# ON THE AMBIGUITY OF SUPERLATIVE MODIFIERS*

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## 1 Introduction

Superlative modifiers (SMs) recently have received intensive investigation (e.g., Krifka 1999, Geurts & Nouwen 2007, Büring 2008, Nouwen 2010, Cummins & Katsos 2010, Coppock & Brochhagen 2013, Cohen & Krifka 2014, Kennedy 2015, Schwarz 2016 and a.o.). However, most studies center on English and little attention was paid to the concessive meaning of SMs. In the latter case, two notable exceptions are Nakanishi & Rullmann (2009) (N&R) and Biezma (2013). N&R observes that English *at least* can be ambiguous between epistemic reading (EPI) and concessive reading (CON).[1,2] For example, (1a) implies that the speaker is uncertain about the quantity of novels Mary wrote. In (1b), by contrast, the speaker *knows* how many novels Mary wrote and conveys that writing three novels, while less than optimal, is still satisfactory.

(1) a. Mary wrote **at least** [three novels]$_F$. (EPI)
b. Although Mary didn't write four novels, **at least** she wrote [three novels]$_F$. (CON)

N&R considers (1) as a case of lexical ambiguity, primarily based on four observations. First, the prejacent is entailed under CON, but it is not necessarily so under EPI.

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[1] In the literature, there are two major approaches to the nature of ignorance inference associated with SMs. Some researchers take the ignorance inference to be semantic: the inference arises because SMs have covert (epistemic) modality in their semantics (e.g., Geurts & Nouwen 2007, Nouwen 2010). Others adopt the view that the ignorance inference is pragmatic in nature (e.g., Cummins & Katsos 2010, Coppock & Brochhagen 2013, Mayr 2013, Kennedy 2015, Mendia 2016a,b, Schwarz 2016). This paper takes the latter position. As we will see, this paper argues for a unified account of EPI and CON for Chinese SMs and it is thus incompatible with a view that speaker ignorance is hard-wired in the semantics of SMs. Readers are referred to Coppock & Brochhagen (2013) and Kennedy (2015) for discussion of some issues raised by the semantic approach and its empirical challenges.

[2] Westera & Brasoveanu (2014) observes that the ignorance inference of SMs typically arises when the preceding question is a *wh*-question. In this line, it is plausible that EPI and CON are sensitive to different discourse questions.

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(2) **The truth-conditional status of the prejacent**
a. EPI: Mary is **at least** an [associate]$_F$ professor.
*does not entail* Mary is an associate professor
b. CON: **At least** Mary is an [associate]$_F$ professor.
*entails* Mary is an associate professor

Second, CON is compatible with higher alternatives being false, while this is not the case for EPI.

(3) **Compatibility with false higher alternatives**
Scale: *gold medal > silver medal > bronze medal*
a. EPI: #Mary didn't win a gold medal, but she won **at least** a [silver]$_F$ medal.
b. CON: Mary didn't win a gold medal, but **at least** she won a [silver]$_F$ medal.

Third, CON conveys a "settle-for-less" interpretation while this is not the case for EPI. Moreover, higher alternatives are more preferable under CON while they are neutral under EPI.

(4) **Preferability and "settle-for-less" interpretation**
a. EPI: Phelps won **at least** [eight]$_F$ gold medals. *Neutral*
b. CON: **At least** Phelps won [eight]$_F$ gold medals. *Winning eight gold medals falls short of an intended goal/ standard*

Fourth, EPI and CON can be syntactically distinguished based on the position of *at least*. Specifically, EPI arises with the prenominal *at least*, while CON with the sentence-initial *at least*.

(5) **Syntactic distribution**
a. Mary won **at least** a silver medal. *only EPI*
b. Mary **at least** won a silver medal. *EPI or CON*
c. **At least** Mary won a silver medal. *prefer CON*

Despite these differences, Biezma (2013) argues that a unified account of English *at least* can still be maintained. There are two core ideas in Biezma's analysis. First, CON is a pragmatic variant of EPI, when all the higher alternatives are contextually known to be false. Second, the preferability and the "settle-for-less" interpretation of CON are due to the contextual evaluation of alternatives. Along this line, the set of alternatives can be induced from the discourse.[3] Consider the example below:

(6) Tom has a date with someone he met online. He gets back home to find his roommate Jim.

