# Definiteness in Superlatives

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**Abstract.** A new analysis of superlatives is presented, which assigns two functions to the definite article. It reflects the definiteness of the DP in absolute superlatives, and the definiteness of the DegP in comparative superlatives. The analysis accounts for the distribution of *the* in attributive, amount, predicative and adverbial superlatives in English.

**Keywords:** superlatives, definiteness, absolute-comparative ambiguity

## 1   Introduction

Most semantic theories of superlatives are concerned with resolving the comparative-absolute ambiguity superlative sentences are notorious for. Comparative superlatives are considered a thorny case because their semantic indefiniteness seems to clash with the presence of the definite article. The standard solution is to replace *the* by an abstract $A$ in such cases.

However, the empirical landscape is much more intricate. The definite article is optional in some superlatives, e.g. with superlative adverbs. In amount superlatives, it disambiguates between comparative and proportional readings. For example, the bare superlative in (1) is interpreted as (1-a), and the insertion of *the* leads to the interpretation in (1-b) .

(1)    John climbed (the) most mountains.
      a.    John climbed more than half of the mountains.
      b.    John climbed more mountains than anyone else.

In this work, we aim at a more accurate account of the contribution of the definite article in superlatives, which can explain the observed distribution and establish a correlation between the superlative meaning and definiteness.

The paper is structured as follows. In section 2 and 3 we review the existing analyses of superlatives and motivate a new approach, which is developed in section 4 and compared to other theories in section 5. Section 6 discusses the predictions of the new analysis on the distribution of the definite article.

## 2   Absolute and Comparative Superlatives

Adjectival superlatives are known to be ambiguous between an absolute and a comparative reading.[1] For example, sentence (2-a) can be used to convey that John climbed a mountain that is higher than any other mountain, cf. (2-b). On the other hand, (2-a) can be used to compare John's achievement to the other people's achievements, cf. (2-c).

(2)    a.    John climbed the highest mountain.
       b.    John climbed Mount Everest.
       c.    John climbed a higher mountain than anyone else.

Comparative readings are not so easily distinguishable from absolute ones. In the example at hand, we are ultimately comparing the heights of mountains in both cases. The comparative reading may therefore be thought of as a case of the absolute one in which the mountains compared are the ones climbed by the salient people. There are two strands in the literature, depending on whether comparative readings are subsumed under absolute ones or not. I will refer to them as pragmatic and structural approaches (PA and SA, henceforth).

   Before we look at the difference between PA and SA, let us identify their common features. Be it pragmatic or structural, any existing analysis assumes that the superlative meaning is contributed by the superlative morpheme which is restricted by a contextual variable corresponding to the comparison class. According to the lexical entry in (3) from [4], *-est* applies to a comparison class $C$ and a gradable predicate $A$ to return a predicate of individuals that is true of those entities whose $A$-ness degrees exceeds $A$-ness degrees of everyone else in $C$. Thus, the role of the superlative is to existentially bind the degree variable projected by the gradable predicate and restrict it by an appropriate type of comparison. $C$ is also presupposed to consist of entities to which $A$ applies.[2]

(3)    a.    $\llbracket\text{-est}\rrbracket = \lambda C \in D_{et}\lambda A \in D_{d(et)}\lambda x \in D_e \exists d[A(d)(x) \wedge$
             $\forall y[y \in C \wedge y \neq x \rightarrow \neg A(d)(y)]]$
       b.    $\llbracket\text{-est}\rrbracket(C)(A)(x)$ is only defined iff $\forall y \in C[\exists d[A(d)(x)]]$

   PA ([4], [2], [8], [9]) maintain the view that to resolve the ambiguity, it suffices to pragmatically fix the value of $C$. The corresponding analysis of (2-a) is outlined in (4), where (4-a) is the assumed LF, (4-b) is the meaning of the NP, (4-c) are the resulting truth conditions, and (5-a) and (5-b) are the value assignments of $C$ under the absolute and the comparative reading, respectively.

