

# The Other Pole of Degree Modification of Gradable Nouns by Size Adjectives: A Mandarin Chinese Perspective<sup>\*</sup>

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**Abstract** Size adjectives can have degree readings when they modify gradable nouns. However, a cross-linguistic variation exists with respect to what type(s) of size adjectives in a particular language can have such readings. In English degree readings are available only for size adjectives that predicate bigness, and in Mandarin Chinese degree readings are available for all size adjectives irrespective of whether they predicate bigness or smallness. The observation is supported by results of web search as well as by diachronic considerations. The paper links this difference between English and Mandarin Chinese to the different ways measure phrases are interpreted in the two languages. Degree readings of size adjectives and measure phrases are interpreted through making reference to very similar licensing degree morphemes. In English, measure phrases have the ‘at least’ interpretation as the default reading, and in Mandarin Chinese they have the ‘exactly’ interpretation as default. The degree morpheme for English measure phrases involves a minimality operator and a comparison relation, and the one for Mandarin Chinese measure phrases involves an existential operator and an identity relation. The degree morpheme for degree readings of size adjectives in Mandarin Chinese differs in a parallel way from the one in English. Exactly this difference accounts for the restriction that in English only size adjectives that predicate bigness can have degree readings, as well as for the lack of such a restriction in Mandarin Chinese. In English, adjectives that predicate smallness do not have effect on the semantics of degree modification of gradable nouns, so they have to take an alternative interpretation other than degree readings. Mandarin Chinese adjectives that predicate smallness do have semantic effects on the interpretation of gradable nouns, so they can degree-modify gradable nouns. In both languages adjectives that predicate bigness are interpreted in a due manner and cause no problem. During the discussion, we primarily draw on data obtained and adapted from the Web. Thus the paper makes both empirical and theoretical contributions to the study of semantics of degree modification of gradable nouns.

**Keywords:** Degree, Size Adjectives, Gradable Noun, Crosslinguistic Variation, Mandarin Chinese, English

## 1. Preamble

Gradability is a quite pervasive phenomenon in natural language, and there exist a variety of linguistic means to express the notion. Though the adjective is the most commonly used way to express gradable concepts, some nouns can too be gradable predicates and be modified by degree expressions. In this paper we look at one particular class of degree modification of gradable nouns, and describe and explain an important variation that two languages (i.e. English and Mandarin Chinese) show with respect to a polarity constraint on the modification.

Size adjectives can have degree readings when they modify gradable nouns, whereby an adjective that normally express size characterizes the degree to which the gradable noun they modify holds of an individual. According to Morzycki (2005, 2009), two constraints are at work that regulate this particular usage of size adjectives. The Position Generalization states that degree modification of gradable nouns by size adjectives is available only for size adjectives that appear in the attributive position, but not for size adjectives that appear in the predicate position. The Bigness Generalization says that only size adjectives that predicate bigness like ‘big’, ‘enormous’ and ‘gigantic’ (*b-adjectives* henceforth) license degree readings, and size adjectives that predicate smallness like ‘small’, ‘tiny’ and ‘minute’ (*s-adjectives* henceforth) do not. The English sentences in (1) and (2) (all adapted from Morzycki 2009) illustrate the two generalizations respectively.

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- (1) a. Three huge goat cheese enthusiasts were arguing in the corner.  
 b. %The three goat cheese enthusiasts who were arguing in the corner were huge.<sup>1</sup>
- (2) a. George is a(n) big/enormous/huge/colossal/mammoth/gargantuan idiot.  
 b. George is a %small/%tiny/%minuscule/%microscopic/%diminutive/%minute idiot.

Morzycki examines size adjectives in English, German, Hebrew, Polish and Spanish. He implies that the two generalizations hold with degree readings of size adjectives in these languages. However, further crosslinguistic scrutiny suggests that the Bigness Generalization is not a universally valid constraint<sup>2</sup>. In Mandarin Chinese, for instance, s-adjectives can receive degree readings when they modify gradable nouns, more or less just like their b-adjective counterparts. Before we cite empirical data to illustrate this claim, it is helpful to get a broad picture of the crosslinguistic contrast through web search.

Searches were carried out on Google and Yahoo for exact matches of English ‘small idiot’, ‘small idiots’, ‘big idiot’, and ‘big idiots’<sup>3</sup>. For each search engine, the numbers of hits returned for ‘small idiot’ and for ‘small idiots’ were added together, and so were the numbers of hits for ‘big idiot’ and for ‘big idiots’. The numbers of hits for Mandarin Chinese *xiao baichi* ‘(lit.) small idiot(s)’ and for *da baichi* ‘big idiot(s)’ were also recorded<sup>4</sup>. For each language, the ratio of the number of hits for ‘small idiot(s)’ to the number of hits for ‘big idiot(s)’ was calculated.

	# of ‘small idiot(s)’	# of ‘big idiot(s)’	ratio
English	705	58.4k	1.2%
Mandarin Chinese	82.1k	144k	57.0%

**Table I: Google Results**

	# of ‘small idiot(s)’	# of ‘big idiot(s)’	ratio
English	2.2k	181.2k	1.2%
Mandarin Chinese	158k	333k	47.4%

**Table II: Yahoo Results**

The two search engines give similar results. For English, the number of hits of ‘small idiot(s)’ is small in its absolute figure. Moreover, it is negligible compared to the big number of hits for ‘big idiot(s)’. By contrast, the number of hits for Mandarin Chinese *xiao baichi* ‘(lit.) small idiot(s)’ is big in the absolute sense. It is definitely not negligible compared to the even bigger number of hits for *da baichi* ‘big idiot(s)’. Impressionistically, while the size adjective ‘small’ in English cannot be a degree modifier for gradable nouns, its Mandarin Chinese counterpart *xiao* can.

