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Majority Quantification and Quantity Superlatives

A Crosslinguistic Analysis of *Most*

CARMEN DOBROVIE-SORIN AND ION GIURGEA

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General Preface

The theoretical focus of this series is on the interfaces between subcomponents of the human grammatical system and the closely related area of the interfaces between the different subdisciplines of linguistics. The notion of "interface" has become central in grammatical theory (for instance, in Chomsky's Minimalist Program) and in linguistic practice: work on the interfaces between syntax and semantics, syntax and morphology, phonology and phonetics, etc. has led to a deeper understanding of particular linguistic phenomena and of the architecture of the linguistic component of the mind/brain.

The series covers interfaces between core components of grammar, including syntax/morphology, syntax/semantics, syntax/phonology, syntax/pragmatics, morphology/phonology, phonology/phonetics, phonetics/speech processing, semantics/pragmatics, and intonation/discourse structure, as well as issues in the way that the systems of grammar involving these interface areas are acquired and deployed in use (including language acquisition, language dysfunction, and language processing). It demonstrates, we hope, that proper understandings of particular linguistic phenomena, languages, language groups, or inter-language variations all require reference to interfaces.

The series is open to work by linguists of all theoretical persuasions and schools of thought. A main requirement is that authors should write so as to be understood by colleagues in related subfields of linguistics and by scholars in cognate disciplines.

In this empirically rich crosslinguistic exploration of the quantifier MOST, Dobrovie-Sorin and Giurgea uncover a new typology of quantificational elements which different languages draw from to express the notion of the largest part of some substance or set of entities. In addition to a straightforward partitive, they show that human language also has available a distributive and cumulative quantifier to express these meanings. They tie the different semantics down to distinct syntactic positions within the nominal projection, using this to explain the different distribution of the quantifiers in different languages and show how their approach improves over classical theories of MOST as a generalized quantifier or superlative. The approach shows how careful

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attention to syntactic detail across a wide range of languages can give deep insight into issues of meaning and opens up new lines of research into cumulative quantification, an area that has been neglected in the literature.

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Hagit Borer

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List of Abbreviations

Abbreviations used in glosses

1, 2, 3	1st, 2nd, 3rd person
ABL	ablative
ABS	absolutive
ACC	accusative
ADJ	adjectival suffix
ADV	adverbial suffix
AGR	preposed agreement marker
AOR	aorist
ART	article
ASP	aspectual particle
CL	clitic
CLS	classifier
COM	common gender
COMP	comparative
COP	copula
DAT	dative
DEF	definite
DIR	directive
DOM	differential object marker
ERG	ergative
EXIST	existential
EZ	ezafe
F	feminine
FUT	future
GEN	genitive (in Romanian, also the preposed genitive marker agreeing with the possessee)
HAB	habitual
IMPF	imperfective
INF	infinitive
INST	instrumental
INT	interrogative marker
LOC	locative
M	masculine
MPAS	mediopassive

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N	neuter
NOM	nominative
OBL	oblique
PART	particle
PFV	perfective
PL	plural
POSS	possessive
PRES	present
PSPT	past participle
PST	past
PTPL	participle
REFL	reflexive
SG	singular
SBJV	subjunctive
SUP	superlative
TOP	topic marker

Language abbreviations

Ady.	Adyghe
Alb.	Albanian
Ar.	Arabic
Arm.	Armenian
Bas.	Basque
Bre.	Breton
Bulg.	Bulgarian
Cat.	Catalan
Cz.	Czech
Dan.	Danish
Du.	Dutch
Engl.	English
Fr.	French
Ge.	German
Geo.	Georgian
Gr.	Greek
Heb.	Hebrew
Hung.	Hungarian
Ice.	Icelandic
It.	Italian
Ja.	Japanese
Latv.	Latvian
Lith.	Lithuanian

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Mand.	Mandarin
Norw.	Norwegian
Per.	Persian
Po.	Polish
Port.	Portuguese
Ro.	Romanian
Ru.	Russian
S-C	Serbo-Croatian
Sl.	Slovenian
Sp.	Spanish
Sw.	Swedish
Swa.	Swahili
Syr.	Syrian
Tur.	Turkish
Wol.	Wolof

