

Quantity superlatives: The view from Slavic and its cross-linguistic implications

Roumyana Pancheva
University of Southern California

1 Introduction

This paper focuses on the quantity determiner *most* in its two manifestations – superlative as in (1a) and proportional as in (1b).

- (1) a. Mary read the *most* articles.
- b. Mary read *most* (of the) articles.

The two are clearly related, both in form and meaning. Morphologically, they can be treated as complex expressions composed of the superlative operator *-est* and quantity *many*, an analysis suggested by Bresnan (1973) for *most* in (1a) and extended by Hackl (2009) to proportional *most* in (1b).¹ Semantically, both involve comparison along a quantity dimension, cardinality in the case of (1).² The similarities suggest that the two determiners should be given a unified analysis. Hackl (2009) offers such an analysis, arguing that proportional *most* is also superlative, not only in form but also in its compositional semantics. As evidence for his proposal, he points out that a uniform superlative analysis of quantity *most* can treat the different interpretations of (1a) and (1b) as an instance of an ambiguity found also with adjectival superlatives.

As has been noted by Heim (1985), Szabolcsi (1986), and others, a sentence like (2) has two interpretations, with the superlative evaluated with respect to different comparison classes. On the so-called *relative* reading, (2a), the comparison class is determined relative to contextually salient alternatives to *Mary*, i.e., the articles Mary read are compared to articles other people read. On the *absolute* reading, (2b), the comparison class is determined in absolute terms, on the basis of the superlative DP alone, i.e., the articles being compared need not be articles read by different people, they simply need to be contextually salient.

* Thanks to the organizers of CLS 49 for the invitation to present this work, and to the audience for their constructive comments. Thanks also to Carmen Dobrovie-Sorin, Ora Matushansky, Ellen O'Connor, Jessica Rett, and Barbara Tomaszewicz for discussion of quantity superlatives and *many*.

¹ In English, the superlative determiner typically appears with the definite article, *the most*, while the proportional determiner is bare *most*, although there are complications in subject position where bare *most* can be used as a superlative determiner (de Hoop 2006) and where *the most* has variable acceptability (Kotek et al 2011, 2012b). In other languages, e.g., German, Hungarian, Romanian, the two quantity superlatives are identical in form.

² For discussion of quantity *most* combining with nominals other than plural count NPs see Dobrovie-Sorin 2013, Szabolcsi 2012. The full data present some complications for the uniform treatment of proportional *most* as a superlative determiner, as these authors discuss.

- (2) Mary read the *longest* articles.
- ‘Mary read longer articles than anyone else did.’
 - ‘Mary read the articles that were longer than any other articles.’

Hackl (2009) points out that the interpretation of (1a) is a relative superlative interpretation, mirroring the relative reading in (2a) – the articles Mary read are compared in number/length to the articles other relevant individuals read. The interpretation of (1b) is an absolute superlative interpretation, a counterpart to the absolute reading in (2b) – the superlative DP denotes a plurality of relevant articles that exceed the remaining articles in the comparison class in number/length.

Hackl’s account unifies not only the two instances of quantity *most* in (1a-b), a desirable result, but also quantity and adjectival superlatives, (1)-(2): *-est* gives rise to two readings – absolute and relative – whether in combination with quantity *many* or with lexical adjectives. This analysis has been endorsed by Gajewski (2010), Kotek et al (2011, 2012b), Solt (2011) and Szabolcsi (2012).

However, not all languages that have a superlative *most* as in (1a) also have a proportional *most* as in (1b), as pointed out by Živanović (2008). In Polish, (3) is not ambiguous. Superlative lexical adjectives display the absolute-relative ambiguity, as seen in (4), leading to the expectation that if *-est* interacts in the same way with quantity *many*, a proportional reading would be available for (3), in addition to a relative reading, yet this is not the case.

- (3) *Maria przeczytała naj-więcej artykułów.* Polish
 Maria read.PAST.FEM.SG *-est-more*_{SUPPL} article.GEN.PL
 a. ✓ ‘Mary read more articles than anyone else did.’
 b. not available: ‘Mary read a majority of the articles.’
- (4) *Maria przeczytała naj-dłuższe artykuły.* Polish
 Maria read.PAST.FEM.SG *-est-longer*.ACC.PL article.ACC.PL
 a. ✓ ‘Mary read longer articles than anyone else did.’
 b. ✓ ‘Mary read the articles that were longer than any other articles.’

The absence of a proportional reading in quantity superlatives in languages like Polish poses a problem for the unified analysis of (1a-b) and (2a-b). Here, I address the question of why *most* does not have a proportional reading in some languages. I discuss some possible answers that have been suggested previously – obligatory DP-external scope for *-est*, obligatory focus association for *-est*, absence of a definite article – and I point out why they would not work for all cases. I then suggest another explanation: the syntax of quantity superlatives in the Slavic-type languages is as in (5), where the superlative-*est* is an argument of an adjective modifying a null measure noun NUMBER in an *individuating* pseudo-partitive structure. This syntax constrains the comparison class with respect to which the superlative is interpreted to degrees of cardinality, allowing only a relative reading, as also happens in (6) where the pseudo-partitive is overt.

- (5) (the) *largest* NUMBER (of) articles
- (6) Mary read the *largest* number of articles.
- a. ✓ ‘Mary read more articles than anyone else did.’
 - b. not available: ‘Mary read a majority of the articles.’

In English-type languages, the syntax of *-est-many* is that of a *measure* pseudo-partitive. This syntax restricts the comparison class to individuals in the denotation of the head NP, allowing both proportional and relative readings.

2 Languages with a proportional reading of quantity superlatives

German, Dutch, Hungarian and Romanian are like English – the quantity superlative has both a relative and a proportional reading, as seen in (7)-(10).

- (7) *Hans hat die meisten Bücher gelesen.* German
 Hans has the most books read Hackl ‘09
- a. ✓ ‘Hans read more books than anyone else did.’
 - b. ✓ ‘Hans read a majority of the books.’
- (8) *De meeste mensen drinken bier.* Dutch
 the most people drink beer Živanović ‘08
- a. ✓ ‘More people are drinking beer than anything else.’
 - b. ✓ ‘A majority of the people are drinking beer.’
- (9) *Ki mászta meg a leg-több hegyet?* Hungarian
 who climbed prt the *-est-more*_{SUPPL} mountain Szabolcsi ‘12
- a. ✓ ‘Who climbed more mountains than anyone else?’
 - b. ✓ ‘Who climbed a majority of the mountains?’
- (10) *Cei mai multi oameni beau bere* Romanian
 the *-er* many people drink beer Živanović ‘08
- a. ✓ ‘More people are drinking beer than anything else.’
 - b. ✓ ‘A majority of the people are drinking beer.’