(4)    a.    John climbed [the [-est C [high mountain]]]
       b.    $\llbracket\text{high}\rrbracket(\llbracket\text{mountain}\rrbracket) = \lambda d\lambda x\ x$ is a mountain $\wedge\ height(x) \geq d$
       c.    John climbed the unique $x$, s.t. $x$ is a mountain $\wedge \exists d[height(x) \geq d$
             $\wedge\ \forall y[y \in C \wedge y \neq x \rightarrow \neg[y$ is a mountain $\wedge\ height(y) \geq d]]]$

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[1] This observation goes back to [7]

[2] I disregard other presuppositions usually assumed to be triggered by the superlative as they are orthogonal to the present discussion.

(5)     a.    $C_{ABS} = \{x : x$ is a salient mountain$\}$
        b.    $C_{COMP} = \{x : x$ is a mountain climbed by a salient individual$\}$

SA ([10], [4]) agree that ambiguity is related to the value of the comparison class, but argue that the latter depends on the structural position of *-est* at LF. Thus, to derive the comparative reading of (2-a), *-est* is interpreted DP-externally. Its movement creates the right kind of property for the derivation of the comparative reading, namely the relation holding between an individual $x$ and a degree $d$ if $x$ climbed a $d$-high mountain. Correspondingly, it is not mountains but mountain climbers that are compared, and the resulting value of $C_{COMP}$ in (6-c) is different from the one in (5-b).[3] The superlative DP is assumed to be indefinite, which accords with the mobility of *-est* .[4] Accordingly, an abstract indefinite determiner $A$ heads the DP. Note that the uniqueness requirement contributed by *-est* renders the definite article superfluous, so the replacement of *the* by $A$ does not have a considerable semantic effect.

(6)     a.    John [-est C] $[\lambda d \lambda x$ x climbed [A d high mountain]]
        b.    $\exists x[x$ is a mountain $\wedge$ John climbed $x \wedge \exists d[height(x) \geq d \wedge \forall y[y \in C \wedge y \neq$ John $\rightarrow \neg\exists z[z$ is a mountain $\wedge y$ climbed $z \wedge height(z) \geq d]]]]$
        c.    $C_{COMP} = \{x : \exists d[x$ climbed a $d$-high mountain$\}$

The main argument in favour of SA, and contra PA, is the availability of the so called upstairs *de dicto* readings in intensional superlatives. Consider sentence (8) uttered in the context in (7).

(7)     – How high a mountain do you need to climb?
        John: – I need to climb a 6000 m high mountain.
        Bill: – I need to climb a 4000 m high mountain.
        Mary: – I need to climb a 3000 m high mountain.

(8)     John needs to climb the highest mountain.

Two things are certain: the DP receives a *de dicto* interpretation, and we are dealing with a comparative superlative. However, the task of providing a value for $C$ under PA has proved a challenge in such cases. No matter how we constrain the mountains in $C$ and whether we replace *the* by an abstract indefinite article, the uniqueness requirement on *-est* leads to a definite interpretation, which is incompatible with the given scenario, see [4]. SA do not have this problem. The relevant interpretation can be derived by assigning *-est* wide scope relative to *need*, cf. (9-a). This move guarantees that $C$ corresponds to the set in (9-b), which does not create a problem in combination with the uniqueness requirement.

(9)     a.    John [-est C] $[\lambda d \lambda x$ x needs to climb [A d high mountain ]]
        b.    $C = \{$x: $\exists d[x$ needs to climb a $d$-high mountain$]\}$

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[3] Both PA and SA concur that focus plays a role in promoting this or that reading. That is, if *John* is focussed in (2-a), the contextual variable is assigned $C_{COMP}$ as its value. We will return to the issue of focus in section 4.
[4] Movement out of a definite DP is subject to syntactic island constraints.

We can draw two lessons from this kind of sentences. First, unless we make sure that we technically compare different kinds of entities under an absolute and a comparative reading, the uniqueness requirement clashes with the indefiniteness of the DP in comparative superlatives. Second, the definite article, though merely superfluous in other kinds of superlatives, is at odds with an indefinite interpretation of the upstairs *de dicto* superlatives.