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1
Introduction

MOST is famous for having provided the paradigmatic example of a natural language quantifier that cannot be analyzed in terms of the quantifiers of classical logic combined with connectives. The GQT (Generalized Quantifier Theory) analysis treats this element as a semantic unit, thus ignoring its remarkable morphosyntactic form, which is identical to the superlative form of MANY/MUCH. Based on this observation, Hackl (2009) analyzes the proportional quantifier *most* in English (as well as *meist* in German) as a superlative adjective. Although it constitutes a crucial step towards a compositional analysis of MOST, Hackl's analysis is in fact not compositional enough, since it does not pay attention to important syntactic distinctions, such as (non-) partitivity or (im)possibility of combining with mass NPs. As such, his proposal can be shown to fail in empirical adequacy even for well-studied languages, such as English and German. Our goal will be to provide fine-grained morphosyntactic descriptions of MOST in a large number of languages, and to propose semantic analyses that can account for the similarities and differences among the various distributional types of MOST that need to be distinguished. Since crosslinguistic data on MOST is scarce in both the formal and the descriptive literature, we relied on questionnaires. Besides providing a large body of data for which we propose detailed analyses of the morphosyntax, this book is theoretically interesting in that it deals with proportional mass quantification, which has been massively understudied in the formal semantic literature.

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1.1 The results of this book

The goal of this book is to provide a fine-grained description of proportional MOST across languages. Morphosyntactic generalizations gathered from a large number of languages will constitute the empirical basis of the semantic analyses.

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1.1.1 A distribution-based typology of proportional MOST

We will distinguish between proportional MOST, which is morphologically identical to the superlatives of MANY or MUCH, and expressions of the type THE LARGEST PART OF and THE MAJORITY OF. This book is primarily concerned with MOST, but THE LARGEST PART OF will be frequently invoked: as we will see, whenever MOST is ruled out in a given configuration or in a certain language, the intended meaning can be expressed by using THE LARGEST PART OF or THE MAJORITY OF.

Our main empirical result is the identification of several distinct distributional types of MOST. We will examine separately non-partitive and partitive configurations. Concentrating first on non-partitives, we will identify a "distributive" and a "cumulative" MOST ($\text{MOST}_{\text{dist}}$ and MOST_{cum}, respectively). The following generalizations will be shown to hold crosslinguistically:

(1) a. $\text{MOST}_{\text{dist}}$ allows only quantification over atomic domains. It cannot quantify over mass domains (nor does it allow collective quantification).
b. MOST_{cum} allows mass and collective quantification.

The term "quantification" used in these generalizations does not refer to an operation that necessarily involves counting. This is clear for "mass quantification", which involves measuring, but not counting.

The following contrast, observed by Dobrovie-Sorin (2013b), shows that the Romanian MOST is an instantiation of $\text{MOST}_{\text{dist}}$:

(2) a. Cei mai mulți studenți din grupa mea au picat
the more many students of-in group-the my have fallen
la examenul de lingvistică.
at exam-the of linguistics
'Most students in my class failed the linguistics exam.'

b. *Cel mai mult vin din pivnița mea a fost furat
the more much wine of-in cellar-the my has been stolen
anul trecut.
year-the past'
'Most of the wine in my cellar was stolen last year.'

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This type of MOST is also found in Hungarian and Icelandic.[1]

The cumulative type of MOST, MOST_{cum}, is found in German, Scandinavian languages, Greek, and Basque. This is demonstrated by the possibility of combining with mass NPs:

(3) Der meiste Wein aus meinem Keller wurde gestohlen. (Ge.)
the most wine from my cellar was stolen
'Most of the wine in my cellar was stolen.'

MOST_{cum} also differs from $\text{MOST}_{\text{dist}}$ when combining with plurals. In addition to the distributive interpretation (see (4a)), it also allows a collective reading of the main predicate (see (4b)), which is ruled out with $\text{MOST}_{\text{dist}}$ (see (5)):

(4) a. Die meisten Demonstranten kennen diesen Politiker. (Ge.)
the most demonstrators know this politician
'Most demonstrators know this politician.'

b. Die meisten Demonstranten zerstreuten sich.
the most demonstrators dissipated 3REFL
'Most of the demonstrators dispersed.'

(5) *Most demonstrators dispersed.