Mandarin Chinese *xiao* has many other uses. For instance, it can be used to mean ‘insignificant’, to self-derogate, and to show the speaker’s affection and intimacy toward the referent of the nominal it modifies. By contrast, English ‘small’ does not have such a rich variety of meanings. Regarding the above discrepancy between English ‘small’ and Mandarin Chinese *xiao*, one could say that the by far bigger number of hits of *xiao baichi* over ‘small idiot(s)’ and the much bigger ratio do not guarantee the intended conclusion that s-adjectives can degree-modify gradable nouns in Mandarin Chinese. It is likely that, in the overwhelming majority of the search results, *xiao* means something else rather than being a degree modifier for gradable nouns. So only after careful examination of all the search results can one see whether

<sup>1</sup> In this paper we use the % symbol to indicate absence of the intended degree reading of size adjectives, and the \* symbol to indicate ungrammaticality of a sentence.

<sup>2</sup> This paper assumes that the Position Generalization is crosslinguistically valid and does not discuss it at all. It is likely that this generalization is subject to crosslinguistic variation as well.

<sup>3</sup> The search results reported here were accurate as of May 5, 2010.

<sup>4</sup> Nominals in Mandarin Chinese are not marked for number. This is why, for the purpose of valid comparison, the numbers of hits of English ‘small idiot’ and of the plural ‘small idiots’ were added together, and the same for English ‘big idiot’ and ‘big idiots’.

the conclusion holds or not. This is a potentially viable objection and has to be dismissed before we can conclude that the contrast between English and Mandarin Chinese s-adjectives as degree modifiers is real. In section 2 we take up this issue and cite concrete empirical data to show that the desired conclusion is really the case, and that the degree reading of s-adjectives in Mandarin Chinese is independent of their other readings<sup>5</sup>. Section 3 outlines several key concepts for semantic analysis of gradability and degree modification. In particular, the interpretation of size adjectives as degree modifiers for gradable nouns makes a great deal of use of a degree morpheme similar to the one that licenses measure phrases that modify adjective phrases. For English, the degree morpheme involves a minimality operator and a comparison relation between two degrees, and this plays a crucial role in explaining the Bigness Generalization in English. In section 4, we show that for Mandarin Chinese measure phrases that modify adjective phrases, the degree morpheme involves an existential operator and an identity relation between two degrees. Correspondingly, the degree morpheme for the interpretation of gradable nouns makes reference to the same operator and relation, and this explains the absence of the Bigness Generalization in Mandarin Chinese. Section 5 concludes the paper.

## 2. Empirical Data in Mandarin Chinese

In this section we present empirical data<sup>6</sup> to show that Mandarin Chinese s-adjectives pattern with their antonymous counterparts in that they are both able to receive degree readings when they modify gradable nouns. We first establish that Mandarin Chinese b-adjectives are available to degree-modify gradable nouns. Not only can the prototypical b-adjective *da* ‘big’ and those formed out of it have degree readings, but other, less commonly used b-adjectives can receive degree readings as well. In the most natural reading of (3), for example, *da* is a degree modifier and characterizes the degree of the two persons’ kindness. Similarly, *hangmu ji* ‘aircraft carrier-scale’ in (4), which makes reference to the huge size of aircraft carriers, describes how good the ‘good service’ of the relevant company is.

- (3) qu le tang Shaanxi, zai nar pengdao le liang ge da haoren.  
 go PAST CL Shaanxi, at there meet PAST two CL big good-person  
 (lit.) ‘I visited Shaanxi and met two big good-persons there.’  
 (nat.) ‘I visited Shanxi and met two super kind people there.’
- (4) hangmu ji de youzhi fuwu shi bie de qiye wufa bi de.  
 aircraft carrier scale MOD good-quality service is other MOD company cannot compare DE  
 (lit.) ‘No other business can beat (the company’s) aircraft carrier-scale good service.’  
 (nat.) ‘No other business can beat (the company’s) top-level service.’

Now turning to s-adjectives in Mandarin Chinese, let us first take (5) for example. The most natural scenario to make sense of the second clause of the sentence is that the old man shows a moderate amount of interest in music. The phrase *xiao yinyue fashaoyou* ‘a music enthusiast to a small degree’ predicates the old man, so *xiao* in the phrase cannot mean ‘young’. It does not mean ‘insignificant’ either, because the sentence is completely compatible with a scenario where the old man is a wealthy and influential figure. It can, at best marginally though, describe the size of the old man, but this is not the preferred reading and is definitely different from the reading under discussion. Interpreting *xiao* in other non-degree-modifying senses does not capture the desired reading either. So we can conclude that *xiao* in the sentence modifies the degree of the man’s enthusiasm for music. The sentences in (6-7) illustrate the same point. One might try to argue that *xiao* in (6) makes reference to size along some abstract measurable dimension, on a par with ‘small’ in ‘a small mistake’. This cannot be the case, however. While ‘small’ in ‘a small mistake’ can appear in the predicate position (cf. ‘The mistake is small.’), *xiao* in (6) cannot transform to the predicate position, as suggested by the ungrammaticality of (8). As for *xiao* in (7), it does not convey affection or

<sup>5</sup> Mandarin Chinese does not have a reservoir of size adjectives as rich as in English. Mandarin Chinese size adjectives are typically formed out of *xiao* ‘small’ or *da* ‘big’ along with a modifying degree element. It is hard to find other s-adjectives which have a more restricted range of meanings to further fortify the claim that Mandarin Chinese s-adjectives can be degree modifiers. In this paper, we mostly focus on *da* ‘big’ and *xiao* ‘small’.

<sup>6</sup> Most of the Mandarin Chinese data used in this paper were retrieved or adapted from web search results. For space considerations, we do not include the URLs from which the examples were taken or were based on.

intimacy on the part of the speaker: the speaker does not have favorable personal feeling towards individual stock buyers. Nor does it characterize the size of businesses owned or run by those individual stock buyers: some of them run pretty big businesses.

