

# Independent Dependency in the Mandarin *bǐ* Comparative<sup>1</sup>

mitcho (Michael 芳貴 Erlewine), MIT

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## Goals

The *bǐ* (比) comparative is a very common comparative construction in Mandarin Chinese and the most commonly studied in the literature. The *bǐ* comparative follows the schema in (1):

- (1) target *bǐ* standard predicate of comparison

Today I will:

- argue that the gradable predicate in a *bǐ* comparative must be the predicate in two clauses—one for the target and one for the standard—a hypothesis I call *Independent Dependency*:
- (2) **Independent Dependency:**  
A comparative [ X *bǐ* Y predicate ] includes both [ X predicate ] and [ Y predicate ] within its derivation.
- present cases of *syntactic dependencies (movement chains) between both the target and the predicate and the standard and the predicate*, in internal argument comparatives, subject reconstruction, *bèi* long passives, verb-copy constructions, and *bǎ* constructions;
  - note that recent analyses (Erlewine, 2007; Lin, 2009) cannot accurately account for these facts; and
  - illustrate one of two *potential technical implementations* which obey Independent Dependency.

<sup>1</sup>A previous version of this talk was presented at MIT Syntax Square in spring 2010. While this is my latest iteration in an ongoing research program, the material I am presenting today is particularly informed by my discussions with Norvin Richards, David Pesetsky, Omer Preminger, and Chris Kennedy. Thanks are also due to my many informants, including (most recently) C.-M. Louis Liu, Pamela Pan, Wei Wang, C.-Y. Edwin Tsai, and Yuncheng Zhou. All errors are my own.

## 1 The Mandarin *bi* Comparative

### 1.1 Parallelism between the target and standard

☞ We note that the target and standard in the *bǐ* comparative seem to exhibit a **parallelism** requirement: both must be of the same “type.”

- (3) 我 比 他 高。  
[wo] bi [ta] gao  
1sg BI 3sg tall  
“I am taller than him/her.”
- (4) 約翰 比 湯姆 喜歡 瑪麗。  
[Yuehan] BI [Tangmu] xihuan Mali  
John bi Tom like Mary  
“John likes Mary more than Tom does.”
- (5) 約翰 騎 馬 比 瑪麗 騎 牛 騎 得 快。  
[Yuehan qi ma] bi [Mali qi niu] qi de kuai  
John ride horse BI Mary ride cow ride DE fast  
“John rides horses faster than Mary rides cows.”

☞ In particular, this parallelism requirement is manifest in the lack of embedded standards (6) and subcomparatives (7):

- (6) **No embedded standards**
- a. John rides horses faster than I think Mary rides cows.  
b. \*約翰 騎 馬 比 我 認為 瑪麗 騎 牛 騎 得 快。  
[Yuehan qi ma] bi [wo renwei Mali qi niu] qi de kuai  
John ride horse BI 1SG think Mary ride cow ride DE fast  
Intended: “John rides horses faster than I think Mary rides cows.”
- (7) **No subcomparatives**
- a. My chair is taller than your table is wide.  
b. \*我的 椅子 比 你的 桌子 寬 高。  
[wo de yizi] bi [ni de zhuozi kuan] gao  
1SG GEN chair BI 2SG GEN table wide tall  
Intended: “My chair is taller than your table is wide.”

- Note also that the target and standard must match in thematic role as well: whereas the standard 'Tom' in the English comparative (8a) is ambiguous between an experiencer and a theme, the standard 'Tom' in the Mandarin (8b) must be an experiencer, just like the target 'John.' (The Internal Argument Prohibition of Erlewine 2007)

(8) **Target and standard also must match in thematic role:**

- a. John likes Mary more than Tom.  
 ✓ "John likes Mary more than Tom likes Mary."  
 ✓ "John likes Mary more than John likes Tom."
- b. 約翰 比 湯姆 喜歡 瑪麗。  
 Yuehan bi Tangmu xihuan Mali  
 John BI Tom like Mary  
 ✓ "John likes Mary more than Tom likes Mary."  
 \* "John likes Mary more than John likes Tom."

