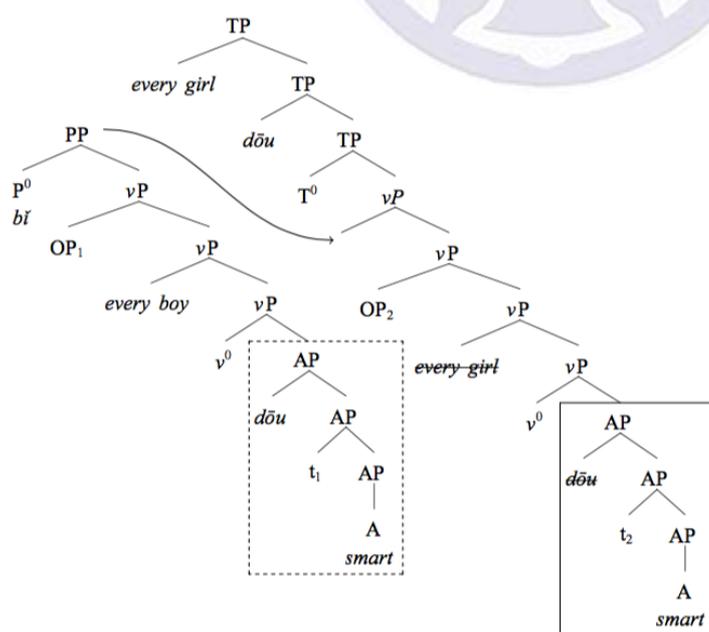
(91) mei-ge nusheng dou bi mei-ge nansheng (*dou) congming
 every-CL girl all BI every-CL boy all smart
 ‘Every girl is smarter than every boy.’

(92) mei-ge nusheng *(dou) bi Zhangsan (*dou) congming
 every-CL girl all BI Zhangsan all smart
 ‘Every girl is smarter than Zhangsan.’

(93) Zhangsan bi mei-ge nusheng ?/*(dou) congming
 Zhangsan BI every-CL girl all smart
 ‘Zhangsan is smarter than every girl.’

Take (91) as an example. It has the structure shown in (94) below.²¹

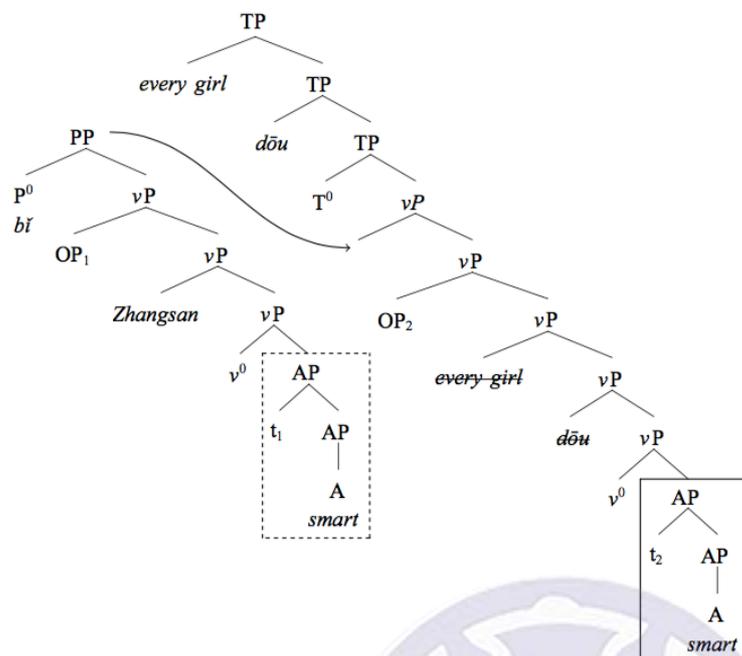
(94)



²¹ In Hsieh (2017), dash-line boxing marks the elided constituent, and the solid-line boxing indicates its antecedent.

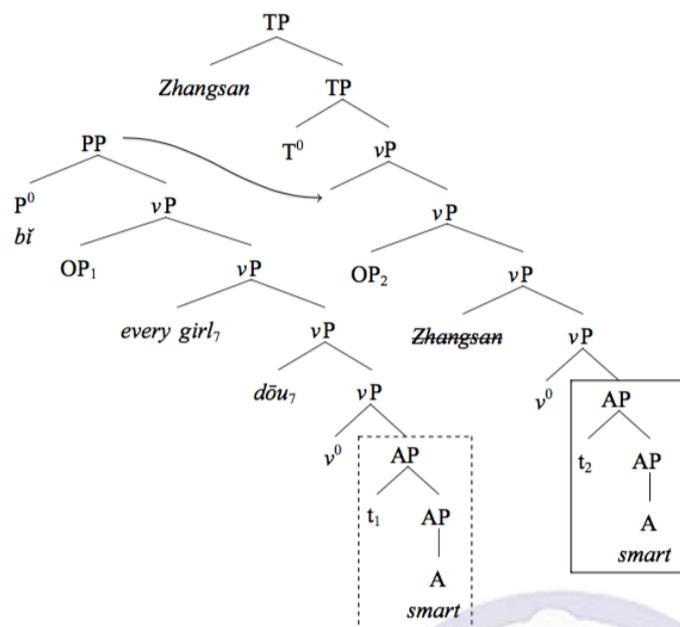
Here, *dou* is assumed to be base-generated under AP. Based on MaxElide, the ellipsis operation targets at AP; thus, the *dou* in the *bi*-constituent is elided (in the dash-line boxing). Then, the remaining *dou* (in the solid-line boxing) moves to adjoin to TP in order to be in the same Spell-out domain with the subject which it modified. This is why *dou* does not appear in the *bi*-constituent in the surface structure of this sentence. According to Hsieh (2017), *dou* cannot be base-generated under ν P in this sentence since ellipsis only targets maximal projections. However, the maximal projection here is the AP rather than the ν P. Therefore, MaxElide targets at AP and the *dou* adjoined to ν P cannot be elided, which causes ungrammaticality because we have two tokens of *dou* in the surface structure, contrary to the fact. Sentences (92) and (93) can be analyzed in a similar way. The only difference is that in these two sentences, *dou* is assumed to be base-generated under ν P rather than AP. Consider the structure of (92) in (95).

(95)



As mentioned above, *dou* here is base-generated within *vP*, instead of AP. If this is not the case, there will be no maximal projection that can be deleted. As a result, the predicate inside the *bi*-constituent cannot be elided, which leads to ungrammaticality. However, if *dou* is under *vP*, the AP will be the maximal projection that satisfies MaxElide. With the deletion of the predicate in the *bi*-constituent and the movement of *dou* to the TP domain, the correct surface word order can be successfully derived. Then, let's see what happens in (96), the structure of the sentence in (93).

(96)



Again, in this structure, *dou* is base-generated under *vP*. If it is in the AP, the predicate within the *bi*-constituent cannot be deleted. Same as (95), MaxElide is satisfied by the ellipsis of AP, the maximal projection. Then, we can derive the grammatical sentence.

As for the second and third problem, i.e., the lack of subcomparative and embedded standard, Hsieh (2017) adopts two theoretical notions, Agree and the rescuing effect from PF-deletion. For the former, Hsieh adopts Wurmbrand's (2014) definition of Agree, and the latter has been proposed in Boskovic (2011), Merchant (2009), and many others. Moreover, there are three assumptions. Firstly, all functional clausal heads (T, Mod, Asp...) have an interpretable T(ense)-feature (*i*T) which is typically valued; all verbal heads (V, A...) have an uninterpretable T-feature (*u*T) which is typically unvalued. Secondly, an unvalued feature is

not allowed at the interface (PF/LF), so it must undergo Agree with the closest valued feature.

Thirdly, Hsieh assumes that the *bi*-constituent contains a *vP*, and lacks all the higher functional heads.²² With the two notions and the three assumptions, the two ungrammatical sentences in (97a) and (98a) can be explained. Consider (97a) first, which is an example of subcomparatives.

