Chinese Comparatives: Commentary on Clausal vs. Phrasal Analyses[*]

1. Introduction

Studies of comparative constructions have made much progress in syntax and semantics over the last three decades. Chinese comparatives are no exception. Many new analyses have been proposed for them, in particular, in the past 15 years or so. This development leads to a debate between a clausal approach and a phrasal approach to Chinese comparatives. The goal of this article is to make a contribution to this debate by examining the different analyses, focusing specifically on my own phrasal analysis proposed in Lin (2009) and the clausal analyses proposed recently by Liu (2011, 2014), Hsieh (2017) and Erlewine (2018). Those clausal analyses represent the newest development in studies of *bi*-comparatives in Mandarin Chinese.

To discuss the debate, let me start with some background knowledge of the syntax and semantics of comparatives in general. Comparatives are often assumed to involve degree comparison (von Stechow 1984a, b; Kennedy 1997; Heim 2000; Bhatt & Pancheva 2004; Schwarzschild and Wilkinson 2002; Kennedy 2001, among many others). For example, sentence (1) is said to have the truth conditions in (2).

(1) John is happier than Bill.

(2) a. *max*(λd. John is d-happy) > *max* (λd. Bill is d-happy)

b. Paraphrase: The maximal degree of John's happiness exceeds the maximal degree of Bill's happiness.

On this degree approach to comparatives, gradable predicates have a degree argument of type *d* and denote a relation between individuals and degrees as illustrated by (3), where *happiness* is a measure function that maps an individual to his degree on the scale encoded by the adjective *happy* (Cresswell 1976; Heim 1985, 2000; Kennedy 1997, 2007; Kennedy & McNally 2005; Rullmann 1995; von Stechow 1984a, among

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many others).

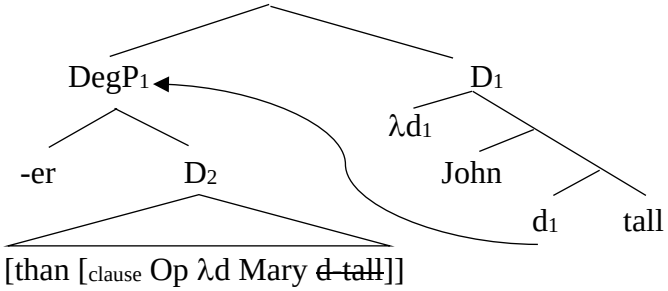
(3) $[\![happy]\!] = \lambda d.\lambda x.\ \text{happiness}(x) \geq d$

On this analysis of gradable predicates, the literature has provided two ways to obtain the truth conditions in (2). One approach assumes that the comparative morpheme *–er*$_C$ is a two place operator taking two clausal degree expressions of type <d,t> as its arguments and asserting that the maximal degree of one degree expression (D_2) exceeds the maximal degree of the other one (D_1), as shown below.

(4) $[\![-er_C]\!] = \lambda D_{1<d,t>}.\lambda D_{2<d,t>}.\ \max(D_2) > \max(D_1)$

This approach requires a very abstract syntax, as the standard of comparison is assumed to be derived from a full clause that denotes a set of degrees by moving an abstract degree wh-operator (cf. Bresnan 1973; Chomsky 1977; Heim 1985; Lechner 2001, among others). This standard clause forms a generalized quantifier over degrees with the comparative morpheme *–er* and undergoes quantifier raising to create a degree expression for the target clause. The predicate in the standard clause is then deleted by identity to the predicate in the target clause. The derivation is schematically represented as in (5).

(5) [[-er [than OP λd_1 [Mary is d_1-happy]]]$_2$ [λd_2 John is d_2-happy]]
= max(λd.John is d-tall) > max(λd.Mary is d-tall))



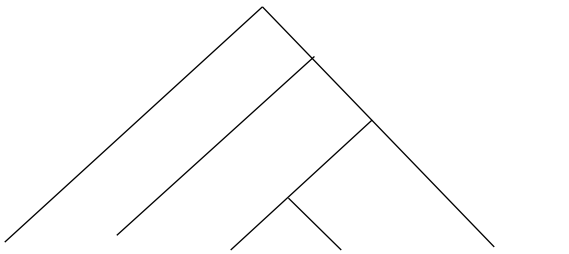
The other approach to obtain the same truth conditions is to let the semantics go hand in hand with the surface syntax. On this approach, the comparative morpheme *–er*$_P$ is a three place operator. It first takes a gradable predicate as its argument, followed by the standard and target of comparison as the second and third argument, as shown below.

(6) $[\![-er_P]\!] = \lambda G_{<d,et>}.\lambda y_e \lambda x_e.\ \max(\lambda d_1.G(d_1)(x)) > \max(\lambda d_2.G(d_2)(y))$

This approach is known as a phrasal approach, as the standard is assumed to be a phrase, as it is in surface syntax.

The phrasal analysis involves no wh-movement, no degree abstraction and no deletion. There are variants of this approach (Heim 1985; Bhatt & Takahashi 2007, 2011, Kennedy 1997). Illustrated below is one possible instantiation of the phrasal approach, where *-er* takes the gradable predicate as its first argument and the standard DP and the subject DP a second and the third argument.

(7)



a. $[\![-\text{er tall}]\!] = \lambda G_{<d,et>}.\lambda y_e \lambda x_e.\ \max(\lambda d_1.G(d_1)(x)) > \max(\lambda d_2.G(d_2)(y))](\text{tall'})$
$= \lambda y_e \lambda x_e.\ \max(\lambda d_1.\text{tall'}(d_1)(x)) > \max(\lambda d_2.\text{tall'}(d_2)(y))$

b. $[\![\text{John is} - \text{er tall than Mary}]\!]$
$= \lambda y_e \lambda x_e.\ \max(\lambda d_1.\text{tall'}(d_1)(x)) > \max(\lambda d_2.\text{tall'}(d_2)(y))](\text{Mary'})(\text{John'})$
$= \max(\lambda d_1.\text{tall'}(d_1)(\text{John'})) > \max(\lambda d_2.\text{tall'}(d_2)(\text{Mary'}))$

With the above summary of English comparatives in mind, let us now consider Chinese comparatives. As (8) and (9) illustrate, there is no overt comparative morphology comparable to the English *–er*. Instead, the morpheme *bi* 'compare' marks the construction as a comparative construction. A special property of Chinese comparatives is that they may compare multiple items such as (9) where *Zhangsan* and *Lisi*, *jintian* and *zuotian* and *zai xuexiao* and *zai jiali* are compared respectively (cf. Tsao 1989, Lin 2009, Liu 2011).

(8) Zhangsan bi Lisi gao
Zhangsan BI Lisi tall
'Zhangsan is taller than Lisi.'

(9) Zhangsan jintian zai xuexiao bi Lisi zuotian zai jiali kaixin
Zhangsan today at school BI Lisi yesterday at home happy
'Zhangsan is happier at school today than Lisi was at home yesterday.'

Both the clausal and the phrasal analyses have been extended to analyze Chinese

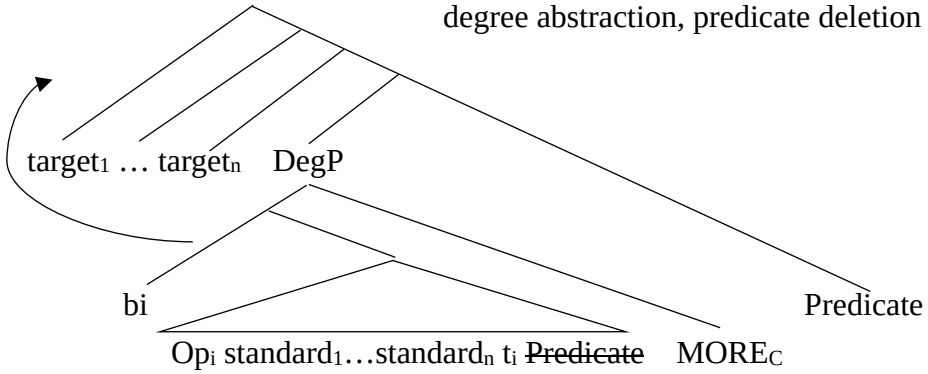
comparatives. A modern representative of the clausal approach was proposed by Liu (1996) (For earlier analyses, see the references cited in Liu (1996, 2011)) and was later challenged by Xiang (2003, 2005), Erlewine (2007), Lin (2009), Guo (2012), Gu & Guo (2015) and Guo & Gu (2017). The clausal approach has recently been revived by Liu (2011, 2014), Hsieh (2017), Luo (2017) and Erlewine (2018). The purpose of this article is to compare the phrasal approach, in particular Lin's (2009) analysis, and the clausal approach which Liu (2011, 2014), Hsieh (2017) and Erlewine (2018) adopt. I will examine the different challenges the two approaches meet and provide a fine-tuned revision of Lin's (2009) phrasal analysis, showing that it still stands a very good chance of being on the right track.

2. Recent Analyses of Chinese Comparatives

I am aware that many different analyses of Chinese comparatives are available, but due to space constraint, this article focuses on only the clausal analyses proposed recently by Liu (2011, 2014), Hsieh (2017) and Erlewine (2018) and the phrasal analysis proposed by Lin (2009).

Both Liu (2011, 2014) and Hsieh (2017) assume that the *bi*-constituent is an adjunct adjoined to the main predicate of comparison. According to their analyses, in particular Liu's, there is a covert degree morpheme MORE_C in the tree diagram which has a meaning quite similar to English *–er*. Liu (2011) takes this morpheme to have the same status as the Chinese overt comparative morpheme *geng* and argues that only comparatives with multiple standards such as (9) involve clausal comparison and comparative deletion. By contrast, constructions such as (8) involving only one standard are analyzed as phrasal comparatives.

(10) Liu (2011, 2014) & Hsieh (2017): null degree-operator movement, degree abstraction, predicate deletion

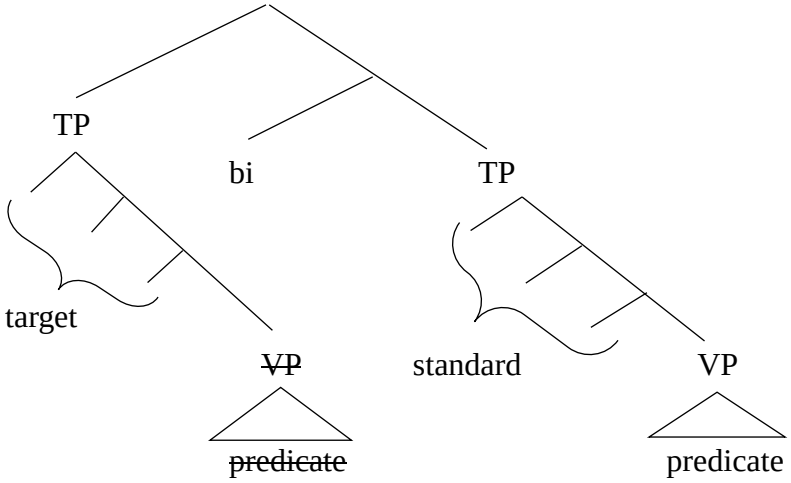


On the other hand, Erlewine (2018) proposes that *bi* is categorically a clausal

conjunction and the two clauses it connects follow the regular rules of Chinese clausal syntax. The standard TP is the complement of *bi* and the target TP is the specifier, as shown in (12). Another big difference is that Erlewine assumes that the degree argument is the last argument of the gradable predicate as given in (11), in contrast to the standard denotation of *happy* as in (3). As a consequence, both the standard and target TPs are degree expressions but no degree operator movement is needed.

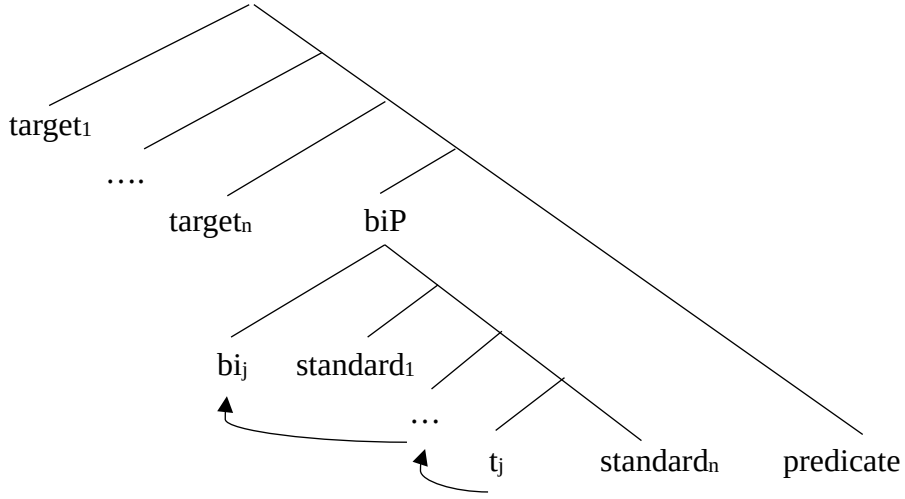
(11) ⟦*happy*⟧ = λx.λd. x is d-happy

(12) Erlewine (2018): no degree operator movement, no degree abstraction, predicate deletion, degree last



As for the phrasal approach to Chinese comparatives, I focus on the phrasal analysis proposed by the author in Lin (2009), for that analysis has been the major target of criticisms in recent clausal analyses. According to Lin (2009), Chinese is a dyadic comparison language which only allows arguments of gradable predicates, but not adjuncts, to serve as compared items. The comparative morpheme *bi* is defined in such a way that it semantically takes a series of standard constituents as its arguments that are parallel to the target constituents and syntactically *bi* raises from a lower head position to a higher one, as shown by (13).

(13) Lin (2009): no degree operator movement, no degree abstraction, no predicate deletion, *bi*-movement



On this analysis, though there is only one predicate in syntax, the target constituents and the standard constituents will both become the arguments of the predicate in semantic computation due to the semantics of *bi* to be discussed later, yielding truth conditions with a form of 'max(λd.predicate(d)(target$_n$)…(target$_1$) > max(λd.predicate(standard$_n$)…(standard$_1$))'.

3. Challenges to the Clausal Approach

This section discusses three major challenges that the clausal approach to Chinese comparatives faces.

