

Degree comparison without degree abstraction¹

Michael Yoshitaka Erlewine, August 9, 2013

This paper argues that Mandarin Chinese fills a gap in the typology of comparative constructions in natural language. Beck et al. (2004) proposes that languages may vary in whether or not they allow for degree abstraction, and Kennedy (2007) proposes a distinction between comparative constructions with degree-denoting standards and individual-denoting standards. Based on these parameters, we expect to find languages that lack degree abstraction yet allow for degree comparison, but such languages have not been attested in the literature. I argue that Mandarin Chinese instantiates such a language.

I show that the derivation of the Mandarin *bǐ* comparative involves two instances of the predicate in syntax—one which composes with the target and one which composes with the standard—in order to form two degree descriptions. I posit an obligatory ellipsis operation to yield the final word order, and show that various properties of *bǐ* comparatives fall out of general constraints on ellipsis parallelism. Finally, I argue that the computation of *bǐ* comparatives does not—and cannot—involve abstraction over a degree argument. Gradable predicates in Mandarin take their degree argument last, allowing for degree comparison without using degree abstraction.

1 Introduction

Different languages employ different strategies to express comparison, i.e. to assert a ranking of two entities along a scale. In this paper we will take a close look at Mandarin Chinese and its *bǐ* comparative construction,² and show that it fills a gap in the theoretical typology of comparative constructions.

Recent work on the cross-linguistic syntax/semantics of gradability and comparison has proposed a number of distinct parameter systems to describe distinctions both at the language-level and at the level of individual comparative constructions, within languages. Two prominent proposals are Beck et al. (2004), which proposes the language-level Degree Abstraction Parameter, and Kennedy (2007), which proposes the construction-level Standard Type Parameter.³

¹Previously titled “Syntactic composition in the Mandarin *bǐ* comparative.”

²The *bǐ* comparative construction is so-called for its use of the *bǐ* (比) morpheme. The morpheme *bǐ* (比) is both historically and contemporarily also a lexical verb meaning “compare.” Here I assume that the functional lexeme *bǐ* studied here is distinct from the lexical verb *bǐ*.

³Kennedy (2007) also proposes a more fundamental distinction between *implicit* and *explicit* comparison. See Erlewine (2007) for arguments that the Mandarin *bǐ* comparative is an explicit comparative.

Similarly, Beck et al. (2009) proposes a distinction between languages with degrees as a semantic type and those which do not (so-called *degreeless* languages). I will argue that the Mandarin *bǐ* comparative utilizes degree comparison, necessitating the use of degrees in its semantic ontology. See also Krasikova (2008); Beck et al. (2009) for explicit arguments that Mandarin is not a degreeless language.

There is an implicational relationship between these two additional parameters: a language with an explicit compar-

(1) **Beck et al.’s (2004) Degree Abstraction Parameter (DAP):**

A language {does, does not} have binding of degree variables in the syntax.

(2) **Kennedy’s Standard Type Parameter (STP):⁴**

A comparative selects for a standard of individual-denoting type (e.g. type *e*; *individual comparison*) or degree-denoting type (e.g. *d*, $\langle d, t \rangle$; *degree comparison*).

As discussed in Kennedy (2007), the Degree Abstraction Parameter and the Standard Type Parameter are logically independent of each other and, as such, produce an expected typology of language-comparative pairs. The bottom right cell of the table—a degree comparative in a language without degree abstraction—has been unattested in the literature.

(3) **A typology of comparative constructions:**

		<i>Degree Abstraction Parameter (Beck et al., 2004):</i>	
		+DAP	–DAP
<i>Standard Type Parameter (Kennedy, 2007):</i>	individual	Hindi-Urdu <i>-se</i> comp. (Bhatt and Takahashi, 2011)	Japanese <i>-yori</i> comp. (Beck et al., 2004, 2009)
	degree	English comparatives with clausal standards	???

In this paper I argue that the Mandarin Chinese *bǐ* comparative construction, exemplified in (4), fills this typological gap. I will show that the *bǐ* comparative employs degree comparison but that Mandarin Chinese is, in general, a language without degree abstraction (–DAP).

(4) Yuēhàn bǐ Mǎlì gāo

John BI Mary tall

“John is taller than Mary.”

The evidence for these claims will come from a detailed examination of the *bǐ* comparative construction. I will argue that the derivation of a Mandarin *bǐ* comparative involves two instances of the gradable predicate, exemplified by the structure in (5). Semantically, the *bǐ* comparative’s standard is a degree-denoting clause, making it an instance of degree comparison in terms of Kennedy’s STP. An obligatory ellipsis process yields the surface word order.

(5) **Proposed structure for (4):**

[_{target clause} John [_{predicate} tall]] *bǐ* [_{standard clause} Mary [_{predicate} tall]]

The evidence I present for the *bǐ* comparative taking a structure as in (5) does not depend on Mandarin Chinese having or not having degree abstraction. Once this syntactic proposal for the Mandarin *bǐ* comparative has been established, however, I will then present an argument from *bǐ* comparatives which shows that Mandarin grammar does not allow the use of degree abstraction.

ative requires degrees in its semantics. It has been argued that degreeless languages do exist, and only exhibit implicit comparison: see, for example, Pearson (2009) on Fijian.

⁴The wording here is based on Kennedy (2005).

Additional evidence will come from the lack of attributive *bǐ* comparatives in Mandarin. This will lead us to conclude that Mandarin Chinese lacks degree abstraction altogether, making the Mandarin *bǐ* comparative an instance of degree comparison in a language without degree abstraction.

I begin in the next section with a survey of the formal details of the syntactic and semantic approaches to comparative constructions and the predictions that these two approaches make for the *bǐ* comparative. In section 3 I develop my analysis of the *bǐ* comparative and present a series of syntactic arguments which prove fatal for other approaches where the derivation includes only one instance of the gradable predicate. I also give technical details of the ellipsis operation utilized in the *bǐ* comparative, where I adopt the work of Takahashi and Fox (2005) and others in enforcing a semantically-sensitive licensing condition on the ellipsis. Then in section 4 I demonstrate that the derivation of *bǐ* comparative constructions cannot involve degree abstraction, and argue that Mandarin Chinese is a –DAP language. I propose that Mandarin gradable predicates always take their degree arguments last, allowing for degree comparison without degree abstraction.

2 Analyzing comparison

The analysis of comparative constructions such as (6b) yields a puzzle for compositionality. The gradable predicate “tall” in its positive form in (6a) takes one argument to satisfy its syntactic and semantic valency. In its comparative form in (6b), on the other hand, the predicate composes with both a *target* “John” and a *standard* “Mary,” in order to assert that the “tallness of John” exceeds the “tallness of Mary.” The key question, then, is how does the gradable predicate compose with both the target and the standard in (6b), given that it composes with just one argument in its positive form (6a)?

- (6) a. John is **tall**. *positive form*
 b. John is **taller** than Mary. *comparative form*

The same puzzle applies to the Mandarin *bǐ* comparative, as in (4), repeated below. The scale of comparison is introduced linguistically through the predicate “tall.” Formally, gradable predicates relate entities (such as individuals, states, or events) to degrees (Cresswell, 1976), as in (8).

- (4) Yuēhàn bǐ Mǎlì gāo
 John BI Mary tall
 “John is taller than Mary.”

- (7) target *bǐ* standard gradable predicate
 “*target* is more *predicate* than *standard* is *predicate*.”

- (8) $\llbracket g_{\text{tall}} \rrbracket = \lambda d. \lambda x. x \text{ is } d\text{-tall}$ type $\langle d, \langle e, t \rangle \rangle$

- (4') $\llbracket (4) \rrbracket = \max(\lambda d. \text{John is } d\text{-tall}) > \max(\lambda d. \text{Mary is } d\text{-tall})$

The truth conditions of (4), in (4'), assert that the maximal degree which satisfies “John is *d*-tall” is greater than the maximal degree which satisfies “Mary is *d*-tall.” The question we are exploring

is how the predicate *gāo* “tall,” which only takes one argument, composes with both “John” and “Mary.”

Two solutions to the composition question have been suggested in the literature: what I will refer to here as *syntactic composition* and *semantic composition*. In terms of Kennedy’s Standard Type Parameter, syntactic composition corresponds to degree comparison and semantic composition corresponds to individual comparison:

- (9) **Syntactic composition:** (= Degree comparison; Bresnan 1973; Chomsky 1977; von Stechow 1984; Bhatt and Pancheva 2004; a.o.)

There are two instances of the gradable predicate in the syntax. One composes with the target and the other composes with the standard, *in the syntax*.

- (10) **Semantic composition:** (= Individual comparison; a.k.a. “Direct Analysis”; Heim 1985; Bhatt and Takahashi 2007, 2011; a.o.)

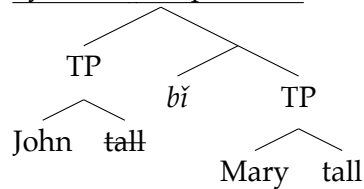
There is only one instance of the gradable predicate in the syntax. The comparative operator takes that one predicate and composes it with the target and with the standard, *in the semantics*.

In the syntactic composition approach (11a), there are two instances of the predicate in the syntax: one for the target and one for the standard. These approaches must then perform some operation to explain why only one instance of the predicate is pronounced. This is done through some reduction operation, often called *comparative deletion*, which yields the pronounced word order as in (4).

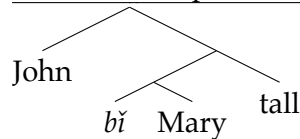
In a semantic composition approach (11b), there is only one instance of the predicate throughout the syntactic derivation.⁵ The semantics of the comparative acts as a mediator between the predicate and arguments of the comparative.

- (11) **Some simplified LFs for syntactic and semantic composition approaches:**

a. Syntactic composition:



b. Semantic composition:



To illustrate the two approaches, I will use familiar examples from English. Conveniently, English has been argued to have two different types of comparative constructions: one which uses semantic composition and another which uses syntactic composition (Bhatt and Takahashi, 2011, a.o.). Comparatives with a phrasal standard as in (6b), commonly referred to as “phrasal comparatives” and repeated here as (12a), utilize semantic composition. Comparatives such as (12b) represent their standards as reduced clauses and are thus called “clausal comparatives.” These comparatives have been analyzed using the syntactic composition approach.

⁵Note that (11b) below is simply a representative syntactic structure. In section 2.4, I will discuss alternative phrase structures for the semantic composition approach.

- (12) a. John is taller than Mary. *“phrasal comparative,” semantic composition*
b. John is taller than Mary is. *“clausal comparative,” syntactic composition*

In the following subsections I will illustrate the two approaches, formalize the requisite syntax and semantics for them, and discuss the different properties of comparative constructions that are predicted by them.

2.1 The syntactic composition approach

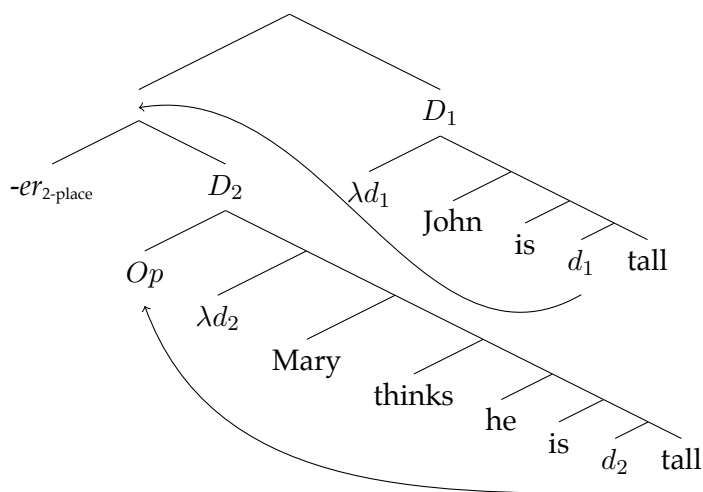
In the syntactic composition approach, there are underlyingly two instances of the gradable predicate in the syntax: one for the target and one for the standard. The degree descriptions (sets of degrees) to be compared are standardly constructed by \bar{A} -movement of a null-operator (Bresnan, 1973; Chomsky, 1977). Evidence for this \bar{A} -dependency has come in English from the availability of embedded standards such as in (13) and the island-sensitivity of these embeddings as in (14).

- (13) John is taller than [Mary thinks [he is ____]]

- (14) * John is taller than [_{island} Mary’s claim that [he is ____]]

Movement of the comparative operator *-er* with the standard clause occurs in order to construct the degree description for the target (Wold, 1995; Heim, 2000; Bhatt and Pancheva, 2004).⁶ This results in an LF as in (13') below, where the two degree-denoting expressions are labeled D_1 and D_2 . D_1 is the set of degrees such that John is that tall and D_2 is the set of degrees such that Mary thinks he is that tall.

(13')



Once degree descriptions for the target and the standard have been constructed, the comparative operator simply selects for these two degree-denoting expressions and asserts a ranking between them.

⁶Non-trivial details of this derivation, such as the late merger of the standard-denoting clause (Bhatt and Pancheva, 2004), are not discussed here as they are orthogonal to the discussion of Mandarin comparatives. As will be discussed in section 4, the derivation of Mandarin *bǐ* comparatives does not involve such movement steps.

(15) **A two-place *-er* for the syntactic composition approach:**

$$-er_{2\text{-place}} = \lambda D_2 \langle d, t \rangle . \lambda D_1 \langle d, t \rangle . \max(D_1) > \max(D_2)$$

Because the standard (D_2 in (15)) is degree-denoting, syntactic composition approaches are necessarily cases of “degree comparison,” as opposed to “individual comparison,” in terms of Kennedy’s (2007) Standard Type Parameter.

In the case of example (13), we yield the following truth conditions:

$$\begin{aligned} (16) \quad \llbracket (13) \rrbracket &= -er_{2\text{-place}}(D_2)(D_1) = -er_{2\text{-place}}(\lambda d_2 . \text{Mary thinks John is } d_2\text{-tall})(\lambda d_1 . \text{John is } d_1\text{-tall}) \\ &= \max(\lambda d_1 . \text{John is } d_1\text{-tall}) > \max(\lambda d_2 . \text{Mary thinks John is } d_2\text{-tall}) \end{aligned}$$

To summarize, in a syntactic composition approach, the degree descriptions corresponding to the target and the standard are each constructed as individual syntactic objects. This is possible since there are underlyingly two instances of the gradable predicate in the syntax.

Before moving on to the semantic composition approach, I will note one variant of the syntactic composition approach that will become important later in this paper. In the syntactic composition approach demonstrated above (13’), the two degree descriptions were constructed by movement of a degree-type operator, abstracting over a lower degree variable. In theory, it is also possible to construct degree descriptions of this sort without employing degree abstraction, if the gradable predicates involved are Schoenfinkelized in such a way that their degree argument is their inner-most (last) argument.⁷ For example, consider a denotation for *tall* as in (17a), which takes its degree argument last. The result of *tall* combining with a subject results in a degree description of type $\langle d, t \rangle$ as in (17b), without the use of degree abstraction. The two-place *-er* (15) could then simply take two of these degree descriptions and assert a comparative over them.

(17) **Hypothetical syntactic composition approach without degree abstraction:**

- a. $\llbracket tall \rrbracket = \lambda x . \lambda d . x \text{ is } d\text{-tall}$ type $\langle e, \langle d, t \rangle \rangle$ (cf 8)
- b. $\llbracket \text{John is tall} \rrbracket = \lambda d . \text{John is } d\text{-tall}$
- c. $\begin{aligned} \llbracket \text{John is taller than Mary is} \rrbracket &= -er_{2\text{-place}}(\llbracket \text{Mary is tall} \rrbracket)(\llbracket \text{John is tall} \rrbracket) \\ &= -er_{2\text{-place}}(\lambda d_2 . \text{Mary is } d_2\text{-tall})(\lambda d_1 . \text{John is } d_1\text{-tall}) \\ &= \max(\lambda d_1 . \text{John is } d_1\text{-tall}) > \max(\lambda d_2 . \text{Mary is } d_2\text{-tall}) \end{aligned}$

To be clear, (17) is not meant to be a proposal for English clausal comparatives, but rather a proof of concept for syntactic composition without the use of degree abstraction. The point here is that the syntactic composition approach does not itself necessitate degree abstraction, although the two are usually employed together and degree abstraction is certainly necessary for the derivation of embedded standards. A syntactic composition approach without degree abstraction, similar to what is explored in (17), is ultimately what I will propose for the Mandarin *bǐ* comparative.

In the next section I present the semantic composition approach, before comparing the predictions of the two approaches.

⁷This choice will be discussed later in footnote 19.

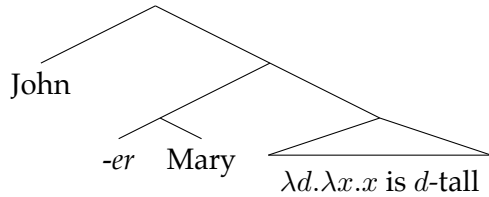
2.2 The semantic composition approach

In the semantic composition approach, there is only one instance of the gradable predicate in the syntax. The comparative operator takes the gradable predicate and composes it with the target and with the standard in the semantics. There are no syntactic objects which correspond to the degree descriptions compared, as there were in the syntactic composition approach.

Consider the basic example (12a), repeated here. A standard semantic composition approach to English comparatives posits an LF for such comparatives as in (12a') (Heim, 1985; Bhatt and Takahashi, 2011). See Bhatt and Takahashi (2011) for details of the covert movement operations proposed which yields (12a') from the English (12a).

(12a) John is taller than Mary.

(12a')



The LF in (12a') isolates three components: the target *John*, the standard *Mary*, and the gradable predicate. The comparative operator *-er* is then a three-place operator which takes the standard, the gradable predicate, and the target as arguments. The comparative operator applies the gradable predicate to the target and to the standard and asserts an ordering over the resulting degree descriptions (Heim, 1985).

(18) **A three-place *-er* for the semantic composition approach:**

$$-er_{3\text{-place}} = \lambda y_e. \lambda G_{\langle d, \langle e, t \rangle \rangle}. \lambda x_e. \max(\lambda d_1. G(d_1)(x)) > \max(\lambda d_2. G(d_2)(y))$$

The standard in a semantic composition approach will be an individual (type *e*) or a sequence of individuals. Therefore semantic composition approaches are what Kennedy (2007) calls “individual” comparison, as opposed to “degree” comparison.

