Proceedings of SALT 21: 353–372, 2011

Three Readings of *Most*[*]

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Abstract. In this paper we show that *most* DPs in subject position can receive three kinds of truth-conditions, yielding a proportional reading, a 'regular' superlative reading and a 'partition-based' superlative reading. We propose an analysis of the three readings that views them as resulting from the interaction of several components, including (a generalized version of) the superlative operator *-est*, covert and overt movement, and focus. Furthermore, we explain how movement affects the distribution of readings of *most*.

Keywords: Quantification, superlatives, partitions, *most*

1 Introduction

It is well known that when *most* appears in object position, it can occur both as a proportional determiner, in which case it can be paraphrased using *more than half,* (1a), and as the spellout of the superlative morpheme *-est* attached to a gradable predicate *many,* in which case it is accompanied by the definite article, (1b) (Bresnan 1973).

(1) a. John talked to most of the students. **proportional**
≈ John talked to more than half of the students.
b. John talked to the most students. **superlative**
≈ John talked to more students than anybody else.

There have been a number of attempts in the literature to relate the two uses of *most* (e.g. Pinkham 1985, Yabushita 1999, Hackl 2009). However, the canonical

* We would like to thank the audiences of SALT 21 and the workshop on the Proper Use of Quantification in Ordinary Language at ESSLLI 23, as well as the participants of the Syntax and Semantics Experimental Lab at MIT for valuable comments. The research was supported by the *National Science Foundation* under Grant No. 0642748.

view seems to be that this is a case of lexical ambiguity, with bare *most* a quantificational determiner, Barwise and Cooper 1981, and *the most* a superlative construction, e.g. Szabolcsi 1986.[1]

This paper presents an argument in favor of a structural ambiguity view of *most* according to which *most* and *the most* are surface forms that are generated from the same lexical resources. These forms can project different LFs depending on the syntactic environment that they are in, giving rise to different readings. The environment that we focus our discussion on in this paper is the subject position, where, at first sight, the clear distributional correlation between form and meaning observed for *most* in object position seems to break down: sentences with (bare) *most* give rise to proportional truth-conditions, (2a); however, parallel sentences with *the most* are generally judged by native speakers to be degraded, (2b).[2]

(2) a. Most of the students talked to John.
b. ??The most students talked to John.[3]

Given the degraded status of (2b) and the dependence of the superlative reading on the presence of the definite article, one might expect that only proportional meanings are expressible with *most* in subject position. However, as we will show in this paper, this is not correct. In fact, we argue that there are two different ways in which speakers can assign superlative truth-conditions to sentences with *most* in subject position, resulting in two different kinds of superlative readings: a 'regular' superlative reading parallel to the one we observed in (1b) and a 'partition-based' superlative reading which we describe in Section 2.1.3. Moreover, we find that the two kinds of superlative readings arise not only with *the most* but also with bare *most*. The existence and distribution of these readings provide, we submit, compelling evidence for a decompositional analysis of *most* under which it is uniformly analyzed as a superlative construction.

Our goal in this paper is to give a detailed characterization of the three readings of *most* in subject position and to propose an analysis that views them as resulting from the interaction of several components, including (a generalized version of) the superlative operator *-est*, covert and overt movement, and focus.

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[1] See Szabolcsi 2010 for a review of the history of this debate.

[2] See Farkas and E.Kiss 2000 for an earlier discussion.

[3] We will ignore in this paper non-partitive (bare) *most*, which seems to give rise to a generic interpretation (see Matthewson 2001 for discussion). We will also not discuss sentences with *the most* in the partitive construction, e.g. (i), which all of the speakers we have consulted find completely ungrammatical, regardless of environment:

(i) **The most of the students talked to John.*

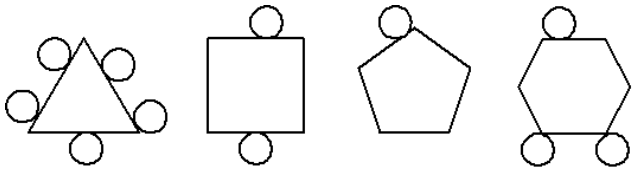


Figure 1 Scene with circles touching different shapes.

As will become apparent, speakers vary with regard to the form that they use to express superlative meanings (*most* or *the most*) and may make different choices in different syntactic environments. We will provide an overview of the variation we find among speakers but will not attempt to explain it here.

2 Three readings of *most* in subject position

In this section we describe the distribution of the proportional and superlative readings of (*the*) *most* in subject position. We begin our discussion of the data by considering native speaker judgments regarding the felicity of simple sentences like (3a-b) as well as whether or not they can be used to truthfully describe the state of affairs in Figure 1.

(3) a. Most of the circles are touching the triangle.
b. The most circles are touching the triangle.

Figure 1 is constructed so as to allow us to determine whether the sentences in (3a-b) are judged according to proportional truth-conditions or superlative truth-conditions. If speakers use proportional truth-conditions we expect them to judge (3a-b) *false*, as there are 5 circles that are touching the triangle and 6 that are not [5:6 count]. On the other hand, if speakers use superlative truth-conditions we expect them to judge the sentences *true*, as there are 5 circles that are touching the triangle, 2 that are touching the square, 1 that is touching the pentagon and 3 that are touching the hexagon [5:2:1:3 count].

