



A transitive comparative with the transitive verb *duō*: a comparison along the cardinality of taxonomic unit events

C.-S. Luther Liu¹

Received: 14 October 2022 / Accepted: 18 September 2024 / Published online:
© The Author(s) 2025, corrected publication 2025

Abstract The Chinese *duō* verbal comparative is a type of transitive comparative; it is a degree rather than degreeless comparative. The transitive verb *duō* ‘DUO’ results from the incorporation of the quantity adjective *duō* ‘much’ into a light verb with comparison meaning. The quantity adjective *duō* ‘much’ takes the predicate-like phrase right after it as the argument-like adjunct clause; this clause semantically functions as the differential. Due to the Monotonicity Condition, this clause is turned into a set of taxonomic unit events by the Event Taxonomization Function, which applies at the taxonomic level identified by the lexical meaning of the verb, the classifier in the argument-like adjunct clause, and some other relevant factors. Assuming a comparison of two sets of taxonomic unit events along the cardinality of taxonomic events, the proposed degree analysis explains the syntactic and semantic particularities of the *duō* transitive comparative well. For example, the nominal object in the argument-like adjunct clause can be a bare noun, an indefinite NP, a definite NP, a proper name, or an interrogative nominal.

Keywords Argument-like adjunct clause · Degree · Monotonicity · Quantity adjective *duō* · Taxonomic unit event · Transitive comparative · Transitive verb *duō*

Abbreviations

ASP	Aspect marker
CL _n	Nominal classifier
CL _v	Verbal classifier
DE	Marker for modifying phrases

✉ C.-S. Luther Liu
cslu@nycu.edu.tw

¹ Department of Foreign Languages and Literatures, National Yang Ming Chiao Tung University, 1001 Ta Hsueh Road, Hsinchu 300, Taiwan

DUO	The semantic meaning associated with the transitive verb <i>duō</i>
SFP	Sentence final particle
SHAO	The semantic meaning associated with the negative counterpart of the transitive verb <i>duō</i> (i.e., <i>shǎo</i>)

1 Introduction

As Li (2015: 26–28) argues, a degree-based analysis for a Chinese comparative like (1a–b) will encounter the following three empirical and theoretical challenges.

- (1) a. Zhāngsān bǐ Lǐsì duō dú-le liáng-běn
 Zhangsan than Lisi DUO read-ASP two-CL_n
 xiǎoshuō.
 novel
 ‘Zhangsan’s reading novels exceeds Lisi’s reading novels by two novels.’
 b. Zhāngsān bǐ Lǐsì duō dú-le Jane Eyre hé
 Zhangsan than Lisi DUO read-ASP Jane Eyre and
 Pride and Prejudice.
 Pride and Prejudice
 ‘Zhangsan’s reading novels exceeds Lisi’s reading novels
 by *Jane Eyre* and *Pride and Prejudice*

First, according to the degree-based analysis, degree *d* is greater than degree *d'* if and only if degree *d* is equal to the sum of degree *d'* and degree *d''* and *d''* is not zero (Seuren 1973; Cresswell 1976; Hellan 1981; von Stechow 1984; Schwarzschild and Wilkinson 2002). Assuming this, for (1a) to be true, the number of novels that Zhangsan reads has to be equal to the sum of the number of novels that Lisi reads and some additional number of novels, but Zhangsan is not required to read all the novels that Lisi reads. However, the same does not hold in (1b), where the differential phrase is the proper name *Jane Eyre hé Pride and Prejudice* ‘Jane Eyre and Pride and Prejudice’ because, for (1b) to be true, Zhangsan has to read *Little Women* and *Wuthering Heights* if Lisi reads *Little Women* and *Wuthering Heights*. Hence, Li (2015: 28) says “a degree-based analysis as such ... is not truly degree-based, for it goes beyond a simple comparison of pure amounts”.

Second, as Li (2015) points out, the differential NP in (1a–b), as (2a) shows, is parallel to the NP object in non-comparative contexts because they both can be questioned with the *wh*-phrase *shénme* ‘what’; however, the differential phrase in a typical comparative cannot, as attested by the ungrammaticality of (2bii), which is derived from (2bi) by using the *wh*-phrase *shénme* ‘what’ to substitute for the differential phrase *liǎng-gōngfēn* ‘two-centimeter’.

- So, without enough motivation for a degree-based analysis, Li (2015) dubs a comparative like (1a–b) the degreeless verbal comparative and proposes a degreeless mapping analysis for it. According to her analysis, the truth conditions for (1a), which contains an indefinite NP differential phrase, are something like (4), which is derived by the one-to-one mapping governed by the constraint that “only

entities/quantity of the same sort/quantity can be mapped to each other” (Li 2015: 16–19):

- (4) Call the set of objects that Zhangsan read set A, the set that Lisi read set B. (1a) is a comparison between set A and set B such that every entity x in set B can be mapped to a unique $f(x)$ in set A at a specific taxonomic level. The difference between A and $f(B)$ ($f(B) = \{f(x): x \in B\}$) is not equal to A, and it includes two novels.

Assuming the truth conditions in (4), Li (2015: 20) suggests that the morpheme *duō* in the degreeless verbal comparative has the semantics in (5):

- (5) $\llbracket du\bar{o}_f \rrbracket^g = \lambda P_{\langle e, \langle e, t \rangle \rangle} \lambda k_e \lambda y_e \lambda x_e \forall z_e [P(z)(y) > \exists t_e [t = g(f)(z) \wedge \text{PROPER}(g(f)) \wedge P(t)(x) \wedge P(k)(x) \wedge \neg t \circ k]]$
- (6) PROPER is a function (of type $\langle \langle e, e \rangle, t \rangle$) which is true of $g(f)$ iff $g(f)$ preserves the taxonomic level introduced by the differential.

That is, *duō* takes four arguments. (A) It combines with the transitive verb and then combines with the differential argument k . (B) The variable y is the standard of comparison and the variable x is the target of comparison. (C) f is a mapping function, whose value is assigned by the assignment function g . (D) The condition ‘ $\neg t \circ k$ ’ means that there is no overlap between t and k .

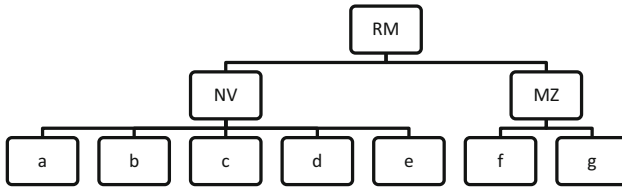
Accordingly, the final truth conditions of (1a) can be represented by (7) (Li 2015: 20–21):

- (7) $\llbracket Zh\bar{a}ngs\bar{a}n\ b\bar{i}\ L\bar{i}s\bar{i}\ du\bar{o}\ d\bar{u}-le\ li\bar{a}ng-b\bar{e}n\ xi\bar{a}oshu\bar{o}_f \rrbracket^g = 1$ iff $\exists x_e [novel(x) \wedge |x| \geq 2 \wedge \forall z_e [read(z)(Lisi) \rightarrow \exists t_e [t = g(f)(z) \wedge \text{PROPER}(g(f)) \wedge read(t)(Zhangsan) \wedge read(x)(Zhangsan) \wedge \neg t \circ x]]]$

Namely, there is an entity x composed of at least two atomic novels. For every entity z that Lisi read, there is an entity t ; t and z are of the same quantity and of the same sort at the taxonomic level identified by the differential. Zhangsan read t and x , and t does not overlap with x .

Central to Li’s (2015: 16) mapping-based analysis is the idea: in the degreeless verbal comparative, it is the differential phrase that indicates at what taxonomic level the mapping relation is established and how the different categories are related in the taxonomic hierarchy. For example, in (1a), the indefinite NP *liáng-běn xiǎoshuō* ‘two-CL_n novel’ indicates that the mapping has to be done at the taxonomic level of novels in a taxonomic hierarchy like (8), where the category of reading materials (i.e., *RM*), the category of novels (i.e., *NI*) and the category of magazines (i.e., *MZ*) are not of the same sort.

(8)



Namely, *a*, *b*, *c*, *d* and *e* all belong to the same taxonomic level (i.e., the level of novels) and are of the same sort; however, *f* and *g*, not belonging to the taxonomic level of novels, are sortally different from *a*, *b*, *c*, *d* and *e*. Given this, (1a) is felicitous in context (9), but infelicitous in context (10).

(9) Zhangsan: {*a*, *b*, *c*, *f*}

Lisi: {*d*, *g*}

(10) Zhangsan: {*a*, *b*, *c*}

Lisi: {*d*, *e*, *f*, *g*}

Insightful though Li's (2015) mapping-based analysis might be, some doubts about her analysis remain. First, as the semantic interpretation of (11) indicates, the taxonomic level where the mapping relation is established cannot be simply determined by the differential phrase in Li's (2015) sense because (11), though being three-way ambiguous, clearly indicates that the differential, depending on whether the reading conveyed by (11) is the internal reading (i.e., three couples), the external reading (i.e., six couples) or the mixed reading (i.e., four or five couples), is three marriages, six marriages or four/five marriages rather than 'those six young persons' (Carlson 1987; Hardt and Mikkelsen 2015).^{1,2}

¹ At the very beginning stage of this study, I did not consider the possibility that example (11) might convey the external reading. After presenting the early versions of this manuscript on two different occasions where the total audience was comprised of about 100 participants, I was frequently reminded by many in the audience, including some leading Chinese semanticists and syntacticians, that (11) might convey the internal and the external reading; some of the audience members even argued that the mixed reading is also possible. Besides, the two reviewers are not consistent in the interpretation of (11), either. One of them, in addition to saying "it is difficult to get the alleged external reading" and "the sentence in (11) may involve vagueness rather than ambiguity", asks "what, if anything, in the author's analysis would rule out a potentially "mixed" reading which integrates both the internal and external reading?" The other reviewer, on the other hand, points out to me clearly that "I am wondering whether the author has considered the possibility of the mixed reading where the differential is used to refer to four or five couples. ... I feel that (11) is true in such a context: There is a dating game where ten young people participated {*a*, *b*, *c*, *d*, *e*, *f*, *g*, *h*, *i*, *j*}. They can either find someone among themselves to marry or find someone outside the game to marry. Aunt Wang and Aunt Li are the two matchmakers in this game. In the end of the game, Aunt Wang has arranged the following marriages: {*a*&*b*; *c*&*d*; *e*&*f*; *g* & someone not in the game; *h* & someone not in the game}; Aunt Li arranged {*i*&*j*}". Given these remarks, and to respect the intuition of native speakers, of course including the reviewers, I would rather take an INCLUSIVE approach in considering the interpretation of (11). In spite of this, in footnote (15), I will propose a parametric analysis as a supplementary to my proposal to account for the variations among native speakers in the acceptability of the internal, the external, and the mixed reading.

² The ambiguity shown by (11) reminds us of the interpretation of the English *same* and *different* (Carlson 1987). The English *same* and *different* are always used as the representatives to show how an element shows the internal reading and the external reading. For instance, in (ia), *same* conveys the internal reading by having the

Footnote 2 continued

sentence provide ‘its own context’ (i.e., *as Bill did*) for the interpretation of *the same book*, whereas, in (ib), *same* conveys the external reading by having *the same book* refer to an antecedent outside the sentence *Bill read the same book* or in the surrounding discourse (i.e., *War and Peace*).

- (i) a. John read the same book as Bill did.
- b. John read War and Peace. Bill read the same book.

As Carlson (1987: 531) argues in his account for the semantics of *same* and *different*, “*same* and *different* involve, by virtue of their meanings, some kind of implicit comparison between two or more elements”, and this kind of comparison can be overtly or covertly expressed. For example, in (ia), comparison is overtly expressed by *as Bill did* in the phrase *the same book as Bill did*, and, through *same* inside, an identical relation between *the book John read* and *the one Bill read* is expressed. Given this, it is not implausible for us to say that a structure showing the internal-external ambiguity should involve two factors: comparison and a relation between the compared items. Keeping this in mind, let us shift our attention to the following three sentences provided by one anonymous reviewer to challenge my observation on (11).

- (ii) *Wáng gūmā cuòhé-le yí-ge niánqīng rén. (external reading)
Wang aunt match-ASP one-CL_n young person
- (iii) Wáng gūmā cuòhé-le liǎng-ge niánqīng rén.
Wang aunt match-ASP two-CL_n young person
‘Aunt Wang matches two young persons.’
- (iv) Zhāngsān cuòhé-le yí-zhuāng jiāoyì.
Zhangsan match-ASP one-CL_n transaction
‘Zhangsan matches a transaction.’

Based on (ii)–(iv), the reviewer reminds me of the following three issues: (A) it is difficult for her/him to get the alleged external reading for (ii) because (ii) is ungrammatical with the external reading, (B) example (iii) does not show him/her the internal-external ambiguity, and (C) the object NP of the verb *cuòhé* ‘match’, as (iv) shows, can be a singular one. I agree with the reviewer about the judgment of (ii)–(iv); however, I want to argue that they do not have any significant impact on my observation about (11). My response to issue (A) is that example (ii) does not convey the external reading because it does not involve ‘comparison’. The validity of this response can be attested by the clear contrast between (ii) and (v) in grammaticality.

- (v) Wáng gūmā bǐ Lǐ gūmā duō cuòhé-le yí-ge niánqīng rén.
Wang aunt than Lisi aunt DUO match-ASP one-CL_n young person
‘Aunt Wang’s arranging marriages exceeds Aunt Li’s arranging marriages by one marriage.’

Namely, in (v) the “comparison” overtly expressed by *bǐ Lǐ gūmā* ‘than Li Aunt’ works together with the lexical meaning of *cuòhé* ‘match’ to make the external reading possible for (v). However, the same does not happen in (ii) because it does not involve ‘comparison’. The unavailability of the external reading, then, makes (ii) ungrammatical because the semantic requirement of the verb *cuòhé* ‘match’ is not fulfilled. My response to issue (B) is similar to my response to issue (A); that is, the external reading is unavailable for (iii) because it does not involve ‘comparison’. This can be attested by the internal-external ambiguity shown by (vi), which involves ‘comparison’.

- (vi) Wáng gūmā bǐ Lǐ gūmā duō cuòhé-le liǎng-ge
Wang aunt than Li aunt DUO match-ASP two-CL_n
niánqīng rén.
young person
- a. The internal reading: ‘Aunt Wang’s arranging marriages exceeds Aunt Li’s arranging marriages by one marriage.’
- b. The external reading: ‘Aunt Wang’s arranging marriages exceeds Aunt Li’s arranging marriages by two marriages.’

- (11) Wáng gūmā bí Lǐ gūmā duō cuòhé-le
Wang aunt than Li aunt DUO match-ASP
nà liù-gè niánqīng rén.
that six-CL_n young person
- a. The internal reading: ‘Aunt Wang’s arranging marriages exceeds Aunt Li’s arranging marriages by three marriages; for these three marriages, each couple is formed by two of those six young persons.’
- b. The external reading: ‘Aunt Wang’s arranging marriages exceeds Aunt Li’s arranging marriages by six marriages; for each couple, one of the partners is provided by the surrounding discourse.’
- c. The mixed reading: ‘Aunt Wang’s arranging marriages exceeds Aunt Li’s arranging marriages by four or five marriages; for the four-marriage reading, among the four couples, two couples have a partner provided by the surrounding discourse; for the five-marriage reading, among the five couples, four couples have a partner provided by the surrounding discourse.’

Since the output of a matching event is a couple, the ‘unit’ for a mapping case is a couple rather than a single young person. So, contra Li (2015), to correctly identify the taxonomic level, the lexical meaning of the verb behind the marker *duō* ‘DUO’, at least, has to be taken into consideration.³

Footnote 2 continued

The lexical meaning of the noun *jiāoyì* ‘transaction’ provides a good hint for us to respond to issue (C). That is, although (iv) is similar to (ii) in having a singular object NP, the object NP in (iv) (i.e., *yí-zhuāng jiāoyì* ‘one-CL_n transaction’) semantically requires two or more participants to involve in the transaction event. This semantic requirement makes the object NP *yí-zhuāng jiāoyì* ‘one-CL_n transaction’ semantically compatible with the lexical meaning of the verb *cuòhé* ‘match’. So, (iv) is grammatical.

³ One anonymous reviewer wonders whether Li’s (2015) mapping-based analysis fails to capture all or some of the readings shown by (11). The reviewer, based on her/his understanding of Li’s (2015) analysis, reminds me that Li’s (2015) analysis might be rescued by having the differential-denoting phrase in (11) *nà liù-gè niánqīng rén* ‘that six-CL_n young person’ reinterpreted or rewritten as *nà liù-gè niánqīng rén de hūnyīn* ‘that six-CL_n young person DE marriage’. Assuming this, we would expect (11) to be able to be rewritten as (i) without any semantic change.

- (i) Wáng gūmā bí Lǐ gūmā duō cuòhé-le nà
Wang aunt than Li aunt DUO match-ASP that
liù-gè niánqīng rén de hūnyīn.
six-CL_n young person DE marriage
‘Aunt Wang’s matching events exceed Aunt Li’s matching events by matching marriages involving those six young persons.’

However, the meaning of (i) actually differs from that of (11) because (i) is felicitous under a scenario described by (ii), where *nà liù-gè niánqīng rén de hétóng* ‘that six-CL_n young person DE contract’

As the intuition of native speakers who accept the internal, the external, and the mixed readings of (11) further indicates, examples like (12)–(15), all of which contain a verb similar to *cuòhé* ‘match’, provide more empirical foundation and convincing evidence for the assumption that, when interpreting the meaning of a comparative like (1a–b), the lexical meaning of the verb behind the marker *duō* ‘DUO’ has to be taken into consideration.