This yields the following truth conditions for (12a):

$$\begin{aligned} (19) \quad \llbracket (12a) \rrbracket &= -er_{3\text{-place}}(\text{Mary})(\lambda d. \lambda x. x \text{ is } d\text{-tall})(\text{John}) \\ &= \max(\lambda d(\lambda d. \lambda x. x \text{ is } d\text{-tall})(d)(\text{John})) > \max(\lambda d(\lambda d. \lambda x. x \text{ is } d\text{-tall})(d)(\text{Mary})) \\ &= \max(\lambda d. \text{John is } d\text{-tall}) > \max(\lambda d. \text{Mary is } d\text{-tall}) \end{aligned}$$

Note that in (12a'), there are no syntactic objects that correspond to the degree descriptions ($\lambda d. \text{John is } d\text{-tall}$) or ($\lambda d. \text{Mary is } d\text{-tall}$). There is only one instance of the gradable predicate in the syntax, so if it directly composed with the target or the standard in the syntax, we would not be able to compute the competing degree description. Thus in this approach, the gradable predicate is only composed with the target and the standard in the semantics. More precisely, the construction of the degree descriptions takes place entirely within the process of evaluating $-er_{3\text{-place}}$.

2.3 Predictions of the two approaches

The two approaches presented, syntactic composition and semantic composition, predict very different properties for comparative constructions which use them. In this section I will lay out the different predictions, using English examples. Recall that English has two types of comparative constructions: “phrasal” comparatives, which use semantic composition, and “clausal” comparatives, which use syntactic composition:

- (12) a. John is taller than Mary. *“phrasal” comparative, semantic composition*
 b. John is taller than Mary is. *“clausal” comparative, syntactic composition*

A number of syntactic differences come from the simple idea that the standard in a clausal comparative as in (12b) is an embedded clause, while the standard in a phrasal comparative as in (12a) is truly a simple DP rather than a reduced clause. For example, accusative case can be assigned to phrasal but not clausal standards, and phrasal standards can be reflexives bound by the target (Hankamer, 1973):

- (20) **Accusative case in the phrasal standard:**
 a. John is taller than her.
 b. *John is taller than her is.
- (21) **Reflexives possible in the phrasal standard:**
 a. John cannot be taller than himself.
 b. *John cannot be taller than himself is.

Moreover, following (Chomsky, 1977), the derivation of a clausal standard involves \bar{A} -movement of a null operator, predicting that the clausal standard is a *wh*-island for extraction. As also noted by Hankamer (1973), no such extraction difficulty is observed in the phrasal comparative.

- (22) **Wh-extraction possible from phrasal standards:**
 a. Who is John taller than ___?
 b. *Who is John taller than ___ is?

Additional differences between the two approaches stem from the fact that there are two instances of the predicate in the syntax for the syntactic composition approach, but only one instance of the predicate in the syntax in the semantic composition approach. The syntactic composition approach can straightforwardly account for cases where two different but commensurable predicates are used (23)—the so-called *subcomparative* construction.

- (23) My chair is taller than your table is wide.
 LF: $\max(\lambda d. \text{my chair is } d\text{-tall}) > \max(\lambda d. \text{your table is } d\text{-wide})$


Under a semantic composition approach, on the other hand, there is only one instance of the gradable predicate in syntax, so the predicate composed with the target and the predicate composed with the standard must be exactly the same. Thus subcomparatives such as (23), where two different gradable predicates are used, are impossible under semantic composition.

More generally, in the semantic composition approach, the function that maps individuals onto degrees must be the same for the target and the standard. This is because the function is only constructed *once* in the syntax (as illustrated in the sample LF in (12a') above), and then it is used *twice* in the semantics. For example, comparatives with clausal embeddings in the standard but not the target cannot be computed using semantic composition, and instead must use syntactic composition. An example of such a comparative is (13), repeated below.

(13) John is taller than Mary thinks he is.

LF: $\max(\lambda d. \text{John is } d\text{-tall}) > \max(\lambda d. \text{Mary thinks John is } d\text{-tall})$

Finally—and most importantly for the arguments later in this paper—the syntactic composition and semantic composition approaches make different predictions for movement in comparative constructions. Consider a node α which is base-generated within the gradable predicate and must move to a higher position (24).

(24) $[\text{TP} \dots \alpha \dots [\text{predicate} \dots t_\alpha \dots]]$



The two approaches make different predictions as to whether multiple α -movement chains can occur in a comparative. This type of configuration is schematized in (25), where there are two moved elements, α_1 and α_2 , but only one overt gap.

(25) **Surface word order of parallel movement cases:**

“ $\dots \alpha_1 \dots$ *target* *bī* $\dots \alpha_2 \dots$ *standard* $\dots t_\alpha \dots$ ” *predicate*

In the semantic composition approach, there is only one instance of the gradable predicate in the syntax, and thus there is also only one base-generated instance of α . The semantic composition approach would only allow at most one α -movement chain within a comparative. On the other hand, in the syntactic composition approach, there are two instances of the predicate in syntax, so an α can be base-generated in each predicate and can independently move into the target and the standard (26).

(26) **Proposed structure for parallel movement cases:**

$[\text{target clause} \dots \alpha_1 \dots [\text{predicate} \dots t_\alpha \dots]]$ *bī* $[\text{standard clause} \dots \alpha_2 \dots [\text{predicate} \dots t_\alpha \dots]]$


In section 3, I will show the existence of comparative constructions which involve parallel movements from the predicate to the target and from the predicate to the standard (26). This will lead

to the conclusion that the semantic composition approach is not tenable for the Mandarin *bǐ* comparative.

Although the facts will ultimately rule in favor of the syntactic composition approach, the *bǐ* comparative exhibits several properties which point at an analysis using the semantic composition approach. Thus, before I present my proposal and the evidence supporting it, I will review the recent analyses of the Mandarin *bǐ* comparative which utilize a semantic composition approach and survey the properties that led their authors to choose this approach.

2.4 Semantic composition approaches to the Mandarin *bǐ* comparative

A number of recent proposals for the syntax/semantics of the Mandarin *bǐ* comparative have taken a semantic composition approach (Xiang, 2003, 2005; Erlewine, 2007; Lin, 2009).⁸ As discussed in the previous section, subcomparatives and comparatives with embedded standards are two types of comparatives which clearly require a syntactic composition approach. These authors have noted that the Mandarin *bǐ* comparative cannot be used to form these two types of comparatives, as illustrated below, and offered the lack of these types of comparatives as evidence for semantic composition.⁹

(27) No subcomparatives

* wǒ de yǐzi gāo bǐ nǐ de zhuōzi kuān
1SG GEN chair tall BI 2SG GEN table wide

Intended: “My chair is taller than your table is wide.”

(28) No embedded standards

* Yuēhàn bǐ Mǎlì rènwéi tā gāo
John BI Mary thinks he tall

Intended: “John is taller than Mary thinks he is.”

The Mandarin *bǐ* comparative can have a target and standard which look to include clausal material (29a). (Such cases will be discussed in detail in section 3.2.4.) Even in these cases, however, the addition of a clausal embedding in the standard is ungrammatical (29b).

(29) No embedded standards, even with clausal-looking standards

- a. ✓ Yuēhàn qí mǎ bǐ Mǎlì qí niú qí de kuài
John ride horse BI Mary ride cow ride DE fast
“John rides horses faster than Mary rides cows.”

⁸Liu (2011) proposes a “hybrid analysis,” wherein both syntactic composition and semantic composition *bǐ* comparatives exist in Mandarin Chinese. The arguments I present against all semantic composition approaches will also apply to Liu’s (2011) semantic composition analysis, thus invalidating the hybrid analysis itself. Note that my own proposal is conceptually similar to the syntactic composition approach presented in Liu (2011), based on Liu (1996).

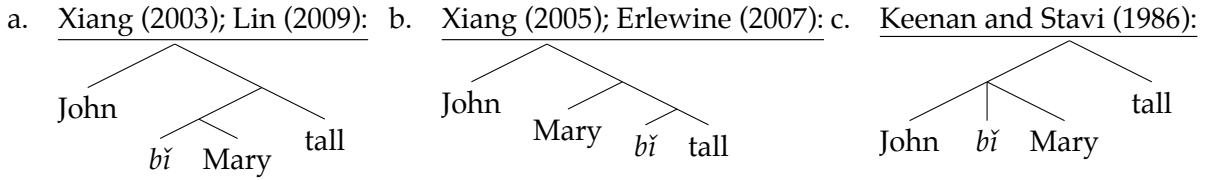
⁹Note that this does *not* mean that rankings of degrees on different scales cannot be expressed in Mandarin at all. They simply cannot use the *bǐ* comparative. See section 3.3.3 for discussion.

- b. * Yūehàn qí mǎ bǐ wǒ rènwéi Mǎlì qí niú qí de kuài
 John ride horse BI 1SG think Mary ride cow ride DE fast
 Intended: “John rides horses faster than I think Mary rides cows.”

I will argue that the mere nonexistence of such constructions in Mandarin does not entail that the Mandarin *bǐ* comparative does not utilize syntactic composition. Instead, I will argue that there are independent reasons why such constructions do not exist. (See section 3.3.3 for details.)

The semantic composition approach is compatible with a variety of different phrase structural configurations, some of which have been proposed in the literature:¹⁰

(30) **Some possible semantic composition phrase structures at LF:**



These different syntactic configurations have different implications for the constituency of *bǐ* comparatives as well as the syntactic category and semantic type of *bǐ*.¹¹ However, they all share the defining characteristics of semantic composition: (a) that there is only one instance of the gradable predicate in the derivation and (b) that the comparative operator has the task of combining the target with the predicate, and the standard with the predicate, in the semantics.

In the following sections I will argue that no semantic composition approach—regardless of the particular phrase structure chosen—can adequately model the Mandarin *bǐ* comparative.

3 Proposal and evidence

In this section I will present my proposal for the *bǐ* comparative and supporting evidence. The proposal put forth here is a syntactic composition approach, where each *bǐ* comparative includes two instances of the predicate of comparison. An obligatory ellipsis operation is proposed to derive the final word order, where only one instance of the predicate is pronounced.

A syntactic composition approach to the Mandarin *bǐ* comparative has been proposed previously, most notably by Liu (1996). However, the treatment here diverges from all previous approaches in two ways: it provides (a) empirical evidence that necessitates the use of a syntactic composition approach over a semantic composition one and (b) an explicit characterization of the mechanics of the ellipsis operation used, and its motivations and corollaries.

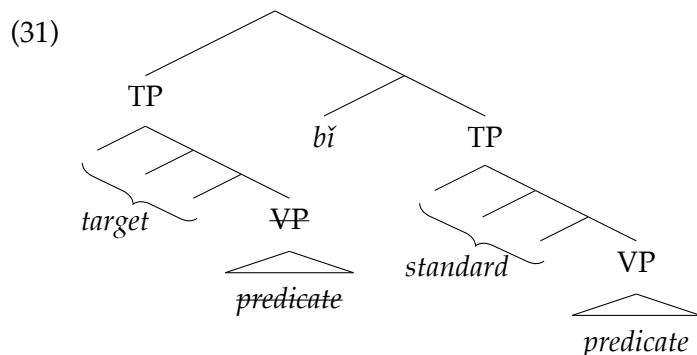
¹⁰For some authors, *bǐ* does not itself represent the locus of the comparative operator. Here I have categorized different constituent structures based on the relationship between the target, standard, predicate, and the comparative operator, which I represent as *bǐ*.

¹¹The structure in (30a) would require *bǐ* to have semantic type $\langle e, \langle \langle d, \langle e, t \rangle \rangle, \langle e, t \rangle \rangle \rangle$. Beck et al. (2012) calls this variant *-er*_{Heim} after Heim (1985). (30b) would require *bǐ* to have semantic type $\langle \langle d, \langle e, t \rangle \rangle, \langle e, \langle e, t \rangle \rangle \rangle$. Beck et al. (2012) calls this variant *-er*_{Kennedy} after Kennedy (1997). The original formulation in Kennedy (1997, p. 143, #134c) has a slightly different type signature (because Kennedy (1997) views gradable predicates as measure functions of, for example, type $\langle e, d \rangle$) but the order of composition is the same as in (30b) above. The structure in (30c) would require *bǐ* to have type $\langle e, \langle e, \langle d, \langle e, t \rangle \rangle \rangle \rangle$.

Following the basic proposal in section 3.1, section 3.2 will demonstrate the necessity of a syntactic composition approach to the *bǐ* comparative. Evidence in support of the semantics of section 3.1, which does not use degree abstraction, will be discussed in section 4. Section 3.3 provides empirical support for different aspects of the ellipsis operation proposed and presents its correct predictions. Section 3.4 extends the proposal to another class of *bǐ* comparatives. Finally, section 3.5 provides a review of the proposal and the empirical evidence presented for different components of the proposal.

3.1 Proposal

I propose that the Mandarin *bǐ* comparative utilizes syntactic composition. Despite appearances, the syntax of a *bǐ* comparative includes two instances of the gradable predicate. One forms a clause together with the target and the other forms a clause with the standard, each following the regular rules of Mandarin clausal syntax. The comparative morpheme *bǐ* is then categorically a clausal conjunction.¹² This configuration is schematized in (31).¹³ A Comparative Deletion Requirement will be proposed, yielding the final word order with only one instance of the predicate pronounced.



For concreteness, I will illustrate this proposal with our basic example (4), repeated here. We'll first look at the syntactic derivation before turning to the compositional semantics.

¹² Due to the comparative semantics of *bǐ*, the coordination of these two clauses will not be symmetric. However, asymmetric coordinations are cross-linguistically common, particularly with a temporal or causal semantics relating the conjoined clauses. Below are two English examples of asymmetric clause-coordinating “and” from Bjorkman (to appear):

- (i) The lights came on and the singer stepped onto the stage. *temporal asymmetric coordination*
- (ii) The sniper shot him and he died. *causal asymmetric coordination*

See also Moltmann (1992) for discussion of English clausal comparatives as asymmetric coordination.

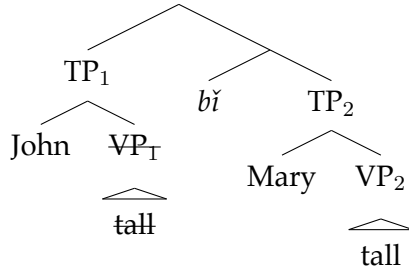
¹³ Derivations will be given here with (a) no *vP* extended projection of VP and (b) base-generation of subjects in Spec,TP, for ease of illustration. The proposal made here is also compatible with the *vP*-internal subject hypothesis—as has been proposed for Mandarin in Huang (1993)—with the CDR (33) modified to require ellipsis of a *vP* instead of a VP. The only substantive difference will be due to the movement of the subject from Spec,*vP* to Spec,TP. However, if such movements happen in parallel in both the target and standard clauses, they will not adversely affect the licensing of ellipsis. See section 3.2.1 for the derivation of a comparative involving subject raising, which would be similar to what would happen with ubiquitous Spec,*vP* to Spec,TP movement.

- (4) Yuēhàn bǐ Mǎlì gāo
 John BI Mary tall
 “John is taller than Mary.”

3.1.1 Syntactic derivation

The syntactic composition approach requires that clauses corresponding to the strings “*target predicate*” and “*standard predicate*” be independently constructed. We then conjoin these two TPs with *bǐ*.

- (4') **Syntactic derivation for “John *bǐ* Mary tall”:**



In order to derive our final word order, the VP inside TP₁ must be elided.¹⁴ To ensure that this ellipsis takes place, I propose the Comparative Deletion Requirement (33) below.

- (32) **Definition: Local VP**

Given a TP β , α is a *local VP* of β iff (a) α is a VP, (b) β dominates α , and (c) there is no TP which dominates α and is dominated by β .

- (33) **Comparative Deletion Requirement (CDR):**

In a *bǐ* comparative, elide the largest elidable local VP (32) of the target TP under identity with a local VP of the standard TP. If the target TP has no elidable local VP, the derivation is illicit.

The ellipsis enforced by the CDR joins instances of comparative deletion in other languages in having the interesting property of being obligatory: if the required ellipsis does not take place, the resulting *bǐ* comparative is ungrammatical. This obligatoriness of comparative deletion contrasts with other instances of ellipsis outside of comparatives, which are optional. A deeper explanation for this property of comparative deletion is beyond the scope of this paper. See Kennedy (2002) for extensive data and discussion.¹⁵

¹⁴Here I will use VP to refer to predicate phrases, whether headed by a verb or adjective. That these predicate phrases in question are gradable will be enforced by the semantics of *bǐ*, rather than through the syntax.

¹⁵Two other properties of comparative deletion in the *bǐ* comparative make it notable: first, that the deletion is backwards, in the sense that the elided “gap” position linearly precedes its antecedent; and second, that the elided gap cannot be in an embedded clause in the target clause, and its antecedent cannot be in an embedded clause in the standard clause.

Deletion with these properties is also observed in other languages, in particular in processes targeting coordinate structures. Right Node Raising has been argued to be a form of backwards deletion in this sense (Wexler and Culicover, 1980; Kayne, 1994; Bošković, 2004; Chalcraft, 2006). Gapping also exhibits a requirement that the deleted constituent and its antecedent cannot be embedded (Hankamer, 1979), as illustrated through the minimal pair in (i–ii) from Johnson

Furthermore, I follow the work of Rooth (1992a); Heim (1997); Takahashi and Fox (2005) in adopting a semantically sensitive licensing condition for ellipsis, wherein every instance of ellipsis must be licensed by a corresponding Parallelism Domain (PD).¹⁶ Takahashi and Fox’s (2005) formulation of this mechanism is paraphrased in (34–35).

(34) **Ellipsis Licensing** (Takahashi and Fox, 2005):

For ellipsis of α to be licensed, there must exist a constituent, which reflexively dominates α , and satisfies the parallelism condition in (35). Call this constituent the *Parallelism Domain*, PD.

(35) **Ellipsis Parallelism** (Takahashi and Fox, 2005):

PD must be semantically identical to an *Antecedent Constituent*, AC, modulo focus-marked constituents: there exists a focus alternative PD_{Alt} , $\llbracket PD_{Alt} \rrbracket \in \llbracket PD \rrbracket^f$, such that for every assignment function g , $\llbracket AC \rrbracket^g = \llbracket PD_{Alt} \rrbracket^g$.¹⁷

In the case of (4), illustrated in (4’), we can simply use the VPs themselves as the Parallelism Domain and its antecedent: $PD = VP_1$, $AC = VP_2$. $\llbracket AC \rrbracket \equiv \llbracket PD \rrbracket \in \llbracket PD \rrbracket^f$, licensing ellipsis of the VP “tall” within TP_1 and satisfying the CDR. This yields the observed word order in (4), as needed.