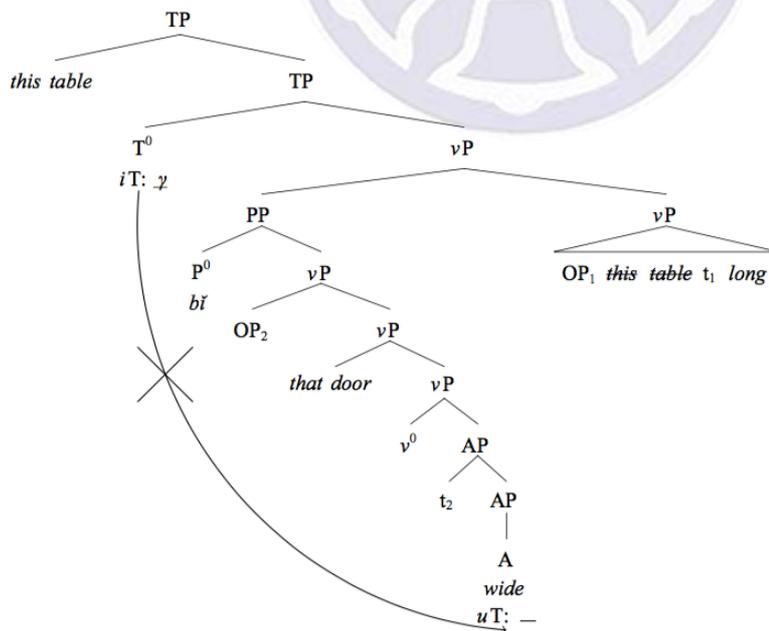
Hsieh provides its structure in (97b).

(97) a. *zhe-zhang zhuozi bi na-shan men kuan chang

this-CL table BI that-CL door wide long

Intended: 'The table is longer than the door is wide.'

b.



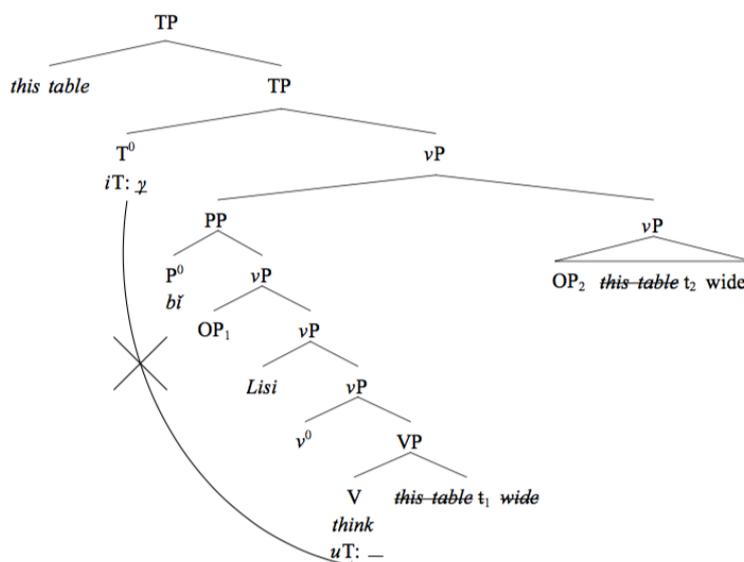
²² According to Hsieh (2017), the assumption that *bi* takes a small clause (*vP*) as its complement and lacks all the higher functional heads is inspired by Pancheva's (2006) analysis of certain types of phrasal comparatives in Slavic languages.

As we can see, there is an uninterpretable feature on the predicate *kuan* ‘wide’. With the assumption that the *bi*-constituent lacks all the higher functional heads, the uninterpretable feature on the predicate cannot be valued inside the PP formed by *bi*. The only possible head with interpretable valued feature is the T head; however, the feature valuation is blocked by the PP, which is an adjunct island. Then, since the uninterpretable unvalued feature cannot be valued, it becomes a fatal feature. Hence, the derivation crashes, and the sentence is ungrammatical. Now, we can turn to (98), an example of embedded standard.

(98) a. *zhe-zhang zhuozi bi Lisi renwei (ta) kuan
 this-CL table BI Lisi think it wide

Intended: ‘This table is wider than Lisi thinks it is,’

b.



The same logic can be applied to the explanation for the ungrammaticality of (98). The uninterpretable unvalued feature on the predicate *renwei* ‘think’ cannot be valued inside the *bi*-constituent, nor can it get valued by the interpretable feature on the T head because of the PP adjunct. Thus, it turns out to be a fatal feature, which crashes the derivation at PF.

With the three solutions provided, Hsieh (2017) suggests that the reduction analysis has a greater advantage over the direct analysis in capturing the syntactic and semantic properties of Mandarin *bi*-comparatives.

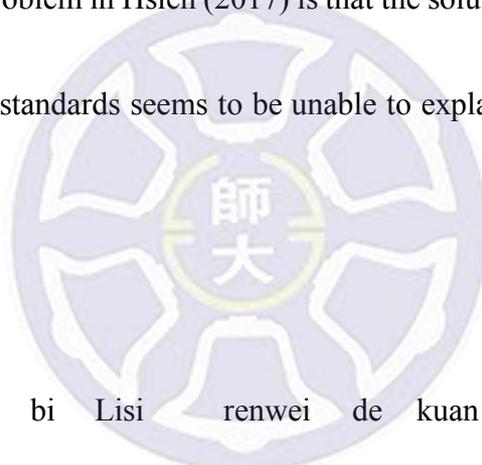
At first glance, it seems that Hsieh’s (2017) proposal is capable of solving the three problems of the Reduction Analysis. However, with a closer examination, there are three possible problems of Hsieh’s analysis.

First of all, in the analysis of the *dou*’s distribution in *bi*-comparative, Hsieh claims that ellipsis only targets at maximal projections, the phrase level. However, the example in (99) shows that ellipsis can also happen to a non-maximal projection.

(99) John ate a cake in the park, and Bill did at home.

He suggests that *dou* should be base-generated under AP when both the matrix subject and the subject inside the *bi*-constituent are universal; however, if ellipsis can happen at the intermediate level, Hsieh’s account would become problematic because in this way, *dou* can also be base-generated under *vP* in the situation mentioned above, just like the *dou* in sentences involving only one universal subject. By assuming that all the tokens of *dou* in his analysis are base-generated under *vP*, it will make the analysis more consistent and elegant.

The second possible problem in Hsieh (2017) is that the solution which Hsieh uses to deal with the lack of embedded standards seems to be unable to explain the grammatical sentence in (100).



(100) Zhe-zhang zhuozi bi Lisi renwei de kuan
 this-CL table BI Lisi think DE wide

‘This table is wider than Lisi thinks it is.’

In Hsieh’s proposal, the *bi*-constituent is a PP, which is an adjunct island. It will block the feature valuation between the T head and the verb *renwei* ‘think’. Hence, based on Hsieh’s analysis, the sentence in (100) will be ungrammatical; however, this is contrary to the fact because example (100) is grammatical.

Finally, the third problem in Hsieh's proposal pertains to one of his assumptions. That is, the post-*bi* constituent contains a *v*P and lacks all the higher functional clausal heads such as Tense, Aspect, or Modal. However, the sentence below indicates that the post-*bi* constituent can be larger than a *v*P, as illustrated in (101).

(101) Zhangsan mei-you xie gongke bi Lisi mei-you zuo jia-shi haiyao zaogao

Zhangsan not-have write homework BI Lisi not-have do chore more bad

'That Zhangsan does not do his homework is worse than that Lisi does not do the chores.'

The post-*bi* constituent in (101) contains negation *mei* 'not' and the aspect marker *you* 'have', both of which are higher than *v*P. Some may regard *Lisi mei-you zuo jia-shi* 'Lisi does not do the chores' in (101) as a sentential subject since there is an elided predicate *zaogao* 'bad'. In this way, the whole post-*bi* constituent can still be a *v*P. However, in sentence (102) below, which involves topicalization of the object *keben* 'textbook' within the *bi*-constituent, it is difficult to claim that *keben wang-le dai* 'forget to bring the textbook' is a sentential subject. Therefore, the assumption that the post-*bi* constituent contains a *v*P and lacks all the higher functional clausal heads is still problematic.

