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On Arguments against Comparative Deletion in Mandarin

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English abstract:

In this paper, I discuss some arguments presented in the previous research against the deletion-based account (i.e., the Reduction Analysis) of the Mandarin *bǐ*-comparative, which include the lack of the subcomparative, the lack of the embedded standard, and the distribution of the quantificational adverb *dōu* in this construction. Working with an Agree-based theory of selection and a featural account of PF-deletion, I show that a deletion-based account does capture these facts. The proposal is built on the assumptions that i) deletion may rescue some illegitimate representations caused by uninterpretable features at PF (Wurmbrand 2014, see also Merchant (2009), Bošković (2011) and others) and ii) the *bǐ*-constituent contains a small clause (i.e., *v*P) and lacks all the higher functional clausal heads (e.g., T, Asp, Mod, etc.) (cf. Pancheva 2006).

Key words: comparatives, comparative deletion, *bǐ*, ellipsis, *dōu*-adjunction

中文摘要:

本文探討漢語中帶「比」字比較句的句法結構；討論的焦點為「刪略分析」在分析帶「比」字比較句時所遇到的問題。本文指出，若在帶「比」字比較句中，將「比」所帶的補語視為小句(small clause)，文獻中所提出的「刪略分析」所遇到的問題，將可獲得解釋。

關鍵字: 帶「比」字比較句、比較句刪略、刪略結構、量化副詞

1. Introduction

This paper concerns the structure of the Mandarin *bǐ*-comparative, with a focus on the arguments presented in the literature against the claim that a Mandarin *bǐ*-comparative has a clause-like structure in the *bǐ*-constituent.

1.1. Deletion or not?

According to one type of analysis it receives, namely the Reduction Analysis (henceforth, RA; Heim 1985; Lechner 2001, 2004; Bhatt and Takahashi 2011; a.o.), the *than*-constituent in an English comparative sentence like (1a) (as indicated by underlining) involves a structure richer than what it looks like at the surface: while at the surface the constituent that follows the standard marker *than* appears as a DP, the complement of *than*, in fact, has a full-fledged clausal structure and contains another occurrence of the gradable predicate (in, e.g., (1), *smart*). The mismatch between the underlying syntax and the surface representation, under this approach, results from deletion of all the material but the DP *Bill* in the *than*-constituent, as shown in (1b) (striking-through indicates deletion of syntactic objects at the surface (i.e., PF)).

(1) a. John is smarter than Bill.

b. *John is* [_{AP} [_{DegP} *er* [_{CP} OP₁ *than* [*Bill is* [_{AP} ~~*t*_I~~ [_{AP} ~~*smart*~~]]]] *smart*]

Several attempts have been made to extend the RA to a Mandarin *bǐ*-comparative (e.g., (2); Tsao 1989; Liu 1996; and others).¹ In (2a), the target of comparison *Zhāngsān*

¹The meaning of the English comparative in (1), in addition to the *bǐ*-comparative, can be expressed by other two constructions in Mandarin (see (i-a) and (i-b)). In (i-a), the gradable predicate is suffixed with the morpheme *gùo*. In (i-b), the gradable predicate, at the surface, is used as a transitive predicate; furthermore, in this construction, the occurrence of a differential phrase is obligatory. This paper concerns only the *bǐ*-comparative. For the discussion of the constructions like (i-a)-(i-b), I refer the reader to Liu (2007) and Grano and Kennedy (2012) for details. I also refer the reader to Liu (2014)

is followed by the morpheme *bǐ*, which serves to introduce the standard of comparison *Lǐsì*.² According to one analysis along with RA, namely Liu (1996), the morpheme *bǐ* together with the standard of comparison form a constituent that contains an occurrence of the gradable predicate. At the surface, the occurrence of the gradable predicate inside the *bǐ*-constituent is deleted (see (2b)).³

- (2) a. Zhāngsān bǐ Lǐsì cōngmíng
 Zhangsan COMP Lisi smart
 ‘Zhangsan is smarter than Lisi.’
- b. Zhangsan [[*bǐ* Lisi ~~smart~~] smart]

Alternatively, several research (Hankamer 1973; Napoli 1983) have suggested that there is no reduction operation involved in the syntactic derivation of a comparative. Along with this idea, this size of the complement of *than* is exactly what it looks like on the surface; in (1a), *than* is followed by the DP *Bill*, and syntactically the complement of *than* is a DP. Following Bhatt and Takahashi (2011), I dub this approach the Direct Analysis. Several variants of the Direct Analysis have been suggested for the Mandarin *bǐ*-comparative (Erlewine 2007; Grano and Kennedy 2012; Lin 2009; Xiang 2005; a.o.).

for an overview of the comparative constructions in Mandarin.

- i. a. Zhāngsān gāo-guò Lǐsì
 Zhangsan tall-GUO Lisi
 ‘Zhangsan is taller than Lisi.’
- b. Zhāngsān gāo Lǐsì *(sān gōngfēn)
 Zhangsan tall Lisi three centimeter
 ‘Zhangsan is 3cm taller than Lisi.’

²There is no consensus on the semantic contribution of the morpheme *bǐ* in current research on the Mandarin comparative constructions. Lin (2009) encodes the meaning of comparison in the denotation of *bǐ*. Liu (2010, 2011), on the other hand, takes *bǐ* to be semantically vacuous. The choice between these two assumptions do not affect the arguments and the discussion presented below. For simplicity I will assume in the following discussion that *bǐ* functions as a standard marker as well as a comparative marker.

³For convenience, here and in the following I will use the English gloss when discussing the structure of the Mandarin examples.

In some variants, a Larsonian DegP/VP-shell structure (Larson 1988, 1991) is assigned to (2a) (see (3)); in others, *bǐ* and the standard of comparison form a PP-adjunct (see (4)).

(3) Direct Analysis I:

a. Xiang (2005) (cf. Grano and Kennedy (2012)):

Zhangsan [_{DegP} [_{Deg'} *bǐ* [_{AP} [_{DP} *Lisi*]₂ [_{A'} EXCEED₁-*smart* [_{DegP} *t*₂ [_{Deg'} *t*₁]]]]]]

b. Erlewine (2007):

Zhangsan [*bǐ* [_{vP} [_{DP} *Lisi*] [_{v'} *t*₁ [_{v'} VOICE [_{V/AP} *smart*]]]]]

(4) Direct Analysis II (Lin (2009); cf. Paul (1993)) :

Zhangsan [_{AP} [_{DegP} [_{Deg'} *bǐ* [_{DP} *Lisi*]]] *smart*]

1.2. Arguments against the RA to the Mandarin *bǐ*-comparative

Empirical facts against RA have been reported in several research. First, as noted in Xiang (2005) and many others, Mandarin, unlike English, lacks subcomparatives. As shown in (5), a gradable predicate that is not identical to the matrix one may occur inside the *than*-constituent. This is straightforwardly predicted by the RA, given that in this approach, the *than*-constituent contains a full-fledged clausal structure.

(5) a. The door is longer than the window is wide.

b. *The door is* [_{AP} [_{DegP} *er* [_{CP} OP₁ *than* [*the window is* [_{AP} *t*₁ [_{AP} *wide*]]]]] *long*]

The Mandarin counterpart of an English subcomparative (e.g., (29a)-(29b)), however, is simply ungrammatical. To express the intended meaning, a nominalization form of some sort must be used (see (7)). This is unexpected if one assumes that in a Mandarin

bǐ-comparative, the complement of *bǐ* involves a clausal or clause-like structure.

- (6) a. *zhè-zhāng zhūozi cháng [bǐ nà-shàn mén kuan]
 this-CL table long COMP that-CL door wide
 b. *zhè-zhāng zhūozi [bǐ nà-shàn mén kuan] cháng
 this-CL table COMP that-CL door wide long
 Intended reading for (29a)-(29b): ‘The table is longer than the door is wide.’
- (7) zhè-zhāng zhūozi-dè chángdù bǐ nà-shàn mén-dè kūandù dà
 this-CL table-POSS length COMP that-CL door-POSS width great
 lit. ‘the length of this table is greater than the width of that door.’ \approx
 ‘This table is longer than that door is wide.’

Second, as pointed out by Xiang (2005), unlike English (see (8a)), comparatives with an embedded standard are ungrammatical in Mandarin (see (29a)). To express the intended meaning, relativization must be involved, as shown in (29b).⁴ This is also unexpected under an analysis along with the RA.