3.1.2 Compositional semantics

Next we’ll turn our attention to the compositional semantics of the *bǐ* comparative. Unlike English *-er* which may be ambiguous between a two-place comparative operator and three-place one, *bǐ* is unambiguous; *bǐ* is two-place comparative operator. It will take two degree expressions of type $\langle d, t \rangle$, and assert that the maximum of the target’s degree description is greater than the standard’s.¹⁸

(36) ***bǐ* is the familiar two-place comparative operator: (=15)**

$$\llbracket bǐ \rrbracket = \lambda D_2 \langle d, t \rangle. \lambda D_1 \langle d, t \rangle. \max(D_1) > \max(D_2)$$

However, unlike what has been proposed for many other languages, I argue that degree abstraction is not used to construct these degree descriptions in Mandarin. This is made possible (2009). See Toosarvandani (2013) for discussion and a recent analysis of gapping as ellipsis.

- (i) ✓ Some had eaten mussels and others ____ shrimp.
- (ii) * Some had eaten mussels and she claims that others ____ shrimp.

The comparative deletion in *bǐ* comparatives, analyzed here as a coordinate structure, is thus a case of ellipsis which exhibits these two properties which are each separately observable in other coordinate structures.

¹⁶All cases of movement discussed in this paper are instances of overt movement. I therefore assume that the representations evaluated at the PF and LF interfaces are identical.

¹⁷ $\llbracket \cdot \rrbracket^f$ is the focus value denotation function. See Rooth (1985, 1992b) for more on the computation of focus values.

¹⁸The *bǐ* comparative in Mandarin can optionally take a differential, with the differential following the gradable predicate. Semantically, the differential would be an argument of the comparative operator, *bǐ*, with a modified comparative semantics which specifies the differential as equal to the difference $\max(D_1) - \max(D_2)$. I will leave an extension of the proposal here to *bǐ* comparatives with differentials for future work. See Xiang (2005) for extensive discussion of differentials in Mandarin comparatives.

through the following Degree Last proposal (37) for Mandarin Chinese:^{19,20}

(37) **Degree Last:**

Gradable predicates in Mandarin Chinese take their degree argument as their last argument.

Thus, the predicate *gāo* “tall” will be of type $\langle e, \langle d, t \rangle \rangle$, instead of the more commonly assumed type $\langle d, \langle e, t \rangle \rangle$:

$$(38) \llbracket \text{gāo “tall”} \rrbracket = \lambda x. \lambda d. x \text{ is } d\text{-tall}$$

The advantage of Degree Last is seen in the semantic derivation of (4), below:

(4'') **Semantic computation for “John *bǐ* Mary tall”:**

$$\begin{aligned} & \llbracket bǐ \rrbracket (\llbracket TP_2 \rrbracket) (\llbracket TP_1 \rrbracket) \\ &= \max(\llbracket TP_1 \rrbracket) > \max(\llbracket TP_2 \rrbracket) \\ &= \max(\lambda d. \text{John is } d\text{-tall}) > \max(\lambda d. \text{Mary is } d\text{-tall}) \end{aligned}$$

TP_{1,⟨d,t⟩}

λd. John is d-tall

John_e

VP_{⟨e,⟨d,t⟩⟩}

|

tall

λx. λd. x is d-tall

bǐ

TP_{2,⟨d,t⟩}

λd. Mary is d-tall

Mary_e

VP_{⟨e,⟨d,t⟩⟩}

|

tall

λx. λd. x is d-tall

In each clause, the gradable predicate merges with its subject. As the predicate is of type $\langle e, \langle d, t \rangle \rangle$, this occurs through regular functional application. This results in two degree descriptions of type $\langle d, t \rangle$: TP₁ represents the target’s “tallness of John” and TP₂ represents the standard’s “tallness of Mary.” The standard two-place comparative operator (36) then takes these two arguments and asserts the ordering over the maxima of these degree descriptions.

¹⁹The editor and a reviewer ask whether the order in which a lexical item takes its arguments should be a point of cross-linguistic variation. This is an important question which should ultimately be answered empirically. Much previous work on gradable predicates has assumed that a predicate such as *tall* has type $\langle d, \langle e, t \rangle \rangle$, without explicitly motivating the choice over $\langle e, \langle d, t \rangle \rangle$. This reflects the reality that in most cases, the two choices are effectively equivalent. See Rett (2008) for previous work which models English gradable predicates using the Degree Last property, e.g. $\langle e, \langle d, t \rangle \rangle$. It is only in a language where degree abstraction may not exist where this choice becomes an immediate issue. The argument for Mandarin Chinese lacking degree abstraction will be presented in section 4. See also further discussion in the conclusion.

²⁰An alternative approach would be to make all gradable predicates measure functions that return their maximal degree after saturating all their arguments (Heim, 1985; Kennedy, 1997; Svenonius and Kennedy, 2006; Grano and Kennedy, 2012). For example, *tall* would have a type signature of $\langle e, d \rangle$ under such a system. For the purposes of this paper, this measure function approach is completely equivalent to the Degree Last proposal made here and could be adopted for the Mandarin Chinese facts. Here I choose the technical variant which does not require varying the definition of the two-place comparative operator (36), albeit only notationally.

This makes the Mandarin *bǐ* comparative cross-linguistically unique in that it is an explicit, syntactic composition comparative which does not involve degree abstraction.²¹ Evidence that degree abstraction is not used in the *bǐ* comparative will be presented in section 4.

3.2 The argument from parallel movements

The most important characteristic of the derivation proposed here is that it includes two instances of the predicate in the syntax, i.e. it is a syntactic composition approach. I will present evidence in support of syntactic composition from *parallel movement* constructions: comparatives which involve both movement from the predicate to the target and movement from the predicate to the standard. This configuration is schematized here:

(39) **Pronounced word order of parallel movement constructions:**

$$\text{“ } \underbrace{\dots \alpha_1 \dots}_{\text{target}} \quad bǐ \quad \underbrace{\dots \alpha_2 \dots}_{\text{standard}} \quad \underbrace{\dots t_\alpha \dots}_{\text{predicate}} \text{ ”}$$

In such configurations, we observe two nodes α_1 and α_2 in the target and standard, respectively, and one gap position in the predicate which corresponds to the trace position of α -movement.

In the next four sections, I will present examples of comparatives which involve such parallel movements, involving four different types of Mandarin movement constructions: subject raising, object preposing, *bèi*-passivization, and verb-copy. This is strong evidence in favor of the syntactic composition approach as they cannot be analyzed under semantic composition.

Parallel movements can be straightforwardly captured under syntactic composition as the derivation includes two TPs, which can each involve movement operations available in Mandarin simplex clauses. Under a semantic composition analysis, though, there is only one instance of the predicate in the syntax. It is thus impossible to derive the two α -movement chains: if both α_1 and α_2 moved out of the same gap position, they must have been base-generated in the same position, which is impossible. Thus *analyses with just one copy of the predicate in the syntax cannot adequately account for such data*. It is crucial in this line of argumentation to show that *both* α_1 and α_2 are indeed the products of such movement out of the predicate, rather than, for example, only one element undergoing that movement and the other being base-generated in its surface position. This is precisely what we will see.

3.2.1 Subject reconstruction with *de dicto* readings

The first case of parallel movements will come from subject raising. A sentence like (40a) and its Mandarin counterpart (40b) are observed to have two distinct readings differing in the scope of the subject indefinite “an Australian.” In the *de re* reading, the speaker asserts that there is an Australian who has the property of being likely to win the race, while in the *de dicto* reading the speaker asserts that it is likely that there is an Australian who will win the race.

²¹“Explicit” comparison, in the sense of Kennedy (2007). See footnote 3.

(40) *De re/de dicto readings via raising:*

- a. An Australian is likely to win the race.
De re: “There is an Australian who is likely to win the race.” $\exists > \text{likely}$
De dicto: “It is likely that an Australian will win the race.” $\text{likely} > \exists$
- b. Àozhōurén yǒukěnéng yíng zhè chǎng bǐsài
 Australian likely win this CL competition
 $\checkmark \exists > \text{likely}, \checkmark \text{likely} > \exists$

The existence of the *de dicto* reading, where the modal operator *likely* and the indefinite’s existential force are interpreted with inverse scope, is attributed to the fact that *likely* is a raising predicate and thus there is an A-movement chain from the subject position of “win the race” to its surface position. The indefinite is able to *reconstruct* into its lower position at LF, below the *likely* operator, yielding the *de dicto* reading (see May, 1977). Note that Lin and Tang (1995) argues that epistemic modals in Mandarin, of which *yǒukěnéng* is one, are raising verbs.

The question, then, is whether reconstruction is possible in a comparative construction where the predicate of comparison is of this type, e.g. ‘likely to win the race,’ and both the target and standard are indefinite subjects. In particular, we would like to know whether *both* subjects can reconstruct at the same time, which would show us that both the target and standard must have been base-generated below *likely*. We see in (41) that this reading is indeed available.²²

(41) **Both target and standard can reconstruct at the same time:**

Zhōngguórén bǐ Àozhōurén yǒukěnéng yíng zhè ge bǐsài
 Chinese person BI Australian likely win this CL comp.

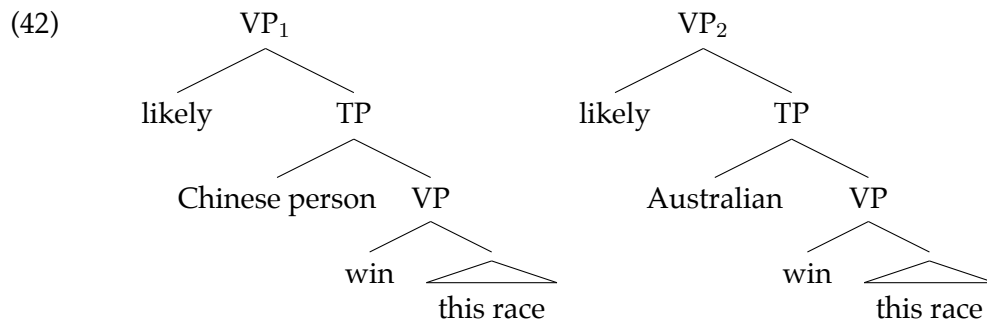
De re/de re: “There is a Chinese person and an Australian such that the Chinese person is more likely to win the race than the Australian.” $\exists^2 > \text{likely}$

De dicto/de dicto: “It is more likely that a Chinese person will win the race than that an Australian will.” $\text{likely} > \exists^2$

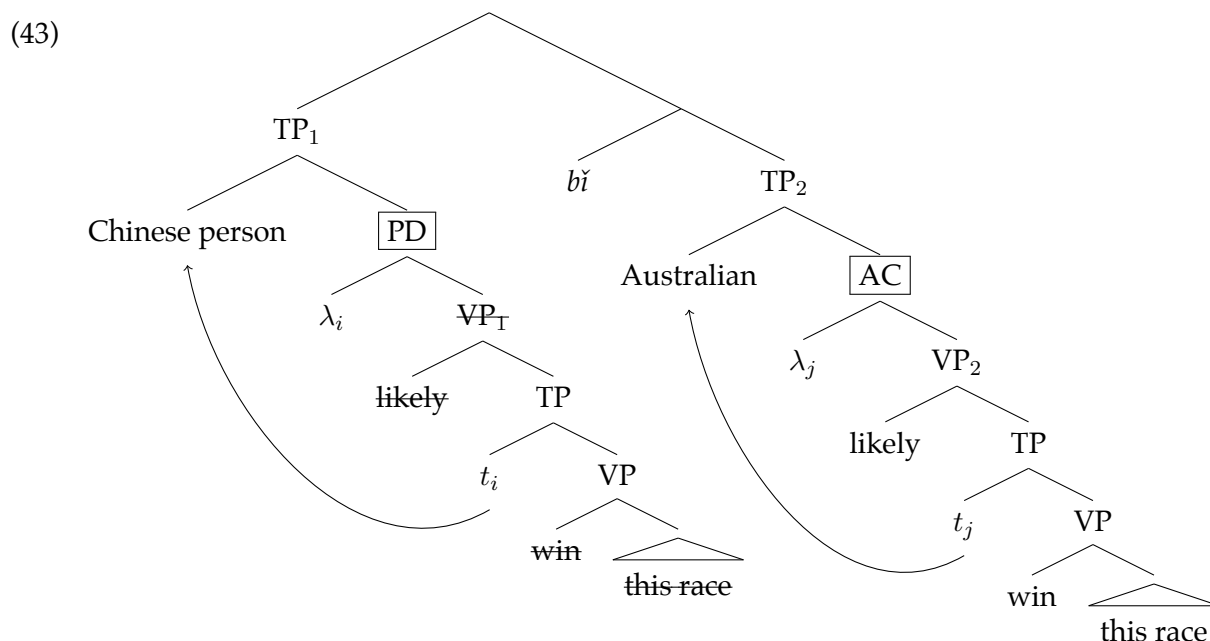
Given the availability of the *de dicto/de dicto* reading in (41), we know that *both subjects* must have been raised from within the complement of *likely*. In the syntactic composition approach proposed here, this can be accounted for straightforwardly, as the derivation includes two instances of the predicate.

We begin by generating one instance of “likely” and its nonfinite complement which includes “Chinese person,” and one instance of “likely” with its own complement which includes “Australian.” Note that at this point, VP₁ cannot be elided under identity with VP₂, as they are not semantically identical: VP₁ contains the DP “Chinese person” and VP₂ contains the DP “Australian.” However, the two trees are otherwise structurally identical.

²²The logic of this argument draws from Grosz (2009).



The raising of these DPs out of their respective VPs is what will enable ellipsis of the desired size. In (43) I illustrate the result of raising both DPs and conjoining the resulting TPs using *bǐ*. Following Heim and Kratzer (1998), I explicitly annotate the λ -binders associated with movement.



The CDR requires that we elide the local VP of TP_1 and to do so, we must identify a Parallelism Domain which satisfies the Ellipsis Parallelism condition (35), repeated here:

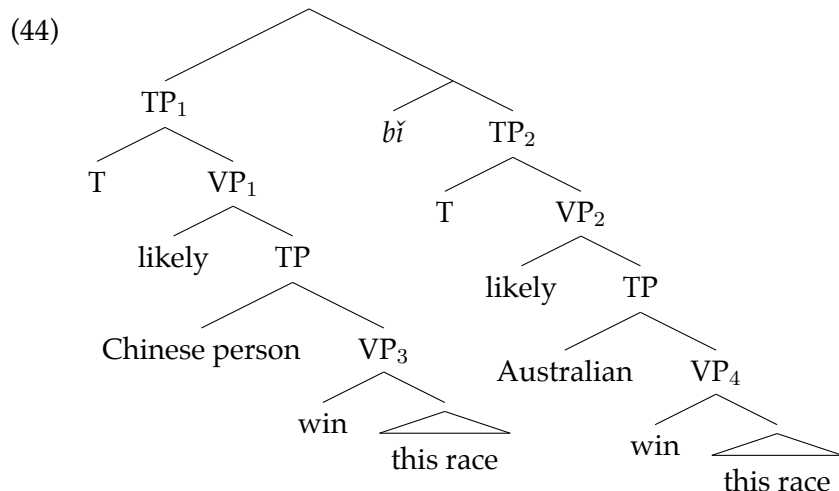
(35) **Ellipsis Parallelism** (Takahashi and Fox, 2005):

PD must be semantically identical to an *Antecedent Constituent*, AC, modulo focus-marked constituents: there exists a focus alternative PD_{Alt} , $\llbracket PD_{Alt} \rrbracket \in \llbracket PD \rrbracket^f$, such that for every assignment function g , $\llbracket AC \rrbracket^g = \llbracket PD_{Alt} \rrbracket^g$.

In particular, the semantic identity enforced by (35) requires that the PD not include free variables whose identity would be affected by a change in assignment function, and thus the PD must be large enough to include the λ -binder of “Chinese person” (Takahashi and Fox, 2005; Hartman, 2011). We thus choose the projection marked PD in (43) as the relevant Parallelism Domain. $\llbracket PD \rrbracket \equiv \llbracket AC \rrbracket = (\lambda x. \lambda d. \text{it is } d\text{-likely that } x \text{ win the race})$, and so we satisfy the Parallelism requirement in (35) and are able to elide VP_1 .

With a syntactic composition approach as in (43), both subjects are independently raised out of the complement of a raising verb, and can reconstruct for interpretation. This yields the availability of the *de dicto/de dicto* reading in (41).

Furthermore, the proposal here also accurately rules out a variant of the derivation in (43) which cannot result in a grammatical comparative. Consider a hypothetical variant of (43), where the subjects have not raised out of the lower TPs. This is illustrated in the tree in (44). I posit that there is no grammatical comparative that results from this derivation.²³



The issue with (44) will be how it is able to satisfy the CDR. Consider first the ellipsis of VP₁ in the target clause. The deletion of VP₁ will violate the recoverability condition on deletion, as the content of the constituent “Chinese person” cannot be recovered. If instead we attempt to delete VP₃ to satisfy the CDR, we would yield the word order in (45), based on an example provided by an anonymous reviewer. However, note that VP₃ is not a local VP of TP₁, as there is an intervening TP projection, and therefore the deletion of VP₃ will not satisfy the CDR. This explains the ungrammaticality of example (45). Therefore there are no *bǐ* comparatives with a derivation as in (44).²⁴

- (45) * yǒukěnéng Zhōngguórén bǐ yǒukěnéng Àozhōurén yíng zhè ge bǐsài
 likely Chinese person BI likely Australian win this CL comp.

Int.: “It is more likely that a Chinese person will win the race than that an Australian will.”

I will now demonstrate how semantic composition approaches are unable to derive the *de dicto/de dicto* reading in example (41). Recall that semantic composition approaches are compatible

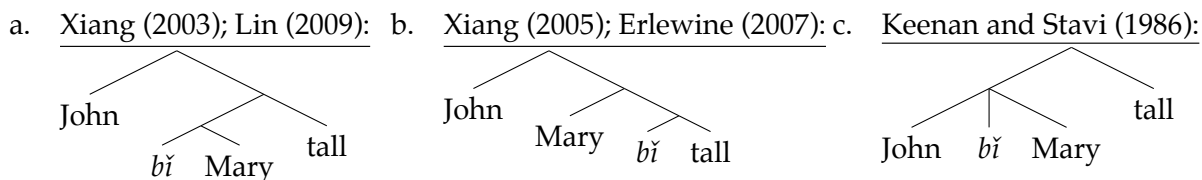
²³ Note that *yǒukěnéng* is in general an optionally raising verb, allowing for both the word order in (40b) above with a raised subject and in (i) below with an unraised subject:

- (i) yǒukěnéng Àozhōurén yíng zhè chǎng bǐsài
 likely Australian win this CL competition
 “It is likely that an Australian will win this race.”