3.1 Problems with comparative deletion

One shared and the most important component of all the clausal analyses of Chinese comparatives is that they resort to some version of backward predicate deletion to derive the surface forms. Yet, the proponents of the clausal analyses except Liu (2011) do not provide arguments to justify the proposed rule of predicate deletion in Chinese syntax. In this section, I review Liu's arguments, elaborating why his argumentation is not valid.

Liu argues that backward predicate deletion is possible in Chinese as illustrated by (14a). He also notes that though the backward VP deletion requires a head licensor such as *yao* 'want' (cf. the contrast between (14a) and (14b)), a head licensor for predicate deletion is not always needed, as (15) illustrates.

(14) a. Yinwei ni ye yao ~~qu~~, suoyi wo cai yao qu
because you also want go so I then want go
'Because you will go, I will go.'

b. *Yinwei ni ye ~~qu~~, suoyi wo cai qu
because you also go so I then go
'Because you go, I will go.'

(15) Zhangsan jintian chufa, Lisi mingtian ~~chufa~~.
Zhangsan today set.off Lisi tomorrow set.off
'Zhangsan sets off today, and Lisi tomorrow.'

The problem with the above argumentation is that even if (15) is acceptable, it involves forward VP deletion, not backward VP deletion as required by comparative deletion. Backward VP deletion without a head licensor is not allowed, as shown by (16).

(16) a. *Zhangsan jintian ~~chufa~~, Lisi mingtian chufa
Zhangsan today set.off Lisi tomorrow set.off
'Zhangsan sets off today and Lisi sets off tomorrow.'

b. *Zhuren yinwei xiaozhang zuotian ~~fa nu~~ jintian ye genzhe
director because principal yesterday get angry today also follow
fa nu
get angry
'The director also got angry today because the principal got angry yesterday.'

Also note that comparative deletion mostly involves APs rather than VPs but Chinese APs do not allow backward deletion even with the presence of the auxiliary copular verb *shi* 'be', as evidenced by (17).

(17) a. *Yinwei Lisi zuotian (shi) ~~hen kaixin~~, suoyi Zhangsan jintian hen
because Lisi yesterday be very happy so Zhangsan today very
kaixin
happy
'Because Lisi was happy yesterday, Zhangsan is happy today.'

b. *Zhangsan zuotian (shi) ~~bukaixin~~, Lisi jintian ye (shi) bukaixin
Zhangsan yesterday be unhappy Lisi today also be unhappy
'Zhangsan was unhappy yesterday and Lisi was also unhappy today.'

Another challenge to the comparative deletion rule in Chinese is the difficulty in reconstructing comparatives with an overt differential phrase. Consider (18).

(18) Zhangsan jin nian bi Lisi qu nian zhong liang gongjin
Zhangsan this year than Lisi last year heavy two kilogram
'This year Zhangsan is two kilograms heavier than Lisi was last year.'

Unlike English comparatives, overt differential phrases in Chinese comparatives such as *liang gongjin* 'two kilograms' in (18) appear in a post-adjectival position and are often assumed to be the complements of the gradable predicates. Under this traditional assumption, one possibility for a clausal approach to reconstruct (18) is to reconstruct the AP consisting of the adjective and the differential phrase such as (19).

(19) *[Zhangsan jin nian [$_{DegP}$ [bi Lisi qu nian ~~zhong liang gongjin~~] [$_{AP}$ zhong liang gongjin]]]

However, this kind of reconstruction is clearly incorrect, because *liang gongjin* 'two kilograms' in the standard constituent must be construed as either Li's actual weight or as a differential phrase, but neither analysis expresses the meaning of (18).

Perhaps one may argue that the differential phrase does not originate as the complement of the adjective but instead as the complement of a covert degree morpheme $MORE_{CD}$, forming part of a degree generalized quantifier rather than forming a constituent with the adjective in a way similar to English differential comparatives as represented in (20).

(20) a. [Zhangsan jin nian [[$_{DegP}$ [bi OP_i Lisi qu nian t_i zhong] [$MORE_{CD}$ [liang gongjin]]] zhong]]
b. LF: [[$_{DegP_j}$ [bi OP_i Lisi qu nian t_i zhong] [$MORE_{CD}$ [liang gongjin]]] [Zhangsan jin nian t_j zhong]]
c. $[\![MORE_{CD}]\!] = \lambda d.\lambda P_{<d,t>}.\lambda Q_{<d,t>}.max(Q) = max(P) + d$
d. max(λd. Zhangsan is d-heavy this year) = max(λd. Lisi was d-heavy last year) + 2 kilograms

In (20a) and its logical form (20b), a result of QR-ing the whole DegP, the differential phrase is discontinuous from the adjective and therefore they do not form a constituent. As we can see from (20d), given an appropriate denotation of $MORE_{CD}$, the truth conditions of (18) can be obtained from the LF (20b). On this analysis, since

the differential phrase and the adjective do not form a constituent, the identity deletion problem discussed above arguably does not arise. The problem, however, does not really disappear, because the presumed structure (20a) is not the surface form that we saw in (18). For the above analysis to work, there must exist a story for how (20a) can be turned into the surface form of (18). One imaginable route is to assume that the differential phrase is moved to a position after the adjective or the adjective tucks into the degree generalized quantifier at PF rather than in overt syntax. Yet this raises a serious question pertaining to the motivation of such reordering and the landing site of the differential phrase. It is also important to note that if the reordering took place in overt syntax, then the LF required to generate the right truth conditions would be destroyed and the issue of reconstruction would surface again. In light of the above difficulty, constructions such as (18) constitute a true challenge to the clausal approach to Chinese *bi*-comparatives.

Since the problem is brought about by the overt differential expression, one may wonder whether it is possible not to reconstruct the differential phrase but to reconstruct only the adjective as shown below.

(21) [Zhangsan jin nian [bi OP_i Lisi qu nian t_i zhong] zhong liang gongjin
Zhangsan this year BI Lisi last year heavy heavy two kilogram

The problem with this suggestion is that reconstruction of the adjective alone should not be allowed. Consider (22)

(22) Zhangsan mai-le liang-ben shu, Lisi ye shi [$_{VP}$…]
Zhangsan buy-Asp two-Cl book Lisi also be
'Zhangsan bought two books and Lisi did, too' (Lisi must buy two books)

In (22), the predicate in the second sentence is deleted under identity with the predicate in the first sentence. Significantly, the deleted VP must be completely parallel to the VP '*mai-le liang ben shu*' in the first sentence; so Lisi must buy two books as well. The deleted VP cannot be construed as *mai-le shu* 'buy books' with the number of books unspecified. In other words, there is a strict identity requirement with respect to predicate deletion. This makes it impossible not to reconstruct the differential phrase to the comparative *bi*-clause as (21) suggests.

In contrast to the clausal approach, the phrasal approach as proposed by Lin (2009) does not have the reconstruction problem because no comparative deletion is needed at all. All that is required is an appropriate denotation of $MORE_{PD}$, which takes the adjective as the first argument and the differential phrase a second argument

and the standard DP and the target subject a third and fourth argument (with other possible arguments being ignored), as illustrated below.

(23) $[\![\text{MORE}_{\text{PD}}]\!] = \lambda G_{<d,et>}.\lambda d.\lambda y_e \lambda x_e.\ \max(\lambda d_1.G(d_1)(x)) = \max(\lambda d_2.G(d_2)(y)) + d$

3.2 Problems with subcomparatives and embedded standards

There are two important arguments for a clausal analysis of English comparatives. One argument is the existence of subcomparatives such as (24) (cf. Bresnan 1975).

(24) This table is wider than that desk is long.

In this construction, since the standard constituent is clearly a clause, (24) proves the existence of clausal comparatives in English.

Another argument for clausal comparatives in English and degree operator movement is the possibility of embedding the standard constituent as illustrated by (25) (Chomsky 1977). This example shows that English comparatives may involve long distance wh-movement of some kind.

(25) Zhangsan is happier than Lisi thinks Mary is.

Significantly, Xiang (2003) points out that unlike English comparatives, Chinese allows neither subcomparatives nor embedded standards. Consider (26) and (27).

(26) *Zhe-zhang shuzhuo [bi na-zhang zhuozi chang] kuan.
this-Cl desk than that-Cl desk long wide
'This desk is wider than that table is long.'

(27) *Zhangsan (jintian) bi [Lisi renwei [Wangwu (zhuotian) __]] kaixin
Zhangsan today than Lisi think Wangwu yesterday happy
'(Today) Zhangsan is happier than Lisi thinks that Wangwu was (yesterday).'

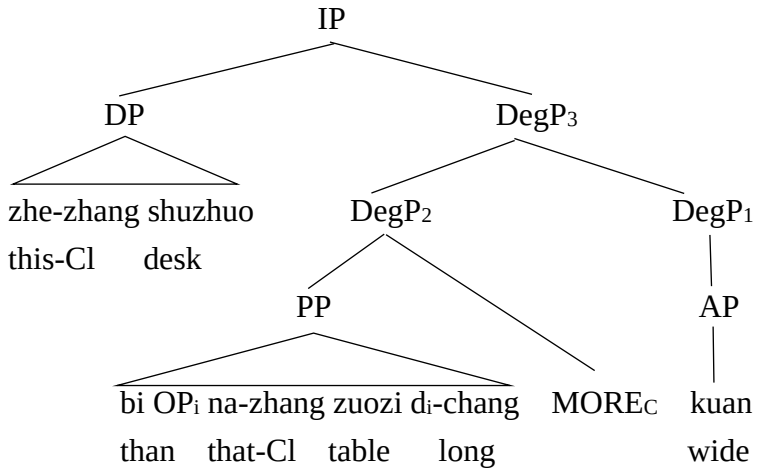
Based on the ungrammaticality of the above two constructions, Xiang (2003) and Lin (2009) argue that a clausal approach to Chinese comparatives is implausible.

3.2.1 Liu's (2011) new answer and its problems

The challenge of subcomparatives and embedded standards have recently been considered by Liu (2011), Hsieh (2017) and Erlewine (2018). In what follows, I examine their new attempts to explain why they are not counterexamples to the clausal approach.

Liu's account for the lack of subcomparatives in Chinese relies on two assumptions. First, following Paul (1993), he assumes that the standard constituents must be c-commanded by their contrasting target correlates. Second, standard CPs are taken to be adjuncts adjoined to DegP rather than specifiers of APs .[1]

(28)



According to Liu, in (28), the target constituent *zhe-zhang shuzhuo* 'this desk' c-commands the contrasting standard constituent *na-zhang zhuozi* 'that table', but the target AP *kuan* 'wide' does not c-command the standard AP *chang* 'long' and it is the failure of c-command in question that makes subcomparatives in Chinese impossible.

However, from the syntactic structure in (28), it is not clear why the matrix predicate AP *kuan* 'wide' does not c-command the AP *chang* 'long' in the *bi*-clause. Despite the non-branching intervening $DegP_1$ projection above AP, every branching node dominating the former also dominates the latter. In fact, since Liu assumes that the degree morpheme forms a degree generalized quantifier with the standard clause, it is not clear why the intervening $DegP_1$ should be there. If it were not there, it would be obvious that the matrix AP c-commands the AP in the *bi*-clause. The c-command relation will not hold only at LF after the *bi*-clause and $MORE_C$ undergoes quantifier raising. However, after quantifier raising $DegP_2$ at LF, the target constituent, in this

[1] Liu (2011: 1790; 2014: 358) assumes the following syntactic structure:

(i) [$_S$[$_{DP}$ Zhangsan] [$_{DegP}$ bi [$_{DP}$ Lisi]] [$_{DegP}$ [$_{AP}$ kaixin]]]

(28) is parallel to (i) in terms of structure. Note that though Liu does not spell out $MORE_C$ in (i), he (2014: 347-348) explicitly assumes that the *bi*-phrase and the comparative degree morpheme form a syntactic constituent and undergoes quantifier raising at LF.

case *zhe-zhang shuzuo*, will fail to c-command the standard constituent *na-zhang zuozi* 'that desk'. Either way, an account for the lack of subcomparatives in terms of failure of c-command is problematic. So there is no true explanation of why subcomparatives are not allowed in Chinese under Liu's analysis.

As for the problem of embedded standards, Liu (2011) attributes the lack of them in Chinese comparatives to the minimality constraint of his proposed comparative predicate deletion rule. According to him, this rule deletes all the subelements of the complement clause of *bi* except those that are in contrast to the corresponding target correlates. Moreover, the deleted elements must be e-given in the sense of Merchant (2001) and to use Liu's (2011: 1787-1788) own statement, "the salient site must be as minimal as possible", containing only "(A) a degree variable, and (B) a minimal predicate that can form with the standard constituents a clause the same as (or parallel to) the minimal clause containing the *bi* phrase in the basic type". Given the above conditions, (28) is not allowed because the standard clause is not minimal containing an additional non-parallel matrix clause. However, it is significant to note that even if we try to make the complement clause of *bi* and the main clause fully parallel, the sentence is still ill-formed, as shown in (29).

(29) *Zhangsan renwei [Lisi jintian [bi [Wangwu yiwei [Mali zuotian
Zhangsan think Lisi today than Wangwu think Mary yesterday
~~kaixin~~]]] kaixin
happy happy
'Zhangsan thinks Lisi is happier today than Wangwu thinks that Mary was yesterday.'

