

# The ‘Associative Reading’ of DPs and the Quantity *vs.* Quality Distinction

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This paper investigates an unnoticed difference in Mandarin between the Q-adjectives and the gradable adjectives of quality and shows that this observation follows straightforwardly from a theory that differentiates gradable predication of quantity and that of quality (e.g., Rett 2008; Lin 2014; Solt 2015; a.o.).

## I. Mandarin Q-adjectives and the ‘Association’ Effect

### I.I. The unnoticed reading and the *quantity vs. quality* distinction

The Mandarin Q-adjectives *dūo* ‘many/much’ and *shǎo* ‘few/little’ may appear in predicate position in various degree constructions (see (1))<sup>1, 2</sup>; in all these examples, the Q-adjectives are predicates of the nominal phrases (indicated by the underlining) that refer to the students that Zhangsan taught and those that Lisi taught respectively.

- (1) a. Zhāngsān jiāo-gùo dè xúeshēng hěn dūo/shǎo (positive)  
Zhangsan teach-EXP REL student very many/few  
‘The students Zhangsan taught are many/few.’
- b. Zhāngsān jiāo-gùo dè xúeshēng bǐ Lìsì jiāo-gùo dè xúeshēng  
Zhangsan teach-EXP REL student COMP Lisi teach-EXP REL student  
dūo/shǎo (comparative)  
many/few  
‘The students Zhangsan taught are more/fewer than the students Lisi taught.’
- c. Zhāngsān jiāo-gùo dè xúeshēng hàn Lìsì jiāo-gùo dè xúeshēng  
Zhangsan teach-EXP REL student and Lisi teach-EXP REL student  
yīyàng dūo/shǎo (equative)  
the-same many/few  
‘The students Zhangsan taught are as many/few as the students that Lisi taught.’
- d. Zhāngsān jiāo-gùo dè xúeshēng zài dūo/shǎo (superlative)  
Zhangsan taught-EXP REL student SUPL many/few  
‘The students that Zhangsan taught are the most/fewest.’

Something that has gone unnoticed in the literature, however, is the fact that the predicative Q-adjectives may give rise to an ‘association effect’ on the nominal phrases they are predicates of: in the various degree constructions in (2), while on the surface it looks as if the Q-adjectives are predicates of the proper names *Zhāngsān* and *Lìsì*, these

<sup>1</sup> There is no morphological *many/few vs. much/little* distinction in Mandarin, and there is no obligatory plural marking (like English *-s*) in Mandarin, either.

<sup>2</sup> The abbreviations used in glosses are listed below:

COP: copular	CL: classifier	EXP: experiential marker
GEN: genitive case	MOD: modification marker	NOM: nominative case
PERF: perfective marker	POSS: possessive marker	REL: relativizer
SUPL: superlative	TOP: topic marker	

Q-adjectives, with the sentential adverbial *speaking of the students that one taught*, are in fact predicates of the students that Zhangsan taught and those that Lisi taught, as indicated by the bold-facing in the translation.

- (2) shuōdào jiāo-gùo dé xúeshēng,  
speaking-of teach-EXP REL student  
'speaking of the students that one taught'
- a. Zhāngsān hěn duō/shǎo (positive)  
Zhangsan very many/few  
'**The students that Zhangsan taught** are many/few.'
- b. Zhāngsān bǐ Lǐsì duō/shǎo (comparative)  
Zhangsan COMP Lǐsì many/few  
'**The students Zhangsan taught** are more/fewer than **the students Lisi taught**.'
- c. Zhāngsān hàn Lǐsì yīyàng duō/shǎo (equative)  
Zhangsan and Lisi the-same many/few  
'**The students Zhangsan taught** are as many/few as **the students Lisi taught**.'
- d. Zhāngsān zuì duō/shǎo (superlative)  
Zhangsan SUPL many/few  
'**The students that Zhangsan taught** are the most/fewest.'

Examples (3) and (4) show that it is possible in a comparative sentence for the association effect to target only the nominal after the comparative morpheme *bǐ* (i.e., the post-*bǐ* nominal)<sup>3</sup>; in these two examples, while the post-*bǐ* nominal appears to be simply the proper name *Lǐsì*, semantically the standards of comparison in (3) and (4) are the students that Lisi taught and the students of Lisi, respectively.

- (3) Zhāngsān jiāo-gùo dé xúeshēng bǐ Lǐsì duō/shǎo  
Zhangsan teach-EXP REL student COMP Lisi many/few  
'The students that Zhangsan taught are more/fewer than the students that Lisi taught.'
- (4) Zhāngsān-de xúeshēng bǐ Lǐsì duō/shǎo  
Zhangsan-POSS student COMP Lisi many/few  
'Zhangsan's students are more/fewer than Lisi's students.'

Examples (5)-(6) further show that it is possible for the association effect to target only the subject of the comparative; while the subject in these two examples appears to be

<sup>3</sup> A Mandarin *bǐ*-comparative has the schema in (i), where GP is the gradable predicate and DIFF the differential phrase.

- (i) TARGET *bǐ* STANDARD GP (DIFF)

For simplicity we will treat *bǐ* as carrying the function of expressing the meaning of comparison, though this choice has no effect on the discussion below. For more discussion on this matter, see Lin (2009), Liu (2011) and the references cited therein.

the proper name *Zhāngsān*, semantically the targets of comparison are the students that Zhangsan taught and the students of Zhangsan, respectively.

- (5) *Zhāngsān* bǐ Lǐsì jiāo-guò dé xúeshēng dūo/shǎo  
 Zhangsan COMP Lisi teach-EXP REL student many/few  
 ‘The students that Zhangsan taught are more/fewer than the students that Lisi taught.’
- (6) *Zhāngsān* bǐ Lǐsì-dè xúeshēng dūo/shǎo  
 Zhangsan COMP Lisi-POSS student many/few  
 ‘Zhangsan’s students are more than Lisi’s students.’

The data in (2)-(6) are particularly interesting for the following two reasons. First, this way of mapping from form to meaning is far from common in Mandarin. As shown in (7a)-(7b), while it is possible to omit the head noun in a possessive or a complex nominal phrase, a proper name by itself is never interpreted the way it is in (2)-(6), even with a proper antecedent.