Jim: How was your date?
Tom: It was ok, **at least** she was smart.

Under CON, Tom's utterance indicates that with *all things* considered, his date was ok (despite that his date could have been better), given that his date could have been worse. In giving an answer evaluating his date, Tom identifies some possible aspects that he infers Jim is interested in. For expository purposes, let's assume the possibilities are ordered as in (7).

[3] Disagreeing with N&R's observation, Biezma argues that CON also arises with the prenominal *at least* in English. However, for all native speakers I have consulted, their judgments agree with N&R's observation that CON is not available with the prenominal *at least* in English.

(7) Great: She was tall, smart, beautiful

Good: She was tall and smart, or She was smart and beautiful,
or She was tall and beautiful

Ok: She was tall, or She was smart, or She was beautiful

Bad: She was not tall and She was not smart and She was not beautiful

What (6) and (7) show is that the set of alternatives can be contextually induced and evaluated against the speaker's goals in the discourse.

Finally, Biezma provides a unified lexical entry of *at least* for both EPI and CON.[4, 5]

(8) Let $p$ be a proposition, and $[p]_{A,i}$ the set of alternatives of $p$ ordered according to $\leq_i$, where $\leq_i$ is a contextually salient order of alternatives and [illegible]$[p]_{A,i}$, π [illegible]QUD:

***at least p*** = $\lambda w.$ [illegible], $r \in [p]_{A,<i}$, *s.t.* $r <_i p <_i q$ & $[p(w) \wedge q(w)]$ &
[illegible]$[p]_{A,i}$, $s <_i p[\neg s(w) \wedge p$ entails $s]$

In prose, (8) says that given a contextual ordering $r <_i p <_i q$, "*at least p*" asserts that the prejacent $p$ or its relevant higher alternative $q$ is true and that those relevant lower alternatives $s$ (that are not entailed by $p$) are false. Since *at least p* makes a disjunctive statement ($p(w) \wedge q(w)$) and CON arises when the relevant higher alternative $q$ is false, the prejacent $p$ is thus entailed under CON. This immediately explains two of N&R's observations: (i) the truth-conditional difference on the status of the prejacent; (ii) the compatibility of false higher alternatives. Furthermore, the preferability and the "settle-for-less" interpretation are also explained if the set of alternatives can be induced from the discourse and evaluated against the speaker's goals, as shown in (6)/ (7).[6]

Given the above discussion, two questions immediately emerge. First, both studies consider only English *at least*, what about its intuitive antonym *at most*? Second, both studies are restricted to English; do we expect the same EPI-CON ambiguity to show up in other languages? Put differently, it seems to be a matter of taste whether the two meanings (i.e., EPI and CON) should be unified if we only consider one single language, namely, English. Do we have any cross-linguistic evidence favoring one view or the other?

Based on Chinese, this paper provides a cross-linguistic support for a unified account of the EPI-CON ambiguity. Specifically, it is shown that Chinese SMs, both *zhishao* 'at least' and *zuiduo* 'at most', reveal the familiar EPI-CON ambiguity. Moreover, this paper provides a novel formalization of the unified entries, which avoids the disjunction in the semantics of SMs. A

[4] Biezma (2013) provides two lexical entries for *at least* (to take care of the fact that it can occur in different syntactic positions): one is propositional and the other is non-propositional. Only the propositional version is illustrated here. Readers are referred to her paper for details.

[5] Biezma (2013) adopts Roberts's (2012) discourse model: Questions-Under-Discussion (QUDs). Furthermore, she assumes with Beaver and Clark (2008) that the set of focus alternatives is contextually constrained in addressing the QUDs in a given discourse. For this paper, I stick to Rooth (1992) where the contextual restriction is represented by a variable *C*. Readers are referred to Beaver and Clark (2008) for discussion of the nuanced differences.