In sum, the type of non-partitive MOST found in German can combine with mass and plural NPs, which denote cumulative properties. Hence the label MOST_{cum}. The identification of the two types of MOST described above is a result for which this book can be credited.[2]

Neither $\text{MOST}_{\text{dist}}$ nor MOST_{cum} can take singular count nominals as complements:

(6) a. *Cel mai mult oraş a fost distrus. (Ro.)
the more many city has been destroyed

b. *Die meiste Stadt wurde zerstört. (Ge.)
the most city was destroyed
Intended: 'Most of the city was destroyed.'

[1] See also the English proportional *most* when it combines with particular-referring NPs that denote sets of particular individuals, e.g. *most students in my class* vs. **most water in the tub*. The analysis of the English *most* is complicated by examples of the type *Most water is liquid*, in which *water* is to be analyzed as kind-referring (see §§2.2 and 4.5).

[2] Szabolcsi (2012a) noticed in passing the possibility of combining German *meist* with mass NPs, but did not suggest any explanation for the contrast between German *meist* and English *most*. Dobrovie-Sorin (2013b) suggested that DPs headed by *meist* could be analyzed as covert partitives. This will in fact be proved to be wrong in Ch. 3.

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The fact that $\text{MOST}_{\text{dist}}$ is unable to combine with singular count Ns is surprising in the following respect: under the standard GQT analysis, MOST denotes a relation between sets of atoms, and therefore we are puzzled to see that MOST cannot combine with nominals that denote sets of atoms, but instead requires plural-marked NPs, which denote sets of pluralities. This is a hard question, which will be addressed in §2.3.3.

The unacceptability of MOST_{cum} shown in (6b) is unsurprising from the morphosyntactic point of view: MOST_{cum}, on a par with MANY/MUCH, can combine with NP_{pl} and NP_{mass}, but not with NP_{sg}. This type of example is important, however, since it points to the necessity of distinguishing between MOST_{cum} in non-partitive and partitive contexts. Indeed, the example becomes grammatical as soon as we insert MOST_{cum} in a partitive configuration:

(7) Das meiste der Stadt wurde zerstört. (Ge.)
the.NSG most the.FSG.GEN city(F) was destroyed
'Most of the city was destroyed.'

The semantics of this type of example involves quantification over parts of atoms, and the observed acceptability of (7) indicates that the semantics of MOST_{cum} allows this type of quantification, provided that the atom itself (in this case the atom is the house) is supplied in the syntax, by the DP introduced by the partitive preposition. As will become clear immediately below, the quantification over parts of atomic entities performed by majority quantifiers is an instance of *mass* quantification[3] (this issue will constitute an important part of Chapter 4).

The contrast between (6b) and (7) points to an important generalization, which constitutes the signature property of the MOST occurring in partitives:

(8) Proportional MOST can quantify over parts of atoms only in partitive configurations.

Note that (8) is formulated as a constraint on proportional MOST in general, which means that we intend (8) to cover not only the behavior of MOST_{cum}

[3] Our notion of "quantification over parts of entities" is crucially different from what Wągiel (2018) calls "subatomic quantification", which is an instance of count quantification, since it refers to the application of plural number and cardinals to parts of entities. Wągiel's main goal is to distinguish between parts of entities that can be counted and parts that cannot be counted (in our terms, "concrete" and "functional" parts: see §5.2). Our own concern is with parts of entities that cannot be counted but nevertheless can be quantified over by MOST.

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described above, but also a type of MOST that is specialized for partitives (see the discussion of example (11)).

Note also that (8) is not a biconditional, which means that it is not true that any type of MOST allows quantification over parts of atoms as soon as it is inserted in a partitive. Indeed, partitive contexts have no effect on the $\text{MOST}_{\text{dist}}$ found in Romanian, which inherits all of its constraints from non-partitive contexts (Hungarian behaves by and large in the same way, but see §4.4.3.1 for some exceptions). Thus, both mass quantification and quantification over parts of atoms are ruled out in partitive DPs that embed $\text{MOST}_{\text{dist}}$. Only distributive quantification is allowed (just as in non-partitives):

(9) a. Cei mai mulți din studenții mei au picat la examenul
the more many of students-the my have fallen at exam-of
de lingvistică. (Ro.)
of linguistics
'Most of my students failed the linguistics exam.'

b. *Cel mai mult din vinul meu a fost furat
the more much of wine-the my has been stolen
anul trecut.
year-the past

c. *Cel mai mult din orașul nostru a fost distrus.
the more many of city-the our has been destroyed
Intended: 'Most of our city was destroyed.'