Clearly, it is not the parallelism that is at issue, but the minimality stipulation. Yet, the minimality requirement is nothing but a redescription of the fact. It does not explain why Chinese has this requirement but other languages, say English, do not. This requirement itself is a mystery that calls for an explanation.[2]

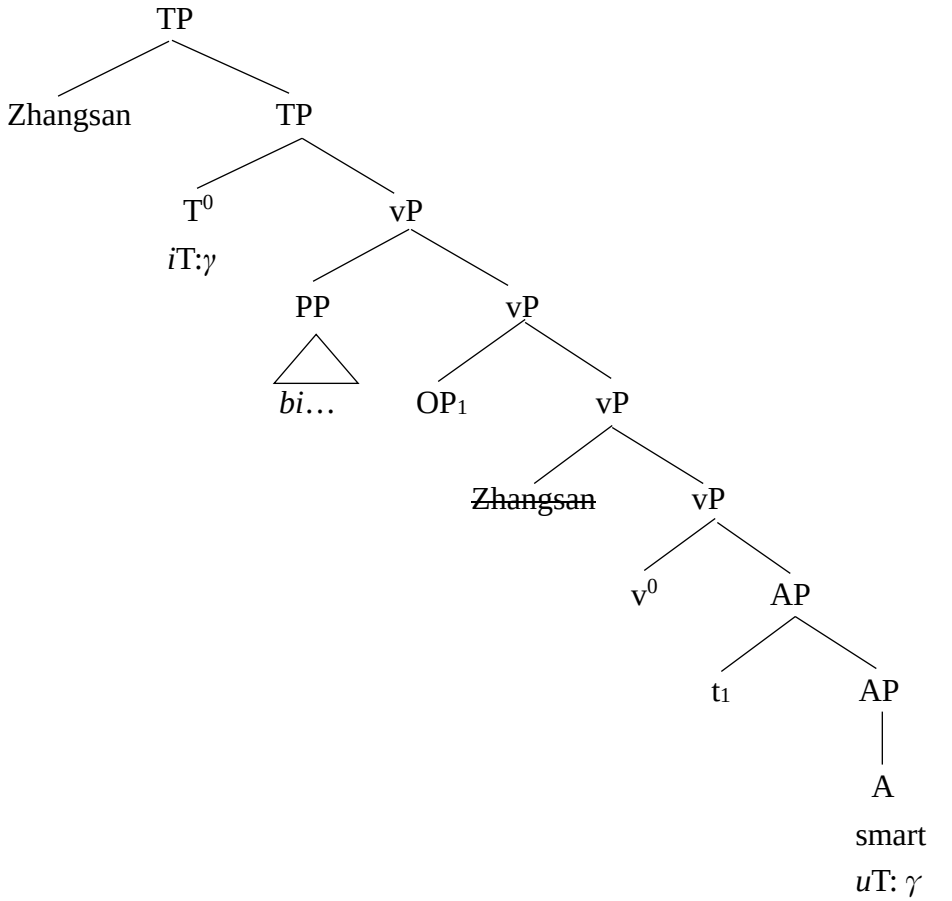
3.2.2 Hsieh's (2017) solution and its problems

The main ingredients of Hsieh's analysis is as follows. Syntactically, *bi* heads a PP adjoined to the matrix VP and the predicate in the *bi*-constituent is obligatorily deleted under an identity condition. The specifier of the predicate AP is a degree operator, which is raised and adjoins to vP, leaving a trace behind. The degree operator

[2] An anonymous reviewer of Liu's (2011) article raised the same question. In footnote 22, Liu briefly responded to this question.

movement is an instance of A'-dependency. Moreover, comparative deletion is parallel to sluicing and is subject to constraints on sluicing such as Merchant's (2008) MaxElide, which dictates that a constituent containing an A'-trace can be deleted only if it is the maximal possible deletable constituent. Most importantly, he assumes that the complement of *bi* is a small clause that lacks all the higher functional projection such as CP, TP and AspP. According to Hsieh, it is precisely the lack of the higher functional projections that is responsible for the lack of subcomparatives and embedded standards in Chinese. Both problems have to do with feature checking, it is suggested. In Hsieh's view, verbal elements such as verbs and adjectives carry an unvalued feature *u*T, which can be valued via Agree with the closest valued T-feature. An unvalued feature may avoid crash after spell-out when it is eliminated. For example, in (30), the unvalued feature uT of the matrix AP *congming* 'smart' is valued via the interpretable feature of the matrix T head.

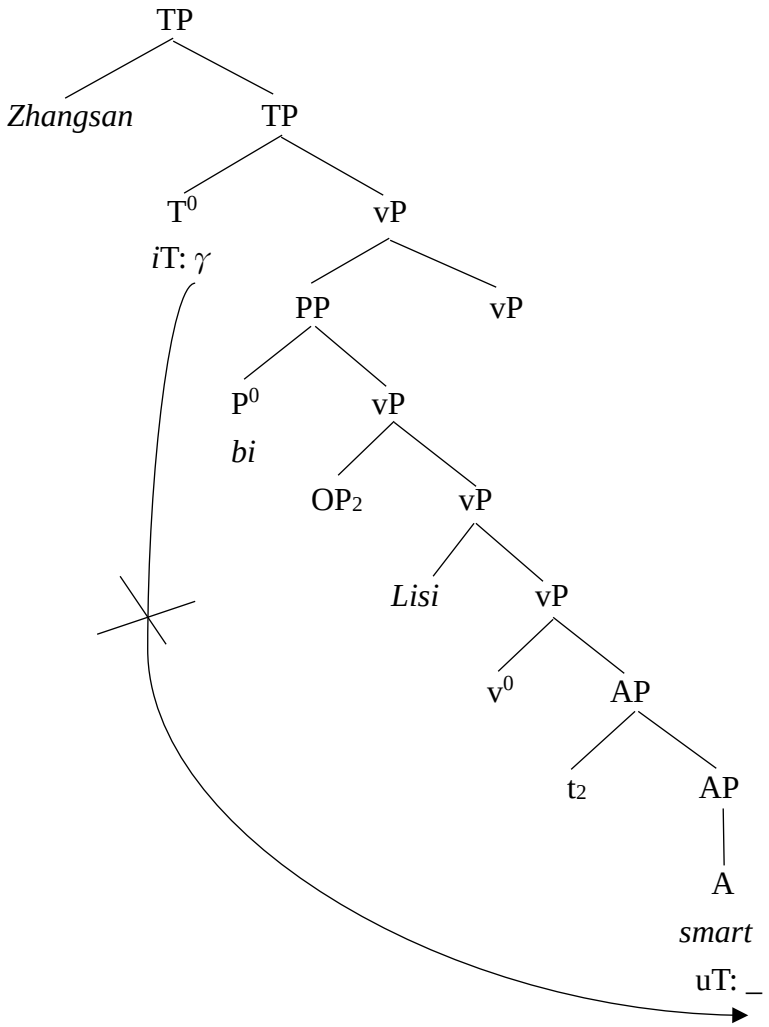
(30)



By contrast, since the complement of *bi* lacks any functional projection such as AspP or TP, the AP contained in it is not able to be valued in its own small clause. For example, in (31), the *bi*-clause does not have a T projection, so the unvalued feature of the AP *congming* 'smart' must target the matrix T for agree. However, according to

Hsieh, this is not allowed because the *bi*-constituent is an adjunct, hence a syntactic island for Agree. The only way to avoid crash at PF is thus to delete the AP inside the *bi*-constituent.

(31)

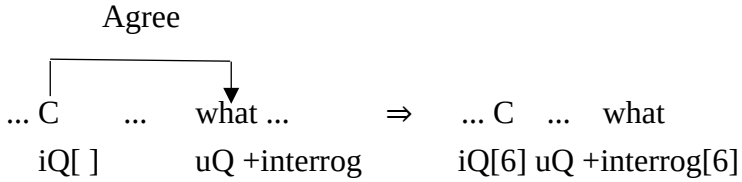


Given the above valuation analysis, Hsieh's answer to the problems of subcomparatives and embedded standards is very simple. Chinese does not have these two constructions because overt predicates in a *bi*-clause are not able to be valued within their own small clause. For example, the adjective *chang* 'long' in (26) and the verb *renwei* 'think' in (27) are not able to get valued with an interpretable T without violating island conditions.

Hsieh's above account for the impossibility of subcomparatives and embedded standards is quite interesting, but its plausibility faces challenges. The main idea of his account is that local feature valuation of an expression in a *bi*-clause cannot be completed in the *bi*-clause due to its defective clausal status, but global valuation is blocked because a *bi*-clause constitutes an island for feature valuation. Unfortunately, if this view were correct, many well-formed constructions would be wrongly ruled

out. Take a wh-question for example. A wh-phrase must agree with an interrogative feature in Comp as Pesetesky & Torrego's (2007) following schema illustrates.

(32) Formation of an interrogative CP



But now consider a comparative question such as (33).

(33) Zhangsan bi shei gao (ne)?
Zhangsan than who tall Q
'Whom is John taller than?'

In (33), the wh-expression *shei* in the *bi*-constituent should agree with the matrix Comp but this feature valuation would be wrongly blocked because a *bi*-constituent would be an island to which feature valuation is sensitive.

A similar problem arises for polarity licensing such as (34).

(34) Wo *(meiyou) bi renhe ren duo he ban di shui
I not than any person more drink half drop water
'I did not drink a half more drop of water than anybody.'

The polarity item *renhe ren* 'any person' in (34) must agree with or be valued by the negation marker *meiyou* 'not', but the negation marker is in the main clause rather than in the *bi*-constituent.

I conclude that though feature valuation might help explain the impossibility of subcomparatives and embedded standards, this is only at the cost of incorrectly ruling out many other well-formed non-comparative constructions. This casts a serious doubt on Hsieh's answer to the problem of subcomparatives and embedded standards.

4.3 Erlewine's (2018) account and problems

As noted, Erlewine proposes that *bi* is categorically treated as a clausal conjunction. The standard TP is the complement of *bi* and the target TP is the specifier. In addition, he assumes that a rule of obligatory comparative deletion, given in (35) below, deletes a semantically identical predicate in the *bi*-clause to derive the surface form.

(35) Compare Deletion Requirement (CDR) (Erlewine 2018: 454):
In a *bi* comparative, elide a local predicate 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.

(36) 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 dominates α.

It is important to note that according to Erlewine (2018), all comparatives must apply the rule of comparative deletion. The derivation is illicit when the deletion rule fails to apply even when the structural description is not met. This is why (37) is ruled out.

(37) *[$_{TP1}$ Wo de yizi gao] bi [$_{TP2}$ ni de zhuozi kuan]
I GEN chair tall BI you GEN table wide
Intended: 'My chair is taller than your table is wide.'

The forced obligatory application of comparative deletion, however, is a stipulation rather than an explanation. One might wonder why there is no similar requirement for English comparatives. For English, there might be an obligatory comparative deletion under identity, but there is no forced application to subcomparatives.

As for the problem of embedded standards, Erlewine claims that they are not allowed because the antecedent is not a local predicate in the *bi*-clause.

(38) *[$_{TP1}$ Yuehan ~~gao~~] bi [$_{TP2}$ Mali renwei [$_{TP3}$ ta$_i$ gao]]
John tall BI Mary think he tall
Intended: 'John is taller than Mary thinks he is.'

The locality account, again, is a stipulation rather than a true explanation just like Liu's minimality stipulation. Why must Chinese be so strange in this aspect? Why does English not have the same locality requirement?

In addition to the above problems, Erlewine's (2018) syntax and semantics of Chinese comparatives give rise to other problems. One problem has to do with the distribution of *dou*. As is well-known, universal DPs in Chinese are normally accompanied by *dou*, as shown by (39). Now consider (40a). Erlewine's proposed syntax of Chinese comparatives would assign (40a) the structure (40b).

(39) Meige ren *(dou) qingchu
every person all clear
'Everyone is clear.'

(40) a. Meige ren bi wo dou (geng jia) qingchu
every person than I all more clear
'Everyone is clearer than I am.'

b. [$_{TP1}$ meige ren ~~qinqu~~] bi [$_{TP2}$ wo dou (gen jia) qinchu]

But the structure (40b) must be wrong because in this structure *dou* is associated with the subject *wo* 'I' rather than *mei-ge ren* 'everyone'.

Another syntactic problem is related to the reflexive *ziji* 'self, which must be bound by a c-commanding subject. Consider (41), whose structure is (42) under Erlewine's analysis. In (42), clearly, *Zhangsan* does not c-command *ziji* in the second clause because the former is the subject of an embedded clause.

(41) Zhangsan$_i$ bi Lisi$_j$ hai geng bu liaojie ziji$_i$
Zhangsan than Lisi still more not understand self
'The degree to which Zhangsan understand himself is less than the degree to which Lisi understand him.'

(42) [Zhangsan$_i$ ~~bu liaojie ziji$_i$~~] bi [Lisi$_j$ hai geng bu liaojie ziji$_i$]
|_____|
No c-command

The last problem with Erlewine's analysis is a semantic one. When the target of comparison is a downward entailing DP such as (43a), the structure that his analysis gives, i.e., (43b), would not obtain the right truth conditions.

(43) a. Meiyou ren/henshao ren bi wo geng mingbai
No person/few person than I more understand
'No one/few people understand it better than I do.'

b. Erlewine's structure
[Meiyou ren/henshao ren ~~mingbai~~] bi [wo geng mingbai]
no person/few person than I more understand

The meaning that (43b) would get is something like 'The degree to which no one/few people understands it is greater than the degree to which I understand it'. This is clearly not the meaning of (43a).

The only way for Erlewine's analysis to obtain the right truth conditions is to scope out the downward-entailing DPs via quantifier raising out of their containing clause. Under this analysis, (43a), for example, would mean that no person x is such that he understands it better than I do. However, this proposal is impossible because the scope of downward entailing DPs is restricted to their containing clause—a constraint known as the clause-boundedness constraint. For example, (44a) does not have a reading on which the DP *meiyou ren* 'no one' scopes out the *if*-clause and (44b) does not have a reading on which *meiyou ren* scopes out the sentential subject.

(44) a. [Ruguo meiyou ren lai], wo hui hen shangxin
if no person come I will very sad
'If no one comes, I will be sad.'
*'No person x is such that if x comes, I will be sad.'

b. [Meiyou ren lai] rang ta hen shangxin
no person come make him very sad
'(The fact) that no person$_i$ came made him$_{j/*i}$ sad.'
*'No person x is such that x's coming made x sad.'

5. Remarks on Arguments against the Phrasal Analysis

Both Liu (2011) and Erlweine (2018) provide arguments against my phrasal analysis set out in Lin (2009) . This section reviews Erlewine's arguments first. There are two major types of arguments from Erlewine against the phrasal analysis. One type of argument is related to how comparatives involving a complex predicate of the form 'verb+de+AP' are generated and the other type of argument has to do with movement chains involving object preposing, *bei* passives and verb copying constructions. I review these two types of arguments in turn below.