[6] What remains puzzling under a purely pragmatic analysis is why the (un)availability of EPI and CON is sensitive to the syntactic position of *at least*. As we will see in section 2, the EPI-CON ambiguity repeats itself with Chinese SMs. Moreover, the same syntactic restriction on the (un)availability of EPI and CON holds for Chinese as well: EPI typically arises with prenominal SMs while CON sentence-initial SMs. These cross-linguistic facts suggest that there should be some important linguistic factors underlying the observed semantic-syntactic correlation. For space reasons, this paper will not deal with the distributional issue and leave a detailed investigation for future research.

potential worry about Biezma's formalization is that *at least* in (8) is semantically not distinguished from the disjunction *or*. However, this does not seem to be the case.

(9) a. Although Mary didn't get a gold medal, **at least** she got a [silver]$_F$ medal.
b. #Although Mary didn't get a gold medal; she got a gold medal **or** a silver medal.

The contrast in (9) indicates that a different semantic formalization of SMs may be needed, to avoid the semantic equivalence to the disjunction *or*.

In short, this paper argues for a unified account of the EPI-CON ambiguity in Chinese and proposes the following lexical entries for Chinese SMs (assuming they are propositional operators for simplicity). The variable *C* represents the contextual restriction as in Rooth (1992).

(10) ***zhishao*** = $\lambda C_{<st,t>}\, \lambda p_{<st>}\, \lambda w_{<s>}.\ \exists q\, [q \in C \wedge q \geq_{i,g} p \wedge q(w)]$
*There is a proposition q in C which is stronger or equally strong as the prejacent p such that q is true in w*

(11) ***zuiduo*** = $\lambda C_{<st,t>}\, \lambda p_{<st>}\, \lambda w_{<s>}.\ \forall q\, [q \in C \wedge q(w) \rightarrow q \leq_{i,g} p]$
*For every proposition q in C, if q is true, then q is less strong or equally strong as the prejacent p in w*

In particular, *zhishao* is an existential quantifier over the set of propositional alternatives consisting of the prejacent and the relevant higher alternatives and says that one element in that set is true. *Zuiduo* is a universal quantifier requiring every relevant alternative, if it is true, to be at most as strong as the prejacent. Both scalar items are sensitive to some contextual ranking (relative to the speaker's goals in the discourse). More specifically, the ordering $\geq_{i,g}$ among the set of alternatives is not only contextually given (via the assignment function *i*) but also relative to the speaker's goals in the discourse (via the assignment function *g*). The former makes SMs (under both EPI and CON) compatible with various scales (based on the semantic strength or pragmatic strength). The latter adds the evaluative flavor to CON under appropriate contexts.

The rest of this paper proceeds as follows. Section 2 presents the core data about Chinese SMs. Section 3 offers the semantics of *zhishao* 'at least' and *zuiduo* 'at most'. Section 4 discusses an asymmetry between *zhishao* and *zuiduo*: other things being equal, it seems more difficult for CON to arise with *zuiduo* than with *zhishao*. The asymmetry is attributed to an intrinsic semantic difference on the quantificational force of the two scalar items, with respect to how the pragmatic conditions of speaker concession are satisfied. Section 5 concludes the paper.

# 2 Superlative Modifiers in Chinese

To begin with, Chinese superlative modifier *zhishao* 'at least', like English *at least*, also reveals the EPI-CON ambiguity. For example, (12) is ambiguous and can be used to convey the speaker's concession or ignorance about what *Zilu* has bought.

(12) A contextual ranking: e.g., *cherries* >*apples* >*bananas*

| | |
|---|---|
| *Zilu* ***zhishao*** *mai-le* [*pinguo*]$_F$. | **EPI/ CON** [**Pragmatic Scale**] |
| Zilu at least buy-ASP apple | |
| 'Zilu at least bought apples.' | |

Second, both EPI and CON are focus-sensitive: the position of focus associate indicates the piece of information that the speaker's concession or ignorance is about. Contrasting with (12), it is about what *Zilu* has done (e.g., for the party) rather than what *Zilu* has bought in (13).