- (7) a. Wángwǔ jiàoxùn-lè Zhāngsān-dè xuéshēng, yěi  
 Wangwu teach.a.lesson-PERF Zhangsan-POSS student also  
 jiàoxùn-lè Lǐsì-dè/ \*Lǐsì  
 teach.a.lesson-PERF Lisi-POSS/ Lǐsì  
 Intended: ‘Wangwu taught Zhangsan’s students a lesson, and he also taught Lisi’s students a lesson.’
- b. Wángwǔ jiàoxùn-lè Zhāngsān jiāo-guò dé xúeshēng, yěi  
 Wangwu teach.a.lesson-PERF Zhangsan teach-EXP REL student also  
 jiàoxùn-lè Lǐsì jiāo-guò dé/ \*Lǐsì  
 teach.a.lesson-PERF Lisi teach-EXP REL/ Lisi  
 Intended: ‘Wangwu taught a lesson to the students that Zhangsan taught, and he also taught a lesson to the students that Lisi taught.’

Second, the ‘association’ effect observed above is only seen with the Q-adjectives; no such effect on the nominal phrase is observed with a gradable adjective of quality. The various degree constructions in (8), if they are well-formed at all with the sentential adverbial *speaking of the students that one taught*, only have a reading in which the intelligence of the individual the proper name *Zhāngsān* refers to and that of the individual that the proper name *Lǐsì* refers to are in comparison. In none of these examples is the reading available in which the intelligence of the student(s) Zhangsan taught and/or that of the student(s) Lisi taught are being discussed.

- (8) shūodào jiāo-guò dé xúeshēng,  
 speaking.of teach-EXP REL students  
 lit. ‘Speaking of students that one taught,’
- a. <sup>\*/ok</sup>Zhāngsān hěn cōngmíng (positive)  
 Zhangsan very smart  
 ✓‘Zhangsan is smart.’  
 ✗‘The student(s) that Zhangsan taught is/are smart.’

- b. <sup>?</sup>/<sup>ok</sup>Zhāngsān bǐ Lǐsì cōngmíng (comparative)  
 Zhangsan COMP Lisi smart  
 ✓‘Zhangsan is smarter than Lisi.’  
 ✗‘The student/s that Zhangsan taught is/are smarter than that/those that Lisi taught.’
- c. <sup>?</sup>/<sup>ok</sup>Zhāngsān hàn Lǐsì yīyàng cōngmíng (equative)  
 Zhangsan and Lisi the.same smart  
 ✓‘Zhangsan is as smart as Lisi.’  
 ✗‘The student/s that Zhangsan taught is/are as smart as that/those Lisi taught.’
- d. <sup>?</sup>/<sup>ok</sup>Zhāngsān zài cōngmíng (superlative)  
 Zhangsan SUPL smart  
 ✓‘Zhangsan is the smartest.’  
 ✗‘The student/s that Zhangsan taught is/are the smartest.’

The lack of the association effect with the gradable adjectives of quality is further evidenced by (9) and (10); the fact that the comparative in (9) can only be judged false in the scenario (10) indicates that unlike (3), (9) only has a reading in which the intelligence of Lisi himself, rather than that of the student(s) that he taught, is being compared.

- (9) Zhāngsān jiāo-gùo de xúeshēng bǐ Lǐsì cōngmíng  
 Zhangsan teach-EXP REL student COMP Lisi smart  
 ✓‘the student(s) taught by Zhangsan is/are smarter than Lisi.’  
 ✗‘the student(s) that Zhangsan taught is/are smarter than the student/s that Lisi taught.’
- (10) Scenario: the IQ of the students that Zhangsan taught is 115-119; the IQ of the students that Lisi taught is 106-109; Lisi’s IQ is 125.

The contrast between (11a)-(11b) provides another piece of evidence for the lack of an association effect with gradable adjectives of quality: while continuing (2a) with the Mandarin counterpart of *just pick one to be your assistant* is fine (see (11a)), continuing (8a) with the same sentence results in oddity (see (11b)). The cause of this oddity seems intuitively straightforward: given that in (11b) *Zhāngsān* can only be interpreted as a unique individual, rather than a plurality associated with someone named Zhangsan, there is no appropriate antecedent for the indefinite cardinal determinative *one*. On the other hand in (11a), the first sentence may carry a meaning in which it is the students that Zhangsan taught, rather than Zhangsan himself, who are under discussion, even though the subject nominal appears to be simply the proper name *Zhāngsān*. The indefinite cardinal *one* thus has an appropriate antecedent.

- (11) shuōdào jiāo-gùo de xúeshēng,  
 speaking.of teach-EXP REL students  
 lit. ‘speaking of students that one taught,’
- a. Zhāngsān hěn duō/shǎo, nǐ jǐngguān zhǎo yī-gè dāng nǐ-de zhùlǐ  
 Zhangsan very many/few you just find 1-CL to.be you-POSS assistant  
 ‘Zhangsan’s students are many; you just pick one to be your assistant.’

- b. #Zhāngsān hěn cōngmíng, nǐ jǐngǔan zhǎo yī-gè dāng nǐ-dé  
 Zhangsan very smart you just/simply find 1-CL to.be you-POSS  
 zhùlǐ  
 assistant  
 ‘Zhangsan is smart; just pick one to be your assistant.’

It is worth noting that the association effect observed above and the contrast between the Q-adjectives and the gradable adjectives of quality are not unique to Mandarin; they are observed in Japanese as well.<sup>4</sup> Japanese *ooi* ‘many’ may occur in predicate position.<sup>5</sup> In the various degree constructions in (12), *ooi* appears to be predicated of the proper names *Taro* and *Hanako*; nevertheless, with the sentential adverbial *speaking of the students that one taught*, it is predicated of the students that Taro taught and those that Hanako taught respectively.

- (12) Osieta gakusee nituite iu to  
 taught student about talk when  
 ‘Speaking of students one taught,
- a. Taro-ga ooi (positive)  
 Taro-NOM many  
 ‘The students that Taro taught are many.’
- b. Taro-ga Hanako yori-mo ooi (comparative)  
 Taro-NOM Hanako than-more many  
 ‘The students that Taro taught are more than the students that Hanako taught.’
- c. Taro to Hanako-ga onaji yooni ooi (equative)  
 Taro and Hanako-NOM same way many  
 ‘The students that Taro taught are as many as the students that Hanako taught.’

Example (13) shows that the association effect observed in (12) is not available with adjectives of quality; with the gradable adjective *kasikoi* ‘smart’, all the degree constructions in (13) only permit the reading in which the intelligence of Taro and that of Hanako are under discussion.

- (13) Osieta gakusee nituite iu to  
 taught student about talk when  
 ‘Speaking of students (people) taught,’

<sup>4</sup> We thank Toshiko Oda for sharing with us the Japanese data. All errors, of course, are ours.

<sup>5</sup> There are two lexical items in Japanese, *ooi* and *takusan*, that translate as ‘many’. Unlike *ooi*, the predicate position is a less hospitable environment for *takusan*.