In the next subsection, we will show that native speakers of English can not only use the two forms in (3a-b) to express both types of meanings but, on top of these, a third type of meaning, which we call a 'partition-based' superlative reading.

2.1 Three different truth-conditions for *most* in subject position

2.1.1 Proportional truth-conditions

The only grammatical way to express proportional truth-conditions with *most* in subject position is to use bare *most*. All the speakers we have consulted find sentence (3a) grammatical and *false* in the situation described in Figure 1; no one reported that (3b) is an acceptable way of describing proportional truth-conditions. That is, none of our consultants judge (3b) as *false* in the situation described in Figure 1, nor provide a justification for their judgment that involves the count 5:6.

2.1.2 'Regular' superlative truth-conditions

There are two ways in which the speakers we have consulted express the familiar superlative truth-conditions we observe for *the most* in object position when a *most* DP is in subject position: some prefer to use *the most*, while others who find *the most* ungrammatical in subject position are able to assign bare *most* superlative truth-conditions. We find that speakers may make different choices as to their preferred form, but that no speaker can assign superlative truth-conditions to both *most* and *the most*.

For both possible choices, (3a) and (3b), speakers report that they are able to judge their chosen sentence as *true* in the context of Figure 1, justifying this answer with the count 5:2:1:3. For both speaker groups, we observe that the superlative truth-conditions are not easily obtained: speakers for whom bare *most* is ambiguous between a proportional reading and a superlative reading report that the proportional reading is dominant, despite the fact that it is false in Figure 1. The ambiguity of bare *most* in subject position and the dominance of the proportional reading are documented in a series of experiments presented in Kotek, Sudo, Howard and Hackl (in press). For speakers who are able to use *the most* to express superlative truth-conditions nonetheless, we find, based on single informant data rather than on laboratory experiments, that they judge (3b) to be somewhat deviant. Furthermore, these speakers require a very specific focus pattern, marked in (4), for the sentence to be acceptable. When pronounced with a flat intonation, the status of the sentence deteriorates.

(4) The most circles are touching [the triangle]$_F$.

2.1.3 'Partition-based' superlative truth-conditions

Alongside the familiar superlative truth-conditions surveyed in section 2.1.2, we found a partition-based superlative reading of *most* in subject position. The relevant context in which this reading can be detected is given in Figure 2. The two sentences against which this figure should be evaluated are repeated below for convenience.

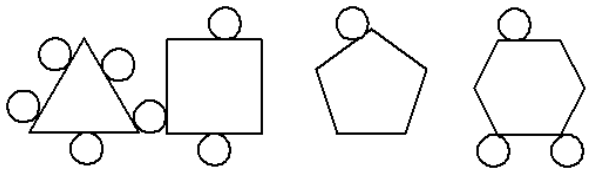


Figure 2 Scene with one shared circle.

(3) a. Most of the circles are touching the triangle.
b. The most circles are touching the triangle.

Figure 2 differs from Figure 1 in that one of the circles touches both the triangle and the square. This difference should not affect speakers' willingness to assent to a description of the scene if there were only two readings for (*the*) *most* in subject position. Under the proportional reading it would be false and under the 'regular' superlative reading it would be true since nothing prevents a given circle from being both a member of the set of "triangle-touchers" and a member of the set of "square-touchers." Indeed, some of our informants report the same felicity and truth-value judgments for Figure 2 as for Figure 1. They count the shared circle both as a "triangle-toucher" and as a "square-toucher" and therefore report that since there are 5 circles that are touching the triangle, as opposed to 3 that are touching the square, 1 that is touching the pentagon and 3 that are touching the hexagon [5:3:1:3 count], (3) is *true* in Figure 2.

However, we also find that some speakers are sensitive to the presence of the shared circle in Figure 2. These speakers report an inability to assign the sentence a truth-value, which is the result of their inability to uniquely assign the shared circle to any predicate of the form "x-touching." That is, we observe a group of speakers who require a partition of the circles according to the shape that they touch. In addition to the partition requirement, the comparison class these speakers use must be a cover of the circles: they are unable to ignore the shared circle, despite the fact that it is immaterial for determining the truth-value of (3) in Figure 2. The four non-shared circles that are touching the triangle are sufficient to render (3) as *true* under superlative truth-conditions, making the status of the shared circle seemingly unimportant. Nevertheless, the speakers who exhibit the partitioning effect are all unable to ignore this circle: the ratios 4:2:1:3, 4:3:1:3 and 5:2:1:3 are all *not* possible counts in Figure 2.[4]

[4] Interestingly, the partitioning effect has different consequences for the two groups of speakers we described in Section 2.1.2. Speakers who used *most*, (3), to express superlative truth-conditions in Figure 1 are now unable to judge Figure 2 according to the same truth-conditions. Rather, they are forced to judge the figure according to proportional truth conditions: that is, whereas (3) could be either true or false in Figure 1, it is necessarily false in Figure 2. Speakers who used *the most*,

2.2 The effects of overt movement on *most* in subject position

Two aspects informed our choice of the forms in (3a-b) above: the fact that 'are touching' is a symmetric predicate, allowing for a straightforward comparison with parallel sentences in which *most* appears in object position; and the fact that no overt movement of an element crossing the superlative operator has occurred in these sentences, providing a baseline against which to compare sentences with overt movement. In this section we show that when overt movement occurs, and when *most* appears in object position, the partitioning effect described in section 2.1.3 disappears. This will assist us in determining the precise distribution, as well as the origin, of the different readings of *most* in subject position.