These observations point to the following empirical generalizations:

(10) a. Partitivity does not suspend the constraints to which $\text{MOST}_{\text{dist}}$ is subject in non-partitives: mass quantification (including quantification over parts of atoms), as well as collective quantification, are disallowed.

b. Partitivity makes possible quantification over parts of atoms for MOST_{cum}.

In Chapter 4 we will show that both of these two generalizations can be explained by assuming that insertion into a partitive configuration does not change the semantic type that MOST has in non-partitives.

The generalization in (10a) seems to be contradicted in English. If we leave aside generically interpreted examples (to which we come back in §1.1.2), the

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MOST of this language qualifies as $\text{MOST}_{\text{dist}}$ in non-partitives (because it disallows mass quantification), but in partitives mass quantification (including quantification over parts of atoms) is allowed:

(11) a. *John drank most milk in the fridge.
b. John drank most of the milk in the fridge.
c. John read most of the book.

In Chapter 4 we will argue that the English data briefly described here does not constitute a counterexample to the generalization in (10a) because the MOST occurring in English partitives is not $\text{MOST}_{\text{dist}}$, but rather a MOST that is specialized for partitives, labeled "partitive MOST" and notated $\text{MOST}_{\text{part}}$ in this Introduction.[4]

In sum, based on observations in around 40 languages, we have distinguished between two distributional types of MOST in non-partitives, $\text{MOST}_{\text{dist}}$ and MOST_{cum}. No language can be shown to have both of these non-partitive MOSTs, because the contexts of use of MOST_{cum} properly include the contexts of use of $\text{MOST}_{\text{dist}}$.

Both $\text{MOST}_{\text{dist}}$ and MOST_{cum} can occur in partitive configurations. Given on the one hand our respective analyses of these two MOSTs and on the other hand independently motivated analyses of partitive DPs, we expect that $\text{MOST}_{\text{dist}}$ will preserve its constraints from non-partitives in partitives, whereas the combinatorial possibilities of MOST_{cum} are enlarged: because in partitives MOST_{cum} takes a full DP as a complement, it can in particular combine with DPs headed by singular count Ns, as in (7) above; in such contexts, MOST_{cum} quantifies over parts of atoms, which is excluded in non-partitives (where MOST_{cum} can only combine with mass and plural NPs).

Turning now to $\text{MOST}_{\text{part}}$, the proportional MOST that is "specially designed" for partitives, it will be shown to exist in two groups of languages. One group is constituted by English and Icelandic, which have $\text{MOST}_{\text{dist}}$ in non-partitives but exhibit an unexpected larger distribution of MOST in partitives. We have therefore concluded that English and Icelandic have $\text{MOST}_{\text{dist}}$ in non-partitives and $\text{MOST}_{\text{part}}$ in partitives. The other group of languages that have $\text{MOST}_{\text{part}}$ are

[4] This label, which signals the descriptive notion of "partitive", will be changed to the more technical MOST_{RP} in Ch. 4, which is dedicated to the various types of MOST that may occur in partitives. The RP subscript on MOST_{RP} stands for Zamparelli's (1998) "Residue Phrase", a constituent headed by the functional head R (from Residue), realized as the preposition OF (or as genitive case). In the context of Ch. 4, the label MOST_{RP} is useful not only because it is theoretically more precise, but also because it allows us to distinguish between MOST_{RP}, which takes an *of*-DP as a complement, and another MOST, which takes an *of*-less DP as a complement (hence the label MOST_{DP} used in Ch. 4). To keep things as simple as possible at this introductory stage, we will ignore MOST_{DP} in this Introduction and use $\text{MOST}_{\text{part}}$ instead of MOST_{RP}.