(13) A contextual ranking: e.g., *ordering pizzas >buying apples >writing an invitation letter*

*Zilu* ***zhishao*** [*mai -le* *pinguo*]$_F$. **EPI/ CON** [**Pragmatic Scale**]
Zilu at least buy-ASP apple
'Zilu at least bought apples.'

Third, both meanings occur with various scales (based on the semantic or pragmatic strength).

(14) a. A contextual ranking: e.g., *4 > 3 > 2*

*Zilu* ***zhishao*** *xie-le* [*san*]$_F$*-ben-xiaoshuo*. **EPI/ CON** [**Numerical Scale**]
Zilu at least write-ASP three-CL-novel
'Zilu at least wrote three novels.'

b. A contextual ranking: e.g., *adam□ill□ilu > adam□ill > zilu*

*Zilu* ***zhishao*** *yaoqing-le* [*Adam he Bill*]$_F$. **EPI/ CON** [**Cardinality Scale**]
Zilu at least invite-ASP Adam and Bill
'Zilu at least invited Adam and Bill.'

c. A contextual ranking: e.g., *gold medal > silver medal > bronze medal*
*Zilu* ***zhishao*** *na-le* *yi-mian*-[*yin*]$_F$*-pai*. **EPI/ CON** [**Lexical Scale**]
Zilu at least take-ASP one-CL-silver-medal
'Zilu at least got a silver medal.'

Finally, according with N&R's observation on English *at least*, the (un)availability of EPI and CON is sensitive to the syntactic position of *zhishao* 'at least'.[7] For example, neither (15a) nor (15b) is ambiguous. More specifically, EPI is missing in (15a) with the sentence-initial *zhishao* while CON is missing in (15b) with the prenominal/ pre-numeral *zhishao*.

(15) a. ***Zhishao*** *Zilu* [*qipian-le* *Lisi*]$_F$. [**CON, #EPI**]
At least Zilu deceive-ASP Lisi
'At least, Zilu deceived Lisi.'

b. *Zilu* *xie-le* ***zhishao*** [*san*]$_F$*-ben-xiaoshuo*. [#**CON**, **EPI**]
Zilu write-ASP at least three-CL-novel
'Zilu wrote at least three novels.'

Note that the above observations concerning both EPI and CON (e.g., the focus-sensitivity and compatibility with various scales) apply to English *at least* as well.

[7] Although English SMs are well-known for being cross-categorial in the prenominal position, this is not the case for Chinese. When *zhishao* and *zuiduo* occur pre-nominally, they are compatible with only numerals (i.e., incompatible with proper names, bare nouns, quantifiers, etc). Despite this difference, N&R's observation that the (un)availability of CON and EPI is correlated with the position of SMs still holds for both English and Chinese. A detailed investigation of this semantic-syntactic correlation is left for future research.

Now, let's shift our attention to *zuiduo* 'at most'. At first glance, it seems that *zuiduo* only conveys EPI, namely, no EPI-CON ambiguity is detected.

(16) a. A contextual ranking: e.g., *4 > 3 > 2*
*Zilu* ***zuiduo*** *xie-le* [*san*]$_F$*-ben-xiaoshuo*. **EPI/#CON**[**Numerical Scale**]
Zilu at most write-ASP three-CL-novel
'Zilu at most wrote three novels.'

b. A contextual ranking: e.g., *adam&bill&zilu > adam&bill > zilu*

*Zilu* ***zuiduo*** *yaoqing-le* [*Adam he Bill*]$_F$. **EPI/#CON**[**Cardinality Scale**]
Zilu at most invite-ASP Adam and Bill
'Zilu at most invited Adam and Bill.'

c. A contextual ranking: e.g., *gold medal > silver medal > bronze medal*
*Zilu* ***zuiduo*** *na-le* *yi-mian*-[*yin*]$_F$*-pai*. **EPI/ #CON** [**Lexical Scale**]
Zilu at most take-ASP one-CL-silver-medal
'Zilu at most got a silver medal.'

d. A contextual ranking: e.g., *cherries >apples >bananas*
*Zilu* ***zuiduo*** *mai-le* [*pinguo*]$_F$. **EPI/ #CON** [**Pragmatic Scale**]
Zilu at most buy-ASP apple
'Zilu at most bought apples.'