- (12) Zhāngsān bǐ Lǐsì duō péiduì-le nà liù-zhī
 Zhangsan than Lisi DUO pair-ASP that six-CL_n
 èrhuán.
 earring
- a. The internal reading: ‘Zhangsan’s pairing earrings exceeds Lisi’s pairing earrings by three pairs; for these three pairs, each pair is formed by two of those six earrings.’
- b. The external reading: ‘Zhangsan’s pairing earrings exceeds Lisi’s pairing earrings by six pairs; for each pair, one of the earrings is provided by the surrounding discourse.’
- c. The mixed reading: ‘Zhangsan’s pairing earrings exceeds Lisi’s pairing earrings by four or five pairs; for the four-pair reading, among the four pairs, two pairs have one of the earrings provided by the surrounding discourse; for the five-pair reading, among the five pairs, four pairs have one of the earrings provided by the surrounding discourse.’
- (13) Tǔháo bǐ èbā duō chāisàn-le nà liù-ge
 bully than tycoon DUO break-up-ASP that six-CL_n
 niánqīng rén.
 young person

Footnote 3 continued

and *nà liù-ge niánqīng rén de hūnyīn* ‘that six-CL_n young person DE marriage’ both belong to the same taxonomic level where the comparison or mapping is made.

- (ii) Suǐrán Wáng gūmā hé Lǐ gūmā yìqǐ cuòhé-le
 though Wang aunt and Li aunt together match-ASP
 nà liù-ge niánqīng rén rén
 that six-CL_n young person person
 de hétong, dànsì Wáng gūmā bí Lǐ gūmā duō cuòhé-le nà
 DE contract but Wang aunt than Li aunt DUO match-ASP that
 liù-ge niánqīng rén de hūnyīn.
 six-CL_n young person DE marriage

‘Although Aunt Wang and Aunt Li work together to match the contracts involving those six young persons, Aunt Wang’s matching events exceed Aunt Li’s matching events by matching marriages involving those six young persons.’

(11), on the other hand, is infelicitous under the same scenario. Besides, one might suggest that Li (2015) still can derive the interpretations of (11) if the notion of ‘cover’ is incorporated into her analysis (Schwarzschild 1996). This suggestion does not work. As the external reading of (11) indicates, twelve young persons are needed; however, the sentence itself can only provide six young persons if the lexical meaning of the verb *cuòhé* ‘match’ and the notion of ‘comparison’ are not taken into consideration.

- a. The internal reading: ‘The bully’s breaking couples exceeds the tycoon’s breaking couples by three couples; for these three couples, each couple is formed by two of those six young persons.’
- b. The external reading: ‘The bully’s breaking couples exceeds the tycoon’s breaking couples by six couples; for each couple, one partner of the couple is provided by the surrounding discourse.’
- c. The mixed reading: ‘The bully’s breaking couples exceeds the tycoon’s breaking couples by four or five couples; for the four-couple reading, among the four couples, two couples have one of the partners provided by the surrounding discourse; for the five-couple reading, among the five couples, four couples have one of the partners provided by the surrounding discourse.’
- (14) Zhūgěliàng bǐ Zhōuyóu duō líjiàn-le liù-ge Cáocǎo zhènyíng
Zhugeliang than Zhouyu DUO alienate-ASP six-CL_n Caocao camp
de rén.
DE person
- a. The internal reading: ‘Zhugeliang’s alienating two-member-teams exceeds Zhouyu’s alienating two-member-teams by three teams; for these three teams, each team is formed by two of those six persons in Caocao’s camp.’
- b. The external reading: ‘Zhugeliang’s alienating two-member-teams exceeds Zhouyu’s alienating two-member-teams by six teams; for each team, one member of the team is provided by the surrounding discourse.’
- c. The mixed reading: ‘Zhugeliang’s alienating two-member-teams exceeds Zhouyu’s alienating two-member-teams by four or five teams; for the four-team reading, among the four teams, two teams have one of the members provided by the surrounding discourse; for the five-team reading, among the five teams, four teams have one of the members provided by the surrounding discourse.’
- (15) Zhūgěliàng bǐ Zhōuyóu duō tiǎobō-le liù-ge Cáocǎo zhènyíng
Zhugeliang than Zhouyu DUO disharmonize-ASP six-CL_n Caocao camp
de rén.
DE person.
- a. The internal reading: ‘Zhugeliang’s disharmonizing two-member-teams exceeds Zhouyu’s disharmonizing two-member-teams by three teams; for these three teams, each team is formed by two of those six persons in Caocao’s camp.’
- b. The external reading: ‘Zhugeliang’s disharmonizing two-member-teams exceeds Zhouyu’s disharmonizing two-member-teams by six teams; for each team, one member of the team is provided by the surrounding discourse.’

- c. The mixed reading: ‘Zhugeliang’s disharmonizing two-member-teams exceeds Zhouyu’s disharmonizing two-member-teams by four or five teams; for the four-team reading, among the four teams, two teams have one of the members provided by the surrounding discourse; for the five-team reading, among the five teams, four teams have one of the members provided by the surrounding discourse.’

Second, Li (2015) also makes a wrong prediction about the interpretation of (16a–c), in which the differential phrase, as Li (2015) argues, is the proper name *Lǐníng hé Wángguān* ‘Lining and Wangguan’.

- (16) a. Wáng gūmā bí Lǐ gūmā duō cuòhé-le Lǐníng hé Wángguān.
 Wang aunt than Li aunt DUO match-ASP Lining and Wangguan
 i. The internal reading: ‘Aunt Wang’s arranging marriages exceeds Aunt Li’s arranging marriages by one marriage.’
 ii. The external reading: ‘Aunt Wang’s arranging marriages exceeds Aunt. Li’s arranging marriages by two marriages: one for Lining and the other for Wangguan, and, for each couple, one of the partners is provided by the surrounding discourse.’
 b. Tūháo bǐ èbā duō chāisàn-le Lǐníng hé
 bully than tycoon DUO break-up-ASP Lining and Wangguan.
 i. The internal reading: ‘The bully’s breaking couples exceeds the tycoon’s breaking couples by one couple; that couple is formed by Lining and Wangguan.’
 ii. The external reading: ‘The bully’s breaking couples exceeds the tycoon’s breaking couples by two couples; for each of these two couples, one partner of the couple is provided by the surrounding discourse.’
 c. Zhūgěliàng bǐ Zhōuyóu duō lǐjiàn-le Cáohóng hé Cáorén.
 Zhugeliang than Zhouyu DUO alienate-ASP Caohong and Caoren
 i. The internal reading: ‘Zhugeliang’s alienating two-member-teams exceeds Zhouyu’s alienating two-member-teams by one team; this team is formed by Caohong and Caoren.’
 ii. The external reading: ‘Zhugeliang’s alienating two-member-teams exceeds Zhouyu’s alienating two-member-teams by two teams; for each of these two teams, one member of the team is provided by the surrounding discourse.’

Take (16a) for example; Li's (2015) analysis would expect Aunt Wang to arrange marriages for Linpin and Zhangli if Aunt Li arranges marriages for Linpin and Zhangli. However, the fact does not bear out this expectation.⁴

Since the semantic interpretation of (11)–(16a–c) leaves room for further study on a comparative like (1a–b), the purpose of this paper is to investigate the syntax and semantics of this type of comparative (for ease of exposition, I will tentatively use 'the *duō* verbal comparative' to represent it). In Sect. 2, I first go into the syntactic and semantic properties of this construction, and, then, point out the

⁴ As one anonymous reviewer reminds me, what I have observed for (11)–(16a–c) may involve vagueness rather than ambiguity because (i), though typically conveying the (a) reading, might also allow the (b) reading if the context is right.

- (i) Sam and Morgan married in 2012.
 a. 'Sam and Morgan formed a spousal relationship in 2012.'
 b. 'Sam and Morgan both married in 2012.'

I want to argue that the vagueness shown by (i) should not be considered as a case of the internal-external ambiguity. According to Lin (1998), a Chinese predicate cannot be interpreted as distributive by itself unless it is a distributive predicate; however, an English predicate can be interpreted as either distributive or non-distributive if the context allows, as the contrast between (iia–b) and (iii) illustrates.

- (ii) a. Tāmen mǎi-le yī-jīān fángzi.
 they buy-ASP one-CL_n house
 'They bought a house together.'
 b. Tāmen dōu mǎi-le yī-jīān fángzi.
 they all buy-ASP one-CL_n house
 'They each bought a house.'
- (iii) Alice and Bob opened {the/a} door.
 a. Alice opened {the/a} door, and Bob opened {the/a} door.
 b. Alice and Bob opened {the/a} door jointly but not individually.

Given this, I suggest that the vagueness shown by (i) actually results from the possibility of having the English predicate *marry* interpreted as distributive or non-distributive. So, the vagueness shown by (i) is not the same as the internal-external ambiguity in nature. The fact that the Chinese counterpart of (i) (i.e., (iv)) is not ambiguous in the same way provides further evidence for the validity of my response.

- (iv) Lǐníng hé Wángguān zài 2012 nián jiéhūn.
 Lining and Wangguan at 2012 year marry
 'Lining and Wangguan formed a spousal relationship in 2012.'

Namely, the unavailability of the distributive interpretation of the Chinese predicate *jiéhūn* 'marry' makes the 'one-couple' reading the only reading available for (iv), and this reading in some sense can be pragmatically understood as the internal reading. In contrast, the distributive reading is the only possible reading for (v), in which the adverb *dōu* 'all', as Lin (1998) argues, functions to distribute the property denoted by the predicate over the set of individuals denoted by the subject NP, and this reading, for some native speakers, can be further understood as the external reading pragmatically.

- (v) Lǐníng hé Wángguān dōu zài 2012 nián jiéhūn.
 Lining and Wangguan all at 2012 year marry
 'Lining and Wangguan both married in 2012.'

questions raised by them. In Sect. 3, a proposal with the following three main themes will be made for the syntax and semantics of the *duō* verbal comparative.

First, the *duō* verbal comparative is a type of transitive comparative. The transitive verb *duō* ‘DUO’ is derived by having the quantity adjective *duō* ‘much’ incorporated into the light verb *v* that carries the comparison meaning.

Second, the transitive verb *duō* ‘DUO’ takes the predicate-like phrase right after it as the argument-like adjunct clause in Ernst’s (1996; 2014) term (or *búyǔ zǐjù* in a traditional term like Liu et al. (2004)).⁵ To ensure the comparison involved conforms to the Monotonicity Condition, this argument-like adjunct clause has to be turned into a set of taxonomic unit events (henceforth TU events) by the Event Taxonomization Function, which applies at the taxonomic level conjunctively determined by the lexical meaning of the verb and the classifier in the argument-like adjunct clause and some other relevant factors.

Third, the quantity adjective *duō* ‘much’ introduces a measure function which takes as input the set of TU events derived by the Event Taxonomization Function and returns a degree. This degree is the difference between the degree about the cardinality of the set of TU events carried out by the target of comparison and the degree about the cardinality of the set of TU events carried out by the standard of comparison. In Sect. 4, I use four representative examples to demonstrate how the proposed analysis works. The implications of the proposal will be discussed in Sect. 5. Then, some remarks on Li (2015) will be provided in Sect. 6. Finally, Sect. 7 consists of the concluding remarks.

2 The syntactic and semantic properties of *duō* verbal comparative

I start this section by discussing the syntactic and semantic properties of the *duō* verbal comparative, and end it by crystallizing the empirical and theoretical questions raised by these properties.

First, the verb right after the marker *duō* ‘DUO’ can be an activity verb, a stative verb, an achievement verb, an accomplishment verb or a semelfactive verb, as shown by (17a–e), respectively (Li 2015: 10–11).

- (17) a. Zhāngsān bí Lǐsì duō pǎo-le yī-bǎi-gōngchǐ.
 Zhangsan than Lisi DUO run-ASP one-hundred-meter
 ‘Zhangsan’s running exceeds Lisi’s running by one hundred meters.’
 b. Zhāngsān bí Lǐsì duō dǒng liáng-zhǒng yǔyán.
 Zhangsan than Lisi DUO know two-CL_n language
 ‘Zhangsan’s knowing languages exceeds Lisi’s knowing languages
 by two languages.’
 c. Zhāngsān bí Lǐsì duō yíng-le wú-bǎi-kuài.
 Zhangsan than Lisi DUO win-ASP five-hundred-dollar
 ‘Zhangsan’s winning money exceeds Lisi’s winning money by five
 hundred dollars.’

⁵ Please see Sect. 3 for what is an argument-like adjunct clause.

- d. Zhāngsān bǐ Lǐsì duō dǎpò-le yí-ge bēizi.
Zhangsan than Lisi DUO break-ASP one-CL_n cup
‘Zhangsan’s breaking cups exceeds Lisi’s breaking cups by one cup.’
- e. Zhāngsān bǐ Lǐsì duō ké-le liǎng-shēng.
Zhangsan than Lisi DUO cough-ASP two-CL_v
‘Zhangsan’s coughing exceeds Lisi’s coughing by two times.’

Second, the verb right after the marker *duō* ‘DUO’ can be a ditransitive verb, a transitive verb or an unaccusative/unergative intransitive verb, as illustrated by (18a–d), respectively.

- (18) a. Zhāngsān bǐ Lǐsì duō sòng Wángwǔ
Zhangsan than Lisi DUO give Wangwu
liáng-běn shū.
two-CL_n book
‘Zhangsan’s giving Wangwu books exceeds Lisi’s giving Wangwu books by two books.’
- b. Zhāngsān duō mǎi-le
Zhangsan DUO buy-ASP
yì-běn shū.
one-CL_n book
‘Zhangsan’s buying books exceeds someone’s buying books by one book.’
- c. Jīntiān duō lái-le
today DUO come-ASP
liǎng-ge kèrén.
two-CL_n guest
‘Today, there came two more guests.’
- d. Zhāngsān duō tiào-le
Zhangsan DUO jump-ASP
liǎng-cì.
two-CL_v
‘Zhangsan’s jumping exceeds someone’s jumping by two times.’

Third, the *duō* verbal comparative does not allow its predicate to be modified by a degree adverb (e.g., *gèng* ‘even-more’), as the ungrammaticality of (19) shows.

- (19) *Zhāngsān bǐ Lisi gèng’ duō mǎi yì-běn shū
Zhangsan than Lisi even-more DUO buy one-CL_n book

Fourth, in the *duō* verbal comparative, the marker *duō* ‘DUO’ and the verb right after it belong to two independent syntactic constituents, as the semantic ambiguity of (20) attests.⁶

⁶ As one anonymous reviewer reminds me, it is marginal or even impossible to use the coordinator *hé* ‘and’ to link two predicates. However, as the grammaticality of the following examples indicates, this belief needs further consideration (Liu et al. 2004).

- (i) Zhèngfǔ tíchàng hé tuīxíng jìhuà shēngyù.
government promote and pursue plan give.birth
‘The government promotes and pursues the family plan.’
- (ii) Wǒmen bìxū dǎpò chángguī qù fāxiàn, xuǎnbá hé péiyǎng jiéchū de réncái.
we must break routine go find select and cultivate excellent DE talent
‘We have to break the routines to find, select and cultivate the excellent talents.’

Besides, examples like (20) are not seldom found; (iii) and (iv) are some of them.

- (iii) Zhāngsān xiǎng zài duō mǎi yìxiē bù hé
Zhangsan want again DUO buy some cloth and
zuò yí-jiàn yīfú.
make one-CL_n clothing
a. ‘Zhangsan wants to have his buying cloth exceed the contextually determined standard by some more cloth and his making clothing exceed the contextually determined standard by one article of clothing.’
b. ‘Zhangsan wants to make one article of clothing and have his buying cloth exceed the contextually determined standard by some more cloth.’
- (iv) Zhāngsān. xiǎng zài duō zhù jǐ tiān hé huā
Zhangsan want again DUO live several day and spend
diǎn qián
a.little money
a. ‘Zhangsan wants to have his staying exceed the contextually determined standard by some more days and his spending money exceed the contextually determined standard by some more money.’
b. ‘Zhangsan wants to spend some money and have his staying exceed the contextually determined standard by some more days.’

Furthermore, example (va) can be considered as a reduced form of (vb), as attested by (via), which is a reduced form of (vib).

- (v) a. Duō dú huò shǎo dú yī-yè yíngxiǎng bú dà.
DUO read or SHAO read one-page affect not big
‘The impact of reading one more or one less page is not significant.’
b. Duō dú yī-yè huò shǎo dú yī-yè yíngxiǎng bú dà.
DUO read one-page or SHAO read one-page affect not big
‘The impact of reading one more or one less page is not significant.’
- (vi) a. Nǐ qù huò bú qù xuéxiào yíngxiǎng bú dà.
you go or not go school affect not big
‘It does not make much of a difference whether you go to school or not.’
b. Nǐ qù xuéxiào huò bú qù xuéxiào yíngxiǎng bú dà.
you go school or not go school affect not big
‘It does not make much of a difference whether you go to school or not.’

- (20) Wó xiàng zài duō hē yì-bēi kāfēi hé chī
 I want again DUO drink one-CL_n coffee and eat
 yí-kuài jīkuài.
 'one-CL_n chicken.nugget
 a. 'I want to have my coffee drinking exceed the contextually determined standard by one more cup of coffee and my chicken nugget eating to exceed the contextually determined standard by one more chicken nugget.'
 b. 'I want to eat one chicken nugget and have my coffee drinking exceed the contextually determined standard by one more cup of coffee.'

In other words, readings (20a–b) have (21a–b) as their corresponding syntactic structure.

- (21) a. Wó xiǎng zài duō [hē yì-bēi kāfēi hé chī yí-kuài jīkuài].
 I want again DUO drink one-CL_n coffee and eat one-CL_n chicken.nugget
 b. Wó xiǎng zài [duō [hē yì-bēi kāfēi]] hé [chī yí-kuài jīkuài].
 I want again DUO drink one-CL_n coffee and eat one-CL_n chicken.nugget

Fifth, in the *duō* verbal comparative, the subject NP functions as the target of comparison; the standard of comparison is introduced by the preverbal phrase headed by the preposition *bǐ* 'than' and, as Li (2015: 2) argues, the differential, being an obligatory element, occurs as the nominal expression right after the verb behind *duō* 'DUO'.