Hackl’s (2009) analysis has cross-linguistic support. The proportional reading of *most* is not a peculiarity of English. It is thus all the more interesting why in Slavic and in some other languages the proportional reading is missing, as seen in (3), and as further illustrated in the next section.

3 Languages without a proportional reading of quantity superlatives

In none of the Slavic languages does the quantity superlative have a proportional reading. Examples (11) and (12) illustrate this fact with a West Slavic and a South-Western Slavic language; more examples can be found in Živanović (2008).

- (11) *Nej-víc lidi pije pivo.* Czech
 -est-more_{SUPPL} people drink beer Živanović '08
 a. √ 'More people are drinking beer than anything else.'
 b. not available: 'A majority of the people are drinking beer.'
- (12) *Naj-više ljudi pije pivo.* Serbian
 -est-more_{SUPPL} people drink beer Živanović '08
 a. √ 'More people are drinking beer than anything else.'
 b. not available: 'A majority of the people are drinking beer.'

Russian, a representative of East Slavic, has several superlative forms but none can have a proportional reading.

- (13) *Saša pročitai nai-ból'see količestvo statej.* Russian
 Sasha read -est-more_{SUPPL} quantity articles
 a. √ 'Sasha read more articles than anyone else did.'
 b. not available: 'Sasha read a majority of the articles.'
- (14) *Saša pročitai samoe bol'soe količestvo statej.* Russian
 Sasha read most great quantity articles
 a. √ 'Sasha read more articles than anyone else did.'
 b. not available: 'Sasha read a majority of the articles.'
- (15) *Saša pročitai ból'se vsego statej.* Russian
 Sasha read more_{SUPPL} everything articles
 a. √ 'Sasha read more articles than anyone else did.'
 b. not available: 'Sasha read a majority of the articles.'

The South-Eastern Slavic languages Bulgarian and Macedonian differ from the rest of Slavic in that they have a definite article and in that the superlative *naj-*'-est' is added to the positive, not to the comparative, form of *many*. Still, only a relative reading obtains, as seen in the Bulgarian example below.

- (16) *Maria pročete naj-mnogo(-to) statii.* Bulgarian
 Maria read -est-many(-the) articles
 a. √ 'Maria read more articles than anyone else did.'
 b. not available: 'Maria read a majority of the articles.'

The proportional reading is missing also in Turkish, French (illustrated below), Italian, Spanish, Hebrew, and other languages (see Živanović 2008).

- (17) *En çok makaleyi Mary okudu.* Turkish
 -est many article.ACC Mary read.PAST
 a. √ 'Mary read more articles than anyone else did.'
 b. not available: 'Mary read a majority of the articles.'

- (18) *Marie a lu le plus d'articles.* French
 Marie has read the more articles
 a. √ ‘Marie read more articles than anyone else did.’
 b. not available: ‘Marie read a majority of the articles.’

The Slavic-type languages all have a way to express the meaning of proportional *most*. Some use a noun like *majority*: e.g., *večina* (Slovenian), *większość* (Polish), *bol'sinstvo* (Russian), *çoğunlu* (Turkish); others a nominal phrase like *the greater part*: e.g., *la plupart* (French), *gran parte* and *la maggior parte* (Italian); still others use a (complex) degree determiner: e.g., *povečeto* ‘lit. *more-the*’ (Bulgarian). It cannot be the case that such expressions block the proportional reading of *-est-many*, given that the availability of *majority* and *the greater part* in English does not prevent *most* from having a proportional reading.

In the next section I illustrate Hackl’s (2009) compositional analysis of *most* as a complex superlative expression giving rise to a relative-proportional ambiguity.

4 The analysis of proportional *most* as a quantity superlative

As noted earlier, Hackl (2009) proposes that the same elements, quantity *many* and superlative *-est*, combine to form quantity *most*. He further suggests that the different interpretations – relative and proportional – are the result of different scope for *-est*. In treating the readings of *most* as a case of a structural ambiguity, he follows Heim’s (1985, 1999, 2000) and Szabolcsi’s (1986) approach to superlative ambiguities with lexical adjectives. For these authors, the absolute-relative ambiguity is structural, arising from the different position of *-est* at LF.

Sections 4.1 and 4.2 present the structural claims of the accounts of Szabolcsi, Heim and Hackl – the so-called *Scope Theory*. Section 4.3 clarifies the role of *-est*’s LF scope for the determination of the comparison class, section 4.4 illustrates the lexical semantics of *-est* that Hackl adopts from Heim and adapts to quantity superlatives, and section 4.5 presents Hackl’s core proposal of proportional *most* as an absolute quantity superlative.

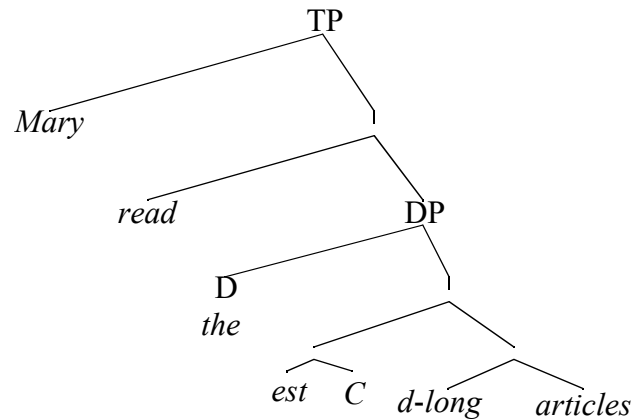
4.1 The Scope Theory – superlatives of lexical adjectives

On the Scope Theory, *-est* is a quantificational degree determiner, and as such, it undergoes QR to different positions. The two LFs for (2) are as in (19). DP-internal scope for the degree quantifier – *-est* and its null restrictor *C* (more on this below) – results in an absolute reading, (19a), and DP-external scope yields a relative reading, (19b).

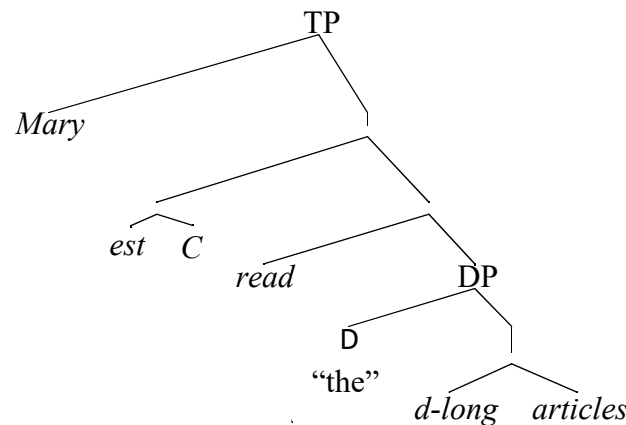
Besides the scope position of the superlative quantifier, the two structures differ in the role of the determiner *D* that heads the superlative DP. Under the Scope Theory, in absolute superlatives *D* is interpreted as definite, *the* being the regular definite article. The relative superlative DP, on the other hand, is said to be interpreted as indefinite. On one version of the Scope Theory, *the* spells out an indefinite *D*, marked as “*the*” in (19b) (Heim 1999, 2000; Hackl 2009; Gajewski

2010, a.o.). Another view, still within the domain of the Scope Theory, also maintains that the superlative DP is indefinite on the relative reading, but treats *the* as (part of) the degree quantifier itself (Szabolcsi 1986, 2012; Krasikova 2012).