1.2 Previous analyses

Xiang (2003, 2005); Erlewine (2007):

☞ The parallelism requirements observed may be explained by employing Heim's (1985) "direct analysis" in all *bi* comparatives.<sup>2</sup>

- (9) **Heim's (1985) direct analysis:** Given gradable predicate *f* a function from individuals to degrees,  $[-er\langle a, b \rangle f] = 1 \iff f(a) > f(b)$ .

Lin (2009):

- The *bi* comparatives' target and standard can be multiple constituents. Lin (2009) tries to deal with these explicitly.

(10) **"Multiple topic comparison"** (Tsao, 1989):

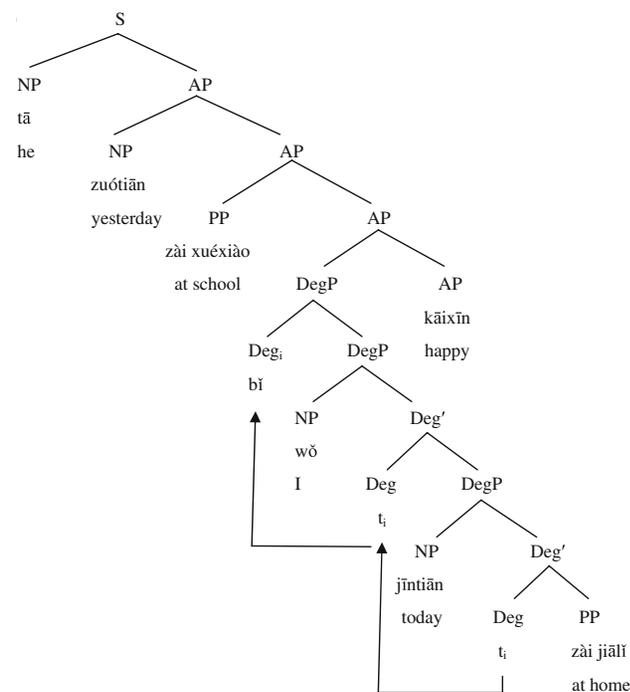
他 昨天 在 學校 比 我 今天 在 家裡 開心  
 ta zuotian zai xuexiao bi wo jintian zai jiali kaixin  
 3SG yesterday at school BI 1SG today at home happy

"He was happier yesterday at school than I am today at home."

<sup>2</sup>In this view, the surface-clausal standards (5) would also have to be arguments (sentential subjects) of the predicate of comparison.

- ☞ **A brute-force syntax/semantics:** Lin's *bi* first merges with the *n* arguments,  $y_n, \dots, y_1$  which form the standard, then merging with an *n*-place gradable predicate, then merging with the *n* arguments of the target,  $x_n, \dots, x_1$ . If all the *n*'s aren't the same *n*, the derivation crashes.

(11) Lin (2009):



**Summary:**

- ☞ The target and standard in a Mandarin *bi* comparative exhibit a parallelism requirement.
- ☞ The previous analyses reviewed have only one instance of the predicate in syntax. They put the burden of composing the predicate of comparison with its arguments on *bi*.

## 2 Proposal

☞ Contra the direct analysis, there cannot be just one copy of the predicate:

### (2) Independent Dependency:

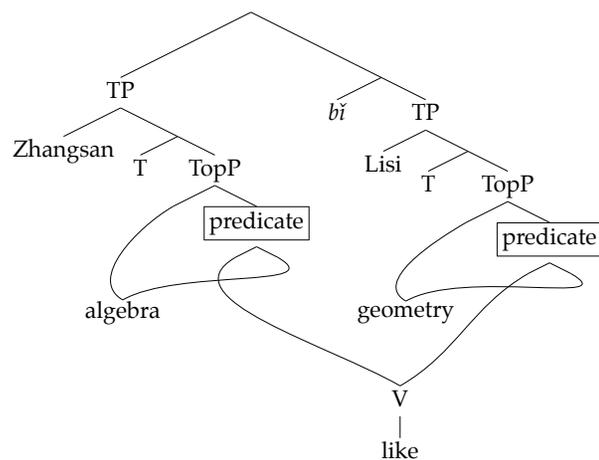
A comparative [ X *bi* Y predicate ] includes both [ X predicate ] and [ Y predicate ] within its derivation.