2.2.1 Object position

As mentioned above, examples (3a-b) use the symmetric predicate 'are touching'. Consequently, these sentences are true in exactly the same situations as examples (5a-b) below for a given reading of *most*. The only difference between the examples in (3) and (5) is in the relative positions of the two arguments of 'is/are touching': examples (3a-b) contain a subject with *most* or *the most*, while in (5a-b) this argument appears in object position.

(5) a. The triangle is touching most of the circles.
b. The triangle is touching the most circles.

All the speakers we have consulted report that examples (5a-b) are both fully grammatical sentences of English. (5a) is unambiguously assigned proportional truth-conditions and is judged *false* in Figure 1, while (5b) is unambiguously assigned superlative truth-conditions and is judged *true* in the same situation. Moreover, we find no sensitivity in any of our speakers to the presence of the shared circle in Figure 2. They all unambiguously assign proportional truth-conditions to (5a) and judge it *false* in Figure 2 [5:6 count] and superlative truth-conditions to (5b) and judge it *true* in Figure 2 [5:3:1:3 count]. The shared circle is counted both as a "triangle-toucher" and as a "square-toucher" and causes no confusion for any speaker, including those who exhibited the partitioning effect when judging sentences (3a-b).

2.2.2 Wh-movement

(3), to express superlative truth-conditions in Figure 1 are now unable to judge (3) with regard to Figure 2 at all. They report that they simply don't know how to assign (3) a truth-value.

Next we examine the grammaticality of examples with (*the*) *most* in subject position, which, importantly, involve *wh*-movement across the superlative operator *-est*. We find that examples (6a-d)—exemplifying a matrix question, a concealed question, a restrictive relative clause and a free relative, respectively, with *the most* in subject position—are all judged by our informants to be more acceptable than the baseline example (3b).

(6) a. Which shape are the most circles touching?
b. Tell me the shape that the most circles are touching.
c. The shape that the most circles are touching is the triangle.
d. What the most circles are touching is the triangle.

Speakers who previously used *the most*, (3b), to express superlative truth-conditions find examples (6a-d) to be more acceptable than (3b). They don't hesitate to answer 'the triangle' to (6a-d) and they judge (6c-d) as *true* in Figure 1 as well as in Figure 2, thus displaying no sensitivity to the presence of the shared circle in that figure.

For some speakers who chose to use bare *most*, (3a), to express superlative truth-conditions and for whom *the most* was ungrammatical, examples (6a-d) represent somewhat of an improvement over (3b), but they are nonetheless ungrammatical. These speakers use the corresponding examples in (7a-d) to express superlative truth-conditions. For other speakers who preferred bare *most*, (3a), over *the most*, (3b), the grammatical status of examples (6a-d) is sufficiently improved so that they can now use these examples to express superlative truth-conditions. All these speakers now report the same felicity and truth-value judgments as the speakers who used *the most,* (3b), in the baseline case: they don't hesitate to answer 'the triangle' to (6a-b) and (7a-b), and they judge (6c-d) and (7c-d) as *true* in Figure 1 as well as in Figure 2. Again, we observe no sensitivity to the presence of the shared circle in Figure 2.[5]

(7) a. Which shape are most of the circles touching?
b. Tell me the shape that most of the circles are touching.
c. The shape that most of the circles are touching is the triangle.
d. What most of the circles are touching is the triangle.

Let us take stock of the main findings we have presented in this section. We have seen that there is considerable variation among native speakers of English as to the status of *most* and *the most* in subject position, in particular with regard to the

[5] As expected, under proportional truth-conditions speakers report that there is no correct answer to the questions in (7a-b) and that the sentences (7c-d) are infelicitous, as there is no one shape that touches more than half of the circles.

possibility of expressing superlative truth-conditions. Contrary to initial expectations (as well as reports in the literature, Farkas and E. Kiss 2000) we saw that assigning superlative truth-conditions is an option, albeit a marked one. We saw, moreover, that the variation among speakers runs along two dimensions: the form that is used to express superlative truth-conditions (*most* or *the most*) and the kind of superlative reading that is accessed ('regular' superlative or 'partitioned' superlative reading). Furthermore, we found that the marginal status of superlative readings as well as of *the most* disappears systematically for all speakers under *wh*-movement. In the next section, we propose an account of the three readings.

3 Analysis

The analysis we propose to explain the observations made in the previous section is an extension of Hackl's (2009) decompositional analysis of *most*. Hackl's analysis derives proportional and superlative readings from the same lexical resources—the superlative operator, *-est*, attached to a gradable predicate of amounts, *many*—but is unable to account for the full set of data we have presented above. In particular, it fails to systematically account for superlative readings of *most* and *the most* in subject position. The central piece of our proposal is a generalized, cross-categorical superlative operator, which can not only form superlative predicates of singular and plural individuals, but also of functions. The full set of data discussed above follows, we argue, from the interaction between the scope position of *-est*, which is either DP-internal or DP-external depending on the availability of a suitable landing site, and focus.