(19) a. absolute *the longest articles*



b. relative *the longest articles*

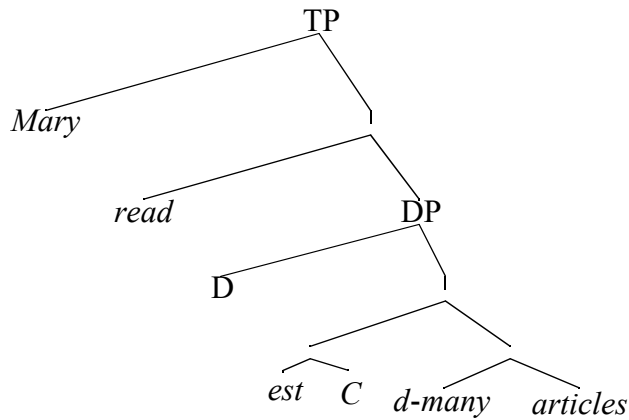


4.2 The Scope Theory – quantity superlatives

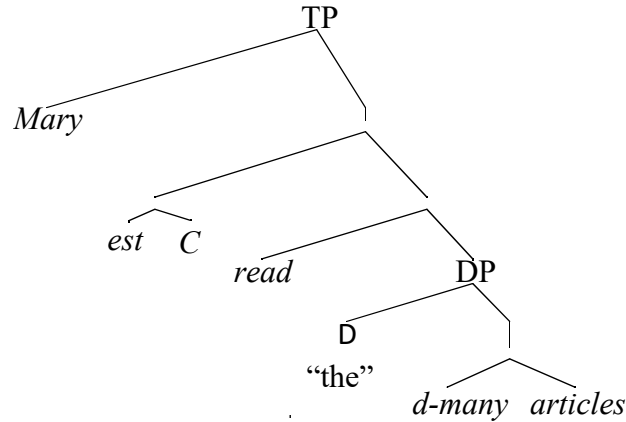
Hackl (2009) suggests the following two LFs for quantity superlatives. DP-internal scope for the superlative quantifier, as in (20a), results in a proportional reading. DP-external scope as in (20b) yields a relative reading.

In a departure from the analysis of absolute adjectival superlatives, where the superlative DP is interpreted as definite, the proportional quantity superlative DP is said to be indefinite (Hackl 2009). The relative quantity superlative DP is analyzed as indefinite as well, just like the relative adjectival superlatives, despite the presence of *the* (hence the notation "*the*" in (20b)).

(20) a. proportional *most articles*



b. relative *the most articles*



4.3 The comparison class

As a quantifier, *-est* is contextually restricted; the restriction is accomplished through a null pronominal *C* that is anaphoric to the comparison class with respect to which the superlative is evaluated. In the proposal of Heim (1999), a presupposition of *-est* is that the members of the comparison class are arguments of *-est*'s second argument (as will be seen in the lexical entry in (22)). Consequently, the interpretation of *C* depends on the LF position of *-est*. Thus, according to the Scope Theory, the comparison class for (19a) and (20a) is determined on the basis of a constituent internal to the superlative DP, whereas the comparison class for (19b)-(20b) incorporates content from the clause. The two comparison classes can be seen in (21a) and (21b), respectively.

- (21) a. $C = \{x: x \text{ are contextually salient articles}\}$
 b. $C = \{x: x \text{ are contextually salient individuals who read articles}\}$

4.4 The lexical semantics of *-est*

Heim (1999) proposes the meaning for *-est* in (22), illustrating its applicability to adjectival superlatives, namely, *-est* has 3 arguments: a set of individuals C , a gradable predicate D , and an individual x ; *-est* applied to its arguments yields a true statement if and only if the maximal degree d of D such that x has that degree of D exceeds the maximal degrees of D that all other individuals in C have. There are two presuppositions associated with *-est*: (i) x is a member of C ; (ii) C consists of individuals which are arguments of D .

- (22) $\llbracket -est \rrbracket (C)(D)(x)$ is defined only if
 $x \in C \ \& \ \exists y [y \in C \ \& \ y \neq x \ \& \ \forall y [y \in C \rightarrow \exists d [D(d)(y)]]$
 When defined, $\llbracket -est \rrbracket (C)(D)(x) = 1$
 iff $\forall y [y \in C \ \& \ y \neq x \rightarrow \max \{d: D(d)(x)\} > \max \{d: D(d)(y)\}]$

Hackl (2009) shows that the same meaning can be applied to quantity superlatives as well, taking x and y to be variables over both atomic and plural individuals. Non-identity of pluralities is interpreted as non-overlap, as in (23):

- (23) Plural individuals x and y are distinct ($x \neq y$), if for every x that is part of x and for every y that is part of y , x and y are distinct ($x \neq y$)

As an illustration, a plurality that is the sum of two atomic individuals, a and b , i.e., $a \oplus b$, is distinct from a plurality such as $c \oplus d \oplus e$, formed on the basis of atomic individuals c , d , and e , because every individual that is part of $a \oplus b$ is distinct from every individual that is part of $c \oplus d \oplus e$. The plurality $a \oplus b$ is not distinct from the plurality $b \oplus c \oplus d$, since a part of the former, b , is identical to part of the latter.

4.5 The compositional semantics of proportional *most*

According to Hackl (2009), the meaning of quantity *many* is as in (24): after it combines with its two arguments, a degree d and a predicate of individuals P , it returns (the characteristic function of) a set of pluralities with a property P whose cardinality is at least d . The meaning of proportional *most articles* is calculated as in (25). Recall that *-est* C undergoes local QR, inside the superlative DP.

- (24) $\llbracket many \rrbracket (d)(P) = \lambda x [P(x) \ \& \ |x| \geq d]$
 (25) $\llbracket -est \ C \ many \ articles \rrbracket = \lambda x [x \text{ is articles} \ \& \ \forall y [y \in C \ \& \ y \neq x \rightarrow$
 $\max \{d: |x| \geq d\} > \max \{d: |y| \geq d\}]]$
 $= \lambda x [x \text{ is articles} \ \& \ \forall y [y \in \{z: z \text{ is articles}\} \ \& \ y \neq x \rightarrow |x| > |y|]]$

After the null indefinite D is composed with the expression in (25), the interpretation is that of a plurality of articles whose cardinality is greater than that of any other /non-overlapping plurality of articles in the comparison class.