- (8) a. This book is more popular than I thought.
 b. the book is [AP [DegP *er* [OP₁ *than* [I thought ~~that the book is~~ [AP ~~t_I~~ [AP ~~popular~~]]]]] [AP *popular*]]
- (9) a. *zhè-zhāng zhūozi bǐ Lǐsì rěnwéi (tā) kuan
 this-CL table COMP Lisi think 3rd.sg wide
 Intended: ‘This table is wider than Lisi thinks it is.’
 b. zhè-zhāng zhūozi bǐ Lǐsì rěnwéi de kuan
 this-CL table COMP Lisi think REL wide
 ‘This table is wider than Lisi thinks it is.’

Third, as noted in Xiang (2005), the RA to the Mandarin *bǐ*-comparative wrongly predicts where the quantificational adverbial *dōu* (glossed as ‘all’ in the following dis-

⁴The *bǐ*-constituent in (29b) might involve a null head noun, the nature of which is not quite clear.

cussion) may appear in a *bǐ*-comparative. In Mandarin, a universal nominal in subject position is obligatorily accompanied by the quantificational adverb *dōu*, as shown in (10).

- (10) měi-gè nǚshēng *(dōu) hěn cōngmíng
 every-CL girl all very smart
 ‘every girl is smart.’

According to the RA, the post-*bǐ* nominal in (11) is a syntactic subject; hence, it predicts that the occurrence of *dōu* is allowed with the universal post-*bǐ* nominal. This prediction, however, is not borne out. As shown in (11), the occurrence of *dōu* with the post-*bǐ* universal nominal results in ungrammaticality.

- (11) měi-gè nǚshēng dōu bǐ měi-gè nánshēng (*dōu) cōngmíng
 every-CL girl all COMP every-CL boy all smart
 ‘every girl is smarter than every boy.’

Note that analyses along with DA are immune from these problems. In this approach, neither does the complement of *bǐ* have a clausal or clause-like structure nor the post-*bǐ* nominal is a syntactic subject. Consequently, the lack of the subcomparative and embedded standard and the distribution of *dōu* in a *bǐ* comparative are predicted.

1.3. The Roadmap

The goal of this paper is to provide an account for the three problems presented above faced by the RA to the Mandarin *bǐ*-comparative. Along with Pancheva (2006), who suggests that in some Slavic languages the standard marker selects a small clause rather than a full CP, I suggest that the difference between the English clausal comparative and the Mandarin *bǐ*-comparative is mainly attributed to the difference between the selection properties of *bǐ* and English *than*: both the *bǐ*- and English *than*-constituents involve a

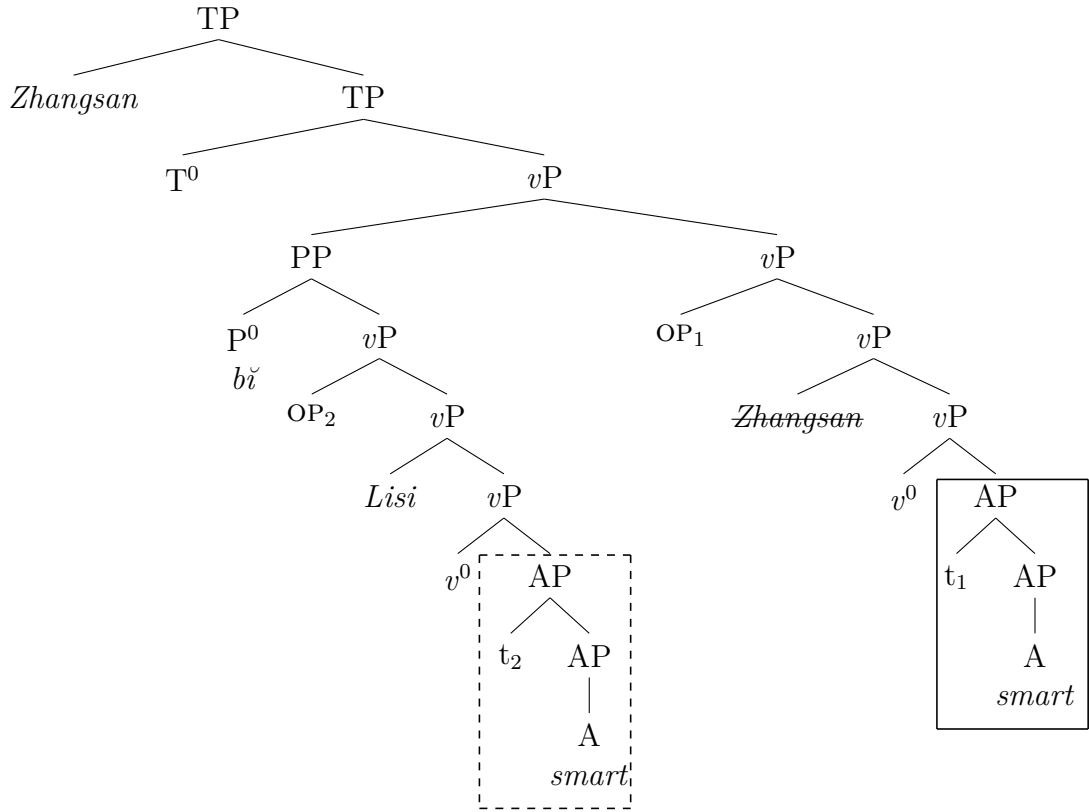
clause-like structure; unlike English *than* however, the complement of which has a full-fledged clausal structure (e.g., CP; Bhatt and Takahashi 2011; a.o.), the complement of *bǐ* is a small clause and lacks all the higher functional projections. With this syntax, the problem of the distribution of *dōu* pointed out by Xiang (2005) may be easily accounted for by appealing to Merchant’s (2008) MaxElide. Furthermore, this syntax of the *bǐ*-comparative, together with the theory of selection based on Agree and current theory on rescuing effect from PF-deletion (Bošković 2011; Merchant 2001, 2009; Kennedy and Merchant 2000; a.o.), provides an account for the lack of the subcomparative and embedded standard in Mandarin.

This paper is structured as follows. Section 2 lays out the theoretical assumptions and the proposal for the structure of a Mandarin *bǐ*-comparative. Section 3-4 show how the proposed analysis, which is along the lines of the RA, may account for the distribution of *dōu* and the lack of the subcomparative and embedded standard respectively. The conclusion is in Section 5.

2. The structure of the *bǐ*-comparative

As noted above, in the RA, the *bǐ*-constituent contains an occurrence of the gradable predicate that is elided at the surface. Along with this idea, I suggest that a *bǐ*-comparative like (2a) is assigned the structure in (12); dash-line boxing signals the elided constituent, whereas solid-line boxing indicates its antecedent. I assume the copy theory of movement, according to which an element that undergoes movement leaves a copy in its base-generation position; strike-through in (12) indicates deletion of the low copy of a displaced element.

(12)



In (12), the morpheme *bǐ* heads a projection PP, which adjoins to the matrix vP ; inside the *bǐ*-constituent, there is an AP (i.e., (12), the AP that the gradable adjective *smart* heads) that is deleted at the surface (as indicated by dashed-line boxing). For the purpose of the following discussion, it suffices to simply assume that deletion of the gradable predicate inside the *than/bǐ*-constituent is obligatory when it is identical to the one in the matrix clause. See Lasnik (1995), Roberts (1998), Fox (2000), Merchant (2015) and others for the assumption that the license of constituent deletion requires syntactic identity between the elided constituent and its antecedent.⁵ For obligatory deletion inside the *than*-constituent, see Kennedy (2002) for an account couched on the Optimality Theory.

Following the assumption that a comparative construction involves a degree variable bound by a degree operator (von Stechow 1984; Heim 2000; and others; cf. Chomsky

⁵Note that the discussion below does not necessarily count on this assumption; the proposal below can still be maintained if the license of ellipsis is based on semantic identity rather than syntactic identity (see, e.g., Merchant (2001)). For a deletion-based account of the *bǐ*-comparative couched on the semantic-identity-based approach of ellipsis, see Hsieh and Shen (2016).

1977; Kennedy 1999), I further assume that in both the matrix and the embedded APs, Spec-AP is occupied by a trace left after the movement of a degree operator OP, which then adjoins to *v*P.