(102) Zhangsan mei-you xie gongke bi keben wang-le dai hai zaogao

Zhangsan not-have write homework BI textbook forget-Asp bring more bad

‘That Zhangsan doesn’t do his homework is worse than that he forgets to bring his textbook.’

In sum, although Hsieh (2017) tries to argue for the Reduction Analysis, the three problems faced by his analysis suggest that the Reduction Analysis alone still cannot account for all the relevant data here.

2.2.6 An interim summary of the Reduction Analysis

Previous Studies	Major Arguments
Liu (1996)	<ol style="list-style-type: none">1. He analyzes <i>bi</i>-comparatives as one kind of ACD constructions, which contains an I’ gap.2. He treats the <i>bi</i>-constituent as a prepositional phrase, and this PP is seen as a preverbal adjunct.3. The <i>bi</i>-clause and the degree adverb <i>geng</i> ‘more’ form a syntactic constituent, which may undergo QR at LF.
Chung (2006)	<ol style="list-style-type: none">1. She analyzes <i>bi</i> as a complementizer.2. She adopts a <i>geng</i>-headed comparative construction where the degree adverb <i>geng</i> projects a DegP and takes the gradable predicate and the <i>bi</i>-clause as its two arguments.

Hsieh (2015)	He suggests that the Reduction Analysis is better than the Direct Analysis in accounting for the long-distance reflexives and blocking effect in Mandarin.
Erlewine (2017)	<ol style="list-style-type: none"> 1. <i>bi</i> is analyzed as a conjunction, taking two TPs in the derivation. The target TP is in the specifier position, and the standard TP in the complement position of <i>bi</i>. 2. The predicate inside the target TP must be elided so as to derive the correct surface word order (CDR). 3. He provides three additional arguments to support his proposal: object preposing, <i>bei</i> long passives, and verb-copy constructions.
Hsieh (2017)	<ol style="list-style-type: none"> 1. He suggests that the distribution of <i>dou</i> in the <i>bi</i>-comparatives can be explained with MaxElide. 2. He assumes that the <i>bi</i>-constituent contains a <i>vP</i>, and lacks all the higher functional heads. 3. All functional clausal heads have an interpretable T-feature (<i>iT</i>) which is typically valued; all verbal heads have an uninterpretable T-feature (<i>uT</i>) which is typically unvalued. 4. An unvalued feature is not allowed at the interface (PF/LF). 5. The lack of embedded standards and subcomparatives can be attributed to the blocking effect of the PP adjunct formed by the <i>bi</i>-constituent, which contains an unvalued feature on the predicate.

2.3 The Hybrid Analysis

Instead of arguing for either the clausal analysis or the phrasal analysis, Liu (2011) adopts a Hybrid Analysis. Namely, he suggests that comparative constructions in Mandarin Chinese

should be broadly divided into two different types, the phrasal comparatives and the clausal comparatives. Then, he further claims that both the phrasal analysis and the clausal analysis are needed; thus, a Hybrid Analysis is proposed. In §2.3.1, a summary of the proposal in Liu (2011) is provided. Then, I will present in §2.3.2 some counter examples to the distinction of *bi*-comparatives in Liu (2011).

2.3.1 Liu (2011)

Liu's (2011) proposal is composed of five assumptions. First of all, he analyzes the marker *bi* as a prepositional subordinator, which forms a pre-predicate adjunct phrase with the post-*bi* constituent(s). Secondly, he claims that *bi* does not carry the meaning of comparison; instead, it only functions to introduce the standard constituent(s). The meaning of comparison is provided by the degree adverb *geng* 'even more' or the covert comparative morpheme (***geng***). Thirdly, a phrasal *bi*-comparative is defined to have only one standard constituent, and it does not involve any comparative deletion operation. On the other hand, the definition of a clausal *bi*-comparative in Liu (2011) requires that there be more than one standard constituent, and that the standard clause obligatorily undergo comparative deletion as well as involve a degree operator-variable binding relation in syntax. Fourthly, in both types of *bi*-comparatives, the

standard constituent(s) have to be minimally c-commanded by its counterparts in the main clause, and they have to parallel in category and semantics. Moreover, the post-*bi* clause must be parallel to the minimal clause containing the *bi*-phrase in the basic syntactic structure. Fifthly, in a clausal *bi*-comparative, the elided constituents must be *e*-given (Merchant, 2004) in order to reconstruct the content of the ellipsis site.

Under the hybrid analysis, the two examples in (103) and (104) represent the phrasal *bi*-comparative and the clausal *bi*-comparative respectively.

- (103) a. Zhangsan bi Lisi kaixin
 Zhangsan BI Lisi happy
 ‘Zhangsan is happier than Lisi.’



- b. [TP [NP Zhangsan] [DegP [bi [NP Lisi]] [DegP [AP kaixin]]]]

- (104) a. Zhangsan jintian zai jiali bi Lisi zuotian zai xuexiao kaixin
 Zhangsan today at home BI Lisi yesterday at school happy
 ‘Today Zhangsan is happier at home than Lisi was yesterday in school.’

- b. [TP Zhangsan [jintian zai jiali [CP Op_i [C' [C bi] [Lisi zuotian zai xuexiao [DegP [Deg Xi] [AP ~~kaixin~~]]]]] [DegP kaixin]]]

As we can see, the structure of (103a) in (103b) involves only one standard constituent *Lisi* after the prepositional subordinator *bi*, and there is no comparative deletion or degree comparison in this sentence. Therefore, Liu (2011) categorizes (103) as a phrasal *bi*-comparative, and he also suggests that what are compared in a Mandarin phrasal *bi*-comparative are two individuals in terms of certain dimension. On the other hand, Liu claims that the clausal *bi*-comparative in (104) contains a degree operator Op_i and a degree variable x_i , which indicates that what are compared in the clausal comparatives are the maximal degree concerning the matrix predicate and the maximal degree concerning the embedded predicate. In addition, as shown in (104b), the embedded predicate is obligatory elided under comparative deletion; otherwise, the sentence will turn out to be ungrammatical.

To illustrate his fourth assumption, i.e., the parallelism requirement, Liu (2011) provides the example in (105), which is a clausal *bi*-comparative with an embedded standard.

(105) *Zhangsan jintian [bi [Lisi renwei [Wangwu zuotian kaixin]]] kaixin

Zhangsan today BI Lisi think Wangwu yesterday happy happy

According to the fourth assumption above, the post-*bi* clause must be parallel to the minimal clause containing the *bi*-phrase in the basic syntactic structure. In this example, the post-*bi* clause is *Lisi renwei Wangwu zuotian kaixin* ‘Lisi think Wangwu yesterday happy’, which is a sentence with an embedded clause; however, the minimal clause containing the *bi*-phrase is *Zhangsan jintian kaixin* ‘Zhangsan today happy’, which is a sentence without any embedded clause. It is obvious that the example in (105) violates the parallelism requirement; therefore, the *bi*-comparative with an embedded standard in (105) is ruled out.

Liu (2011) further presents two pieces of evidence for his hybrid analysis. One is the *ba* disposal construction, and the other pertains to the focus intervention effect. Both of them are used to support the view that *bi*-comparatives with more than one standard constituent should be treated as clausal comparatives. Consider the *ba* construction first, as shown in (106) below.

(106) a. Zhangsan ba qian bi ba shengming kan-de zhong

Zhangsan BA money BI BA life regard-DE important

‘Zhangsan regards money as more important than (he does) life.’

b. Zhangsan_i ba qian [Op_j [bi Pro_i [_{baP} [ba' ba [_{VP} shengming [_{VP} kan-de t_j zhong]]]]]] kan-de zhong

According to previous studies, such as Whitman & Paul (2005), Li (2006), and Huang et al. (2009), on the *ba* disposal construction, Liu (2011) assumes that the verb *ba* selects a light verb phrase as its complement. Hence, the sentence in (106) actually contains a *ba*-phrase with the elided predicate *kan de zhong* ‘regard-DE important’ after the prepositional subordinator *bi*. Since the disposal *ba* does not form a constituent with the following NP, as shown in (106b), it is impossible for us to adopt the phrasal analysis to account for the sentence in (106). Only with the clausal analysis can (106) be well-explained.