- Evidence for Independent Dependency will come from examples where there is a movement chain between the predicate and the target and between the predicate and the standard, such as in (12) (revisited in §3.1).

(12) 張三 代數<sub>i</sub> 比 李四 幾何<sub>j</sub> 喜歡 <sub>-i/j</sub>  
 Zhangsan daishu<sub>i</sub> bi Lisi jihe<sub>j</sub> xihuan <sub>-i/j</sub>  
 ZS algebra bi LS geometry like  
 ‘Zhangsan likes algebra more than Lisi likes geometry.’

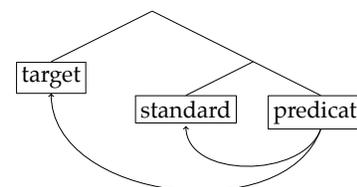
- At some level of representation, there must be one predicate for the target and one predicate for the standard. Only one “copy” of the predicate is then pronounced, through some syntactic means.
- Technically, this could involve **ellipsis** or **multidominance**. I will not attempt to distinguish between these two approaches here, and will present only a multidominance analysis (cf Gracanin-Yuksek, 2007, 2009).

### (13) Sharing is ~~easy~~ comparing:



## 3 Dependencies between target-predicate and standard-predicate

☞ In this section I will present evidence from various constructions which involve movement simultaneously between the predicate and the target and between the predicate and the standard. *Analyses with just one copy of the predicate in syntax cannot account for such data.*



### 3.1 Internal argument comparatives

#### (14) Internal Argument (IA) comparatives: (Tsao, 1989):

- 他 英文 比 我 法文 說 得好  
 ta yingwen bi wo fawen shuo de hao  
 3SG English BI 1SG French speak DE good  
 ‘He speaks English better than I speak French.’
- 他 籃球 比 排球 打 得好  
 ta lanqiu bi paiqiu da de hao  
 he basketball BI volleyball play DE good  
 ‘He plays basketball better than (he does) volleyball.’

- Not all objects can participate in this frame: [ Subj<sub>X</sub> Obj<sub>X</sub> *bi* Subj<sub>Y</sub> Obj<sub>Y</sub> V ].

☞ Tsao (1989) observed that the same distributional restrictions on *object preposing* (Ernst and Wang, 1995; Paul, 2002) apply to IA comparatives as well.

- Object-preposing is a Mandarin TP-internal topic (often contrastive) construction. Where object preposing leaves a gap after a transitive verb, the object has moved from its base position to the topic position (Paul, 2002).

(15) Animacy restrictions on object preposing and IA comparatives

- |  |   |
|--|---|
| a. *我 張三 喜歡<br>wo Zhangsan xihuan<br>I ZS like<br>Int: 'I, Zhangsan, like' | a'. *我 張三 比李四 喜歡<br>wo Zhangsan bi Lisi xihuan<br>I ZS bi LS like<br>Int: 'I like ZS more than I like LS'         |
| b. ?我 貓 喜歡<br>wo mao xihuan<br>I cat like<br>Int: 'I, cat, like'           | b'. ?我 貓 比狗 喜歡<br>wo mao bi gou xihuan<br>I cat bi dog like<br>Int: 'I like cats more than dogs'                  |
| c. 我 代數 喜歡<br>wo daishu xihuan<br>I algebra like<br>'I, algebra, like.'    | c'. 我 代數 比幾何 喜歡<br>wo daishu bi jihe xihuan<br>I algebra bi geometry like<br>'I like algebra more than geometry.' |