This captures the meaning of proportional *most*. As an illustration, consider some possible pluralities formed on the basis of articles *a*, *b*, *c*, *d*, and *e*. The plural individual $a \oplus b \oplus c \oplus d$ satisfies the predicate in (25) since its cardinality is 4 and since *e* – the only distinct individual in the set of contextually relevant articles – has a cardinality of 1. Similarly, a plural individual such as $a \oplus c \oplus d$ satisfies (25) since its cardinality is 3, and the cardinalities of all other non-overlapping individuals, namely, $b \oplus e$, *b*, *e* are less than 3. A plural individual like $a \oplus c$ does not satisfy (25), however, since it has a cardinality of 2 and there is a distinct plural individual in the comparison set, the plurality $b \oplus d \oplus e$, whose cardinality is greater.

This section illustrated Hackl (2009)’s proposal, which extends the analysis of superlative adjectives to the superlative form of quantity *many*. On this account, the proportional interpretation of *most* naturally emerges when the superlative quantifier QRs internally to the superlative DP. The question is, why doesn’t this happen in all languages with a quantity *most*? To clarify, it is not necessary that a proportional reading be expressed through a superlative quantity determiner in every language – we’ve seen that there are other ways through which a proportional meaning could be encoded. But, if Hackl’s account is correct, the reverse needs to be true, a quantity superlative *most* needs to have a proportional reading. The next section is dedicated to a discussion of two accounts that have been proposed to account for the missing proportional reading of *most* in some languages.

5 Accounts of the unavailability of the proportional reading

I know of two studies that have addressed the question of why the proportional reading is missing from quantity superlatives in Slavic and other languages: Živanović (2008) and Bošković & Gajewski (2011). Only the latter proposes a detailed analysis, centered on QR of the superlative quantifier, though the former identifies two additional important factors – focus association and presence or absence of a definite determiner in the superlative noun phrase. These three factors – QR, focus association, and *the* – may indeed account for some of the variation in the availability of the proportional interpretation. However, I identify some problems that make the accounts, at least as currently stated, unlikely to apply to all relevant languages.

5.1 Obligatory focus association

Živanović (2008) suggests that in quantity superlatives that only have relative readings (e.g., in Slavic), *most* obligatorily associates with focus, while in superlatives that allow proportional readings (e.g., in Germanic besides English), *most* optionally associates with focus. For English, he suggests that *most* does not associate with focus. He does not clarify the distinction between English and the rest of Germanic, but presumably it is meant to capture the fact that bare *most* in English only has a proportional reading (apart from exceptions noted in footnote 1), whereas *die meisten* (German) and *de meeste* (Dutch) ‘lit. the most’ in (7) and (8) have both relative and proportional readings. Given the fact that *the most* in

English results in relative readings, we can treat English the same as the rest of the Germanic languages, putting aside the role of *the* (as is done in Hackl 2009). If so, the cross-linguistic distinction reduces to obligatory vs. optional focus association.

Focus association indeed plays an important role in the absolute-relative ambiguity of superlatives, as discussed in Szabolcsi (1986, 2012), Heim (1999), Farkas and Kiss (2000), Sharvit and Stateva (2002), Pancheva and Tomaszewicz (2012), Tomaszewicz (2013) – although the issue is far from settled. Here, it suffices to say that the relative reading is focus-sensitive, i.e., different relative readings arise with varying the position of focused constituents in the sentence, (26); accordingly, the relative reading can be given an account in terms of *-est* associating with focus. The absolute reading is not focus-sensitive; it continues to be available and interpreted the same way, independently of which constituent in the sentence is focused, (27). Analogous facts obtain with adjectival superlatives.

- (26) a. MARY read the *most* articles on Friday.
 b. Mary read the *most* articles on FRIDAY.
- (27) a. MARY read *most* articles on Friday.
 b. Mary read the *most* articles on FRIDAY.

It is important to remember that in all languages discussed here, the same *-est*, when it combines with adjectives, gives rise to both focus-sensitive relative readings and focus-insensitive absolute readings. The cross-linguistic variation is restricted to quantity superlatives. So the conclusion we need to draw is not that Slavic *-est* is different from Germanic *-est* with respect to focus association, but that Slavic *many* is the one responsible for the missing proportional reading.

This conclusion already goes beyond what is discussed in Živanović (2008). Apart from the suggestion that focus association of *most* is obligatory, optional (or not available) in the relevant languages, and that the relative reading obtains through “the interaction between NralP [NumeralP] in the extended NP projection and FocusP in the extended VP projection”, there is no further discussion of the role of focus in quantity superlatives. What follows below is a brief discussion of focus association in the case of *many* (since, as noted above, attributing the effects to *-est* itself would be unreasonable, in the face of preserved ambiguities with superlative adjectives in Slavic). As Herburger (1997) has shown, English cardinal *many* is focus-sensitive. Babko-Malaya (1998) and Krasikova and Champollion (2011) note that Russian *mnogo* ‘many’ is similarly focus-sensitive. The following sentences, modified from Krasikova and Champollion (2011), have distinct truth conditions, just like their English translations. In (28a) the comparison class with respect to which *many* is evaluated consists of students who took semantics; in (28b) the comparison class is female students who took different classes.

- (28) a. *Semantiku vybralo mnogo STUDENTOK. Russian*
 semantics chose many students.FEM
 ‘Many FEMALE students took semantics.’

- b. *Mnogo studentok vybralo SEMANTIKU. Russian*
 many students.FEM chose semantics
 ‘Many female students took SEMANTICS.’

Many in the other Slavic languages behaves like Russian *mnogo*. Some of these languages make a distinction between cardinal and proportional *many* (originally identified in Partee 1989), just like Russian *mnogo* vs. *mnogie* (Babko-Malaya 1998, Krasikova and Champollion 2011); we consider here cardinal *many*, which is the input to quantity superlative *most* (Kotek et al 2012a,b). Given the facts in (28), it is not immediately clear how to successfully argue that cardinal *many* differs in Slavic and English in that only the former associates with focus.

This is not to deny that there could be a difference in the way focus-sensitivity of cardinal *many* is expressed in Slavic and English. Krasikova and Champollion (2011) in fact suggest that the distinction between Russian *mnogo* and English *many* may be analogous to the distinction proposed by Beaver and Clark (2008) for *only* and *always*: *only* directly and obligatorily associates with focus, whereas the focus-sensitivity of *always* is indirect, the result of dependency on context, which itself is affected by focus (what they term *free association with focus*). Krasikova and Champollion’s (2011) suggestion is likely meant to address the fact that English *many* corresponds to both focus-sensitive cardinal *mnogo*, and focus-insensitive proportional *mnogie* in Russian. When worked out in detail, the proposal may very well be correct, but it will not give us the complete answer to our problem. For languages that do not have a *mnogo-mnogie* type distinction, for instance Bulgarian, we would expect *many* to be as in English, i.e. allow a focus-insensitive interpretation, and thus a proportional reading, contrary to fact.