- (5) *laozhei shi zuo yinxiang shengyi de, ye suanshi ge xiao yinyue fashaoyou*  
old man is do acoustics business NOM also considered to be CL small music enthusiast  
'The old man is a businessman of musical instruments and is a music enthusiast-to-a-small-degree.'
- (6) *qiang shang guazhe ji fu youhua, fangjian xianchu buyiyang de xiao qingdiao*<sup>7</sup>  
wall on hang several CL oil painting room display unique MOD small appeal  
'On the wall hang several oil paintings; the room has a unique appeal-to-a-small-degree.'
- (7) *Gushi shi zhuangjia de youyi, sanhu zhishao ye suanshi xiao baichi.*  
stock market be banker MOD game stock buyer at least even count small idiot  
'The stock market is bankers' game, individual stock buyers are at least idiots-to-a-small-degree.'
- (8) \**na ge fangjian de qingdiao hen xiao*  
that CL room MOD appeal very small  
intended: 'The appeal in the room is to a small degree.'

Other s-adjectives in Mandarin Chinese, many of which are formed out of *xiao* along with a modifying degree element, can degree-modify a gradable noun as well. In the intended degree reading of (9), for instance, *weixiao* 'tiny' cannot make reference to insignificance of the pity of the team's not having a good goalkeeper: it does not make intuitive sense to say whether a pity is important or not. Neither does *weixiao* describe the abstract size of pity: the abstract size use of size adjectives can appear in the predicate position, but *weixiao* in (8) cannot transform to the predicate position. Likewise, *zhima daxiao* 'sesame-size' in (10) degree-modifies stardom, which inherently is a gradable concept<sup>8</sup>.

- (9) *meiyou hao shoumenyuan shi na zhi dui yi ge weixiao de yihan*  
without good goalkeeper be that CL team one CL tiny MOD pity  
'It is their pity-to-a-tiny-extent that the soccer team does not have a good goalkeeper.'
- (10) *ta zai luoshanji zhu le ji ge yue, zhima daxiao de mingxing ye mei jiandao.*  
he at Los Angeles live PAST some CL month sesame size MOD (movie) star even not see  
'He stayed in Los Angeles for several months, but he didn't even see a little-famed (movie) star.'

Our second piece of evidence for the degree use of size adjectives in Mandarin Chinese has to do with a closely related use of *xiao*. In modern colloquial Mandarin Chinese, *xiao* can serve as a modifier for an adjective phrase or for a verb phrase. When thus used, it means 'somewhat' or 'a bit' (11)<sup>9</sup>. It requires the degree argument of the adjective phrase AP or the verb phrase VP it modifies to exceed the contextual standard of being AP or VP-ing by a small amount. In this use, *xiao* is a degree head and not an adjective phrase which projects its own degree morphology. One piece of evidence for this claim is the fact that with this use *xiao* behaves just like other degree heads like *feichang* 'extraordinarily' and *tebie* 'particularly' in that they cannot be modified by another degree head like *hen* 'very' and *jiqi* 'extremely', as indicated by

<sup>7</sup> Mats Rooth (p.c.) pointed out to me that in English 'small appeal', though a bit awkward, can mean 'a minor degree of appeal'. I am not sure whether 'small' is still a size adjective here if it is interpreted as 'minor'.

<sup>8</sup> At this point we should note that a gradable noun is not modifiable by every size adjective. The noun *mingxing* '(movie) star', for instance, can be modified by *zhima daxiao* 'sesame size', but not by *bazhang daxiao* 'palm size', both of which are s-adjectives. The degree use of a size adjective appears to be constrained by the adjective's original size use. We remain vague on what the constraint is like, as it is not very relevant to the discussion in the paper.

<sup>9</sup> As far as the use as a degree modifier is concerned, *xiao* is less productive than its antonym *da*. For instance, there is a construction '*da* 'big' + *bu* 'not' + verb/adjective' in Mandarin Chinese which requires the degree of '*bu* + verb/adjective' to exceed a standard by a large amount. There does not exist a parallel construction for *xiao*. The interested reader can refer to Lü (1981, p117-20) for some more discussion. I leave the question of why there is such a discrepancy for future research.

the incompatibility of these modifiers with *xiao* in (11-12). If *xiao* of this use projects its own degree morphology, then we would expect it to be able to serve as an argument to these degree modifiers.

- (11) gou zuizhong xuanze zisha, zhangsan wei ci (\*feichang) xiao shangxin le ji tian  
 dog finally choose suicide John for this extraordinarily small sad PAST several days  
 ‘The dog committed suicide in the end; John was somewhat sad about this for quite a while.’
- (12) jianchi le liang yue, jianshen jihua yijing (\*hen/\*jiqi/tebie) xiao you chengxiao  
 keep up PAST two month fitness plan already very/extremely/particularly small have effect  
 ‘The fitness plan more or less has already shown effect after sticking to it for two months.’

Given that *xiao* can be used as an adverbial modifier for adjective and verb phrases and given the semantic similarity between adjectival/verbal and nominal predicates, it should come as no surprise that the adjective use of *xiao* can be used as a degree modifier in the nominal domain. However, the use of *xiao* to modify gradable nouns has a crucial difference from when it modifies adverbs and verbs. The former use does project its own degree morphology. This is evident from the fact with the former use *xiao* can be modified by a degree head like *shao ... dian* ‘a bit more’ as in (13). In this respect *xiao* behaves just like the degree use of *da* (14), which is analyzed by Morzycki (2005, 2009) as having an independent degree projection.

- (13) lia zhujue dou shi baichi, nvzhujue shi ge shao xiao dian de baichi bale  
 two leading role DOU be idiot heroine be CL a bit small DE idiot INTJ  
 ‘The two leading roles are both idiots, only that the heroine is an idiot to a smaller degree.’
- (14) na ge baichi hai yizhi zuo zhe chengwei geng da de baichi de meng  
 that CL idiot still always do PROG become even more big MOD idiot DE dream  
 ‘The idiot still always dreams becoming an even bigger idiot.’