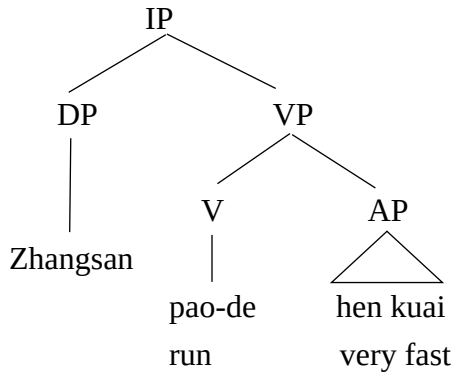
5.1 Arguments based on complex predicate constructions

The verb-de-AP construction is illustrated by (45). In (45a) the post-verbal AP *hen kuai* introduced by *de* is functionally a manner or degree modifier of the verb *pao* but syntactically the *de*-AP is a complement of the verb to which *de* encliticizes as shown by (45b) (Huang 1988, Huang et al 2009.)

(45) a. Zhangsan pao de hen kuai
Zhangsan run DE very fast

‘Zhangsan runs/ran very fast.’

b.



When this construction interacts with a *bi*-constituent, it shows some interesting properties. First, what are compared can be the subject and the verb. Consider (46a).

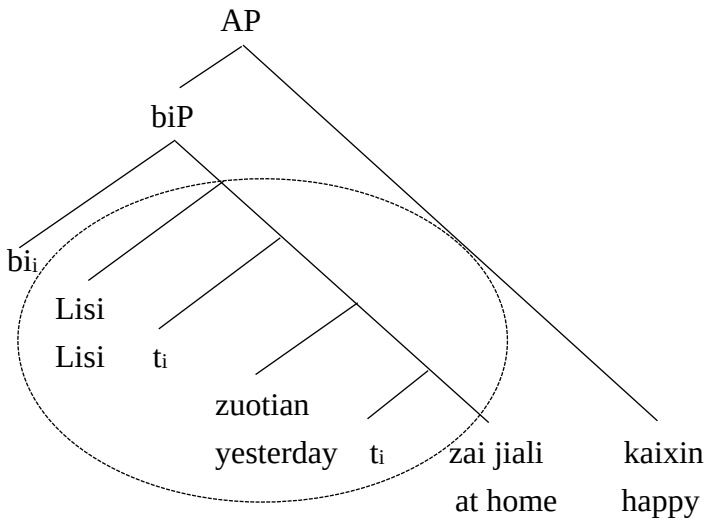
(46) a. Zhangsan pao de bi feiji fei de kuai
Zhangsan run DE than plane fly DE fast
‘Zhangsan runs faster than planes fly.’

b. [$_{TP1}$ Z.S. [$_{VP1}$ run [DE [~~$_{AP1}$ fast~~]]]] bi [$_{TP2}$ plane [$_{VP2}$ fly [DE [$_{AP2}$ fast]]]]

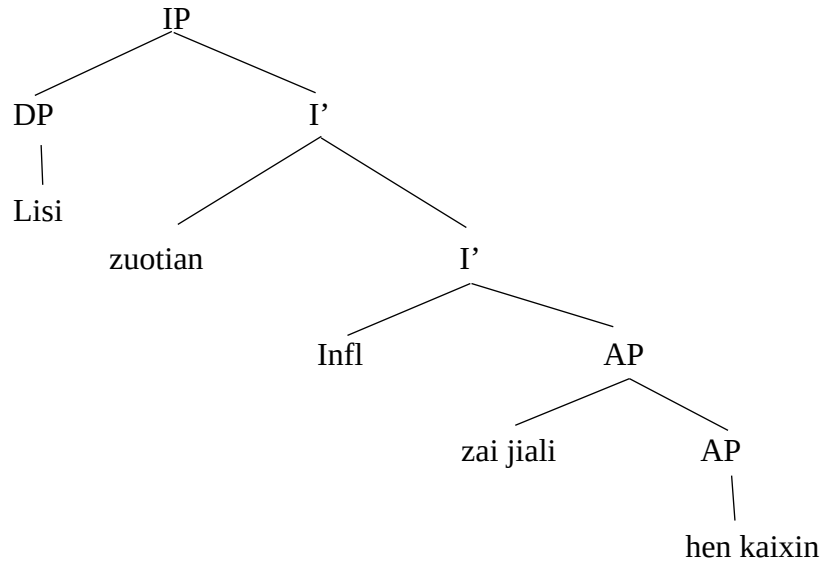
Erlewine argues that under his analysis (46a) can be derived as (46b) by deleting the lower local AP predicate of the target clause but no phrasal analysis including Lin (2009) is able to derive this structure because neither *Zhansasn pao de* nor *feiji fei de* in (46a) is a constituent given Huang’s (1988) and Huang et al’s (2009) analysis of the complex predicate construction in (45) (see Erlewine 2018, note 13).

Erlewine’s criticism above is based on a misinterpretation of Lin’s (2009) analysis. According to Lin (2009), compared items must form layers of standard constituents whose head is *bi* but the notion of constituency that he refers to should not be understood in the traditional sense of syntactic structure. This position is clear in comparatives with multiple standards such as *Zhangsan jintian zai xuexiao bi Lisi zuotian zai jiali kaixin* ‘Zhangsan is happier at school today than Lisi was at home yesterday’ discussed by him. In a traditional syntactic structure such as (48) below, the subject, the time phrase and the location expression do not form a constituent. But in (47), Lin’s proposed structure for *bi*-comparatives, the three phrases under discussion do form a constituent as the dotted oval indicates.

(47)

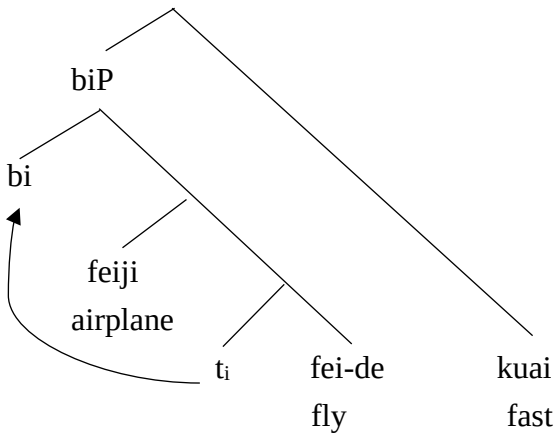


(48)



Therefore, as long as *feiji* 'airplane' and *fei* 'fly' are arguments of *kuai* 'fast' in (46a), as required by the author's phrasal analysis, there is no problem that they form a constituent in a *bi*-phrase, as shown below.

(49)



So the question is: can *feiji* ‘planes’ and *fei-de* ‘fly’ be arguments of *kuai* ‘fast’? Before answering this question, reconsider the structure of (45b), which Erlewine assumes, and how it is semantically composed. It is important to note that intuitions of surface grammatical relation may not necessarily correspond to semantic argument structure. Take a quantificational sentence such as (50) for example.

(50) Everyone laughed.

Syntactically *everyone* is the subject and *laughed* the predicate of the sentence. But this relation of predication might turn out to be reversed when doing semantic composition due to semantic types. It has been widely assumed since Montague (1973) that quantificational expressions are semantically generalized quantifiers of type <<e,t>,t>, i.e., a set of properties, and intransitive verbs denote properties of type <e,t>. In other words, in terms of semantic composition, *everyone* is the predicate and *laughed* its argument.

With this as background, I would like to argue that the denotation of the post-verbal AP in (45) is in fact semantically a predicate that takes the verb as its argument, though syntactically the post-verbal *de*-AP might be a complement of the verb. This assumption will save my phrasal analysis from Erlewine’s criticism above.

What does *hen kuai* ‘very fast’ denote? Let us assume that in additional to individual arguments, verbs contain an eventuality argument represented by the variable *s* and there are measure functions such as FAST mapping an eventuality to a degree of speed just as adjectives such as *tall* map an individual to a degree in height. Given this, *hen kuai* ‘very fast’ can have a denotation such as (51).

(51) $[\![hen\ \ kuai]\!] = \lambda P_{<e,<s,dt>>}.\lambda x \exists d \exists s[P(x)(s) \wedge FAST(s) \geq d_c]$

In other words, *hen kuai* ‘very fast’ is a two-place predicate. Its first argument is a verb of type <e,<s,<d,t>>> and the second argument is an individual. Take (45) for example. On the assumption that *de* is semantically vacuous and syntactically encliticizes to the preceding verb, in (45) the verb *pao* ‘run’ is the first argument of *hen kuai* ‘very fast’and *Zhangsan* its second argument. The truth conditions assert that there is an eventuality *s* of Zhangsan’s running and the speed of *s* is greater than the contextually determined standard.

Granted that the above analysis of eventuality modifiers such as *de-hen kuai* is plausible, Erlewine’s argument above against the author’s phrasal analysis is flawed, because he misunderstands what I mean by constituency of a layered *bi*-phrase in Lin

(2009).

Erlewine's second argument against the author's phrasal analysis again has to do with the 'verb+de+AP' construction. Consider (52).

(52) a. Yuehan pao de bi feiji kuai (Erlewine 2018: 460)
John run DE than airplane fast
'John runs faster than airplane/the speed of an airplane.'

b. [$_{TP1}$ John [$_{VP}$ pao DE ~~[$_{AP}$ kuai]~~]] bi [$_{TP}$ feiji [$_{AP}$ kuai]]

On the assumption that airplanes cannot be described using the verb *pao* 'run', Erlewine claims that the standard clause in (52) contains only the AP *kuai* 'fast' but not the verb *pao* 'run' and the derivation of (52a) involves deletion of the lower predicate *kuai* in the target clause as in (52b). Since the author's phrasal analysis requires that the targets and the standards contain equal number of parallel constituents, he claims that (52a) is a problem with the phrasal analysis.

The above argument against the phrasal analysis is a very interesting one, but not necessarily a correct one. An important assumption behind that argument is that the verb *pao* 'run' can never apply to *feiji* 'airplanes', but this assumption is problematic. As long as one searches the internet, it is very easy to find examples such as the following.

(53) a. Huoche pao-de kuai haishi feiji pao-de kuai?
train run-DE fast or planes run-DE fast
'Are trains faster or are airplanes faster?'

b. Shijie shang you-mei-you bi feiji pao-de kuai de che?
world in have-not-have than airplane run-DE fast REL car
'Are there cars that run faster than airplanes in the world?'

c. Huoche han feiji shei pao-de kuai?
train and airplane who run-DE fast
'As for trains and airplanes, which run faster?'

In light of the above examples, one can argue that (52a) is derived by deleting the second occurrence of *pao* in the standard clause.

Even for bullets and sound, which people normally won't think of using *pao* 'run' to describe their manner of motion, we can easily find examples of the following sort on the internet:

(54) a. Zidan han shengyin, shei pao de kuai?
bullet and sound who run DE fast
'As for bullets and sound, who runs faster?'
b. Shengyin pao de hen kuai
sound run DE very fast
'Sound runs very fast.'

This suggests that the verb *pao* 'run' in examples such as (52)-(54) might be only a metaphoric cover term of manner of motion rather than denoting actual running. If this line of thought is plausible, then (55) is not a problem with the phrasal analysis either.

(55) Ren keyi pao-de bi zidan kuai ma?
human can run-DE than bullet fast Q
'Can humans run faster than bullets?'

Finally, it is worth noting that in (52) and (55), the verb *pao-de* may also follow the *bi*-DP instead of preceding it without changing the meaning of the sentence. So (56a) and (56b) mean the same thing as (52a) and (55), respectively.

(56) a. Yuehan bi feiji pao de kuai (Erlewine 2018: 460)
John than airplane run DE fast
'John runs faster than an airplane.'
b. Ren keyi bi zidan pao de kuai ma?
human can than bullet run DE fast Q
'Can humans run faster than bullets?'

One may find many other examples similar to (56a,b).These examples indicate that even for Erlewine (2018), he has to assume that airplanes and bullets must be able to "run". Given this, his counter-argument against the phrasal analysis based on (52a) is not a successful argument.

5.2 Erlewine's (2018) Arguments based on movement chains

Erlewine's second type of arguments against the phrasal analysis comes from consideration of constructions which have been analyzed as movement dependencies in previous literature, such as object preposing, *bei* passive and verb copying.

According to him, the above constructions may all form *bi*-comparatives, generating a form of the following type, where both A and B are related to the presumably trace position *t*:

(57) […A…] bi […B…] […t…]

target standard predicate

He argues that such examples are problematic for a phrasal analysis as there is only one trace position but unproblematic for a clausal analysis as there are underlyingly two separate instances of the predicate in the syntax.

To illustrate, consider object preposing. In Mandarin Chinese, objects of transitive verbs are canonically postverbal, so preverbal objects are often assumed to be fronted from their postverbal base position via the rule of object preposing (Ernst & Wang 1995; Paul 2002), which is subject to Tsao's (1989) animacy restriction, illustrated below.

(58) a. *Wo Zhangsan xihuan
I Zhangsan like
'I like Zhangsan.'

b.?Wo mao xihuan
I cat like
'I like cats'

c. Wo daishu xihuan
I algebra like
'I like algebra.'

Interestingly, Tsao (1989: 169-170) observes that preposed objects (secondary topics) may function as compared items in *bi*-comparatives and are subject to the same animacy restriction.

(59) a. Wo daishu bi jihe xihuan
I algebra than geometry like
'I like algebra more than I like geometry.'

b. ?Wo mao bi gou xihuan
I cat than dog like
'I like cats more than I like dogs.'

c. *Wo Zhangsan bi Lisi xihuan
I Zhangsan than Lisi like
'I like Zhangsan more than I like Lisi.'

Erlewine (2018: 463) further points out that a combination of animate-inanimate objects in *bi*-comparatives is judged equally deviant.

(60) a. *Wo Zhangsan bi daishu xihuan

I Zhangsan than algebra like
'I like Zhangsan more than I like algebra.'

b. *Wo daishu bi Zhangsan xihuan
I algebra than Zhangsan like
'I like algebra more than I like Zhangsan.'

From the above data, he concludes that both the object in the target and the object in the standard are derived from a postverbal position, because they are subject to the same animacy restriction on object preposing.