3.1 Cross-categorical *-est* and distinctness

The superlative morpheme *-est* is traditionally analyzed as a degree quantifier, which is restricted by a covert variable C providing a comparison class (Heim 1985, 1999, Szabolcsi 1986 among many others). [*-est* C] combines with a degree predicate D (type $\langle d,et\rangle$) and yields a predicate. We will call this predicate the "superlative predicate." [*-est* C] is defined only if C contains at least two members, one of which is the subject of the resulting superlative predicate. If defined, the predicate is true of an individual if it satisfies the degree predicate to a higher degree than any alternative in C, (8).

(8) $[\![\text{-est}]\!](C)(D)(x)$ is defined only if $x \in C \;\&\; \exists y[x \neq y \;\&\; y \in C]$; if defined
$[\![\text{-est}]\!](C)(D)(x) = 1$ iff $\exists d[D(d)(x) \;\&\; \forall y \in C[y \neq x \rightarrow \neg D(d)(y)]]$ [6]

[6] The presupposition explains the infelicity of e.g. #*You are the best mother I have*, as pointed out in Fox 2004.

We propose to generalize the definition in (8) to semantic types other than e resulting in a cross-categorical semantics for *-est,* (9).

(9) $[\![\text{-est}]\!](C_{<\delta,t>})(D_{<d,\delta t>})(x_{\delta}) = 1$ iff $\exists d[D(d)(x) \,\&\, \forall y \in C[x \text{ and } y \text{ are distinct} \rightarrow \neg D(d)(y)]]$

The definition in (9), which, for ease of exposition, abstracts away from definedness conditions, gives us for any semantic type δ a superlative predicate that ranges over things of type δ. This predicate is true of the x of type δ that satisfies the degree predicate to a higher degree than any alternative. If δ is instantiated by e we get a superlative predicate of individuals just like in (8), but if δ is instantiated by a more complex type, e.g. a predicate of type ⟨e,t⟩, the resulting superlative predicate will be of a higher type, e.g. ⟨et,t⟩.

The definition in (9) differs from the one in (8) in one other respect–it generalizes the non-identity condition of (8) to a distinctness condition that applies across catgories, (10).

(10) Distinctness
  a. Truth values: The two truth values are distinct.
  b. Individuals:
    i. Atomic individuals x and y are distinct if $\exists P_{<e,t>}$[P(x) and P(y) are distinct].
    ii. Plural individuals X and Y are distinct if $\forall x \sqsubseteq X\ \forall y \sqsubseteq Y$[x and y are distinct] ($\sqsubseteq$ means 'is a part of').
  c. Functions f and g of the same type are distinct if $\exists x$[f(x) and g(x) are distinct].

Some remarks about the notion of distinctness are in order. Following Hackl 2009, the notion of distinctness for plural individuals is non-overlap or disjointness, which can be termed "everywhere-distinctness." On the other hand, we propose that the relevant notion of distinctness for functions is "anywhere-distinctness": one non-shared element (an ordered pair in their graph) is sufficient to make two functions distinct. Although this difference may seem arbitrary, we believe that it complies with naïve intuitions about the meaning of distinctness for different semantic categories. Specifically, we perceive two plural individuals as distinct just in case they do not overlap at all, while we perceive two functions/predicates as distinct even when there is some overlap, as long as the overlap is not complete. To give an example, consider *the Americans* and *the semanticists* in a situation where there are some American semanticists. There is a sense, which we believe is a very natural one, in which *the Americans* are not

distinct from *the semanticists*, albeit they are not identical. On the other hand, *being American* and *being a semanticist* are clearly distinct predicates, even in the presence of American semanticists. We submit that this intuitive notion of distinctness, which is expressed formally in (10), is the one that is pertinent to the semantics of *-est.*

With this notion of distinctness in hand, we turn to the definedness conditions of the cross-categorical superlative. Our proposal is given in (11).

(11) $[\![\text{-est}]\!](C_{<\delta,t>})(D_{<d,\delta t>})(x_{\delta})$ is defined only when all of the following hold
  a. $x \in C$
  b. $\forall y \in C\ \exists d[D(d)(y)]$
  c. $\forall y,z \in C$[y and z are distinct]

As before, we presuppose that the subject of the superlative predicate is an element in C, (11a). We also assume, with Heim 1999, that all elements in C must satisfy the degree predicate D to some extent, (11b).[7] (11c) is a novel condition on *-est.* It demands that all elements in C are distinct. This will play an important role in our account of the partition-based superlative reading.

Note that, unlike (8), the definedness condition in (11) no longer holds the superlative operator responsible for the comparison class having at least two members. Instead, we suggest that this is a consequence of how the content of C is determined as a function of focus. To this end, we follow Heim 1999 in adopting Rooth's (1992) anaphoric treatment of focus in the analysis of the superlative. In this treatment, the comparison class argument of the superlative is anaphorically dependent on a covert variable, C', which is introduced by the ~ operator. The ~ operator constrains the value of C' by presupposing that it is a subset of the focus semantic value of the sister of [~C'], that the ordinary semantic value of the sister of [~C'] is an element of C' and that C' contains at least one additional element, (12).