- (22) [[_{subject} Zhāngsān][_{PP} bǐ Lǐsì] duō mǎi * ([_{object} yì-běn shū)]].
 Zhangsan than Lisi DUO buy one-CL_n book
 'Zhangsan's buying books exceeds Lisi's buying books by one book.'

Sixth, as Li (2015: 7–10) argues, the differential-denoting phrase, on the one hand, can be the thematic object of a transitive or ditransitive verb, the internal theme argument of an unaccusative verb, or the postverbal measure for a verb; on the other hand, it can be a bare noun, an indefinite NP, a definite NP, a proper name, or an interrogative nominal, as shown by (23a–e) and (24a–e), respectively.

- (23) a. Zhāngsān bǐ Lǐsì duō mǎi-le yì-běn shū.
 Zhangsan than Lisi DUO buy-ASP one-CL_n book
 'Zhangsan's buying books exceeds Lisi's buying books by one book.'
 b. Zhāngsān bǐ Lǐsì duō sòng Wángwǔ *(liǎng-běn shū).
 Zhangsan than Lisi DUO give Wangwu two-CL_n book
 'Zhangsan's giving Wangwu books exceeds Lisi's giving Wangwu books by two books.'
 c. Zhāngsān bǐ Lǐsì duō sòng *(liǎng-ge rén) lǐwù.
 Zhangsan than Lisi DUO give two-CL_n person gift

- ‘Zhangsan’s giving people gifts exceeds Lisi’s giving people gifts by two persons.’
- d. Jīntiān duō lái-le *(liǎng-ge kèrén).
today DUO come-ASP two-CL_n guest
‘Today, there came two more guests.’
- e. Zhāngsān bǐ Lǐsì duō pǎo *(shí-fēnzōng).
Zhangsan than Lisi DUO run ten-minute
‘Zhangsan’s running exceeds Lisi’s running by ten minutes.’
- (24) a. Zhāngsān bǐ Lǐsì duō mǎi-le bàozhǐ.
Zhangsan than Lisi DUO buy-ASP newspaper
‘Zhangsan’s buying reading materials exceeds Lisi’s buying reading materials by also including the category of newspaper.’
- b. Zhāngsān bǐ Lǐsì duō mǎi-le yì-běn xiǎoshuō.
Zhangsan than Lisi DUO buy-ASP one-CL_n novel
‘Zhangsan’s buying novels exceeds Lisi’s buying novels by one novel.’
- c. Zhāngsān bǐ Lǐsì duō mǎi-le zhè-píng shuǐ.
Zhangsan than Lisi DUO buy-ASP this-CL_n novel
‘Zhangsan’s buying bottled water exceeds Lisi’s buying bottled water by this bottle of water.’
- d. Zhāngsān bǐ Lǐsì duō mǎi-le Hónglómèng.
Zhangsan than Lisi DUO buy-ASP Dream-of-the-Red-Chamber
‘Zhangsan’s buying novels exceeds Lisi’s buying novels by Dream of the Red Chamber.’
- e. Zhāngsān bǐ Lǐsì duō mǎi-le shénme?
Zhangsan than Lisi DUO buy-ASP what
‘By what does Zhangsan’s buying exceed Lisi’s buying?’

However, as the semantic interpretations of (11)–(15) indicate, the differential in the *duō* verbal comparative cannot be simply identified as the entities denoted by the nominal expression right after the verb behind the marker *duō* ‘DUO’. The differential should be ‘something’ related to the predicate-like phrase right after the marker *duō* ‘DUO’ (e.g., *cuòhé-le nà liù-gè niánqīng rén* ‘match-ASP that six-CL_n young person’ in (11)), because, to get the internal, the external and the mixed reading for (11), the lexical meaning of the verb *cuòhé* ‘match’ and other relevant factors (e.g., comparison) must be taken into consideration. Besides, the type of the classifier in the predicate-like phrase right after the marker *duō* ‘DUO’ also plays a crucial role in identifying the differential, as attested by the fact that, in (25), which contains the verbal classifier *cì* ‘time’, the differential is ‘three book-buying events’ rather than ‘three books’.

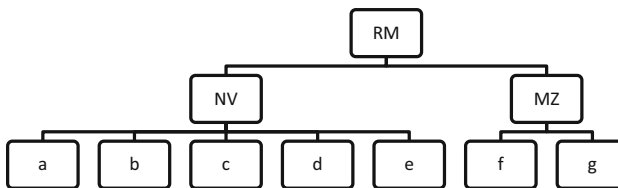
- (25) Zhāngsān bǐ Lǐsì duō mǎi-le sān-cì shū.
Zhangsan than Lisi DUO buy-ASP three-CL_v book
‘The number of Zhangsan’s book-buying events exceeds the number of Lisi’s book-buying events by three book-buying events no matter how many books Zhangsan and Lisi have each bought.’

Seventh, according to Li's (2015: 14–18) degreeless mapping analysis, depending on whether the object of the verb right after the marker *duō* 'DUO' has a concrete configuration, the mapping involved in the *duō* verbal comparative must be subject to the constraint of sort or quantity. That is, what is mapped must be of the same sort or quantity. As for the constraint of sort, (26a–c), where the object of the verb right after the marker *duō* 'DUO' has a concrete configuration, it can be used as the representative to demonstrate how this constraint works.

- (26) a. Zhāngsān bǐ Lǐsì duō mǎi-le yì-běn xiǎoshuō/zhè-běn xiǎoshuō.
Zhangsan than Lisi DUO buy-ASP one-CL_n novel/this-CL_n novel
'Zhangsan's buying novels exceeds Lisi's buying novels by one novel/this novel.'
- b. Zhāngsān bǐ Lǐsì duō mǎi yì-zhǒng dúwù.
Zhangsan than Lisi DUO buy one-CL_n reading-material
'Zhangsan's buying reading materials exceeds Lisi's buying reading materials by one reading material.'
- c. Zhāngsān bǐ Lǐsì duō dú-le Hónglóumèng.
Zhangsan than Lisi DUO read-ASP Dream-of-the-Red-Chamber
'Zhangsan's reading novels exceeds Lisi's reading novels by Dream of the Red Chamber.'

(A) As the semantic interpretation of (26a) shows, when the object is an indefinite NP or a definite NP (i.e., *yì-běn xiǎoshuō* 'one-CL_n novel' and *zhè-běn xiǎoshuō* 'this-CL_n novel'), the mapping must be done at the taxonomic level of novels in a taxonomic hierarchy like (27). (For ease of exposition, I use *RM* to represent 'reading material', *NV* 'novel' and *MZ* 'magazine'.)

(27)



That is, *a*, *b*, *c*, *d* and *e* belong to the same taxonomic level (i.e., the level of novels) and are of the same sort. However, *f* and *g*, not belonging to the taxonomic level of novels, are sortally different from *a*, *b*, *c*, *d* and *e*. Given this, (26a) is felicitous in context (28), but infelicitous in context (29).

(28) Zhangsan: {*a*, *b*, *c*, *f*}

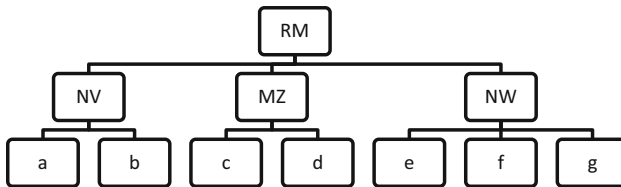
Lisi: {*d*, *e*, *g*}

(29) Zhangsan: {*a*, *b*, *c*}

Lisi: {*d*, *f*, *g*}

(B) As attested by the semantic interpretation of (26b), where the object is the kind-referring NP *yì-zhǒng dúwù* ‘one-CL_n reading-material’, the mapping must be done at the taxonomic level of reading materials in a taxonomic hierarchy like (30). (For ease of exposition, I use *RM* to represent ‘reading material’, *NV* ‘novel’, *MZ* ‘magazine’, and *NW* ‘newspaper’.)

(30)



Namely, *novel*, *magazine* and *newspaper* are at the same taxonomic level (i.e., the level of reading materials) and, thus, belong to the same sort. However, *a*, which belongs to the level of novels, and *c*, which belongs to the level of magazines, for example, are not of the same sort. So, (26b) is felicitous in context (31), but infelicitous in context (32).

(31) Zhangsan: {a, c, e}

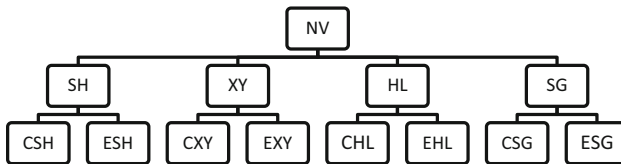
Lisi: {d, f}

(32) Zhangsan: {a, c, d, e}

Lisi: {f, g}

(C) As indicated by the semantic interpretation of (26c), where the object is the proper name *Hónglómèng* ‘Dream of the Red Chamber’, the mapping must be done under a taxonomic hierarchy like (33), where different novels (e.g., *Shuǐhǔzhuàn* ‘Water Margin’, *Xīyóujì* ‘The Journal to the West’, *Hónglómèng* ‘Dream of the Red Chamber’ and *Sānguózhì* ‘Romance of Three Kingdoms’) belong to different taxonomic levels, but different versions of the same novel (e.g., the Chinese version of *Shuǐhǔzhuàn* ‘Water Margin’ and the English version of *Shuǐhǔzhuàn* ‘Water Margin’) belong to the same taxonomic level. So, the novel *Shuǐhǔzhuàn* ‘Water Margin’ and the Chinese version of *Shuǐhǔzhuàn* ‘Water Margin’ belong to different taxonomic levels (Li 2015: 17). (For ease of exposition, I use *SH* to represent *Shuǐhǔzhuàn* ‘Water Margin’, *XY* *Xīyóujì* for ‘The Journal to the West’, *HL* *Hónglómèng* for ‘Dream of the Red Chamber’, *SG* *Sānguózhì* for ‘Romance of Three Kingdoms’, *CSH* for the Chinese version of *SH*, *ESH* for the English version of *SH*, *CXY* for the Chinese version of *XY*, *EXY* for the English version of *XY*, *CHL* for the Chinese version of *HL*, *EHL* for the English version of *HL*, *CSG* for the Chinese version of *SG*, and *ESG* for the English version of *SG*.)

(33)



Hence, Li (2015) correctly predicts that (26c) is felicitous in context (34), where Zhangsan reads *SH*, *XY* and *HL* and Lisi reads *SH* and *XY*, but infelicitous in context (35), where Zhangsan does not read *XY*.

(34) Zhangsan: {*SH*, *XY*, *HL*}

Lisi: {*SH*, *XY*}

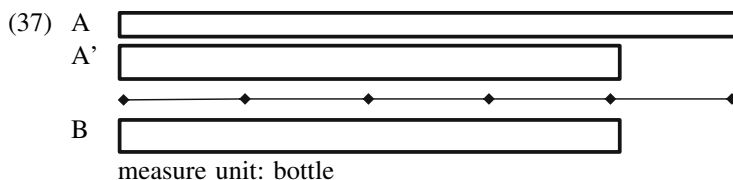
(35) Zhangsan: {*SH*, *HL*}

Lisi: {*SH*, *XY*}

As for the constraint of quantity, let us use example (36), where the object of the verb right after the marker *duō* ‘DUO’ (i.e., *shuǐ* ‘water’) is without a concrete configuration, to show how this constraint works.

(36) Zhāngsān bǐ Lǐsì duō mǎi-le liǎng-píng shuǐ.
 Zhangsan than Lisi DUO buy-ASP two-CL_n water
 ‘Zhangsan’s buying bottled water exceeds Lisi’s buying bottled
 water by two bottles of water.’

Given the constraint of quantity, the mapping involved, as Li (2015: 18) argues, has to be done under a measure system like (37).

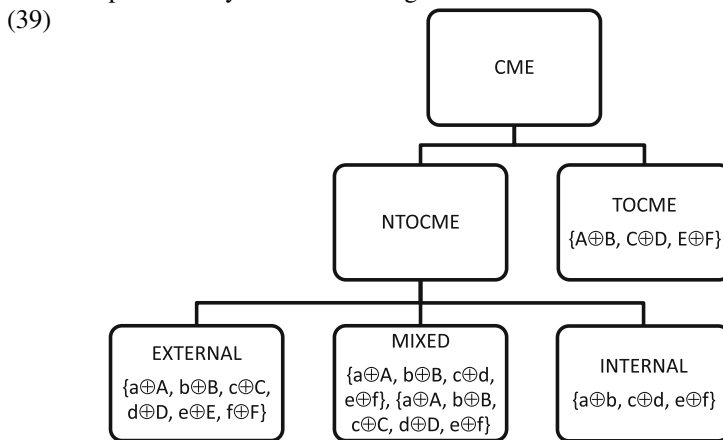


That is, the quantity of bottled water Zhangsan bought is *A* and *A'* is a proper part of *A*. If *A'* is equal to *B* and *B* is the quantity of bottled water Lisi bought, then the quantity of bottled water Zhangsan bought is greater than the quantity Lisi bought.

However, as I have argued, the ‘sort’ cannot be simply defined by the taxonomic category to which the object of the verb right after the marker *duō* ‘DUO’ belongs.

For example, as the three-way ambiguity of (11), repeated as (38), indicates, the sort is the category of the non-two-outsider-couple matching events (i.e., *NTOCME*) under a taxonomic hierarchy of couple-matching events like (39).⁷

- (38) Wáng gūmā bí Lǐ gūmā duō cuòhé-le nà liù-ge
 Wang aunt than Li aunt DUO match-ASP that six-CL_n
 niánqīng rén.
 young person
- a. The internal reading: ‘Aunt Wang’s arranging marriages exceeds Aunt Li’s arranging marriages by three marriages; for these three marriages, each couple is formed by two of those six young persons.’
- b. The external reading: ‘Aunt Wang’s arranging marriages exceeds Aunt Li’s arranging marriages by six marriages; for each couple, one of the partners is provided by the surrounding discourse.’
- c. The mixed reading: ‘Aunt Wang’s arranging marriages exceeds Aunt Li’s arranging marriages by four or five marriages; for the four-marriage reading, among the four couples, two couples have a partner provided by the surrounding discourse; for the five-marriage reading, among the five couples, four couples have a partner provided by the surrounding discourse.’



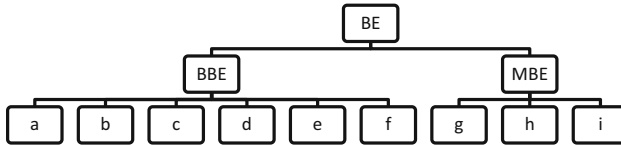
That is, for (38) to be true, there must be two sets of *NTOCMEs* which are compared along the cardinality of *NTOCMEs* under a taxonomic hierarchy like (39), and the differential, depending on whether the reading conveyed by (38) is the internal, the external, or the mixed one, might be three couples, six couples or

⁷ I use *CME* to represent the couple matching event, *TOCME* the two-outsider-couple matching event and *NTOCME* the non-two-outsider-couple matching event. The term ‘outsider’ represented by a capital letter like *A* means a partner from the surrounding discourse, and the term ‘insider’ represented by a small letter like *a* means a partner provided by the sentence itself. A *TOCME* is an event in which the couple is formed by two outsiders. A *NTOCME* is an event in which the couple might be formed by one insider and one outsider or by two insiders.

four/five couples. So, to identify the ‘sort’, at least, the lexical meaning of the verb right after the marker *duō* ‘DUO’ must be taken into consideration.

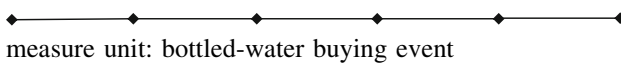
Furthermore, the verbal classifier like *cí* ‘time’ in (25) also indicates that the ‘sort’ is the category of book-buying events rather than the category defined by the object of the verb right after the marker *duō* ‘DUO’ (i.e., *shū* ‘book’). So, the interpretation of (25) must be done at the taxonomic level of book-buying events under a taxonomic hierarchy of buying events like (40). (Here, I use *BE* to represent the buying event, *BBE* the book-buying event and *MBE* the magazine-buying event.)

(40)



Following this way of reasoning, I would like to suggest that example (36), which, as Li (2015) suggests, is subject to the constraint of quantity, has a semantic interpretation as follows. Namely, for (36) to be true under a measure system like (41), there are two sets of bottled-water buying events, they are compared along the cardinality of bottled-water buying events, and the differential is ‘two bottled-water buying events’.

(41)



Assuming this, for (36), the differential can be understood as the cardinality of the set of bottled-water buying events ‘generated’ from the predicate-like phrase right after the marker *duō* ‘DUO’ (i.e., *mǎi-le liǎng-píng shuǐ* ‘buy-ASP two-bottle water’).⁸

⁸ One anonymous reviewer challenges this assumption by saying that two additional events of bottled-water buying (i.e., the differential) does not necessarily lead to the purchase difference of two bottles of water, and reversely, a difference of two bottles of water does not necessarily require two events of bottled-water buying. For example, suppose when preparing for an upcoming group trip on a very tight budget, Zhangsan bought 10 liters of water at an automatic water dispenser, and Lisi bought 5 liters of water at the same water dispenser. Both Zhangsan and Lisi used their own containers to bring the water back home. After that, Zhangsan poured his water into 20 500-ml small bottles, and Lisi poured his water into 10 500-ml bottles. Under such a scenario, it is perfectly fine to say (i).

- (i) Zhāngsān bǐ Lǐsì duō mǎi-le shí-píng shuǐ.
 Zhangsan than Lisi DUO buy-ASP ten-bottle water
 ‘Zhangsan’s buying bottled water exceeds Lisi’s buying bottled water by ten bottles of water.’