A further complication arises under Krasikova and Champollion’s (2011) analysis of the focus-sensitive reading of *mnogo*: it QRs to take propositional scope, similarly to standard treatments of *only*. However, as will become clear below, in definite-marked superlatives in Bulgarian, QR of *-est* or *many* is prohibited. Yet, such definite-marked quantity superlatives only have a relative reading.

In conclusion, Živanović’s suggestion that obligatory focus-association is the reason for the obligatory relative reading of quantity superlatives in the Slavic-type languages faces problems. Until they are resolved, such an analysis is not feasible.

5.2 The role of the definite article

Živanović’s (2008) makes the interesting observation that all languages with proportional *most* have a definite article. English, as well as German, Dutch, Hungarian and Romanian (the last four illustrated in examples (7)-(10)), confirm this pattern. On the basis of Bulgarian and Macedonian, which have a definite article, and also have a proportional determiner, though not one derived from *-est-many*, Živanović suggests that having a definite article is a precondition for having a proportional determiner, whether or not that determiner is *most*. He proposes that proportional determiners structurally incorporate a definite article.

We can see how this suggestion can account for many of the languages discussed here. Czech and Slovenian (11)-(12), Russian (13)-(15), and Turkish (17), do not have a definite article and don't have a proportional determiner either, *most* included. If indeed a definite article is needed to build a proportional determiner, a *most* without a definite article cannot have a proportional reading.

However, this cannot be the general analysis for the missing proportional reading of quantity superlatives. Note that Bulgarian has a definite article, and moreover the definite article can be added to the quantity superlative, as seen in (16), yet no proportional reading is available for *(the)-est-many*. Similar issues arise in the case of French (example (18)), Italian and Spanish, all of which have a definite article but no proportional reading of quantity superlatives.

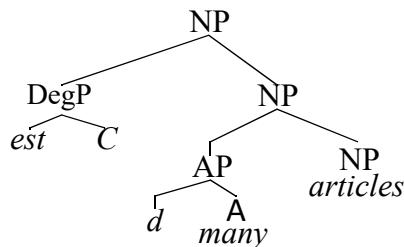
Finally, Živanović's proposal that proportional determiners, *most* included, have to incorporate a definite article, runs counter to Hackl's analysis of proportional *most* as indefinite.

5.3 Obligatory QR of *-est*

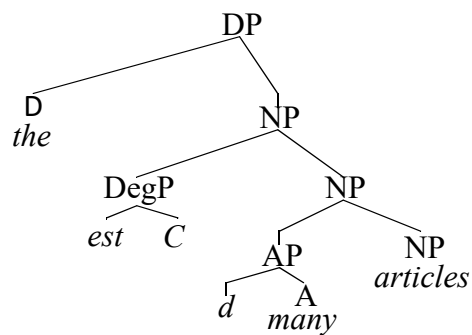
Bošković and Gajewski (2011) adopt the analysis of Hackl (2009) and the Scope Theory, with lexical entries for *-est* and *many* as in (22) and (24). Following Bošković's (2008) NP/DP Parameter, they propose that in languages without the definite article (NP-languages), *-est* obligatorily QRs into the clause. The obligatory long QR is responsible for the obligatory relative reading (see (20b)).

Bošković and Gajewski's analysis proceeds as follows. Adjunction of *-est* to NP, as in (29a), is prohibited in NP-languages, since NPs are arguments and adjunction to arguments is banned (Chomsky 1986).³ Only QR into the clause is available for *-est*, resulting in a relative reading only.⁴ In DP languages, adjunction to NP is not a problem, since NPs are not arguments. DP-internal QR of *-est* is thus possible, (29b), and the proportional reading obtains.

(29) a. NP-languages



b. DP-languages

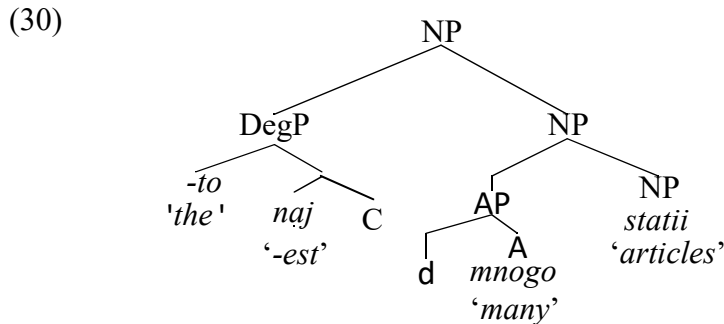


³ AP adjunction to NP in (29a) happens before the NP is merged as an argument and is thus allowed. The question arises as to why *-est* may not adjoin to NP before the NP is merged as an argument.

⁴ The absolute reading with quality adjectives (e.g., Polish (4)) obtains when *-est* is interpreted in-situ, without QR, on Bošković and Gajewski's account.

Bulgarian is problematic for this account. It is a DP-language, since it has a definite article (and forbids left-branch extraction, another characteristic according to Bošković's 2008 diagnostics), so the superlative quantifier should be able to stay DP-internally, as in (29b), and yield a proportional reading.^{5,6}

But what if the structure of *the most articles* in Bulgarian (16) is not as in (29b), but as in (30), with *-to* 'the' not in D heading the superlative DP, but part of the degree quantifier (cf. Szabolcsi 1986, 2012; Krasikova 2012)? Bošković and Gajewski could treat (30) like (29a), which requires DegP to have sentential scope.



I next illustrate that, irrespective of the analysis of *the* in relative readings, whether it heads the superlative DP or is part of a complex superlative quantifier, its presence requires *-est* to stay DP-internal, in Bulgarian and English.

Pancheva and Tomaszewicz (2012) identify cross-linguistic differences in the availability of relative readings. Specifically, in the Slavic languages, relative readings can obtain with respect to a constituent internal to the superlative DP. Such DP-internal relative readings are not possible in English. Bulgarian and Macedonian are like English, when the superlative phrase is marked definite, but behave like the rest of the Slavic languages when the definite article is missing.

Below I illustrate the generalization with examples not discussed in Pancheva and Tomaszewicz (2012), i.e., DP-internal readings relativized to the superlative NP itself (see also Tomaszewicz 2013). I also focus on quantity superlatives; with adjectival superlatives the contrasts are even sharper. Note that (31) only has one relative reading, whereas (32) and (33) are ambiguous, with both a DP-external, (32a)-(33a), and a DP-internal, (32b)-(33b), relative reading. When the definite article is added to the Bulgarian quantity superlative, the DP-internal relative is no longer possible, just like in English.

⁵ Macedonian does not allow the definite article to appear in quantity superlatives. Therefore, even though it is a DP-language, it is possible that it only has the structure in (29a), and so Bošković and Gajewski's analysis would extend to it as well. Bulgarian however, remains a problem.