Two points are in order before we move on. First, the proposal presented here differs from the existent variants of the RA (Liu 1996, 2011; Erlewine 2012; a.o.) in one important aspect: the complement of *bǐ*, in the structure presented above, is a small clause rather than a full-fledged CP and lacks all the higher functional projections (e.g., TP, AspP, CP, etc.). Here I assume that in a comparative like (2a), the complement of *bǐ* is a *v*P; crucially, the size of the complement of *bǐ* cannot be as big as AspP or TP.⁶ Along with these lines, the complement of *bǐ* may be seen as a small clause, and the proposal below may be seen as a variant of Pancheva’s (2006) analysis of certain types of phrasal comparatives in Slavic languages, according to which in some Slavic languages, some phrasal comparatives have a small-clause source. As suggested below, it is the lack of the higher functional projections that leads to the lack of subcomparatives and the embedded standard.

Second, as shown in (12), a *bǐ*-comparative involves the movement of a degree operator, which may be seen as an instance of A'-dependency. Furthermore, the deleted

⁶One reviewer worries that this assumption might be challenged by the example below, where the perfective marker *le* occurs inside the shared predicate.

- i. méixiāngdào, jiàoliàn jūrán bǐ xǔànshǒu dé-lè jiāng hái gāoxióng
 out.of.expectation, coach unexpectedly COMP player win-PERF prize even.more happy
 ‘Out of expectation, the coach was even more happier than the player after winning the prize.’

This example, as far as I can see, hardly constitutes a counterexample to my assumption regarding the syntactic constituent of the complement of *bǐ*. This example involves a serial-verb construction, and the perfective marker *le* occurs within an adjoined VP, namely, *dé-lè jiāng*, rather than the main predicate *gāoxióng*. While the exact structure of this example depends on one’s choice of the serial verb construction, the structure of the *ǐ*-comparative here, I believe, is compatible with the analyses of the Mandarin serial-verb construction on the market. For some discussion on serial verb constructions in Mandarin, see Paul (2005), Law (1996) and the references cited therein.

constituent inside the $b\check{v}$ -constituent constrains a trace left after the movement of the degree operator. These two assumptions render the deletion operation inside the $b\check{v}$ -constituent parallel to sluicing (see (13)), where a constituent contains an A' -trace is deleted at the surface.

(13) John called someone, but I do not know who₁ [~~he called t₁~~].

As shown in the following discussion, this parallelism plays a crucial role in accounting for the distribution of the quantificational adverb *dōu* in a $b\check{v}$ -comparative. Given this parallelism, one might expect that the deletion operation inside the $b\check{v}$ -constituent is subject to constraints on sluicing. Specifically, I suggest that Merchant's (2008) MaxElide is at play, according to which a constituent that contains an A' -trace can be elided only if it is not properly contained in another constituent that is also a possible target for ellipsis. This constraint is motivated by the contrast between (13) and (15); as shown in these two examples, deletion of only part of a possible target of sluicing, namely TP, leads to ungrammaticality.

(14) MaxElide (Merchant 2008)

Let XP be an elided constituent containing an A' -trace. Let YP be a possible target for ellipsis. YP must not properly contain XP ($XP \not\subset YP$).

(15) *John called someone, but I do not know who₁ [_{TP} he did [~~call t₁~~]].

In (12), the AP in the $b\check{v}$ -constituent is the maximal deletable XP that contains an A' -trace; MaxElide is satisfied.

The following discussion is devoted to showing how the structure in (12) may shed

light on the problems the existent variants of the RA are facing. I will first address the distribution of *dōu*, then move to the lack of the subcomparative and embedded standard.

3. *Dōu*-adjunction and Max-Elide

3.1. *Dōu*-adjunction

In Mandarin, a universal quantificational nominal such as *měi-gé nǚshēng* ‘every girl’, in most circumstances, must occur with the quantificational adverb *dōu* when it is located in subject position (see (16)).⁷

- (16) *měi-gé nǚshēng₁ *(dōu₁) mǎi-lè yī-běn shū*
 every-CL girl all buy-PERF one-CL book
 ‘Every girl bought a book.’

The co-occurrence of *dōu* with a universal quantificational nominal has received great attention (Lee 1986; Cheng 1995; Lin 1998; a.o.). One of the observations reported in these research is that *dōu* may only occur pre-verbally and can only be associated with elements that occurs at its left (see (17a)-(17b)). Hence, a universal nominal not located in subject position may be associated with *dōu* only if it is preposed to the left of *dōu* (see (17c)). The displacement of a universal nominal in object position, however, is not necessary if it is not in association with *dōu*, as shown in (17b).

- (17) a. *Zhāngsān gěi-lè měi-gé nǚshēng₁ *(dōu₁) yī-zhāng kǎpiàn*
 Zhangsan give-PERF every-CL girl all one-CL card
 ‘Zhangsan gave every girl a card.’
 b. *Zhāngsān *(dōu₁) gěi-lè měi-gé nǚshēng₁ yī-zhāng kǎpiàn*
 Zhangsan all give-PERF every-CL girl one-CL card
 ‘Zhangsan gave every girl a card.’

⁷Throughout the discussion, I use subscriptions to indicate the dependency between *dōu* and its associate.

- c. Zhāngsān měi-gè nǚshēng₁ dōu₁ gěi-lè yī-zhāng kǎpiàn
 Zhangsan every-CL girl all give-PERF one-CL card
 ‘Zhangsan gave every girl a card.’

Furthermore, as noted in Cheng (1995), the dependency between *dōu* and its associate may cross a PP, as shown in (18b).

- (18) a. měi-gè rén₁ [PP duì Zhāngsān] dōu hěn hǎo
 every-CL person to Zhangsan all₁ very good
 ‘every person is good to Zhangsan.’
 b. měi-gè rén₁ dōu₁ [PP duì Zhāngsān] hěn hǎo
 every-CL person all to Zhangsan very good
 ‘Every person is good to Zhangsan.’

3.2. *Dōu* in a *bǐ*-comparative

As mentioned above, under the RA, the post-*bǐ* nominal (e.g., *Lǐsì* in (2a)) is a syntactic subject; as pointed out by Xiang (2005), this, as shown in (11), leads to the wrong prediction that the post-*bǐ* nominal may be accompanied by *dōu*.

- (11) měi-gè nǚshēng dōu bǐ měi-gè nánshēng (*dōu) cōngmíng
 every-CL girl all COMP every-CL boy all smart
 ‘every girl is smarter than every boy.’

Although Xiang (2005) correctly predicts that (12) poses a problem for the existent variants of the RA, it seems too rush to conclude simply based on this example that the RA is not extendable to the *bǐ*-comparative. Xiang (2005) only considers the case where both the subject of the comparative and the post-*bǐ* nominal are universal. To see whether the RA correctly predicts the distribution of *dōu* in a *bǐ*-comparative, one should also consider the cases where only one of the subject and the post-*bǐ* nominal is universal. (19)-(20) are intended for this purpose. (19) shows that when the subject of

the comparative, rather than the post-*bǐ* nominal, is universal, *dōu* obligatorily follows the subject and, crucially, should not be placed after the post-*bǐ* nominal.⁸ position. I have noting smart to say about this variation in judgments. As far as I can see, perhaps this is, along with the proposal below, because for some speakers, *dōu* and its associate need not be spelled out in the same Spelled-out domain at PF and hence the occurrence of *dōu* need not adjoin to a higher position after the universal subject moves to Spec-TP.

- (19) měi-gè nǚshēng₁ *(dōu₁) bǐ Zhāngsān (*dōu₁) cōngmíng
 every-CL girl all COMP Zhangsan all smart
 ‘every girl is smarter than Zhangsan.’

(20) shows that when the post-*bǐ* nominal, rather than the subject, is a universal nominal, *dōu* obligatorily follows the post-*bǐ* nominal.

- (20) Zhāngsān bǐ měi-gè nǚshēng₁ ?/*(dōu₁) cōngmíng
 Zhangsan COMP every-CL girl all smart
 ‘Zhangsan is smarter than every girl.’

Note that without further implementation, at least (19) straightforwardly follows from the RA though an analysis along these lines may lead to the wrong prediction in (11).

In the following, I show that along with the RA, the small-clause analysis of the *bǐ*-comparative illustrated in (12), together with MaxElide (14), fully captures the paradigm in (11) and (19)-(20).