The second piece of evidence comes from the focus intervention effect in an object-preposing construction. An example is given in (107a), with its structure provided in (107b).

(107) a. *Zhangsan (xianzai) shuxue bi Lisi (yiqian) wuli xihuan

Zhangsan now math BI Lisi past physics like

Intended: ‘Zhangsan likes math more than Lisi liked physics.’

b. Zhangsan xianzai shuxue_i [[_{CP} Op_j [C' [C bi] [Lisi yiqian [_{FocP} wuli_k [_{OpF} [_{DegP} [_{Deg} *_j]]]]]]] xihuan t_i

[_{AP} xihuan t_k]]]]]]] xihuan t_i

As shown in (107b), the two objects *shuxue* ‘math’ and *wuli* ‘physics’ come from the two post-verbal positions. This indicates that there should be two tokens of the predicate *xihuan* ‘like’. Therefore, a clausal analysis rather than a phrasal analysis is needed. Besides, according to Liu (2011), the degree variable x_j is c-commanded by the focus operator Op_F , which will wrongly reset the semantic value of the degree variable. Then, this resetting process leaves the degree operator with nothing to bind, which violates the focus intervention effect. Thus, the ungrammaticality of (107a) can be explained.

Finally, Liu (2011) also adopts the hybrid analysis to cope with the problem of the lack of subcomparatives faced by the clausal analyses. The example in (108) shows an ungrammatical sentence containing a subcomparative.

(108) *Zhe-tiao he xianzai [bi [na-tiao he guoqu shen]] kuan
 this-CL river now BI that-CL river past deep wide

Intended: ‘This river is wide than that one was deep.’

Based on the fourth assumption in Liu (2011), the minimal c-commanding condition, the ungrammaticality of (108) can be explained. This condition says that the standard constituent(s)

have to be minimally c-commanded by its counterparts in the main clause, and they have to parallel in category and semantics. Unfortunately, the predicate *shen* ‘deep’ in the *bi*-clause cannot find any c-commanding counterpart in the matrix clause, which results from the pre-verbal status of the *bi* adjunct phrase. As a result, the subcomparative sentence in (108) is ungrammatical.

2.3.2 Counter examples to the distinction of *bi*-comparatives in Liu (2011)

Liu (2011) suggests that Chinese *bi*-comparatives should be categorized into phrasal comparatives and clausal comparatives, based on the number of standard constituent(s). The phrasal *bi*-comparatives contain only one standard constituent and no comparative deletion occurs. On the other hand, when there is more than one standard constituent, the construction in question involves clausal *bi*-comparatives and comparative deletion. This distinction seems to be able to account for most of the Chinese data containing *bi*-comparatives; however, it is found that Liu’s distinction will encounter problems in explaining *bi*-comparatives with preposed objects. The two examples below are taken from Liu (2011:1774).

(109) a. Zhangsan shuxue bi wuli xihuan²³

Zhangsan mathematics BI physics like

‘Zhangsan likes mathematics more than physics.’

b. Mao zhuxi Zhou Enlai bi Deng Xiaoping haiyao xinren

Mao chair Zhou Enlai BI Deng Xiaoping even-more trust

‘Chair Mao_i trusts Zhou Enlai more than he_i trusts Deng Xiaoping.’

What are compared in the examples above are the objects of the main predicate. In (109a), the degree to which Zhangsan likes mathematics is compared to the degree to which he likes physics. According to Liu’s distinction, (109a) should be an example of phrasal *bi*-comparatives because there is only one standard constituent *wuli* ‘physics’. However, this cannot be true. Based on the argument requirement of Chinese comparatives in Lin (2009), the compared constituents have to be the arguments of the predicate of comparison. That is, the two preposed NPs, *shuxue* ‘mathematics’ and *wuli* ‘physics’, are the internal arguments (objects) of the main predicate *xihuan* ‘like’. Nevertheless, *xihuan* ‘like’ is only a transitive verb, rather than a ditransitive one. Thus, it is hard to claim that the two objects *shuxue*

²³ Here I retain the original sentence in Liu (2011). This sentence may sound marginal for some native Chinese speakers; however, if we change the main predicate *xihuan* ‘like’ into *shanchang* ‘be good at’, the sentence becomes much better to the native Chinese speakers I consulted with.

‘mathematics’ and *wuli* ‘physics’ share *xihuan* ‘like’ as their predicate. Therefore, two main predicates are needed. In this way, the sentence in (109a) can be analyzed as an example of clausal *bi*-comparatives which involves the deletion of the predicate *xihuan* ‘like’ inside the *bi*-constituent. The same logic can be applied to example (109b). There are two preposed objects *Zhou Enlai* and *Deng Xiaoping*, which suggests that the underlying structure of this sentence contains two tokens of the main predicate *xinren* ‘trust’. Thus, (109b) should be analyzed as a clausal *bi*-comparative rather than a phrasal one, despite the fact that there is only one standard constituent after *bi*.

From the discussion above, it seems that the distinction between phrasal and clausal *bi*-comparative provided in Liu’s (2011) proposal fails to account for *bi*-comparatives with preposed object. It makes wrong predictions that the examples above are phrasal *bi*-comparatives, which is contrary to the fact. Therefore, the two examples indicate that the distinction between phrasal and clausal *bi*-comparatives cannot be made only depending on how many standard constituent(s) are present. In fact, it seems that it is the number of the predicate in the underlying structure that determines whether a *bi*-comparative is clausal or phrasal. Thus, an adjustment to the criteria of distinction should be made to incorporate more data. In next section, I will elaborate more on this argument and provide some examples to

illustrate the importance of the number of predicate in determining the “identity” of a *bi-comparative*.



CHAPTER 3 The Revised Hybrid Analysis of *Bi*-comparatives

In §2.2.4 and §2.2.5, I have shown that Erlewine (2017) and Hsieh (2017), the two recent representatives of the Reduction Analysis, have offered some solutions to the three problems of the Reduction Analysis. However, it is also found that they have their own problems. On the other hand, this thesis also points out that the Hybrid Analysis in Liu (2011) needs some modifications in §2.3.2. Thus, a revised Hybrid Analysis is proposed in this chapter (§3.1). In addition, for the problem of *dou*'s distribution in *bi*-comparatives, which is not discussed in Liu (2011), I will adopt the mechanism of haplology so as to capture *dou*'s distribution in the new Hybrid Analysis. The concept of syntactic haplology and some relevant examples in Mandarin Chinese will also be provided in §3.2.

3.1 The revised Hybrid Analysis

Since neither the Direct Analysis nor the Reduction Analysis alone accounts for all the data of Chinese *bi*-comparatives, it seems that the Hybrid Analysis proposed in Liu (2011) will be a feasible solution. However, as shown in §2.3.2, Liu's Hybrid Analysis is not without problems. In this section, I will propose the revised Hybrid Analysis, which is mainly based on

Liu's proposal though with some modifications, including the distinction between phrasal and clausal comparatives as well as the parallelism requirement.

There are two main concerns in the current proposal. One is to modify the distinction between phrasal and clausal *bi*-comparatives given in Liu (2011). Some data from the *bei* long passive construction and the *ba* disposal construction will be used to support my argument.

The other concern is to demonstrate how the three problems faced by the Reduction Analysis can be solved under the revised Hybrid Analysis. Among them, the lack of subcomparatives and embedded standards are dealt with in this section, while the issue about the distribution of *dou* in *bi*-comparatives will be discussed in next section.

I will start with the distinction between the two types of *bi*-comparatives. As shown in §2.3.2, the standard of distinction provided in Liu (2011) is problematic when applied to *bi*-comparatives with preposed objects, which apparently contains two tokens of the main predicate in the underlying structure. Moreover, Liu's (2011) distinction also encounters difficulties in categorizing *bi*-comparatives with *bei* long passive constructions and *ba* disposal constructions. The examples are given in (1) and (2) below.