- (i) ?/\*John-no tomodati-ga takusan-da  
 John-GEN friend-NOM many-COP  
 ‘John’s friends are many.’

- a. Taro-ga kasikoi (positive)  
 Taro-NOM smart  
 ✓‘Taro is smart.’  
 ✗‘The student/s that Taro taught is/are smart.’
- b. Taro-ga Hanako-yori-mo kasikoi (comparative)  
 Taro-NOM Hanako-than-more smart  
 ✓‘Taro is smarter than Hanako.’  
 ✗‘Taro’s student/s is/are smarter than Hanako’s.’
- c. Taro to Hanako-ga onaji yooni kasikoi (equative)  
 Taro and Hanako-NOM same way smart  
 ✓‘Taro and Hanako are equally smart.’  
 ✗‘The students taught by Taro and by Hanako are equally smart.’

Example (14) shows that it is possible for the association effect to target the complement of *-yori* alone; in this example, it is the students that John taught and Mary taught who are being compared, despite the fact that the complement of *-yori* appears to be simply the proper name *Mary*. This association effect, again, disappears with the gradable adjective of quality *smart*, as shown in (15).

- (14) John-ga osieta gakusee-wa Mary-yori-mo ookatta  
 John-NOM taught student-TOP Mary-than-more many  
 ‘The students that John taught were more than the students that Mary taught.’
- (15) John-ga osieta gakusee-wa Mary-yori-mo atamagaii  
 John-NOM taught student-TOP Mary-than-more smart  
 ✓‘The student(s) John taught is(are) smarter than Mary.’  
 ✗‘The students John taught are smarter than the students Mary taught.’

## I.II. Some alternatives that do not seem to work

One quick response to the association effect observed in Mandarin (as well as Japanese) is to say that in the relevant examples, the Q-adjectives are predicated not of the proper names *Zhāngsān* and *Lǐsì* but rather of a nominal phrase that contains a phonetically null head, which may result from PF-deletion or a base-generated empty category *e*. Along these lines, (2a) may be assigned the structure (16a) or (16b).

- (16) a. [ *Zhāngsān teach-EXP-de-student* ] *very dūo/shǎo*  
 b. [ *Zhāngsān e* ] *very dūo/shǎo*

Nevertheless, analyses along with these lines not only lack empirical support, as already shown in (7), but also leave unexplained the contrast between the Q-adjectives and the gradable adjectives of quality.

Another possible response is that the association effect results from coercion. It is assumed that the Q-adjectives carry a plurality requirement and hence do not combine with nominal phrases that are interpreted as atomic individuals (see, e.g., Hackl (2000)). The proper names *Zhāngsān* and *Lǐsì* denote atomic individuals and hence cannot be combined directly with the Q-adjectives. In order to guarantee interpretability, a coercion operation along the lines of de Swart (1998) and Sawada and Grano (2011) might have applied in the examples above, when the association effect is observed.

If coercion is a ‘last resort’ operation (de Swart 1998; Sawada and Grano 2011; a.o.), an analysis along these lines predicts that the association effect should not arise once the plurality requirement of the Q-adjectives has been satisfied. This prediction is not borne out, however. With the sentential adverbial *speaking of one’s books*, (17) does carry the meaning in which the cardinality of the books possessed by the group of students that the nominal phrase *these students* refers to, rather than the cardinality of this group of students itself, is being compared, even though on the surface the Q-adjective appears to combine with the nominal phrase *those students*.

- (17) shūodào shū, zhè-xiē xúeshēng hěn dūo  
 speaking.of book these-CL<sub>PL</sub> student very many  
 ‘speaking of books, the books of these students are many.’

A coercion-based analysis also leads us to expect that the same effect should be seen with a gradable adjective of quality that also poses a plurality requirement (e.g., *diverse*). Contrary to our expectation, this prediction is not borne out, as evidenced by the ungrammaticality of (18a) (in contrast to (18b)).<sup>6</sup>

- (18) a. \*shūodào xúeshēng-dè bèijǐng, Zhāngsān hěn dūoyuán  
 speaking.of student-POSS background Zhangsan very diverse  
 intended: ‘speaking of the backgrounds of the students, the backgrounds of Zhangsan’s students are diverse.’
- b. Zhāngsān-dè xúeshēng(-dè) bèijǐng hěn dūoyuán  
 Zhangsan-POSS student-POSS background very diverse  
 ‘The backgrounds of Zhangsan’s students are diverse.’

As we suggest below, an adequate account of the association effect should lie in the combination of the syntax of comparison of quantity and the semantics of the Q-adjectives.

## II. The Association Effect and the Syntax and Semantics of Q-adjectives

### II.I. The semantics of Q-adjectives and MEASUREMENT

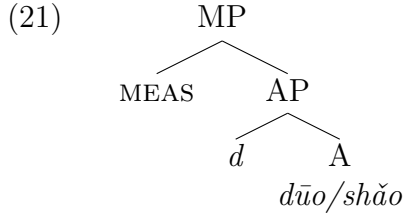
Constructions involving Q-adjectives have been treated on a par with those involving gradable adjectives of quality and analyzed using degree semantics (Bresnan 1973; Hackl 2000, 2009; Nakanishi 2004; Wellwood et al. 2012; a.o.). While some treat the Q-adjectives as comparable to the gradable adjectives of quality (Nakanishi 2004; Wellwood et al. 2012; a.o.), others suggest that there is a fundamental difference between the two in their syntax and semantics (Rett 2008; Solt 2015; Lin 2014; a.o.). In the latter approach, a gradable adjective of quality like *smart* is taken to encode in its lexical meaning a measure function  $\mu$  that maps individuals to (sets of) degrees (see (19); Creswell 1976; von Stechow 1984; a.o.), whereas the semantic contribution of the Q-adjectives is considered to be rather trivial. Solt (2015) suggests the semantics in (20a)-(20b), according to which the Q-adjectives are semantically bleached.

$$(19) \quad \llbracket \textit{smart} \rrbracket = \lambda d_d. \lambda x_e. \mu_{\textit{intelligence}}(x) \geq d$$

$$(20) \quad \begin{array}{l} \text{a.} \quad \llbracket \textit{many/dūo} \rrbracket = \lambda d_d. \lambda I_{\langle d, t \rangle}. I(d) \\ \text{b.} \quad \llbracket \textit{few/shǎo} \rrbracket = \lambda d_d. \lambda I_{\langle d, t \rangle}. \neg I(d) \end{array}$$

<sup>6</sup> We thank Stefan Kaufmann and Jon Gajewski for pointing this out.