(16) Object preposing cannot leave behind a monosyllabic verb with gap; also restricted in IA comparatives

- |  |   |
|--|---|
| a. *我 代數 愛<br>wo daishu ai<br>I algebra love<br>Int: 'I, algebra, love.' | a'. *我 代數 比幾何 愛<br>wo daishu bi jihe ai<br>I algebra bi geometry love<br>Int: 'I love alg. more than geo.'        |
| b. 我 代數 喜歡<br>wo daishu xihuan<br>I algebra like<br>'I, algebra, like.'  | b'. 我 代數 比幾何 喜歡<br>wo daishu bi jihe xihuan<br>I algebra bi geometry like<br>'I like algebra more than geometry.' |

- In addition, preposed objects cannot be indefinite (Tsao, 1989, a.o.). The same effect is observed with IA comparatives:

(17) Internal arguments in IA comparatives cannot be indefinite

\* 這裡 之中, 我 三 個 科目 比幾何 喜歡 得多  
zheli zhi zhong wo san ge kemu bi jihe xihuan de duo  
these GEN in I three CL classes BI geometry like DE more

Int: 'of these courses, I, three (of these) courses, like more than geometry.'

☞ There is a clear connection between object preposing and internal argument comparatives (Tsao, 1989).

- The *bi* comparative need not have a special mechanism for IA comparatives: **IA comparatives are cases of object preposing**, explaining why the same restrictions apply.

**NB:** Lin (2009) which clearly overgenerates these structures.

3.2 Subject reconstruction with de dicto readings (à la Grosz 2009)

(18) de re/de dicto readings: baseline

中國人 有 可能 贏 這個 比賽  
Zhongguoren you keneng ying zhe ge bisai  
Chinese-person have possible(ity) win this CL competition

De re: 'A (specific) Chinese person is likely to win the race.'  $\exists > likely$   
De dicto: 'It is likely that a Chinese person will win the race.' *likely*  $> \exists$

(19) Comparatives get de re/de dicto readings

中國人 比 澳洲人 有 可能 贏 這個 比賽  
Zhongguoren bi Aozhouren you keneng ying zhe ge bisai  
Chinese-person BI Australian have possible(ity) win this CL comp.

De re/de re: 'A (specific) Chinese person is more likely to win the race than a (specific) Australian.'  $\exists^2 > likely$   
De dicto/de dicto: 'It is more likely that a Chinese person will win the race than that an Australian will.' *likely*  $> \exists^2$

☞ Reconstruction of *both subjects* within the VP, under the scope of *you keneng*, must be possible.

3.3 Verb-copy constructions:

(20) "Verb-copy" constructions:

約翰 騎 馬 騎 得 很 快。  
Yuehan qi ma qi de hen kuai  
John ride horse ride DE HEN fast

"John rides horses quickly."

(21) "Clausal" comparatives are derived from these constructions: (=5)

約翰 騎 馬 比 瑪麗 騎 牛 騎 得 快。  
[Yuehan qi ma] bi [Mali qi niu] [qi de kuai]  
John ride horse bi Mary ride cow ride DE fast

"John rides horses faster than Mary rides cows."

☞ Cheng (2007); Huang (1988), argue that these verb-copy constructions are indeed derived via movement without deletion. Having only one copy of the predicate in the derivation of (21) would be problematic.