²⁴The ungrammaticality of (45) will also be important later in section 4.3.

with a number of different phrase-structural configurations. Some possible structures are repeated from (30):

(30) **Some possible semantic composition phrase structures at LF:**



I will first discuss semantic composition approaches where the target and standard do not form a constituent, as in (30a,b), and then those where they do together form a constituent, as in (30c).

Consider a semantic composition analysis of the comparative wherein the target and the standard do not form a constituent, as in (30a,b). As “likely” is a raising verb, we assume that a constituent was base-generated as the subject of “win the race” and then raised, and this constituent would have the opportunity to syntactically reconstruct. However, as this is a semantic composition approach, only one instance of the predicate “likely to win the race” is constructed in the derivation of the sentence. Hence only one nominal—either the target or the standard—will be able to reconstruct below the scope of “likely.” Therefore in a derivation like (30a,b), we predict that at least one of the subjects would not be able to reconstruct, preventing the *de dicto/de dicto* reading.

Now consider a semantic composition analysis based on Keenan and Stavi (1986) (30c), where “target *bǐ* standard” is a constituent and forms a complex quantifier. This type of semantic composition approach is also unable to derive the desired interpretation of example (41).

Under this view, the complex quantifier “Chinese person *bǐ* Australian” itself is first base-generated as the subject of “win the race.” This complex quantifier raises above “likely” (46) and then is reconstructed for interpretation (47).

(46) **Hypothesis: “target *bǐ* standard” is a complex quantifier**



(47) **Hypothetical LF with reconstruction:**



In this LF, “Chinese person” and “Australian” would indeed both be interpreted within the scope of “likely,” as desired. However, this LF in (47) would not be interpretable. In particular, this LF requires that the comparative operator *bǐ* also be interpreted below “likely,” taking “win this race” as its gradable predicate. The VP “win this race” is not itself gradable, as evidenced by the ungrammaticality of (48).

- (48) * [Zhōngguórén bǐ Àozhōurén] yíng zhè chǎng bǐsài
 Chinese person BI Australian win this CL competition

In the desired interpretation of (41), “Chinese person” and “Australian” take scope below “likely,” but the comparative operator *bǐ* must take scope over “likely,” the gradable predicate. However, the semantic composition analysis based on Keenan and Stavi (1986) builds a complex quantifier from the target, standard, and comparative operator *bǐ*, predicting them to take scope together. In this way, we see that both types of semantic composition analyses for the Mandarin *bǐ* comparative are unable to derive (41).

3.2.2 Internal argument comparatives as object preposing

The second example of parallel movements comes from comparatives such as (49), where both the target and the standard include arguments which are logically internal arguments of the predicate of comparison. I call such cases *Internal Argument (IA) comparatives*.

- (49) **Internal Argument (IA) comparatives** (Tsao, 1989):

wǒ_i dàishù bǐ *pro*_i jǐhé xǐhuān ____
 I algebra BI *pro* geometry like

“I like algebra more than I like geometry.”

Note that the gradable predicate in (49) is a transitive verb and internal arguments are canonically postverbal in Mandarin. However, Mandarin has a process by which an object of a transitive verb is moved to a preverbal position without any additional marking, known as *object preposing* (Ernst and Wang, 1995; Paul, 2002). Preposed objects are often interpreted in contrast to implicit or explicit alternatives.

- (50) **Object preposing:**

wǒ_i [dàishù]_F xǐhuān ____, kěshì *pro*_i [jǐhé]_F bù xǐhuān ____
 I algebra like but *pro* geometry NEG like

“I like [algebra]_F, but I don’t like [geometry]_F.”

One important property of IA comparatives is that not all objects can participate in such a frame. Tsao (1989) observed a number of distributional restrictions on IA comparatives, which I will review below. The objects involved in IA comparatives cannot be animate or indefinite and the verb involved cannot be monosyllabic. Importantly, Tsao (1989) also notes that these restrictions are precisely the same set of restrictions which govern object preposing as well.

Let us first review in turn the parallel restrictions on object preposing and IA comparatives as reported by Tsao (1989). We begin with the animacy restriction. As presented in the left column, object preposing is grammatical with the inanimate object, “algebra,” but degrades with the

semi-animate “cat,” and is ungrammatical with the human “Zhang San.”²⁵ All of these objects are grammatical in postverbal position. In the right column, we see parallel grammaticality judgments for IA comparatives with internal arguments of corresponding animacy.²⁶

(51) **Animacy restrictions on object preposing and IA comparatives** (Tsao, 1989):

<u>Object preposing:</u>		<u>Comparative:</u>	
a.	* wǒ Zhāng Sān xǐhuān I Zhang San like Intended: “I like [Zhang San] _F .”	a’.	* wǒ Zhāng Sān bǐ Lǐ Sì xǐhuān I Zhang San BI Li Si like Intended: “I like Zhang San more than I like Li Si.”
b.	? wǒ māo xǐhuān I cat like Intended: “I like [cats] _F .”	b’.	? wǒ māo bǐ gǒu xǐhuān I cat BI dog like Intended: “I like cats more than I like dogs.”
c.	wǒ dàishù xǐhuān I algebra like “I like [algebra] _F .”	c’.	wǒ dàishù bǐ jǐhé xǐhuān I algebra BI geometry like “I like algebra more than I like geometry.”

Moreover, IA comparatives in animate-inanimate or inanimate-animate object order are uniformly judged as deviant; i.e. the animacy restriction applies equally to objects in the target and objects in the standard.

(52) a.	* wǒ Zhāng Sān bǐ dàishù xǐhuān I Zhang San BI algebra like Int: “I like Z.S. more than I like algebra.”	b.	* wǒ dàishù bǐ Zhāng Sān xǐhuān I algebra BI Zhang San like Int: “I like algebra more than I like Z.S.”
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Another similarity between object preposing and IA comparatives reported in Tsao (1989) concerns the morphological size of the verb. Tsao (1989) claims that object preposing is ungrammatical when the verb is monosyllabic. Example (53a) is judged to be ungrammatical due to its monosyllabic verb *ài* “love,” while the minimally contrasting (51c) with the disyllabic verb *xǐhuān* “like”

²⁵Tsao (1989) credits Tsao (1979) with the original observation of the animacy condition on the felicity of object preposing. Paul (2002, footnote 7) cites Hou (1979) as first documenting this animacy condition, and also notes that a similar observation is made in C.-T. James Huang’s unpublished MA thesis. Examples and judgments here are from Tsao (1989).

²⁶ There seems to be variation regarding the felicity conditions for object preposing and IA comparatives. For example, Liu (2011) gives example (i) below which has one interpretation (b) which is an IA comparative with animate objects in the target and standard. (Interpretation (a) is a case of object topicalization, not an IA comparative.) I thank an anonymous reviewer for pointing this out.

- (i) Máo zhǔxí Zhōu Ēnlái bǐ Dèng Xiǎopíng hái-yào xìnren
Mao chair Zhou Enlai than Deng Xiaoping even-more trust
- a. “Zhou Enlai trusts Chairman Mao_i more than Deng Xiaoping trusts him_i.”
- b. “Chairman Mao_i trusts Zhou Enlai more than he_i trusts Deng Xiaoping.”

What is predicted by my analysis, borrowing from Tsao’s observation, is a correlation between the conditions on object preposing and IA comparatives. Therefore, speakers who accept examples such as (ib) and therefore do not have a strong animacy constraint in IA comparatives should also accept animate object preposing constructions. This anonymous reviewer is such a speaker, judging (ib) as grammatical and also allowing animate object preposing sentences.

is grammatical. We observe the same contrast between the minimally distinct comparatives (53a') and (51c').

(53) **No monosyllabic verbs in object preposing and IA comparatives** (Tsao, 1989):

- | | |
|--|--|
| <u>Object preposing:</u> (cf 51c) | <u>Comparative:</u> (cf 51c') |
| a. * wǒ dàishù ài
I algebra love
Intended: "I love [algebra] _F ." | a'. * wǒ dàishù bǐ jǐhé ài
I algebra BI geometry love
Intended: "I love algebra more than I love geometry" |

Finally, to these parallels between object preposing and IA comparatives observed by Tsao (1989), I will add one more. Object preposing is incompatible with having a contrastive subject. For example, recall that object preposing is often used with an explicit contrasting object in a continuation, as in example (50). If the continuation is changed to involve a contrasting subject, as in (54a), the expression becomes ungrammatical. Similarly, IA comparatives with contrasting subjects are ungrammatical, as in (54b), as noted by Liu (2011).

(54) **Subjects cannot contrast in object preposing and in IA comparatives:**

- a. Object preposing: (cf 50)
 * [Zhāng Sān]_F [dàishù]_F xǐhuān __, [Lǐ Sì]_F [jǐhé]_F xǐhuān __
 Zhang San algebra like Li Si geometry like
 Intended: "[Zhang San]_F likes [algebra]_F, (and / but) [Li Si]_F likes [geometry]_F."
- b. Comparative: (Liu 2011, example 19b; cf 49)
 * Zhāng Sān dàishù bǐ Lǐ Sì jǐhé xǐhuān __
 Zhang San algebra BI Li Si geometry like
 Intended: "Zhang San likes algebra more than Li Si likes geometry."

As object preposing offers a way to realize objects in a pre-verbal position and exhibits the same restrictions observed with IA comparatives, it would be preferable to derive IA comparatives as involving two separate instances of object preposing. Object preposing with obligatorily transitive verbs such as *xǐhuān* "like" are derived via movement from the post-verbal object position (Ernst and Wang, 1995; Paul, 2002).²⁷ Thus in these IA comparatives, there must be a movement chain from the post-verbal object position to the target object as well as a movement chain from that same post-verbal object position to the standard object.

I will now present the derivation for the comparative in (49). Our syntactic composition assumptions first predict that "*target predicate*" and "*standard predicate*" are each independently available clauses in Mandarin and this is indeed the case:

²⁷Note that not all preposed objects are derived via movement; see Paul (2002) for some examples of "object preposing" with overt post-verbal objects. In all cases discussed here, however, the preposed object corresponds to a post-verbal gap.

(55) a. TP₁ = “target predicate”:

wǒ [dàishù]_F xǐhuān ____
I algebra like

“I like [algebra]_F.”

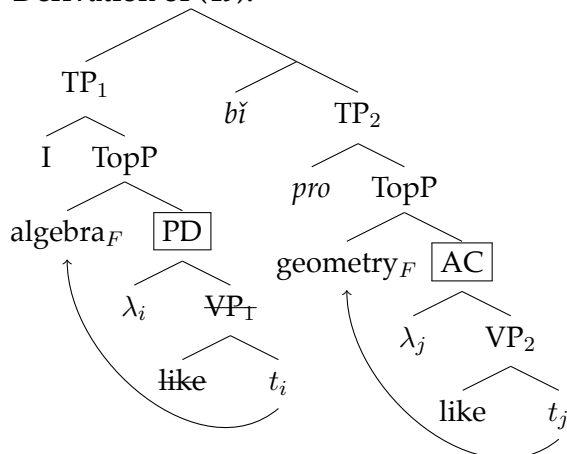
b. TP₂ = “standard predicate”:

wǒ [jǐhé]_F xǐhuān ____
I geometry like

“I like [geometry]_F.”

We begin by independently constructing the two TPs, each involving object preposing, and conjoin them using *bǐ*.²⁸ Comparative Deletion requires that we elide the VP within the left conjunct, TP₁. The semantic identity enforced by Ellipsis Parallelism (35) requires that the Parallelism Domain include the λ -binders of movement traces, so we use the Parallelism Domain labeled PD below. This projection is semantically identical to the projection marked AC, so we satisfy the Parallelism requirement in (35) and are able to elide VP₁.

(56) Derivation of (49):



The syntactic composition approach hence derives the restrictions on IA comparatives from independently existing restrictions on object preposing.

Now consider how these facts would be analyzed under a semantic composition approach. First, I note that the Keenan and Stavi (1986) style analysis, where “target *bǐ* standard” is taken to be a constituent which is a complex quantifier, cannot account for this data. Such an approach takes the sequence “algebra *bǐ* geometry” in example (49) to be a constituent generated in object position, predicting the grammaticality of example (57). In general, object preposing is never an obligatory operation: there are no object preposing examples where the same object is ungrammatical in the post-verbal object position.

(57) * wǒ xǐhuān dàishù bǐ jǐhé

I like algebra BI geometry

Intended: “I like algebra more than I like geometry.”

Second, for a semantic composition approach where the target and standard are not a constituent, one would have to introduce a separate mechanism by which IA comparatives can be built by base-generating an object directly in the target and/or standard. Such an approach would

²⁸Following Paul (2002), I represent object preposing as movement to the specifier of a TP-internal Topic projection.

view the parallel restrictions on object preposing and IA comparatives as a coincidence. Lin (2009) pursues this alternative, introducing a semantic composition approach which can generate IA comparatives without making use of object preposing. His analysis predicts that IA comparatives are free of the restrictions on object preposing reviewed here, contrary to fact, and overgenerates many IA comparatives. See the Appendix where the Lin (2009) analysis is presented in detail and we will observe another incorrect prediction made by it.

3.2.3 *bèi* long passives in comparatives

Mandarin Chinese offers a curious and well-studied passivization strategy known as the *bèi* long passive, exemplified in (58).²⁹ Huang (1999) argues that *bèi* long passives involve \bar{A} -movement of a null operator to a position between *bèi* and the agent (59).

(58) **The *bèi* long passive**^{30,31}

Yūehàn bèi bàba mà de hěn cán
John BEI father scold DE HEN serious

“John was scolded seriously by his father.”

(59) John BEI [*Op*_i [father scold *t*_i ...]]

↑

The operator movement in (59) is interpreted as λ -abstraction over the base object position, resulting in the predicate (λx . father scolds *x* seriously) which is then applied to the subject (in (58, ‘John’) by BEI (Huang, 1999).

Now consider a comparative (60) involving two contrasting agents of *bèi* long passives.³² Following Huang (1999), we must posit two instances of operator movement, both originating within the predicate of comparison as the complement of *scold*, with one landing between *bèi* and *father* in the target and the other landing between *bèi* and *mother* in the standard. These parallel movements would again be problematic under a semantic composition view where there is only one gradable predicate in the syntax.

(60) Yūehàn bèi bàba bǐ bèi māma mà de gèng cán
John BEI father BI BEI mother scold DE more serious

“John was scolded by his father more seriously than by his mother.”

²⁹The term “*bèi* long passive” refers to those *bèi* passives which have an overt agent, in contrast to the “*bèi* short passive” which does not have an overt agent. Huang (1999) argues that the long passive involves a null operator \bar{A} -movement step in its derivation but that short passives do not. Here I will only discuss long passives since it is their null operator movement step which is crucial to my argumentation.

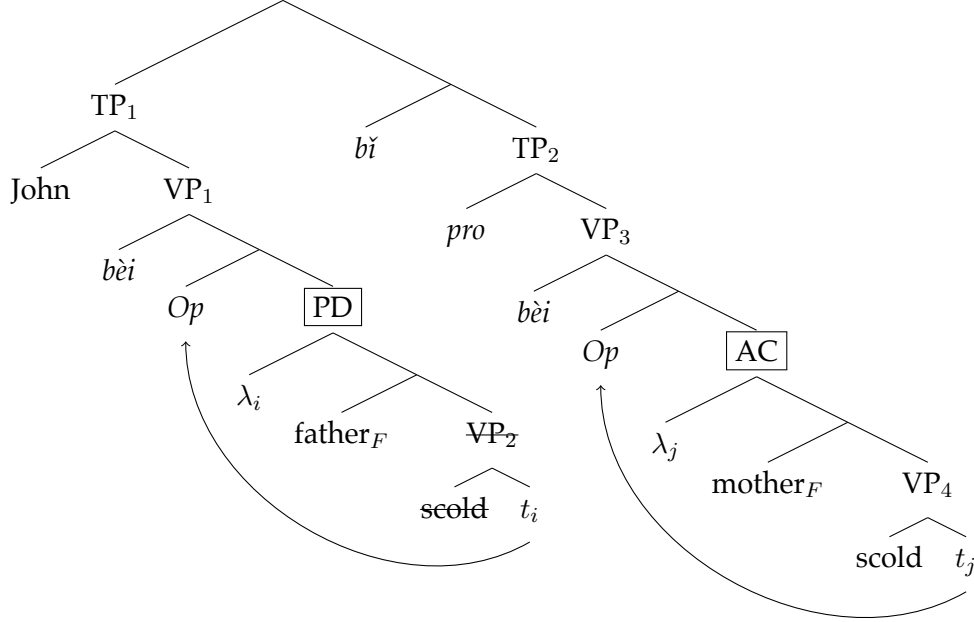
³⁰The morpheme *de* is obligatory when postverbal adverbs are introduced. It is orthographically distinct from the genitive marker *de* which is glossed in this paper as GEN. See Huang (1988); Cheng (2007) for discussion of this *de* which appears with manner adverbials.

³¹In positive form uses, addition of the morpheme *hěn* is required on gradable predicates in some environments. The nature of this *hěn* morpheme is outside of the scope of this paper. See Grano (2011) for a recent approach to *hěn*.

³²Example (60) was brought to my attention by an anonymous reviewer.

Under our syntactic composition proposal, however, the parallel movements out of the predicate are not at all problematic, as there can simply be two different instances of the null operator in the derivation. The derivation for (60) is presented in (61).³³

(61) **Derivation of (60):**



In order to satisfy the CDR, we must elide a local VP of TP₁. The largest local VP is VP₁, but it contains a focus-marked constituent “father” and ellipsis cannot delete focus-marked material, so we cannot elide VP₁. The next largest local VP of TP₁ is VP₂.³⁴ In order to elide VP₂ against its antecedent VP₂, we must identify an appropriate Parallelism Domain and its matching antecedent. Since the VP₁ includes a free variable in the trace t_i of the null operator, it cannot be used as its own Parallelism Domain. We must instead use the constituent which includes the associated λ-binder, identified as PD in (61) as the Parallelism Domain. The corresponding antecedent in TP₂ is labeled AC.

Note, however, that PD is not semantically identical to AC: $\llbracket \text{PD} \rrbracket = (\lambda x. \text{father scold } x \text{ seriously})$ and $\llbracket \text{AC} \rrbracket = (\lambda x. \text{mother scold } x \text{ seriously})$. However, the Ellipsis Parallelism condition (35) from Takahashi and Fox (2005) crucially requires that AC be equal to a focus alternative of PD, i.e. if PD includes any focus-marked material, these focus-marked constituents can be replaced with contextually salient alternatives to form AC. As “father” and “mother” are the contrasting subparts in otherwise identical conjuncts, they will naturally be focus-marked (Rooth, 1992b). Assuming that “mother” is a salient alternative to “father,” we yield $\llbracket \text{AC} \rrbracket \in \llbracket \text{PD} \rrbracket^f$, satisfying Ellipsis Parallelism.