Recall that an important hallmark of CON (observed by N&R) is that the prejacent is *entailed* under CON. However, none of the examples above convey that the prejacent is entailed. For example, (16a) does not entail that *Zilu* wrote three novels; (16b) does not entail that *Zilu* invited Adam and Bill. Similarly, (16c) does not entail that *Zilu* got a silver medal and (16d) does not entail *Zilu* bought apples.

Despite examples like (16), I argue that the lack of the EPI-CON ambiguity with *zuiduo* is only apparent; Specifically, CON does arise with *zuiduo*. Consider the discourse below.

(17) *Zilu* has a date with someone he met online. He gets back home and has a conversation with his roommate *Lisi*.

*Lisi*: How was your date?

(18) *Zilu*'s utterance:
*Zaotou-le*! *Ta* *jibu* *youmo* *yebu* *piaoliang*.
bad-ASP she neither funny nor beautiful
'It was so bad! She was neither funny nor beautiful.'
*Ta* ***zuiduo*** *jiushi/ suan* *congming*.
She at most just count smart
'At most, she was/ counted as smart.'

Under CON, *Zilu*'s utterance indicates that with *all things* considered, his date was bad (despite that his date could have been worse), given that his date could have been better. In giving an answer evaluating his date, *Zilu* identifies some possible aspects that he infers *Lisi* is interested in. For expository purposes, let's assume the possibilities are ordered as in (19).

(19) Great: She was funny, smart and beautiful

Good: She was funny and smart, or She was smart and beautiful, or She was funny and beautiful

Bad: She was funny but not beautiful and not smart, or She was beautiful but not funny and not smart, or She was smart but not funny and not beautiful

Extremely bad: She was not funny and She was not smart and She was not beautiful

To be more specific, given the ordered possibilities and *Lisi*'s interest in the discourse, *Zilu*'s utterance conveys that in terms of the aspects that his date could have been better, the only (good) thing worth mentioning is that she was smart. In other words, the prejacent is true/ entailed in the discourse, consistent with N&R's observation on the status of the prejacent.[8] Based on this sort of examples, I conclude that the EPI-CON ambiguity is also attested in the case of *zuiduo*.

To sum up, we have seen that the EPI-CON ambiguity is not unique to English *at least*. In particular, Chinese SMs, *zhishao* 'at least' and *zuiduo* 'at most', also reveal the EPI-CON ambiguity. However, perhaps surprisingly, there exists an asymmetry between *zhishao* and *zuiduo* with respect to the availability of CON: it seems more difficult for CON to arise with *zuiduo*, than with *zhishao*. The question is why. I return to this asymmetry in section 4 and attribute it to the difference on the quantificational force of *zhishao* and *zuiduo*. The next section presents my analysis of Chinese SMs.

# 3 An Analysis of *Zhishao* and *Zuiduo*

Recall that Chinese SMs (paralleling with English *at least*), *zhishao* 'at least' and *zuiduo* 'at most', demonstrate the following properties: (i) Both scalar items show the EPI-CON ambiguity; (ii) Both EPI and CON show the focus-sensitivity and the compatibility with various scales; (iii) The set of alternatives can be contextually induced and evaluated against the speaker's goals in the discourse. To capture these properties and provide a unified account for EPI and CON, I propose the entries in (10) and (11) for *zhishao* and *zuiduo*, respectively, repeated below as (20) and (21). For simplicity, both scalar items are assumed to be propositional operators.