In the following we will work with this approach, given that it provides a straightforward way to locate the source of the association effect and to account for the contrast between the Q-adjectives and the gradable adjectives of quality. We assume the semantics in (20a)-(20b) for the Mandarin Q-adjectives *dūo* ‘many/much’ and *shǎo* ‘few/little’, and the measurement of cardinality is introduced by the functional head MEAS.<sup>7</sup> Syntactically, MEAS heads the projection MP and takes as its complement an AP headed by the Q-adjective; the specifier of AP may be occupied by a degree variable, which may be bound by a degree operator in a higher position.



As we suggest below, the source of the association effect is located in MEAS. The lexical entry of this functional head is given in (22); it encodes a variable R, whose value is largely determined by the linguistic context.

(22)  $\llbracket \text{MEAS} \rrbracket = \lambda D_{\langle \langle d, t \rangle, t \rangle}. \lambda x_e. D([\lambda d. \mu_{\text{card}}(\mathbf{R}(x)) \leq d])$ ,  
 where R is a function from individuals to individuals

This flexibility in the lexical meaning of MEAS enables us to derive the association effect observed above. Provided that the plurality requirement of the measure function  $\mu_{\text{card}}$  is not violated, R may be an identity function and map some individual x to x itself.

## II.II. Accounting for the association effect

First consider the positives (1a) and (2a) (with the Q-adjective *dūo* ‘many’). In (1a), the Q-adjective appears to be predicated of the nominal phrase *the students that Zhangsan taught*. Uttered out of the blue, this example carries a meaning in which the cardinality of the students that Zhangsan taught is what is being discussed. With the lexical meanings of *dūo* in (20a), MEAS in (22), and the positive morpheme in (23) (von Stechow 2005; Heim 2006; and others), this meaning of (1a) (see the LF (24a)) may be modeled through the truth conditions in (24b); the value of the variable R, in this case, is an identity function, and hence  $\mu_{\text{card}}$  applies to the unique group itself of students that Zhangsan taught.

- (1) a. Zhāngsān jiāo-gùo de xúeshēng hěn dūo/shǎo  
 Zhangsan teach-EXP REL student very many/few  
 ‘The students Zhangsan taught are many/few.’

(23)  $\llbracket \text{POS} \rrbracket = \lambda P_{\langle d, \langle e, t \rangle \rangle}. \lambda x_e. \forall d [d \in \text{MIDDLE-GROUND}_C \rightarrow P(d)(x)]$

(24) a.  $\llbracket \textit{the-students-that-Zhangsan-taught} \rrbracket_{[\text{MP POS} [1 [\text{MP MEAS} [\text{AP } d_1 \textit{dūo} ]]]]}$

<sup>7</sup> The syntax and semantics we assume for MEAS differs from Solt’s 2015 proposal in several aspects. As far as we can see, nothing hinges on this. Nevertheless, see section IV.I for the empirical support for this move.



- b.  $\llbracket (1a) \rrbracket = 1$  iff  $\forall d[d \in \text{MIDDLE-GROUND}_C \rightarrow \mu_{\text{card}}(\text{R}(\text{the students that Zhangsan taught})) \geq d]$ ,  
 where  $\text{R} = [\lambda x_e. x]$

In (2a) on the other hand, while the subject appears to be the proper name *Zhāngsān*, it is actually the cardinality of the students that Zhangsan taught that is being compared. With the LF (25a), the truth conditions of (2a) are presented as in (25b). The content of the variable R is made explicit by the sentential adverbial *speaking of the students that one taught*, just as would be the conversational background of a modal statement such as *John must pay a fine*, which can be made explicit by a sentential modifier like *in view of the law* (Kratzer 2012; a.o.). In this case, the value of R is a function that maps an individual x to the unique group of students that x taught.

- (2) a. shūodào jiāo-gùo dé xúeshēng, Zhāngsān hěn dūo  
 speaking-of teach-EXP REL student Zhangsan very many  
 ‘Speaking of the students that one taught, the students that Zhangsan taught are many.’
- (25) a.  $[ \text{Zhangsan} ]_{\text{MP POS}} [ 1 [_{\text{MP MEAS}} [_{\text{AP}} d_1 \text{ dūo} ] ] ] ] ]$   
 b.  $\llbracket (2a) \rrbracket = 1$  iff  $\forall d[d \in \text{MIDDLE-GROUND}_C \rightarrow \mu_{\text{card}}(\text{R}(\text{Zhangsan})) \leq d]$ ,  
 where  $\text{R} = [\lambda x. \iota y[y \text{ are students that } x \text{ taught}]]$

Note that the variable R in (2a)/(25a) cannot be an identity relation; otherwise the non-atomicity requirement of MEAS would be violated.

In a comparative, the association effect can target the post-*bǐ* nominal (see (3)-(4)) or the subject of the comparative (see (5)-(6)), or both (see (2b)). At this point we simply assume the Reduction Analysis of the Mandarin comparative (Liu 1996; Hsieh 2015; a.o.) and make the following assumptions, although as far as we can see nothing crucial is hinging on them<sup>8</sup>: we assume that there is an occurrence of the gradable predicate in the *bǐ*-constituent that is elided at the surface, and the *bǐ*-constituent adjoins to *vP* (see (27a)). For convenience, we also assume that both the subject of the comparative and the post-*bǐ* nominal are interpreted MP-internally. In (2b), both proper names *Zhāngsān* and *Lǐsì*, with the sentential adverbial *speaking of the students one taught*, are associated with a contextually bound variable whose value is a function that maps an individual x to the unique group of students that x taught. With the lexical meaning of the comparative morpheme *bǐ* in (26) and the LF in (27a), the truth conditions of (2b) are as presented in (27c).<sup>9</sup>

- (2) b. shūodào jiāo-gùo dé xúeshēng, Zhāngsān bǐ Lǐsì dūo  
 speaking.of teach-EXP REL student Zhangsan COMP Lǐsì many  
 ‘speaking of the students one taught, the students that Zhangsan taught are more/fewer than the students that Lisi taught.’
- (26)  $\llbracket bǐ \rrbracket = \lambda D_{\langle d, t \rangle}. \lambda D'_{\langle d, t \rangle}. \text{MAX}(D') > \text{MAX}(D)$   
 (for any  $D_{\langle d, t \rangle}$ ,  $\text{MAX}(D) = \iota d[D(d)]$  and  $\forall d'[D(d') \rightarrow d \geq d']$ )

<sup>8</sup> The implications of the association effect for the structure of the Mandarin comparative are discussed in detail in Section III.