(1) Zhangsan bei baba bi bei mama ma-de (geng) can
 Zhangsan BEI father BI BEI mother scold-DE GENG severe

‘Zhangsan was scolded by his father more severely than by his mother.’

(2) Zhangsan ba qian bi ba shengming kan-de zhong
 Zhangsan BA money BI BA life regard-DE important

‘Zhangsan regards money as more important than (he does) life.’

Based on Ting’s (1998) and Huang’s (1999) studies on *bei* long passives, it is generally accepted that *bei* long passives involve movement of a null operator from the VP to a position between *bei* and the agent NP. In example (1), two “*bei* + agent NP” clusters are compared. This indicates that there are two null operators moving out of the main predicate, which further suggests that the sentence in (1) actually contains two tokens of the main predicate *ma-de can* ‘be scolded severely’. Therefore, (1) should be treated as a clausal *bi*-comparative.

As for example (2), according to Huang et al. (2009), *ba* selects a *vP* as its complement. Since there are two “*ba* + NP” clusters in (2), it can be inferred that each of the “*ba* + NP” cluster selects a *vP* as their complement. In other words, the sentence in (2) includes two tokens

of the main predicate *kan-de zhong* ‘regard as important’. Again, (2) should be analyzed as a clausal *bi*-comparative.

If we adopt Liu’s (2011) standard to categorize (1) and (2), we will encounter problems. It is a consensus that *bei* and *ba* do not form a constituent with the following NP. Then, in the standard of comparison in (1), *mama* ‘mother’ itself is a constituent, but the preceding *bei* does not form a constituent with it. In this way, we are not sure how many standard constituent(s) we exactly have in (1). The same problem also occurs when we count the standard constituent in (2), where the DP *shengming* ‘life’ together with the disposal *ba* do not form a constituent. Therefore, from *bi*-comparatives with preposed objects, *bei* long passives and *ba* disposal constructions, we know that we cannot judge the “identity” of a *bi*-comparative only from the number of standard constituent(s) it contains. The number of the main predicate in the underlying structure should be put into consideration.

In addition, it is found that there is a discrepancy between Liu (2011) and Liu (2014) in the examples he uses to illustrate the phrasal *bi*-comparatives. Although Liu (2011) and Liu (2014) apparently adopt the same definition to distinguish phrasal *bi*-comparatives from clausal ones, some sentences that are very likely to be labeled as clausal *bi*-comparatives in Liu (2011) are categorized as phrasal *bi*-comparatives in Liu (2014). This point is further elaborated in (3).

(3) a. Zhangsan bi Lisi kaixin

Zhangsan BI Lisi happy

‘Zhangsan is happier than Lisi’

b. Beigao yinwei fan du hui bi yinwei qiangjie er geng

Accused because sell drugs will BI because rob then even-more

youkeneng bei pan zhong xing

possible BEI judge severe penalty

‘It is more possible for the accused to be given a severe penalty because he sold drugs than because he robbed.’

c. Ni qu bi wo qu heshi

you go BI I go appropriate

‘It is more appropriate for you to go than for me to go.’

Sentence (3a) is used as an example of phrasal *bi*-comparatives in Liu (2011), based on which (3b) and (3c) seem to be treated as clausal *bi*-comparatives because they involve more than one standard constituent. Take (3c) for instance, it involves one DP *wo* ‘I’ and one VP *qu* ‘go’ in

the standard of comparison, which indicates that it is a clausal *bi*-comparative. However, both (3b) and (3c) are analyzed as phrasal *bi*-comparatives in Liu (2014).

It seems that, in Liu (2014), whether a *bi*-comparative is phrasal or clausal is determined by the number of “pairs” that are compared in the sentence. For example, *fan-du* ‘sell drugs’ and *qiangjie* ‘rob’ form a comparison pair in (3b), and what is compared in (3c) is the pair formed by *ni* ‘you’ and *wo* ‘I’. Since both (3b) and (3c) contains only one comparison pair, they are claimed to be phrasal *bi*-comparatives in Liu (2014). However, even under the distinction in Liu (2014), *bi*-comparatives with preposed objects, *bei* long passives, and *ba* constructions, are still wrongly categorized as phrasal *bi*-comparatives because we only see one comparison pair at the surface of those sentences.

Because we cannot successfully classify all the *bi*-comparatives either by the standard suggested in Liu (2011) or the one in Liu (2014), here I would like to propose revised criteria for the distinction between phrasal and clausal *bi*-comparatives. The new criteria are not only capable of dealing with *bi*-comparatives containing object-preposing constructions, *bei* long passives, and *ba* constructions, but also more straightforward.

The currently proposed criteria for the distinction originate from the observation of the sentences in (4), all of which are analyzed as phrasal *bi*-comparatives in my proposal.

(4) a. Zhangsan bi Lisi gao [comparison between two DPs]

Zhangsan BI Lisi tall

‘Zhangsan is taller than Lisi.’

b. Zhangsan zai xuexiao bi zai jiali kaixin [two PPs]

Zhangsan at school BI at home happy

‘Zhangsan is happier at school than he is at home.’

c. Zhangsan lai Taipei bi qu Xianggang fangbian [two VPs]

Zhangsan come Taipei BI go Hong Kong convenient

‘It is more convenient for Zhangsan to come to Taipei than for him to go to Hong Kong.’

d. Mama yinwei Zhangsan shuo huang bi yinwei ta tou dongxi

mother because Zhangsan say lie BI because he steal thing

haiyao shengqi [two adverbial clauses]

even angry

‘Zhangsan’s mother gets angry more because he lies than because he steals things.’

e. Zhangsan zuotian zai xuexiao bi Lisi jintian zai jiali kaixin²⁴[two TPs]

Zhangsan yesterday at school BI Lisi today at home happy

‘Zhangsan was happier yesterday at school than Lisi is at home today.’

f. Zhe-zhang zhuozi bi Lisi renwei de kuan

this-CL table BI Lisi think DE wide

‘This table is wider than Lisi thinks it is.’

²⁴ Prof. Luther Liu (p.c.) wonders how the relation between the standard and the main predicate is established if *Lisi jintian zai jiali* ‘Lisi is at home today’ forms a constituent. Actually, under my proposal, the main predicate *kaixin* ‘happy’ takes two degree-denoting clauses, i.e., *Zhangsan zuotian zai xuexiao* ‘Zhangsan was at school yesterday’ and *Lisi jintian zai jiali* ‘Lisi is at home today’, and asserts an ordering relation between them.

Examples (4a) - (4d) are treated as phrasal *bi*-comparatives in Liu (2014) and the current proposal. The difference between Liu's (2014) distinction and mine lies in (4e). Liu (2014) analyzes (4e) as a clausal *bi*-comparative; however, I would like to suggest that it will be better to regard (4e) as a phrasal *bi*-comparative based on the following generalization derived from the examples in (4) above:

(5) Phrasal *bi*-comparatives: a *bi*-comparative is phrasal when the elements in the standard of comparison form a complete constituent.

We make comparisons between two DPs, two PPs, and two VPs respectively in (4a) – (4c). All of them are complete constituents. In (4d) and (4e), what are compared are two reason clauses and two propositions, both of which are also complete constituents. As for (4f), it can be analyzed as a headless relative clause, with a covert head *kuandu* 'width'. Since a headless relative clause is a CP, the standard of comparison in (4f) is also a complete constituent. Here, a common feature shared by the standard of comparison in (4) is their being complete constituents. Moreover, another commonality is that there is no need to posit the existence of

the main predicate inside the *bi*-phrase for all the *bi*-comparatives in (4). Therefore, it is plausible to group all of them together as phrasal *bi*-comparatives according to the generalization in (5).

Then, what are the clausal *bi*-comparatives in my revised Hybrid Analysis? To answer this question, I would like to propose the generalization in (6) which describes the shared properties of the clausal *bi*-comparatives in my analysis.

(6) Clausal *bi*-comparatives: a *bi*-comparative is clausal when the elements in the standard of comparison DO NOT form a complete constituent.