(20) ***zhishao*** = $\lambda C_{<st,t>}\, \lambda p_{<st>}\, \lambda w_{<s>}.\ \exists [q \in C \wedge q \geq_{i,g} p \wedge q(w)]$
*There is a proposition q in C which is stronger or equally strong as the prejacent p such that q is true in w*

(21) ***zuiduo*** = $\lambda C_{<st,t>}\, \lambda p_{<st>}\, \lambda w_{<s>}.\ \forall [q \in C \wedge q(w) \rightarrow q \leq_{i,g} p]$
*For every proposition q in C, if q is true, then q is less strong or equally strong as the prejacent p in w*

[8] As for English, Cohen & Krifka (2014) indicates that *at most* (like *at least*) also has an evaluative interpretation.

(i) The hotel is so bad! **At most**, it is centrally-located.

The example conveys that being centrally-located is the best/ the only good property of the hotel. Notice that this evaluative interpretation seems equivalent to CON. First, the speaker is *not* ignorant about whether the prejacent is true. Second, the prejacent that the hotel is centrally-located is actually *entailed* given the discourse. Thus, the EPI-CON ambiguity seems to arise for English *at most* as well. If this line of thought is correct, then the EPI-CON ambiguity of SMs is not simply a lexical coincidence and should be unified at least in English and Chinese. Readers are referred to Cohen & Krifka (2014) for discussion of *at most* under an evaluative interpretation.

There are three important characteristics of the entries above. First, *zhishao* and *zuiduo* are scalar particles, quantifying over the alternatives induced by focus. Second, the two scalar items semantically encode different quantificational forces. More specifically, *zhishao* makes the prejacent *p* the lower bound among the set of contextually relevant alternatives and asserts that there is a proposition *q* that is at least as strong as the prejacent *p* such that *q* is true. Put differently, *zhishao* makes an existential statement over the set of alternatives consisting of the prejacent *p* and its relevant higher alternatives: one element in the set is true.[9] By contrast, *zuiduo* makes the prejacent *p* the upper bound among the set of contextually relevant alternatives and asserts that for every proposition *q*, if *q* is true, then *q* is at most as strong as the prejacent *p*. That is, *zuiduo* makes a universal statement requiring the relevant alternatives *q* (if they are true) to be less strong or equally strong as the prejacent *p*, according to some contextual ranking.

Third, the ordering $\geq_{i, g}$ among the set of alternatives is not only contextually given (via the assignment function *i*) but also relative to the speaker's goals in the discourse (via the assignment function *g*).[10] The former makes SMs (under both EPI and CON) compatible with various scales (whether a scale is based on semantic or pragmatic strength).[11] The latter adds the evaluative flavor to CON under appropriate contexts.

Given the three characteristics, it is obvious that the focus-sensitivity and the compatibility with various scales automatically follow, since *zhishao* and *zuiduo* are scalar focus particles. The real questions here are how and why the EPI-CON ambiguity should arise.

I propose that the rise of *speaker concession* requires two (pragmatic) conditions:[12]

(22) The core of speaker concession
  a. The relevant higher alternatives are false while (only) the prejacent is true.
  b. The set of alternatives is evaluated relative to the speaker's goals in the discourse.

The idea behind (22) is that given some contextual ranking and evaluative value imposed on the set of alternatives, speaker concession is conveyed in the situation where (only) the prejacent is true while its relevant higher alternatives are false. Now, we are ready to see how and why the EPI-CON ambiguity arises. Let us first consider the *how*-question.

In the case of *zhishao*, it is semantically sensitive to some contextual ranking and requires one contextually relevant alternative that is at least as strong as the prejacent to be true. CON arises when some evaluative value (relative to the speaker's goals) is attached to the alternatives and when the speaker knows that the relevant higher alternatives are false in the discourse (i.e.,

[9] The idea that an existential closure over a set of alternatives leads to a disjunctive statement is not new in previous linguistic studies. For example, see Abusch (2002, 2010) for discussion of how such an idea explains the soft-hard distinction in the domain of presuppositions.