The third piece of evidence for the degree use of s-adjectives in Mandarin Chinese is a diachronic one. A number of idioms in Mandarin Chinese contain *xiao* which degree-modifies a gradable noun<sup>10</sup>. In (15), for example, *xiao* does not make reference to the size, age, insignificance, etc of hermits. Rather it modifies the degree of detachment of a hermit away from worldly affairs. So the use of s-adjectives as degree modifiers for gradable nouns is nothing unprecedented or exceptional from a historical point of view.

- (15) xiao yin yin yu ye, da yin yin yu shi  
 small hermit seclude at field big hermit seclude at city  
 ‘A hermit to a small degree secludes in the wild; a big hermit secludes right in the city center.’
- (16) xiao da xiao nao  
 small beating small disturbance  
 ‘(something) on a small scale’

Our interim conclusion drawn from the above empirical discussion is that in Mandarin Chinese s-adjectives can be used as degree modifiers for gradable nouns. However, we should note that the use of s-adjectives as degree modifiers is not as productive as b-adjectives. At this point we do not have any good idea regarding why this is so. Modulo the productivity difference, Mandarin Chinese s-adjectives behave just like b-adjectives with respect to degree modification of gradable nouns. Therefore, Mandarin Chinese contrasts with English: in the latter only b-adjectives have degree readings. The paper holds that the crosslinguistic variation finds its root in the different semantic interpretations of degree readings of size adjectives in the two languages. It is helpful to start with the question of how the semantics of degree interacts with the scale structure of size adjectives to give rise to the Bigness Generalization for English size adjectives. Ideally, answering this question will provide some insight into addressing the crosslinguistic variation.

<sup>10</sup> The majority of these idioms contain *xiao* along with an instance of its antonym *da* or another instance of *xiao*. At this stage, I do not know whether and how this pattern affects the validity of using the idioms as a piece of evidence.

### 3. Accounting for the Bigness Generalization in English

Our explanation of the empirical fact that the Bigness Generalization is not a constraint at play for degree readings of size adjectives in Mandarin Chinese draws heavily on Morzycki's account of the working of the constraint in English. A brief review of Morzycki's (2005, 2009) proposal is in order.

#### 3.1 Semantics of Adjectival Gradability (in English)

Morzycki adopts Kennedy's (1997, 2007) view of adjectival gradability and extends it to the domain of nominal gradability. Within the framework, a gradable adjective *A* denotes a function from individuals to their degrees of *A*-ness. Applying the function *tall* to an individual *x* gives *x*'s actual height (17).

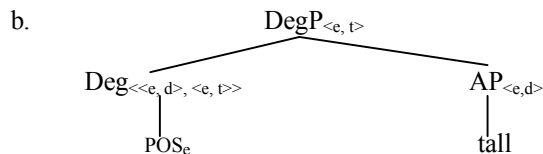
$$(17) \llbracket \text{tall} \rrbracket = \lambda x. \text{id} [x \text{ is } d\text{-tall}] \quad (= \text{tall})^{11}$$

Extra mechanisms are needed to derive the correct semantics for simple degree sentences like (18); otherwise they would denote a degree (e.g. John's actual height for (18)), rather than the desired truth conditions. Under the Kennedian framework of gradability, degree morphemes provide the appropriate mechanism. Such morphemes can be either overtly spelled out as 'more', 'as ... as', 'very', 'somewhat', etc, or covertly realized as the POS degree head (19). The POS morpheme maps the function denoted by an adjective to a property (Kennedy 1997, 2007, Kennedy & McNally 2005). The function *stnd* maps a gradable adjective to the contextually determined standard of comparison associated with the adjective. Applying the function  $\text{POS}_e$  to the function denoted by 'tall', for instance, yields a set of individuals whose height does not fall below the contextual standard of being tall for the relevant group (e.g. adults, basketball players, seven year olds, etc) (20) <sup>12</sup>.

(18) John is tall.

$$(19) \llbracket \text{POS}_e \rrbracket = \lambda g_{\langle e, d \rangle} \lambda x. \text{stnd}(g) \leq g(x) \quad (\text{the subscript } e \text{ stands for individual})$$

$$(20)\text{a. } \llbracket \text{POS}_e \rrbracket (\llbracket \text{tall} \rrbracket) = \lambda x. \text{stnd}(\text{tall}) \leq \text{tall}(x) \quad (\text{Morzycki 2009})$$



Gradable adjectives can be modified by a measure phrase too. Morzycki (2009) interprets the measure phrase as a set of degrees: '6 feet' denotes the set {6 feet, ..., 7 feet, ..., 8 feet, ...}. We need an extra degree morpheme in order to derive the correct semantics of a sentence containing a measure phrase which modifies an adjective phrase (e.g. 'John is six feet tall'). For English, the morpheme  $\text{MEAS}_E^A$  does this job by requiring that the minimum element of the set of degrees determined by the measure phrase be not greater than the degree to which the adjective holds of an individual (21). The semantics of '6 feet tall' denotes the set of individuals whose height measures 6 feet or more (see (22) on next page).

$$(21) \llbracket \text{MEAS}_E^A \rrbracket = \lambda g_{\langle e, d \rangle} \lambda m_{\langle d, t \rangle} \lambda x. \text{MIN} \{d: m(d)\} \leq g(x) \quad (\text{the subscript } E \text{ stands for English, the superscript } A \text{ for adjective})$$

Crucially, the denotation of the  $\text{MEAS}_E^A$  morpheme makes reference to the minimum element of the set of degrees denoted by an AP-modifying measure phrase, as well as to the 'greater than or equal to' comparison relation between this element and the degree to which the AP modified by the measure phrase

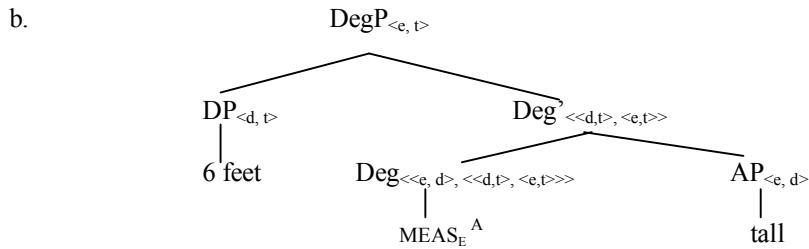
<sup>11</sup> In the discussion to follow, we put certain lexical items in bold face to denote their semantic interpretation.