In the current proposal, clausal *bi*-comparatives are often exemplified by *bi*-comparatives with special constructions such as object-preposing, *bei* long passives, *ba* constructions, and pivotal constructions. Examples are provided in (7) below.

(7) a. Zhangsan shuxue bi wuli xihuan [object-preposing]

Zhangsan mathematics BI physics like

‘Zhangsan likes mathematics more than physics.’

b. Zhangsan bei baba bi bei mama ma-de geng can [passives]

Zhangsan BEI father BI BEI mother scold-DE even severe

‘Zhangsan was scolded by his father more severely than by his mother.’

c. Zhangsan ba qian bi ba ming kan-de zhong [*ba* constructions]

Zhangsan BA money BI BA life regard-DE important

‘Zhangsan regards money as more important than (he does) life.’

The standard of comparison in (7) is underlined. Note that the subject *Zhangsan* is originally present before the underlined parts inside the *bi*-constituents of (7), and it is deleted at the surface structure later. In other words, the standard of comparison in (7a) – (7c) is actually *Zhangsan wuli*, *Zhangsan bei mama*, and *Zhangsan ba ming*²⁵ respectively. All of them do not form a complete constituent. As a result, they are categorized as clausal *bi*-comparatives according to the generalization in (6). This classification is supported by Liu (2011) and Erlewine (2017), where it is claimed that the three sentences in (7) require the presence of the main predicate inside the standard of comparison.

²⁵ Another possibility is that the agent preceding *ba ming* is *pro*. Here, *Zhangsan* is the closest and most discourse-salient referent for *pro*. For the sake of convenience in discussion, I directly use *Zhangsan* to reconstruct the agent preceding the *ba* sequence *ba ming*.

To show that *bi*-comparatives with pivotal constructions are indeed clausal, I will start with the contrast between the two different usages of *rang* in (8). The *rang* in (8a) is a transitive verb whose meaning is ‘to yield’ or ‘to give in’; on the other hand, in (8b), *rang* is a pivotal verb, which is claimed to select a VP as its complement in Tang (2010). This suggests that *rang* ‘let’ in (8b) does not form a constituent with the following *ta* ‘he’.

(8) a. Zhe-chang bisai, wo rang ni bi ni rang ta geng youkeneng

this-CL game I yield you BI you yield he even possible

‘It is more possible that I yield you than that you yield him in this game.’

b. Wo rang ni bi ni rang ta duo zhu-le san-tian

I let you BI you let he many live-ASP three-day

‘I let you stay for three more days than you let me.’

Thus, in spite of the fact that we see two identical strings *ni rang ta* on the surface in (8a) and (8b), they in fact have different syntactic structures. The standard of comparison of (8a) is a proposition and thus a complete constituent; however, the elements in the standard of (8b) do

not form a complete constituent. Then, based on the two generalizations in (5) and (6) above, (8a) is a phrasal *bi*-comparative, and (8b) is a clausal one.

Before we end the discussion of the distinction between phrasal and clausal *bi*-comparatives, there is one worth-noting case of clausal *bi*-comparatives, that is, *bi*-comparatives with verb-copy constructions, as shown in (9).

(9) a. Zhangsan qi ma bi Lisi qi niu qi-de kuai

Zhangsan ride horse BI Lisi ride cow ride-DE fast

‘Zhangsan rides horses faster than Lisi rides cows.’

b. Zhangsan qi ma bi Lisi qi niu kuai

Zhangsan ride horse BI Lisi ride cow fast

‘Zhangsan rides horses faster than Lisi rides cows.’

Again, the standard of comparison is underlined. The standard of comparison in (9a) *Lisi qi niu* ‘Lisi rides cows’ is a proposition as well as a complete constituent; thus, it is analyzed as a phrasal *bi*-comparative according to the generalization in (6). However, it has been shown in Erlewine (2017) that *bi*-comparatives with verb-copy constructions actually require two tokens

of the main predicate in the underlying structure, which indicates that they are clausal *bi-comparatives*.

It seems that the generalization in (6) fails to cover (9a) and something needs to be added to (6). If we compare (9a) with (9b) above, it is clear that what makes (9a) a special case of clausal *bi-comparatives* is the *DE-complement* predicate *qi-de kuai*. The standard of comparison in (9b) is the proposition *Lisi qi niu* ‘Lisi rides cows’, which is a complete constituent. Thus, (9b) is a phrasal *bi-comparative* according to the generalization in (5). However, if we replace the predicate *kuai* ‘fast’ in (9b) with the *DE-complement* predicate *qi-de kuai*, the whole sentence becomes a clausal *bi-comparative*. This suggests that it is the *DE-complement* predicate that makes (9a) a clausal *bi-comparative*. To cover this special case of clausal *bi-comparatives*, a revision is made to the generalization in (6), as demonstrated in (10) below (the revision is underlined):

(10) Clausal *bi-comparatives* (revised): a *bi-comparative* is clausal (a) when the elements in the standard of comparison DO NOT form a complete constituent or (b) when the predicate of comparison is a *DE-complement* predicate.²⁶

²⁶ Prof. Miao-Ling Hsieh (p.c.) points out if one assumes the analysis of Huang (1982), under which a verb-copy construction like (i) below is analyzed as a combination of an adjunct and the main predicate, then we might not need the second condition.

With the two generalizations in (5) and (10), all of the *bi*-comparatives discussed in previous studies can be correctly categorized based on straightforward standards. As shown above, the distinction made in Liu (2011) and (2014) seems inconsistent. What's more, how to count the number of standard constituent(s) is kind of vague in Liu (2011) and (2014). Therefore, my proposal makes contribution in this respect in that the now clear-cut criteria is able to cover more data and allow the phrasal/clausal classification in a more straightforward way.

Then, turn to the second concern of the current proposal, which is about how the lack of subcomparatives and embedded standards can be explained under the revised Hybrid analysis.

For the lack of subcomparatives, I would like to adopt the analysis presented in Liu's (2011) Hybrid Analysis. To solve this problem, Liu appeals to the minimal c-commanding condition, which regulates that each standard constituent should be c-commanded by its correlates in the matrix clause. An example is given in (11).

-
- (i) Ta qi ma qi-de hen kuai
 he ride horse ride-DE very fast
 'He rides horses fast.'

According to Huang (1982), *qi ma* 'ride horses' in (i) is an adjunct adjoined to the main predicate, and it does not form a constituent with the subject *ta* 'he'. Under this analysis, the sequence *Lisi qi niu* 'Lisi rides cows' in (21a) does not form a complete constituent, either. Then, based on the generalization in (18), (21a) is categorized as a clausal *bi*-comparative. Thus, if we follow Huang's (1982) analysis of verb-copy constructions, maybe the second condition in (22), which is used to classify *bi*-comparatives with *DE*-complement predicate, can be removed.

(11) *Zhe-tiao he [bi na-tiao he shen] kuan
 This-CL river BI that-CL river deep wide

Intended: ‘This river is wider than that one is deep.’

According to the minimal c-commanding condition, the ungrammaticality of (11) can be attributed to the failure of the predicate inside the *bi*-constituent *shen* ‘deep’ to find its c-commanding correlate in the matrix clause. The main predicate in the matrix clause *kuan* ‘wide’ does not c-command *shen* ‘deep’ because the whole *bi*-constituent serves as an adjunct adjoined to the main predicate.

As for the lack of embedded standards, although the parallelism requirement in Liu (2011) can deal with this problem, the formulation of the requirement is a bit complicated and the source of its force is unclear. Therefore, in the revised Hybrid Analysis, I would like to propose an alternative explanation to this phenomenon. Inspired by the No Embedding Constraint formulated in Johnson (2014), I suggest a No Embedding Constraint for *bi*-comparatives, as shown in (12):

(12) The No Embedding Constraint for *bi*-comparatives:

Suppose that A and B are the matrix clause and the *bi*-constituent respectively, and that β is the predicate elided in B whose correlate is α in A. Then, β must contain the highest verb in B.

Take the sentence in (13) below as an example, I will compare my analysis with the one in Liu (2011).