[10] This is a naïve view on how the speaker's goals are identified in a dynamic discourse. One plausible implementation is to adopt the framework of Question-Under-Discussion (QUD; Roberts 1996/ 2012). Very briefly, within the QUD framework, the discourse is structured by a set of question-under-discussions. Under that view, we may consider the speaker's goals in a given discourse as trying to address/ answer some immediate question-under-discussions. A detailed implementation under the framework of QUD is left for future research.

[11] Apparently, whether a scale is based on semantic or pragmatic strength seems correlated with whether the alternatives are mutually exclusive. When the alternatives are mutually exclusive, the scale is based on the pragmatic strength. However, when a scale is based on the semantic strength, the alternatives may or may not be mutually exclusive (depending on our assumptions about covert exhaustification).

[12] The two conditions of speaker concession are taken to be pragmatic, since Chinese SMs are assumed not to be ambiguous in their lexical semantics. A conceivable alternative view is that cross-linguistically, there may be scalar items lexicalizing the two conditions. In that case, those scalar items are dedicated particles *unambiguously* expressing speaker concession. The issue of lexicalization is left open in this paper.

the prejaent is true, given the existential statement). In the case of *zuiduo*, it is semantically sensitive to some contextual ranking and requires every contextually relevant alternative, if it is true, to be at most as strong as the prejacent. Importantly, unlike *zhishao*, *zuiduo* semantically precludes the relevant higher alternatives. CON arises when some evaluative value (relative to the speaker's goals) is attached to the alternatives and when the speaker knows that (only) the prejacent is true.

Next, let us consider the *why*-question. In the case of *zhishao*, the EPI-CON ambiguity arises because the relevant higher alternatives can be left open or contextually known to be false. When the two pragmatic conditions are satisfied, CON arises. In the case of *zuiduo*, the EPI-CON ambiguity arises because the relevant higher alternatives are semantically precluded and the speaker knows that (only) the prejacent is contextually true. When the two pragmatic conditions are satisfied, CON arises.

Given the current analysis, it is unclear why there should exist an asymmetry between the two scalar items, namely, it seems more difficult for CON to arise with *zuiduo* than with *zhishao*. The next section tackles this issue and attributes it to the difference on the quantificational force.

# 4 The Asymmetry between *Zhishao* and *Zuiduo*

From the above discussion, it should be clear that the two scalar particles (given their semantics) take different routes to satisfy the first condition of speaker concession, namely, the relevant higher alternatives are false while (only) the prejacent is true. More specifically, since *zhishao* is an existential quantifier over the set consisting of the prejacent and its relevant higher alternative, the condition is satisfied when the speaker knows that the relevant higher alternative is contextually false. However, the situation for *zuiduo* is different. The relevant higher alternatives are precluded by *zuiduo* semantically. Furthermore, *zuiduo* is a universal quantifier requiring every relevant alternative, if it is true, to be at most as strong as the pejacent. To satisfy the condition, *zuiduo* needs some strong contextual or additional linguistic support making the prejacent the only proposition that is true and worth mentioning in the discourse. In Chinese, the linguistic support generally comes from the addition of exclusive particles like *jiu* 'only' or *zhishi* 'just', as shown below.

(23) *Zilu* ***zuiduo*** *jiu/ zhishi ma-le Lisi jiju*.
Zilu at most only/ just scold-ASP Lisi a-little-bit
'At most, Zilu just scolded Lisi a little bit.
*Ni hebi zheme renzhen*?
You unnecessarily so serous
'Why do you take it so serious?'

In (23), *zuiduo* conveys that the (only) bad thing happened (i.e., being true) and worth mentioning is the prejacent that *Zilu* scolded *Lisi* a little bit. Specifically, the relevant higher alternatives (those worse than the prejacent) are semantically precluded. The presence of exclusive particles makes the prejacent the only true proposition in the domain.[13]

[13] Note that contra N&R (2009), the higher alternatives are not always more preferable in the discourse. In (23), the higher alternatives are actually, in a sense, less preferable than the prejacent (cf. (17)-(19)). Thus, it seems undesirable to hard-wire a preference scale into the semantics of SMs, making the higher alternatives always more preferable. Instead, the evaluative value on the set of alternatives should vary with different discourse contexts.