<sup>12</sup> The paper does not discuss the semantics of overt degree morphemes like 'more', 'as ... as', 'very', 'somewhat'. The interested reader can refer to Klein (1982), Kennedy (1997, 2007) and von Stechow (1984) for relevant discussion.

holds of an individual. The denotation satisfactorily captures the interpretation of measure phrases that modify adjective phrases.

The comparison relation in the semantics of  $MEAS_E^A$  conveys that AP-modifying measure phrases in English have the ‘at least’ interpretation, whereby ‘6 feet tall’ means ‘at least 6 feet tall’. This is desirable from an empirical point of view. For the sentence in (23) to be true John’s height must be at least 6 feet. If the sentence means ‘John’s height is exactly six feet’, B’s response in (24) would be self-contradictory. Similarly, the sentence in (25) implies that Joe, who is exactly 6.7 feet tall, is required to take the test<sup>13</sup>.

(22)a.  $\llbracket 6 \text{ feet } MEAS_E^A \text{ tall} \rrbracket = \lambda x. \text{MIN}\{d: \mathbf{6\text{-feet}}(d)\} \leq \mathbf{tall}(x)$  (Morzycki 2009)



(23) John is six feet tall.

(24) A. The minimum height for applicants for this job is six feet.  
 B. Well, John is six feet tall; in fact he is six feet five tall.

(25) Every student who is 6 feet tall has to take the physical test.

However, some native speakers of English do take sentences like (23) to have the ‘exactly’ reading and/or treat this reading as being more prominent than the ‘at least’ interpretation. Here, we adopt with Horn (1972) and Klein (1980) that the two interpretations are not totally independent of each other. The ‘at least’ reading of such sentences is basic and assigned by the semantics, and the ‘exactly’ reading is derived from the basic reading via a Gricean implicature<sup>14</sup>.

### 3.2 Explaining the Bigness Generalization

Gradable nouns receive interpretations which are very similar to gradable adjectives. A gradable noun *N* denotes a function from individuals to their degree of *N*-iness. The gradable noun *idiot*, for instance, is a function which takes an individual as its argument and yields his or her degree of stupidity (26).

(26)  $\llbracket \text{idiot} \rrbracket = \lambda x. \text{id}[x \text{ is } d\text{-idiotic}] \quad (= \mathbf{idiot})$

Degree readings of size adjectives are parallel to measure phrases that modify adjective phrases in that, intuitively, both of them somehow measure the degree that the predicate they modify holds of an individual. Pursuing along this line of similarity, Morzycki posits that size adjectives are also introduced by a *MEAS* morpheme. However, the *MEAS* morpheme for degree readings of size adjectives differs from the one for AP-modifying measure phrases in two major respects. First, the same size adjective can apply to degrees on many different scales. For instance, *big* can make reference to idiocy, enthusiasm, penmanship, and more. Thus there are many single smallest degrees which satisfy a size adjective degree phrase.

<sup>13</sup> Inter-speaker variation exists regarding this judgment.

<sup>14</sup> An IsCLL-12 reviewer pointed out that measure phrases in English can have the *less than* reading in some contexts. In a weight-losing clinic, the doctor can utter (i) to a person whose weight has dropped to below the advertised benchmark 50 kilograms. I have nothing interesting to offer regarding this observation, except for noting that the judgment is far away from being clear-cut.

(i) You are now 50 kilograms.

Relevant in the definition of the MEAS morpheme for degree readings of size adjectives ( $MEAS^N$ ) are only degrees on the scale particularly associated with the modified gradable noun. Thus  $MEAS^N$  should receive some qualification from the gradable noun. Second, while an AP-modifying measure phrase does not require the AP it modifies to absolutely hold of the individual that the AP predicates of, the degree use of a size adjective needs the modified gradable NP to hold of the individual that the NP predicates of. More concretely, someone who is *five feet tall* is not necessarily tall, depending on the class of comparison; but someone who is *a big idiot* is necessarily an idiot. Therefore,  $MEAS^N$  has to make reference to the standard of the modified gradable noun. Correspondingly, for English size adjectives, the semantics of  $MEAS^N$  can be defined as in (27).

$$(27) \llbracket MEAS_E^N \rrbracket = \lambda g \lambda m \lambda x. \text{MIN}\{d: d \in \text{scale}(g) \wedge m(d)\} \leq g(x) \wedge \text{std}(g) \leq g(x)$$

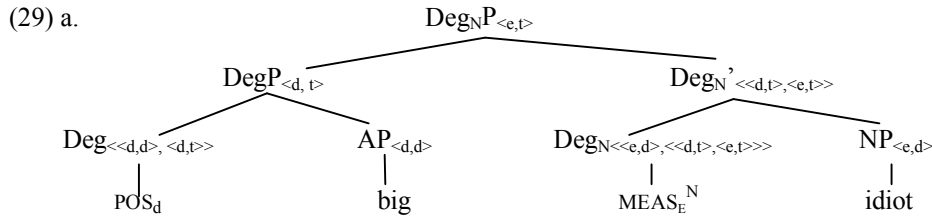
(the subscript E stands for English, the superscript N for nominal)

In addition to the  $MEAS^N$  degree head, the LF for ‘size adjective + gradable noun’ involves still another degree head:  $POS_d$ . The type for the degree use of size adjectives is of  $\langle d, d \rangle$ , and the  $POS_d$  morpheme is adjusted to type  $\langle \langle d, d \rangle, \langle d, t \rangle \rangle$  from the type  $\langle \langle e, d \rangle, \langle d, t \rangle \rangle$  for  $POS_e$  for ‘regular’ adjectives. This is a natural move given the strong analogy between individuals and degrees (Heim 2000).