(13) *_A[Zhangsan _B bi Lisi renwei Wangwu [_{β} kaixin]] [_{α} kaixin]]
Zhangsan BI Lisi think Wangwu happy happy

Intended: ‘Zhangsan is happier than Lisi thinks Wangwu is.’

According to the No Embedding Constraint for *bi*-comparatives in (12), the reason why Chinese *bi*-comparatives do not allow embedded standards is that the elided predicate in the *bi*-constituent *kaixin* ‘happy’ does not contain the highest verb in the *bi*-constituent *renwei* ‘think’. In this way, the ungrammaticality of (13) is straightforward explained.

As for the parallelism requirement, Liu (2011) claims that “in the *bi* clausal comparative, the complement clause of the marker *bi* must be parallel to the minimal clause containing the *bi* phrase in basic syntactic structure.” (Liu, 2011:1789) Then, he uses this requirement to rule out (13) by pointing out that “the complement clause of the marker *bi*” *Lisi renwei Wangwu kaixin* is not parallel to “the minimal clause containing the *bi* phrase” *Zhangsan kaixin* in basic syntactic structure (the former contains an embedded clause while the latter does not).

In spite of the fact that both my proposal and Liu’s can successfully account for the lack of embedded standards in *bi*-comparatives, I think the current proposal is better than Liu’s for the following reason. My proposal originates from and connects to Johnson’s (2014) study on Gapping, which is defined as “an ellipsis in which a verb is removed in one, or more, of a series of coordinations.” (Johnson, 2014:1) As evidenced by some previous studies, *bi*-comparatives would involve comparative deletion and thus, being elliptical constructions, it would be not surprising if they share some similarities. What I am trying to do in my proposal is to extend the constraint on Gapping to comparative deletion in *bi*-comparatives with embedded standards. In other words, the suggested constraint in my proposal is attested in other elliptical constructions and thus derived from a general principle. However, according to Liu himself,

the parallelism requirement is a realization of logical reasoning, which is vague to me and seems to lack backup from any general principles.

3.2 A haplological approach to the distribution of *dou* in *bi*-comparatives

After examining the problems of subcomparatives and embedded standards, in this section, I will turn to the distribution of *dou* in *bi*-comparatives. Here, I would like to adopt a haplological approach to account for the distribution of *dou* in *bi*-comparatives.

The concept of haplology is originally related to the Obligatory Contour Principle (OCP) in phonology (Leben 1973; Goldsmith 1979), which requires that adjacent phonemes be contrastive. When two identical phonemes are adjacent, in order to obey the OCP, one way out is to adopt haplology to delete one of the identical phonemes. In other words, languages that hold the OCP will avoid repeated phonemes at word-level. Then, at the sentence level, there is a constraint called the Repeated Morph Constraint whose essence is quite similar to that of the OCP. The proposal of this constraint comes from the observation that, just like what we see in phonology, languages tend to avoid accidental repetition of morphemes. According to Neeleman and Van de Koot (2006), when accidental repetition of morphemes occurs, three

repair strategies can be adopted to obey the Repeated Morph Constraint, which are demonstrated below in (14).

- (14) a. *... M₁ M₂... [violation of the Repeated Morph Constraint]
- b. ...M₂... or ...M₁... [Strategy 1: haplology]
- c. ... M₁ M₂'... or ... M₁' M₂... [Strategy 2: suppletion]
- d. ...M₃... [Strategy 3: portmanteau morpheme]

When two identical morphemes, M₁ and M₂, happen to be adjacent, the Repeated Morph Constraint is violated (14a). One strategy to avoid the violation is to use haplology, deleting either M₁ or M₂ (14b); another strategy is suppletion which means to give either of the two identical morphemes a different realization (M₂' or M₁') based on a subset or a superset of its features (14c); the other strategy is to solve the problem by means of the portmanteau morpheme (M₃), which is a combination of the features of both M₁ and M₂.

In several previous studies, the mechanism of haplology has been adopted to analyze some phenomena in Mandarin, such as two kinds of *le*, two kinds of *ne*, and the reduplicated adjectives. Each of them is exemplified below.

(15) a. Huo mie-le (*le) (Li and Thompson, 1981:299-300)

fire go.out-PFV SFP

‘The fire went out, and that’s what I’m telling you.’

b. A: If he’s awake, ask him to call me. (Paul, 2010:139)

B: Na ruguo ta hai zai shuijiao ne (??ne)?

then if he still PROG sleep ASP SFP

‘And if he’s still sleeping?’

c. gaogaoxingxing(*de) de haizi (Constant, 2011:25)

happy SUB child

‘happy children’



The first *le* in (15a) is a perfective aspectual marker, and the second *le* is a sentence final particle. The situation is quite similar to the case of *ne* in (15b). The first *ne* is an aspect marker that refers to an ongoing event, and the second *ne* is a sentence final particle whose function is to make a contrast. Either in the case of *le* or *ne*, the two tokens of the two morphemes in question are adjacent; however, we only see one token of them in the surface. In previous studies, it is claimed that one of the two tokens of *le* and *ne* is deleted by haplology. As for the example in (15c), there are two tokens of *de* underlyingly: the first one is part of the reduplicated adjective, and the second one is a subordinator which makes the connection

between the reduplicated adjective and the noun phrase. Again, only one of them is realized in the surface. According to Constant (2011), this is also a consequence of applying haplology to the two tokens of *de*. Here, it is clear that haplology is often adopted to deal with phenomena where two identical morphemes are adjacent; thus, in the following paragraphs, I will apply haplology to my analysis of *dou*'s distribution in *bi*-comparatives.

In view of the relevant data, there are two points worth mentioning. First of all, according to previous studies on *dou*, such as Lee (1986), there are different types of *dou*, and I will focus on two of them in my analysis. They are listed in (16).

(16) *Dou*₁: *dou* that quantifies over plural NPs

*Dou*₂: *dou* that quantifies over plural events^{27,28}

The second point is about my assumption of the term “adjacency” in my proposal. As we have seen above, adjacency of two identical morphemes is the trigger of haplology. Since

²⁷ I will not discuss the exact positions of *dou*₁ and *dou*₂ in this thesis because of the following two reasons. First of all, their positions are not the focus of this study. In addition, when accounting for the distributions of *dou* in *bi*-comparatives with a haplological approach, what's more relevant to the discussion is the relative position between *dou*₁ and *dou*₂ as well as that between them and other elements in the sentence. For more discussion on the position of *dou*, please refer to Lee (1986) and Cheng (1995).

²⁸ The assumption that *dou* can quantify over plural events is supported by the analysis of *dou* in Xiang (2005), where she claims that *dou* operates on events.

haplology is originally applied in phonology at word level, which is irrelevant to the issue discussed here, thus I would like to define “adjacency” in my analysis as “the condition in which two identical words are immediately side-by-side to each other at phrase level”.

Then, we can examine the three *bi*-comparatives which contains *dou* in (17) with syntactic haplology, the two points above, and the revised Hybrid Analysis.²⁹

(17) a. Mei-ge nusheng **dou** bi mei-ge nansheng gao

every-CL girl all BI every-CL boy tall

‘Every girl is taller than every boy.’

b. Mei-ge nusheng **dou** bi Zhangsan gao

every-CL girl all BI Zhangsan tall

‘Every girl is taller than Zhangsan.’

c. Zhangsan bi mei-ge nusheng **dou** gao

Zhangsan BI every-CL girl all tall

‘Zhangsan is taller than every girl.’

²⁹ Under my revised Hybrid Analysis, the three examples in (17) are all phrasal *bi*-comparatives. Thus, all the universal NPs inside the *bi*-phrase in (17) do not serve as the subject, and they don’t need to be licensed by the universal quantifier *dou*.

Although Hsieh (2017:265-266) claims that *dou* in (17a) and (17b) can only appear in one position (after the matrix universal subject), it is found that *dou*'s distribution in these two sentences is not so restricted. Actually, according to the native Chinese speakers that I checked with, (17a) and (17b) can be paraphrased into (18a) and (18b).