³³The manner adverb *seriously* is not represented to simplify the example. The precise position of the adverb is not crucial to the argument made here.

³⁴In Huang (1999), the projections corresponding to “father scold t seriously” and “mother scold t seriously” in (61) are considered to be standard finite IPs (TPs in the terms used here). However, if they were labeled TPs here, VP₂ “scold t seriously” would not count as a local VP of TP₁, so we would not be able to satisfy the CDR. As the CDR proposed here accurately rules out subcomparative constructions in Mandarin with this one possible exception, here I will simply consider these clauses inside bèi-passives to be defective TPs and will leave this technical detail open.

3.2.4 Verb-copy constructions

The fourth and final argument against semantic composition comes from the Mandarin verb-copy construction. There are cases of *bǐ* comparatives which have a target and standard which both superficially look like clauses—i.e., they include a verb and object—and the gradable predicate is a verb with an adverbial modifier (62). As noted by Liu (1996), in *bǐ* comparatives of this form, all three instances of the verb must match (63).

(62) **Comparatives with verbs in both target and standard:**

Yūehàn qí mǎ bǐ Mǎlì qí niǔ qí de kuài
John ride horse BI Mary ride cow ride DE fast

“John rides horses faster than Mary rides cows.”

(63) **All three verbs must match in comparatives with verbs in target and standard** (Liu, 1996):

* Yūehàn qí mǎ bǐ Mǎlì gǎn yáng qí de hǎo
John ride horse BI Mary keep sheep ride DE good

Intended: “John rides horses better than Mary keeps sheep.”

Liu (1996) argues that this is predicted through a derivation of (62) that involves two instances of the Mandarin manner verb-copy construction (64), which requires that its two exponents of the verb be identical. Huang (1988) and Cheng (2007) argue that these verb-copy constructions are derived via movement of the verb without deletion of the lower copy.

(64) **Mandarin manner “verb-copy” construction:**

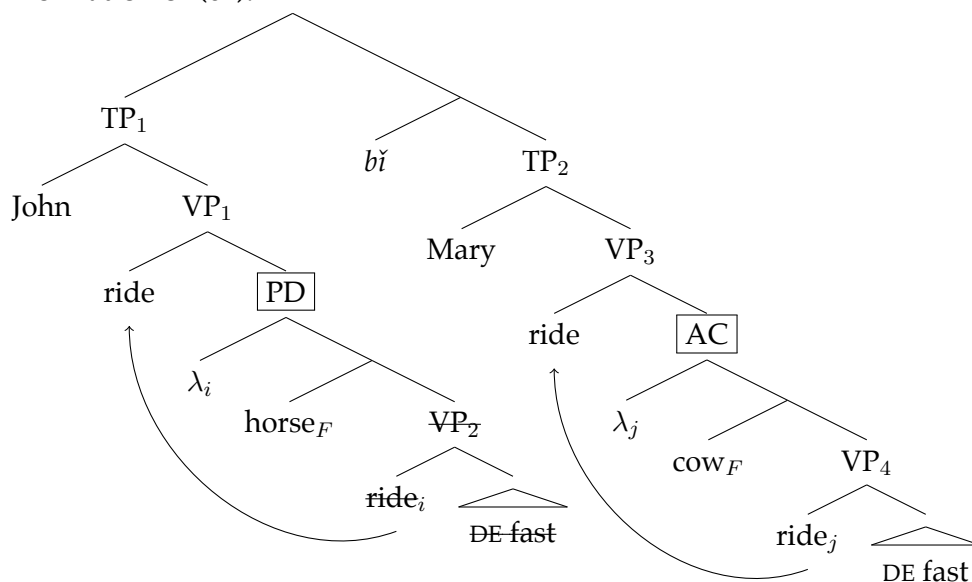
Yūehàn qí mǎ qí de kuài
John ride horse ride DE fast

“John rides horses fast.”

As Liu suggests, syntactic composition would be able to straightforwardly derive comparatives such as (62) using two instances of verb-copy. This derivation for (62) is given below. There are two independent instances of verb-copy, which are represented as regular movement chains, including λ -binders.³⁵

³⁵See Hartman (2011) for evidence that head-movement leaves semantically real λ -binders of this form for the purposes of computing ellipsis parallelism.

(65) **Derivation of (62):**



Now consider how the CDR will apply to this structure. The largest local VP of TP_1 is VP_1 , but VP_1 contains the focus-marked constituent “horse,” so it cannot be elided. The next largest VP is VP_2 . As VP_2 includes the lower trace position of the movement chain of “ride,” it cannot act as its own Parallelism Domain; instead, we must use the projection labeled PD above, which includes the λ -binder associated with this movement chain (see footnote 35).

As with the *bī* passive example in the previous section (60), PD and AC necessarily include material that differ: here, “horse” and “cow.” However, as contrasting constituents within a conjunction, they will be focus-marked. Assuming $\llbracket \text{cow} \rrbracket \in \llbracket \text{horse} \rrbracket^f$, Ellipsis Parallelism is satisfied. We are thus able to elide the VP within PD in TP_1 , including the lower copy of the verb-copy chain. We are thus left with three instances of “ride” linearized at PF.

This derivation also yields the verb matching constraint. As each TP is constructed using verb-copy, the two verbs in TP_1 will match and the two verbs in TP_2 will match. Further, Ellipsis Parallelism will require that the lower copy of V in TP_1 and the lower copy of V in TP_2 be identical. By transitivity, all three pronounced instances of the verb must match exactly.

Semantic composition would not be able to naturally derive comparatives such as (62) with all three exponents of the verb derived through verb-copy, and would instead have to give a separate account for the verb matching constraint.³⁶

3.2.5 Summary of the argument from parallel movements

The last four sections presented different types of *bī* comparatives which are challenging for semantic composition in precisely the same way: all involved parts of the standard and target moving out of the predicate of comparison. Two items have moved out, but we only see one gap.

The argument being made here is in some sense one of theoretical efficiency: semantic composi-

³⁶See Erlewine (2007) for such an attempt.

tion for these types of comparatives is not necessarily impossible, but brand new mechanisms must be proposed for comparatives that seemingly involve subject raising, object preposing, *bèi* passives, and verb-copy, independently maintaining the characteristics of each construction. Using syntactic composition, any comparative derivation involves two separate TPs—one for the target and predicate and another for the standard and predicate—and thus we need not introduce any new comparative-specific mechanisms for the derivation of the complex comparatives reviewed here.

3.3 Evidence for the ellipsis requirements

In the last section I presented various comparatives which involve parallel movements into the target and into the standard, which necessitates a syntactic composition approach to the *bǐ* comparative. Thus the derivation of every *bǐ* comparative includes two instances of the predicate of comparison. In order to yield the final word order a Comparative Deletion Requirement was proposed which forces only one instance of the predicate to be pronounced. The CDR is repeated here:

(66) **Comparative Deletion Requirement (CDR):**

In a *bǐ* comparative, elide the largest elidable local VP of the target TP under identity with a local VP of the standard TP.³⁷ If the target TP has no elidable local VP, the derivation is illicit.

In this section I will provide evidence to support the CDR proposed here. First, I discuss cases where there are multiple local VPs that are candidates for comparative deletion, in order to motivate the requirement that it be the largest elidable local VP that is elided. Second, I show how the mechanism of ellipsis licensing through parallelism domains (Rooth, 1992a; Heim, 1997; Takahashi and Fox, 2005; Hartman, 2011) accurately rules out comparatives which involve movement chains which are not parallel between the target and standard clauses. Third, I demonstrate how the current analysis rules out subcomparison and embedded standards.

3.3.1 Eliding the largest local VP possible

In this section I will motivate the specification in the CDR that the local VP elided be the largest elidable local VP. Regular clauses in Mandarin simply have one maximal VP projection per clause, but we have seen two constructions in Mandarin wherein a single TP includes two local VPs: the verb-copy construction and *bèi* passives. In this section I will illustrate the argument using the verb-copy construction.

A basic example of a simplex verb-copy clause is repeated below. Again, following Huang (1988) and Cheng (2007), I take verb-copy constructions to involve a movement chain of the verb without deletion of the lower copy. I assume that this structure results in a single TP containing two projections which are labeled VP.

³⁷Given a TP β , α is a *local VP* of β iff (a) α is a VP, (b) β dominates α , and (c) there is no TP which dominates α and is dominated by β .

- (67) Yūehàn [VP qí mǎ [VP qí de kuài
 John ride horse ride DE fast
 “John rides horses fast.”

In a *bǐ* comparative involving verb-copy, then, there are in theory two different ellipsis options. What we will observe—and what the formulation of the CDR here predicts—is a correlation between the choice of ellipsis size and the position of contrasts between the two clauses. If the higher VPs are identical across the target and standard clauses, the higher VP will be elided. If there is contrasting material within the higher VPs, the lower VP will be elided.

Consider the *bǐ* comparative in (68), where the target clause and standard clause differ only in their subjects, “John” and “Mary.” The word orders which result from ellipsis of the higher and lower local VPs are given in (68a,b). Ellipsis of the higher VP (68a) is grammatical, while ellipsis of the lower VP (68b) is judged as degraded.

- (68) [TP John [VP ride horse [VP ride fast]]] *bǐ* [TP Mary [VP ride horse [VP ride fast]]]

a. Higher VP ellipsis:

- ✓ Yūehàn bǐ Mǎlì qí mǎ qí de kuài
 John BI Mary ride horse ride DE fast
 “John rides horses faster than Mary rides horses.”
Derivation: [TP John {VP ride horse {VP ride fast } }] *bǐ* ...

b. Lower VP ellipsis:

- ?* Yūehàn qí mǎ bǐ Mǎlì qí mǎ qí de kuài
 John ride horse BI Mary ride horse ride DE fast
 “John rides horses faster than Mary rides horses.”
Derivation: [TP John [VP ride horse {VP ride fast }]] *bǐ* ...

Recall that focus-marked material cannot be elided. In (68), the higher local VPs in the target and standard clauses are identical and they thus will not contain focus-marking. This allows both local VPs of the target clause to be legal targets of ellipsis. In this situation where both higher and lower local VPs of the target clause are elidable, ellipsis of the largest elidable VP is required, as predicted by the CDR.

When there is contrasting material in the higher VPs, however, the lower local VP of the target is elided. Consider (69), where the objects additionally contrast between the target and the standard clauses. By assumption, the objects in verb-copy constructions (in bold in 69) are above the lower VPs. Again, we assume that contrasting material between the clauses is naturally focus-marked.

(69) [TP John [VP ride **horse**_F [VP ride fast]]] bǐ [TP Mary [VP ride **cow**_F [VP ride fast]]]

a. Higher VP ellipsis:

Yūehàn bǐ Mǎlì qí niǔ qí de kuài

John BI Mary ride cow ride DE fast

* “John rides *horses* faster than Mary rides cows.” (intended reading)

✓ “John rides *cows* faster than Mary rides cows.”

Intended derivation: [TP John {~~VP ride horse~~_F {~~VP ride fast~~ } }] bǐ ...

b. Lower VP ellipsis:

✓ Yūehàn qí mǎ bǐ Mǎlì qí niǔ qí de kuài

John ride horse BI Mary ride cow ride DE fast

“John rides horses faster than Mary rides cows.”

Derivation: [TP John [VP ride horse_F {~~VP ride fast~~ }]] bǐ ...

The relationship between ellipsis size and contrast in the *bǐ* comparative is made clear in the *bǐ* comparatives presented in this section. If there is contrasting (and therefore focus-marked) material in the higher VP, the lower VP is elided. If ellipsis of both local VPs are possible, ellipsis of the higher VP is chosen.³⁸ This motivates the formulation of the CDR as proposed.³⁹

3.3.2 Licensing by parallelism domains

In this paper I’ve proposed that the derivation of *bǐ* comparatives involves an obligatory ellipsis step, and moreover that this ellipsis must be licensed through the identification of a *parallelism*

³⁸In cases where both ellipsis sizes are possible, as in (68), some speakers judge ellipsis of the lower VP (68b) to be degraded but not completely ungrammatical, while others categorically accept the higher VP ellipsis (68a) but reject the lower VP ellipsis (68b). I have used ?* to represent this pattern in (68b).

³⁹This preference for the higher local VP to be elided may remind readers of the “MaxElide” constraint proposed in the work of Takahashi and Fox (2005) and Merchant (2008):

- (i) MaxElide (Takahashi and Fox, 2005): Elide the biggest deletable constituent reflexively dominated by the PD.

However, the effects of MaxElide and the formulation given here are different. MaxElide requires that, *given a particular parallelism domain*, the largest deletable constituent in it be deleted. However, in the case of (68) where the higher VP ellipsis is preferred, different parallelism domains can be chosen to license ellipsis of the higher VP or the lower VP in a MaxElide-obeying way. Thus even if MaxElide is adopted here, the higher VP ellipsis and lower VP ellipsis options would not be competitors. (Recall that the movement of verb in the verb-copy construction introduces a trace and λ -binder, and that ellipsis parallelism domains cannot include unbound traces; see Hartman 2011.)

- (ii) a. Higher Parallelism Domain \Rightarrow higher VP ellipsis

[TP John [PD: [VP ride λ_i horse [VP ride_i fast]]]] bǐ ...

\rightarrow [TP John {~~VP ride horse~~ {~~VP ride fast~~ } }] bǐ ...

\rightarrow “John *bǐ* Mary ride horse ride fast”

- b. Lower Parallelism Domain \Rightarrow lower VP ellipsis:

[TP John [VP ride [PD: λ_i horse [VP ride_i fast]]]] bǐ ...

\rightarrow [TP John [VP ride horse {~~VP ride fast~~ }]] bǐ ...

\rightarrow “John ride horse *bǐ* Mary ride horse ride fast”

The constraint on the *bǐ* comparative must be stronger than MaxElide: regardless of the parallelism domains used, the largest elidable local VP must be elided.

domain à la Rooth (1992a); Heim (1997); Takahashi and Fox (2005); a.o. An alternative would be to require that ellipsis of the local VP be licensed by simple PF identity, without requiring any LF identity of parallelism domains. In this section I will argue that LF identity is essential for explaining the grammaticality and interpretation of Mandarin *bǐ* comparative constructions.⁴⁰

I will illustrate my argument in this section using *bǐ* comparatives which involve the verb-copy construction. I begin by considering the *bǐ* comparative in (70) below. In the syntactic composition approach proposed here, where the comparative is made up of two clauses with ellipsis in the target clause, we could imagine two different parses for the comparative, which correspond to two different assertions.

In the first option (70a) both the target and standard clauses are verb-copy constructions, and it asserts a ranking of the speeds at which John rides horses and Mary rides horses. In this parse, the predicate elided in the target clause is the higher VP in the verb-copy construction, “ride horse ride fast.” In the second parse (70b), the target clause is simply the verb “ride” with the adverb “fast,” without an overt object and verb-copy. This interpretation would assert that the speed that John rides (in general) is faster than the speed that Mary rides horses. However, this latter interpretation is not available.⁴¹

- (70) Yūehàn bǐ Mǎlì qí mǎ qí de kuài
 John BI Mary ride horse ride DE fast
- a. ✓ [Yūehàn qí—mǎ—qí—de kuài] bǐ [Mǎlì qí mǎ qí de kuài]
 John ride horse ride DE fast BI Mary ride horse ride DE fast
 “John rides horses faster than Mary rides horses.”
- b. * [Yūehàn qí—de kuài] bǐ [Mǎlì qí mǎ qí de kuài]
 John ride DE fast BI Mary ride horse ride DE fast
 “John rides (in general) faster than Mary rides horses.”

This fact about the interpretation of (70) is an important argument for the necessity of identifying a parallelism domain to license the ellipsis. A simple PF identity approach to ellipsis would predict both parses to be available, whereas the ellipsis licensing conditions used here accurately generate the parse in (70a) and disallow the parse in (70b). We’ll step through these two derivations (one grammatical and one ungrammatical) one at a time.

⁴⁰ A similar notion of “parallelism” required between the target clause and standard clause is described in Liu (2011), although it is discussed as a condition for establishing a minimal pair to facilitate comparison, rather than a condition for licensing comparative deletion. The approach presented here instead uses the preestablished notion of Parallelism Domains for the licensing of ellipsis.

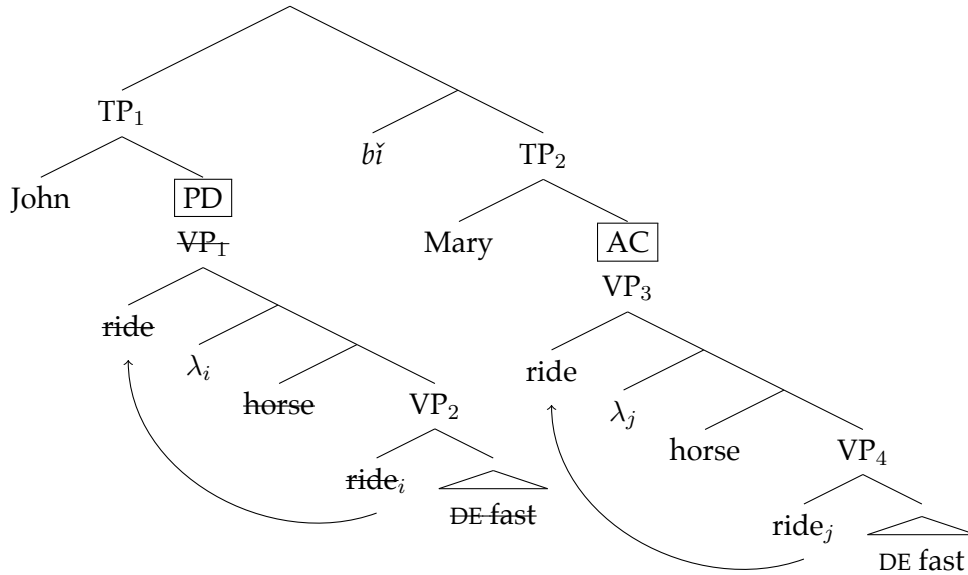
Note that Liu (2011) argues that this parallelism must hold between “minimal clauses,” reminiscent of the notion of Local VP developed here. See Liu (2011, footnote 23) for details.

⁴¹ Note that the target clause proposed in the unavailable parse, (70b), is by itself grammatical in a positive form. The positive form here requires addition of the morpheme *hěn*.

- (i) Yūehàn qí de hěn kuài
 John ride DE HEN fast
 “John rides fast.”

I begin with the grammatical derivation of (70a), where we will see that this structure is allowed by the licensing of ellipsis through parallelism domains. We start, as in all derivations of *bĭ* comparatives, with the conjunction of two TPs. In this case, both TPs will be verb-copy clauses of the form “ride horse ride fast.”