### 3.4 *bèi* long passives in comparatives

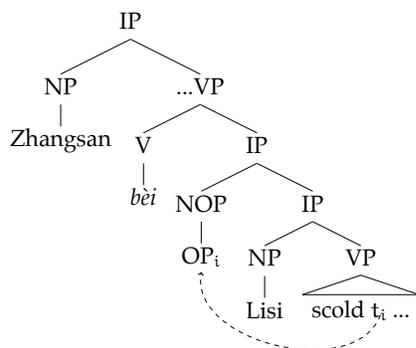
- An example from an anonymous reviewer (marginal for some speakers):

(22) “sharing” the predicate of two *bèi* long passives

約翰 被 爸爸 比 被 媽媽 嗎 得 還 要 更 殘  
 Yuehan bei baba bi bei mama ma de hai yao geng can  
 John by father bi by mother scold de even want more serious

‘John was scolded by his father to a degree more serious than by his mother.’

- The flagship analysis of the *bèi* long passive, Huang (1999); Huang et al. (2009) argues that they involve  $\bar{A}$ -movement of an operator to a position between *bèi* and the agent:



### 3.5 *bǎ* NP's in comparatives:

(23) Comparison of [*bǎ* + object]'s (Lin, 2009)

他把錢 比 把 生命 看 得 重  
 ta ba qian bi ba shenming kan de zhong  
 he BA money BI BA life regard DE important

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

- For analyses of the *bǎ* construction where the fronted object is moved from a VP-internal position, it would be problematic if there is only one VP.

### Conclusion:

- ☞ Comparatives involving various complex constructions show evidence that it must be possible to have movement chains between the target and the predicate as well as between the standard and the predicate. **Both the target and the standard are independently dependent upon the predicate.**

## 4 Evidence from the Blocking Effect

- Consider the Mandarin subject-oriented reflexive *ziji* (自己). Our analysis would predict that subjects in both target and standard positions are potential antecedents of a *ziji* in the predicate of comparison.

(24) The standard can be the antecedent of a *ziji* within the predicate:

約翰 比 瑪麗 喜歡 自己  
 Yuehan bi Mali xihuan ziji  
 John bi Mali like self

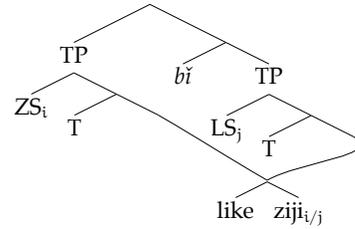
- ✓ ‘John<sub>i</sub> likes himself<sub>i</sub> more than Mary<sub>j</sub> likes him<sub>i</sub>.’
- ✓ ‘John<sub>i</sub> likes himself<sub>i</sub> more than Mary<sub>j</sub> likes herself<sub>j</sub>.’

- Mandarin *ziji* is subject to a Blocking Effect (Pan, 2000; Xue et al., 1995): first and second-person subjects block binding by further third person subject.

(25) The Blocking Effect: (Pan, 2000)

- 張三<sub>i</sub> 覺得 李四<sub>j</sub> 對 自己<sub>i/j</sub> 沒 信心。  
 Zhangsan<sub>i</sub> juede Lisi<sub>j</sub> dui ziji<sub>i/j</sub> mei xinxin.  
 Zhangsan think Lisi to self not confidence  
 ‘Zhangsan thinks that Lisi has no confidence in him/himself.’
- 張三<sub>i</sub> 覺得 我/你<sub>j</sub> 對 自己<sub>\*i/j</sub> 沒 信心。  
 Zhangsan<sub>i</sub> juede wo/ni<sub>j</sub> dui ziji<sub>\*i/j</sub> mei xinxin.  
 Zhangsan think I/you to self not confidence  
 ‘Zhangsan thinks I/you have no confidence in myself/yourself/\*him.’

☞ My analysis predicts there to be **no Blocking Effect between the target position and the standard**. This prediction is borne out.



(26) **No Blocking Effect between the target and standard:**

約翰<sub>i</sub> 比我<sub>j</sub> 更 喜歡 自己<sub>i/j</sub>-的學生  
 Yuehan<sub>i</sub> bi wo<sub>j</sub> geng xihuan ziji<sub>i/j</sub>-de xuesheng  
 John bi I even.more like self-DE student

'John likes his own students more than I like my own students.'