$$(28) \llbracket POS_d \rrbracket = \lambda g_{\langle d, d \rangle} \lambda r_d. \text{std}(g) \leq g(r).$$

(the subscript  $d$  stands for degree)

With all the preliminaries, the semantics of ‘big idiot’ can now be calculated. The end result in (29b) roughly says that ‘big idiot’ denotes a set of individuals  $x$  such that the degree of  $x$ ’s idiocy is at least as great as the smallest degree that meets the bigness standard on the scale of idiocy, and  $x$  meets the standard of being an idiot. The smallest degree that meets the bigness standard on the scale of idiocy amounts to the degree of idiocy of a standard-big idiot. Therefore ‘big idiot’ simply denotes the set of idiots who are not less idiotic than a standard-big idiot, which conforms to native intuition.



$$b. \llbracket [POS_d \text{ big}] MEAS_E^N \text{ idiot} \rrbracket$$

$$= \lambda x. \text{MIN}\{d: d \in \text{scale}(\mathbf{idiot}) \wedge \llbracket [POS_d \text{ big}] \rrbracket(d)\} \leq \mathbf{idiot}(x) \wedge \text{std}(\mathbf{idiot}) \leq \mathbf{idiot}(x)$$

$$= \lambda x. \text{MIN}\{d: d \in \text{scale}(\mathbf{idiot}) \wedge \text{std}(\mathbf{big}) \leq \mathbf{big}(d)\} \leq \mathbf{idiot}(x) \wedge \text{std}(\mathbf{idiot}) \leq \mathbf{idiot}(x)$$

In parallel, the semantics of ‘small idiot’ can be defined as in (30). Here,  $\text{MIN}\{d: d \in \text{scale}(\mathbf{idiot}) \wedge \text{std}(\mathbf{small}) \leq \mathbf{small}(d)\}$  corresponds to ‘(just next to) not idiotic at all’. Anyone who has some degree of idiocy is not less idiotic than someone who is (just next to) not idiotic at all. Hence  $\text{MIN}\{d: d \in \text{scale}(\mathbf{idiot}) \wedge \text{std}(\mathbf{small}) \leq \mathbf{small}(d)\} \leq \mathbf{idiot}(x)$  satisfies vacuously. Then the semantics of ‘small idiot’ reduces to (31), which is equivalent to the semantics of ‘idiot’. It amounts to saying that ‘small idiot’ is semantically indistinguishable from ‘idiot’. The size adjective ‘small’ melts away and has no contribution to the semantics of the intended degree reading. According to Morzycki (2009), because there are alternative ways to construe s-adjective that do have a semantic effect, s-adjectives is always interpreted in these other ways. This is why s-adjectives in English appear not to have degree readings. By now, the presence of the Bigness Generalization for English size adjectives has received a successful semantic explanation.

$$(30) \llbracket [POS_d \text{ small}] MEAS_E^N \text{ idiot} \rrbracket$$

$$= \lambda x. \text{MIN}\{d: d \in \text{scale}(\mathbf{idiot}) \wedge \text{std}(\mathbf{small}) \leq \mathbf{small}(d)\} \leq \mathbf{idiot}(x) \wedge \text{std}(\mathbf{idiot}) \leq \mathbf{idiot}(x)$$

$$(31) \llbracket [POS \text{ small}] MEAS^N \text{ idiot} \rrbracket$$

$$= \lambda x. \text{std}(\mathbf{idiot}) \leq \mathbf{idiot}(x)$$

$$= \llbracket [POS \text{ idiot}] \rrbracket$$



#### 4. Accounting for the Absence of the Bigness Generalization in Mandarin Chinese

Morzycki (2005, 2009) provides a satisfactory account of the Bigness Generalization for degree readings of size adjectives in English. What is most crucial in explaining why English s-adjectives cannot degree-modify gradable nouns appears to be the vacuous satisfaction of the comparison relation between a minimal degree and the degree to which the gradable nominal predicate holds of an individual. The minimality operator and the comparison relation, in turn, are introduced by the  $MEAS_E^N$  degree morpheme. Furthermore, this degree morpheme is parallel with the  $MEAS_E^A$  morpheme for AP-modifying measure phrases in English. In English, such measure phrases receive an ‘at least’ interpretation, and this is captured exactly by the comparison relation in the semantics of the  $MEAS_E^A$  morpheme. To account for the absence of the Bigness Generalization in the degree use of Mandarin Chinese size adjectives, AP-modifying measure phrases in the language may be a good place to start with.<sup>15</sup>

AP-modifying measure phrases in Mandarin Chinese do not have the ‘at least’ interpretation; rather their default reading is the ‘exactly’ one. Here is some evidence in favor of this claim. First, all of the several naïve native speakers of Mandarin Chinese whom I consulted with reported that an AP-modifying measure phrase means something that is equivalent to the ‘exactly’ reading. Imagine John walking into a grocery store and asking the store keeper if he had ten-pound watermelons. Further imagine that in the relevant world watermelons somehow weigh 5lbs, 61bs, 71bs ... 291bs, 301bs, with no fraction of a pound being possible. All the watermelons in the store were over ten pounds. My consultants said the store keeper would be lying if he gave a positive answer.