3.3. MaxElide, *Dōu*-adjunction, and the *bǐ*-comparative

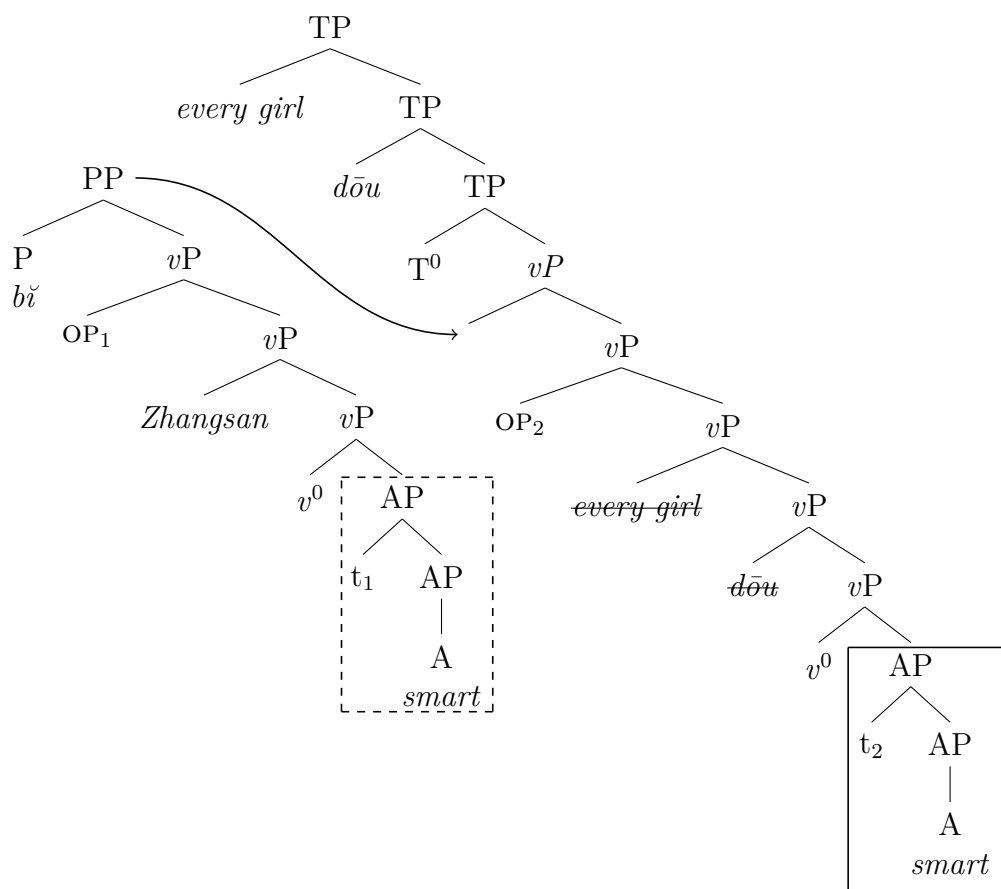
Some assumptions regarding the syntax of *dōu* are in order. First, following Lee (1986), Cheng (1995) and others, I assume that *dōu* is an adverb base-generated under V/AP or

⁸An anonymous reviewer claims that to his/her ear, (19) sounds good with *dōu* in the post-*bǐ* nominal

vP . Following Chomsky (2001), I assume that vP is a phase, and the complement of the phase head constitutes a Spell-out domain. Furthermore, as already mentioned above, in the structure in (12), the deletion operation inside the $b\check{i}$ -constituent involves an A' -trace and hence should be seen as an instance parallel to sluicing and hence is subject to Merchant's (2008) MaxElide (14).

Now consider (20), where the subject of the comparative, but not the post- $b\check{i}$ nominal, is universal. Along with the assumptions laid out above, the structure (21) is assigned to (20). As shown in (21), $d\bar{o}u$ is associated with the subject of the comparative and is base-generated under vP . To be with its associate in the same Spell-out domain at PF, $d\bar{o}u$ further adjoins to TP after the vP phase is spelled-out.

(21)

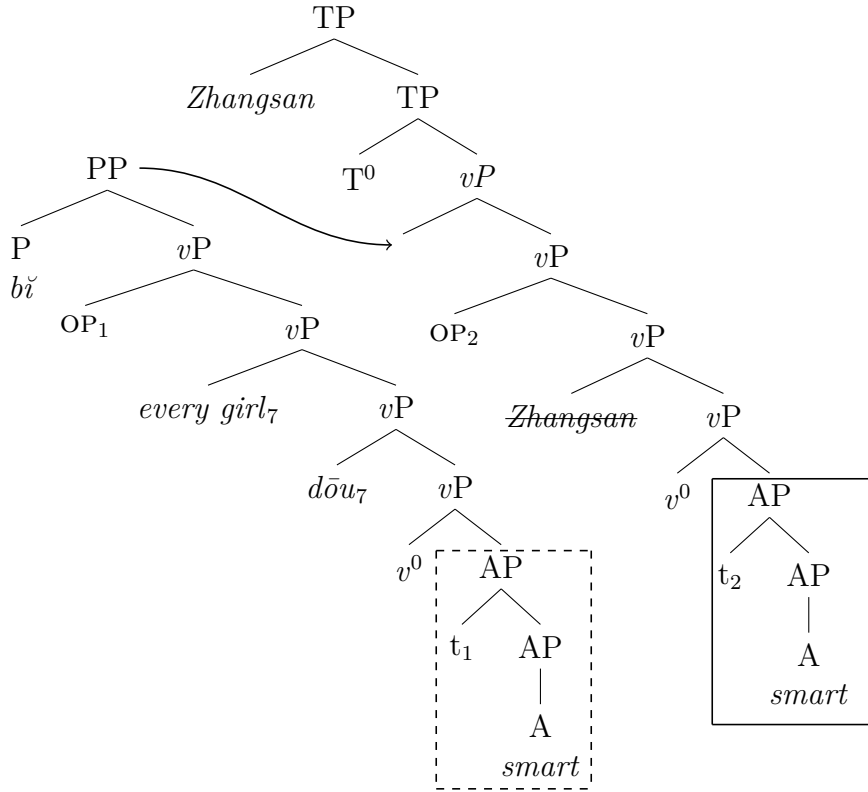


The AP inside the $b\check{i}$ -constituent (i.e., the one inside the dashed-line box) is deleted at

the surface; since it is the maximal deletable constituent that contains an A'-trace, which is left by the movement of degree operator, MaxElide is satisfied.

In (19), the post-*bǐ* nominal, but not the subject of the comparative, is universal. The structure and derivation in (22), along with the assumptions above, are assigned to (19). In this case, *dōu* is base-generated with the *vP* inside the *bǐ*-constituent. At the surface, the AP inside the *bǐ*-constituent is elided, and MaxElide is satisfied.

(22)



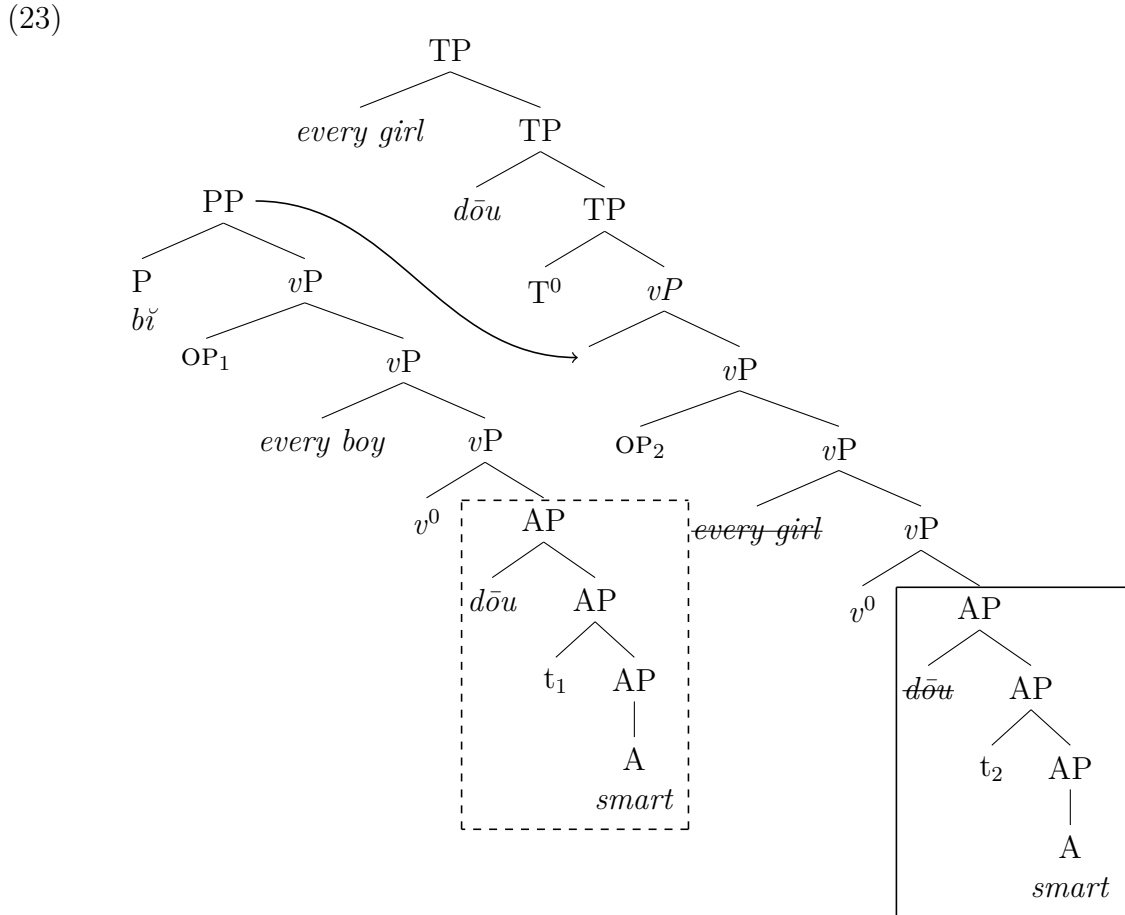
Note that in (21) and (22), *dōu* is required to adjoin to *vP*; if *dōu* adjoined to AP in these examples, there would be no deletable maximal projection XP; consequently, deletion inside the *bǐ*-constituent leads to ungrammaticality.