## 5 Parallelism by COSH

- Earlier we noted that there seem to be some parallelism requirements between the target and the standard.

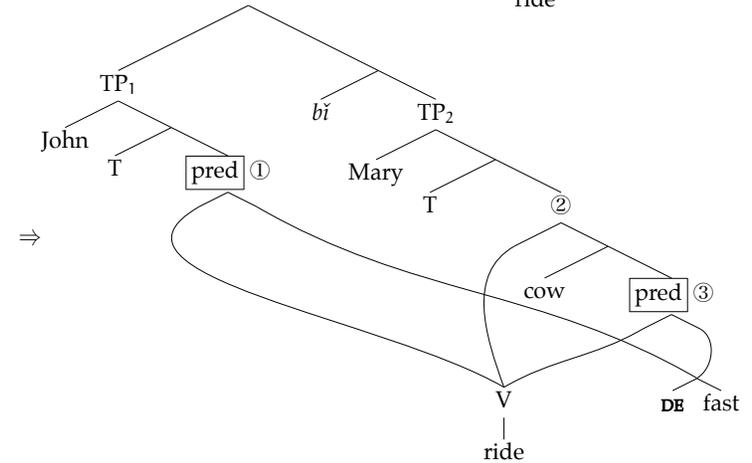
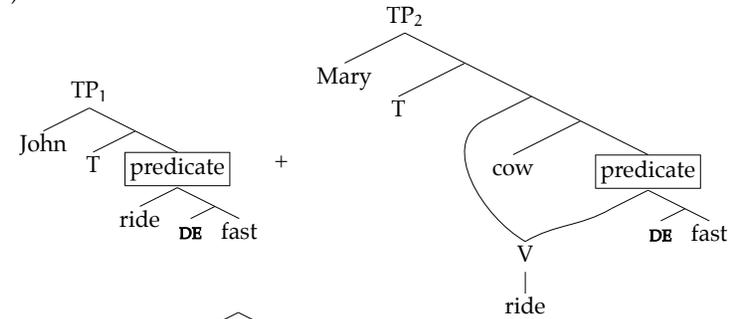
(27) **Parallelism in action:**

約翰 比瑪麗 騎 牛 騎 得快。  
 Yuehan bi Mali qi niu qi de kuai  
 John BI Mary ride cow ride DE fast

- \* [約翰] 比 [瑪麗 騎 牛] 騎 得快。  
 [Yuehan] bi [Mali qi niu] [qi de kuai]  
 John BI Mary ride cow ride DE fast  
 "John rides (things) faster than Mary rides cows."
- ✓ [約翰] 比 [瑪麗] [騎 牛 騎 得快]。  
 [Yuehan] bi [Mali] [qi niu qi de kuai]  
 John BI Mary ride cow ride DE fast  
 "John rides cows faster than Mary rides cows."

☞ Independent Dependency itself will not yield these restrictions. Consider the following Independent Dependency-obeying structure for (27a), (27a'). Both [X predicate] and [Y predicate] sentences are valid structures (modulo positive form marker *hěn*). Note that TP<sub>2</sub> is a verb-copy structure.

(27a')



☞ This structure, however, is ruled out by the Constraint on Sharing (COSH):

(28) **Constraint on Sharing (Gracanin-Yuksek, 2007, 2009):** (informal ver.) Multiple locally-highest mothers of every shared node in a multidominated structure completely dominate<sup>3</sup> identical sets of terminal nodes.

☞ "ride" in (27a) has two locally highest mothers, ① & ②, but they completely dominate different sets of nodes: ② dominates "cow" which ① does not. (27b), on the other hand, has a COSH-compliant parse.