⁶ Bošković and Gajewski (2011) suggest in an appendix an alternative account of DP-languages, one where the Adj takes the NP as a complement. This account requires a slight change to the meaning of *many* in DP languages, and allows *-est* to be interpreted in-situ when it combines with *many*. Bulgarian poses the same problem, as it is still predicted to allow a proportional reading.

- (31) John bought the most cakes.
 a. √ ‘JOHN bought more cakes than anyone else did.’
 b. * ‘John bought more of CAKES than of anything else.’
- (32) *Ivan kupi naj-mnogo torti.* *Bulgarian*
 Ivan bought -est-many cakes
 a. √ ‘IVAN bought more cakes than anyone else did.’
 b. √ ‘John bought more of CAKES than of anything else.’
- (33) *Jan kupił naj-więcej ciastek.* *Polish*
 Ivan bought -est- many.ACC cakes.GEN
 a. √ ‘JAN bought more cakes than anyone else did.’
 b. √ ‘Jan bought more of CAKES than of anything else.’
- (34) *Ivan kupi naj-mnogo-to torti.* *Bulgarian*
 Ivan bought -est-many-the cakes
 a. √ ‘IVAN bought more cakes than anyone else did.’
 b. * ‘John bought more of CAKES than of anything else.’

Pancheva and Tomaszewicz illustrate the DP-internal reading with modifiers to the NP (e.g., *the youngest students from London, the most albums of U2*). Such examples show that the absence of a DP-internal relative reading in definite-marked superlatives is not due to a ban on extraction of the modifier phrase, since *London* and *U2* can be moved overtly out of the superlative DP. Rather, the conclusion is that DP-internal relative readings are blocked in the presence of *the*.

How do we account for this generalization? Pancheva and Tomaszewicz propose a modification to the Scope Theory: relative readings may, but do not always arise from DP-external scope for the superlative quantifier. DP-internal scope can and does result in relative readings (as has been proposed in Farkas and Kiss 2000, Sharvit and Stateva 2002) – as long as the reading is relativized to a constituent outside of the superlative nominal phrase. Whether QR is local to the superlative DP or long-distance, depends on whether or not the superlative DP is a degree island. Definite-marked superlatives are islands for degree movement, and QR of the superlative quantifier is blocked. Pancheva and Tomaszewicz (2012) further suggest that relative readings involve association with focus, and show that association of *-est* with DP-internal focus is precluded when *-est* is itself DP-internal. The cross-linguistic pattern thus follows: in the English (31) and the Bulgarian (34), long QR of the superlative quantifier is blocked, and because *-est* remains DP-internal, it cannot properly associate with focus on a constituent that is also DP-internal. Only focus-association with a DP-external focus works. When long QR is possible, it can apply. In Bulgarian and Polish indefinite-marked superlatives, (32)-(33), it is possible for *-est* to have sentential scope, and from that position it can associate both with DP-internal and DP-external focus.

The details of Pancheva and Tomaszewicz's analysis need not concern us here. Interested readers can consult that paper for detailed derivations. What is important for us now is that *-est* does not always move out of the superlative phrase in Bulgarian – in (16) and (34) the superlative quantifier stays inside the superlative DP. This means that whether the structure is as in (29b) or as in (30), long QR of the superlative quantifier cannot be the reason for the missing proportional reading. Bošković and Gajewski's (2011) account may work for the other Slavic languages, but Bulgarian remains a problem. Movement of *many* itself will also be blocked – recall that on Krasikova and Champollion's analysis at least, such movement is needed for focus association, and, as discussed in section 5.1, to account for the missing proportional reading through obligatory focus association, we need to posit a cross-linguistic distinction in the focus-sensitivity of *many*, not *-est*.

The previous studies have identified important factors in the interpretation of *most*, but an account of the missing proportional reading is still elusive.

6 Two types of pseudo-partitive structures for *-est-many*

I will pursue a different approach here. The idea is that in Slavic and similar languages, in quantity superlatives *-est* compares degrees, not individuals. This is in line with proposals by Krasikova (2012) and Szabolcsi (2012) for a degree-based analysis of *the most*, and also by Heim (1999) for an alternative semantics for *-est*, though the details are different. The degree 'mode of comparison' (to use Sharvit and Stateva's 2002 and Kennedy's 2007 term) is determined by the syntax. Specifically, quantity superlatives in Slavic appear in an individuating pseudo-partitive structures, with a null measure noun heading the nominal projection. In English, the structure behind quantity superlatives is a measure pseudo-partitive, with the lexical noun being the head of the nominal projection.

6.1 The syntax of *-est-many*

Kayne (2005) suggests that *many* and *few* don't directly modify NPs, but an unpronounced noun NUMBER whose pseudo-partitive complement the overt NP is, so that *many/few articles* is in fact *many/few NUMBER articles*.

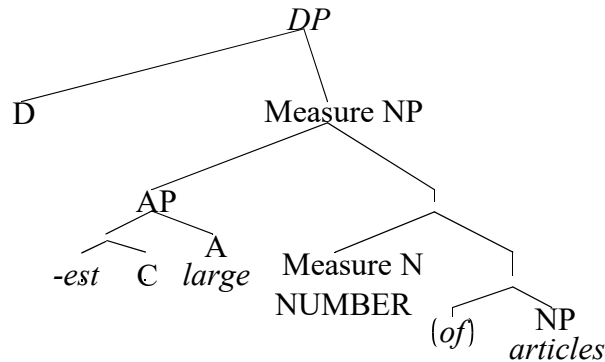
Let's modify this idea somewhat. In both Slavic-type and English-type languages quantity superlatives participate in pseudo-partitive structures, but they instantiate different types of pseudo-partitives. Two types of pseudo-partitives have been identified (Doetjes 1997, Landman 2004, Rothstein 2009, a.o., and much work in syntax, e.g. Alexiadou et al 2007): in individuating pseudo-partitives, the container/measure noun is the head noun of the nominal phrase, with the substance noun its argument (or modifier); in measure pseudo-partitives, the container/measure noun is part of a measure phrase, and the substance noun is the head noun of the nominal phrase. According to (35a), two objects, each a glass full of water, are broken. According to (35b) no actual glasses need to be added to the soup, just the amount of water that would in principle fill two glasses.

- (35) a. John broke two glasses of water.
 b. John added two glasses of water to the soup.