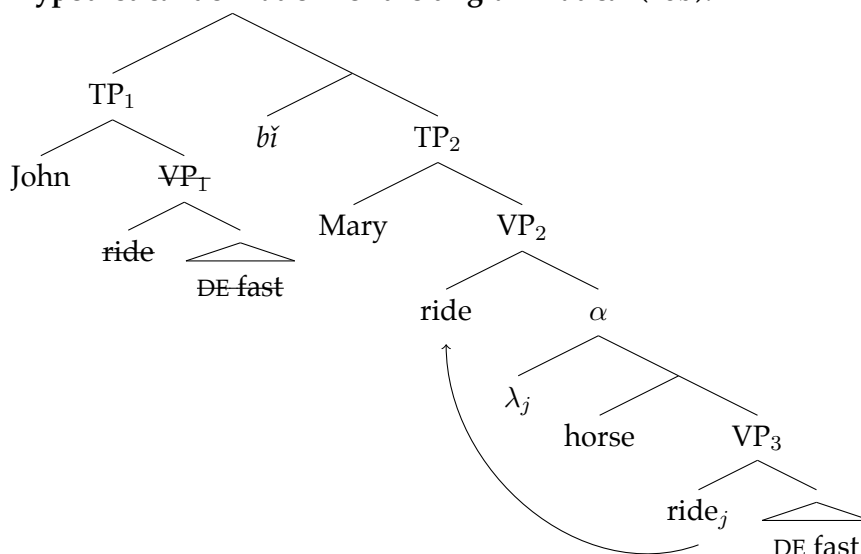
(71) **Grammatical derivation of (70a):**



The CDR requires that we elide a local VP within TP₁, and moreover that that be the largest local VP possible. The largest local VP of TP₁ is VP₁. We now must identify a parallelism domain for VP₁ and its antecedent. A parallelism domain cannot include any unbound variables, but there are none in VP₁, so we can simply use the VP₁ projection as its own parallelism domain. An antecedent to PD is easily found in TP₂: the projection labelled AC. The denotations of AC and PD are identical under any variable assignment. Finally, VP₁ contains no focus-marked material. With these conditions satisfied, we can elide VP₁ and satisfy the CDR. This yields the word order in (70).

Now consider a hypothetical derivation for the ungrammatical parse, (70b). Here, we would like to yield the same word order as with (70a) but using a different target clause, which does not include the object and verb-copy construction. The CDR requires that we elide the local VP of TP₁. Intuitively, we want to elide VP₁ under identity with VP₃.

(72) Hypothetical derivation for the ungrammatical (70b):



Under a simple approach where ellipsis is satisfied simply by PF identity, this ellipsis would be possible, as the pronunciation of VP₁ is equal to the pronunciation of VP₃: *qí de kuài*, glossed as “ride DE fast.” However, the approach adopted here which requires LF identity of parallelism domains would not license this ellipsis, as a suitable parallelism domain for VP₁ does not exist. A natural choice is to use PD = VP₁ with AC = VP₃ but VP₃ contains the semantic trace of the verb-copy chain of “ride,” and such traces of head movement are interpreted as variables (Hartman, 2011). Parallelism domains and antecedents cannot include any unbound variables. Since VP₃ contains the unbound trace of “ride,” it is not a valid antecedent for VP₁. The smallest constituent which includes the λ -binder for this variable is that labelled α in the tree above. However, this projection now includes the object “horse.” There is no “horse” in VP₁, nor any other object which could be turned into a horse by focus alternative replacement.⁴² Attempting to find an antecedent for PD = TP₁—or any intermediate projection between TP₁ and VP₁ not pictured here—will also fail in the same way. Thus the ellipsis parallelism approach employed here will accurately disallow a derivation leading to interpretation (70b) for (70).

This same logic ruling out (70b) also predicts the ungrammaticality of comparatives with a verb-copy construction in the target clause but only a VP with a manner adjunct in the standard clause. Unlike (70) which does have a grammatical parse (70b), there is no grammatical derivation leading to the word order in (73). Thus the sentence (73) is simply judged as ungrammatical.

- (73) * Yūehàn qí mǎ bǐ Mǎlì qí de kuài
 John ride horse BI Mary ride DE fast
 Intended: “John rides horses faster than Mary rides (in general)”
 Intended derivation: [Yūehàn qí mǎ qí de kuài] bǐ [Mǎlì qí de kuài]

In this section I showed that the identity required between parallelism domains and their antecedents ensures that a comparative cannot be formed between one verb-copy clause and a non-

⁴² A horse is a horse, of course of course.

verb-copy clause. A simple PF identity approach to ellipsis would not accurately rule out derivations such as (70b) or (73), necessitating the approach to ellipsis licensing adopted here for the *bǐ* comparative.

The effects exemplified in this section go beyond verb-copy constructions. Licensing ellipsis in the *bǐ* comparatives through parallelism domains entails a restriction against non-parallel movements out of the VPs in the target and standard clauses. If parallel movements are made out of VPs in the target and standard clauses, legal parallelism domains and antecedents can still be identified and ellipsis licensed, as was demonstrated in all the examples in section 3.2. However, if movement only occurs from within one of the clauses, or if movements are not parallel, ellipsis will not be licensed and the attempted comparative derivation will be ungrammatical.

3.3.3 Explaining the lack of subcomparatives and embedded standards

Recall that the *bǐ* comparative cannot be used to form subcomparatives—comparison of degrees of two different gradable predicates—or comparatives with embedded standards. Previous work on the Mandarin *bǐ* comparative (Xiang, 2003, 2005; Erlewine, 2007; Lin, 2009) used such facts as an argument for a semantic composition approach.

Note that it is not the case that rankings of degrees on different scales cannot be expressed in Mandarin at all. They simply cannot use the *bǐ* comparative. For example, a comparison between the height of a chair and the width of a table can be grammatically expressed using *-dù* ‘degree’ nominalizations, as follows:

(74) **Grammatical comparison of height and width:**

wǒ de yǐzi de gāo-dù chāoguò nǐ de zhuōzi de kuān-dù
1SG GEN chair GEN tall-degree exceed 2SG GEN table GEN wide-degree

“The height of my chair exceeds the width of your chair.”

The lack of subcomparatives and embedded standards in the *bǐ* comparative must be a fact about the syntactic structure of *bǐ* comparatives, not due to a difference in the semantics of degrees in Mandarin.

Under the syntactic composition approach proposed here, the ungrammaticality of both (75) and (77) will be due to the CDR. Consider first the case of subcomparison, example (27), repeated below as (75). This structure is ungrammatical because the CDR is not satisfied: no VP has been elided in the target clause.

(75) **No subcomparatives:** (=27)

* wǒ de yǐzi gāo bǐ nǐ de zhuōzi kuān
1SG GEN chair tall BI 2SG GEN table wide

Intended: “My chair is taller than your table is wide.”

Intended derivation: [_{TP} my chair [_{VP} tall]] *bǐ* [_{TP} your table [_{VP} wide]]

Suppose we take the intended derivation in (75) but then delete the predicate in the target clause, TP₁, in an attempt to satisfy the CDR. The resulting comparative (76) does not have the intended subcomparative reading, “my chair is taller than your table is wide.” This is because deletion of the predicate *gāo* ‘tall’ in the target clause would be unrecoverable. This is true even in a context where the predicate ‘tall’ was just used in the discourse, as the CDR specifies that the antecedent for the deletion of the target’s local VP must be a local VP in the standard clause.

(76) **An intended subcomparative with *gāo* ‘tall’ deleted:**

wǒ de yǐzi bǐ nǐ de zhuōzi kuān
1SG GEN chair BI 2SG GEN table wide

- a. * Intended subcomparative: “My chair is taller than your table is wide.”

Intended derivation: [TP my chair {VP ~~tall~~}] bǐ [TP your table [VP wide]]

- b. ✓ “My chair is wider than your table.”

Derivation: [TP my chair {VP ~~wide~~}] bǐ [TP your table [VP wide]]

Finally, consider comparatives with embedded standards. Consider example (28), repeated below as (77). As shown in the intended derivation, the idea is that the predicate in the target clause, VP₁, is deleted using the antecedent VP₃. This is ruled out by the CDR because VP₃ is not a local VP of the standard clause, and the CDR specifies that the antecedent for the comparative deletion be a local VP of the standard clause.

(77) **No embedded standards: (=28)**

* Yuēhàn bǐ Mǎlì rènwéi tā gāo
John BI Mary thinks he tall

Intended: “John is taller than Mary thinks he is.”

Intended derivation: [TP John {VP₁ ~~tall~~}] bǐ [TP Mary [VP₂ think [TP he [VP₃ tall]]]]

It is worth noting that the target’s gradable predicate also cannot be in an embedded clause inside the target clause of *bǐ*. Consider example (78) below. We could imagine two different derivations for this structure: one where the target clause denotes the degree description “the height that John thinks Mary is,” and another where the entire comparative is embedded under “John thinks.” Only the latter reading is available. This is because the the CDR is violated in reading (78a): the VP elided in the target clause is not a local VP of the left conjunct of *bǐ*.

(78) **No embedded targets, either:**

Yuēhàn rènwéi Mǎlì bǐ tā gāo
John thinks Mary BI he tall

- a. * Intended: “The height that John thinks Mary is is greater than the height of Mary.”

Intended derivation: [TP John [VP thinks [TP Mary {VP ~~tall~~}]]] bǐ [TP he [VP tall]]

- b. ✓ “John thinks [Mary is taller than he is].”

Derivation: [TP John thinks [[TP Mary [~~VP tall~~] *bǐ* [TP he [VP tall]]]]]

Note that there is another reason why the embedded standard and embedded target examples (77, 78a) are ungrammatical. The interpretation of *bǐ* requires its conjuncts to each be a degree description, but a TP such as “John thinks Mary tall” in (78a) cannot denote a degree description without degree abstraction. In section 4, I will argue that Mandarin Chinese lacks degree abstraction, and show that the CDR’s reference to “local VPs” is still needed.

3.4 An extension to adverbial comparatives

In this section I will extend the proposal here to another set of *bǐ* comparatives, called “adverbial comparatives” in Erlewine (2007), such as (79).⁴³ Adverbial comparatives use a different word order than other *bǐ* comparatives we have seen thus far, such as (68a), repeated below as (80) (see the preceding sections 3.3.1 and 3.3.2 for discussion). Below I will discuss the differing syntax and semantics of these adverbial comparatives.

(79) **An adverbial comparative:**

Yūehàn qí mǎ qí de *bǐ* Mǎlì kuài
John ride horse ride DE BI Mary fast

≈ “John rides horses faster than Mary.”

(80) **Comparative with a complex predicate (=68a):**

Yūehàn *bǐ* Mǎlì qí mǎ qí de kuài
John BI Mary ride horse ride DE fast

“John rides horses faster than Mary rides horses.”

Derivation: [TP John [~~VP ride horse~~ [~~VP ride fast~~]]] *bǐ* [TP Mary [VP ride horse [VP ride fast]]]

I propose that comparatives such as (79) are derived by a target clause which includes the complex VP “ride horse ride DE fast” as in (80), and a standard clause with just the predicate ‘fast’.⁴⁴ The ‘fast’ in the target clause is deleted under identity with the predicate ‘fast’ in the standard clause in order to satisfy the CDR.⁴⁵

(81) **Proposed derivation for (79):**

[TP John [VP ride horse [VP ride DE [~~VP fast~~]]]] *bǐ* [TP Mary [VP fast]]

⁴³I thank an anonymous reviewer for requesting discussion of such examples. Example (79) was offered by this reviewer.

⁴⁴Note that the “adverbs” which modify verbs with postverbal *de*, e.g. *kuài* ‘fast’ in (80), can also function individually as predicate adjectives.

⁴⁵VP is used simply as a label for the maximal projection of the predicate ‘fast’ without making a claim as to its category. See also footnote 14.

The following observation supports this analysis of adverbial comparatives: there is a semantic difference between comparatives with complex predicates in both clauses, versus these adverbial comparatives where I propose that the main verb ('ride' in examples above) is only in the target clause. To see this, I first note a fact about the verb "run": our friend Zhang San, being human, is able to run, but it is strange to say that an airplane runs.⁴⁶ This is reflected in the judgment of native speakers below.

(82) **It's weird to say that an airplane runs:**

- a. ✓ Zhāng Sān (pǎo bù) pǎo de kuài
Zhang San run feet run DE fast
"Zhang San runs fast."
- b. # fēijī (pǎo bù) pǎo de kuài
airplane run feet run DE fast
"An airplane / Airplanes run fast."
Speaker comment: strange / infelicitous because planes do not run.

Now consider the comparative (83). Under the proposal here, the complex VP "run DE fast" will be part of the derivation of both target and standard clauses, and is predicted to be infelicitous because it compares the speed at which Zhang San and planes can run. It is indeed judged just as infelicitous as (82b), again because planes do not run.

(83) **Comparative with "run DE fast" in both target and standard:**

- # Zhāng Sān bǐ fēijī (pǎo bù) pǎo de kuài
Zhang San BI airplane run feet run DE fast
≈ "Zhang San runs faster than airplanes run."
Speaker comment: strange / infelicitous because planes do not run.
Derivation: [TP ZS {VP run feet {VP run DE {VP fast}}}] bǐ [TP airplane {VP run feet {VP run DE {VP fast}}}]]]

In contrast, consider the adverbial comparative (84) below formed of the same words as (83). In this word order, the sentence is judged as completely natural. Intuitively, (84) compares the speed at which Zhang San runs to the speed of planes, not the speed at which planes run. This semantic difference is explained by the approach to adverbial comparatives presented here.

(84) **Adverbial comparative does not imply that planes run:**

- ✓ Zhāng Sān (pǎo bù) pǎo de bǐ fēijī kuài
Zhang San run feet run DE BI airplane fast
"Zhang San runs faster than {an airplane / the speed of an airplane}."
Derivation: [TP ZS {VP run feet {VP run DE {VP fast}}}] bǐ [TP airplane {VP fast}]]]

⁴⁶Whether this restriction is due to world knowledge or is encoded in the lexical semantics of the verb "run" is incidental to the argument here.

There are some important questions that must be answered before this analysis can be adopted. First, are the two instances of ‘fast’ in the derivation of (84) semantically identical? This is important for the question of how Ellipsis Parallelism is satisfied. Second, are the predicates ‘fast’ and ‘run fast’ commensurable? As the fine-grained syntax/semantics of these “V DE A” constructions takes us far outside the scope of this paper, I will leave these questions for future research.

3.5 Summary of the proposal and arguments

In this section I gave my proposal of the syntax and semantics for the Mandarin *bǐ* comparative. The proposal is a syntactic composition approach, where the *bǐ* comparative is made up of two clauses, each with its own instance of the predicate of comparison. The semantics of *bǐ* asserts an ordering over these two degree-denoting clauses, making it an instance of degree comparison in Kennedy’s (2007) terms. This proposal is a marked departure from recent work on the Mandarin *bǐ* comparative (Xiang, 2003, 2005; Erlewine, 2007; Lin, 2009), which have adopted the semantic composition approach, wherein there is only one instance of the gradable predicate in the syntax and the standard is individual-denoting.

Primary evidence for the syntactic composition approach was presented in section 3.2. I presented examples of *bǐ* comparatives which involve *parallel movements* from within the predicate of comparison into the target and from within the predicate into the standard. Parallel movements are realized in overt word order as in the following schema:

(85) **Pronounced word order of parallel movement constructions:**

$$\begin{array}{ccccc}
 \text{“} & \dots & \alpha_1 & \dots & bǐ & \dots & \alpha_2 & \dots & \dots & t_\alpha & \dots & \text{”} \\
 & \underbrace{\hspace{1.5cm}} & & & & \underbrace{\hspace{1.5cm}} & & & & \underbrace{\hspace{1.5cm}} & & \\
 & \text{target} & & & & \text{standard} & & & & \text{predicate} & &
 \end{array}$$

Examples of this form were presented with four different Mandarin movement constructions: subject raising, object fronting, *bèi* passives, and verb-copy constructions. Under the syntactic composition approach, each of these cases can be analyzed straightforwardly as two instances of movement—one in the target clause and one in the standard clause. Care was taken to show that not just one movement chain has occurred, but that two movement chains have. In a semantic composition analysis, on the other hand, these examples would have to be given an alternative explanation without parallel movement chains. These facts make a compelling case for the analysis of the Mandarin *bǐ* comparative construction using syntactic composition.

As a syntactic composition analysis, an important question is exactly how the overt word order is derived. In my proposal here I put forward the Comparative Deletion Requirement, repeated below.

(86) **Comparative Deletion Requirement (CDR):**

In a *bǐ* comparative, elide the largest elidable local VP of the target TP under identity with a local VP of the standard TP.⁴⁷ If the target TP has no elidable local VP, the derivation is illicit.

The CDR ensures that a local VP of the target clause is elided, yielding the observed word order. Moreover, in cases where the target clause has more than one local VP, the CDR ensures that the largest elidable local VP be elided, explaining the patterns of ellipsis in section 3.3.1. Furthermore, I follow the work of Rooth (1992a); Heim (1997); Takahashi and Fox (2005) in adopting a semantically sensitive licensing condition on ellipsis. This formulation of ellipsis licensing is shown in section 3.3.2 to accurately predicts patterns of grammaticality and interpretation for comparatives involving verb-copy. The proposal also rules out subcomparison and embedded standards in the *bǐ* comparative. Finally, the proposal here is extended to so-called adverbial comparatives, demonstrating the wide empirical coverage of this approach.

4 Degree comparison without degree abstraction

In this paper, I have proposed that the Mandarin *bǐ* comparative employs syntactic composition. Under this approach, two degree descriptions of type $\langle d, t \rangle$ are independently constructed, and the comparative operator asserts a ranking over the maximal degrees in each. As these arguments of the comparative operator *bǐ* are degree-denoting, the Mandarin *bǐ* comparative will be an instance of degree comparison under Kennedy’s (2007) Standard Type Parameter:

(87) **Kennedy’s Standard Type Parameter (STP): (=2)**

A comparative selects for a standard of individual-denoting type (e.g. type *e*; *individual comparison*) or degree-denoting type (e.g. *d*, $\langle d, t \rangle$; *degree comparison*).