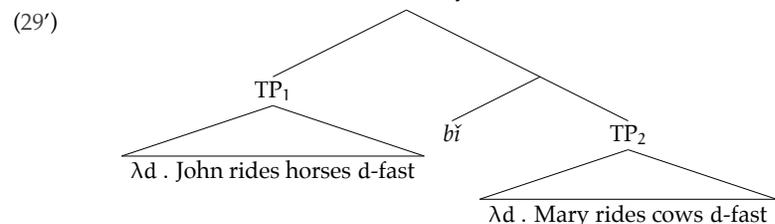
☞ In this way, **many of the parallelism constraints observed are predicted by universal constraints on sharing.**

<sup>3</sup>Complete dominance (Fox and Pesetsky, 2005): a node  $\alpha$  completely dominates a node  $\beta$  iff every path from  $\beta$  to the root includes  $\alpha$ .

## 6 A semantics for the *bǐ* comparative

☞ Consider the LF of (5), repeated here as (29).

- (29) 約翰 騎 馬 比 瑪麗 騎 牛 騎 得 快。  
 [Yuehan qi ma] bi [Mali qi niu] qi de kuai  
 John ride horse BI Mary ride cow ride DE fast  
 “John rides horses faster than Mary rides cows.”



- (30)  $\llbracket (29) \rrbracket = 1 \iff \max\{d \mid J \text{ rides } h. d\text{-fast}\} > \max\{d \mid M \text{ rides } c. d\text{-fast}\}$

- (31)  $\llbracket bǐ \rrbracket = \lambda P_{\langle d,t \rangle} . \lambda Q_{\langle d,t \rangle} . \max(Q) > \max(P)$

☞ I propose that Mandarin does not have a null degree-abstracting operator to create degree abstraction structures in syntax. Instead, **all Mandarin gradable predicates must have their degree argument as their outermost argument**, a claim I make here with no independent justification.

☞ **This explains the ungrammaticality of embedded standards** as in (6b), repeated here as (32).

- (32) \* [約翰 騎 馬] 比 [我 認為 瑪麗 騎 牛] 騎 得 快。  
 [Yuehan qi ma] bi [wo renwei Mali qi niu] qi de kuai  
 John ride horse BI 1SG think Mary ride cow ride DE fast  
 intended: “John rides horses faster than I think Mary rides cows.”

- The standard clause in (32) (“I think [Mary ride cows ride DE fast]”) would have two problems: first, the embedded clause lacks positive form morphology (overt in Mandarin), leaving an unbound degree argument; second, the matrix clause (“I think...”) does not result in an expression of type  $\langle d, t \rangle$ .

## 7 Conclusion

☞ Analyses of the Mandarin *bǐ* comparative which syntactically only have one instance of the predicate (Erlewine, 2007; Lin, 2009; Xiang, 2005), to be composed with its arguments via a direct analysis semantics (Heim, 1985), **are unable to derive comparatives which involve object preposing, subject reconstruction, verb-copy, *bèi* long passive, or *bǎ* disposal constructions**. Thus:

### (2) Independent Dependency:

A comparative [ X *bǐ* Y predicate ] includes both [ X predicate ] and [ Y predicate ] within its derivation.

- A **multidominance syntax** was presented as one of two potential analyses—an ellipsis account and a multidominance account—which obey Independent Dependency. We observed that **the lack of *zìjǐ* Blocking Effect and parallelism effects between the target and standard can be explained by this structure**.

- A **minimalist semantics for *bǐ*** was presented. Mandarin is then a degree-comparison language, but not of the standard sort—the standard degree is computed not by a degree abstraction structure. This **explains the lack of embedded standards**.

☐ Are there tests which can help distinguish between the multidominance analysis presented and an ellipsis account?

☐ Are there other attested structures which require its arguments to share certain subconstituents? How is such a structure enforced?