<sup>9</sup> This lexical meaning of *bǐ* needs to be revised in order to derive the correct truth conditions for comparatives of negative gradable adjectives, including *shǎo* ‘few’. The required revision, however, does not affect the point made here. Due to space limitations, we simply refer the reader to Beck (2012) and Solt (2015) for possible solutions.

- (27) a. Surface syntax of (2b):  

$$[_{\text{TP}} \text{Zhangsan}_2 \dots [_{\text{vP}} [ \text{bǐ} [ \text{Lisi}_3 [_{\text{MP}} \text{t}_3 \text{ MEAS } [_{\text{AP}} \text{d}_1 \text{ dūo} ] ] ] ] ] ] v [_{\text{MP}} \text{t}_2 \text{ MEAS } [_{\text{AP}} \text{d}_2 \text{ dūo} ] ]$$
- b. LF of (2b):  

$$[[ \text{bǐ} [ 1 [_{\text{MP}} \text{Lisi MEAS } [_{\text{AP}} \text{d}_1 \text{ dūo} ] ] ] ] [ 2 [_{\text{MP}} \text{Zhangsan MEAS } [_{\text{AP}} \text{d}_2 \text{ dūo} ] ] ] ] ]$$
- c.  $[[ (2b) ] ] = 1$  iff  
 $\text{MAX}([\lambda d_d. \mu_{\text{card}}(\text{R}(\text{Zhangsan})) \geq d]) > \text{MAX}([\lambda d_d. \mu_{\text{card}}(\text{R}(\text{Lisi})) \geq d]),$   
 where  $\text{R} = [\lambda x_e. \iota y [y \text{ are students that } x \text{ taught}]]$

In (3) (with *dūo* ‘many’), where the association effect targets only the post-*bǐ* nominal, the  $\text{R}'$  associated with the nominal phrase *the students that Zhangsan taught* is an identity function, whereas the  $\text{R}$  associated with the proper name *Lǐsì* is a function that maps an individual  $x$  to the unique group of students that that  $x$  taught (see (28a)-(28b)).

- (3) Zhāngsān jiāo-gùo dé xúeshēng bǐ Lǐsì dūo  
 Zhangsan teach-EXP REL student COMP Lisi many  
 ‘The students that Zhangsan taught are more/fewer than the students that Lisi taught.’
- (28) a.  $[[ \text{bǐ} [ 1 [_{\text{MP}} \text{Lisi MEAS } [_{\text{AP}} \text{d}_1 \text{ dūo} ] ] ] ] [ 2 [_{\text{MP}} \text{the-students-Zhangsan-taught MEAS } [_{\text{AP}} \text{d}_2 \text{ dūo} ] ] ] ] ]$
- b.  $[[ (3) ] ] = 1$  iff  
 $\text{MAX}([\lambda d_d. \mu_{\text{card}}(\text{R}'(\text{The students that Zhangsan taught})) \geq d]) >$   
 $\text{MAX}([\lambda d_d. \mu_{\text{card}}(\text{R}(\text{Lisi})) \geq d]),$   
 where  $\text{R}' = [\lambda x_e. x]$  and  $\text{R} = [\lambda x_e. \iota y [y \text{ are students that } x \text{ taught}]]$

Example (5) can be analyzed in the same fashion (see (29)); the variable  $\text{R}'$  associated with the subject *Zhāngsān* maps Zhangsan to the unique group of students that Zhangsan taught; the variable  $\text{R}$  associated with the post-*bǐ* nominal *the students that Lisi taught*, on the other hand, is an identity function.

- (29) a.  $[[ \text{bǐ} [ 1 [_{\text{MP}} \text{the-student-that-Lisi-taught MEAS } [_{\text{AP}} \text{d}_1 \text{ dūo} ] ] ] ] [ 2 [_{\text{MP}} \text{Zhangsan MEAS } [_{\text{AP}} \text{d}_2 \text{ dūo} ] ] ] ] ]$
- b.  $[[ (5) ] ] = 1$  iff  
 $\text{MAX}([\lambda d_d. \mu_{\text{card}}(\text{R}'(\text{Zhangsan})) \geq d]) >$   
 $\text{MAX}([\lambda d_d. \mu_{\text{card}}(\text{R}(\text{the students that Lisi taught})) \geq d]),$   
 where  $\text{R} = [\lambda x_e. x]$ , and  $\text{R}' = [\lambda x_e. \iota y [y \text{ are students that } x \text{ taught}]]$

Note that the suggested analysis predicts that a comparative like (3) is ambiguous; in addition to the meaning expressed by the translation, (3) can have a meaning in which the quantity of something related to the students that Zhangsan taught and the quantity of the same type of object associated with Lisi are being compared. This reading can be made more salient by adding the sentential adverbial *speaking of ...*, as shown in (30).

- (30) shūodào jiāo-gùo dé nǚpéngyǒu, Zhāngsān jiāo-gùo dé xúeshēng  
 speaking.of make-EXP REL girl-friend Zhangsan teach-EXP REL student  
 bǐ Lǐsì dūo  
 COMP Lisi many  
 ‘speaking of the girlfriends that one had, the girlfriends that the student(s) that Zhangsan taught had are more than the girlfriends that Lisi did.’

Likewise, the positive in (1), with the adverbial *speaking of . . .*, can have a meaning that exhibits the association effect, as shown in (31). This is also expected under our analysis.

- (31) shūodào shū, Zhāngsān-dè xúeshēng hěn dūo  
speaking.of book Zhangsan-POSS student very many  
‘speaking of books, the books of Zhangsan’s student(s) are many.’

The contrast between the Q-adjectives and the gradable adjectives of quality, as indicated above, simply follows from the fundamental difference between these two types of gradable predication in the syntactic structure. In the gradable predication of quantity, the functional head MEAS, whose interpretation is contextually dependent, gives rise to the observed association effect. In contrast, the structure of gradable predication of quality lacks such a functional head; therefore, the association effect is not available in gradable predication of quality.

### II.III. Remarks on the relation analysis of *many*

In another approach (Nakanishi 2004, 2007; Wellwood et al. 2012; a.o.), the Q-adjectives are treated on a par with gradable adjectives of quality; the lexical meaning of these words is taken to be a relation between degrees and individuals (i.e. a function of type  $\langle d, \langle e, t \rangle \rangle$ ) and is taken to encode the measure function  $\mu_{\text{card}}$ . Along these lines, the lexical meanings in (32a) are proposed for the Mandarin Q-adjectives *dūo* and *shǎo*; the source of the association effect, just as in the analysis suggested above, is located in the variable R that is incorporated in these lexical meanings. Its value is a contextually determined function that maps an individual x to the unique group of objects associated with x in some way.