(18) a. Mei-ge nusheng bi mei-ge nansheng dou (haiyao) gao

b. Mei-ge nusheng bi Zhangsan dou (haiyao) gao

Taking (17a) and (18a) as the starting point. I would like to claim that both of them can be derived from one underlying structure by assuming that they have an underlying representation in (19a), and the process of derivation is shown in (19b) ~ (19c')

(19) a. [Adjunct bi mei-ge nansheng] [Matrix Clause mei-ge nusheng dou₁ dou₂ gao]³⁰

b. [Adjunct bi mei-ge nansheng] [Matrix Clause mei-ge nusheng dou₁ ~~dou₂~~ gao]

b'. [Subject mei-ge nusheng dou₁] [Adjunct bi mei-ge nansheng] [Predicate ~~dou₂~~ gao]

³⁰ The assumption that there can be more than one *dou* in one sentence gains support from Zhang (1997), Sybesma (1996), and Gao (1994). An example is given below:

(i) Lian tamen **dou** meiyou **dou** mai zhei-ben shu
 even they all not all buy this-CL book
 'Even they did not all buy this book.'

c. [Adjunct *bi mei-ge nansheng*] [_{Matrix Clause} *mei-ge nusheng dou₁ dou₂ gao*]

c'. [_{Subject} *mei-ge nusheng dou₁*] [Adjunct *bi mei-ge nansheng*] [_{Predicate} *dou₂ gao*]

Here *dou₁* appears after *mei-ge nusheng* ‘every girl’ because it is a universal NP that also serves as the subject. Recall that (17a) and (18a) are analyzed as phrasal *bi*-comparatives, indicating that *mei-ge nansheng* ‘every boy’ inside the adjunct *bi*-phrase is not a subject. As a result, it is not followed by a *dou₁*. Besides, the main predicate *gao* ‘tall’ in the matrix clause is preceded by *dou₂*, which quantifies over plural events, since the meaning of (17a) and (18a) is composed of several comparing event between each girl and each boy in terms of their heights. Following the VP-internal Hypothesis (cf. Radford, 1997), I assume that the subject is base-generated inside *vP*, as shown in (19a). Then, as we can see, there are two adjacent tokens of *dou* in the matrix clause. Thus, haplology is applied to (19a), and two possibilities arise. One is (19b), in which *dou₂* is deleted. Then, after the subject moves to [Spec, TP], the remaining *dou₁* also moves to TP in order to be in the same Spell-out domain (Chomsky, 2001) with the subject at PF. The result is shown as (19b’) above. On the other hand, the second possibility is demonstrated in (19c). *Dou₁* is deleted via haplology and the subject moves to [Spec, TP], as

shown in (19c'). In this way, both (17a) and (18a) can be derived from (19a). The former is equal to (19b') and the latter (19c').

Then, how can (17b) and (18b) be derived from one single underlying structure? The derivation process, as shown in (20), is similar to what we have seen in (19).

- (20) a. [Adjunct bi Zhangsan] [Matrix Clause mei-ge nusheng dou₁ dou₂ gao]
- b. [Adjunct bi Zhangsan] [Matrix Clause mei-ge nusheng dou₁ ~~dou₂~~ gao]
- b'. [Subject mei-ge nusheng dou₁] [Adjunct bi Zhangsan] [Predicate ~~dou₂~~ gao]
- c. [Adjunct bi Zhangsan] [Matrix Clause mei-ge nusheng ~~dou₁~~ dou₂ gao]
- c'. [Subject mei-ge nusheng ~~dou₁~~] [Adjunct bi Zhangsan] [Predicate dou₂ gao]

Again, there are two adjacent tokens of *dou* in (20a) and haplology is triggered. If we delete *dou₂* as (20b), then we will derive (20b') after the subject and *dou₁* moves to TP. On the other hand, if *dou₁* is deleted as we see in (20c), then (20c) will be derived after the subject moves to [Spec, TP]. The derivation in (20) shows that both (17b) and (18b) can be derived from one single underlying structure, (20a).

As for (17c), it is much more straightforward, compared to (17a) and (17b). The underlying structure and derivation of (17c) is given in (21) below.

(21) a. [Adjunct *bi mei-ge nusheng*] [Matrix Clause *Zhangsan dou₂ gao*]

b. [Subject *Zhangsan*] [Adjunct *bi mei-ge nusheng*] [Predicate *dou₂ gao*]

Note that all the three sentences are categorized as phrasal *bi*-comparatives under my revised Hybrid Analysis because that all of them contain one single standard constituent and that there is no need to posit the existence of the predicate inside the *bi*-constituent. Therefore, no *dou₁* appears in (21a). In this way, all we have to do to derive (17c) is move the subject *Zhangsan* to [Spec, TP]. We don't need to move *dou₂* with the subject to TP because what *dou₂* quantifies over is the main predicate *gao* 'tall' rather than the subject. Moreover, no haplology is triggered in (21) since there is only one token of *dou*.

Among the previous studies, Hsieh (2017) is the only one that discusses the distribution of *dou* in *bi*-comparatives. As I have mentioned, his proposal has some problems and cannot derive some peripheral examples such as (18a) and (18b). By contrast, both of them can be derived under my haplological approach. In addition, another merit of my analysis is the

consistent position of *dou*. In Hsieh's (2017) proposal, he assumes that *dou* is adjoined to either ν P or AP; however, it is unclear why *dou* has to be adjoined to ν P in some conditions but AP in other conditions.



CHAPTER 4 Conclusion

This thesis explores the *bi*-comparatives in Mandarin Chinese, and the main focus is on the debate between the Direct Analysis and the Reduction Analysis in terms of the analysis of the underlying structure of the post-*bi* constituent.

The study of *bi*-comparatives is so popular in the fields of Chinese syntax and semantics that many researchers of these two fields have proposed various kinds of analyses. A detailed review of previous studies on Mandarin *bi*-comparatives is presented in Chapter 2, based on the two major camps that each of them belongs to. In the camp of Direct Analysis, the central idea is that the underlying structure of the post-*bi* constituent is just what we see on the surface, and that comparative deletion does not occur inside the *bi*-constituent. As a result, under the Direct Analysis, there is only one token of the predicate of comparison in the underlying structure of a *bi*-comparative, which leads to the difficulties in explaining some sentences where two tokens of the predicate of comparison are needed, for examples, *bi*-comparatives with *bei* long passives, *ba* disposal constructions, verb copying constructions, and preposed objects. As for the camp of Reduction Analysis, the essential argument is that the post-*bi* constituent is in fact an elided CP in which one token of the predicate of comparison is deleted

via comparative deletion. However, three problems are faced by the Reduction Analysis: the lack of subcomparatives, the lack of embedded standards, and the distribution of *dou* in *bi*-comparatives. Although Erlewine (2017) and Hsieh (2017) have provided some possible solutions to the three problems in their proposals, this thesis pointed out that their analyses are not without problems.

In addition to the two major camps of the studies on *bi*-comparatives, a minor but influential camp called the Hybrid Analysis is represented by Liu (2011). This camp advocates that Mandarin *bi*-comparatives can be classified into two types: phrasal and clausal *bi*-comparatives. Liu (2011) provides some criteria to distinguish between these two types of *bi*-comparatives. He also adopts Paul's (1993) c-command condition and his own parallelism requirement to account for the lack of subcomparative and embedded standards in *bi*-comparatives.

Nevertheless, this thesis points out some problems in Liu's Hybrid Analysis. Therefore, a revised Hybrid Analysis is proposed in this thesis. There are three major components in my proposal. First of all, the distinction between phrasal and clausal *bi*-comparatives could be made by looking at whether the elements in the standard of comparison form a complete constituent. In addition, when the predicate of comparison is a *DE*-complement predicate, the

bi-comparative in question is a clausal one. Secondly, I propose the No Embedding Constraint for *bi*-comparatives to account for the lack of embedded standards in *bi*-comparatives. Last but not least, the distribution of *dou* in *bi*-comparatives is well-explained under my haplological approach.

The study of Mandarin *bi*-comparatives is quite manifold, and this thesis only focuses on a small portion of it. I believe that there is still a long way to go in the study of Mandarin comparative constructions, but I hope this thesis indeed sheds some light for the future study on this complicated but fascinating topic.



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