The above argument for the clausal analysis is again an interesting one, but it is not necessarily one which goes against the phrasal analysis. It depends on whether the animacy restriction should be taken as a condition on derivations or a condition on representations. Note that when a pronoun or an epithet is substituted for the trace of a preposed object, the sentence is equally deviant. Consider (61)

(61) a. *Zhangsan Lisi$_i$ xihuan ta$_i$
Zhangsan Lisi like him
Intended: 'Zhangsan likes Lisi.'

b. *Zhangan Lisi$_i$ taoyan na jiahuo$_i$
Zhangsan Lisi dislike that guy
Intended: 'Zhangsan dislikes Lisi that guy.'

(61a) is ill-formed on its intended reading according to which Lisi is understood as the object. When Lisi is understood as the subject and Zhangsan the object, the sentence is grammatical. Similarly, (61b) is ill-formed on the reading 'Zhangsan dislike Lisi' but is well-formed on the reading 'Lisi dislikes Zhangsan'. Now if we take the presence of the object pronoun or epithet to indicate that there is no movement involved, then the animacy restriction on object preposing should be restated as a condition on representations as shown in (62), which bans a preverbal animate object from being related to a transitive verb.

(62) *[$_{IP}$ DP$_{subject}$ …[$_{XP}$ DP$_{Object}$ …Verb$_{tr}$…]], when DP$_{object}$ is animate and construed as the internal argument of Verb$_{tr}$.[3]

Under this view, whether or not there is a trace does not matter, because (62) is not a condition on movement chains. The condition is to rule out a representation where a

[3] It is not clear to me which projection a preposed object DP is adjoined to. I use XP to represent the projection that immediately dominates the preposed object DP.

transitive verb is related to a preverbal object DP that follows the subject.[4] It applies to constructions where there is a gap as well as one with no gap, and to not only simplex sentences but also comparative sentences.[5] Given this representational view, the phrasal analysis is immune from Erlewine's criticism that a phrasal analysis is not able to explain the parallel animacy restriction on simplex and comparative sentences.

Another argument that Erlewine provides is based on Chinese passives such as (63).

(63) Zhangsan bei Lisi da-le
Zhangsan BEI Lisi hit-Asp
'Zhangsan was hit by Lisi.'

Following Huang (1999) and Huang et al (2009), Erlewine assumes that long passives in Mandarin Chinese do not involve A-movement as English passives but A'-movement of a null operator to a position between *bei* and the agent as shown in (64).

(64) Zhangsan [bei [Op_i [Lisi da-le t_i]]]

In (64), the operator movement yields a property by λ-abstracting the base object position. This property is then applied to the subject (Huang 1999).

What is interesting about *bei*-passives is that they may enter comparative constructions generating two constrasting agents introduced by *bei*, as illustrated by (65), cited in Erlewine (2018: 466).

(65) Yuehan bei baba bi bei mama ma de geng can
John BEI father than BEI mother scold DE more severe
'John was scolded by his father more severely than by his mother.'

According to Erlewine, to explain (65), two instances of operator movement must be postulated with one in the target clause and another in the standard clause and this is a problem for the phrasal analysis because there is only one gradable predicate in the

[4] If the preposed object DP is preceded by a preposition such as *ba*, it will not be ruled out by (62) because what is immediately dominated by XP is a PP containing the object DP rather than the object DP itself.

[5] It should be noted that normally Chinese does not use inanimate pronouns, so it is more difficult to test whether an inanimate pronoun can be linked to a preposed object. It sounds to me that (i) is marginally acceptable.

(i) ?Ni na-zhi $shouji_i$ hao reng-le ta_i le ba
You that-Cl mobile.phone better throw-Asp it Asp Par
'You better throw that mobile phone.'

syntax. Moreover, adopting Liu's (2011) view, Erlewine argues that (65) cannot be dealt with by a phrasal analysis because *bei* and the agent do not form a constituent in the structure proposed by Huang (1999).

The above argument against the phrasal analysis is not conclusive, however. Shi (2005) has convincingly argued that many existing arguments against analyzing *bei* as a preposition and *bei*+agent as a constituent are not cogent. Take Huang's (1999: 431) sentence in (66) for example. He uses the coordination test to show that the string of words following *bei* can be conjoined with a similar string of words to the exclusion of *bei*, thus excluding the possibility that *bei* and the agent DP form a constituent.

(66) Ta bei [Zhangsan ma-le liang sheng], [Lisi ti-le yi jiao]
he BEI Zhangsan scold-Asp two voice Lisi kick-Asp one foot
'He was scolded by Zhangsan twice, and kicked by Lisi once.'

Yet, as pointed out by Shi (2005: 43), when a preposition occurs repeatedly, it may sometimes be omitted, as is shown by (67), taken from one of the many examples that he provides.

(67) Zhengfu cong Shanghai diaolai-le yaowu, (cong) Beijing diaolai-le
government from Shanghai collect-Asp medicine from Beijing collect-Asp
zhangpeng, (cong) Ningpou diaolai-le bianzhi dai
tent from Ningpou collect-Asp knitted bag
'The government collected medicine from Shanghai, tents from Beijing and knitted bags from Ningpou.'

(66) can be another instance of the same phenomenon by deleting the second occurrence of *bei*, as the sentence *Ta bei Zhangsan ma-le liang sheng, bei Lisi ti-le yi jiao* is fully grammatical.

In fact, Shi (2005: 44) provides examples showing that *bei* and the agent DP form a constituent and may enter coordinated constructions. I reproduce one of his examples below:[6]

(68) Tongzhimen de jingli yidian yidiandi bei shen xue, bei bingwou, bei
colleagues DE energy one.bit one.bit BEI deep snow BEI ice.hole BEI
buting de chuanqi han diejiao xiaomojin-le
non.stop DE breath and fall drain-Asp

[6] Liu (2011) argues that examples such as (68) might involve right node raising.

‘The energy of our colleagues was drained bit by bit by the deep snow, by the ice hole and the non-stop breath and falls. ’

In addition to the coordination test, there are other tests to show that *bei* and the agent DP form a constituent. For example, they may serve as a fragment answer, as shown by (69).

(69) Q: Zhangsan bei shei pian-le?
Zhangsan BEI who cheat-Asp
‘By whom was Zhangsan cheated?’
A: bei Lisi
BEI Lisi
‘by Lisi’

Second, two coordinated *bei*-DP’s can license the use of *dou* indicating that the two *bei*-DP’s form a plural entity as illustrated below.

(70) Zhangsan bei Lisi han bei Wangwu dou ge pian-guo liang ci
Zhangsan BEI Lisi and BEI Wangwu all each cheat-Asp two times
‘Zhangsan was cheated twice respectively by Lisi and by Wangwu.’

It is important to note that though the coordinator *han* ‘and’ may conjoin two PPs or DPs, it is not able to conjoin two sentences. In other words, (70) may not be derived by backward VP deletion. In fact, two conjoined *bei*-DPs are parallel to two conjoined *dui*-DPs. As we see below in (71), two conjoined *dui*-DPs may also form a plurality and hence license the use of *dou*.

(71) Zhangsan dui Lisi han dui Wangwu dou yiyang hao
Zhangsan to Lisi and to Wangwu all same good
‘Zhangsan is equally good to Lisi and to Wangwu.’

Returning to (65), under the phrasal analysis such as the author’s in Lin (2009), one does not need to postulate two instances of the predicate in the syntax to obtain the right truth conditions. The semantics of *bi* is responsible for distributing the single gradable predicate in syntax to the two *bei*-DPs in semantic computation. That is, the two instances of the same predicate surface in semantics, not in overt syntax. So the issue raised by Erlewine is only an apparent one in the author’s phrasal analysis.

Another argument very similar to the one based on passives discussed by Liu

(2011) comes from *ba*-constructions in which a preposed object DP is preceded by the morpheme *ba*. The syntactic status of *ba*-constructions has been controversial (see for instance, Hashimoto 1971; Bender 2000; Chao 1968; Travis1984; Li 1990; Huang 1982; Koopman 1984; Goodall 1986; Zou 1993; Sybesma 1999). Huang et al (2009: 195) analyze *ba* as a functional light verb taking VP as its complement and the DP following it the specifier of VP, as illustrated by Liu's (2011: 1791) example below.

(72) [Zhangsan$_i$ [$_{baP}$ t$_i$ [$_{ba'}$ ba [$_{VP}$ qian [$_{V'}$ v [$_{VP}$ kan-de zhong]]]]]]
Zhangsan BA money regard-De important
'Zhangsan regards money important.'

Ba-construction may also form *bi*-comparatives as illustrated by Liu's example in (73):

(73) Zhangsan ba qian bi ba shengming kan-de zhong
Zhangsan BA money than BA life regard-DE important
'Zhangsan regards money as more important than life.'

Based on the syntactic analysis of *ba*-constructions in (72), Liu argues that a phrasal analysis of *bi*-comparatives is not able to generate (73) because *ba* and its following preposed object DP do not form a constituent. The conclusion of this argument is flawed, however, because there is evidence in support of the constituency of a *ba*-DP. Consider the following two examples taken from the internet resources by google searching.

(74) Youci gen laoban cheng Delta-de meiguo guonei hangban, ta shi
one.time with boss take Delta's American domestic flight he be
zui gao-de status, yushi ba ta han ba wo dou sheng cang le,
most high status so BA him and BA me all upgrade class Asp
ba ling yige yong dianshu mai de ganhui jingji cang
BA another one use reward.point buy REL drive.back economic class
'One time I took American airline's domestic flight with my boss. He had the highest status, so the airline upgraded him and me to a better class but drove another one to his economic class who bought the ticket with his reward points.'

(75) Wo yi bu gaoxing, jiu keyi ba ni han ba ni xiang zhao de ren
I once not happy then may BA you and BA you want find REL person
liu zai shan li, tianwang laozi ye guan-bu-liao wo

leave in mountain inside emperor old.guy also unable.to.control me
'Once I am not happy, I then may leave you and the person that you are looking for in the mountain. Even the emperor is not able to control me. '

In both (74) and (75), two *ba-DPs* are conjoined by the coordinator *han* 'and', indicating that *ba* and its following DP form a constituent. The constituency of a *ba*-DP is particularly clear in (74). Note that the two coordinated *ba*-DPs in (74) are followed by *dou*. As is well-known, *dou* must be associated with a plural entity. This is possible only when the two *ba*-DPs in (74) are each a constituent so that they can be conjoined to form a plurality.

On the other hand, like *bei*-passives, arguments for the complementation structure in (72) can be counter-argued. For example, Liu argues that the VP following *ba* can be coordinated with a similar string of words excluding *ba* such as (76), thus supporting the assumption that the preposed object DP does not form a constituent with *ba*.

(76) Zhangsan ba yiqi kan-de zhong, jinqian kan-de qing
Zhangsan BA personal-loyalty look-DE important money look-DE belittle
'Zhangsan regards personal loyality important, and think of money light.'

(76), however, is not decisive. It can be equally explained by an analysis treating *ba* as a preposition which forms a PP with its following DP. Under this analysis, the second occurrence of *ba* can be omitted in a way parallel to the omission of the second occurrence of *bei* in (66). In fact, insertion of another occurrence of *ba* before *jinqian* 'money' in (76) is perfectly acceptable, as illustrated by (77).

(77) Zhangsan ba yiqi kan-de zhong, (**ba**) jinqian kan-de qing
Zhangsan BA personal-loyalty look-DE important BA money look-DE belittle

(77) shows that what is coordinated can be two VPs of the following form:

(78) [VP [PP ba yiqi] [VP kan-de zhong]], [VP [PP (ba) jinqian] [VP kan-de qing]]

I conclude that (76) cannot prove that a *ba*-DP sequence is not a constituent. If a *ba*-DP forms a constituent, then it is straightforward to derive (73) under a phrasal analysis.

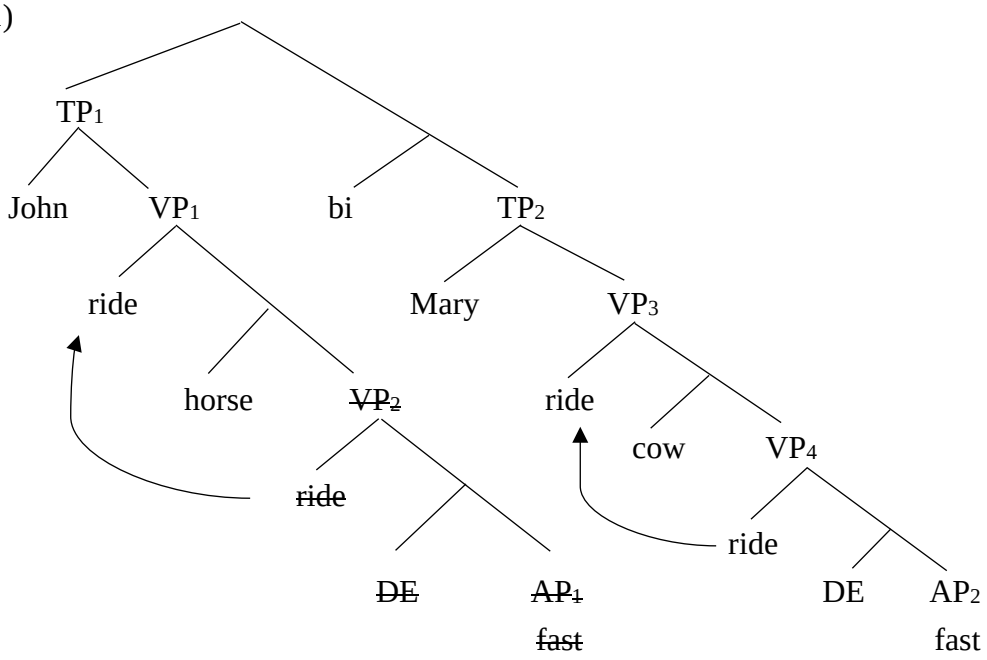
Erlewine's third argument against the phrasal analysis comes from consideration of comparatives involving verb copying constructions such as (79) discussed in Liu (1996).

(79) Yuehan qi ma bi Mali qi niu qi de kuai
John ride house BI Mary ride cow ride DE fast
'John rides horses faster than Mary rides cows.'

In this construction, both the target and the standard superficially look like clauses as they each contain a verb and an object. Liu (1996) argues that (79) can be easily derived through a derivation with two instances of verb-copy construction such as (80) by deleting one instance of V-de-AP. Adopting the assumption that verb-copy constructions are derived via verb movement without deleting the lower copy (cf. Huang 1988 and Cheng 2007), Erlewine (2018: 469) recasts his analysis of (79) as (81) within his framework.