- (32) a.  $\llbracket dūo \rrbracket = \lambda d_d. \lambda x_e. \mu_{\text{card}}(R(x)) \geq d$   
 $\llbracket shǎo \rrbracket = \lambda d_d. \lambda x_e. \mu_{\text{card}}(R(x)) < d$   
b. LF of (2a):  $\llbracket Zhangsan \llbracket_{AP} POS dūo/shǎo \rrbracket \rrbracket$

It seems to us that this line of analysis leads to much the same predictions for the data under discussion. For conceptual reasons however, we consider this approach less desirable. Given that within this approach gradable predication of quantity and of quality are executed through the same structure, the only way we can see to cash out the distinction in the availability of the association effect is to stipulate that in Mandarin and other languages where this contrast is observed, the lexical meaning of a gradable adjective of quality like *smart* does not incorporate a contextually bound variable; in other words, it does not have a lexical meaning like (33).

- (33)  $\llbracket smart \rrbracket = \lambda d_d. \lambda x_e. \mu_{\text{intelligence}}(R(x)) \geq d$

This may lead one to wonder whether there are languages in which a gradable adjective of quality can give rise to the association effect and hence might have a lexical meaning of the same sort. In our limited survey however, we have not encountered any language of this kind. If indeed there exists no such language, it is unclear how to capture the fact under this approach.

### III. More on the Association effect and the Mandarin Comparative

In this section, we will discuss further the association effect in a comparative and its implications for the syntax and semantics of this construction.

#### III.I. Isomorphism and the association effect

##### III.I.I. The confinement of the association effect

In the analysis above, we suggest that the association effect arises from the contextually bound variable R incorporated in the lexical meaning of the functional head MEAS. Nevertheless, the following examples show that the rise of the association effect in a comparative seems to be subject to some other constraints.

The association effect, as shown above, may target the subject of the comparative, the post-*bǐ* nominal, or both. Hence, we expect to see (34)/(35) carry both readings (34a)/(35a) and (34b)/(35b). In fact, only the readings (34b) and (35b) are available.

- (34) shuōdào jiāo-gùo de nǚpúnyǒu, Zhāngsān jiāo-gùo de xúeshēng  
speaking.of make-EXP REL girlfriend Zhangsan teach-EXP REL student  
bǐ Lǐsì dōu  
COMP Lisi many
- a. ✗‘Speaking of the girlfriends one had, the student(s) that Zhangsan taught are more than the girlfriends that Lisi had.’
- b. ✓‘Speaking of the girlfriends one had, the girlfriends that the student(s) taught by Zhangsan had are more than the girlfriends that Lisi had.’
- (35) shuōdào jiāo-gùo de nǚpúnyǒu, Zhāngsān bǐ Lǐsì jiāo-gùo de  
speaking-of make-EXP REL girlfriend Zhangsan COMP Lisi teach-EXP REL  
xúeshēng dōu  
student many
- a. ✗‘Speaking of the girlfriends one had, the girlfriends that Zhangsan had are more than the students that Lisi taught.’
- b. ✓‘Speaking of the girlfriends one had, the girlfriends that Zhangsan had are more than the girlfriends that the students that Lisi taught had.’

Note that the meanings (34a) and (35a) are sensible, as evidenced by the well-formedness of the comparatives in (36). This suggests that whatever factor causes the lack of these readings (34a)-(35a) should be structural.

- (36) a. Zhāngsān jiāo-gùo de xúeshēng bǐ Lǐsì jiāo-gùo de nǚpúnyǒu  
Zhangsan teach-EXP REL student COMP Lisi make-EXP REL girlfriend  
dōu  
many  
‘The students that Zhangsan taught are more than the girlfriends that Lisi had.’
- b. Zhāngsān jiāo-gùo de nǚpúnyǒu bǐ Lǐsì jiāo-gùo de xúeshēng  
Zhangsan make-EXP REL girlfriend COMP Lisi teach-EXP REL student  
dōu  
many

‘The girlfriends that Zhangsan had are more than the students that Lisi taught.’

(34)-(35), together with (3)-(6), suggest that some form of isomorphism between the target and the standard of comparison is required when the association effect arises: in (3), the proper names *Lisi* and *Zhangsan* are in contrast, and what is under comparison is the students that Zhangsan taught and the students that Lisi taught; on the other hand, in (34) (with the reading (34b)), the things under comparison are the students that Zhangsan taught and the girlfriends that Lisi had. Below we show that this follows straightforwardly from the Reduction Analysis of the *bǐ*-comparative and the constraint of semantic isomorphism on ellipsis (e.g., Rooth 1992; Schwarzschild 1999; Merchant 2001; a.o.) .

### III.I.II. *e*-GIVENNESS and the association effect

It is widely accepted that there is semantic isomorphism (of some form) between an elided VP and its antecedent, and several proposals have been made to capture this. In the following, we work with Merchant’s (2001) *e*-GIVENNESS condition on ellipsis (37), according to which an expression  $\alpha$  may be deleted at the surface only if  $\alpha$  is *e*-given.

- (37) a. *e*-GIVENNESS:  
 An expression E counts as *e*-GIVEN iff E has a salient antecedent A and modulo  $\exists$ -type shifting,  
 (i) A entails F-clo(E), and  
 (ii) E entails F-clo(A)  
 b. F-clo( $\alpha$ ), the F-closure of  $\alpha$ , is the result of replacing the F-marked parts of  $\alpha$  with  $\exists$ -bound variables.  
 c. an expression  $\alpha$  can be deleted only if  $\alpha$  is *e*-given.

Along with the Reduction Analysis, we assume that there is an AP/MP inside the *bǐ*-constituent that is elided at the surface. With the *e*-GIVENNESS condition (37), it then follows that the elided constituent is *e*-given, and hence the conditions (37a-i)-(37a-ii) are met. To see how this works, consider the comparative (3) and its LF (28b) with some slight modification (see (38)): we assume that the nominals that are in contrast, in this case *Zhāngsān* and *Lǐsì* (as well as their MP-internal copies), are F-marked (cf. Liu 2011).<sup>10</sup>

- (38) [ [ *bǐ* [ 1 [MP<sub>E</sub> *Lǐsì*<sub>F</sub> MEAS [AP *d*<sub>1</sub> *dūo* ]]] ] [ 2 [MP<sub>A</sub> *the-students-that-Zhangsan*<sub>F</sub>-*taught* MEAS [AP *d*<sub>2</sub> *dūo* ]]] ]

In (38), the antecedent MP (i.e. MP<sub>A</sub>) contains an open degree variable; modulo  $\exists$ -type shifting, MP<sub>A</sub> is assigned the truth conditions (39a). The focus-closure of the elided MP (i.e. F-clo(MP<sub>E</sub>)) inside the *bǐ*-constituent, modulo  $\exists$ -type shifting operation on the open degree variable, is assigned the truth conditions (39b). With the given specification of the variables R and R’, (39a) entails (39b) and hence (37a-i) is met.