So, the reviewer says that the water buying event does not involve water in bottles at all, not to mention minimal quantity as required by the nominal classifier *píng* ‘bottle’. Nevertheless, I want to argue the reviewer’s argument cannot hold. Namely, when Zhangsan bought water at the automatic water dispenser, there must be some measure system pre-programmed into the automatic water dispenser, by which the quantity of water that Zhangsan bought was measured, and the same happened in Lisi’s water buying event. Since they bought water at the same automatic water dispenser, they ‘used’ the same measure system. Without this measure system, neither can Zhangsan know the quantity of the water he bought, nor can Lisi. As the reviewer says, after going back home, Zhangsan can pour the water he bought into 20 500-ml small bottles, and Lisi can pour the water he bought into 10 500-ml small bottles. Although (i), as the reviewer says, is felicitous under such a scenario, this scenario cannot constitute an empirical challenge to my account for (36). That is, under this ‘bigger’ scenario, there are two smaller scenarios: the water buying scenario and the water pouring scenario. What was used in the water buying

Thus far, the syntactic and semantic properties shown by the *duō* verbal comparative bring us the following empirical and theoretical questions that any study on the *duō* verbal comparative cannot evade.⁹

First, what is the syntactic status of the marker *duō* ‘DUO’ in the *duō* verbal comparative?

Second, what is the syntactic structure of the *duō* verbal comparative?

Third, what are compared in the *duō* verbal comparative?

Fourth, what kind of semantic role does *duō* ‘DUO’ play in the *duō* verbal comparative?

Fifth, what makes the predicate of the *duō* verbal comparative unable to be modified by a degree adverb?

Sixth, which constituent, if there is one, is the genuine differential-denoting phrase in the *duō* verbal comparative?

In the following, I will begin Sect. 3 by briefly introducing the main themes of my proposal for the syntax and semantics of the *duō* verbal comparative, and then use four representative examples to demonstrate how my analysis deals with the empirical and theoretical questions raised by this construction.

3 Proposal: a comparison of two sets of taxonomic events

In a nutshell, my proposal for the syntax and semantics of the *duō* verbal comparative consists of the following four major themes.

First, assuming that the lexical entry *duō* ‘much’ in a canonical transitive comparative like (42) is a transitive verb, I suggest that the morpheme *duō* ‘DUO’ in the *duō* verbal comparative (e.g., (43)) is also a transitive verb but this transitive verb is derived by having the quantity adjective *duō* ‘much’ incorporated into the light verb *v* that carries the comparison meaning. (Henceforth, I dub the *duō* verbal comparative the *duō* transitive comparative.)

Footnote 8 continued

event, for example, is the liter-unit measure system pre-programmed into the automatic water dispenser and what was used in the water pouring event is the bottle-unit measure system. So, it is invalid to use the measure system used in the water pouring event to challenge the felicitousness of a sentence constructed under a water buying event where the liter-unit measure system was adopted.

⁹ The *duō* verbal comparative like (i) has (ii) as its antonymous counterpart, in which *duō* ‘DUO’ is replaced by its antonym *shǎo* ‘SHAO’.

- | | | | | | |
|------|---|-----------|---------|---------------------|------|
| (i) | Zhāngsān bǐ | Lǐsì duō | mǎi-le | yī-běn | shū. |
| | Zhangsan than | Lisi DUO | buy-ASP | one-CL _n | book |
| | ‘Zhangsan’s buying books exceeds Lisi’s buying books by one book.’ | | | | |
| (ii) | Zhāngsān bǐ | Lǐsì shǎo | mǎi-le | yī-běn | shū. |
| | Zhangsan than | Lisi SHAO | buy-ASP | one-CL _n | book |
| | ‘Zhangsan’s buying books falls short of Lisi’s buying books by one book.’ | | | | |

Since they share all syntactic and semantic properties except their opposition in meaning, examples like (ii) will not be discussed in the rest of this study unless it is necessary.

- (42) Zhāngsān duō Lǐsì shí-fēn.
 Zhangsan much Lisi ten-point
 ‘Zhangsan exceeds Lisi by ten points’
- (43) Zhāngsān bǐ Lǐsì duō mǎi-le shū.
 Zhangsan than Lisi DUO buy-ASP book
 ‘Zhangsan’s buying reading materials exceeds Lisi’s buying reading materials by also including the category of books.’

I further suggest that, in the *duō* transitive comparative, the predicate-like phrase right after *duō* ‘DUO’ (e.g., *mǎi-le shū* ‘buy-ASP book’ in (43)) is the differential-denoting phrase. As is widely assumed, the differential always occurs as a measure phrase in a transitive comparative, and a Chinese adjective does not allow any thematically related phrasal or clausal constituent to occur after it. So, I suggest that this differential-denoting predicate-like phrase occurs as the argument-like adjunct clause of the quantity adjective *duō* ‘much’ in Ernst’s (1996) term because this clause is similar to a complement clause in allowing extraction from it, as (44b) illustrates (Zhu 1982; Ernst 2014; Schwarzschild 2002: 2; Huang et al. 2009).

- (44) a. Zhāngsān hé Lǐsì, yī-gè duō mǎi-le shū, yī-gè sháo
 Zhangsan and Lisi one-CL_n DUO buy-ASP book one-CL_n SHAO
 mǎi-le shū.
 buy-ASP book.
 ‘As for Zhangsan and Lisi, one’s buying materials exceeds the contextually determined standard by also including the category of books, but the same contextually determined standard exceeds the other’s buying materials by also including the category of books.’
- b. Zhāngsān hé Lǐsì, shū, yī-gè duō mǎi-le, yī-gè
 Zhangsan and Lisi book one-CL_n DUO buy-ASP one-CL_n
 sháo mǎi-le.
 SHAO buy-ASP
 ‘As for Zhangsan and Lisi, it is by also including the category of books that one’s buying materials exceeds the contextually determined standard, but the same contextually determined standard exceeds the other’s buying materials by also including the category of books.’

As I will further argue, the quantity adjective *duō* ‘much’ functions to introduce a measure function that takes as input the set of taxonomic unit events derived from the argument-like adjunct clause. So, to prevent this relation from being interrupted, the marker *dé* ‘DE’ that functions to introduce a degree/descriptive complement clause is not allowed to occur between the quantity adjective *duō* ‘DUO’ and the differential-denoting argument-like adjunct clause, as the contrast below attests.

(48) Condition A

- a. If the classifier in the argument-like adjunct clause is a verbal classifier, the argument-like adjunct clause has to be turned into a set of TU events by the Event Taxonomization Function A. Here, a TU event is a verbal-classifier unit of event in which the cardinality/quantity of entities/mass denoted by the NP/DP object of the verb right after the marker *duō* ‘DUO’ is contextually determined (Krifka 1995: 400; Li 2011: 16–17).¹¹
- b. If the classifier in the argument-like adjunct clause is a nominal classifier, the argument-like adjunct clause has to be turned into a set of TU events by the Event Taxonomization Function B. Here, a TU event is an event in which the object of the verb right after the marker *duō* ‘DUO’, in terms of the measure system defined by the nominal classifier, carries the minimal cardinality/quantity that can normally satisfy the lexical meaning of the verb (Krifka 1995: 400; Li 2011: 16–17).
- c. For a *duō* transitive comparative without an overt classifier, the taxonomic level where the comparison is made provides information to identify the classifier needed for interpreting the sentence.¹²

Taking the argument-like adjunct clause in (49a–b) (i.e., the bracketed part) for example, the Event Taxonomization Functions A and B can be defined as (50) and (51), respectively (Krifka 1995: 400; Li 2011: 16–17).

¹¹ Here, I cite Krifka (1995) and Li (2011) simply because I adopt their semantic analysis of Chinese classifiers to define Condition A, especially the clause (a) and (b).

¹² As one anonymous reviewer points out to me, while the generalization that the *duō* transitive comparative requires an overt or covert classifier for interpretation is largely true, there do exist exceptions, for example, (i), where the classifier cannot be reconstructed.

- (i) Zhāngsān bǐ Lìsì duō mǎi-le shǒujī.
 Zhangsan than Lisi DUO buy-ASP smartphone
 ‘Zhangsan’s buying materials exceeds Lisi’s buying materials by smartphones.’

As the reviewer says, the ‘reconstructed’ classifier cannot be *zhǒng* ‘kind’ because (ii) has a different interpretation.

- (ii) Zhāngsān bǐ Lìsì duō mǎi-le yī-zhǒng shǒujī.
 Zhangsan than Lisi DUO buy-ASP one-CL_n smartphone
 ‘Zhangsan’s buying smartphones exceeds Lisi’s buying smartphones by one kind of smartphones.’

As I have argued, in cases without an overt classifier, the classifier reconstructed has to be one that is used at the taxonomic level where the comparison is made (e.g., the taxonomic level of materials for (i)). So, for (i), the taxonomic level where the comparison is made is the level of *wùpǐn* ‘material’, and, thus, (i) should have (iii) rather than (ii) as its ‘classifier-reconstructed’ counterpart.

- (iii) Zhāngsān bǐ Lìsì duō mǎi-le yī-zhǒng wùpǐn. Nà-zhǒng wùpǐn shì shǒujī.
 Zhangsan than Lisi DUO buy-ASP one-CL_n material that-CL_n material is smartphone
 ‘Zhangsan’s buying materials exceeds Lisi’s buying materials by one kind of material, and it is the smartphone.’

- (49) a. Zhāngsān bǐ Lǐsì duō [Verb-le y-CL_v
 Zhangsan than Lisi DUO Verb-ASP y-CL_v
 Noun].
 Noun
- b. Zhāngsān bǐ Lǐsì duō [Verb-le y-CL_n
 Zhangsan than Lisi DUO Verb-ASP y-CL_n
 Noun].
 Noun

(50) The Event Taxonomization Function A

The Event Taxonomization Function A turns the argument-like adjunct clause in (49a) into a set of TU events as follows:¹³

$\lambda v^{TU} \exists v \exists x [Verb(zs, x, v^{TU}) \wedge Verb(zs, x, v) \wedge Noun(x) \wedge$
 $[R(v, VERB) \wedge TAXONOMIC-UNIT_{event}(v) = y \wedge$
 $Verb(v) \wedge \text{verbal-classifier-unit}(v^{TU}, v)]]$

- a. The R relation is defined as follows: If v is an event and $VERB$ is the kind of event denoted by $Verb$, then $R(v, VERB)$ holds if v is a ‘legitimate’ instantiation of event kind $VERB$.
- b. The ‘TAXONOMIC-UNIT’ is an operation which takes a kind and yields a measure function that measures the number of taxonomic specimens of that kind based on the measure system defined by the verbal classifier.
- d. v^{TU} is a taxonomic unit of v .
- e. A TU event (i.e., v^{TU}) is an event with a verbal-classifier unit of event cardinality or quantity.

(51) The Event Taxonomization Function B

¹³ The Taxonomization Function A is defined as follows.

- (i) $f_{<v, <v, t>>} : \lambda v \lambda v^{TU} \exists x [[R(v, VERB) \wedge TAXONOMIC-UNIT_{event}(v) = y \wedge Verb(v) \wedge$
 $\text{verbal-classifier-unit}(v^{TU}, v) \wedge Verb(zs, x, v^{TU}) \wedge Verb(zs, x, v) \wedge Noun(x)]]$

Besides, the compositional relation between the Taxonomization Function A and the event denoted by the argument-like adjunct clause (i.e., $\lambda v \exists x [Verb(zs, x, v) \wedge Noun(x)]$) in some sense can be considered as an Event Identification relation (Kratzer 1996: 122).

- (ii) If α is a branching node, β and γ are the daughters of α , and $[[\beta]]^g \in D_{<e, <v, t>>}$ and $[[\gamma]]^g \in D_{<v, t>}$, then $[[\alpha]]^g = [[\beta]]^g$ (the event variable e_v in $[[\beta]]^g$ is identified with the one in $[[\gamma]]^g$).

Namely, here, the Event Identification, being a type of conjunction operation, takes the function f of type $<v, <v, t>>$ (i.e., $\lambda v \lambda v^{TU} \exists x [[R(v, VERB) \wedge TAXONOMIC-UNIT_{event}(v) = y \wedge Verb(v) \wedge \text{verbal-classifier-unit}(v^{TU}, v) \wedge Verb(zs, x, v^{TU}) \wedge Verb(zs, x, v) \wedge Noun(x)]]$) and the function g of type $<v, t>$ (i.e., $\lambda v \exists x [Verb(zs, x, v) \wedge Noun(x)]$) as input and yields the function h of type $<v, <v, t>>$ as output, and, then, with the first event variable of the function h being existentially bound, a set of TU events of type $<v, t>$ is derived.

The Event Taxonomization Function B turns the argument-like adjunct clause in (49b) into a set of TU events as follows:¹⁴

$$\lambda v^{TU} \exists x \exists x^{TU} \exists v [Verb(zs, x^{TU}, v^{TU}) \wedge Verb(zs, x, v) \wedge [R(x, NOUN) \wedge TAXONOMIC-UNIT(x) = y/z + n \wedge Noun(x) \wedge taxonomic-unit(x^{TU}, x)] \wedge [R(v, VERB) \wedge TAXONOMIC-UNIT_{event}(v) = y/z + n \wedge Verb(v) \wedge taxonomic-unit(v^{TU}, v)]]]$$

- i. The value of ‘y/z + n’ (‘y/z’ means ‘divide y by z’) is the number of taxonomic units and has to be a positive integer.
- ii. $0 \leq n \leq (p - q)$ (‘p - q’ means ‘p minus q’; p is the number of taxonomic units allowed by the external reading if there is one and q is the number of taxonomic units allowed by the internal reading if there is one)¹⁵
- iii. The value of ‘y + n x z’ (‘n x z’ means ‘multiply n by z’) is the number of partners and the value of ‘n x z’ is the number of partners provided by the surrounding discourse (i.e., outsiders).
- iv. The value of z is the minimal cardinality/quantity of *Noun* that can satisfy the lexical meaning of *Verb* based on the measure system defined by the nominal classifier.
 - a. If the value of z is 1, then the value of n is 0.
 - b. If the value of z is larger than 1, then the value of n might vary within the range of ‘ $0 \leq n \leq (p - q)$ ’ and the interpretation of the sentence varies accordingly.

¹⁴ The Taxonomization Function B is defined as follows.

(i) $f_{<e, <v, t>}: \lambda x \lambda v^{TU} \exists x^{TU} \exists v [[R(x, NOUN) \wedge TAXONOMIC-UNIT(x) = y/z + n \wedge Noun(x) \wedge taxonomic-unit(x^{TU}, x)] \wedge [R(v, VERB) \wedge TAXONOMIC-UNIT_{event}(v) = y/z + n \wedge Verb(v) \wedge taxonomic-unit(v^{TU}, v)] \wedge Verb(zs, x^{TU}, v^{TU}) \wedge Verb(zs, x, v)]$

Similarly, the compositional relation between the Taxonomization Function B and the event denoted by the argument-like adjunct clause (i.e., $\lambda v \exists x [Verb(zs, x, v) \wedge Noun(x)]$) can also be considered as an Event Identification relation.

¹⁵ Here, the value of n is larger than/equal to 0 but is smaller than/equal to ‘p-q’. So, the value of n can be divided into three categories: one only contains the smallest value (i.e., 0); another only contains the largest value (i.e., ‘p-q’) and the other contains the positive integer value(s) between 0 and ‘p-q’. To account for the variations among native speakers in the acceptability of the internal, the external and the mixed reading, I propose a parametric analysis by suggesting that, for those who can only accept the first-category value as the value of n (i.e., the smallest value 0), only the internal reading is allowed; for those who accept the first- and the second-category value as the value of n (i.e., the smallest value 0 and the largest value ‘p-q’), both the internal and the external readings are allowed; and, for those who accept the first-, the second- and the third-category value as the value of n (i.e., the smallest values 0, the largest value ‘p-q’ and the positive integer value(s) between the smallest value and the largest value), all the three possible readings are allowed.

- a. The R relation is defined as follows: If x is an entity/mass and *NOUN* is the kind of entities/mass denoted by *Noun*, then $R(x, NOUN)$ holds if x is a 'legitimate' instantiation of kind *NOUN*. If v is an event and *VERB* is the kind of events denoted by *Verb*, then $R(v, VERB)$ holds if v is a 'legitimate' instantiation of event kind *VERB*.
 - b. The 'TAXONOMIC-UNIT' is an operation which takes a kind and yields a measure function that measures the number of 'legitimate' taxonomic specimens of that kind based on the measure system defined by the lexical meaning of *Verb*, *Noun* and the classifier.
 - c. $TAXONOMIC-UNIT_{\text{entity/mass}}(x) = TAXONOMIC-UNIT_{\text{event}}(v)$
 - d. x^{TU} is a taxonomic unit of x and v^{TU} is a taxonomic unit of v .
 - e. A TU event (i.e., v^{TU}) is an event in which *Noun* carries the minimal cardinality or quantity that can normally satisfy the lexical meaning of *Verb*.
- (52) Condition B
- Depending on whether the elements of the set of TU events derived by the Event Taxonomization Function from the argument-like adjunct clause are of the same sort, the set of TU events derived can be divided into two types: a homogeneous one and a heterogeneous one.
- a. Two TU events are of the same sort if they belong to the same taxonomic level; otherwise, they are not.
 - b. The identification of a taxonomic level is sensitive to the lexical meaning of the verb, the type of classifier (i.e., verbal or nominal) and the NP/DP object in the argument-like adjunct clause.
- (53) Condition C
- a. If the elements of the set of TU events derived by the Event Taxonomization Function from the argument-like adjunct clause are of the same sort and the set of TU events carried out by the target of comparison has a proper subset whose number of elements is the same as that of the set of TU events carried out by the standard of comparison, the set of TU events carried out by the target of comparison and the set of TU events carried out by the standard of comparison can be analogous to being properly ordered in a part-of relation and, due to the Monotonicity Condition, their measurements are similarly ordered.