## 3    Distribution of the Definite Determiner

The previous section revealed a weakness of existing approaches. They don't assign any role to *the*. Moreover, *the* appears incompatible with an apparently indefinite interpretation of some comparative superlatives. Szabolsci [10] is one of the first to conclude that only comparative superlatives are indefinite.[5] Along with some syntactic tests, she considers how superlatives behave in "definiteness effect contexts". It turns out that comparative superlatives may occur in such contexts, while absolute superlatives are unacceptable. For example, putting focus on *John* in (10-c) promotes the comparative reading and creates a contrast to (10-b), which is as bad as the variant with a non-superlative definite in (10-a).

(10)    a.    *John has the sister.
        b.    John has the smartest sister.
        c.    JOHN has the smartest sister.

However, the occurrence of *the* in superlatives does not seem to correlate with their definiteness. Three classes of English superlatives may be distinguished relative to how *the* is distributed.

First, attributive superlatives require the presence of the article regardless of the interpretation available, cf. (2-a). Adopting Szabolsci's generalisation that absolute superlatives are definite and comparative ones are indefinite, it looks as if *the* were interpreted in the former and were spurious in the latter case.

Second, in amount superlatives, which are indefinite under comparative and proportional readings, *the* has been observed to play a disambiguating role, cf. [3]. (11) and (12) are examples of a comparative and a proportional reading of amount superlatives, the paraphrases given in (11-c) and (12-c) follow the analysis in Hackl [3].

(11)    a.    John climbed the most mountains.
        b.    John climbed more mountains than anyone else.
        c.    There is a plurality of mountains John climbed whose cardinality exceeds the cardinalities of pluralities of mountains others climbed.

(12)    a.    John climbed most mountains.
        b.    John climbed more than half of the mountains.
        c.    There is plurality of mountains that John climbed that exceeds the cardinalities of all non-overlapping pluralities of mountains.

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[5] See [8] for an alternative view.

Finally, adverbial and predicative superlatives do not require the definite article, cf. (13). The optionality of *the* is not disambiguating in this case. In fact, neither of the constructions can exhibit the relevant kind of ambiguity. Adverbial superlatives can be ambiguous, but comparison classes associated with different readings all involve different kinds of eventualities, modified by the adverb. In predicative superlatives, there is no room for variation either: alternatives in comparison classes are always shaped after the subject.

(13)    a.    John ran (the) fastest.
        b.    John is (the) tallest.

There is a fair amount of variation in how superlatives are formed across languages. However, the fact that the presence of the definite determiner does not reflect the definiteness of the superlative DP holds across languages. For example, in German the definite article can never be optional, regardless of the reading and the kind of superlative, cf. (14). Note that (14-a) and (14-b) have both an absolute/proportional and a comparative reading.

(14)    a.    Hans hat *(den) höchsten Berg bestiegen.
              Hans has the highest mountain climbed
        b.    Hans hat (die) meisten Berge bestiegen
              Hans has the most mountains climbed
        c.    Hans ist *(am) schnellsten gelaufen.
              Hans is at.the fastest run
        d.    Hans ist *(am) schnellsten.
              Hans is at.the fastest

To give an intermediate summary, most of the existing theories are successful in accounting for the differences in absolute and comparative superlatives; however, the presence of the definite article remains a mystery under any approach. The distribution of *the* does not seem incidental, considering its role in amount superlatives, but it does not reflect the definiteness of the superlative DP in all cases. Ideally, we would like to understand why comparative superlatives are marked for definiteness despite their semantic indefiniteness, and why some languages make the definite article optional in some contexts.

## 4   Definite DP and Definite DegP

We would like to suggest that the distribution of the definite article is complicated by the fact that it plays a double role in superlatives. It either heads a definite determiner phrase, or provides a definite standard of comparison, i.e. heads a definite degree phrase. In absolute superlatives, which behave as definites, *the* requires the uniqueness of the referent of the superlative DP. In comparative superlatives, it requires the uniqueness of the degree to which the gradable predicate relates an arbitrary individual. Let us first look at the least controversial, absolute case.

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### 4.1　DP-internal Superlatives

We assume that absolute and proportional superlatives involve an abstract superlative degree modifier whose presence is licensed by the uninterpretable superlative morphology on the adjective. Let us call this modifier SUP. The following definition is based on the entry for the superlative morpheme given in (3).