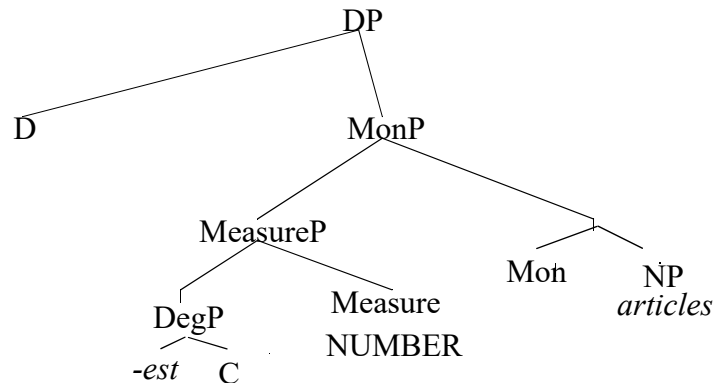
The proposal is that in the Slavic-type languages, quantity superlatives involve a pseudo-partitive structure with a null count semi-lexical measure noun, NUMBER (to be understood as count QUANTITY), and an attributive modifier *large*, whose degree argument is bound by the superlative quantifier. In English-type languages, quantity superlatives involve a functional, not semi-lexical, NUMBER and no modifying adjective. NUMBER is the head of the nominal structure in the Slavic-type languages (36a), but a specifier of a functional projection in the English-type languages (36b).

The head Mon in (36b) is from Schwarzschild (2006) who notes that measure expressions, including *many*, observe a monotonicity constraint on the part-whole denotation of the head NP. According to Schwarzschild's analysis, quantity *many* merges above the Mon head, whereas attributive adjectives merge below it – the semantic monotonicity constraint has a structural correlate.

- (36) a. individuating structure (Slavic-type)



- b. measure structure (English-type)



In the context of *-est*, Russian, Italian, and Spanish spell out separately the measure noun and the adjective *large*. Recall that Russian forms quantity superlatives with an overt measure noun *količestvo* ‘quantity’ as in (13)-(14). Italian and Spanish superlatives also overtly show the structure in (36a).

(37) *il maggior numero di articoli* *Italian*
 the larger number of articles
 ‘the most articles’

(38) *el mayor número de artículos* *Spanish*
 the larger number of articles
 ‘the most articles’

It is important to emphasize that the overt individuating pseudo-partitive structure in Russian, Italian and Spanish is required only for superlatives; comparative and positive forms of *many* do not require an overt measure noun. This is illustrated below for Russian, compare (39) to (13)-(14).

(39) a. *bol’še statej* *Russian*
 more_{SUPPL} articles.GEN.PL
 ‘more articles’

b. *mnogo statej* *Russian*
 many articles.GEN.PL
 ‘many articles’

Bulgarian and Polish spell *large* and the measure noun together, but the underlying syntax is nevertheless that of an individuating pseudo-partitive, as in (36a), and not as in (36b). Suppletion facts support this claim. As pointed out by Bobaljik (2012), it is a robust typological generalization that when a comparative form is suppletive, so is the corresponding superlative form (e.g., *many*, *more*, *most*). Bulgarian quantity *many* violates this generalization: *mnogo* ‘many’; *po-veče* ‘more’; *naj-mnogo* ‘most’. If the input to *naj-mnogo* ‘most’ is an individuating pseudo-partitive, whereas the input to *po-veče* ‘more’ is a measure pseudo-partitive, the surprising morphological pattern would receive an explanation.

English of course can overtly have the individuating structure, in addition to the measure pseudo-partitive, and not just in superlatives (e.g., *a large(r) number of articles*), and of course all Slavic languages can overtly express such structures too. The claim here is that for reasons that are not entirely clear, the individuating pseudo-partitive is the *only* structure available to quantity superlatives in the Slavic-type languages, even when the measure pseudo-partitive is available to comparative and positive *many* in these languages. In other words, this is a generalization about the structure in which Slavic-type *-est* can appear, and not about quantity structures in general.

6.2 Lexical semantics and semantic composition

A direct consequence of the syntactic proposal is that when the superlative quantifier stays within the superlative DP, the comparison class for *-est* will be determined on the basis of the meaning of Measure NP in the Slavic-type languages but of NP in the English-type languages, as in (40a,b), respectively. Recall that the LF sister of *-est C* determines the comparison class, through the presupposition that members of the comparison class are arguments of the second argument of *-est*.

- (40) a. $C = \{d: d \text{ are cardinalities of articles}\}^7$
 b. $C = \{x: x \text{ are articles}\}$

The lexical entry for the null semi-lexical noun NUMBER in the individuating structure is as in (41a), and in the measure structure functional NUMBER has the interpretation in (41b) – this is Hackl’s semantics for *many* in (24).

- (41) a. $\llbracket \text{NUMBER}_i \rrbracket = \lambda P \lambda d \exists x [P(x) \ \& \ |x| = d]$
 b. $\llbracket \text{NUMBER}_m \rrbracket = \lambda d \lambda P \lambda x [P(x) \ \& \ |x| \geq d]$

The lexical entry for the adjective that modifies the semi-lexical noun NUMBER is as in (42a), it incorporates a measure function that measures count amounts in terms of their size, where size is relative to the degree’s position on a cardinality scale; compare with the regular (attributive) adjective *large* in (42b).

- (42) a. $\llbracket \text{large}_d \rrbracket = \lambda D_{\langle d, dt \rangle} \lambda d' \lambda d [D(d) \ \& \ \mu\text{-size}(d) \geq d']$
 b. $\llbracket \text{large} \rrbracket = \lambda P_{\langle e, t \rangle} \lambda d \lambda x [P(x) \ \& \ \mu\text{-size}(x) \geq d]$

The composition of the quantity structure in the Slavic-type languages, before the superlative quantifier is merged, is as in (43). Given that this expression, which will become the sister of *-est C*, is a function of type $\langle d, dt \rangle$, the comparison class will be degree-based, as in (40a) rather than having individuals as members, (40b).

- (43) $\llbracket \text{large}_d \text{ NUMBER}_i \text{ (of) articles} \rrbracket =$
 $\lambda d' \lambda d \exists x [x \text{ is articles} \ \& \ |x| = d \ \& \ \mu\text{-size}(d) \geq d']$

To capture both modes of comparison – degree-based for quantity superlatives in the Slavic-type languages, and individual-based for quantity superlatives in the English-type languages and for adjectival superlatives in both Slavic-type and English-type languages – we need a cross-categorial meaning for *-est*. The entry in (44) is a 3-argument *-est* that can compare degrees or individuals.