Now consider the problematic case (11), where both the subject of the comparative and the post-*bǐ* nominal are universal. As noted above, the occurrence of *bǐ* with the post-*bǐ* nominal leads to ungrammaticality even though in the RA, the post-*bǐ* nominal

is a syntactic subject.

- (11) měi-gè nǚshēng dōu bǐ měi-gè nánshēng (*dōu) cōngmíng
 every-CL girl all COMP every-CL boy all smart
 ‘every girl is smarter than every boy.’

Along with the assumptions laid out above, (11) is assigned the structure and the derivation in (23). In this example, there are two occurrences of *dōu*, which are associated with the subject of the comparative and the post-*bǐ* nominal respectively. After the *vP* phase, *dōu* in the matrix clause undergoes movement and adjoins to TP in order to be in the same Spell-out domain with its associate *every girl*.⁹



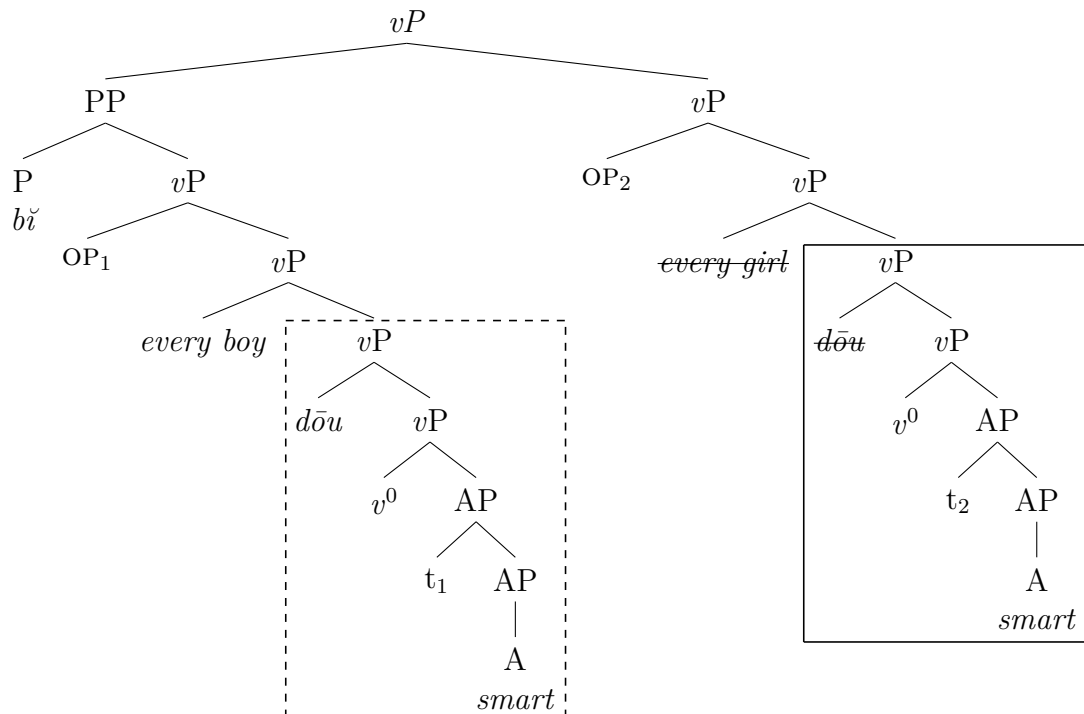
(23) differs from (21)-(22) in the base-generation position of *dōu*; in (23), both occurrences

⁹To be more accurate, *dōu* adjoins to TP via the edge of the *vP* phase, given the Phase Impenetrability Condition (Chomsky 2001).

of $d\bar{o}u$ are base-generated under AP rather than vP . Given that the matrix AP and the one inside the $b\check{i}$ -constituent both contain $d\bar{o}u$, the elided part inside the $b\check{i}$ -constituent must contain an occurrence of this quantificational adverb as well so that the identity requirement on ellipsis may be satisfied. As shown in (23), the maximal XP that can be deleted to satisfy MaxElide is the AP inside the dashed-line box, which includes $d\bar{o}u$ that is associated with the post- $b\check{i}$ universal nominal *every boy*.

What if the $d\bar{o}us'$, in (23), are base-generated under vP rather than AP (see (24))? Note that to satisfy MaxElide, the vP inside the dashed-line box must be elided. Nevertheless, the maximal deletable XP that can satisfy MaxElide is just part of vP and is not a maximal projection. Given the general assumption that ellipsis targets only maximal projections, the presentation and derivation in (24) are illicit.

(24)



The ill-formedness of (24) also indicates the essential role of MaxElide in the analysis proposed above. Without MaxElide, the AP in the $b\check{i}$ -constituent may be chosen to be

deleted. In this case, all interface constraints are satisfied, and we end up seeing two occurrences of $d\bar{o}u$ at the surface. This prediction, as already shown above, is not borne out.¹⁰

In sum, taking the deletion operation inside the $b\check{i}$ -constituent to be parallel to sluicing, the full paradigm of the distribution of $d\bar{o}u$ in a $b\check{i}$ -comparative, including the seemingly problematic case from Xiang (2005), may be explained with the RA together with Merchant's (2008) MaxElide. Note that this does not mean that the adjunction site of the quantificational adverbial $d\bar{o}u$ is totally regulated by deletion. Instead, the adjunction site of $d\bar{o}u$ and its occurrence at the surface should be seen as the result of the interaction of the independent constraints on $d\bar{o}u$ -association and deletion at the interfaces. Despite the flexibility in the base-generation position of $d\bar{o}u$, the adjunction site of this quantificational adverb in fact determines whether these independent constraints may be satisfied at the interface. In (21) and (22), only if $d\bar{o}u$ adjoins at vP does deletion inside the $b\check{i}$ -constituent give a legitimate PF representation; in (23), on the other hand, Max-Elide can be satisfied only when both tokens of $d\bar{o}u$ adjoin at AP.

3.4. $D\bar{o}u$ -adjunction and DA

I would like to end this section with some remarks on the DA with respect to the same set of data discussed above. As mentioned above, the DA correctly predicts that $d\bar{o}u$ cannot occur with the post- $b\check{i}$ nominal when both the subject of the comparative and the post- $b\check{i}$ nominal are universal (see (11)). Nevertheless, it is not clear how analyses along

¹⁰An anonymous reviewer questions the motivation of appealing to the MaxElide. According to this reviewer, MaxElide is meant to resolve the competition between the deletion of CP and that of VP in the case of English sluicing; nevertheless, in the case discussed here, there is no such competition.

As the discussion around (24) shows however, AP and part of vP are in competition with respect to the availability to the deletion operation. Merchant's (2008) MaxElide constraint is meant for deletion inside a constituent containing an A'-trace and is not limited to CP. Hence, I do not see any problem extending MaxElide to the data discussed here.

with the DA account for the cases where only one of the subject of the comparative and the post-*bǐ* nominal is universal.