(12) $[\![\text{P ~C'}]\!]$ is defined only when all of the following hold
  a. $[\![\text{P}]\!] \in$ C'
  b. C' $\subseteq [\![\text{P}]\!]^{f}$
  c. $|\text{C'}| > 1$

In what follows we will demonstrate how the machinery just introduced generates the readings we have observed in Section 2.

[7] See Gajewski 2010 for a weaker version.

3.2 *The most* and *most* in object position

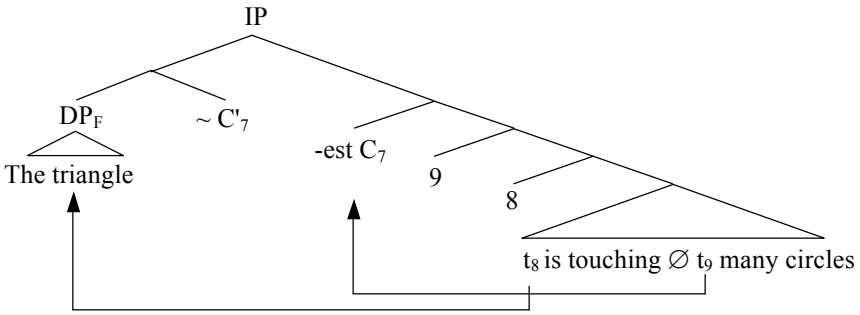
As mentioned above, one ingredient in our analysis is a gradable predicate of amounts, which modifies a plural NP. We assume, following Hackl 2009, that this predicate is a covert version of *many* which is true of a degree d, a plural NP and a plurality X if X is in the extension of the NP and has at least d-many atomic parts, (13).[8] We will also assume, with Hackl 2009, that *most* DPs are always headed by an indefinite determiner represented by ∅ in our analyses.

(13) ⟦many⟧(d)(⟦NP⟧)(X) = 1 iff ⟦NP⟧(X) & |X|≥d

The superlative operator realizes the degree argument of *many,* but needs to move to a predicative node to be interpretable. Such a position can be found inside the DP but also DP-externally.[9] As we will see, the choice between these two options has important consequences for the comparison class argument of *-est*.[10]

Let us consider first a structure in which the superlative moves into the matrix and the subject is F-marked.

(14) a. The triangle is touching the most circles.
b. [[the triangle]$_F$ ~C'$_7$]] [[-est C$_7$] 9 8 [[t$_8$ is touching [∅ d$_9$-many circles]]]][11]
c.



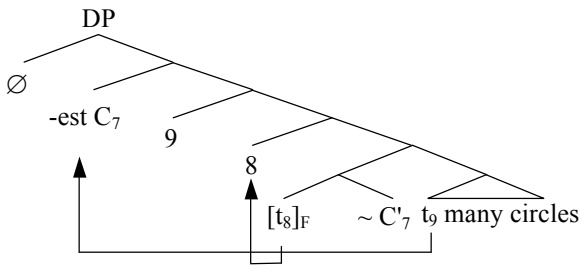
[8] The requirement that *many* combines with a plural NP is presumably a presupposition of *many* (cf. Hackl 2000).
[9] In Szabolcsi's (1986) movement account of the superlative, the scope of *-est* correlates with the semantics of the definite article attached to superlative DPs. When it is interpreted as definite, *-est* must stay inside the DP and the superlative receives the so-called absolute reading. When it is interpreted as indefinite, *-est* has to move into the matrix which gives rise to the so-called comparative reading of the superlative. See Heim 1999 for detailed discussion.
[10] On the assumption that [*-est* C] is a degree operator, we expect that its movement abides by the same locality constraints that govern movement of other degree operators. See Kennedy 1997 and Heim 2000 for discussion.
[11] For expository reasons, we abstract away from the fact that *the most circles* is a quantifier in our analysis and thus not interpretable in situ.

d. ⟦[[-est C_7] 9 8 [t_8 is touching [∅ t_9-many circles]]]⟧ =
λx.∃d∃X[circles(X) & |X| ≥ d & x is touching X & ∀y∈C_7[y is distinct from x → ¬∃Y[circles(Y) & |Y|≥d & y is touching Y]]]

In this case, the predicate that [-*est* C] adjoins to is a derived predicate created by A-movement of the subject to SpecIP.[12] The focus semantic value of the F-marked subject is the set of contextually relevant alternatives to *the triangle* (the triangle, the square, the pentagon and the hexagon in our scenes). The ~ operator adds the presupposition that its sister, C'$_7$, is a subset of that set, and since the comparison class argument of -*est* is anaphorically dependent on C'$_7$, we get a superlative predicate of individuals. It will be true of an individual if it is touching more circles than any other individual in the comparison class, (14d). Thus, in our case the sentence compares shapes with regard to how many circles they are touching and it will be true just in case the triangle is touching more circles than any other shape. This is what we called the regular superlative reading.

Next, let us consider what happens if [-*est* C] remains inside the DP. To arrive at an interpretable structure we need to identify a possible landing site for [-*est* C] and we need to specify how focus determines the content of C. To this end, we assume that the external argument of the NP *circles* is syntactically realized as PRO, which is semantically vacuous but creates a derived predicate inside the DP (see Heim and Kratzer 1998), to which [-*est* C] can adjoin. The trace of PRO, we assume, can be F-marked (cf. Bhatt 2002), giving rise to (15).