(80) Yuehan [$_{VP}$ qi ma [$_{VP}$ qi de kuai]]
John ride horse ride DE fast
'John rides horses fast.'

(81)



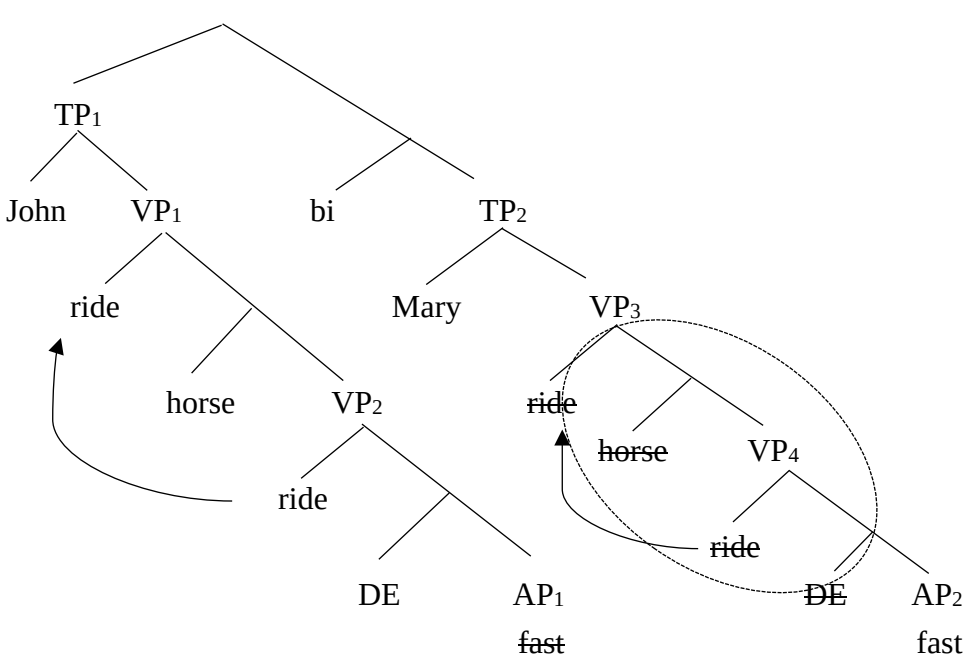
If the syntactic derivation of (79) is as described above, it does constitute a great challenge to the phrasal analysis.

But now consider comparatives such as (82). In this sentence, what is deleted is not the first occurrence of V-DE-AP but the first occurrence of AP and the second

occurrence of V-DP-V-de, as represented in (83). In other words, the derivation of (82) involves not only comparative deletion of AP but forward deletion of V-DP-V-de under identity.

(82) Yuehan qi ma qi de bi mali kuai
John ride horse ride DE BI Mary fast
'John rides horses faster than Mary does.'

(83)



What is crucial here is the forward deletion of the second occurrence of ride-horse-ride-DE. It is normally assumed that only constituents can be deleted, but as shown in (83), the string of words that undergoes forward deletion, i.e., the dotted oval, actually does not form a constituent under Erlewine's analysis of verb-copy constructions regardless of whether or not *de* is cliticized to the verb. This fact indicates that the structure of verb-copy constructions is not a simple matter. What the correct structure of verb-copy constructions is remains to be determined. Indeed, various analyses have been proposed in previous work and it is beyond the scope of this article to discuss them. For a recent review of those analyses, see Bartos (2019). Though I will not pursue or really argue for it, if *qi-ma-qi-(de)* in (82) can be a constituent, something like [$_{VP}$ [$_{VP}$ qi ma qi de] [$_{AP}$ hen kuai]], as the deletion fact implies, (79) and (82) will not be a problem for the phrasal analysis.

To sum up, Erlewine (2018) has provided many interesting arguments against the phrasal analysis involving movement chains and verb-copying constructions. Yet, as discussed, those arguments do not necessarily prove that the phrasal analysis is on the

wrong track. To the contrary, some related facts inspired by his discussion show that evidence points to the other direction.

6. Liu's (2011) arguments against Lin's (2009) analysis

6.1 *Rang*-constructions

Liu (2011) also provides very challenging and difficult examples for the phrasal approach to Chinese comparatives. One of them has to do with the pivotal comparative construction in (84). (84) is a so-called verbal comparatives in which a comparative morpheme *duo* 'many' is attached to a transitive verb taking a differential DP as its complement (cf. Li 2015).

(84) Wo rang ni bi ni rang ta duo zhu-le san tian
I let you than you let him more stay-Asp three day
'I let you stay for three more days than you let him.' Liu (2011: 1784)

Following Tang (2010: 184-187), Liu assumes that the verb *rang* in (84) selects a VP as its complement and therefore it is difficult to analyze *wo rang ni* 'I let you' or *ni rang ta* 'you let him' as a constituent. According to him, this challenges the author's phrasal analysis in Lin (2009).

Liu's argument here has two problems. To put aside the question of whether or not (84) is really grammatical[7], the same construction would constitute a similar challenge to his reduction analysis. (84) is in fact an exceptional pivotal construction rather than the norm. Many informants told us that other pivotal comparative sentences with verbs such as *jiao* 'ask', *qing* 'ask', *quan* 'persuade', *bi* 'compel', etc. are much worse than (84). For example, for many people, (85) is not even understandable.

(85) *Wo qing/quan/bi/jiao ni bi ni qing/quan/bi/jiao ta
I ask/persuade/compel/ask you than you ask/persuade/compel/ask him
duo zhu-le san tian
more stay-Asp three day
'I asked/persuaded/compelled/asked you to stay for three more days than you asked/persuaded/compelled/asked him.'

[7] For some people, this sentence is unacceptable and for some others, it is understandable but not fully natural. There are also people who accept it.

If the structure of pivotal constructions is like what Tang (2010) proposes with the pivotal verb taking a VP complement, then the ungrammaticality of (85) follows directly from a phrasal analysis. Yet Liu's analysis would wrongly predict that (85) should be as equally grammatical as (84) because they have the same structure. In other words, if a phrasal analysis owes an account for the grammaticality of (84), then a clausal analysis owes an account for the ungrammaticality of (85). In this sense, the latter analysis is no better than the former one and is perhaps even worse because almost every pivotal verb except *rang* 'let' cannot be used in the same construction as (84).

A second problem with (84) is that this sentence is not a regular *bi*-comparative but a verbal comparative. A verbal comparative requires that the verb be followed by an overt differential complement. Earlier I showed that a clausal approach is not able to derive comparatives with a differential phrase. Take (86) as another illustration. The underlying structure before comparative predicate deletion cannot be as given, because this structure will not give the sentence the right truth conditions.

(86) Wo rang ni [bi [ni rang ta ~~zhu-le san tian~~] duo zhu-le san
I let you than you let him stay-Asp three day more stay-Asp three
tian
day
'I let you stay for three more days than you let him.'

6.2 Reason clauses

Another challenge to my proposed phrasal analysis that Liu makes is related to reason clauses in comparatives. According to the author's proposal in Lin (2009), only arguments of predicates can function as the target and standard constituents for Chinese comparatives. So manner adjuncts and reason clauses may not serve as compared items. For example, (87) is judged to be unacceptable.

(87) *Mama yinwei Xiaomıng shuo huang bi yinwei ta tou qian geng
mother because Xiaoming say lie than because he steal money more
shengqi◦
angry
'Mother was angry more because Xiaoming told a lie than because he
stole money.' (Lin 2009: 18)

Yet, in contrast to the author's observation in Lin (2009), Liu (2011: 1783) claims that the following sentences are acceptable.[8]

(88) a. Mama yinwei Xiaoming$_i$ shuo huang bi baba yinwei ta$_i$ tou dongxi
Mother because Xiaoming say lie than father because he steal thing
haiyao shengqi.
even angry
'His$_i$ mother gets angry more because Xiaomingi lies than his$_i$ father gets angry because he$_i$ steals things.'

b. Laoban yinwei ta jingchang chidao bi yinwei ta ouer fan
boss because he often late than because he sometimes make
cuo hai geng shengqi.
mistake even more angry
'The boss is even more angry because he is often late than because he sometimes makes mistakes.'

I will not attempt to adjudicate on the grammaticality judgement dispute between Lin (2009) and Liu (2011) with respect to the occurrence of reason clauses in comparatives. When read carefully, the two sentences in (88) are understandable but I am not sure that they are perfectly natural Chinese sentences.[9]

Granted that the two sentences in (88) are acceptable, the question to ask is whether or not a phrasal analysis is able to account for them. Here is an attempt. Assume that the author's claim in Lin (2009) is correct that Chinese is an argument comparison language. A consequence of this is that the reason clauses in (88) would be arguments of the predicate of comparison. I would like to argue that this is a possible conclusion. Let us first consider the following sentences.

(89) a. [(Yinwei) ni de huangyan][rang shiqing bian de hen fuza]
because you DE lie make matter become DE very complicated
'Your lies make the matter very complicated.'

b. Laoban$_i$ [yinwei mali chang chidao][rang ta$_i$ hen shengqi]
boss because Mary often late make him very angry
'Mary's often being late makes the boss very angry.'

[8] On the other hand, Liu (2011) says nothing about manner adjuncts. His clausal analysis, as well as other clausal analyses, falsely predicts that manner adjuncts are able to function as compared items.
[9] Many informants that I asked have the same intuition that examples of the sort in (88) are not natural. In written sentences, they can be understood but in colloquial speech, this kind of sentence maybe is rarely heard.

The verb *rang* ‘make’ is a causal verb that requires two arguments, one being the cause argument and the other being the consequence argument. In (89a), the *yinwei*-phrase is the cause. I claim that it is also the external argument of the verb *rang*. With or without *yinwei* ‘because’, the sentence is equally grammatical.

Next, consider (89b). This sentence is similar to (89a) except that the object DP of the verb *rang* ‘make’, i.e., *laoban* ‘boss’, is preposed (topicalized) to a position before the *yinwei*-clause, leaving a pronoun behind. One can reconstruct the noun phrase *laoban* back to the position of the pronoun, as shown below. (90) and (89a) are then almost completely parallel in terms of syntactic structure

(90) [Yinwei mali chang chidao][rang laoban hen shengqi]
because Mary often late make boss very angry
‘Mary’s often being late makes the boss very angry.’

In other words, the *yinwei*-clause in (89b) is still the external argument of the causal verb *rang* ‘make’ just as the *yinwei*-DP in (89a) and the DP l*aoban* in fact is not the external argument but a topicalized internal argument. Now notice that the construction in (89b) may form a *bi*-comparative, as illustrated below.

(91) Laoban$_i$ [yinwei mali chang chidao] bi [yinwei ta ouer fan
boss because Mary often late than because she sometimes make
cuo] hai geng rang ta$_i$ shengqi
mistake even more make him angry
‘The boss is made even more angry because Mary is often late than because she sometimes makes mistakes.’

If my reasoning above is correct, the *yinwei*-clause in (91) can be the external argument of the causative verb *rang* ‘make’ and the DP *laoban* ‘boss’ the preposed internal argument of ‘make-angry’. Since the *yinwei*-clauses in (91) is an argument of the main predicate, it follows from the author’s phrasal analysis that it can function as a compared item.

Notice that (91) is completely parallel to Liu’s example (88b) except that (91) has an overt causative verb *rang* and the pronoun *ta* ‘him’ linked to the preposed DP *laoban*. Now suppose that the causative verb and the pronoun in (91) are dropped because the presence of *yinwei* has already made the causal relation obvious. Then we will derive (88b). Under this analysis, the reason clauses in (88) are not adjuncts but the external arguments of the dropped causative verb, just as the reason clause is in (91). It should be noted that expressions such as *yinwei* ‘because’, *suoyi* ‘so’, *ruguo*

'if', *suiran* 'though', *danshi* 'but' and so on are often deleted as long as the meaning of a given sentence can be clearly inferred from the context. So the proposed deletion of the causative verb should not be that surprising. Perhaps it is the deletion of the causative verb that brings about grammaticality judgement variations among different informants. Analyzed this way, Liu's examples in (88) are compatible with the phrasal analysis that the author proposed in Lin (2009) rather than constituting counterexamples to it.

6.3 Object comparison in multiple standard comparatives

Different from his earlier (1996) treatment of *bi*-comparatives, Liu (2011, 2014) argues for a hybrid analysis according to which *bi*-comparatives with one standard involve a phrasal comparison, whereas *bi*-comparatives with more than one standard involve a clausal comparison. According to him, one distinguishing property between phrasal comparatives and clausal comparatives lies in object comparison. He claims that phrasal comparatives allow object comparison, whereas clausal comparatives do not, as illustrated by the contrast between (92a) and (92b).

(92) a. Zhangsan shuxue bi wuli xihuan
Zhangsan mathematics than physics like
'Zhangsan likes mathematics than Lisi likes physics.'

b. *Zhangsan (xianzai) shuxue bi Lisi (yiqian) wuli xihuan
Zhangsan now mathematics than Lisi before physics like
'Zhangsan likes mathematics now more than Lisi liked physics before.'

I am not certain that the contrast claimed above is genuine. Object comparison often appears in *de*-constructions such as those in (93).

(93) a. Wo niurou bi ta zhurou chi de geng duo
I beef than he pork eat DE more many
'I eat beef much more than he eats pork.'

b. Zhangsan shuxue bi Lisi wuli xue de geng hao
Zhangsan mathematics than Lisi physics study DE more good
'Zhangsan studies mathematics much better than Lisi studies physics'

However, Liu argues that the *de*-constructions under discussion involve a verb copying construction with a backward deletion of the first verb, as is shown in (94). Therefore, he takes examples such as (93a,b) as not involving true preposed object

comparison.

(94) Zhangsan xianzai [[V ~~xue~~] [DP shuxue]][V xue]-de [Result geng hao]]
(Liu 2011: 1775)

One problem with this analysis is that as mentioned, there is no independent evidence to support backward VP or backward verb deletion in Mandarin Chinese. Moreover, there are examples of object comparison which do not involve verb copying and deletion. For example, consider the two examples in (95). (95a) is not a regular *bi*-comparatives but an inferiority comparative. (95b) shows that a preposed object DP may sometimes need a preposition such as *dui* 'to' to accompany it, and such PPs support object comparison in comparatives with multiple standards.