Along with the DA, the post-*bǐ* nominal may be parallel to a direct object (e.g., Xiang 2005; Erlewine 2007; see (4)) or a PP-complement (e.g., Lin 2009; see (5)). Hence, one may expect that *dōu* interacts with the post-*bǐ* nominal in the same way it does with a direct object or a PP-complement. A universal nominal in direct object position need not occur or be associated with *dōu*, as already shown in (17) (see also (25)).

- (25) Zhāngsān gěi-lè měi-gè nǚshēng₁ yī-zhāng kǎpian
 Zhangsan give-PERF every-CL girl one-CL card
 ‘Zhangsan gave every girl a card.’

Dōu, however, obligatorily occurs with the post-*bǐ* nominal when the post-*bǐ* nominal, but not the subject, is universal, as already shown in (20). It is unclear how this can be captured in a variant of the DA according to which the *bǐ* nominal is treated on par with a direct object (e.g., Xiang 2005 and Erlewine 2007).

- (20) Zhāngsān bǐ měi-gè nǚshēng₁ ^{*/?}(dōu₁) cōngmìng
 Zhangsan COMP every-CL girl all smart
 ‘Zhangsan is smarter than every girl.’

(18a) shows that the association of *dōu* may cross a PP. Nevertheless, (19) shows that the association of *dōu* with the universal subject cannot be intervened by the *bǐ*-constituent. This is unexpected if the *bǐ*-constituent, as the analysis Lin (2009) and Paul (1993) imply, is parallel to a PP adjunct.

- (18) a. měi-gè rén₁ [PP duì Zhāngsān] dōu₁ hěn hǎo
 every-CL person to Zhangsan all very good
 ‘every person is good to Zhangsan.’

- (19) měi-gè nǚshēng₁ *(dōu₁) bǐ Zhāngsān (*dōu₁) cōngmíng
 every-CL girl all COMP Zhangsan all smart
 ‘every girl is smarter than Zhangsan.’

All this suggests that the DA is not as adequate as it might initially seem to be in capturing the distribution of *dōu* in a *bǐ*-comparative. To the extent that the analysis presented above is on the right track, it adds another argument in favor of the RA to the Mandarin *bǐ*-comparative and against the DA.

4. On the lack of the subcomparative and embedded standard

The RA to the Mandarin *bǐ*-comparative, without further implementation, is challenged by the lack of the subcomparative and embedded standard. This section is devoted to show how along with the RA, the structure of the *bǐ*-comparative presented in (12), according to which the complement of *bǐ* may be seen as a small clause and lacks all the higher functional projections, may account for these two phenomena. Two theoretical notions are in order to achieve this; one concerns Agree and selection, and the other the rescuing effect from PF-deletion.

4.1. Agree and selection

Since Chomsky (2000, 2001), Agree has been the central notion in several aspects of syntactic theory, including Merge and selection. In Chomsky (2000), Collins (2002) and others, the idea has been put forward that Merge is licensed under Agree and requires actual feature satisfaction. For instance, Pesetsky and Torrego (2006) suggest that if α and β merge, some feature *F* of α must probe *F* on β (Pesetsky and Torrego’s (2006) *Vehicle Requirement on Merge*). This idea, as put forward by Wurmbrand (2014), may be cashed out with feature valuation and the downward valuation approach of Agree.

Wurmbrand (2014) adopts the definition of Agree in (26) (cf. Bošković 2007; Zeijlstra 2012; and others).

- (26) A feature F :___ on α is valued by a feature F : val on β , iff
- i. β c-commands α , and
 - ii. α is accessible to β .¹¹
 - iii. α does not value a feature of β .

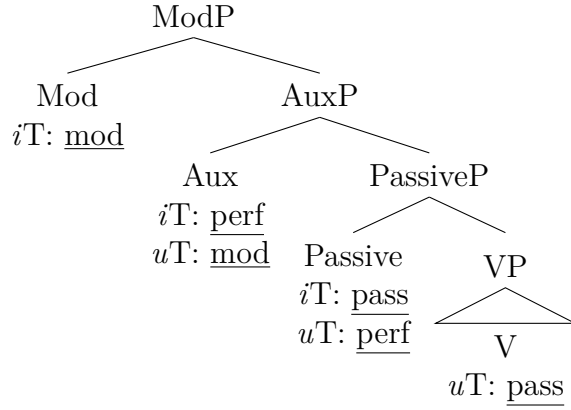
As Wurmbrand (2014) suggests, when a head X selects a constituent YP as its complement, X values some feature F on YP , which YP may inherit from its head Y . In this idea, all functional clausal heads (i.e., T , Mod , Asp , etc.) have an interpretable $T(ense)$ -feature (i.e., iT) which is typically valued; the value of this feature corresponds to the value of these functional heads (e.g., past, perfect, modal, etc.). On the other hand, all verbal heads have an uninterpretable T -feature (uT), which is typically unvalued. Given that an unvalued feature is not allowed at the interfaces (e.g., PF and LF), it must undergo Agree with the closest valued feature.

Take (27a) for instance; as shown in (27b), each of the functional clausal head (Mod , Aux , $Pass$) carries a valued iT , and each of these verbal heads (Aux , $Pass$, V) carries an unvalued uT and undergoes Agree with the closest valued feature.

- (27) a. He must have been left alone.

¹¹ α is accessible only if it is not spelled-out.

b.



Wurmbrand (2014) suggests that one may see the value of an *uT* as what is realized at PF. For instance, a verb which is valued by a perfect or passive auxiliary is realized as a participle (e.g., *leave* vs. *left*). In Mandarin, while verbal elements usually lack inflections, several research (e.g., Tsai 2008) point out that certain morpho-syntactic measures are required to guarantee a proper temporal reference of the predicate in a sentence and hence may be seen as a process of spelling out an underlying event argument of a verbal element. On these grounds, I assume that in Mandarin verbal elements (i.e., V, A, etc.) carry an unvalued *uT*, which may get valued via Agree with the closest valued T-feature.

4.2. Rescue by Deletion

It is well-known that violations of several syntactic constraints may be ameliorated by PF-deletion. For instance, as pointed out by Ross (1969) and further discussed by Merchant (2001) and others, island effects may be obviated via PF-deletion, as shown (28).

- (28) a. *Ben will be mad if Abby talks to one of the teachers, but she couldn't remember which (of the teachers) Ben will be mad if she talks to.
- a'. Ben will be mad if Abby talks to one of the teachers, but she couldn't remember which. (Merchant (2001: 88))

- b. *She kissed a man who bit one of my friends, but Tom does not realize which one of my friends she kissed a man who bit.
- b'. She kissed a man who bit one of my friends, but Tom does not realize which one of my friends.

Several featural accounts have been proposed for rescuing effects from PF-deletion; for instance, see Bošković (2011), Merchant (2009), and others. The basic idea suggested in these research is that the violation of these syntactic constraints leads to the generation of some fatal feature, which may lead to crash at PF. Deletion at PF of the problematic constituent eliminates these fatal features and hence guarantee the Spell-out at PF.

The mismatch between an elided verb and its antecedent in certain environments is another phenomenon that may be related to this effect. As observed by Lasnik (1995) and many others, the identity between an elided VP and its antecedent is sometimes but not always required, as shown in (29).

- (29) John was sleeping, and now Mary will ~~sleep~~. (Lasnik 1995)

Putting forward the downward-valuation approach of Agree (26), Wurmbrand (2014) suggests that this may be explained if one assumes that in the case of ellipsis, Spell-out of the elided constituent applies before feature valuation. Given that before feature valuation, the elided verb/VP and the antecedent VP are identical (i.e., *sleep* with the feature specification $uT: ___$), the identity requirement of ellipsis is met. Although Wurmbrand (2014) does not explicitly mention this, this idea suggests that deletion at PF may eliminate an unvalued uninterpretable feature and hence save a derivation from being crashed at PF.

4.3. *Subcomparatives, *embedded standard and unvalued features

As already shown above, Mandarin lacks subcomparatives and embedded standards (see (6) and (9)).