(15) a. The triangle is touching most of the circles.
b. [∅ PRO [[-est C_7] 9 8 [[[t_8]$_F$ ~C'$_7$] t_9-many circles]]]
c.



d. ⟦[[-est C_7] 9 8 [[[t_8]$_F$ ~C'$_7$] t_9-many circles]]⟧ = λX.∃d[circles(X) & |X|≥d & ∀Y∈C_7[Y is distinct from X → ¬ [circles(Y) & |Y|≥d]]]

The comparison class argument of -*est* is determined by the same mechanism we have seen above—it is anaphorically dependent on C'$_7$, the variable introduced by

[12] We assume with Nissenbaum 1998, 2000 and Sauerland 1998 that movement-derived predicates can be the target of movement operations.

the ~ operator. However, since the F-marked constituent in (15) is the subject of the plural NP *circles*, which has an assignment-dependent denotation that ranges over pluralities, the comparison class will be a set of pluralities rather than the set of relevant shapes. Importantly, because of the presuppositions of *-est,* C_7 is subject to further constraints that will affect the resulting truth-conditions. First of all, only pluralities that satisfy the degree predicate $\lambda d.\lambda X.\ |X| \geq d$ & *circles*(X) to some degree can be in C_7. Since *circles* is an inherently distributive predicate, this will exclude all pluralities that contain non-circles. Secondly, the maximal circle plurality cannot be in the comparison class because no other circle plurality is distinct from it.[13] The presuppositions of *-est* demand, furthermore, that the external argument of *-est* be a member of C_7 and that all the members of C_7 are distinct. Note that in order to derive an appropriate superlative predicate we need to assume that every plurality in C_7 must be as big as possible.[14] This in effect requires C_7 to be a two-membered subset of $\{Y: Y \text{ is distinct from } X\} \cup \{X\}$ (where X is the external argument of the superlative predicate). Given these constraints on C_7, the superlative predicate is true of a circle plurality if it has more atomic parts than any alternative in C_7. This derives a quantifier denotation that is equivalent to the proportional quantifier *more than half of the circles.*[15]

The analysis of the regular superlative reading and the proportional reading that we have given in this subsection is parallel to the one given in Hackl 2009 except for the contribution of focus in the determination of C. In the next section, we see more dramatic effects of focus and how the generalized *-est* operator predicts superlative readings in subject position that cannot be explained by Hackl 2009.

3.3 *The most* and *most* in subject position

Next we show how the machinery introduced above can derive the three readings of *most* in subject position. At first glance, it would appear that [*-est* C] has no possible landing site outside DP, as there is no suitable external argument for it in the matrix. A DP-internal landing site for [*-est* C], however, should always be

[13] An immediate consequence of this is that there cannot be an absolute reading for *most* that conveys what *all circles* would convey.

[14] If one could arbitrarily pick and choose circle pluralities to form the comparison class of *-est*, sentences like *most of the circles are blue* could be understood to express very weak truth-conditions, namely that there are at least 3 circles, two of which are blue. For example, in a situation with 5 circles, 2 blue and 3 red, the sentence could be understood to be true under the choice of $C = \{b_1 \oplus b_2, r_1, r_2, r_3\}$.

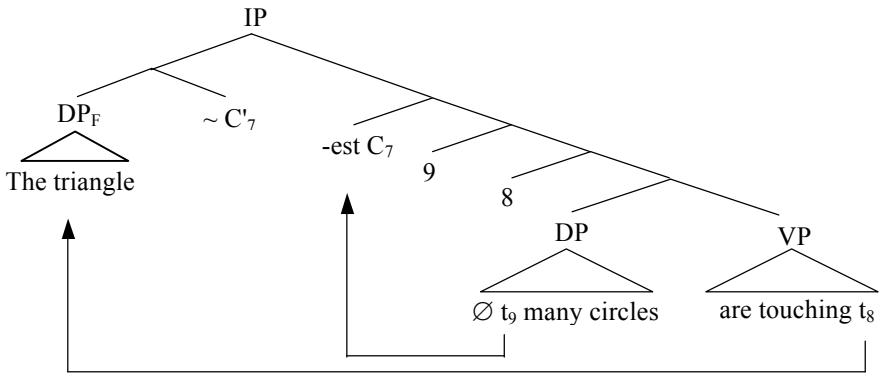
[15] To explain the fact that *the most* in object position can only express the superlative reading and that bare *most* only the proportional meaning, we need to assume that the presence of *the* indicates that [*-est* C] has moved into the matrix while the absence of *the* indicates that it is inside the DP.

available. In fact, we predict that *most* will always have a proportional reading, regardless of its syntactic position in the sentence. To be more concrete, we assume the (simplified) structure in (16b), parallel to (15) above, in which [-*est* C] adjoins to PRO, whose trace is F-marked. The comparison class argument of -*est* will consist of two circle pluralities—the ones that are touching the triangle and the ones that are not touching the triangle—and the sentence will be true just in case the former plurality is more numerous than the latter.