It is standardly assumed, following the early work of Bresnan (1973) and Chomsky (1977), that such degree descriptions (sets of degrees) for the target and standard are constructed by \bar{A} -movement of a null-operator of type *d*. *Degree abstraction*—that is, predicate abstraction of a variable of type *d*—results in a degree description of type $\langle d, t \rangle$.⁴⁸

(88) John is taller than *Op* λd [Mary thinks [he is ~~*t*~~-*tall*]]

↑ _____ ↓

It has been proposed by Beck et al. (2004) that languages differ as to whether their grammars allow degree abstraction. This is known as the Degree Abstraction Parameter (DAP), repeated here:

⁴⁷ Given a TP β , α is a *local VP* of β iff (a) α is a VP, (b) β dominates α , and (c) there is no TP which dominates α and is dominated by β .

⁴⁸ The movement illustrated in (88) forms the degree description corresponding to the standard. In recent approaches, movement is also used to construct the degree description corresponding to the target; see Wold (1995); Heim (2000); Bhatt and Pancheva (2004) for details.

(89) **Degree Abstraction Parameter (DAP) (Beck et al., 2004): (=1)**

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

I propose that Mandarin Chinese lacks degree abstraction, i.e. that Mandarin Chinese is a –DAP language.⁴⁹ Although the *bǐ* comparative involves the construction of $\langle d, t \rangle$ degree descriptions for the target and the standard, it will not do so via degree abstraction as in (88). Instead, Mandarin Chinese has the Degree Last property, allowing each clause conjoined by *bǐ* to be a $\langle d, t \rangle$ degree description after merging in all its other arguments.

(90) **Degree Last: (=37)**

Gradable predicates in Mandarin Chinese take their degree argument as their last argument.

The arguments from previous sections that the Mandarin *bǐ* comparative is an instance of degree comparison, together with the arguments in this section that Mandarin lacks degree abstraction, paint a unique picture for Mandarin Chinese: Mandarin is a language without degree abstraction but which nonetheless employs degree comparison, filling a typological gap in the theoretical typology of comparative constructions predicted by the work of Beck et al. (2004) and Kennedy (2007).

4.1 Testing for degree abstraction

The argument for the lack of degree abstraction in Mandarin will come from the *bǐ* comparative.⁵⁰ As we have already established the syntactic requirements on *bǐ* comparatives (e.g. the CDR), we can now construct a test case for degree abstraction. The example will be predicted to be grammatical according to the CDR, and therefore its grammaticality will specifically reflect whether Mandarin allows degree abstraction or not. I present (91), intended as a Mandarin equivalent to the English in (92), as a test case of this form. I argue that the ungrammaticality of (91) indicates that degree abstraction is not available in Mandarin Chinese.

(91) **The test case for degree abstraction:**

* Yuēhàn bǐ Mǎlì rènwéi Tāngmǔ gāo
John BI Mary think Tom tall

Intended: $\max(\lambda d. \text{John thinks Tom is } d\text{-tall}) > \max(\lambda d. \text{Mary thinks Tom is } d\text{-tall})$

(92) John thinks Tom is taller than Mary thinks he is.

$\max(\lambda d. \text{John thinks Tom is } d\text{-tall}) > \max(\lambda d. \text{Mary thinks Tom is } d\text{-tall})$

⁴⁹Krasikova (2008) has previously claimed that Mandarin Chinese lacks degree abstraction, although her evidence is unfortunately inconclusive. Krasikova repeats the same claim and evidence in the coauthored Beck et al. (2009).

⁵⁰See also Liu (2010) which shows that the *gèng* comparison of deviation comparative in Mandarin—a comparative which does not use *bǐ* and allows for non-local relation between the gradable predicate and a contextually salient standard—also does not involve degree abstraction.

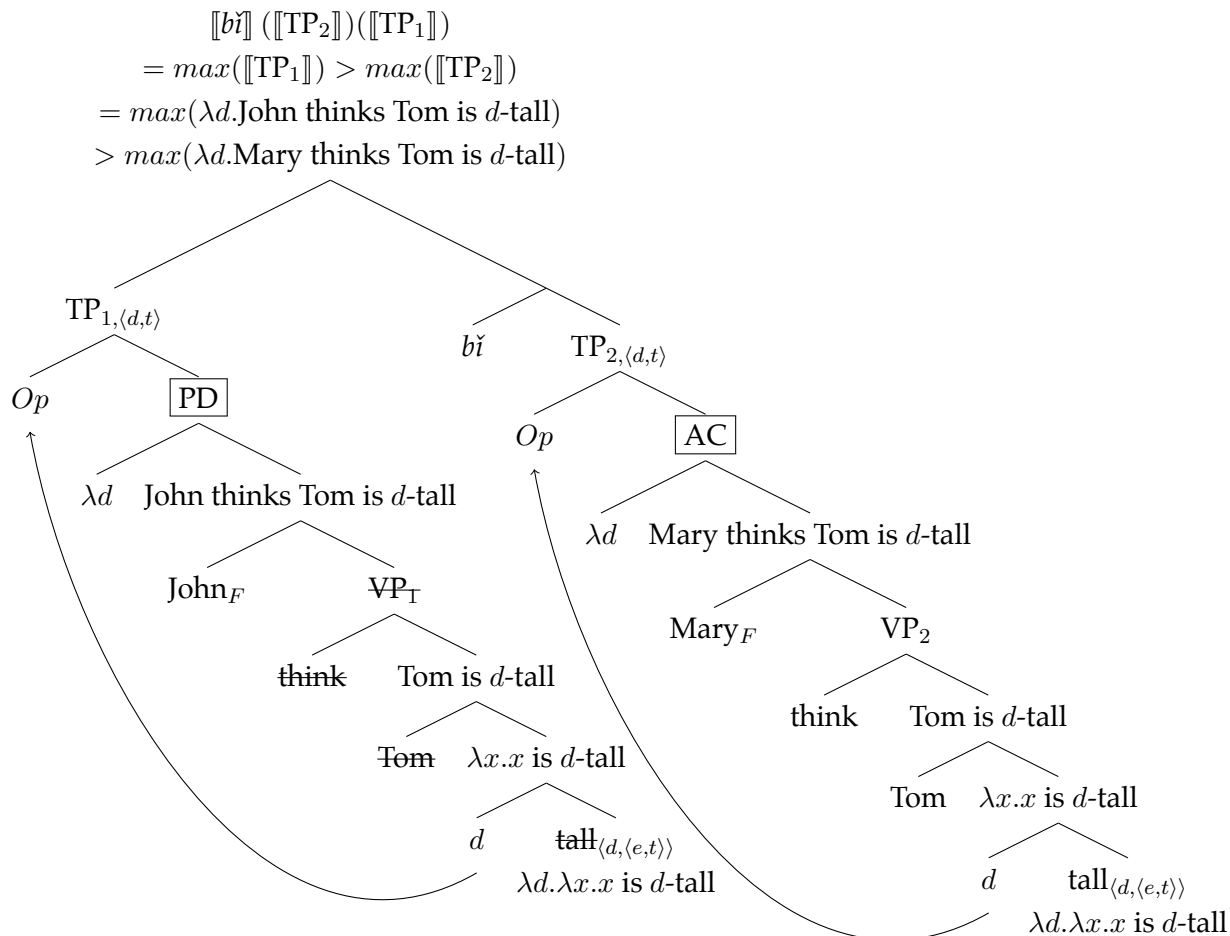
What follows is a proof by contradiction. I assume for contradiction that Mandarin Chinese allows degree abstraction by null operator movement. The argument will go as follows: (a) the target and standard clauses in (91) are independently grammatical in their positive forms; (b) a hypothetical derivation of (91) following the proposal here will yield the intended meaning, satisfy the CDR, and yield the intended word order; (c) degree abstraction is \bar{A} -movement of a null operator (Chomsky, 1977); (d) Mandarin Chinese has long-distance \bar{A} -movement (Huang, 1982). Thus, if degree abstraction were available as an option in the derivation of *bǐ* comparatives, (91) should be grammatical; therefore, the ungrammaticality of (91) tells us that degree abstraction is not even an option in the derivation of *bǐ* comparatives. Parts (a) and (b) of this argument will be demonstrated explicitly here.

The two clauses required in order to construct (91), “John think Tom tall” and “Mary think Tom tall” are grammatical in their positive forms. As noted previously, positive forms of gradable predicates in some environments require the addition of the morpheme *hěn* (Grano, 2011).

- (93) {Yuěhàn, Mǎlì} rènwéi Tāngmǔ hěn gāo
 John Mary thinks Tom HEN tall
 “{John, Mary} thinks Tom is tall.”

Next, I will demonstrate that construction of (91) is possible within the syntax/semantics of the *bǐ* comparative proposed in this paper, if we assume (for contradiction) that degree abstraction is possible. Here I assume that the predicate “tall” is of type $\langle d, \langle e, t \rangle \rangle$, as is commonly assumed for gradable predicates cross-linguistically. As each predicate’s degree argument must be saturated first, we merge a null operator of type d , construct the rest of the clause, and then move this null operator. This movement happens long-distance, resulting in the degree descriptions $(\lambda d.\text{John thinks Tom is } d\text{-tall})$ and $(\lambda d.\text{Mary thinks Tom is } d\text{-tall})$. The comparative operator *bǐ* takes these two degree descriptions and results in the intended truth conditions.

- (94) Hypothetical derivation of *bǐ* comparative with embedding (91), using degree abstraction:



Let us verify that the structure in (94) can pass the CDR and would yield the intended word order. The CDR requires that a local VP of the target clause, TP_1 , be elided. There is only one such candidate, labeled VP_1 . As this VP includes an unbound trace, we must use the constituent labeled PD as our parallelism domain. Ellipsis Parallelism requires that the semantic value of PD be equal to an antecedent, AC, allowing for substitutions to focus-marked material. Assuming focus-marking on the contrasting constituents “John” and “Mary,” $\llbracket AC \rrbracket \in \llbracket PD \rrbracket^f$, and thus ellipsis of VP_1 is licensed. Ellipsis of VP_1 yields the intended word order “John *bǐ* Mary think Tom tall.”

I have demonstrated that if degree abstraction were available, the proposal presented here, together with our understanding of degree abstraction cross-linguistically and of long-distance movement in Mandarin, predicts the comparative in (91) to be grammatical. I thus conclude that the ungrammaticality of (91) indicates that the derivation of *bǐ* comparatives *cannot* involve degree abstraction in the construction of the two degree descriptions.

4.2 The lack of attributive *bǐ* comparatives

In all of the *bǐ* comparatives we have looked at, the gradable predicate introducing the scale of comparison has been a verb, predicate adjective, or an adverb. Gradable predicates could conceivably be introduced elsewhere in the clause, including within a nominal. Comparatives which use a nominal-modifying predicate as their gradable predicate are called *attributive* comparatives. There are broadly two types of attributive comparatives: those which compare the degrees of some attributive adjective and those which compare quantities. English examples of these two types of comparatives are given in (95).

(95) Attributive comparatives in English:

- a. John wrote a longer paper than Mary did.
 $max(\lambda d. \text{John wrote [a } d\text{-long paper]}) > max(\lambda d. \text{Mary wrote [a } d\text{-long paper]})$
- b. John wrote more papers than Mary did.
 $max(\lambda d. \text{John wrote [} d\text{-many papers]}) > max(\lambda d. \text{Mary wrote [} d\text{-many papers]})$

It has been argued that attributive comparatives are derived through \bar{A} -movement of a degree argument from within the DP (Bresnan, 1973; Chomsky, 1977; Kennedy, 1997, a.o.). Consider example (95a), where we are comparing degrees of “long.” In this example, degree abstraction is used to construct the degree descriptions $(\lambda d. \text{John wrote [a } d\text{-long paper]})$ and $(\lambda d. \text{Mary wrote [a } d\text{-long paper]})$.⁵¹ Without degree abstraction, it is impossible for the degree argument of a predicate inside a nominal to be exposed at the TP level. My proposal that Mandarin Chinese does not utilize degree abstraction therefore predicts a lack of attributive *bǐ* comparatives. This prediction is borne out.

I begin with attributive adjectival comparatives, using the English (95a) as a model. The baseline in (96a) shows that Mandarin is able to have gradable predicates—here, “long”—modify object nominals, but we are unable to use this degree argument to construct an attributive comparative (96b). Instead, in order to make this comparison, the objects must be nominalized (96c).

(96) Mandarin lacks attributive adjectival comparatives

- a. Baseline gradable adjective on object:
 \checkmark Zhāng Sān xiě-le (yī piàn) hěn cháng (de) lùnwén
 Zhang San write-PERF one CL HEN long DE paper
 ‘Zhang San wrote a long paper.’

⁵¹In many cases this movement of a degree argument will yield a left-branch extraction configuration, but this violation is alleviated by ellipsis of a constituent which properly contains the violation (Kennedy and Merchant, 2000). For Mandarin Chinese, VP comparative deletion enforced by the CDR would satisfy this purpose, if the construction were otherwise available.

b. Attributive comparative:

* Zhāng Sān bǐ Lǐ Sì xǐe-le (yī piàn) cháng (de) lùnwén
 Zhang San BI Li Si write-PERF one CL long DE paper
 Intended: ‘Zhang San wrote a longer paper than Li Si did.’

c. Grammatical alternative: nominalize the papers

✓ [Zhāng Sān xǐe de lùnwén] bǐ [Lǐ Sì xǐe de (lùnwén)] cháng
 Zhang San write DE paper BI Li Si write DE paper long
 ‘[The paper that Zhang San wrote] is longer than [the paper that Li Si wrote].’

What goes wrong in the attributive comparative (96b)? The target and standard clauses in the *bǐ* comparatives are built using the transitive verb *xǐe* ‘write,’ which takes a DP of type *e* as its complement. The degree argument of *cháng* ‘long’ must be saturated inside the DP, for example using positive degree morphology as in (96a). Without degree abstraction, there is no way for the degree argument of the attributive adjective ‘long’ to be accessible at the TP-level.

Mandarin similarly lacks attributive quantity comparatives. Example (97a) shows that the gradable “many/much” word *dūo* can be used to quantify object nominals, but we are unable to form a comparative over this degree argument, as seen in example (97b). The object can be nominalized in order to express this form of comparison (97c).⁵²

(97) **Mandarin lacks attributive quantity comparatives**

a. Baseline gradable *many* on object:

✓ Zhāng Sān xǐe-le hěn dūo lùnwén
 Zhang San write-PERF HEN many paper
 ‘Zhang San wrote many papers.’

b. Attributive comparative:

* Zhāng Sān bǐ Lǐ Sì xǐe-le dūo lùnwén
 Zhang San BI Li Si write-PERF many paper
 Intended: ‘Zhang San wrote more papers than Li Si did.’

⁵²In addition to the nominalization strategy in (97c), Mandarin also has a distinct construction for comparing the quantity and identity of postverbal constituents, dubbed the “Differential Verbal Comparative” (DVC) by Li (2009). In a DVC, the morpheme *dūo* forms a compound with a non-gradable transitive verb, resulting in a gradable predicate whose degree corresponds to the quantity of a postverbal constituent. Example (i) below is a grammatical DVC expressing a meaning similar to (97b):

- (i) Zhāng Sān bǐ Lǐ Sì dūo-xǐe-le liǎng piàn lùnwén
 Zhang San BI Li Si many-write-PERF two CL paper
 ‘Zhang San wrote two more papers than Li Si did.’

Li (2009) proposes that the differential in a DVC is interpreted above both the target and standard at LF, making it compatible with the approach to differentials of *bǐ* comparatives suggested in footnote 18. However, Li (2009) also shows that the differential phrase in DVCs is very different from differentials in non-DVC *bǐ* comparatives, both in distribution and semantic interpretation. Further work is required to extend the proposal here to DVCs.

c. Grammatical alternative: nominalize the papers

✓ [Zhāng Sān xiě de lùnwén] bǐ [Lǐ Sì xiě de (lùnwén)] duō
 Zhang San write DE paper BI Li Si write DE paper many

≈ '[The papers that Zhang San wrote] are more (numerous) than [the papers that Li Si wrote].'

The unavailability of attributive quantity comparatives also follows the same logic as with the attributive adjectival comparative above (96b). Degree abstraction is necessary to construct TP degree descriptions which abstract over the degree argument of a predicate inside a DP. Mandarin *bǐ* comparatives are instead formed using the Degree Last property of clausal functors. The lack of attributive comparatives of all forms supports the conclusion that Mandarin Chinese lacks degree abstraction.

4.3 A note on local VP deletion

In this section I've argued that Mandarin Chinese does not allow abstraction over degree arguments, i.e., that it is a –DAP language in Beck et al.'s (2004) terms. Recall that degree abstraction is necessary to construct the standard's degree description if the gradable predicate is embedded within another clause in the standard. Therefore a straightforward consequence of Mandarin lacking degree abstraction is that *bǐ* comparatives with embedded standards, such as (28) repeated below as (98), cannot be constructed.

- (98) * Yuēhàn bǐ Mǎlì rènwéi tā gāo
 John BI Mary thinks he tall
 Intended: "John is taller than Mary thinks he is."
Intended derivation: [John tall] bǐ [Mary thinks he tall]

However, examples such as (98) are also ruled out by our formulation of the Comparative Deletion Requirement (CDR), which requires that the target's local VP be elided under identity with a *local VP* of the standard TP, as discussed in section 3.3.3. The antecedent required for the ellipsis, the "tall" in the standard TP, is in an embedded clause of the standard TP, and is thus not a local VP of the standard clause. This leads to the question of whether reference to local VPs in the CDR is unnecessary, given the conclusion that Mandarin lacks degree abstraction.

The answer is that the reference to local VPs is still necessary. The evidence for this comes from examples where the relevant gradable predicate is not embedded, but the predicate itself takes a clausal complement. One such example discussed earlier is (45), repeated below as (99).

- (99) * yǒukěnéng Zhōngguó rén bǐ yǒukěnéng Àozhōu rén yíng zhè ge bǐsài
 likely Chinese person BI likely Australian win this CL comp.
 Int.: "It is more likely that a Chinese person will win the race than that an Australian will."
Intended derivation: [TP₁ [VP₁ likely [TP Chinese person {VP₂ win...}]]] bǐ [TP ...

This example is ungrammatical. The lack of degree abstraction does not rule this structure out: supposing that ‘likely’ follows the Degree Last property, each of the conjoined TPs will have the correct semantic type of a $\langle d, t \rangle$ degree description, without degree abstraction. The ungrammaticality of examples such as (99) must instead be due to the fact that a *local* VP was not deleted: only VP₁ is a local VP of TP₁. Ellipsis of VP₂ does not suffice. Thus the CDR’s reference to local VPs is not redundant and must be preserved.

5 Conclusion

The need to express an ordering relation on a scale is a universal functional requirement for human language. As much recent work has shown, different languages take different approaches, syntactically and semantically, to express these relations. In this paper I took a close look at Mandarin Chinese, with special emphasis on its *bǐ* comparative construction, in order to properly place the language within the broader landscape of comparatives cross-linguistically.