<sup>10</sup> As Merchant (2001, p. 26, footnote 9) points out, in general and perhaps on principled grounds, a deleted constituent will not contain any F-marked material. Here we just follow Merchant (2001) and assume that traces of constituents moved out of the ellipsis site will be  $\exists$ -bound for purposes of satisfaction of the various Focus conditions.

- (39) a.  $\exists d[\mu_{\text{card}}(\text{R}(\text{the students that Zhangsan taught})) \geq d]$   
 b.  $\exists x \exists d[\mu_{\text{card}}(\text{R}'(x)) \geq d]$   
 (where  $\text{R} = [\lambda x_e. \iota y[y \text{ are students that } x \text{ taught}]]$ , and  $\text{R}' = [\lambda x_e. x]$ )

In the same fashion,  $\text{MP}_E$  and the  $\text{F-clo}(\text{MP}_A)$ , modulo  $\exists$ -type shifting on the open degree variable, are assigned the truth conditions (40a)-(40b) respectively. Given that (40a) entails (40b), (37a-ii) is met. Therefore, the  $e$ -GIVENNESS condition on  $\text{MP}_E$  is satisfied.

- (40) a.  $\exists d[\mu_{\text{card}}(\text{R}(\text{Lisi})) \geq d]$   
 b.  $\exists x \exists d[\mu_{\text{card}}(\text{R}'(\text{the students that } x \text{ taught})) \geq d]$   
 (where  $\text{R} = [\lambda x_e. \iota y[y \text{ are students that } x \text{ taught}]]$ , and  $\text{R}' = [\lambda x_e. x]$ )

The  $e$ -GIVENNESS condition is satisfied in the same fashion in the cases where the association effect targets both the subject and the post- $b\check{i}$  nominal (e.g., (2b)) and where it targets only the subject (e.g., (5)-(6)). In (2b) (see the modified LF (41)) the subject and the post- $b\check{i}$  nominal are in contrast. In order to satisfy the  $e$ -GIVENNESS condition, the value for the variables introduced by MEAS is required to be the same.

- (41)  $[[ [ b\check{i} [ 1 [\text{MP}_E \text{ Lisi}_F \text{ MEAS } [\text{AP} d_1 d\bar{u}o]]]]] [ 2 [\text{MP}_A \text{ Zhangsan}_F \text{ MEAS } [\text{AP} d_2 d\bar{u}o]]]]]$

In (5), the subject is in contrast with part of the post- $b\check{i}$  nominal (see the modified LF (42)). With the values in (29b) for the function variables  $\text{R}$  and  $\text{R}'$ , the  $e$ -GIVENNESS condition is satisfied. Due to space limitations, we leave the details for the reader.

- (42)  $[[ [ b\check{i} [ 1 [\text{MP}_E \text{ the-students-that-Lisi}_F\text{-taught MEAS } [\text{AP} d_1 d\bar{u}o]]]]] [ 2 [\text{MP}_A \text{ Zhangsan}_F \text{ MEAS } [\text{AP} d_2 d\bar{u}o]]]]]$

It is then obvious why (34) and (35) lack the reading (34a) and (35a). Take (34) for instance. The comparative in (34) has the very same LF in (42). With the given specification of the function variables for the intended reading and modulo  $\exists$ -type shifting,  $\text{MP}_A$  (see (43a)) does not entail  $\text{F-clo}(\text{MP}_E)$  (see (43b)).

- (43) a.  $\exists d[\mu_{\text{card}}(\text{R}'(\text{the students that Zhangsan taught})) \geq d]$ , where  $\text{R}' = [\lambda x_e. x]$   
 b.  $\exists x \exists d[\mu_{\text{card}}(\text{R}(x)) \geq d]$ , where  $\text{R} = [\lambda x_e. \iota y[y \text{ are girlfriends that } x \text{ had}]]$

Likewise, the truth conditions of  $\text{MP}_E$  (see (44a)) do not entail those of  $\text{F-clo}(\text{MP}_A)$  (see (44b)), either. Hence, the reading (34a) is not available.

- (44) a.  $\exists d[\mu_{\text{card}}(\text{R}(\text{Lisi})) \geq d]$ , where  $\text{R} = [\lambda x_e. \iota y[y \text{ are girlfriends that } x \text{ had}]]$   
 b.  $\exists x \exists d[\mu_{\text{card}}(\text{R}'(x)) \geq d]$ , where  $\text{R}' = [\lambda x_e. x]$

In sum, in our analysis of the association effect, while the value assignment of the function variable incorporated in the lexical meaning of MEAS, as suggested above, is largely contextually determined, it has to comply with other structural constraints at the syntax and syntax-semantics interface.

### III.II. The Direct Analysis and the association effect

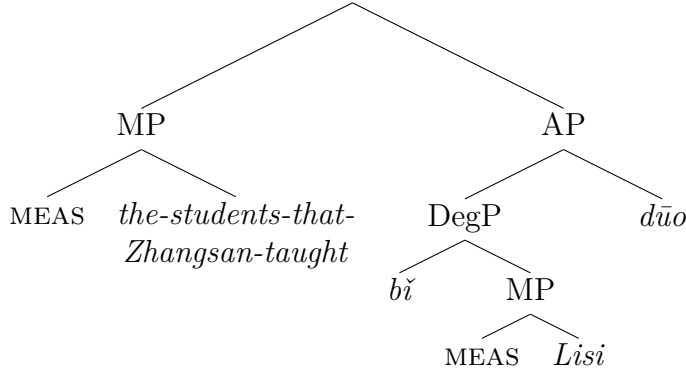
To the extent that our proposal is on the right track, the association effect from the Q-adjective provides an additional piece of evidence in favor of the Reduction Analysis and against the Direct Analysis. While details vary, all the variants of the Direct Analysis

suggested for the Mandarin comparative (Xiang 2003, 2005; Erlewine 2007; Lin 2009; a.o.) assume that the size of the post-*bǐ* constituent is exactly what it looks like at the surface, and no elliptical operation is involved in the derivation. Given that the subject and the post-*bǐ* nominals share one gradable predicate, the syntactic location and the lexical entry of MEAS need to be reconsidered in order to locate the source of the association effect and at the same time keep the flexibility for this effect to target either of the subject or the post-*bǐ* nominal. One possibility is that the subject of the comparative and the post-*bǐ* nominal form a constituent respectively with MEAS, the according lexical entry of which is given in (45).<sup>11</sup>

$$(45) \quad \llbracket \text{MEAS} \rrbracket = \lambda x_e. \lambda d_d. \mu_{\text{card}}(\text{R}(x)) \geq d \quad (\text{to be coupled with the Direct Analysis})$$

These assumptions, together with Lin's (2009) syntax and his lexical entry for *bǐ* (46b), give us the LF in (46a) for (3) and the truth conditions (46c).<sup>12</sup> With the given specification for the values of the function variables R and R', the intended reading of (3) is derived.