Second, if AP-modifying measure phrases in Mandarin Chinese, just like those in English, have the ‘at least’ interpretation as the default, then we would expect that, in a large-scale corpus search, this interpretation should emerge a considerable number of times. Here was a simple experiment I designed that suggested exactly the opposite. The number of Google results matching the exact Mandarin Chinese string “*zhao ge shengao*” ‘find someone whose height is’ is close to 2.1 million. A quick glimpse revealed that, in the majority of the results, *shengao* ‘stature, height’ is followed by the following expressions: *zhishao* ... ‘at least ...’, ...*yishang* ‘over ...’, ...*zuoyou* ‘about ...’ ...*dao*... ‘(from) ... to ...’, and ... *yixia* ‘below ...’, where ‘...’ is some length-denoting measure phrases along with an optional adjective phrase. After the results containing such expressions were suppressed, the number of results reduced to 43(!!!). The dramatic drop is surprising if AP-modifying measure phrases in Mandarin Chinese have the ‘at least’ interpretation. Why is an overt element expressing ‘at least’ needed to induce the ‘at least’ reading for AP-modifying measure phrases, if they have the ‘at least’ interpretation in the first place? Furthermore, some of the 43 remaining results contain a measure phrase, and none of the measure phrases have the ‘at least’ interpretation in any obvious way<sup>16</sup>.

Third, the Mandarin Chinese sentence in (32) is infelicitous for use in B’s response in the context of (24) (repeated below as (33)), because using (32) as the first clause of B’ response would contradict the second clause. If, like in English, (32) means ‘John is at least six feet tall’, we would expect it to be as felicitous as its English counterpart in the context.

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<sup>15</sup> Mats Rooth (p.c.) pointed out to me that, though s-adjectives cannot directly degree-modify gradable nouns in English, they can have degree-like readings via circumlocution by modifying such elements as ‘bit’ which in turn can take gradable nouns as their argument:

(i) John is a small bit of idiot.

If we further observe that ‘bit’ also can take a gradable adjectival argument, as in (ii), it is attempting to say English s-adjectives can have degree-like readings even with gradable adjective predicates.

(ii) John is a small bit sad.

Based on data like (i-ii), Mats Rooth suggested that degree readings of s-adjectives in English do not behave as differently from those in Mandarin Chinese as our discussion tried to convey. He came up with an alternative analysis for s-adjectives as degree modifiers in Mandarin Chinese. The rough idea is that there are covert, language specific ‘bit’-like elements in the degree use of size adjectives in Mandarin Chinese. I find this alternative proposal less attractive than the analysis that I propose in this section, primarily because there is no language-internal motivation for proposing such covert elements.

<sup>16</sup> The figures reported here were accurate as of May 10, 2010.

(32) zhangsan 6 yingchi gao.  
 John 6 foot tall  
 ‘John is six feet tall.’

(33) A. The minimum height for applicants for this job is six feet.  
 B. Well, John is six feet tall; in fact he is six feet five tall.

Lastly, besides using overt adverbs like *zhishao* ‘at least’ and *yishang* ‘more than’, the possessive verb *you* ‘have’ can be used to express ‘at least’ reading with measure phrases in Mandarin Chinese. For this use, *you* takes the chunk ‘measure phrase + gradable adjective’ as its (small clause) ‘object’ (34). We analyze the ‘at least’ reading in sentences like (34) as arising from the semantics of *you* ‘have’ interacting with that of gradability. With this use, *you* denotes a partitive relation between the degree of ‘six feet’ and John’s maximum height. We will not get into the formal details here. The interested reader should refer to Sæbø (2009) and Xie (2010) for relevant discussion.

(34) zhangsan you 6 yingchi gao.  
 John have 6 foot tall  
 ‘John is 6 feet tall or more.’

For our purpose it suffices to note that, intuitively, the ‘*you* + measure phrase + gradable adjective’ construction is more marked than AP-modifying measure phrases. We expect the former to have a more ‘loaded’ semantic interpretation and the latter to have a less ‘loaded’ interpretation. Now that the former unequivocally has the ‘at least’ interpretation, a less ‘loaded’ interpretation for AP-modifying measure phrases would very likely be the ‘exactly’ interpretation. So considerations of linguistic markedness also suggest that AP-modifying measure phrases in Mandarin Chinese are likely to have the ‘exactly’ interpretation.

I hope that the above discussion is sufficient to establish that AP-modifying measure phrases in Mandarin Chinese receive the ‘exactly’ interpretation as the default. This contrasts with the ‘at least’ interpretation of their counterparts in English. We have noted that the ‘at least’ interpretation is capture by a minimality operator and a comparison relation between two degrees in the semantics of  $MEAS_E^A$ . For AP-modifying measure phrases in Mandarin Chinese, to capture the ‘exactly’ interpretation we posit an identity degree morpheme  $MEAS_C^A$  (35). We assume that Mandarin Chinese measure phrases denote a singleton set. The  $MEAS_C^A$  morpheme requires that the only degree element in the set be identical to the degree to which the adjective predicate holds of an individual.

(35)  $\llbracket MEAS_C^A \rrbracket = \lambda g_{\langle e, d \rangle} \lambda m_{\langle d, t \rangle} \lambda x. \exists d \in \{d' : m(d')\} \wedge d = g(x)$ .  
 (the subscript C stands for Mandarin Chinese, the superscript A for adjective)

The positive form of adjectives which are not modified by a measure phrase has a different degree head  $POS_C$ . Mandarin Chinese behaves just like English in this respect. The interested reader can refer to Liu (2010) for detailed discussion.

Recall that Morzycki’s analysis as reviewed in section 3 is motivated by the intuition that degree readings of size adjectives are parallel to AP-modifying measure phrases in that both measure the degree that the predicate they modify holds of an individual. Our analysis of degree readings of size adjectives in Mandarin Chinese shares the same intuition. The  $MEAS$  morpheme for degree readings of size adjectives in Mandarin Chinese ( $MEAS_C^N$ ) differs from its counterpart in English in that the former does not involve a minimality operator or a comparison relation between two degrees. Rather it involves an existential operator and an identity relation between two degrees (36).