(95) a. Wo zhurou mei you ta niurou nayang chang chi
I pork not have he beef that often eat
'I do not eat pork as often as he eats beef.'

b. Dongshizhang dui pinpai jingying bi zongjingli
chairman toward brand management than general.manager
dui renshi guanli hai geng zhongshi
toward human.resources management still more value
'The chairman values brand management much more than the general manager values human resourcs management.'

I conclude that Liu's use of object comparison to differentiate clausal comparison from phrasal comparison need to be reconsidered.

7. A Revision of Lin (2009)

As mentioned, Chinese comparatives may compare more than one item in a single comparative construction. To capture this, in Lin (2009), I propose that the morpheme *bi* not only is responsible for the comparative meaning, i.e., the greater-than relation, but is also a standard-introducer that projects layered standard phrases each of which is an argument of the predicate of comparison. That is, the above two components of meanings are lumped together as a single meaning of *bi* as shown by (96) below. (96b) is a generalized and more simplified version of (96a), where $\vec{a}$ represents a series of arguments (See Lin (2009) for more details of the generalized version).

(96) a. $[\![bi]\!] = (\lambda l)^i(\lambda i)^j(\lambda w)^k\lambda x\lambda \wp_{<d,<(l),<(i),<(e),<e,t>>>>>}(\lambda l')^i(\lambda i')^j(\lambda z)^k\lambda y[\iota_{max}\, d$
$[\wp(d)(l')(i')(z)(y) > \iota_{max}\, d\, [\wp(d)\,(l)(i)(w)(x)]$

b. $[\![bi]\!] = \lambda \vec{a_i} \lambda \wp_{<d,<\vec{a},t>>>}\lambda \vec{a_i'}[\iota_{max}\, d\, [\wp(d)(\vec{a_i'}) > \iota_{max}\, d\, [\wp(d)\,(\vec{a_i})]$,
where $|\vec{a}| \geq 1$.

Though this analysis might work well for those *bi* comparatives without an overt degree morpheme such as *Zhangsan bi Lisi gao* 'Zhangsan is taller than Lisi', as pointed out by Liu (2011), it might be problematic for sentences with an overt comparative morpheme such as the morpheme *geng* in *Zhangsan bi Lisi geng gao* 'Zhangsan is even taller than Lisi'.[10] For this kind of example, it is clear that *bi* is only an element that introduces the standard(s) of comparison. This view might be correct. Equality comparatives such as (97) or negative inferiority comparatives such as (98) point to the same conclusion.

(97) Zhangsan gen Lisi yiyang gao
Zhangsan with Lisi same tall
'Zhangsan is as tall as Lisi.'

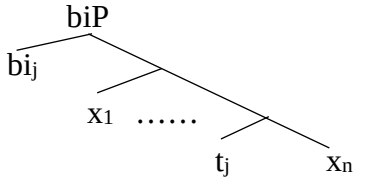
(98) Zhangsan bu xiang Lisi nayang tiexin
Zhangsan not like Lisi that sweet
'Zhangsan is not as sweet as Lisi.'

In (97), *gen* 'with' is a standard-introducer and *yiyang* 'same' a degree morpheme; in (98), *xiang* 'like' is a standard-introducer and *nayang* 'that manner' a degree morpheme. These two examples show that there is a division of labor between a standard-introducer and a degree morpheme. Given this, it is reasonable to say that in *bi*-comparatives, *bi* is only a standard-introducer and the degree meaning is the job of a covert degree morpheme when there is no overt one present.

In light of the above discussion, I would like to revise the original semantics of *bi* given in (96), letting *bi* be a pure standard-introducer. A first attempt is to say that a *bi*-phrase adjoined to the predicate of comparison introduces an n-tuple symbolized as '$\vec{a}$' below, i.e., an ordered set of n elements ($x_1 \ldots x_n$), in contrast to a series of target constituents symbolized as '$\vec{a}'$' . This n-tuple will serve as the standard(s) of comparison in semantic composition.

[10] Note that *geng* is not necessarily a comparative morpheme. It can be the case that it only carries a presupposition that both the target and the standard satisfy the description of the predicate of comparison and the comparative meaning is the job of the covert $MORE_C$.

(99) a.



b. $[\![bi]\!] = \lambda x_n \ldots \lambda x_1.(x_1, \ldots, x_n)$

c. $[\![biP]\!] = (x_1 \ldots x_n) = \vec{a}$

On the other hand, we can abstract the degree meaning from the original denotation of *bi* in (96) and get the degree meaning of the covert MORE$_P$, as given below:

(100) $[\![MORE_P]\!]$

$= \lambda \wp_{<d,<\vec{a},t>>>} \lambda\vec{a}\lambda\vec{a}'[\iota_{max}\, d[\wp(d)(\vec{a}')] > \iota_{max}\, d[\wp(d)(\vec{a})]]$,

Where '$\vec{a}$' and '$\vec{a}'$' represent a series of standard and target constituents, respectively.

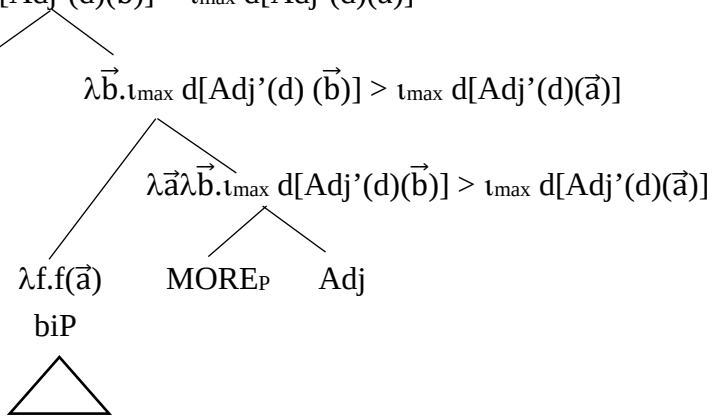
In the above solution, the task of *bi* is only to form a series of arguments that are in contrast to the target arguments. By contrast, the comparative degree morpheme, be it overt or covert, is the core of the semantics of degree. It takes the predicate of comparison as the first argument to form a comparative predicate. This comparative predicate then requires two arguments, one being a series of standard arguments and the other being a series of target arguments, to compare their degrees with respect to the dimension denoted by the predicate.

Such a solution is not the only imaginable one. Thanks to Chris Kennedy (personal communication), an alternative approach would be to treat *bi* as denoting a relation between a series of arguments and a comparative predicate as given in (101). In this analysis, *bi* is a mediator that connects a comparative predicate and makes a series of standard arguments available for it.

(101) $[\![bi]\!] = \lambda\vec{a}\lambda f.f(\vec{a})$, where $|\vec{a}| \geq 1$.

Under this analysis of *bi* and the denotation of the degree morpheme in (100), the semantic computation of a comparative would look like (102).

(102) ι_{max} d[Adj'(d)($\vec{b}$)] > ι_{max} d[Adj'(d)($\vec{a}$)]



No matter whether we adopt the first or second solution, the phrasal approach as defended by Lin (2009) is immune from Liu's criticism that there should be a division of labor between a standard-introducer and a degree operator.

Before ending this section, I would like to show that a phrasal approach may also deal with verbal comparatives successfully, which as remarked, are a big challenge to a clausal approach.

Li (2015) is the first to provide a detailed analysis of verbal comparatives in Chinese. Since the differential phrase in a verbal comparative can be a definite DP or proper name, she argues that a nondegree-based approach to such constructions fares better than a degree-based approach. I will basically follow her approach in pursuing a nondegree-based approach to differential verbal comparatives.

According to Li (2015), one requirement of verbal comparatives is that except for the differential phrase, every element in the set of objects associated with the standard of comparison must correspond to one element of the same sort in the set of elements associated with the target of comparison. That is, there is a similarity requirement between compared items in terms of relevant properties. This requirement explains why (103) is acceptable in situation 1 and 2 below but sounds odd in situation 3 and 4.[11]

(103) Zhangsan (jintian) bi Lisi (zuotian) duo-mai-le yi-ben shu/aoman
Zhangsan today than Lisi yesterday more-buy-Asp one-Cl book/pride
yu pianjian
and prejudice

[11] The interpretation of verbal comparatives also has an exhaustiveness requirement not discussed in Li (2015). This requirement dictates that the referent of the differential object is the only object that is true of the target of comparison but not true of the standard of comparison. Take (103) for instance. The novel denoted by the differential DP *yi-ben shu* 'one book' must be the only additional book that Zhangsan bought. Due to space constraint, I will not discuss how this exhaustiveness effect is captured.

'Zhangsan bought one more book today than Lisi did yesterday.'

'Zhangsan bought the additional book, Pride and Prejudice, that Lisi didn't.'

(104) a. Situation 1

The set of things Zhangsan bought: {novel 1, novel 2, novel 3, novel 4}

The set of things Lisi bought: {novel 1, novel 2, novel 3}

b. situation 2

The set of things Zhangsan boght: {pen, hat, tape, novel}

The set of things Lisi bought: {pen, hat, tape}

c. Situation 3

The set of things Zhangsan boght: {pen, hat, tape, novel}

The set of things Lisi bought : {apple, cloth, battery}

d. Situation 4

The set of things Zhangsan bought: {novel 1, novel 2, novel 3, novel 4}

The set of things Lisi bought: {novel 1, novel 2, pen }

In light of this requirement, I define a matching function which is injective, one to one and order-preserving as given in (105), which is similar to Li's (2015) use of a mapping function.

(105) Matching Function (definition adopted from Luo 2011: 128)

Let A and B be sets, π: A $\rightarrow$ B is a matching function *iff*

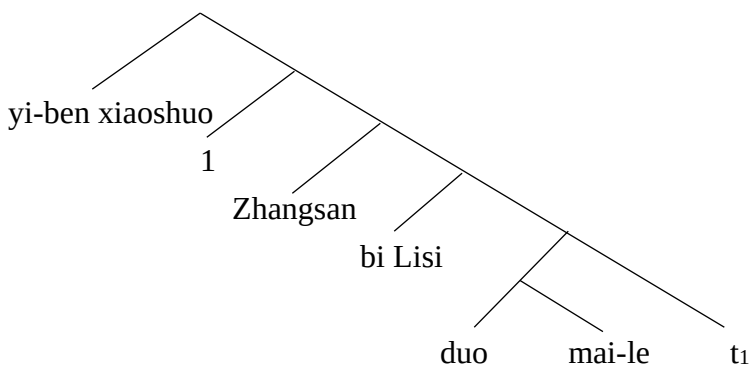
(i) $\forall x \in A\ \exists!y(y \in B \rightarrow \pi(x) = y)$

(ii) For $\forall x_1, x_2 \in A$, $x_1 \leq x_2 \Rightarrow \pi(x_1) \leq \pi(x_2)$

(iii) $\forall x_1, x_2 \in A$: $x_1 \neq x_2 \rightarrow \pi(x_1) \neq \pi(x_2)$

With the above matching function in mind, let us now see how the meaning of *duo* 'many/more' in differential verbal comparatives can be defined when it combines with a transitive verb as in (103). I analyze *duo* in (103) as the core of the sentence with *n* arguments depending on whether time, location, and so on are also present (see Lin (2009) for more discussions on this point). But for the sake of illustration and simplicity, let us ignore time and location, as this does not affect the analysis. When these expressions are present, we only need to add more variables to the argument structure. I also assume that at LF the differential phrase is raised to the periphery position, so (103) has a structure like (106) with the category labels ignored.

(106)



In this configuration, *duo* takes the transitive verb as its first argument, followed by the differential phrase as the second argument. After that, the standard of comparison and the target of comparison are the third and fourth arguments. Here is the denotation of *duo* that is required to compute the semantics of (106).

(107) $[\![\text{duo}]\!] = \lambda P_{<e,<e,t>>}\lambda k_e\lambda y_e\lambda x_e\exists\pi_{<e,e>}[\forall Q_{<e,t>}\forall u_e[Q(u) \wedge P(u)(y) \rightarrow Q(\pi(u)) \wedge P(\pi(u))(x)] \wedge P(k)(x) \wedge \neg\exists u_e[\pi(u) \leq k \wedge P(u)(y)]]$, where π is a matching function as is defined in (105).

In (107), the variables *P*, *k*, *y*, *x* correspond to the transitive verb, the differential phrase, the standard of comparison and the target of comparison, respectively. The symbol '≤' stands for a part-of relation. The first part of the denotation involving universal quantification captures the type-matching requirement. It says that for every property *Q* that an object *u* has such that the standard of comparison has a *P* relation to *u*, the target of comparison has the same *P* relation to *u*'s counterpart via the matching function π and *u*'s counterpart is also a *Q*. This guarantees that if the standard of comparison buys a novel, then the target of comparison must also buy a novel and if the standard of comparison buys a pen, then the target of comparison must also buy a pen and so on and so forth. The second part captures the differential comparative meaning. It says that the differential phrase *k* has a *P* relation to the target of comparison and *k* contains no counterpart element in the domain of π that bears the same *P* relation to the standard of comparison. In other words, only the target of comparison has a *P* relation to *k* but the standard of comparison has no element from the domain of π which can be mapped to (part of) *k* and which bears a *P* relation.

To illustrate, (108) is the semantic composition of (103).