- b. If the elements of the set of TU events derived by the Event Taxonomization Function from the argument-like adjunct clause are not of the same sort, the set of TU events carried out by the target of comparison must have a proper subset with elements that are ‘the same’ as the elements of the set of TU events carried out by the standard of comparison. Then, the Monotonicity Condition will lift the taxonomic level one-level higher than that identified by Condition B and force the TU event that belongs to the taxonomic level identified by Condition B to be interpreted as a token of the event type belonging to the ‘one-level higher’ taxonomic level. At this ‘one-level higher’ taxonomic level, the set of TU events carried out by the target of comparison can have a proper subset whose number of elements is the same as that of the set of TU events carried out by the standard of comparison; therefore, the set of TU events carried out by the target of comparison and the set of TU events carried out by the standard of comparison can be analogous to being properly ordered in a part-of relation and, due to the Monotonicity Condition, their measurements are similarly ordered.

Third, the quantity adjective *duō* ‘much’ introduces a measure function (i.e., $\mu_{\langle v, t \rangle, d \rangle}$ in (54)) with a dimension valued by the assignment function *A* (i.e., the cardinality of TU events), and this measure function, then, takes the set of TU events derived by the Event Taxonomization Function from the argument-like adjunct clause as input and returns a degree as output (Wellwood 2015).

$$(54) \llbracket du\bar{o}_{\langle \langle v, t \rangle, d \rangle} \rrbracket^A = \lambda P_{\langle v, t \rangle} . \max \{ d : A(\mu_{\langle \langle v, t \rangle, d \rangle})(P) \geq d \}$$

Then, this degree is interpreted as the differential. So, it is the measure function introduction feature of the quantity adjective *duō* ‘much’ that allows the *duō* transitive comparative to take an argument-like adjunct clause as the differential phrase.¹⁶

¹⁶ As one anonymous reviewer reminds me, “... the author(s) laid out a bunch of rules and conditions in trying to make their analysis work. At least two issues stand out here. First, how are these rules and conditions independently motivated? ... Second, some stipulations ... at least are highly counter-intuitive. For instance, the (b) clause in Condition A and the Taxonomization Function B ... require there to be a one-to-one correspondence between an event and the corresponding object at the taxonomic level. This cannot be right. You can certainly (say) buy two, ten, five hundred, or a billion things in one single buying event/transaction. ... the “TAXONOMIC-UNIT_{entity/mass}(x) = TAXONOMIC-UNIT_{event}(v)” rule is VERY stipulative”. The analysis I propose consists of three conditions (i.e., Condition A, B and C) and two functions (i.e., the Event Taxonomization Function A and B). As I will argue, they are all independently motivated and none of them are stipulative. To interpret the meaning of a comparative construction, we need (A) a measure function which needs a measured object, a dimension and a system of measurement units, and (B) an ordering relation. In the *duō* transitive comparative, the transitive verb *duō* ‘duo’ is derived by having the quantity adjective *duō* ‘much’ incorporated into the light verb with the comparative meaning. The quantity adjective *duō*

Fourth, according to Heim (1985), a phrasal comparative like (55a), which denotes a comparison between two persons along the dimension of goodness of drummers, has a semantic representation like (55b), in which the joint scope of the two compared items (i.e., $\langle I, \text{Karlheinz} \rangle$) is the scope of the comparative operator and of the degree abstractor that goes with it.

Footnote 16 continued

‘much’ denotes a measure function that needs a measured object, a system of measurement units and a dimension. Here, the measured object is provided by the argument-like adjunct clause. The dimension is semantically provided by what is measured. It is the cooperation between the three conditions and the two functions that provides a system of measurement units compatible with the two compared items of a *duō* transitive comparative sentence, for example *Zhāngsān* and *Lìsì* in (i).

- (i) Zhāngsān bí Lìsì duō mǎi-le sān-běn shū.
 Zhangsan than Lisi DUO buy-ASP three- CL_n book
 ‘Zhangsan’s buying books exceeds Lisi’s buying books by three books.’

Thus, the three conditions and the two functions are all motivated by the measure function denoted by the quantity adjective *duō* ‘much’, or, in the syntactic term, by the quantity adjective *duō* ‘much’. Here, what is specifically relevant to the reviewer’s concern about the “TAXONOMIC-UNIT_{entity/mass}(x) = TAXONOMIC-UNIT_{event}(v)” rule is ‘a system of measurement units compatible with the two compared items of a *duō* transitive comparative’. A comparison between two items must be conducted under the same system of measurement units; otherwise, the comparison is invalid. According to my proposal, which is based on the semantic interpretations of examples like (11)–(15), what is measured in the *duō* transitive comparative is the cardinality of events carried out by the compared item. So, we need a system of measurement units by which the measurement of the cardinality of events is conducted. As I suggest, a TU (i.e., taxonomic unit) event is an event in which the object of the verb right after the transitive verb *duō* ‘DUO’ carries the minimal cardinality/quantity that can normally satisfy the lexical meaning of the verb in the relevant event. Assuming this, we can say that, for example (i), the default system of measurement units should be the one in which the measurement unit is a book-buying event in which one book is purchased because the quantity of ‘one book’ is the minimal quantity that can normally satisfy the lexical meaning of the verb *mǎi* ‘buy’ in a book-buying event, and this measurement unit has to be applied to measuring the cardinality of book-buying events carried out by Zhangsan and Lisi, respectively. That is, when interpreting example (i), we cannot apply a system of measurement units in which the measurement unit is a book-buying event in which one book is purchased to measuring the cardinality of book-buying events carried out by Zhangsan, but a system of measurement units in which the measurement unit is a book-buying event in which five books are purchased to measuring the cardinality of book-buying events carried out by Lisi. Of course, we cannot exclude the possibility of purposely defining the measurement unit as a book-buying event in which ten books, for example, are purchased for the comparison involved in (i), but the crux of the matter is that we have to apply the same ‘purposely defined’ system of measurement units to measuring the cardinality of book-buying events carried out by Zhangsan and Lisi, respectively. Hence, suppose that Zhangsan bought sixty-three books and Lisi bought sixty books; (i) is felicitously acceptable if the same hypothesized system of measurement units is applied to measuring the cardinality of book-buying events carried out by Zhangsan and Lisi, respectively. Namely, under this purposely designed context, (i) still correctly conveys the meaning: Zhangsan’s buying books exceeds Lisi’s buying books by the quantity of a ‘less-than-a-measurement-unit’ book-buying event in which three books are purchased. However, if the measurement unit applied to measuring the cardinality of Zhangsan’s book-buying events is one in which ten books are purchased, but the one applied to measuring the cardinality of Lisi’s book-buying events is one in which five books are purchased, then the comparison is invalid. So, the problem is not how many books you can certainly (say) buy in one single buying event/transaction. It is whether the comparison between the two compared items is conducted under the same system of measurement units.

- (55) a. I have introduced better drummers to you than Karlheinz.
 b. $-er < I, Karlheinz > \lambda x \lambda y [x \text{ has introduced } y\text{-good drummers to you}]$

In (55b), the constituent of the form $\lambda x \lambda y [\dots]$ denotes a function that maps any given person onto the degree of goodness of the drummers which that person introduced to you. So, Heim (1985) suggests that, in a phrasal comparative, the comparative morpheme *-er* has a general meaning as follows.

- (56) “ $-er < a, b > f$ ” is true iff $f(a) > f(b)$.

Assuming that the Chinese *duō* transitive comparative is a type of phrasal comparative with an obligatory differential phrase, I, partially along the line of Heim (1985), suggest that, in the *duō* transitive comparative, the light verb *v* that carries the comparison meaning has a semantic meaning as in (57) (Hellan 1981: 255; von Stechow 1984: 17).¹⁷

- (57) $\llbracket v_{<d, <e, <e, t>>>}\rrbracket = \lambda d \lambda b \lambda a. f(a) - f(b) = d \wedge d \neq 0$
 $f: \lambda x_e \lambda y_d [x \text{ has carried out } y\text{-cardinality of TU events denoted by the verb in the argument-like adjunct clause}]$

4 The exemplification of the analysis

In this section, I will use (58a–d) as the representative examples to show how my analysis successfully accounts for the syntactic and semantic properties of the *duō* transitive comparative.

- (58) a. Zhāngsān bǐ Lǐsì duō mǎi-le sān-cì shū.
 Zhangsan than Lisi DUO buy-ASP three-CL_v book
 ‘The number of Zhangsan’s book-buying events exceeds the number of Lisi’s book-buying events by three book-buying events no matter how many books Zhangsan and Lisi each has bought.’
- b. Zhāngsān bǐ Lǐsì duō mǎi-le sān-běn xiǎoshuō.
 Zhangsan than Lisi DUO buy-ASP three-CL_n novel
 ‘Zhangsan’s buying novels exceeds Lisi’s buying novels by three novels.’
- c. Wáng gūmā bǐ Lǐ gūmā duō cuòhé-le nà liù-gè
 Wang aunt than Li aunt DUO match-ASP that six-CL_n
 niánqīng rén.
 young person

¹⁷ As one anonymous reviewer reminds me, there is also evidence suggesting a clausal analysis (e.g., Hsieh 2015). I agree with the reviewer on this. However, to avoid digression, I do not want to jump into the debate about the clausal versus phrasal analysis of the Chinese *bǐ* ‘than’ comparatives.

- i. The internal reading: ‘Aunt Wang’s arranging marriages exceeds Aunt Li’s arranging marriages by three marriages; for these three marriages, each couple is formed by two of those six young persons.’
- ii. The external reading: ‘Aunt Wang’s arranging marriages exceeds Aunt Li’s arranging marriages by six marriages; for each couple, one of the partners is provided by the surrounding discourse.’
- iii. The mixed reading: ‘Aunt Wang’s arranging marriages exceeds Aunt Li’s arranging marriages by four or five marriages; for the four-marriage reading, among the four couples, two couples have a partner provided by the surrounding discourse; for the five-marriage reading, among the five couples, four couples have a partner provided by the surrounding discourse.’
- d. Zhāngsān bǐ Lǐsì duō mǎi-le Sānguózhi hé Hónglómèng.
Zhangsan than Lisi DUO buy-ASP SG and HL
‘Zhangsan’s buying novels exceeds Lisi’s buying novels by SG and HL.’

First, according to my analysis, (58a), which contains the verbal classifier *cì* ‘time’, has a syntactic structure as in (59), where the quantity adjective *duō* ‘much’ first takes the predicate-like phrase *Pro_{zs} mǎi sān-cì shū* ‘Pro_{zs} buy three-CL_v book’ as the argument-like adjunct clause, and then forms the transitive verb *duō* ‘DUO’ by having itself incorporated into the light verb *v* that carries the comparison meaning.¹⁸

(59) [Zhangsan [[than Lisi] [_{VP} [_V *v*][_{AP} [_A much] [Pro_{zs} buy three-CL_v book]]]]].

Since the classifier in the argument-like adjunct clause is a verbal classifier, the argument-like adjunct clause is turned into a set of TU events by the Event Taxonomization Function A (i.e., (50)), and a TU event is defined as a verbal-classifier unit of event in which the cardinality/quantity of entities/mass denoted by the NP/DP object of the verb right after the transitive verb *duō* ‘DUO’ is contextually determined.

Given these, based on the syntactic structure in (59), the step-by-step semantic composition of (58a) can be demonstrated by (60a–g).

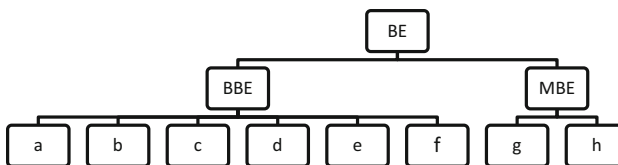
- (60) a. $\llbracket [Pro_{zs} \text{ buy three-CL}_v \text{ book}]_{<v, t>} \rrbracket = \lambda v^{TU} \exists v \exists x [buy(zs, x, v^{TU}) \wedge buy(zs, x, v) \wedge book(x) \wedge [R(v, BUY) \wedge TAXONOMIC-UNIT_{event}(v) = 3 \wedge buy(v) \wedge [verbal-classifier-unit(v^{TU}, v)]]]$
via the Event Taxonomization Function A
- b. $\llbracket much_{<v, t>, d>} \rrbracket^A = \lambda P_{<v, t>} . \max\{d: A(\mu_{<v, t>, d>})(P) \geq d\}$

¹⁸ For reader-friendliness, in the following, I do the demonstration by using English as the metalanguage.

- c. $\llbracket [[much] [Pro_{zs} \text{ buy three-CL}_v \text{ book}]]_d \rrbracket^A = \max \{d: A(\mu_{<v, t>, d>})$
 $(\lambda v^{TU} \exists x [buy(zs, x, v^{TU}) \wedge buy(zs, x, v) \wedge book(x) \wedge [R(v, BUY) \wedge$
 $TAXONOMIC-UNIT_{event}(v) = 3 \wedge buy(v) \wedge [verbal-classifier-unit(v^{TU},$
 $v)]]]) \geq d\}$
 The dimension of the measure function valued by the assignment function A is the cardinality of TU book-buying events.
- d. $\llbracket v_{<d, <e, <e, t>>>} \rrbracket = \lambda d_d \lambda b \lambda a. f(a) - f(b) = d \wedge d \neq 0$
 f: $\lambda x_e \lambda y_d [x \text{ has carried out } y\text{-cardinality of TU book-buying events}]$
- e. $\llbracket [[_v \text{ much-}v] [Pro_{zs} \text{ buy three-CL}_v \text{ book}]]_{<e, <e, t>>} \rrbracket^A = \lambda b \lambda a. f(a) - f(b) =$
 $d \wedge d = (60c) \text{ f: } \lambda x_e \lambda y_d [x \text{ has carried out } y\text{-cardinality of TU book-buying}$
 $\text{events}]$
- f. $\llbracket [[than \text{ Lisi } [_v \text{ much-}v] [Pro_{zs} \text{ buy three-CL}_v \text{ book}]]]_{<e, t>} \rrbracket^A = \lambda a. f(a) - f$
 $(ls) = d \wedge d \neq 0 \wedge d = (60c)$
- g. $\llbracket [Zhangsan [than \text{ Lisi } [_v \text{ much-}v] [Pro_{zs} \text{ buy three-CL}_v \text{ book}]]]_t \rrbracket^A = f(zs) - f$
 $(ls) = d \wedge d \neq 0 \wedge d = (60c).$

As (60a) shows, in order to conform to the Monotonicity Condition, the Event Taxonomization Function A applies at the taxonomic level of TU book-buying events (i.e., *BBE*) under a taxonomic hierarchy like (61), in which *BE* represents the buying event and *MBE* the magazine-buying event, and turns the argument-like adjunct clause *Pro_{zs} mǎi sān-cì shū* ‘Pro_{zs} buy three-CL_v book’ into a set of TU *BBEs* that contains three TU *BBEs* carried out by Zhangsan.

(61)



Then, as (60c) shows, the measure function introduced by the quantity adjective *duō* ‘much’ (i.e., $A(\mu_{<v, t>, d>})$ in (60b) takes as input this set of TU *BBEs* and returns as output a degree about the cardinality of this set of TU *BBEs* (Wellwood 2015).

As (60e) shows, we further have the AP merged with the light verb v that carries a comparison meaning as in (60d). After having the result sequentially merged with the *bǐ* ‘than’ phrase and the subject NP (i.e., *Zhāngsān*), the interpretation (60g) is derived. Namely, (58a) is true in the case where the difference between the degree about the cardinality of the set of TU *BBEs* carried out by Zhangsan and the degree about the cardinality of the set of TU *BBEs* carried out by Lisi is the degree about the cardinality of the set of TU *BBEs* derived from the argument-like adjunct clause by the Event Taxonomization Function A . This ‘difference’ set of TU *BBEs* contains three TU *BBEs* carried out by Zhangsan.

Thus, under the taxonomic hierarchy as in (61), the elements of the set of Zhangsan's TU *BBEs* and the set of Lisi's TU *BBEs* are of the same sort in that they all belong to the taxonomic level of TU *BBEs*. So, the number of elements of a proper subset (i.e. part) of the set of Zhangsan's TU *BBEs* can be the same as that of the set of Lisi's TU *BBEs*. Hence, according to Condition C, the set of Zhangsan's TU *BBEs* and the set of Lisi's TU *BBEs* can be analogous to being properly ordered in a part-of relation and their measurements are similarly ordered along the dimension of the cardinality of TU events in Schwarzschild's (2002) sense.

Accordingly, my analysis correctly predicts that (58a) is felicitous in context (62) but infelicitous in context (63) under a taxonomic hierarchy like (61), where the TU *BBE* *a*, *b*, *c*, *d*, *e* and *f*, belonging to the same taxonomic level (i.e., the level of TU *BBEs*), are of the same sort.

(62) Zhangsan: {*a*, *b*, *c*, *d*}
Lisi: {*e*, *g*}

(63) Zhangsan: {*a*, *b*, *c*, *d*}
Lisi: {*e*, *f*, *g*, *h*}

Namely, in context (62), *a*, *b*, *c* and *d* all belong to the set of Zhangsan's TU *BBEs* but only *e* belongs to the set of Lisi's TU *BBEs*. Thus, the set of Zhangsan's TU *BBEs* can have a proper subset whose number of elements is the same as that of the set of Lisi's TU *BBEs*. So, the set of Zhangsan's TU *BBEs* and the set of Lisi's TU *BBEs* can be analogous to being properly ordered in a part-of relation. Hence, according to Condition C, their measurements are similarly ordered along the cardinality of TU *BBEs*. Since the difference between the cardinality of the set of Zhangsan's TU *BBEs* and the cardinality of the set of Lisi's TU *BBEs* along the cardinality of TU *BBEs* is 3 and the cardinality of the set of TU *BBEs* derived from the argument-like adjunct clause *Pro_{zs} mǎi sān-cì shū* 'Pro_{zs} buy three-CL_v book' by the Event Taxonomization Function A is also 3, the difference between the degree about the cardinality of the set of Zhangsan's TU *BBEs* and the degree about the cardinality of the set of Lisi's TU *BBEs* is equal to the degree about the cardinality of the set of TU *BBEs* derived from the argument-like adjunct clause. So, (58a) is felicitous in context (62).