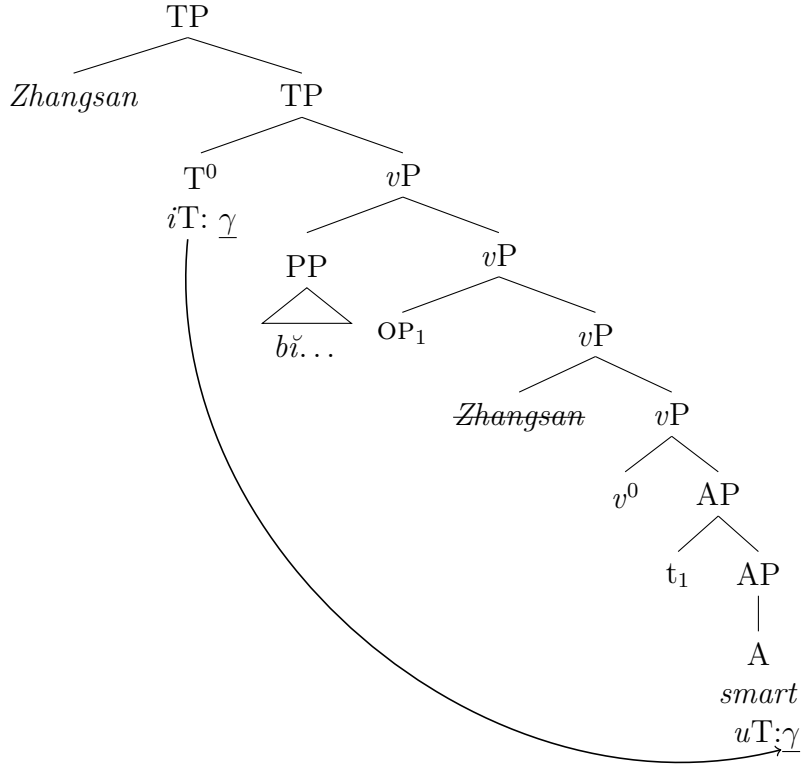
- (6) a. *zhè-zhāng zhūozi cháng [bǐ nà-shàn mén kuan]
 this-CL table long COMP that-CL door wide
- b. *zhè-zhāng zhūozi [bǐ nà-shàn mén kuan] cháng
 this-CL table COMP that-CL door wide long
 Intended reading for (29a)-(29b): ‘The table is longer than the door is wide.’
- (9) a. *zhè-zhāng zhūozi bǐ Lǐsì rènwéi (tā) kuan
 this-CL table COMP Lisi think 3rd.sg wide
 Intended: ‘This table is wider than Lisi thinks it is.’
- b. zhè-zhāng zhūozi bǐ Lǐsì rènwéi dé kuan
 this-CL table COMP Lisi think REL wide
 ‘This table is wider than Lisi thinks it is.’

The following discussion is devoted to showing how this may be captured by theoretical notions introduced above together with the structure of the Mandarin *bǐ*-comparative presented in (12).

First, let us consider how feature valuation applies in a Mandarin *bǐ*-comparative. Take the comparative (2a) (and its structure (12)) for instance. Along with the assumption that verbal heads, including V and A, carry an uninterpretable feature typically unvalued, the adjective *smart* in the matrix clause in (2a)/(12) enters the derivation with an unvalued T-feature (see (30)). To avoid crash at PF, the adjective *smart* is required to undergo Agree with T^0 , the closest element with the same type of feature valued.¹²

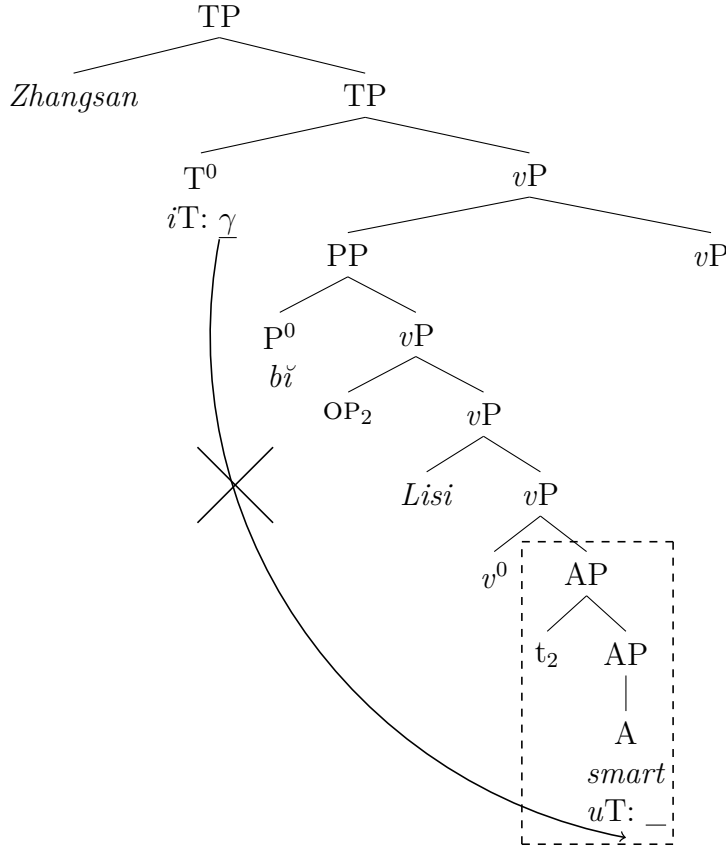
¹²If Agree is subject to phase-hood, one may assume that *smart* undergoes head-movement to v^0 and get valued by T^0 there.

(30)



Now consider the *bī*-constituent. The adjective inside the *bī*-constituent in (12) enters the derivation with an unvalued T-feature as well (see (31)). As suggested in (12), the *bī*-constituent has a small-clause structure and lacks all the higher functional clausal heads, such as T and Asp, that can value the T-feature. Therefore, to value this feature on the adjective *smart*, the only way is for *smart* to agree with the matrix T⁰.

(31)



Nevertheless, the *bǐ*-constituent is an adjunct and hence constitutes a syntactic island.¹³ Assuming that Agree is sensitive to islands (Boeckx 2012), feature valuation from the Matrix T^0 to the adjective *smart* inside the *bǐ*-constituent is blocked. Given the failure to value the unvalued featured on the embedded adjective *smart*, this problematic unvalued feature can only be eliminated via deletion of the AP inside the *bǐ*-constituent at PF, as indicated by the dashed-line boxing in (31), so that the derivation does not crash after Spell-out.

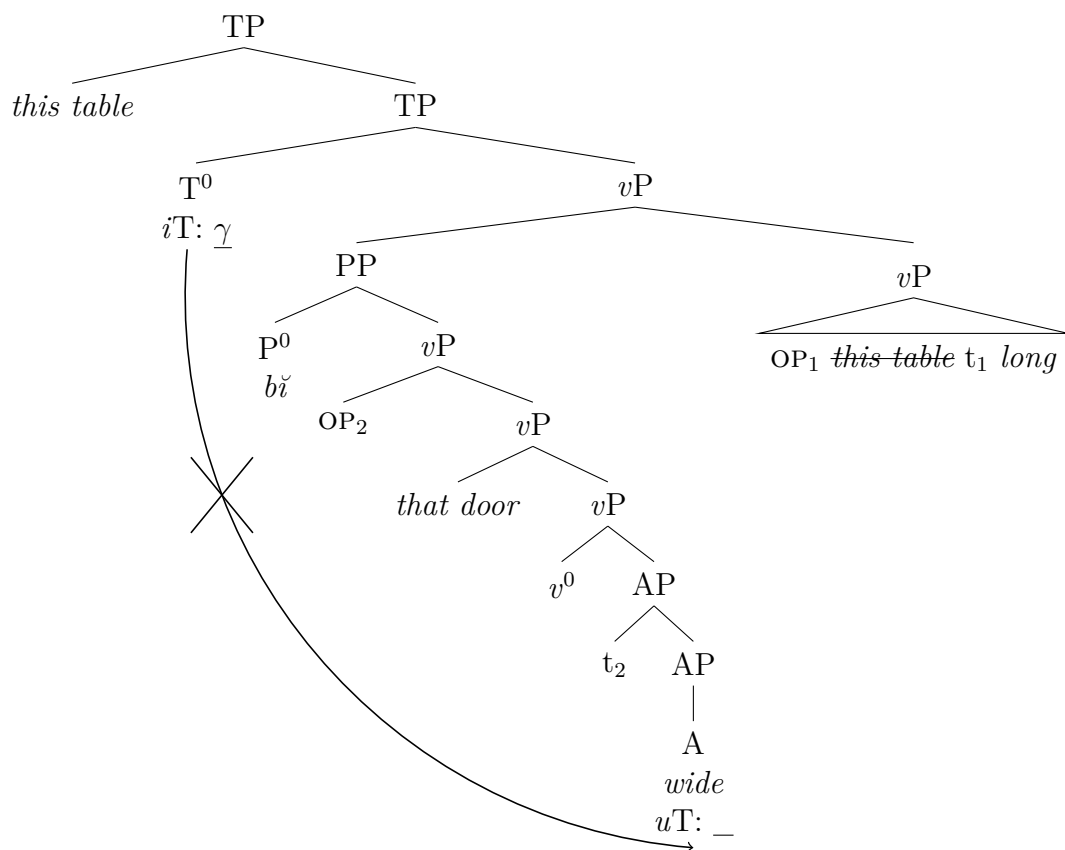
¹³The assumption that the *bǐ*-constituent constitutes a syntactic island is supported by the fact that extraction out of the *bǐ*-constituent leads to ungrammaticality, as shown in (i).