(108) a. $[\![\text{duo mai} - \text{le}]\!]^g = \lambda k_e\lambda y_e\lambda x_e\exists\pi_{<e,e>}[\forall Q_{<e,t>}\forall u_e[Q(u) \wedge \text{bought'}(u)(y)$

$\rightarrow Q(\pi(u)) \wedge bought'(\pi(u))(x)] \wedge bought'(k)(x) \wedge$
$\neg\exists u_e[\pi(u) \leq k \wedge bought'(u)(y)]]$

b. $[\![duo\ mai-le\ t_1]\!]^g = \lambda y_e \lambda x_e \exists \pi_{<e,e>}[\forall Q_{<e,t>} \forall u_e[Q(u) \wedge bought'(u)(y)$
$\rightarrow Q(\pi(u)) \wedge bought'(\pi(u))(x)] \wedge$
$bought'(g(t_1))(x) \wedge \neg\exists u_e[\pi(u) \leq g(t_1) \wedge$
$bought'(u)(y)]]$

c. $[\![Zhangsan\ bi\ Lisi\ duo\ mai-le\ t_1]\!]^g$
$= \exists \pi_{<e,e>}[\forall Q_{<e,t>} \forall u_e[Q(u) \wedge bought'(u)(Lisi') \rightarrow Q(\pi(u)) \wedge$
$bought'(\pi(u))(Zhangsan')] \wedge bought'(g(t_1))(Zhangsan') \wedge \neg\exists u_e[\pi(u) \leq$
$g(t_1) \wedge bought'(u)(Lisi')]]$

d. $[\![1\ Zhangsan\ bi\ Lisi\ duo\ mai-le\ t_1]\!]^g$
$= \lambda k_e \exists \pi_{<e,e>}[\forall Q_{<e,t>} \forall u_e[Q(u) \wedge bought'(u)(Lisi') \rightarrow Q(\pi(u)) \wedge$
$bought'(\pi(u))(Zhangsan')] \wedge bought'(k)(Zhangsan') \wedge \neg\exists u_e[\pi(u) \leq k \wedge$
$bought'(u)(Lisi')]]$

e. $[\![yiben\ xiaoshuo]\!]^g = \lambda P_{<e,t>} \exists y_e[novel'(y) \wedge P(y)]$

f. $[\![yiben\ xiaoshuo\ 1\ Zhangsan\ bi\ Lisi\ duo\ mai-le\ t_1]\!]^g$
$= \exists y_e \exists \pi_{<e,e>}[novel'(y) \wedge [\forall Q_{<e,t>} \forall u_e[Q(u) \wedge bought'(u)(Lisi') \rightarrow$
$Q(\pi(u)) \wedge bought'(\pi(u))(Zhangsan')] \wedge bought'(y)(Zhangsan') \wedge$
$\neg\exists u_e[\pi(u) \leq y \wedge bought'(u)(Lisi')]]$

The final truth conditions in (108f) amount to the following: For every *u* that has the property *Q* such that Lisi bought *u*, Zhangsan bought *u*'s counterpart which is also a Q and there is a y that is a novel and Zhangsan bought *y* and *y* does not have a counterpart element from the domain of π that can be mapped to (part of) *y* via π.

When the indefinite differential DP in (103) is replaced with a definite differential DP such as *zhe-ben xiaoshuo* 'this novel', the result is pretty much the same except that the variable *y* in (108f) is replaced by the referent denoted by *zhe-ben xiaoshuo* 'this novel' and the existential quantifier binding *y* is taken away. To save space, I will not repeat the details. It suffices to emphasize that the proposed analysis is not only a phrasal analysis but is non-degree-based. I conclude that a phrasal analysis is able to deal with both regular *bi*-comparatives and differential verbal *bi*-comparatives.

8. Conclusion

This article provides a comprehensive review of the recent debate between the clausal and phrasal approaches to Chinese comparatives. I examined how the different analyses of the clausal approach such as Liu (2011, 2014), Hsieh (2017) and Erlewine (2018) meet the challenges imposed by subcomparatives and embedded standards and

argued that their new solutions to those two types of constructions are not successful. In addition, evidence was presented to show that most, if not all, of their arguments for the clausal approach are not cogent. In particular, it was shown that there is no evidence for the rule of backward predicate deletion in Mandarin Chinese, which is required by any analysis under the clausal approach. The existing counter-arguments against the phrasal approach were also reviewed and shown not to necessarily hold. To the contrary, evidence based on comparatives with a differential phrase was presented to challenge the clausal approach. Finally, this article concludes by fine-tuning the semantic proposal made by the author in Lin (2009). I showed that the new semantics not only circumvents the problems of that earlier proposal but may deal with differential verbal comparatives in a way that the clausal approach may not.

References

Bartos, Huba. 2019. The V-copy construction in Mandarin: A case temporally reopened. In *Interfaces in Grammar*, Jianhua Hu, and Haihua Pan (eds), 167-205. Amsterdam & Philadelphia: John Benjamins.

Bender, Emily. 2000. The syntax of Mandarin ba: reconsidering the verbal analysis. *Journal of East Asian Linguistics* 9(2): 105-145.

Bhatt, Rajesh, & Roumyana Pancheva. 2004. Late merger of degree clauses. *Linguistic Inquiry* 35(1):1-45.

Bhatt, Rajesh, & Shoichi Takahashi. 2007. Direct comparisons: Resurrecting the direct analysis of phrasal comparatives. In *Proceedings of SALT 17*, ed. Tova Friedman and Masayuki Gibson, 19-36. Ithaca: Cornell University.

Bhatt, Rajesh, & Shoichi Takahashi. 2011. Reduced and unreduced phrasal comparatives. *Natural Language and Linguistic Theory* 29(3): 581–620.

Bresnan, Joan. 1973. Syntax of the comparative clause construction in English. *Linguistic Inquiry* 4(3): 275–343.

Bresnan, Joan. 1975. Comparative deletion and constraints on transformations. *Linguistic Analysis*1(1): 25-74.

Chao, Yuen-Ren. 1968. *A Grammar of Spoken Chinese*. Berkeley: University of California Press.

Cheng, Lisa Lai-Shen. 2007. Verb copying in Mandarin Chinese. In *The Copy Theory of Movement*, Norbert Corver, & Jairo Nunes (eds), 151-174. Amsterdam & Philadelphia: John Benjamins.

Chomsky, Noam. 1977. On *wh*-movement. In *Formal Syntax*, Peter Culicover, Thomas Wasow, & Adrian Akmajian (eds), 71-132. New York: Academic Press.

Cresswell, M. J. 1976. The semantics of degree. In *Montague grammar*, Barbara Hall

Partee (ed), 261-292. New York: Academic Press.
Erlewine, Michael Yoshitaka. 2007. A New Syntax-Semantics for the Mandarin *Bǐ* Comparative. MA thesis, University of Chicago.
Erlewine, Michael Yoshitaka. 2018. Clausal comparison without degree abstraction in Mandarin Chinese. *Natural Language and Linguist Theory* 36(2):445–482.
Ernst, Thomas & Chengchi Wang. 1995. Object preposing in Mandarin Chinese. *Journal of East Asian Linguistics* 4(3): 235–260.
Goodall, Grant. 1986. On argument structure and L-marking with Chinese ba. In *Proceedings of NELS 17*, Bernadette Plunket & Joyce McDonough (eds), 232-242. Amherst: Graduate Linguistics Student Association.
Gu, Yang, & Guo, Jie . 2015. On the internal structure of comparative constructions: From Chinese and Japanese to English. In *Chinese syntax in a cross-linguistic perspective*, Yenhui Audrey Li, Andrew Simpson & Weitien Dylan Tsai (eds), 334-374. Oxford: Oxford University Press.
Guo, Jie. 2012. Form and meaning: Chinese adjectives and comparative constructions. PhD dissertation, The Chinese University of Hong Kong.
Guo, Jie & Gu, Yang. 2017. Hanyu bijiaoju yinjieci de gongneng tezheng zaixi [The properties of standard introducers in Chinese comparative constructions revisited]. Y*uyan Kexue* 16(6): 586-597.
Heim, Irene. 1985. Notes on comparatives and related matters. Unpublished manuscript,University of Texas at Austin.
Heim, Irene. 2000. Degree operators and scope. In *Proceedings of SALT 10***,** Jackson, Brendan & Matthews, Tanya (eds), 40-64. Ithaca: Cornell University.
Hsieh, I-Ta Chris. 2017. On arguments against comparative deletion in Mandarin. *Tsing Hua Journal of Chinese Studies* 47(2): 255-287.
Huang, C.-T. James. 1982. Logical relations in Chinese and the theory of grammar. PhD dissertation, Massachusetts Institute of Technology.
Huang, C.-T. James. 1988. *Wo pao de kuai* and Chinese phrase structure. *Language* 64 (2): 274–311.
Huang, C.-T. James. 1999. Chinese passives in comparative perspective. *Tsing Hua Journal of Chinese Studies* 29: 423-509.
Huang, C.-T. James, Li, Y.-H. Audrey, & Yafei Li. 2009. *The Syntax of Chinese*. Cambridge: Cambridge University Press.
Kennedy, Christopher. 1997. Projecting the adjective: The syntax and semantics of gradability and comparison. PhD dissertation, University of California, Santa Cruz.
Kennedy, Christopher. 2001. Polar opposition and the ontology of ‘degrees’. *Linguistics and Philosophy* 24(1):33-70.

Kennedy, Christopher, & Louise McNally. 2005. Scale structure, degree modification and the semantics of gradable predicates. *Language* 81(2): 345-381.

Kennedy, Christopher. 2007. Modes of comparison. In *Proceedings of CLS 43*, Malcolm Elliott, James Kirby, Osamu Sawada, Eleni Staraki, & Suwon Yoon (eds), 141-165. Chicago: Chicago Linguistic Society.

Koopman, Hilda. 1984. The syntax of verbs: from verb movement rules in the Kru languages to universal grammar. PhD dissertation, Tilburg University.

Lechner, Winfried. 2001. Reduced and phrasal comparatives. *Natural Language and Linguistic Theory* 19(4):683-735.

Li, Shan. 1994. *Xiandai Hanyu Beiziju Yanjiu* [A Study of Passives in Modern Chinese]. Beijing: Beijing Daxue Chubanshe.

Li, Y.-H. Audrey. 1990. *Order and Constituency in Mandarin Chinese*. Studies in Natural Language and Linguistic Theory. Dordrecht: Kluwer Academic Publishers.

Li, Xiao. 2015. Degreeless comparatives: the semantics of differential verbal comparatives in Mandarin Chinese. *Journal of Semantics* 32(1): 1-38.

Lin, Jo-wang. 1998. Distributivity in Chinese and its implications. *Natural Language Semantics* 6(2): 201-243.

Lin, Jo-Wang. 2009. Chinese comparatives and their implicational parameters. *Natural Language Semantics* 17(1): 1-27.

Liu, Chen-Sheng Luther. 1996. A note on Chinese comparatives. *Studies in the Linguistic Sciences* 26(1/2): 215–235.

Liu, Chen-Sheng Luther. 2011. The Chinese bi comparative. *Lingua* 121(12): 1767-1795.

Liu, Chen-Sheng Luther. 2014. Comparatives. In *The handbook of Chinese linguistics*, C.-T. James Huang, Y.-H. Audrey Li, & Andrew Simpson (eds), 342-366.Wiley Blackwell.

Luo, Qiongpeng. 2011. *Mei* and *dou* in Chinese: A tale of two quantifiers. *Taiwan Journal of Linguistics* 9(2): 111-156.

Luo, Qiongpeng. 2017. Hanyu “bi” zi bijiaoju de jufa han yuyi wenti [The syntax and semantics of Mandarin *bi* comparatives]. *Xiandai Waiyu* 3: 324-335.

Merchant, Jason. 2001. *The Syntax of Silence: Sluicing, Islands, and Identity in Ellipsis*. Oxford University Press, Oxford.

Merchant, Jason. 2008. Variable Island Repair under Ellipsis. In *Topics in Ellipsis*, ed. Kyle Johnson, 132-153. Cambridge: Cambridge University Press.

Montague, Richard. 1973. The proper treatment of quantification in ordinary English. In *Approaches to Natural Language*, K.J.J. Hintikka, J.M.E. Moravcsik & P.

Suppes (eds), 221-242. Dordrecht: Reidel. Reprinted in Montague 1974, 247-270.

Paul, Waltraud. 1993. A non-deletion account of the comparative construction in Mandarin Chinese. *Cahiers de Linguistique Asie Orientale* 22 (1): 9-29.

Paul, Waltraud. 2002. Sentence-internal topics in Mandarin Chinese: The case of object preposing. *Language and Linguistics* 3 (4): 695–714.

Pesetsky, David & Torrego, Esther. 2007. The syntax of valuation and the interpretability of features. In *Phrasal and Clausal Architecture: Syntactic Derivation and Interpretation.* Simin Karimi, Vida Samiian & Wendy K. Wilkins (eds), 262-294. Amsterdam & Philadelphia: John Benjamins.

Rullmann, Hotze. 1995. Maximality in the semantics of wh-constructions. PhD dissertation, University of Massachusetts Amherst.

Schwarzchild, Roger & Wilkinson, Karina. 2002. Quantifiers in comparatives: A semantics of degree based on intervals. *Natural Language Semantics* 10(1):1-41.

Shi, Dingxu. 2005. “Bei” ziju de guishu [On “bei” passives in Chinese]. *Hanyu Xuebao* 1: 38-48.

Sybesma, Rint. 1999. *The Mandarin VP*. Berlin: Springer.

Tang, Sze-wing. 2010. *Xingshi Hanyu Jufaxue* [*Formal Chinese Syntax*]. Shanghai: Shanghai Educational Publishing house.

Travis, Lisa. 1984. Parameters and effects of word order variation. PhD dissertation, Massachusetts Institute of Technology.

Tsao, Feng-fu. 1989. Comparison in Chinese: A topic-comment approach. *Tsing Hua Journal of Chinese Studies* 19(2):151-189.

von Stechow, Arnim. 1984a. Comparing semantic theories of comparison. *Journal of Semantics* 3(1-2):1-77.

von Stechow, Arnim. 1984b. My reply to Cresswell’s, Hellan’s, Hoeksema’s and Seuren’s comments. *Journal of Semantics* 3(1-2):183-199.

Xiang, Ming. 2003. A phrasal analysis of Chinese comparatives. In Proceedings from the Annual Meeting of the Chicago Linguistic Society 39, Number 1, 739-754. Chicago: Chicago Linguistic Society.

Xiang, Ming. 2005. Some topics in comparative constructions. PhD dissertation, Michigan State University.

Yue-Hashimoto, Anne. 1971. Mandarin syntactic structures. *Unicorn* 8:1-149. Princeton: Chinese Linguistics Project and Seminar, Princeton University.

Zou, Ke. 1993. The syntax of the Chinese Ba construction. *Linguistics* 31(4): 715-736.