In contrast, in context (63), the TU *BBE* *a*, *b*, *c* and *d* belong to the set of Zhangsan's TU *BBEs*, and *e* and *f* belong to the set of Lisi's TU *BBEs*. Hence, the cardinality of the set of Zhangsan's TU *BBEs* is 4, and the cardinality of the set of Lisi's TU *BBEs* is 2. However, the cardinality of the set of TU *BBEs* derived from the differential-denoting phrase *Pro_{zs} mǎi sān-cì shū* 'Pro_{zs} buy three-CL_v book' is 3. So, (58a) is infelicitous in context (63).

Second, according to my analysis, (58b), where the classifier in the argument-like adjunct clause is a nominal one (i.e., *běn* 'CL_n'), has a syntactic structure like (64), and, due to the lexical meaning of the verb *mǎi* 'buy' and the noun *xiǎoshuō* 'novel' in the argument-like adjunct clause, the value of *z* of the Event Taxonomization Function B (i.e., (51iv)) is 1 and, thus, the value of *n* of the Event Taxonomization Function B (i.e., (51iva)) is 0.

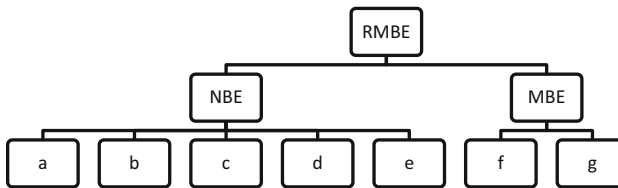
(64) [Zhangsan [[than Lisi] [_{VP} [_V *v*][_{AP} [_A much] [Pro_{zs} buy three-CL_n novel]]]]].

So, based on (64), the step-by-step semantic composition of (58b) can be demonstrated by (65a–g).

- (65) a. $\llbracket [Pro_{zs} \text{ buy three-CL}_n \text{ novel}]_{<v, t>} \rrbracket = \lambda v^{TU} \exists x \exists x^{TU} \exists v [buy(zs, x^{TU}, v^{TU}) \wedge buy(zs, x, v) \wedge [R(x, NOVEL) \wedge TAXONOMIC-UNIT_{entity}(x) = 3 \wedge novel(x) \wedge taxonomic-unit(x^{TU}, x)] \wedge [R(v, BUY) \wedge TAXONOMIC-UNIT_{event}(v) = 3 \wedge buy(v) \wedge taxonomic-unit(v^{TU}, v)]]$
via the Event Taxonomization Function B
- b. $\llbracket much_{<v, t>, d>} \rrbracket^A = \lambda P_{<v, t>, d>}. \max\{d: A(\mu_{<v, t>, d>}(P) \geq d)\}$
- c. $\llbracket [much] [Pro_{zs} \text{ buy three-CL}_n \text{ novel}]_d \rrbracket^A = \max\{d: A(\mu_{<v, t>, d>}) (\lambda v^{TU} \exists x \exists x^{TU} \exists v [buy(zs, x^{TU}, v^{TU}) \wedge buy(zs, x, v) \wedge [R(x, NOVEL) \wedge TAXONOMIC-UNIT_{entity}(x) = 3 \wedge novel(x) \wedge taxonomic-unit(x^{TU}, x)] \wedge [R(v, BUY) \wedge TAXONOMIC-UNIT_{event}(v) = 3 \wedge buy(v) \wedge taxonomic-unit(v^{TU}, v)]]]) \geq d)\}$
The dimension of the measure function valued by the assignment function A is the cardinality of TU novel-buying events.
- d. $\llbracket v_{<d, <e, <e, t>>>} \rrbracket = \lambda d_d \lambda b \lambda a. f(a) - f(b) = d \wedge d \neq 0$
f: $\lambda x_e \lambda y_d [x \text{ has carried out } y\text{-cardinality of TU novel-buying events}]$
- e. $\llbracket [v \text{ much-}v] [Pro_{zs} \text{ buy three-CL}_n \text{ novel}]_{<e, <e, t>>} \rrbracket^A = \lambda b \lambda a. f(a) - f(b) = d \wedge d = (65c)$
f: $\lambda x_e \lambda y_d [x \text{ has carried out } y\text{-cardinality of TU novel-buying events}]$
- f. $\llbracket [than Lisi] [v \text{ much-}v] [Pro_{zs} \text{ buy three-CL}_n \text{ novel}]_{<e, t>} \rrbracket^A = \lambda a. f(a) - f(ls) = d \wedge d \neq 0 \wedge d = (65c)$
- g. $\llbracket [Zhangsan] [than Lisi] [v \text{ much-}v] [Pro_{zs} \text{ buy three-CL}_n \text{ novel}]_t \rrbracket^A = f(zs) - f(ls) = d \wedge d \neq 0 \wedge d = (65c).$

As (65a) shows, the Event Taxonomization Function B applies at the level of TU novel-buying events (i.e., *NBE*) under a taxonomic hierarchy like (66), in which *RMBE* represents the reading-material-buying event and *MBE* the magazine-buying event, and turns the argument-like adjunct clause *Pro_{zs} mǎi sān-běn xiǎoshuō* ‘Pro_{zs} buy three-CL_n novel’ into a set of TU *NBEs* with three TU *NBEs* carried out by Zhangsan.

(66)



Then, as (65c) shows, the measure function introduced by the quantity adjective *duō* ‘much’ takes as input this set of TU *NBEs* and returns as output a degree about the cardinality of this set of TU *NBEs*.

As (65e) shows, the AP is further merged with the light verb *v* that carries a comparison meaning as in (65d). After having the result sequentially merged with the *bǐ* ‘than’ phrase and the subject NP (i.e., *Zhāngsān*), the meaning (65g) is derived. Namely, (58b) is true in case the difference between the degree about the cardinality of the set of TU *NBEs* carried out by Zhangsan and the degree about the cardinality of the set of TU *NBEs* carried out by Lisi is the degree about the cardinality of the set of TU *NBEs* derived from the argument-like adjunct clause by the Event Taxonomization Function B.

Third, my analysis assigns (58c), which contains the nominal classifier *ge* ‘CL_n’, a syntactic structure as in (67).

- (67) [Aunt Wang [[than Aunt Li] [_v *v*]_{AP} [_A much] [Pro_{aw} match that six-CL_n young person]]]]].

Given the lexical meaning of the verb *cuòhé* ‘match’ and the noun *rén* ‘person’, for (58c), the value of *z* of the Event Taxonomization Function B is 2, the value of *n* of the Event Taxonomization Function B, due to (51ivb), is smaller than or equal to 3 (i.e., $p - q = 3$) but larger than or equal to 0 (i.e., $0 \leq n \leq 3$) because the value of *p* is 6 and the value of *q* is 3. Hence, for (58c), the value of *n* of the Event Taxonomization Function B, due to the requirement that ‘*y/z + n*’ be a positive integer, might range over the following possible values, then the output of the Taxonomization Function B varies accordingly, and each output is associated with a different reading.

First, if the value of *n* of the Event Taxonomization Function B is 0, the output of the Event Taxonomization Function B is (68), from which the internal (i.e., three-couple) reading is derived because the number of outsiders, according to (51iii), is 0 (i.e., the value of ‘*n - z*’).

- (68) $\llbracket [Pro_{aw} \text{ match that six-CL}_n \text{ young person}]_{<v, t>} \rrbracket = \lambda v^{TU} \exists x \exists x^{TU} \exists v [match(aw, x^{TU}, v^{TU}) \wedge match(aw, x, v) \wedge [R(x, YOUNG PERSON) \wedge TAXONOMIC-UNIT_{entity}(x) = 6/2 + 0 \wedge young person(x) \wedge taxonomic-unit(x^{TU}, x)] \wedge [R(v, MATCH) \wedge TAXONOMIC-UNIT_{event}(v) = 6/2 + 0 \wedge match(v) \wedge taxonomic-unit(v^{TU}, v)]]$

Second, if the value of *n* of the Event Taxonomization Function B is 3, the output of the Event Taxonomization Function B is (69), from which the external (i.e., six-couple) reading is derived because the number of outsiders is 6 (i.e., $n = 3$, $z = 2$ and ‘*n x z*’ = 6).

- (69) $\llbracket [Pro_{aw} \text{ match that six-CL}_n \text{ young person}]_{<v, t>} \rrbracket = \lambda v^{TU} \exists x \exists x^{TU} \exists v [match(aw, x^{TU}, v^{TU}) \wedge match(aw, x, v) \wedge [R(x, YOUNG PERSON) \wedge TAXONOMIC-UNIT_{entity}(x) = 6/2 + 0 \wedge young person(x) \wedge taxonomic-unit(x^{TU}, x)] \wedge [R(v, MATCH) \wedge TAXONOMIC-UNIT_{event}(v) = 6/2 + 3 \wedge match(v) \wedge taxonomic-unit(v^{TU}, v)]]$

Third, if the value of n of the Event Taxonomization Function B is larger than 0 but smaller than 3, the output of the Event Taxonomization Function B might be (70a), from which the four-couple mixed reading is derived because the number of outsiders is 2 (i.e., $n = 1$, $z = 2$ and ' $n \ z' = 2$), or (70b), from which the five-couple mixed reading is derived because the number of outsiders is 4 (i.e., $n = 2$, $z = 2$ and ' $n \ z' = 4$).

- (70) a. $\llbracket [Pro_{aw} \text{ match that six-}CL_n \text{ young person}]_{\langle v, t \rangle} \rrbracket = \lambda v^{TU} \exists x \exists x^{TU} \exists v [match(aw, x^{TU}, v^{TU}) \wedge match(aw, x, v) \wedge [R(x, YOUNG PERSON) \wedge TAXONOMIC-UNIT_{entity}(x) = 6/2 + 1 \wedge young person(x) \wedge taxonomic-unit(x^{TU}, x)] \wedge [R(v, MATCH) \wedge TAXONOMIC-UNIT_{event}(v) = 6/2 + 1 \wedge match(v) \wedge taxonomic-unit(v^{TU}, v)]]$
 b. $\llbracket [Pro_{aw} \text{ match that six-}CL_n \text{ young person}]_{\langle v, t \rangle} \rrbracket = \lambda v^{TU} \exists x \exists x^{TU} \exists v [match(aw, x^{TU}, v^{TU}) \wedge match(aw, x, v) \wedge [R(x, YOUNG PERSON) \wedge TAXONOMIC-UNIT_{entity}(x) = 6/2 + 2 \wedge young person(x) \wedge taxonomic-unit(x^{TU}, x)] \wedge [R(v, MATCH) \wedge TAXONOMIC-UNIT_{event}(v) = 6/2 + 2 \wedge match(v) \wedge taxonomic-unit(v^{TU}, v)]]$

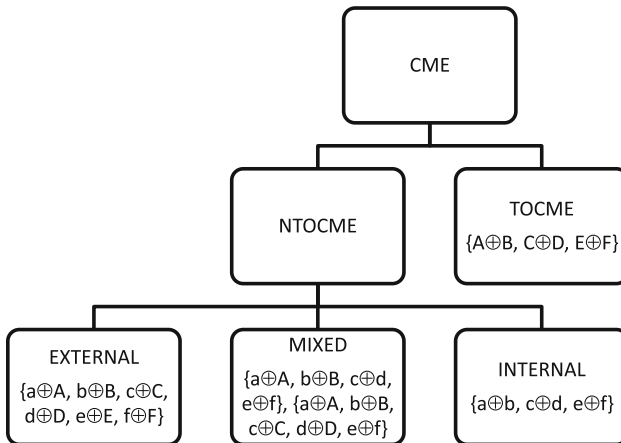
So, based on the syntactic structure in (67), the step-by-step semantic composition for the external reading of (58c), for example, can be demonstrated by (71a–g).

- (71) a. $\llbracket [Pro_{aw} \text{ match that six-}CL_n \text{ young person}]_{\langle v, t \rangle} \rrbracket = \lambda v^{TU} \exists x \exists x^{TU} \exists v [match(aw, x^{TU}, v^{TU}) \wedge match(aw, x, v) \wedge [R(x, YOUNG PERSON) \wedge TAXONOMIC-UNIT_{entity}(x) = 6/2 + 3 \wedge young person(x) \wedge taxonomic-unit(x^{TU}, x)] \wedge [R(v, MATCH) \wedge TAXONOMIC-UNIT_{event}(v) = 6/2 + 3 \wedge match(v) \wedge taxonomic-unit(v^{TU}, v)]]$
 via the Event Taxonomization Function B
 b. $\llbracket [much]_{\langle \langle v, t \rangle, d \rangle} \rrbracket^A = \lambda P_{\langle v, t \rangle} . \max\{d: A(\mu_{\langle \langle v, t \rangle, d \rangle}(P)) \geq d\}$
 c. $\llbracket [[much] [Pro_{aw} \text{ match that } y-CL_n \text{ young person}]]_d \rrbracket^A = \max\{d: A(\mu_{\langle \langle v, t \rangle, d \rangle}(\lambda v^{TU} \exists x \exists x^{TU} \exists v [match(aw, x^{TU}, v^{TU}) \wedge match(aw, x, v) \wedge [R(x, YOUNG PERSON) \wedge TAXONOMIC-UNIT_{entity}(x) = 6/2 + 3 \wedge young person(x) \wedge taxonomic-unit(x^{TU}, x)] \wedge [R(v, MATCH) \wedge TAXONOMIC-UNIT_{event}(v) = 6/2 + 3 \wedge match(v) \wedge taxonomic-unit(v^{TU}, v)]])) \geq d\}$
 The dimension of the measure function valued by the assignment function A is the cardinality of TU marriage arrangement events.
 d. $\llbracket [v_{\langle d, \langle e, \langle e, t \rangle \rangle}] \rrbracket = \lambda d_d \lambda b \lambda a. f(a) - f(b) = d \wedge d \neq 0$
 f: $\lambda x_e \lambda y_d [x \text{ has carried out } y\text{-cardinality of TU marriage arrangement events}]$
 e. $\llbracket [[v \text{ much-}v] [Pro_{aw} \text{ match that six-}CL_n \text{ young person}]]_{\langle e, \langle e, t \rangle \rangle} \rrbracket^A = \lambda b \lambda a. f(a) - f(b) = d \wedge d = (71c)$
 f: $\lambda x_e \lambda y_d [x \text{ has carried out } y\text{-cardinality of TU marriage arrangement events}]$
 f. $\llbracket [[than Aunt Li [v \text{ much-}v] [Pro_{aw} \text{ match that six-}CL_n \text{ young person}]]]_{\langle e, t \rangle} \rrbracket^A = \lambda a. f(a) - f(al) = d \wedge d \neq 0 \wedge d = (71c)$

- g. $\llbracket [Aunt\ Wang\ [than\ Aunt\ Li\ [_v\ much-v]\ [Pro_{aw}\ match\ that\ six-CL_n\ young\ person]]] \rrbracket^A = f(aw) - f(al) = d \wedge d \neq 0 \wedge d = (71c).$

As (71a) shows, the Event Taxonomization Function B, due to the lexical meaning of the verb *cuòhé* ‘match’, applies at the level of *NTOCMEs* under a taxonomic hierarchy like (72) and turns the argument-like adjunct clause *Pro_{aw} cuòhé-le nà liù-gè niánqīng rén* ‘Pro_{aw} match-ASP that six-CL_n young person’ into a set of TU *NTOCMEs* that contains six TU external *NTOCMEs* carried out by Aunt Wang.

(72)



Then, as (71c) shows, the measure function introduced by the quantity adjective *duō* ‘much’ takes as input this set of TU *NTOCMEs* and returns as output a degree about the cardinality of this set of TU external *NTOCMEs* (Wellwood 2015).

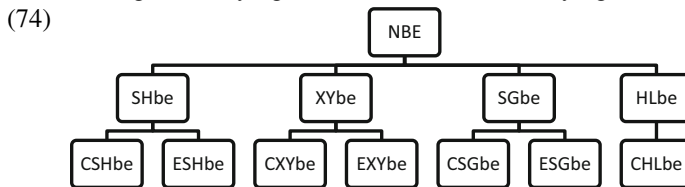
As (71e) shows, we further have the AP merged with the light verb *v* that carries a comparison meaning like (71d). After having the result sequentially merged with the *bǐ* ‘than’ phrase and the subject NP (i.e., *Aunt Wang*), the interpretation (71g) is derived. Namely, (58c) is true in the case where the difference between the degree about the cardinality of the set of TU *NTOCMEs* carried out by Aunt Wang and the degree about the cardinality of the set of TU *NTOCMEs* carried out by Aunt Li is the degree about the cardinality of the set of TU *NTOCMEs* derived from the argument-like adjunct clause. This ‘difference’ set of TU *NTOCMEs* contains six TU external *NTOCMEs* carried out by Aunt Wang.

To put it another way, the elements of the set of Aunt Wang’s TU *NTOCMEs* and the set of Aunt Li’s TU *NTOCMEs* are of the same sort because they all belong to the taxonomic level of *NTOCMEs*. Since the number of elements of a proper subset (i.e., part) of the set of *NTOCMEs* carried out by Aunt Wang can be the same as that of the set of *NTOCMEs* carried out by Aunt Li, the set of Aunt Wang’s *NTOCMEs* and the set of Aunt Li’s *NTOCMEs* can be analogous to being properly ordered in a

part-of relation. So, their measurements are similarly ordered along the dimension of the cardinality of TU *NTOCMEs* in Schwarzschild's (2002) sense.