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## Appendix A: Optionally ditransitive predicates

- Lin's (2009) syntax/semantics requires that the target and the standard in the *bi* comparative be the same number of arguments and adjuncts, modulo deletion of "shared" (in common) arguments and present time/place adjuncts.
- Liu (2010) explicitly notes that "if the word *bi* introduces more than one compared constituent, the compared constituents... have to be c-commanded by their corresponding constituent," requiring the target and standard to be made up of the same number of arguments.
- ☞ **Idea:** while the target and standard often do have the same number of arguments, it is actually possible to construct comparatives with different numbers of arguments, within what is sanctioned by Independent Dependency.
- My very contrived context: Zhangsan is a very important businessman. Both USPS and FedEx have special priority service specifically for Zhangsan:

	FedEx	USPS
Zhangsan	3 days	2 days
everyone else	5 days	4 days

### (33) An optionally ditransitive predicate: baseline

- a. USPS的 一般 服務 送 信 送 得很 快  
 USPS de yiban fuwu song xin song de hen kuai  
 USPS.GEN regular service deliver letter deliver DE very fast  
 'USPS's regular service delivers letters quickly.'

- b. FedEx 給 張三 送 信 送 得 很 快  
 FedEx gei Zhangsan song xin song de hen kuai  
 FedEx GEN ZS deliver letter deliver DE very fast  
 ‘FedEx delivers letters to Zhangsan very quickly’

(34) **The test: comparing the transitive (generic) with the ditransitive**

- a. ✓ FedEx 給 張三 比 USPS 的 一 般 服 務 送 信  
 FedEx gei Zhangsan bi USPS de yiban fuwu song xin  
 FedEx GEN Zhangsan BI USPS.GEN regular service deliver letter  
 送 得 快  
 song de kuai  
 deliver DE fast

‘FedEx delivers letters to Zhangsan faster than USPS’s regular service delivers letters (in general).’

- b. ?/# FedEx 比 USPS 給 張三 送 信 送 得 快  
 FedEx bi USPS gei Zhangsan song xin song de kuai  
 FedEx BI USPS GEN Zhangsan deliver letter deliver DE fast  
 Infelicitous: ‘FedEx delivers letters to Zhangsan faster than USPS does [ deliver letters to Zhangsan ]’

- Note that (34a) is appropriate for this context, but (34b). This is because the FedEx service for Zhangsan is faster than USPS’s service in general, but is not faster than USPS’s Zhangsan express service. Thus (34a) must be interpreted with the indirect object only in the standard, but not in the target.
- Lin (2009) and Liu (2010) explicitly rule out such structures with standards and targets of differing numbers of arguments.
- Norvin Richards and Omer Preminger have pointed out, however, that perhaps there’s some existential binding of the extra indirect object argument in the transitive case. It’s not clear to me, though, that this would yield the correct semantics in the comparative: in (34)’s ditransitive target, all the delivering is to Zhangsan. If we existentially bound the indirect object argument of the transitive (generic) standard in the same position, we would yield a standard of “ $\exists x$  USPS delivers letters to  $x$  quickly.”

## Appendix B: Ellipsis or multidominance? Inconclusive evidence from binding!

- Here we will look at reflexive binding using the complex reflexive *ta-ziji* (他自己) as it has been claimed to be clause-bound unlike the simplex reflexive *ziji* (自己) (Huang, 1984; Tang, 1989).
- If the syntactic mechanism employed here is ellipsis, we may expect both sloppy and strict readings to be available. If it’s multidominance, we may expect only the sloppy reading.

- (35) 張三 比 李四 討 厭 他 自 己  
 Zhangsan bi Lisi taoyan ta-ziji  
 ZS BI LS hate he-self

Subject	“_ hates _ more than _ hates _”	
PP	Z Z L L	sloppy
	Z L L L	??
	Z Z L Z	strict
YZ	Z Z L Z	strict only
LL	Z Z L L	sloppy only
ET	Z Z L Z	strict
	Z Z L L	sloppy

☞ Results inconclusive. ☹<sup>4</sup>

<sup>4</sup>Others have argued that *ta-ziji* does indeed also have a logophoric (but restricted) use (Yu, 2000). Perhaps this is complicating the results here.