Two recent and influential papers have proposed the following parameters, repeated here, regarding the use of degrees in grammar, as hypotheses for capturing the underlying uniformities and possible points of divergence across languages:

- (100) **Beck et al.’s (2004) Degree Abstraction Parameter (DAP):** (=1)

A language {does, does not} have binding of degree variables in the syntax.

- (101) **Kennedy’s Standard Type Parameter (STP):** (=2)

A comparative selects for a standard of individual-denoting type (e.g. type *e*; *individual* comparison) or degree-denoting type (e.g. *d*, $\langle d, t \rangle$; *degree* comparison).

These two parameters predict four types of languages. The bottom right cell—a language with no degree abstraction but employing degree comparison—was hitherto unattested in the literature.

- (102) **A typology of comparative constructions:**

		<i>Degree Abstraction Parameter (Beck et al., 2004):</i>	
		+DAP	–DAP
<i>Standard Type Parameter (Kennedy, 2007):</i>	individual	Hindi-Urdu <i>-se</i> comp. (Bhatt and Takahashi, 2011)	Japanese <i>-yori</i> comp. (Beck et al., 2004, 2009)
	degree	English comparatives with clausal standards	Mandarin Chinese <i>bǐ</i> comparatives

I argue that Mandarin Chinese is precisely such a language: its *bǐ* comparative is an instance of degree comparison, but the language does not employ degree abstraction. The arguments for this conclusion come from a close look at the Mandarin *bǐ* comparative. First, in section 3 I established that the *bǐ* comparative is an instance of degree comparison. Second, in section 4 I showed that Mandarin Chinese does not—and cannot—utilize degree abstraction.

A priori, one might have imagined that languages without degree abstraction would lack degree comparison. That is, languages with a –DAP setting could only have explicit *individual* comparatives, as is the case in Japanese, according to Beck et al. (2004). A potential principled explanation for this would be that gradable predicates take their degree arguments first (e.g. $\llbracket \text{tall} \rrbracket = \lambda d. \lambda x. x$ is d -tall), as commonly assumed, and that this order of arguments is a universal. Without degree abstraction (or a complex type-shifter mimicking its effects), there would be no way to construct degree descriptions of type $\langle d, t \rangle$ to represent the standard of comparison for a degree comparison.

The situation in Mandarin Chinese shows that this view of gradable predicates cannot be correct. The syntactic evidence provided here clearly shows that the Mandarin *bǐ* comparative employs syntactic composition, with *bǐ* comparing two degree descriptions, corresponding to the target and the standard. However, I have also argued that Mandarin Chinese lacks degree abstraction. These facts can only be reconciled by adopting the Degree Last property for gradable predicates (103).

(103) **Degree Last:** (=37)

Gradable predicates in Mandarin Chinese take their degree argument as their last argument.

The choice between different argument orders of gradable predicates—e.g. between $\langle e, \langle d, t \rangle \rangle$ and $\langle d, \langle e, t \rangle \rangle$ —is generally without significant consequence. Only in a situation where we can independently show that degree abstraction is not possible, such as in Mandarin Chinese, can we tell the difference between these two formulations. The existence of Mandarin Chinese with this unique combination of properties—degree comparison without degree abstraction—shows that Degree Last order must at least be an option for the denotations of gradable predicates in natural language.

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Michael Yoshitaka Erlewine
 Massachusetts Institute of Technology
 77 Massachusetts Avenue 32-D808
 Cambridge, MA 02139 USA
 mitcho@mitcho.com

Appendix: Lin's (2009) semantic composition

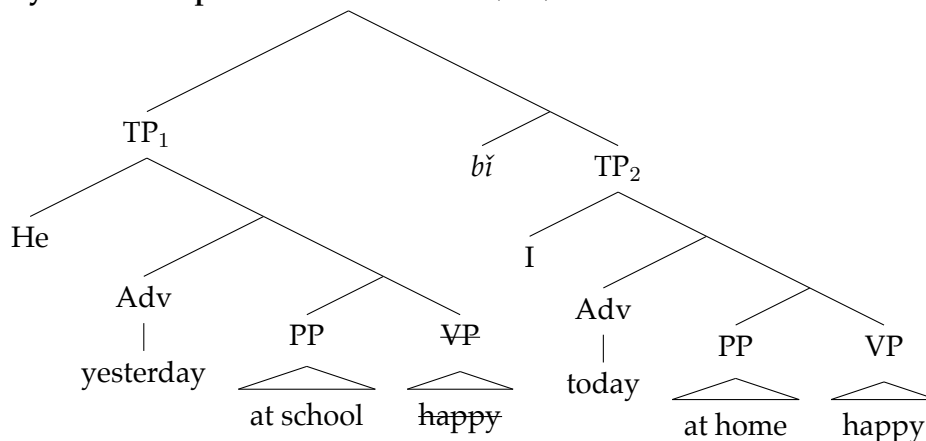
In this section I discuss Lin (2009), which is the most recent and comprehensive semantic composition approach to the Mandarin *bǐ* comparative. Lin (2009) is an exercise in broadening the empirical coverage of semantic composition approaches by proposing a powerful modification to the three-place comparative operator used in semantic composition. I will show that this approach overgenerates a number of comparatives while undergenerating others.

In the previous section I presented evidence that every Mandarin *bǐ* comparative underlyingly involves two independent clauses: one for the target and one for the standard. Constraints on ellipsis parallelism ensure that the predicates in the two clauses are identical, but the clauses are allowed to differ above VP. Various kinds of material may be introduced above VP, including both additional arguments and adjuncts, predicting that the strings we descriptively call “the target” and “the standard” need not be constituents. The comparative in (104) below, from Tsao (1989), is one such example:

- (104) tā zuótiān zài xuexiao bǐ wǒ jīntiān zài jiālǐ kāixīn
 He yesterday at school BI I today at home happy
 “He was happier yesterday at school than I am today at home.”

A comparative such as (104) is straightforward to derive under a syntactic composition account, as we independently construct the two clauses corresponding to the strings *target predicate* and *standard predicate*. The adjuncts “yesterday,” “at school,” “today,” and “at home” are adjoined to the clause as normal, and do not form a constituent with “he” or “I.” The predicate “happy” is elided from the left (target) clause, yielding the word order in (104).

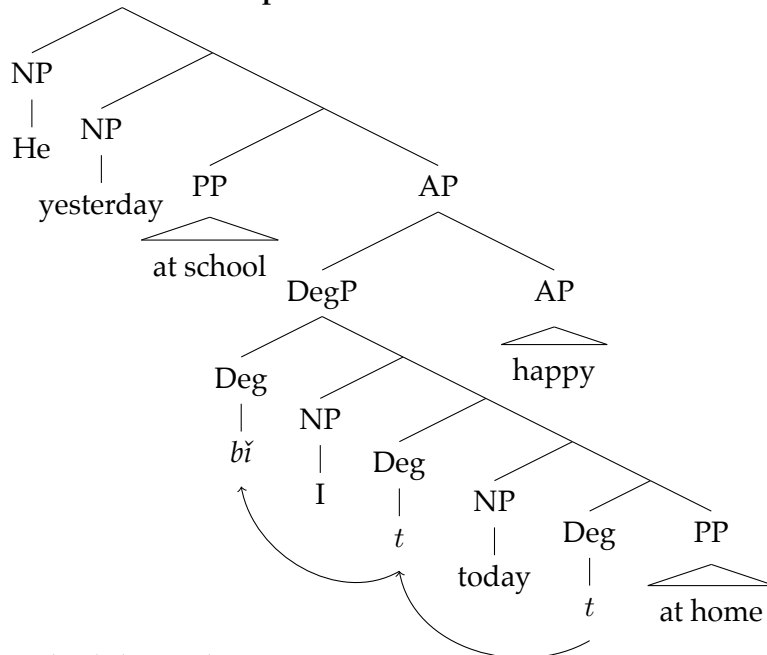
- (105) **Syntactic composition derivation of (104):**



In the semantic composition approach, however, the comparative operator itself selects for the gradable predicate, the standard, and the target. Thus most proponents of semantic composition have assumed that the target and standard are each single constituents (Heim, 1985; Bhatt and Takahashi, 2011). Lin (2009) proposes a modified semantic composition analysis which is explicitly designed to be able to derive examples such as (104).

Lin (2009) type-shifts the traditional semantic composition three-place comparative operator (18), repeated below, into a $(2n + 1)$ -ary one: Lin's *bǐ* first merges with n arguments y_n, \dots, y_1 which form the standard, then merges with an n -place gradable predicate, then merges with the n arguments which constitute the target x_n, \dots, x_1 . Stage-level predicates are argued to take temporal and locational adjuncts as arguments as well, e.g. making *kāixīn* "happy" above a three-place predicate. Thus in the case of (104), *bǐ* is a seven-place operator: it selects for "at home," "today," "I," then the three-place gradable predicate "happy," then "at school," "yesterday," and "he."

(106) **Lin's (2009) semantic composition derivation for (104):**



(18) **The standard three-place -er:**

$$-er_{3\text{-place}} = \lambda y_e. \lambda G_{\langle d, \langle e, t \rangle \rangle}. \lambda x_e. \max(\lambda d_1. G(d_1)(x)) > \max(\lambda d_2. G(d_2)(y))$$

(107) **Lin's (2009) $(2n + 1)$ -ary semantics for *bǐ*:**

$$\llbracket bǐ \rrbracket = \lambda y_n \dots \lambda y_1. \lambda P_{\langle d, \langle \tau_n, \dots, \langle \tau_1, t \rangle \dots \rangle \rangle}. \lambda x_n \dots \lambda x_1.$$

$$\max(\lambda d. P(d)(x_n) \dots (x_1)) > \max(\lambda d. P(d)(y_n) \dots (y_1)),$$

where $n \geq 1$ and τ_i stands for the type of the arguments x_i and y_i .

The comparative operator then computes the maximal degree such that "he was d -happy yesterday at school" and the maximal degree such that "I am d -happy today at home" and asserts that the former is greater than the latter.

An important part of the motivation for Lin's (2009) proposal is the internal argument (IA) comparatives which were discussed earlier in section 3.2.2. An example of an IA comparative, (49), is repeated here as (108).

(108) **Internal Argument (IA) comparatives** (Tsao, 1989) (=49):

wǒ_i dàishù bǐ *pro*_i jǐhé xǐhuān ____
I algebra BI *pro* geometry like

“I like algebra more than I like geometry.”

Lin (2009) discusses such examples and proposes to derive them using the semantics of *bǐ* proposed in (107). Note, however, that (107) does not enforce any of the restrictions on IA comparatives reviewed in section 3.2.2: the internal arguments in IA comparatives cannot be animate, cannot leave a monosyllabic verb, and do not allow contrasting subjects. Furthermore, recall that each of these restrictions on IA comparatives parallel a restriction on the more general process of object preposing in Mandarin, discussed in section 3.2.2 and first observed by Tsao (1989). Therefore the Lin (2009) proposal will either overgenerate IA comparatives or must replicate the conditions independently observed on object preposing as conditions on IA comparatives. Parsimony compels us to instead adopt an analysis which utilizes the operation of object preposing directly in the generation of IA comparatives, as in the syntactic composition proposed here, discussed in section 3.2.2.

Next I would like to highlight a clear corollary of Lin’s (2009) syntax/semantics. The semantics in (107) requires that the target and the standard in the *bǐ* comparative be comprised of the same number of arguments. I call this idea *Strict Parallelism*:

(109) **Strict Parallelism, a prediction of Lin (2009):**

A *bǐ* comparative cannot be composed if the number of arguments comprising the target, x_n, \dots, x_1 , are not equal to the number of arguments comprising the standard, y_n, \dots, y_1 .

In cases with apparently mismatched argument counts or types, Lin follows Tsao (1989) in analyzing such cases as involving argument-drop, fleshing out the list of arguments in the target and standard with *pro* of appropriate types. Tsao (1989) claims that such dropped arguments may be interpreted using the present time or, in the case of gaps in the standard, as matching the corresponding argument in the target.

(110) **Apparently mismatched targets and standards interpreted as argument-drop** (examples from Tsao 1989, discussed in Lin 2009):

- a. $tā_i$ jīntiān $bǐ$ pro_i zuótiān shūfú
he today BI yesterday comfortable
“He feels better today than [he] did yesterday.”
- b. $tā_i$ pro_{time} $bǐ$ pro_i gāngcái liǎnsè hǎo
he BI a while ago face color good
“He looks better [now] than [he] did a while ago.”

However, examples can be constructed where we must interpret the target and standard as introducing different numbers of arguments, beyond what could be interpreted as argument-drop. Thus the Strict Parallelism corollary of Lin (2009) is empirically incorrect.

Consider a context where our friend Zhang San is a very important businessman. Both USPS and FedEx have special priority service specifically for Zhang San:

(111) **Context: mail delivery times**

	FedEx	USPS
to Zhang San	3 days	2 days
to everyone else	5 days	4 days

(112) **An optionally ditransitive predicate: baseline**

- a. USPS de yībān fúwù sòng xìn sòng de hěn kuài
USPS GEN regular service deliver letter deliver DE HEN fast
“USPS’s regular service delivers letters quickly.”
- b. FedEx gěi Zhāng Sān sòng xìn sòng de hěn kuài
FedEx to Zhang San deliver letter deliver DE HEN fast
“FedEx delivers letters to Zhang San quickly.”

Using the predicate *sòng* “deliver” which can optionally take an indirect object, we construct a test sentence (113a) which has two constituents in the target, a subject and the indirect object, but only one constituent in the standard, a subject. Strict Parallelism predicts that (113a) be judged as either ungrammatical or interpreted with a argument-dropped indirect object in the standard. On the other hand, the proposal advocated for here would allow for direct comparison of the transitive delivery of letters to the ditransitive delivery of letters to Zhang San.

(113) **The test: comparing the transitive with the ditransitive**

- a. FedEx gěi Zhāng Sān bǐ USPS de yībān fúwù sòng xìn sòng de kuài
FedEx to Zhang San BI USPS.GEN regular service deliver letter deliver DE fast
“FedEx delivers letters to Zhang San faster than USPS’s regular service delivers letters.”
Derivation: [FedEx to Zhang San ~~deliver letter deliver fast~~] bǐ [USPS’s regular service deliver letter deliver fast]
True in context: 3 days (FedEx to Zhang San) is faster than 4 days (USPS regular service)
- b. FedEx gěi Zhāng Sān bǐ USPS gěi Zhāng Sān sòng xìn sòng de kuài
FedEx to Zhang San BI USPS to Zhang San deliver letter deliver DE fast
“FedEx delivers letters to Zhang San faster than USPS delivers letters to Zhang San”
Derivation: [FedEx to Zhang San ~~deliver letter deliver fast~~] bǐ [USPS to Zhang San deliver letter deliver fast]
False in context: 3 days (FedEx to Zhang San) is not faster than 2 days (USPS to Zhang San)

Native speakers judge (113a) to be both grammatical and appropriate for this context, while (113b) is false.⁵³ This is because the FedEx service for Zhang San is faster than USPS’s regular service, but is not faster than USPS’s Zhang San express service. Thus (113a) must be interpreted with

⁵³There seems to be some speaker variation on this judgment, as noted by an anonymous reviewer. Some speakers do not find the examples (113a,b) grammatical. For those that do, however, speakers uniformly report the difference in truth conditions between (113a) and (113b) which is crucial for this argument.

the indirect object in the standard but not in the target. Due to the violation of Strict Parallelism, Lin (2009) would explicitly rule out such sentences.

One potential avenue for reconciling (113a) with Lin’s (2009) analysis would be to use a ditransitive *sòng* but fill the standard’s goal argument via existential closure. This existential closure could plausibly happen at two scopes in the syntax: within the standard or above the comparison. The truth conditions of these two possibilities are paraphrased below:

- (114) a. Existential closure in the standard:

$\llbracket (113a) \rrbracket$ is true \iff [the maximum degree d such that FedEx delivers Zhang San letters d -quickly] > [the maximum degree d such that $\exists x$ where USPS delivers x letters d -quickly]

Predicts **false** under context (111): 3 days (FedEx to Zhang San) is not faster than 2 days (USPS to someone, in particular, Zhang San)

- b. Existential closure above the comparison:

$\llbracket (113a) \rrbracket$ is true $\iff \exists x$ such that [the maximum degree d such that FedEx delivers Zhang San letters d -quickly] > [the maximum degree d such that USPS delivers x letters d -quickly]

Predicts **true** under context (111): there is someone x , in particular someone other than Zhang San, such that 3 days (FedEx to Zhang San) is faster than 4 days (USPS to x)

Recall that (113a) is judged as true under context (111). So if we would like to interpret (113a) via Lin’s (2009) analysis by interpreting the “missing” indirect object as existentially closed, this existential closure must happen above the comparison as in (114b). However, this high existential closure predicts incorrect truth value judgments in other contexts. Consider the following context, where FedEx delivers letters in five days to any recipient, but now USPS slows down letter-delivery to the mob boss Li Si:

- (115) **Context: revised mail delivery times**

	FedEx	USPS
to Zhang San	5 days	4 days
to Li Si	5 days	6 days
to everyone else	5 days	4 days

According to the truth conditions computed with high existential closure in (114b), (113a) is predicted to be felicitous under situation (115): there exists an individual x , Li Si, such that FedEx’s delivery of letters to Zhang San (5 days) is faster than USPS’s delivery of letters to x (6 days). However, native speakers judge (113a) to be false in this context (115): the availability of a single individual for whom USPS delivery is slower than FedEx’s delivery to Zhang San does not make the utterance felicitous. As such, we can be confident that the comparison in (113a) is between FedEx’s delivery of letters specifically to Zhang San (ditransitive *sòng*) and USPS’s general delivery of letters (transitive *sòng*), and that Lin’s (2009) semantic composition approach cannot be rescued with existential closure.

The Strict Parallelism condition—that the target and standard must both be made up of the same number of semantic arguments—is a necessary consequence of the proposal in Lin (2009), the only proposal to date to seriously reconcile examples such as (104) with the semantic composition approach. In this section we have seen that Strict Parallelism is too strong a condition on the *bǐ* comparative.

More generally, examples such as (113a) reinforce the need to consider the predicate interpreted with the target and the predicate interpreted with the standard as separate derivational objects. Once a predicate such as “deliver letters quickly” is constructed, the derivation can conclude by simply supplying a subject, as in (112a), or specifying an indirect object with *gěi* and then supplying a subject, as in (112b). As long as the CDR is met, there is no inherent requirement that the argument structures of the predicate as interpreted with the target and with the standard must match. We thus see a further advantage to the syntactic composition approach over semantic composition, even with the modifications of Lin (2009).