Fourth, the fact that, under a taxonomic hierarchy like (74), (58d), repeated as (73), is felicitous in context (75) but infelicitous in context (76) can also be well explained. (For ease of exposition, I use *NBE* to represent the TU novel-buying event, *SHbe* the TU *SH*-buying event, *XYbe* the TU *XY*-buying event, *SGbe* the TU *SG*-buying event, *HLbe* the TU *HL*-buying event, *CSHbe* the TU *CSH*-buying event, *ESHbe* the TU *ESH*-buying event, *CXYbe* the TU *CXY*-buying event, *EXYbe* the TU *EXY*-buying event, *CSGbe* the TU *CSG*-buying event, *ESGbe* the TU *ESG*-buying event and *CHLbe* the TU *CHL*-buying event.)

- (73) Zhāngsān bǐ Lǐsì duō mǎi-le Sānguózhì hé Hónglómèng.
Zhangsan than Lisi DUO buy-ASP SG and HL
'Zhangsan's buying novels exceeds Lisi's buying novels by SG and HL.'



- (75) Zhangsan: {SHbe, XYbe, SGbe, HLbe}
Lisi: {SHbe, XYbe}
- (76) Zhangsan: {SHbe, SGbe, HLbe}
Lisi: {SHbe, XYbe}

Namely, Zhangsan has to buy *SH* and *XY* if Lisi buys *SH* and *XY*. However, the version of *SH* that Zhangsan buys might not be the same as the version of *SH* that Lisi buys.

According to Condition B, the taxonomic level is identified by the lexical meaning of the verb *mǎi* 'buy' and the DP object *Sānguózhì hé Hónglómèng* 'SG and HL'; therefore, TU events of buying different novels, for example *SHbe*, *XYbe*, *SGbe* and *HLbe*, belong to different taxonomic levels.¹⁹ So, they are not of the same sort. Hence, in context (75), neither are the elements of the set of TU events of buying different novels carried out by Zhangsan (i.e., {*SHbe*, *XYbe*, *SGbe*, *HLbe*}) the same sort at the taxonomic level identified by Condition B, nor are the elements of the set of TU events of buying different novels carried out by Lisi (i.e., {*SHbe*, *XYbe*}).

In spite of this, the comparison involved in (73) can still conform to the Monotonicity Condition if Condition C is satisfied. That is, in context (75), the set

¹⁹ Given the lexical meaning of the verb *mǎi* 'buy' and the proper name like *Shuǐhǔzhuàn* 'Water Margin', for (73), the value of *z* of the Taxonomization Function B is 1 and, thus, the value of *n* of the Taxonomization Function B is 0.

of Zhangsan's TU *NBEs* {*SHbe*, *XYbe*, *SGbe*, *HLbe*} has {*SHbe*, *XYbe*} as one of its subsets, and the elements of this subset are 'the same' as the elements of the set of Lisi's TU *NBEs* (i.e., {*SHbe*, *XYbe*}). Hence, according to the Condition C, the Monotonicity Condition will lift the taxonomic level one-level higher than that identified by Condition B and force the TU events belonging to the taxonomic level identified by Condition B (i.e., *SGbe* and *HLbe*) to be interpreted as a token of the event type that belongs to the 'one-level higher' taxonomic level (i.e., the level of *NBEs* in (74)).²⁰ At this 'one-level higher' taxonomic level, which provides information to identify the classifier needed for interpreting the sentence as *běn* 'CL_n', the set of TU events carried out by the target of comparison and the set of TU events carried out by the standard of comparison, being able to be analogous to being properly ordered in a part-of relation, are measured and, due to the Monotonicity Condition, their measurements are similarly ordered along the cardinality of *NBEs* in Schwarzschild's (2002) sense. In other words, for (73) to be true, the set of Zhangsan's TU *NBEs* {*SHbe*, *XYbe*, *SGbe*, *HLbe*} must have a subset with its elements 'the same' as the elements of the set of Lisi's TU *NBEs*. This explains why Zhangsan has to buy *SH* and *XY* if Lisi buys *SH* and *XY*.

5 Implications

My proposal has the following three empirical and theoretical implications.

5.1 The transitive comparative and the *duō* transitive comparative

Assuming that the *duō* verbal comparative is a type of transitive comparative, the *duō* transitive comparative is expected to show some intrinsic properties of the canonical transitive comparative. The facts indeed bear out this expectation. A Chinese canonical transitive comparative has the following five major properties, as shown by (77a–f), respectively (Xiang 2005; Liu 2007, 2014; Grano and Kennedy 2012).

²⁰ This account implies that (73) can be rewritten as (i) without any substantial meaning change, and the fact bears out this implication.

(i) Zhāngsān mǎi de xiǎoshuō dāngzhōng chūle Sāngúozhì hé Hónglómèng
Zhangsan buy DE novel among and SG and HL
zhīwài, dōu hé Lǐsì yīyàng.
except all and Lisi same
'All the novels that Zhangsan bought, except SG and HL, are the same as those
bought by Lisi.'

- (77) a. Zhāngsān gāo (Lǐsì) *(liǎng-jīē).
 Zhangsan high Lisi two-rank
 'Zhangsan is two ranks higher than Lisi.'
- b. Zhāngsān (bí Lǐsì) gāo liǎng-jīē.²¹
 Zhangsan than Lisi high two-rank
 'Zhangsan is two ranks higher than Lisi.'
- c. *Zhāngsān gèng gāo Lǐsì liǎng-jīē.
 Zhangsan even-more high Lisi two-rank
- d. *Zhāngsān (bí Lǐsì) gèng gāo liǎng-jīē.
 Zhangsan than Lisi even-more high two-rank
- e. Zhāngsān (bí Lǐsì) gāo sheng-le liǎng-jīē.
 Zhangsan than Lisi high promote-ASP two-rank
 'Zhangsan's promotion exceeds Lisi's promotion by two ranks.'
- f. *Zhāngsān gāo Lǐsì sheng-le liǎng-jīē.
 Zhangsan high Lisi promote-ASP two-rank

²¹ As one anonymous reviewer points out, it is possible to consider (77b) an adjectival comparative. However, it is not appropriate to analyze (77b) as an adjectival comparative because a Chinese adjective is not allowed to have a nominal expression right after it (Zhu 1982; Liu et al. 2004; Huang et al. 2009). In addition to this, the presence of *bǐ* 'than' cannot be used as a criterion to distinguish a transitive comparative from an adjectival comparative, either. In Chinese transitive comparatives, the standard of comparison might occur as the object NP right after the transitive verb or a preverbal phrase headed by the preposition *bǐ* 'than' (Xiang 2005; Liu 2007; Grano and Kennedy 2012). Besides, one might wonder whether *gāo shēng* 'high promote' in (77e) is a compound verb like *gāoshēng* 'high.promote' in (i).

- (i) Zhāngsān gāoshēng zǒngjīnglǐ.
 Zhangsan high.promote general-manager
 'Zhangsan was promoted as the general manager.'

In Chinese, the predicate of a *bǐ* 'than' comparative must be a gradable one and the verb of a transitive comparative must have a gradable counterpart in a structure with a degree modifier, as illustrated by (ii) and (iii-a-b) respectively.

- (ii) Zhāngsān bí Lǐsì gèng gāo.
 Zhangsan than Lisi even.more tall
 'Zhangsan is even taller than Lisi.'
- (iii) a. Zhāngsān gāo Lǐsì shí-gōngfēn.
 Zhangsan tall Lisi ten-centimeter
 'Zhangsan is ten centimeters taller than Lisi.'
- b. Zhāngsān hěn gāo.
 Zhangsan very tall
 'Zhangsan is very tall.'

However, neither is the compound verb *gāoshēng* 'high.promote' a gradable verb like *xǐhuān* 'like', nor does it have a gradable counterpart in a structure with a degree modifier, as the ungrammaticality of (iv-a-b) attests.

- (iv) a. *Zhāngsān hěn gāoshēng zǒngjīnglǐ.
 Zhangsan very high.promote general-manager
- b. *Zhāngsān hěn gāoshēng.
 Zhangsan very high.promote

So, *gāo shēng* 'high promote' in (77e) should not be a compound verb.

First, the transitive verb inside (e.g., *gāo* ‘tall’ in (77a)) has two nominal internal arguments, the one right after the transitive verb *gāo* ‘tall’ (e.g., *Lǐsì* in (77a)) functions as the standard of comparison, and the one following the standard of comparison (e.g., *liǎng-jīe* ‘two-rank’ in (77a)) functions as the differential.

Second, the one functioning as the standard of comparison can be deleted; however, the one functioning as the differential cannot.

Third, the standard of comparison can be introduced by a preverbal phrase headed by the preposition *bǐ* ‘than’.

Fourth, the predicate headed by the transitive verb (e.g., *gāo* ‘tall’ in (77c–d)) cannot be modified by a degree adverb.

Fifth, as the contrast between (77e) and (77f) shows, if an adjunct phrase occurs in a postverbal position, the internal argument that functions as the standard of comparison has to occur as a preverbal phrase headed by the preposition *bǐ* ‘than’ in order not to violate the Postverbal Constraint (Huang 1982).²²

(78) The Postverbal Constraint

In Chinese, the direct object of a verb has to (leftward) move out of its postverbal base position if a constituent other than the direct object follows the verb.

Significantly here, a canonical transitive comparative like (79a), where the transitive verb is *duō* ‘much’, also shows these five properties, as illustrated by (79a–f), respectively.

- (79) a. Zhāngsān duō (Lǐsì) *(yì-běn shū).
 Zhangsan much Lisi one-CL_n book
 ‘Zhangsan has one more book than Lisi.’
 b. Zhāngsān (bí Lǐsì) duō yì-běn shū.
 Zhangsan than Lisi much one-CL_n book
 ‘Zhangsan has one more book than Lisi.’
 c. *Zhāngsān gèng duō Lǐsì yì-běn shū.
 Zhangsan even-more much Lisi one-CL_n book
 d. *Zhāngsān (bí Lǐsì) gèng duō yì-běn shū.
 Zhangsan than Lisi even-more much one-CL_n book
 e. Zhāngsān (bí Lǐsì) duō tài duō le.
 Zhangsan than Lisi much too much SFP
 ‘Zhangsan has too much more (than Lisi).’
 f. *Zhāngsān duō Lǐsì tài duō le.
 Zhangsan much Lisi too much SFP

²² Here, I leave it open whether the preverbal standard of comparison in the Chinese transitive comparative (i.e., *bǐ Lǐsì* ‘than Lisi’) is a result of movement.

More notably here, except the ungrammaticality of (80a), which violates the Postverbal Constraint because the direct object of the transitive verb *duō* ‘DUO’ (i. e., *Lìsì*) and the differential-denoting argument-like adjunct clause (i. e., *mǎi yī-běn shū* ‘buy one-CL_n book’) both occur postverbally, the almost parallelism between (79a–f) and (80a–f) in syntax and semantics implies that a *duō* transitive comparative like (80b) is a transitive comparative.

- (80) a. *Zhāngsān *duō* Lìsì mǎi yī-běn shū.
 Zhangsan DUO Lisi buy one-CL_n book
 b. Zhāngsān (bí Lìsì) *duō mǎi* yī-běn shū.
 Zhangsan than Lisi DUO buy one-CL_n book
 ‘Zhangsan’s buying books exceeds Lisi’s buying books by one book.’
 c. *Zhāngsān gèng bí Lìsì *duō mǎi* yī-běn shū.
 Zhangsan even-more than Lisi DUO buy one-CL_n book
 d. *Zhāngsān (bí Lìsì) gèng *duō mǎi* yī-běn shū.
 Zhangsan than Lisi even-more DUO buy one-CL_n book
 e. Zhāngsān (bí Lìsì) *duō mǎi* yī-běn shū.
 Zhangsan than Lisi DUO buy one-CL_n book
 ‘Zhangsan’s buying books exceeds (Lisi’s buying books) by one book.’
 f. *Zhāngsān *duō* Lìsì mǎi yī-běn shū.
 Zhangsan DUO Lisi buy one-CL_n book

In other words, a *duō* transitive comparative (e.g., (80b)) is a kind of transitive comparative in which the differential phrase is the argument-like adjunct clause of the transitive verb *duō* ‘DUO’. Since the argument-like adjunct clause occurs in the postverbal position, the internal argument *Lìsì*, functioning as the standard of comparison, has to occur as a preverbal phrase headed by the preposition *bǐ* ‘than’ to avoid the violation of the Postverbal Constraint.²³

²³ As one anonymous reviewer points out, my claim that the *duō* verbal comparative, due to its sharing some intrinsic properties with the canonical transitive comparative, is a type of transitive comparative might suffer from the following problems. First, there exists some dissimilarity between the *duō* transitive comparative and the canonical transitive comparative. That is, the predicates that can occur in the canonical transitive comparative are very restricted and need to come with a conventional measure system. However, there is no such restriction for the *duō* transitive comparative. As I have argued, the transitive verb of the *duō* transitive comparative is derived by having the quantity adjective *duō* ‘much’ incorporated into the covert light verb that carries the comparison meaning. The quantity adjective *duō* ‘much’ functions to introduce a measure function, the dimension of measurement along which the measure function works is determined by what is measured, the taxonomic unit used for measuring what is measured is partially determined by the classifier involved, and a classifier is always associated with a conventional measure system. So, it is not implausible for us to suggest that the transitive verb *duō* ‘DUO’ of the *duō* transitive comparative also comes with a conventional measure system. Second, as the reviewer points out, many examples given in (79)–(80) are not the *duō* verbal construction discussed in this study. The *duō* verbal comparative I study here is a comparative in which what occurs right after the verb *duō* ‘DUO’ is an argument-like adjunct clause that functions as the differential, and I dub it the *duō* transitive comparative. I use the contrast between (79a–f) and (80a–f) simply to show how the canonical transitive comparative and the *duō* transitive comparative are similar to each other in syntax and semantics. In other words, (79a–f) are cases of the canonical transitive comparative while (80a–f) are cases of the *duō* transitive comparative.

5.2 The quantity adjective *duō* and degrees

According to the analysis proposed, in the *duō* transitive comparative, degrees are compositionally introduced by the measure function introduced by the quantity adjective *duō* ‘much’, the output of the measure function is a degree about the cardinality of the set of TU events derived from the argument-like adjunct clause, and the comparison involved must be subject to the Monotonicity Condition. So, it is the measure function introduction feature of the quantity adjective *duō* ‘much’ that allows the *duō* transitive comparative to take an argument-like adjunct clause as the differential phrase. This explains why examples like (81a–b) (henceforth the *zǎo/wǎn* verbal comparative), which seem to be identical to the *duō* transitive comparative in the syntactic structure, differ from the *duō* transitive comparative in the following aspects (Li 2015: 6).

- (81) a. Zhāngsān bǐ Lǐsì (gèng) zǎo/wǎn mǎi (yī-běn shū/zhè-běn shū/xiǎoshuō/Hónglóumèng).
 Zhangsan than Lisi even-more early/late buy (one-CL_n book/this-CL_n book/novel/HL)
 ‘Zhangsan bought a book/this book/the novel/HL much earlier/later than Lisi.’
- b. Zhāngsān bǐ Lǐsì (gèng) zǎo/wǎn mǎi (yī-píng shuǐ/zhè-zhóng shuǐ/shuǐ).
 Zhangsan than Lisi (even-more) early/late buy (one-CL_n water/this-CL_n water/water)
 ‘Zhangsan bought one bottle of water/this kind of water/ water much earlier/later than Lisi.’

First, in the *zǎo/wǎn* verbal comparative, the target of comparison and the standard of comparison are compared along the dimension specified by the gradable adverb *zǎo/wǎn* ‘early/late’, and the NP object of the verb right after *zǎo/wǎn* ‘early/late’ plays no role in guaranteeing the comparison is subject to the Monotonicity Condition. So, the NP object can be deleted.

Second, the *zǎo/wǎn* verbal comparative is not a transitive comparative and the gradable adverb *zǎo/wǎn* ‘early/late’ inside is a modifier for the main verb. So, the predicate, due to its containing the gradable adverb *zǎo/wǎn* ‘early/late’, allows a degree adverb to occur inside to modify the adverb *zǎo/wǎn* ‘early/late’. In contrast, in the *duō* transitive comparative, the obligatory requirement of the differential-denoting argument-like adjunct clause implies that the predicate of the *duō* transitive comparative cannot be modified by a degree adverb because a differential phrase, as Grano and Kennedy (2012: 224) argue, is incompatible with a degree modifier, as the ungrammaticality of (82a–b) shows.

- (82) a. Zhāngsān bǐ Lǐsì (*gèng) gāo wǔ-gōngfēn.
 Zhangsan than Lisi even-more tall five-centimeter
 ‘Zhangsan is five centimeters taller than Lisi.’
 b. Zhāngsān bǐ Lǐsì (*gèng) duō mǎi nà-sān-běn shū.
 Zhangsan than Lisi even-more DUO buy that-three-CL_n book
 ‘Zhangsan’s buying books exceeds Lisi’s buying books by
 those three books.’

Third, in the *zǎo/wǎn* verbal comparative, the target of comparison and the standard of comparison are compared along the dimension specified by the gradable adverb *zǎo/wǎn* ‘early/late’. So, the comparison conveyed is about how early/late the event denoted by the verb occurs rather than how many TU events there are.

5.3 The types of verbs right after the transitive verb *duō*

As I have argued, the measure function introduced by the quantity adjective *duō* ‘much’ takes as input the set of TU events derived from the argument-like adjunct clause by the Event Taxonomization Function rather than the denotation of the verb in the argument-like adjunct clause. So, in addition to being an activity verb, a stative verb, or a semelfactive verb, the verb in the argument-like adjunct clause can be an achievement verb or an accomplishment verb because the Monotonicity Condition is not violated (Wellwood 2015).