- i. a. Zhāngsān fàwén bǐ Lǐsì yīngwén shuō-dè hǎo
Zhangsan French COMP Lisi English speak-DE good
'Zhangsan speaks better French than Lisi speaks English.'
- b. *yīngwén₁ Zhāngsān fàwén [bǐ Lǐsì t₁] shuō-dè hǎo
English Zhangsan French COMP Lisi speak-DE good
Intended: 'As for English, Zhangsan speaks better French than Lisi speaks English.'

It immediately follows from this analysis that the failure to delete any element with an unvalued T-feature inside the $b\check{i}$ -constituent leads to ungrammaticality. This is indeed what we have seen in (29b), the case of the subcomparative, and (29a), the case of the embedded standard. Along with the assumptions above, the structure and the derivation in (32) are assigned to (29b).

- (6) b. *zhè-zhāng zhūozi [bǐ nà-shàn mén kuan] cháng
 this-CL table COMP that-CL door wide long
 Intended reading for (29a)-(29b): ‘The table is longer than the door is wide.’

(32)



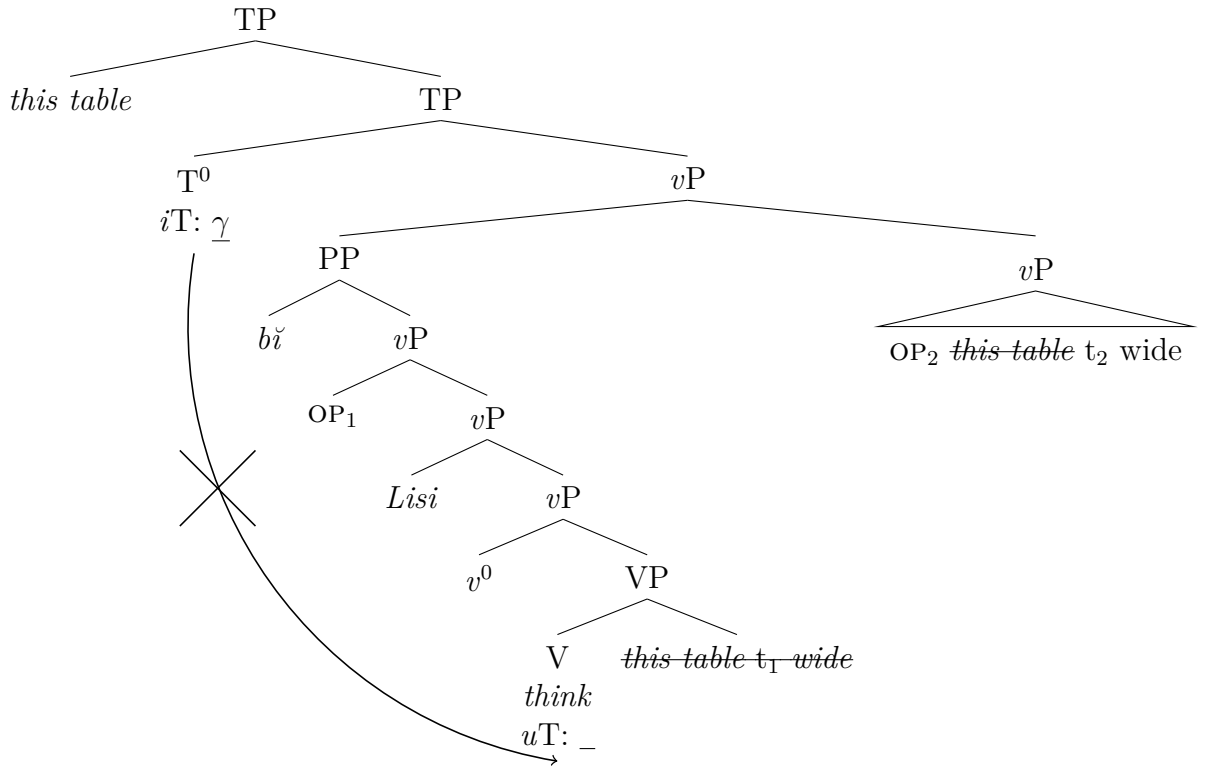
As shown in (32), the adjective *wide* inside the $b\check{i}$ -constituent needs to Agree with the matrix T⁰ so that its uninterpretable T-feature can be valued. Nevertheless, this cannot be done given the intervention of the $b\check{i}$ -constituent. The option of eliminating this unvalued feature via PF-deletion is not available, given that the embedded AP lacks

a proper antecedent. Since there is no way to eliminate this problematic unvalued feature, (29b) is ungrammatical.

The lack of the embedded standard is explained along the same lines. Following the assumptions above, the structure and the derivation in (33) is assigned to (9). The embedded verb *rènwéi* ‘think’, along with the assumptions above, enters the derivation with an unvalued T-feature, which needs to get valued by the closest element with the same feature valued.

- (9) a. *zhè-zhāng zhūozi bǐ Lǐsì rènwéi (tā) kǔan
 this-CL table COMP Lisi think 3rd.sg wide
 Intended: ‘This table is wider than Lisi thinks it is.’

(33)



Regardless what is elided inside the *bǐ*-constituent, (33) is already excluded due to the failure to eliminate the unvalued T-feature on the embedded verb *think*. This unvalued feature can only be valued by the matrix T⁰; this, however, cannot be done since the

bǐ-constituent constitutes a syntactic island and blocks the intended Agree relation. The possibility of eliminating this unvalued feature via PF-deletion is excluded as well, given the lack of the proper antecedent.

In sum, along with the analysis presented above, according to which the *bǐ*-constituent lacks all the functional clausal heads that may value the unvalued T-feature on the verbal elements (e.g., V, A, etc), the lack of the subcomparative and that of the embedded standard in Mandarin may be attributed to the failure to eliminate the unvalued feature at PF.

5. The Conclusion

In the above discussion I have suggested a variant of the RA according to which in a Mandarin *bǐ*-comparative, the complement of *bǐ* is a small clause rather than a full-fledged CP/TP and lacks all the higher functional clausal heads. I have shown that this assumption, together with current theory of Agree, selection and PF-deletion, provides an account for the facts that have been seen as problems for the RA to the Mandarin *bǐ*-comparative: the lack of the subcomparative, the lack of the embedded standard, and the distribution of *dōu* in this construction. With this small-clause analysis, the deletion operation inside the *bǐ*-constituent may be parallel to sluicing, and the distribution of the quantificational adverbial *dōu* in the *bǐ*-comparative may be captured by Merchant's (2008) MaxElide. The lack of the subcomparative and that of the embedded standard, with an Agree-based theory of selection and a featural account of the rescuing effect from PF-deletion, may be attributed to the failure to eliminate unvalued features at PF.

Recently various arguments in support of the need of the RA for the *bǐ*-comparative have been presented in several research, including Liu (1996, 2011), Erlewine (2012),

Hsieh (2015), Hsieh and Shen (2016). Liu (1996, 2011) and Erlewine (2012) have shown that the RA has a great advantage over the DA in accounting for the *bǐ*-comparatives derived from the verb-copying construction, the *bèi*-passive sentence, and the *bǎ*-disposal constructions. Hsieh (2015) shows that RA straightforwardly predicts that the post-*bǐ* nominal may trigger the blocking of the long distance co-reference of the Mandarin bare reflexive *zìjǐ* in the gradable predicate; on the other hand, the DA fails to capture this observation.¹⁴ Together with the conclusions reached in these work, this paper suggests that RA has a greater advantage over DA in capturing the syntactic and semantic properties of the Mandarin *bǐ*-comparative. To the extent that the proposed analysis is on the right track, the proposal also shows that cross-linguistically, in addition to a full CP and a full DP, a standard marker (e.g., Mandarin *bǐ*) may take a small clause as its complement. Pancheva (2006) has argued for this possibility by drawing evidence from Slavic languages, and this paper provides evidence from a non-Slavic language in support of her claim.

¹⁴I simply refer the reader to these work and the reference cited therein for details.

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