(15)　　$[\![\text{SUP}]\!] = \lambda A \in D_{d(et)} \lambda P \in D_{et} \lambda x \in D_e P(x) \wedge \exists d[A(d)(x) \wedge$
　　　　$\forall y[P(y) \wedge y \neq x \rightarrow \neg A(d)(y)]]$

According to this definition, SUP applies to a gradable predicate $A$ and a predicate $P$, expressed by the head noun, to return a predicate holding of $x$ iff $x$ is true of $P$, and has $A$ to a degree to which no other entity in the extension of $P$ does. Line (16) illustrates the application of SUP to *highest mountain* in the derivation of the absolute reading of (2-a).

(16)　　$[\![\text{SUP}]\!]([\![\text{highest}]\!])([\![\text{mountain}]\!]) = \lambda x\ x$ is a mountain
　　　　$\wedge\ \exists d[height(x) \geq d \wedge \forall y[y$ is a mountain $\wedge x \neq y \rightarrow height(y) < d]]$

Due to the uniqueness requirement of SUP, the resulting predicate in (16) can only be true of one mountain. Consequently, a principle in the spirit of "maximise presuppositions" requires that the DP be realised as definite. The definite article therefore emphasises that the referent of the superlative DP is unique. In (17) we sketch the complete LF and the truth conditions for the absolute reading of (2-a).

(17)　　a.　　John climbed [the [SUP highest mountain]]
　　　　b.　　John climbed the unique $x$, such that $x$ is a mountain $\wedge$
　　　　　　　$\exists d[height(x) \geq d \wedge \forall y[y$ is a mountain $\wedge x \neq y \rightarrow height(y) < d]]$

　　In proportional amount superlatives, the uniqueness condition on SUP does not have the same effect. Since we are dealing with plurals, there may be several pluralities falling under the superlative description. The use of the definite article would therefore be unmotivated and the DP is realised as a bare plural, see (18).

(18)　　a.　　John climbed [A [SUP most mountains]]
　　　　b.　　$\exists X[X$ are mountains $\wedge$ John climbed $X \wedge \exists d[card(X) \geq d \wedge$
　　　　　　　$\forall Y[Y$ are mountains $\wedge X$ does not overlap $Y \rightarrow card(Y) < d]]]$

This derivation is almost identical to the PA derivation given in (4). The difference is that (4-a) is unspecified, corresponding to the absolute or the comparative reading depending on the value of C. (17-a) is not ambiguous in the same sense and is meant to represent the absolute reading only.

### 4.2　Superlatives as Plural Definites

We propose that comparative superlatives involve a different kind of degree binding. While the degree argument of the gradable predicate is existentially bound

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by SUP in absolute superlatives, it is saturated by a definite degree description in comparative superlatives. We assume the structure in (19) for the comparative reading of (2-a). The definite article restricted by a contextual variable $C$ fills the degree argument slot of *highest*, whose morphology is again not interpreted. The resulting predicate can be intersectively combined with the head noun. The entire DP is realised as definite due to the definiteness of the DegP.

(19)     $[_{NP}[_{AP}[_{DegP}$ the C] highest] mountain]

To spell out the analysis of (2-a), we need to know how $C$ receives its value, and what the contribution of *the* is. Following Szabolsci's insight, which guided most of the existing theories of superlatives, we propose that the value of $C$ is determined by the focus structure of the sentence. For concreteness, assume that focus is evaluated by Rooth's squiggle operator ([6]), which comes with a variable corresponding to the focus semantic value of the constituent in its scope. The value of the free variable $C$ on the definite determiner is restricted to be a subset of the value of the variable introduced by the squiggle. Suppose, the focus falls on the subject in (2-a), then $C$ ends up a subset of the set of degree sets defined in (20-b).