(36)  $\llbracket MEAS_C^N \rrbracket = \lambda g_{\langle e, d \rangle} \lambda m_{\langle d, t \rangle} \lambda x. \exists d \in \{d' : d' \in \text{scale}(g) \wedge m(d')\} \wedge d = g(x) \wedge \text{std}(g) \leq g(x)$   
 (the subscript C stands for Mandarin Chinese, the superscript N for nominal)

Mandarin Chinese *da baichi* ‘big idiot’ has the exactly same LF as English ‘big idiot’ as in (29a). Assembling everything together, the semantics of *da baichi* (37) denotes a set of individuals *x* such that the

degree of  $x$ 's idiocy is identical to some degree which is at least as great as the standard of being big on the scale of idiocy, and  $x$  meets the standard of being an idiot. Simplifying a bit, *da baichi* denotes the set of individuals who are not less idiotic than a standard-big idiot. This is exactly what English 'big idiot' denotes. Thus, *da baichi* and 'big idiot' have the same semantic interpretation, which is a welcome result.

$$(37) \llbracket da\ baichi \rrbracket = \llbracket MEAS_c^N\ baichi \rrbracket (\llbracket POS_d\ da \rrbracket) \\ = \lambda x. \exists d \in \{d' : d' \in \text{scale}(\mathbf{idiot}) \wedge \text{stnd}(\mathbf{big}) \leq \mathbf{big}(d')\} \wedge d = \mathbf{idiot}(x) \wedge \text{stnd}(\mathbf{idiot}) \leq \mathbf{idiot}(x)$$

Similarly, the semantics of *xiao baichi* 'an idiot to a small degree' is given in (38). The chunk ' $\text{stnd}(\mathbf{small}) \leq \mathbf{small}(d)$ ' says that the smallness degree of  $d$  is *not less than* the standard degree of being small. Then what  $d$  represents has to be *not greater than* what 'standard-small' does on the relevant scale. So an individual  $x$  who has a  $d$ -degree of idiocy is *at most as idiotic as* an idiot with a standard-small degree of idiocy. At the same time,  $\text{stnd}(\mathbf{idiot}) \leq \mathbf{idiot}(x)$  requires  $x$  to be an idiot in the first place. Thus *xiao baichi* denotes the set of individuals who are not more idiotic than an idiot with the standard-small degree of idiocy and who exceeds the degree of idiocy of a standard idiot at the same time. So far we have answered the question of why in Mandarin Chinese b-adjectives and s-adjectives can both degree-modify gradable nouns.

$$(38) \llbracket xiao\ baichi \rrbracket = \llbracket MEAS_c^N\ baichi \rrbracket (\llbracket POS_d\ xiao \rrbracket) \\ = \lambda x. \exists d \in \{d' : d' \in \text{scale}(\mathbf{idiot}) \wedge \text{stnd}(\mathbf{small}) \leq \mathbf{small}(d')\} \wedge d = \mathbf{idiot}(x) \wedge \text{stnd}(\mathbf{idiot}) \leq \mathbf{idiot}(x)$$

## 5. Conclusions

Size adjectives can receive degree readings when they modify gradable nouns. For size adjectives in English, availability of degree readings of size adjectives is subject to the Bigness Generalization: degree readings are systematically available for adjectives that predicate bigness, but not available for adjectives that predicate smallness. However, for size adjectives in Mandarin Chinese this constraint does not exist: both types of size adjectives in Mandarin Chinese can degree-modify gradable nouns. The claim is supported both by results of web search and by diachronic evidence. An analytic intuition for degree readings of size adjectives is their analogy to measure phrases that modify adjective phrases: both are arguments of some degree morphemes. In English, AP-modifying measure phrases have the 'at least' interpretation as the default reading, and in Mandarin Chinese these measure phrases have the 'exactly' interpretation as the default reading. Correspondingly, the degree morpheme for English AP-modifying measure phrases involves a minimality operator and a comparison relation, and the one for AP-modifying measure phrases in Mandarin Chinese involves an existential operator and an identity relation.

The degree morphemes for degree readings of size adjectives for English and for Mandarin Chinese differ in a likewise manner. In English, s-adjectives do not make semantic contribution when they modify gradable nouns, because of the vacuous satisfaction of the comparison relation in the semantics of s-adjectives as degree modifiers. This lack of semantic effects forces s-adjectives to have an alternative interpretation other than degree readings when they modify gradable nouns. In Mandarin Chinese, s-adjectives have semantic effects on the interpretation of gradable nouns they modify and are not forced to have an interpretation alternative to degree readings. Therefore s-adjectives can degree-modify gradable nouns in Mandarin Chinese, and the Bigness Generalization is not a valid constraint on degree readings of size adjectives in the language.

There are many open questions left unanswered in this paper, and I would like to mention just a few of them. In Mandarin Chinese, s-adjectives are not as productive as b-adjectives when they are used as degree modifiers for gradable nouns. Where should this difference be attributable to, the morphophonological properties of size adjectives and/or gradable nouns, or linguistic interference from the other uses of size adjectives, or simply lexical idiosyncrasy? Second, our analysis of the presence or absence of the Bigness Generalization in a language (i.e. English vs. Mandarin Chinese) makes direct reference to how AP-modifying measure phrases are interpreted in the language. But how strong is the contrast between the 'at least' interpretation of AP-modifying measure phrases in English and the 'exactly' interpretation of them in Mandarin Chinese? Does the distinction find support from other languages? Does our analysis attach too much weight to the distinction? After all, on a pre-theoretical level some speakers interpret AP-modifying measure phrases in English as having the 'exactly' interpretation as default, as sometimes entertained in the

literature (e.g. Rett 2008). Last but not least, we do find cases where an English s-adjective degree-modifies a gradable noun, as illustrated in (39), though this use of English size adjectives appears to be much less productive than in Mandarin Chinese. What factors render the use possible anyway? Are they semantic, pragmatic, or extra-linguistic in nature? Right now we even do not have a good descriptive generalization of when the use is possible, let alone a theoretical conceptualization. Only with satisfactory answers to all these questions does our analysis have a better chance to survive theoretical scrutiny.

(39) Domestic violence is a case of two idiots fighting - and the smaller idiot losing.

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