- (83) a. Zhāngsān bǐ Lǐsì duō pǎo-le yī-bǎi-gōngchǐ.
 Zhangsan than Lisi DUO run-ASP one-hundred-meter
 ‘Zhangsan’s running exceeds Lisi’s running by one hundred meters.’
 b. Zhāngsān bǐ Lǐsì duō dǒng liáng-zhǒng yǔyán.
 Zhangsan than Lisi DUO know two-CL_n language
 ‘Zhangsan’s knowing languages exceeds Lisi’s knowing
 languages by two languages.’
 c. Zhāngsān bǐ Lǐsì duō yíng-le wú-bǎi-kuài qián.
 Zhangsan than Lisi DUO win-ASP five-hundred-CL_n money
 ‘Zhangsan’s winning money exceeds Lisi’s winning money
 by five hundred dollars.’
 d. Zhāngsān bǐ Lǐsì duō dǎpò-le yī-ge bēizi.
 Zhangsan than Lisi DUO break-ASP one-CL_n cup
 ‘Zhangsan’s breaking cups exceeds Lisi’s breaking cups by one cup.’
 e. Zhāngsān bǐ Lǐsì duō ké-le liǎng-shēng.
 Zhangsan than Lisi DUO cough-ASP two-CL_v
 ‘Zhangsan’s coughing exceeds Lisi’s coughing by two times.’

Before reaching the concluding remarks, I would like to make some remarks on Li (2015).

6 Some remarks on Li (2015)

As I have argued, the *duō* transitive comparative is a degree comparative. The transitive verb *duō* ‘DUO’ is derived by having the quantity adjective *duō* ‘much’ incorporated into the light verb *v* that carries the comparison meaning. The predicate-like phrase right after the transitive verb *duō* ‘DUO’ is an argument-like adjunct clause. To conform to the Monotonicity Condition, this argument-like adjunct clause has to be turned into a set of TU events by the Event Taxonomization Function. The measure function introduced by the quantity adjective *duō* ‘much’, then, measures this set along the cardinality of TU events, and the result value is the differential.

Here, I would like to show how my proposal differs from Li’s (2015) degreeless mapping-based analysis in nature.

First, as I have argued, in the *duō* transitive comparative, the differential-denoting phrase is the argument-like adjunct clause of the transitive verb *duō* ‘DUO’. Hence, the phenomenon that the DP/NP object in the argument-like adjunct clause functions as the differential phrase is a false impression. Given this, the DP/NP object can be a bare noun, an indefinite NP, a definite NP, a proper name, or an interrogative nominal. So, the three challenges which a degree-based analysis for the *duō* transitive comparative, as Li (2015) argues, might encounter will not be problems for my proposal.

Second, according to Li (2015: 16), it is the nominal expression right after the verb behind the marker *duō* ‘DUO’ that indicates at what taxonomic level a mapping relation is established and how the different categories are hierarchically related in the taxonomic hierarchy involved. However, as I have argued, this is seriously challenged by the semantic interpretation of examples like (58c). According to my analysis, it is the lexical meaning of the verb, the type of classifier, and the NP/DP object in the argument-like adjunct clause that work together to determine the taxonomical level where the comparison is conducted.

Third, as far as I know, the degreeless verbal comparative in the sense of Li (2015) only exists in Chinese, and Li (2015) assigns *duō* ‘DUO’ a semantic meaning as in (85).

$$(85) \quad \llbracket du\bar{o}_f \rrbracket^g = \lambda P_{\langle e, \langle e, t \rangle \rangle} \lambda k_e \lambda y_e \lambda x_e \forall z_e [P(z)(y) > \exists t_e [t = g(f)(z) \wedge \text{PROPER}(g(f)) \wedge P(t)(x) \wedge P(k)(x) \wedge \neg t \circ k]]$$

In other words, Li (2015) constructs an analysis at the expense of assigning *duō* ‘DUO’ a semantic meaning much different from that of the English *many/much*. In contrast, I argue that the transitive *duō* ‘DUO’ is derived by having the quantity adjective *duō* ‘much’ incorporated into the light verb *v* that carries the comparison meaning. As Wellwood (2015) convincingly argues, the English adjective *many/much* is also a quantity adjective and functions to introduce a measure function. So,

the cross-linguistic evidence from English makes my proposal more preferable than Li's (2015) degreeless mapping-based analysis.

Fourth, under Li's (2015) degreeless mapping-based analysis, the constraint of sort/quantity is independently required. However, under my proposal, the constraint of sort/quantity theoretically does not have any independent status because they simply function to ensure that the comparison involved is subject to the Monotonicity Condition (Schwarzschild 2002; Wellwood 2015).²⁴

²⁴ In addition to the degree-based analysis I propose, under the framework of the difference-based semantics for comparatives, Luo and Xie (2018: 94–95), contra Li (2015), argue for a degree-based analysis by pointing out the following two distinctions between the differential-denoting DP in the *duō* verbal comparative and an individual-denoting DP in non-comparative contexts. First, the differential-denoting DP in the *duō* verbal comparative lacks an individual-denoting pronominal form or an empty form but has a degree/kind anaphoric correspondent, as (i)–(ii) illustrate.

- (i) Zhāngsān bǐ Lǐsì duō dú-le [liáng-běn xiǎoshuō]_i. ??/*[Tāmen/e]_i dōu hén hǎokàn.
Zhangsan than Lisi DUO read-ASP two-CL_n novel they/e all veryinteresting
Intended: 'Zhangsan read [two more novels]_i than Lisi did. They_i are both very interesting.'
- (ii) Zhāngsān bǐ Lǐsì duō dú-le [liáng-běn xiǎoshuō]_i. Wángwǔ yě duō dú-le [nàme_i duō].
Zhangsan than Lisi DUO read-ASP two-CL_n novel Wangwu also DUO read-ASP that much
'Zhangsan read two more novels than Lisi did. Wangwu also read so much more, too.'

Second, the differential-denoting DP in the *duō* verbal comparative cannot be topicalized, as the ungrammaticality of (iii) shows.

- (iii) */??_[Topic] Zhè-běn xiǎoshuō]_i, Zhāngsān bǐ Lǐsì duō dú-le e_i.
this-CL_n novel Zhangsan than Lisi DUO read-ASP

Given these, Luo and Xie (2018) construct a degree-based analysis based on the following two assumptions: (A) the differential-denoting DP in the *duō* verbal comparative is a degree-denoting DP (Schwarzschild 2008; Rett 2014), and (B) degrees are kinds (Scontras 2017). Accordingly, they assign example (iv) a syntactic structure like (v), and a semantic interpretation like (vi) (Luo and Xie 2018: 102–103).

- (iv) Zhāngsān bǐ Lǐsì duō dú-le sān-běn shū.
Zhangsan than Lisi DUO read-ASP three-CL_n book
'Zhangsan's reading books exceeds Lisi's reading books by three books.'
- (v) [TP [DP Zhāngsān]_i [[BiP bǐ Lǐsì] [VoiceP [DP t_i] [Voice'
Voice [V_P [V' [V' DUO [V dú-le]]]_{[DP [CIP [NumericalP sān] CL] [NPshū]]]]]]]]}
- (vi) [[Zhāngsān bǐ Lǐsì duō dú-le sān-běn shū]] = $\exists x[\mu(x) = 3 \wedge {}^U_{book}(x)$
 $\wedge read(x)(ZS) \wedge \neg read(x)(LS)]$

Namely, for (iv) to be true, there must be some instantiation *x* of the book kind whose cardinality is 3 such that Zhangsan read *x* but Lisi did not read (the same thing). However, the following empirical and theoretical problems make Luo and Xie's (2018) analysis inconclusive. First, according to Zhu (1982: 76), the adjective *duō* 'much', after being modified by a degree adverb, can occur as the attributive modifier of a noun without taking the marker *de* 'DE', as (vii) shows.

- (vii) hěn duō xiǎoshuō
very many novel
'a lot of novels'

So, the so-called degree anaphoric correspondent *nàme duō* 'that many' in (ii) can be regarded as the reduced form of *nàme duō xiǎoshuō* 'that many novel', in which the degree meaning comes from the adjective *duō* 'many'. So, it is hard to say that the reduced form *nàme duō* 'that much' in (ii) is a degree-

7 Concluding remarks

The *duō* transitive comparative is a type of transitive comparative. It is a degree comparative. The transitive verb *duō* ‘DUO’ is derived by having the quantity adjective *duō* ‘much’ incorporated into the light verb *v* that carries the comparison meaning. It is the interaction among the quantity adjective *duō* ‘much’, the transitive verb *duō* ‘DUO’, and the argument-like adjunct clause that results in the syntactic and semantic particularities of the *duō* transitive comparative. For example, the argument-like adjunct clause semantically functions as the differential phrase, the internal argument of the transitive verb *duō* ‘DUO’ that functions as the standard of comparison has to occur as a preverbal phrase headed by the preposition *bǐ* ‘then’, and the DP/NP object in the argument-like adjunct clause can be a bare noun, an indefinite NP, a definite NP, a proper name or an interrogative nominal.

To put it simply, assuming that the predicate-like phrase right after the transitive verb *duō* ‘DUO’ is the argument-like adjunct clause of it, a degree-based analysis assimilating the semantics of the quantity adjective *duō* ‘much’ can well account for the syntactic and semantic particularities of the *duō* transitive comparative by working together with the Monotonicity Condition. Thus, according to the law of parsimony or Ockham’s razor, a degree-based analysis is preferred to a degreeless mapping-based analysis because explanations of unknown phenomena are best sought first in terms of well-known theories.

Acknowledgments Various versions of this article, which originated from my work in 2013 and developed through my work in 2016, were presented at the NYCU Syntax-Semantics Workshop at National Yang Ming Chiao Tung University in 2021 and at the Yushan Linguistics Salon hosted by National Taiwan Normal University in 2023. I deeply appreciate the valuable feedback from the audiences, especially from Chāo-Tíng Chōu, Miào-Líng Hsièh, Wéi-Fāng Hsièh, Hsiù-Chên Liào, Chí-Míng Liú and Zhōng-Yù Yáng. I am also profoundly grateful to Yì-Hsūn Chén, Jim Huáng, Jò-Wàng Lín, and Niina Ning Zhāng for their insightful comments and helpful suggestions on different parts and versions of this article. The keen and rigorous comments as well as constructive suggestions from the anonymous reviewers, despite the unusually demanding time it required, significantly improved the content and presentation of this work. Additionally, I owe thanks to Yì-Hsūn Chén, Chāo-Tíng Chōu,

Footnote 24 continued

denoting DP. Second, in some specific contexts (e.g., a contrastive focus one), the differential phrase can be topicalized if the definiteness constraint on topicalization is satisfied, as (viii) illustrates.

- (viii) Zhāngsān hé Lísì, shū, yī-gè duō mǎi-le, yī-gè sháo mǎi-le.
 Zhangsan and Lisi book one-CL_n DUO buy-ASP one-CL_n SHAO buy-ASP
 ‘As for Zhangsan and Lisi, it is by also including the category of books that one’s buying materials exceeds the contextually determined standard but the same contextually determined standard exceeds the other’s buying materials by also including the category of books.’

Last but not least, Luo and Xie (2018) do not show how their analysis derives the semantics for a *duō* verbal comparative like (ix), where the differential DP is a proper name.

- (ix) Zhāngsān bí Lísì duō mǎi-le Shuǐhǔzhuān
 Zhangsan than Lisi DUO buy-ASP SH
 ‘Zhangsan’s buying novels exceeds Lisi’s buying novels by SH.’

Chúng-Háo Kū, Chìn-Mǎn Kuō, Hsiù-Chēn Liào, and Tíng-Chì Wèi for their assistance in cross-checking the data used for grammaticality judgments in this study. Any remaining errors or inconsistencies are, of course, my own responsibility. This study is partially funded by the research Grant NSTC 111-2410-H-A49-015 from the National Science and Technology Council, Taiwan, to which I am very grateful.

Funding Open Access funding enabled and organized by National Yang Ming Chiao Tung University.

Open Access This article is licensed under a Creative Commons Attribution 4.0 International License, which permits use, sharing, adaptation, distribution and reproduction in any medium or format, as long as you give appropriate credit to the original author(s) and the source, provide a link to the Creative Commons licence, and indicate if changes were made. The images or other third party material in this article are included in the article's Creative Commons licence, unless indicated otherwise in a credit line to the material. If material is not included in the article's Creative Commons licence and your intended use is not permitted by statutory regulation or exceeds the permitted use, you will need to obtain permission directly from the copyright holder. To view a copy of this licence, visit <http://creativecommons.org/licenses/by/4.0/>.

References

- Carlson, Gregory. 1987. Same and different: Consequences for syntax and semantics. *Linguistics and Philosophy* 10 (4): 531–565.
- Cresswell, Max J. 1976. The semantics of degree. In *Montague grammar*, ed. Barbara Partee, 261–292. New York, NY: Academic Press.
- Ernst, Thomas. 1996. Chinese evidence for semi-arguments. In *Studies in the linguistic sciences*, vol. 26, ed. Chin-Chuan. Cheng, Jerome Lee Packard, and James Hye Suk. Yoon, 117–132. Urbana, Ill: Department of Linguistics, University of Illinois Urbana-Champaign.
- Ernst, Thomas. 2014. Adverbial adjuncts in Mandarin Chinese. In *The handbook of Chinese linguistics*, ed. C-T. James. Huang, Y-H. Audrey. Li, and Andrew Simpson, 49–72. Malden, MA: Wiley Blackwell.
- Grano, Thomas, and Christopher Kennedy. 2012. Mandarin transitive comparatives and the grammar of measurement. *Journal of East Asian Linguistics* 21 (3): 219–266.
- Hardt, Daniel, and Line Mikkelsen. 2015. Same but different. *Linguistics and Philosophy* 38 (4): 289–314.
- Heim, Irene. 1985. *Notes on comparatives and related matters*. MS. Austin, TX: University of Texas, Austin.
- Hellan, Lars. 1981. *Towards an integrated analysis of comparatives*. Narr: Tübingen.
- Hsieh, I-Ta Chris. 2015. Remark: Long-distance reflexives, blocking effects and the structure of Mandarin comparatives. *Syntax* 18 (1): 78–102.
- Huang, Cheng-Teh James. 1982. *Logical relations in Chinese and the theory of grammar*. Cambridge, MA: Massachusetts Institute of Technology.
- Huang, C.-T. James., Y.-H. Audrey. Li, and Yafei Li. 2009. *The syntax of Chinese*. Cambridge, MA: Cambridge University Press.
- Kratzer, Angelika. 1996. Severing the external argument from its verb. In *Phrase structure and the lexicon*, ed. John Rooryck and Laurie Zaring, 109–137. Dordrecht, Netherlands: Kluwer Academic Publishers.
- Krifka, Manfred. 1995. Common nouns: A contrastive analysis of English and Chinese. In *The Generic book*, ed. Greg N. Carlson and Jeff F. Pelletier, 398–411. Chicago, IL: Chicago University Press.
- Li, Xu-Ping. 2011. *On the semantics of classifiers in Chinese*. Ramat Gan: Bar-Ilan University.
- Li, Xiao. 2015. Degreeless comparatives: The semantics of differential verbal comparatives in Mandarin Chinese. *Journal of Semantics* 32 (1): 1–38. <https://doi.org/10.1093/jos/fft013>.
- Lin, Jo-Wang. 1998. Distributivity in Chinese and its implications. *Natural Language Semantics* 6 (2): 201–243.

- Liu, Chen-Sheng Luther. 2007. The weak comparative morpheme in Mandarin Chinese. *Concentric: Studies in Linguistics* 33 (2): 53–89.
- Liu, Chen-Sheng Luther. 2014. Comparatives. In *The handbook of Chinese linguistics*, ed. C.-T. James-Huang, Y.-H. Audrey-Li, and Andrew Simpson, 342–366. Malden, MA: Wiley Blackwell.
- Liu, Yue-Hua., Wen-Yu. Pan, and Gu. Wei. 2004. *Shìyòng xiàndài hànyǔ yǔfǎ* [Modern Chinese grammar]. Běijīng: Shāngwù Yīnshūguǎn.
- Luo, Qiongpeng, and Zhiguo Xie. 2018. Degrees as nominalized properties: Evidence from differential verbal comparatives in Mandarin Chinese. In *Proceedings of sinn und bedeutung*, vol. 22, ed. Uli Sauerland, and Stephanie Solt, 89–106. Berlin: ZAS.
- Rett, Jessica. 2014. The polysemy of measurement. *Lingua* 143: 242–266.
- Schwarzschild, Roger. 1996. *Pluralities*. Dordrecht, Netherlands: Kluwer.
- Schwarzschild, Roger. 2008. The semantics of comparatives and other degree constructions. *Language and Linguistics Compass* 2 (2): 308–331.
- Schwarzschild, Roger, and Karina Wilkinson. 2002. Quantifiers in comparatives: A semantics of degree based on intervals. *Natural Language Semantics* 10 (1): 1–41.
- Schwarzschild, Roger. 2002. The grammar of measurement. In *Proceedings of SALT XII*, ed. B. Jackson, 225–245. Ithaca, NY: CLC Publications.
- Scontras, Gregory. 2017. A new kind of degree. *Linguistics and Philosophy* 40 (2): 165–205.
- Seuren, Pieter A. M. 1973. The comparative. In *Generative grammar in Europe*, ed. Ferenc Kiefer and Nicolas Ruwet, 528–564. Dordrecht: Reidel.
- von Stechow, Arnim. 1984. Comparing semantic theories of comparison. *Journal of Semantics* 3 (1): 1–77.
- Wellwood, Alexis. 2015. On the semantics of comparison across categories. *Linguistics and Philosophy* 38 (1): 67–101.
- Xiang, Ming. 2005. *Some topics in comparative constructions*. East Lansing: Michigan State University.
- Zhu, De.-Xi. 1982. *Yǔfǎ jiāngyì* [Lectures on Chinese syntax]. Běijīng: Shāngwù Yīnshūguǎn.

Publisher's Note Springer Nature remains neutral with regard to jurisdictional claims in published maps and institutional affiliations.