(16) a. Most of the circles are touching the triangle.
b. $[_{DP}\ \varnothing$ PRO [[-est C_7] 9 8 $[[t_8]_F$ t_9-many circles]]] $[_{VP}$ …]
c. ⟦[[-est C_7] 9 8 $[[t_8]_F$ ~C_7] t_9-many circles]] [VP]⟧ = ∃X∃d[circles(X) & |X|≥d & ∀Y∈C_7[Y is distinct from X → ¬[circles(Y) & |Y|≥d]] & ⟦VP⟧(X)]

As noted above, given naïve assumptions about the LF of (16), it would seem that [-*est* C] cannot move into the matrix, as there is no suitable external argument for it there. This predicts that *most* should not have a superlative reading when it is in subject position. Consider, however, the implications of an LF that contains a fronted argument that has moved to a position above the sentential subject. In that case, [-*est* C] will have a derived predicate to attach to. For example, consider the structure in (17b), in which *the triangle* is F-marked and has covertly raised above the subject.

(17) a. The most/most of the circles are touching the triangle.
b. [[the triangle]$_F$ ~C'$_7$] [[-est C_7] 9 8 [[∅ d_9-many circles] are touching t_8]]]]
c.



d. ⟦[[-est C_7] 9 8 [[∅ t_9-many circles] are touching t_8]]]⟧ =
λz.∃X∃d[circles(X) & |X|≥d & ∀y∈ C_7[y is distinct from z → ¬∃X'[circles(X') & |X'|≥d & X is touching z]]]

The movement of *the triangle* supplies a suitable DP-external landing site and an external argument for *-est*. As before, the comparison class argument of *-est* is anaphorically dependent on C'_7. In the case of (17b), the comparison class will contain salient alternatives to *the triangle*. The sentence will be true just in case the triangle is the shape that more circles are touching than any other shape, (17d).

Notice that our cross-categorical semantics for *-est* allows the following alternative LF for (17a):

(18) [[touching [the triangle]$_F$] ~C'_7] [[-est C_7] 9 $8_{<e,t>}$[[∅ d_9-many circles] are t_8]]

The comparison class in this case will be a set of predicates of the form *touching the triangle, touching the square, touching the pentagon,* etc., and the sentence will be true just in case the predicate *touching the triangle* is true of more circles than any alternative predicate. The resulting truth conditions of (18) are identical to those of (17b). However, structures isomorphic to (18) are necessary for the superlative truth conditions of sentences like (19), which do not contain an object DP that could move.

(19) The most /most of the circles are [blue]$_F$.

The superlative truth-conditions we have discussed so far do not require partitioning of the circles according to the predicates in C. Although the presuppositions of *-est* demand that all members of C be distinct, predicates like *touching the triangle* and *touching the square* may share some extensions and be nonetheless distinct. Further, atomic individuals in D_e like *the triangle* and *the square* are by definition distinct from one another. More generally, our account predicts that LFs that involve movement of [*-est* C] following the movement of a focused element produce regular superlative truth-conditions.

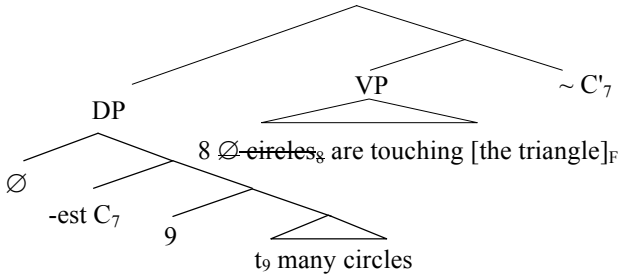
What we have not yet explained is the partitioned superlative reading of (*the*) *most* in subject position. To derive this reading, we must make several additional assumptions to the ones we discussed so far. Firstly, we suggest that the relevant structure for the derivation of the partitioned superlative reading is one with a DP-internal landing site for [*-est* C], coupled with DP-external F-marking, as in the (simplified) structure in (21) below. Furthermore, we adopt Fox's (2002) version of the copy theory of movement and assume that the VP internal copy of the subject is interpreted as a definite description via Trace Conversion. Moreover, we propose that *many-est* can be Late Merged and does not need to be present in the VP-internal copy, (20).

(20) [$_{VP}$ [$_{DP}$ ~~∅-circles~~] [are touching [the triangle]$_F$]~C]

With these assumptions in hand, VP denotes the predicate λx.*touching-the-triangle(x)&circles(x)*, or △*-touching-circles* for short. As the ~ operator attaches to VP, which we assume is pluralized given that its subject is a plural DP, C will be a set of predicates of type ⟨e,t⟩ that range over pluralities. This setting of the comparison class, however, will result in a presupposition failure, as the gradable predicate λx.*d-many-circles(x)* does not apply to predicates. We propose to remedy this situation via a type-shifting operation which applies to a C that contains elements of type ⟨e,t⟩ and returns a set that contains elements of type e: $\lambda C_{<et,t>}.\{Y: \exists P \in C[Y=\sigma(P)]\}$, where σ(P) is the supremum of the join-semilattice ⟨P,⊑⟩. The function σ was chosen here over other functions of type ⟨et,e⟩ since it yields the largest set when applied to the members of C. Here again we appeal to the notion discussed in section 3.2 that all the elements of C must be as big as possible.