(20)     a.    $[\lambda d$ JOHN climbed [ A d highest mountain] $\sim C]$
         b.    $C = \{D : \exists x[D = \lambda d\ x$ climbed a $d$-high mountain]$\}$

This mechanism of providing a value for $C$ is reminiscent of Heim's analysis of superlative as a focus sensitive operator restricted by a comparison class consisting of degree sets, cf. [4]. Like in Heim's analysis, representing comparison classes in terms of degrees may lead to an "information loss" problem.[6] For example, if the highest mountains John and Mary happen to have climbed are both 6000 m high, the degree sets corresponding to Mary and John are indistinguishable. To avoid this, we follow [5], who deals with the same problem in the analysis of *only*, and intensionalise the focus value, so that it consists of degree properties.

(21)     $C = \{D : \exists x[D = \lambda w\lambda d\ x$ climbed a $d$-high mountain in $w]\}$

Turning to the contribution of *the*, we assume that it applies to a set of degree properties $C$ and returns the unique maximal element, as the following definition shows.

(22)     $[\![$the$]\!] = \lambda w\lambda C \in D_{(dt)t}\iota D[C(D) \wedge \forall D'[C(D') \to D(w) \subseteq D'(w)]]$

Following a proposal in [1], we treat the extension of the resulting property as a plurality of degrees. Beck assumes that a set of degrees may saturate the degree argument of some degree predicate by acting as a plurality of degrees interpreted distributively. To derive distributive readings, she introduces Link's star operator, to the effect that the plurality of degrees receives a sentential scope. We adopt this proposal here. The definite article together with the restricting

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[6] Im grateful to Arnim von Stechow and Maribel Romero (p.c.) for pointing this out to me and discussing the solution.

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property $C$ moves out of the DegP of the adjective and combines with the degree property that has been modified by *. Given the standard definition of *, which in this case turns a degree set into its power set, the resulting truth conditions boil down to (23-b).

(23)    a.    [the C] *[$\lambda d$ JOHN climbed [A d highest mountain]$\sim$ C]
        b.    $\exists x[x$ is a mountain in $w \wedge$ John climbed $x$ in $w \wedge$
              $\forall d[d \in [\![$the C$]\!](w) \rightarrow height(x) \geq d]]$

To see that this outcome is correct, consider the predictions of this analysis in three different scenarios. First, suppose that John climbed a 6000 m high mountain, Mary climbed a 5000 m high mountain and Bill climbed a 4000 m high mountain. Then the definite article returns the property [$\lambda w \lambda d$ John climbed a $d$-high mountain] and the sentence is predicted true. If John and Mary each climbed a 6000 m high mountain and Bill climbed a 4000 m high mountain, the definite article applied to $C$ returns *undef*. Finally, if Mary climbed a 6000 m high mountain, John climbed a 5000 m high mountain and Bill climbed a 4000 m high mountain, the sentence comes out false. For completeness, we also sketch the analysis of the comparative amount superlative (11-a) in (24).

(24)    a.    [the C] *[$\lambda d$ JOHN climbed [A $d$ most mountains]$\sim$ C]
        b.    $C = \{D : \exists x[D = \lambda w \lambda d \exists Y[Y$ are mountains in $w$
              $\wedge\ x$ climbed $Y$ in $w \wedge card_w(Y) \geq d]]\}$
        c.    $\exists X[X$ are mountains in $w \wedge$ John climbed $X$ in $w \wedge$
              $\forall d[d \in [\![$the C$]\!](w) \rightarrow card_w(X) \geq d]]$

## 5    Comparison of Approaches

The current approach distinguishes between absolute and comparative superlatives structurally. In comparative superlatives, the definite article provides a plurality of degrees to saturate the degree position of the gradable predicate. We assumed that it is interpreted distributively and its restriction is provided by the focus. This analysis shares with SA the ability to derive the right truth conditions for upstairs *de dicto* readings. By moving the definite term over the modal, we create the comparison class $C$ that contains properties holding of $d$ in $w$ iff some salient individual climbs a $d$-high mountain in every world accessible from $w$, cf. (25-b). If John happens to have a requirement exceeding that of Bill or Mary, the sentence is correctly predicted true, cf. (25-c). Thus, the analysis does not face the problem of PA with the uniqueness requirement in intensional contexts.