Since I argue that the difficulty of *zuiduo* under CON is attributed to its universal quantificational force and how the condition of speaker concession is satisfied (i.e., the prejacent is the only true proposition in the domain), a similar issue is expected to arise with other universal quantifiers. I illustrate this point by English quantifier *every student*. Imagine a scenario where there are three individuals in the discourse: Adam, Bill and Cindy. Adam is a student, Bill is a professor, and Cindy is a singer. Cindy had a party yesterday. Only Adam came to the party. Now, consider the utterance below.

(24) Every student came to the party.

Is (24) true or false? Theoretical, it should be true since the universal quantifier says that for every individual, if he is a student, he came to the party. In the given scenario, Adam is a student and he indeed came to the party. What makes a native speaker hesitate about (24) is that Adam is the only student in the discourse. This is exactly the same kind of difficulty we have seen when *zuiduo* is interpreted under CON: a universal quantifier restricts every relevant true proposition to be at most as strong as the prejacent and the prejacent is the only true proposition in the domain. By contrast, the difficulty does not arise for *zhishao*, given that it is an existential quantifier, with a different quantificational force than *zuiduo*.

In summary, there exists an asymmetry between Chinese SMs, *zhishao* 'at least' and *zuiduo* 'at most' with respect to the rise of CON: without additional linguistic support (e.g., exclusive particles) or some strong contextual support, it seems more difficult for CON to arise with *zuiduo* than *zhishao*. The asymmetry is attributed to an intrinsic semantic difference on the quantificational force of the two scalar items, with respect to how the pragmatic conditions of speaker concession are satisfied.

# 5 Conclusions

This study provides a unified account of the ambiguity of Chinese superlative modifiers (SMs): *zhishao* 'at least' and *zuiduo* 'at most'. In particular, it is shown that (i) the two scalar items show the EPI-CON ambiguity: speaker ignorance and speaker concession; (ii) the two scalar items (under EPI and CON) show the focus-sensitivity and the compatibility with various scales: the position of focus associate precisely indicates the piece of information that the speaker's ignorance/ concession is about; (iii) there exists an asymmetry between *zuiduo* and *zhishao*: other things being equal, it seems more difficult for Con to arise with *zuiduo* than with *zhishao*.

The property (ii) follows, since *zhishao* and *zuiduo* are scalar focus particles (i.e., quantifiers over the set of alternatives induced by focus). The property (iii) is an intrinsic semantic difference on the quantificational force of the two scalar items, with respect to how the pragmatic conditions of speaker concession are satisfied.

Concerning the property (i), from a cross-linguistic perspective, the EPI-CON ambiguity of SMs is surprisingly pervasive: see N&R for Japanese *sukunaku-to-mo*, Dutch *tenminste*; see Grosz 2011 for Greek *tulachiston*, Hebrew *le-faxot*, Czech *aspoň*, Spanish *al menos*. On the one hand, these cross-linguistic facts suggest that the two meanings cannot be simply a lexical coincidence in those languages. Instead, EPI and CON should be systematically and intrinsically related. Based on Chinese, this study proposes uniform semantic representations of Chinese SMs, capturing the intrinsic relation between EPI and CON.

On the other hand, it is worth emphasizing that a unified account of the EPI-CON ambiguity does not necessarily rule out the possibility that cross-linguistically, there are scalar items

specifically lexicalizing EPI or CON. In that case, those dedicated particles *unambiguously* express EPI or CON. The issue of lexicalization is left open in this study.

Finally, one remaining puzzle under the current semantic-pragmatic account is N&R's observation that the (un)availability of EPI and CON is correlated with the surface syntactic position of SMs. Note that such semantic-syntactic correlation holds for not only English but also Chinese. This means that there must be some important factors (cutting across the parameters between English and Chinese) underlying the correlation. More studies are definitely needed in order to unveil the nature of the semantic-syntactic correlation.

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