(46) a.



$$b. \quad \llbracket bǐ \rrbracket = \lambda \vec{a}_i. \lambda \mathcal{P}_{\langle d, \langle \vec{a}, t \rangle \rangle}. \lambda \vec{a}'_i. \iota_{\max} d [P(d)(\vec{a}') > \iota_{\max} d [P(d)(\vec{a})]],$$

where  $|\vec{a}'| \geq 1$

$$c. \quad \llbracket (3)/(46a) \rrbracket =$$

$$\llbracket bǐ \rrbracket (\llbracket \text{MEAS} \rrbracket (\text{Lisi})) (\llbracket dūo \rrbracket) (\llbracket \text{MEAS} \rrbracket (\text{the students that Zhangsan taught})) =$$

$$\llbracket bǐ \rrbracket ([\lambda d_d. \mu_{\text{card}}(\text{R}(\text{Lisi}))]([\lambda d_d. \lambda I_{\langle d, t \rangle}. I(d)]$$

$$([\lambda d_d. \mu_{\text{card}}(\text{R}'(\text{the students that ZS taught}))]) = 1$$

$$\text{iff } \iota_{\max} d [\mu_{\text{card}}(\text{R}'(\text{the students that Zhangsan taught})) \geq d] >$$

$$\iota_{\max} d [\mu_{\text{card}}(\text{R}(\text{Lisi})) \geq d],$$

where  $\text{R} = [\lambda x_e. \iota y [y \text{ are students that } x \text{ taught}]]$ , and  $\text{R}' = [\lambda x_e. x]$

It is unclear to us however in what way other than stipulation such an analysis may predict the lack of, for instance, the reading (34a). With the structure and semantics in (46), it is possible that the value for the variable R' is an identity function and that for R is the function  $[\lambda x_e. \iota y [y \text{ is a girlfriend that } x \text{ had}]]$ ; hence the intended reading (34a) is expected to be available. As we have already seen however, this prediction is not borne out.

As already pointed out in various research (Xiang 2003, 2005; a.o), the lack of sub-comparatives follows straightforwardly from the Direct Analysis but poses a challenge for the Reduction Analysis. Given that the Reduction Analysis has greater advantage

<sup>11</sup> This is the lexical meaning of MEAS suggested by Solt (2015).

<sup>12</sup> We do not see a simple way to extend other variants of the Direct Analysis to the data in question; therefore, we will not discuss them.

than the Direct Analysis in accounting for the association effect in a *bǐ*-comparative, an attempt to implement the Reduction Analysis to account for the lack of the subcomparatives in Mandarin is then desirable.<sup>13</sup> This is however beyond the scope of this paper and should be left for another occasion.

#### IV. Concluding Remarks and Further Issues

In the discussion above, we investigated the association effect observed with the Q-adjectives in Mandarin and suggested that the solution lies in the syntax of the gradable predication of quantity and the lexical meaning of the functional head involved. Our observation suggests that a theory that differentiates gradable predication of quantity and that of quality is preferable. In the end of the discussion we have two remarks; one concerns the pre-nominal occurrence of the Q-adjectives, and the other the cross-linguistic variation regarding the availability of the association effect.

##### IV.I. The pre-nominal Q-adjectives

Just like English *many* and *few*, the Mandarin Q-adjectives *dūo* and *shǎo* may occur in a prenominal position. Nevertheless, unlike those in predicate position, the prenominal Q-adjectives do not give rise to the association effect; the object nominal in (47) merely refers to a group of students the quantity of which is large/small; it cannot refer to a group of students that are associated with some entities or objects the quantity of which is large/small.

- (47) Zhāngsān zuótiān jiàn-lè hěn dūo/shǎo-dè xúshēng  
 Zhangsan yesterday meet-PERF very many/few-MOD student  
 ‘Zhangsan yesterday met many/few students.’

In keep with a unified semantics of the Q-adjectives, what is to blame for the lack of the association effect in this case then is the functional head involved in the prenominal modification of quantity; crucially, this functional head, unlike the one in predicate position (see (22)), does not carry a contextually bound variable that is responsible for the rise of the association effect. This also suggests that an adequate theory of degree syntax and semantics, in addition to the quality *vs.* quantity contrast in predication, should differentiate the case of predication and that of prenominal modification in comparison of quantity. It is also worth noting that the lack of the association effect in the case of prenominal modification suggests that prenominal modification with Q-adjectives should not involve relativization (Sproat and Shih 1988; Cinque 2010, a.o.), though this conclusion then leads to the question why relativization is not allowed with the predicative use of Q-adjectives, which has to be left for future investigation.

##### IV.II. A note on cross-linguistic variation

To our knowledge so far, Mandarin and Japanese are the only languages that show the association effect. For instance, (48a), the English counterpart of (2a), is simply ungrammatical.

<sup>13</sup> See Hsieh (2015) for discussion that the lack of subcomparatives is not necessarily decisive evidence against the Reduction Analysis in a given language.



- (48) a. \*Speaking of the students that one/he<sub>1</sub> taught, John<sub>1</sub> is/are many.  
 b. The students that John taught are many.

Our analysis can be easily extended to English and other languages that do not show the association effect. One possibility is that in those languages, the functional head in gradable predication of quantity MEAS does not involve a contextually bound functional variable, and the measure function  $\mu_{\text{card}}$  applies to the individual argument of MEAS directly. Alternatively, we could give MEAS in English and other languages without the association effect the same lexical meaning as it has in those with this effect (see (22)), but with an additional lexical restriction that the functional variable involved must always be an identity function. Under either of these possibilities, this difference can be reduced to one simple lexical variation.

It is desirable to see how this lexical property may be linked to other components of the grammar so that we may form a hypothesis that predicts in which language we may expect to see the association effect. Given that only limited cross-linguistic data of sufficient depth are available for consideration, this will have to be left for future investigation.

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