(25)    a.    [the C] *[$\lambda d$ need JOHN climbed [A $d$ highest mountains]$\sim$ C]
        b.    $\{D: \exists x[D = \lambda w \lambda d \forall w' \in Acc_w[x$ climbed a $d$-high mountain in $w']]\}$
        c.    $\forall d[d \in [\![$the C$]\!](w) \rightarrow \forall w' \in Acc_w[\exists x[x$ is a mountain in $w'$
              $\wedge$ John climbed $x$ in $w' \wedge height_{w'}(x) \geq d]]]$

The second advantage is that under the present approach the definite article makes a meaningful contribution to the analysis of a superlative construction. Absolute superlative DPs are analysed as semantically definite, *the* acting as a definite determiner in the presence of SUP. Comparative superlative DPs are not necessarily definite, *the* reflects the definiteness of the degree argument.

Regarding the definiteness of the DP, the present approach reveals more flexibility than SA. [8] point out that PA and SA predict different truth conditions in certain contexts. They discuss two situations that can be referred to as "two-equally-high-mountains" and "the-same-mountain" scenarios. In the former, John is assumed to have climbed two equally high mountains, which are higher than any other mountains. In the latter, John and Bill are assumed to have climbed the same mountain, which happens to be the highest. Sharvit and Stateva point out that SA's predictions in these cases are not quite adequate. In the "two-equally-high-mountains" scenario, (2-a) comes out true under SA; and in the "the-same-mountain" scenario it is predicted false. Since the superlative DP may but need not be definite under the present analysis, the "two-equally-high-mountains" scenario predicts that the sentence is either true or undefined under the comparative reading, which reflects Sharvit and Stateva's judgments, who report that their informants hesitate to assign the sentence a truth value in this scenario. In the "the-same-mountain" scenario, the sentence is undefined under the comparative reading and true under the absolute reading, which accords with the fact that the sentence is usually judged misleading in such cases.

## 6   Optionality

The present approach predicts that the definite article is optional in amount superlatives, which are indefinite regardless of the superlative reading available. Though right for English, this prediction is not borne out for German and other languages where the definite article is never omitted. Unlike English, German marks superlatives as definite even when the DegP and the DP are semantically indefinite. A possible explanation is that in languages like German the uniqueness requirement on the superlative modifier SUP introduces the feature 'definite' which projects to the DP level and is responsible for the insertion of the article. In English, SUP lacks the feature 'definite' and the article is optional in absolute superlatives with indefinite DPs.

For adverbial superlatives both an absolute and a comparative construal are possible and derive the same truth conditions, cf. (26) and (27) . For the absolute case, we can assume a covert contextual variable that plays the role of the head noun, see (27-c). Consequently, *the* is predicted optional in English adverbial superlatives.

(26)     a.     [the C] *[$\lambda d$ JOHN ran [A d fastest] $\sim$ C]
         b.     $\exists e[e$ is running by John $\wedge \forall d[d \in [\![$the C$]\!](w) \rightarrow speed(e) \geq d]]$
         c.     C = $\{D : \exists x[D = \lambda w \lambda d \exists e[e$ is running by $x \wedge speed(e) \geq d]]\}$

(27)     a.     John ran [SUP fastest C]

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    b.   $C = \{e : \exists x[e \text{ is running by } x]\}$

    c.   $\exists e[e \text{ is running by John} \wedge \exists d[speed(e) \geq d \wedge$
        $\forall y[y \in C \wedge y \neq x \rightarrow height(y) < d]]]$

Predicative superlatives are always absolute. The present analysis predicts that if the definite article is missing, the resulting property does not necessarily apply to a unique referent. As the relevant data are subtle, we do not evaluate this prediction here but leave this for a future occasion.

(28)    a.   John is [the [SUP tallest C]]
        b.   John is [SUP tallest C]

## 7   Conclusion

We argued that the definite article in superlatives may reflect definiteness at the DP as well as DegP level. According to the present approach, only absolute attributive superlatives are genuinely definite; in comparative superlatives, *the* marks the definiteness of the degree argument, and does not necessarily reflect the definiteness of the superlative DP. This analysis is not only successful in deriving all possible readings of superlatives, it also accounts for the distribution of *the* in different kinds of superlatives.

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