By type shifting, we obtain the set C={*the* △*-touching circles, the* □*-touching circles*, *the* ⬠*-touching circles, …*} for (21). With the assumptions above in place, we predict that (21) will be true just in case *the* △*-touching-circles* are more numerous than all other alternatives in C, resulting in superlative truth-conditions.

(21) a. The most/most of the circles are touching [the triangle]$_F$.
b. [∅ [-est C_7] 9 [d_9-many circles]] [[8 ∅-~~circles~~$_8$ are touching [the triangle]$_F$]~C'_7]
c.



d. ⟦[[-est C_7] 9 [∅ d_9-many circles]] [[8 ∅-~~circles~~$_8$ are touching [the triangle]$_F$]~C_7]⟧ = ∃X∃d[△-touching-circles(X) & |X|≥d & ∀Y∈C [Y is distinct from X → ¬[circles(Y) & |Y|≥d]]]

Note that in this derivation C contains plural individuals, which, following the presupposition of *-est,* must all be distinct. Recall that according to the definition of distinctness in (10), plural individuals are distinct just in case all of their atomic parts are distinct. It follows that the presence of the shared circle in Figure 2 will trigger presupposition failure: that circle will be part of *the* △*-touching-circles* and of *the* □*-touching-circles*. Consequently, these two plural individuals are not distinct and the presuppositions of *-est* will not be met, giving rise to what we called the partitioning effect.

To conclude, we predict that truth-conditions that are derived with DP-internal *-est* will always be sensitive to a partitioning requirement: in the more familiar case—when the trace of PRO is F-marked as in (16)—this results in proportional truth-conditions. When the VP is F-marked, on the other hand, the resulting truth-conditions are 'partition-based' superlative ones.

3.4 Markedness, movement, and the partitioning effect

In Section 2.1 we observed that the superlative readings of *most* in subject position are not available to all speakers. We suggest that the markedness of these readings follows from the extra operations necessary to derive them: the DP-external superlative reading requires covert movement of a constituent to which [*-est* C] can adjoin while the DP-internal superlative reading requires type shifting of C in order to meet the presuppositions of *-est*. On the assumption that both operations are costly and may not be available to all speakers, we can explain the marked status of superlative readings of *most* in subject position.

Recall, however, that superlative readings of *most* in subject position are not always marked. Specifically, as we have seen in Section 2.2.2, sentences that contain overt movement have a readily available regular superlative reading. One such example is the relative clause in (22).

(22) The shape that the most/most of the circles are touching is the triangle.

Our account predicts that (22) can be assigned a superlative reading that does not rely on either of the two operations discussed above. Movement of the relative clause operator creates a derived predicate that is a suitable DP-external landing site for [*-est* C] and on the assumption that the trace of the relative clause operator can be focused, as in (23) below, a regular superlative reading can be generated without covert fronting or type-shifting.

(23) [the shape [[-est C_7] 9 8 [[∅ d_9-many circles] are touching $[t_8]_F$ ~C'_7]]]

As before, the comparison class argument of *-est* is anaphorically dependent on C'_7. Since the focus value of $[t_8]_F$ is assumed to be D_e, C'_7 will be a non-singleton set of individuals containing the denotation of t_8. The superlative predicate of (23) will thus be true of a shape just in case that it is touched by more circles than any other shape. This is the same predicate denotation we have derived in (17). Parallel analyses can be given to all the cases listed in (7).

Note that this analysis predicts that in sentences with overt movement, no partitioning effect will be detectable. That is, such sentences are still predicted to be structurally ambiguous between LFs with a DP-internal and a DP-external

superlative operator. However, since the DP-external LF does not require either of the operations that we assumed are costly while the DP-internal LF does, speakers (including those who get a partitioned reading in other environments) are expected to prefer the DP-external LF to the DP-internal one. This means that they will prefer the regular superlative reading to the partitioned superlative reading. Given that the regular superlative reading is felicitous whenever the partitioned superlative reading is, the former will mask the latter. In fact, we predict that the partitioned superlative reading will only be detectable in a subset of the syntactic environments in which *most* may appear—namely those environments in which movement of *-est* to a DP-external position is blocked or made difficult for some reason. This prediction is in line with the empirical results surveyed in Section 2 of this paper. Conversely, we predict that no partitioning effect will be observed when DP-external movement of [*-est* C] is forced for independent reasons.[16]

4 Conclusion

In this paper we surveyed the available readings of *most* in subject position. We argued that in addition to the proportional reading (expressible by bare *most*), speakers assign superlative truth-conditions to sentences with *most* or *the most* in two different ways, resulting in two kinds of superlative readings: a regular superlative reading and a partition-based superlative reading. We proposed a cross-categorical superlative operator, which is interpretable both DP-internally and DP-externally, and demonstrated how the three readings of *most* arise as a function of the scope of [*-est* C] and the placement of focus. Specifically, when [*-est* C] is interpreted DP-externally, we get the regular superlative reading. When [*-est* C] is interpreted DP-internally we get either a proportional reading or a partitioned superlative reading depending on the placement of focus.

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[16] A relevant test case might be the 'split reading' of the superlative discussed in Heim 1999.

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