⁷ To keep track of what the degrees are of, an approach such as that of Grosu and Landman (1998) could be used, where degrees are structured 3-tuples e.g., $\langle d, \text{articles}, x \rangle$

- (44) $\llbracket -est \rrbracket (C)(\Delta)(\alpha)$ is defined only if
 $\exists \beta [\beta \in C \ \& \ \beta \neq \alpha \ \& \ \forall \beta [\beta \in C \rightarrow \exists d [\Delta(d)(\beta)]]]$
 When defined, $\llbracket -est \rrbracket (C)(\Delta)(\alpha) = 1$ iff
 $\forall \beta [\beta \in C \ \& \ \beta \neq \alpha \rightarrow \max \{d: \Delta(d)(\alpha)\} > \max \{d: \Delta(d)(\beta)\}]$
 where α, β are variables over degrees or individuals, and
 Δ is of type $\langle d, et \rangle$ or $\langle d, dt \rangle$

7 Conclusions

This paper addressed the question of why quantity superlatives are ambiguous between a relative and a proportional interpretation in some languages, whereas in others they only have a relative interpretation. This cross-linguistic variation potentially undermines the analysis of Hackl (2009) – an otherwise uniform analysis that treats the two readings of quantity superlatives as the outcome of the same underlying combination of *-est* and *many*, realized in two different LF structures. I identified some problems with the previous attempts to solve the puzzle of the missing proportional reading. I suggested instead that the source of the cross-linguistic variation in the availability of proportional *most* is the syntax of the *many* that combines with *-est*. In both types of languages, quantity superlatives have pseudo-partitive syntax; the difference is whether the structures are those of individuating or of measure pseudo-partitives. The syntax determines the mode of comparison – of individuals or of degrees.

References

- Alexiadou, A. L Haegeman, & M. Stavrou. 2007. *Noun phrase in the generative perspective*. Mouton de Gruyter.
- Babko-Malaya, O. 1998. Context-dependent quantifiers restricted by focus. In *University of Massachusetts Occasional Papers in Linguistics 21: Proceedings of the Workshop on Focus*, ed. by E. Benedicto, M. Romero and S. Tomioka, 1-18. Amherst: GLSA.
- Beaver, D. & B. Clark. 2008. *Sense and Sensitivity: How Focus Determines Meaning*. Wiley-Blackwell.
- Bobaljik, J. 2012. *Universals in comparative morphology*. MIT Press.
- Bošković, Ž. 2008. What will you have, DP or NP? In *Proceedings of NELS 37*, ed. by E. Elfner and M. Walkow, 101-114. Amherst: GLSA.
- Bošković, Ž & J. Gajewski. 2011. Semantic correlates of the NP/DP Parameter. In *Proceedings of NELS 39*, ed. by S. Lima, K. Mullin, and B. Smith, 121-134. Amherst: GLSA.
- Bresnan, J. 1973. The Syntax of the Comparative Clause Construction in English. *Linguistic Inquiry* 4. 275-343.
- Chomsky, N. 1986. *Barriers*. Cambridge: MIT Press.
- Dobrovie-Sorin, C. 2013. *Most: The view from mass quantification*. In *Proceedings of the 19th Amsterdam Colloquium*, ed. by M. Aloni, M. Franke and F. Roelofsen, 99-106.
- Dojetes, J. 1997. *Quantifiers and selection*. PhD thesis. Leiden University.
- Farkas, D. & Kiss, K. 2000. On the comparative and absolute readings of superlatives. *Natural Language and Linguistic Theory* 18. 417-455.

- Gajewski, J. 2010. Superlatives, NPIs, and *most*. *Journal of Semantics* 27. 125–137
- Grosu, A. & F. Landman. 1998. Strange relatives of the third kind. *Natural Language Semantics* 6. 125-170.
- Hackl, M. 2009. On the grammar and processing of proportional quantifiers: *most* versus *more than half*. *Natural Language Semantics* 17. 63-98.
- Heim, I. 1985. Notes on comparatives and related matters. Ms. Univ. of Texas at Austin.
- Heim, I. 1999. Notes on superlatives. Ms. MIT.
- Heim, I. 2000. Degree operators and scope. In *Proceedings of SALT 10*, ed. by B. Jackson and T. Matthews, 40-64.
- Herburger, E. 1997. Focus and weak noun phrases. *Natural Language Semantics* 5. 53-78.
- de Hoop, H. 2006. Why are most babies born on a Tuesday? In *Between 40 and 60 puzzles for Krifka*, ed. by H-M. Gärtner, S. Beck, R. Eckardt, R. Musan and B. Stiebels. www.zas.gwz-berlin.de/fileadmin/material/40-60-puzzles-for-krifka/
- Kayne, R. 2005. A note on the syntax of quantity in English. In *Movement and Silence*, by R. Kayne, 73-98. Oxford University Press.
- Kennedy, C. 2007. Modes of comparison. In *Proceedings of CLS 43*, ed. by M. Elliott, J. Kirby, O. Sawada, E. Staraki, and S. Yoon. 141-165.
- Kotek, H., Y. Sudo, E. Howard & M. Hackl. 2011. Three meanings of *most*. In *Proceedings of SALT 21*, ed. by N. Ashton, A. Chereches, and D. Lutz, 353–372.
- Kotek, H., Y. Sudo, & M. Hackl. 2012a. Many readings of *most*. Handout, *Chicago Linguistic Society*. April 20, 2012.
- Kotek, H., Y. Sudo, E. Howard & M. Hackl. 2012b. *Most* meanings are superlative. Handout, *SALT 22*, University of Chicago, May 18-20, 2012.
- Krasikova, S. 2012. Definiteness in superlatives. In *Proceedings of the Amsterdam Colloquium*.
- Krasikova, S. & L. Champollion. 2011. Two *many* modifiers? Handout, *Workshop on modification (with and without modifiers)*. Centro de Ciencias Humanas y Sociales, Madrid.
- Landman, F. 2004. *Indefinites and the type of sets*. Blackwell.
- Pancheva, R. & B. Tomaszewicz. 2012. Cross-linguistic differences in superlative movement out of nominal phrases. In *Proceedings of WCCFL 30*, ed. by N. Arnett and R. Bennett, 292-302.
- Partee, B. 1989. Many quantifiers. In *Proceedings of ESCOL '89*, 383-402.
- Rothstein, S. 2009. Individuating and measure readings of classifier constructions: evidence from Modern Hebrew. *Brill's Annual of Afroasiatic Languages and Linguistics* 1. 106-145.
- Schwarzschild, R. 2006. The roles of dimensions in the syntax of noun phrases. *Syntax* 9. 67-110.
- Sharvit, Y. & P. Stateva. 2002. Superlative expressions, context, and focus. *Linguistics and Philosophy* 25. 453-505.
- Solt, S. 2011. How many *mosts*? In *Proceedings of Sinn & Bedeutung 15*, ed. by I. Reich, E. Horch and D. Pauly. 565–579.
- Szabolcsi, A. 1986. Comparative superlatives. In *MITWPL* 8, 245–66.
- Szabolcsi, A. 2012. Compositionality without word boundaries: *(the) more* and *(the) most*, In *Proceedings of SALT 22*, ed. by A. Chereches, 1-25.
- Tomaszewicz, B. 2013. Focus association in superlatives and the semantics of *-est*. In *Proceedings of the 19th Amsterdam Colloquium*, ed. by M. Aloni, M. Franke and F. Roelofsen, 226-233.
- Živanović, S. 2008. Varieties of *most*: on different readings of superlative determiners. In *Proceedings of FDSL 6.5*, 337-354.