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Table 1.1. Distributional types of majority MOST

	$\text{MOST}_{\text{dist}}$	MOST_{cum}	$\text{MOST}_{\text{part}}$
Plural restrictor, distributive main predicate	✓	✓	✓
Plural restrictor, collective main predicate	*	✓	✓
Mass restrictor	*	✓	✓
Singular count restrictor, in non-partitives	*	*	not applicable
Singular count restrictor, in partitives	*	✓	✓
Languages	Romanian, Hungarian, English, Icelandic	German, Dutch, Swedish, Norwegian, Danish, Greek, Basque	English, Icelandic, Italian, Albanian, Syrian, Arabic, Wolof

languages that have neither $\text{MOST}_{\text{dist}}$ nor MOST_{cum} in non-partitives but allow a proportional reading of MOST in partitives. Italian and Albanian belong to this group (see §4.4.3.1).

The three-way typology presented in Table 1.1, based on data from 40 languages, constitutes our main empirical result. Previous analyses, for their most part conducted on English, implicitly assumed that proportional MOST is to be given a unified syntax–semantics analysis across languages and across all the syntactic configurations in which it appears.

This typology extends to certain words or phrases that express majority judgments (hence the term "majority quantifiers") but are not morphologically identical to the superlative of MANY/MUCH. The forms of such quantifiers are quite diverse: positive or comparative forms of MANY/MUCH, the noun PART modified by a size adjective (LARGE) used in the superlative, positive, or (more seldom) comparative form, and finally some forms that are lexically designed to signal majority readings: nouns of the type MAJORITY and, less frequently, adjectives. Non-partitive majority quantifiers other than MOST are quite rare across languages (much like the non-partitive MOSTS). But interestingly, the distinction between distributive and cumulative quantifiers observed for MOST can also be observed for quantifiers that are not morphologically identical to the superlative of MANY/MUCH (Table 1.2).

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Table 1.2. Non-partitive majority quantifiers other than MOST

Type	Distributive	Cumulative		
Form	MUCH+suffix	(THE) MORE	LARGE-PART	special form
Language	Turkish	Bulgarian, Hindi	Chinese	Japanese

It is interesting to note that the Qs listed above behave on a par with $\text{MOST}_{\text{dist}}$ and MOST_{cum} when used in partitives: the distributive Q does not relax its distributional potential (allowing only distributive quantification), whereas the cumulative Qs allow singular count restrictors in addition to mass and plural restrictors.

The crosslinguistically most widespread way of expressing majority judgments is the use of designated words or phrases that require a partitive complement, e.g. nominals of the form LARGE(ST) PART or MAJORITY. We have been able to observe various other isolated forms that convey the same meaning, which we have listed in Table 1.3. Because these forms take an *of*-DP complement, they allow any kind of restrictor (plural, mass, or singular count), on a par with $\text{MOST}_{\text{part}}$ and the MOST_{cum} occurring in partitives.

Table 1.3. Partitive majority quantifiers other than MOST

LARGE(ST) PART	MAJORITY	MUCH	MORE	adj. + entity-denoting bare NP
Romance, Germanic, Slavic, Baltic, Albanian, Breton, Greek, Hungarian, Armenian, Turkish, Swahili	Romance, Germanic, Czech, Polish, Serbo-Croatian, Slovenian, Russian, Albanian, Hebrew	Turkish	Persian, Adyghe	Latin, Hindi

A special chapter is devoted to expressions of this type, which, like $\text{MOST}_{\text{part}}$, may combine with plural, mass, or count singular definite DPs:

(12) a. Ion a citit cea mai mare parte din (Ro.)
Ion has read the more large part of
cărțile astea.
books-the these
'Ion read most of these books.'

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b. Ion a băut cea mai mare parte din laptele ăsta.
Ion has drunk the more large part of milk-the this
'Ion drank most of this milk.'
c. Ion a construit cea mai mare parte din casa asta.
Ion has built the more large part of house-the this
'Ion built most of this house.'

The robust productivity of the type THE LARGEST PART across languages calls for an analysis that derives the proportional meaning in a (quasi-)compositional way from the regular meanings of LARGEST and PART (see §1.1.3).

The three-way distinction presented in Table 1.1, which has been established on purely distributional criteria, is first of all a useful typological distinction, which to our knowledge had not been made before. Although the number of languages we have taken into consideration is relatively small (around 40), we believe it to be representative. Indeed, we have checked the data in all the languages with proportional MOST, which represent a subset of the languages with morphosyntactic superlatives (and in particular with superlative MOST), which themselves are relatively rare compared to the overall number of natural languages. We therefore believe that the present work can be viewed as typological. An extensive typological survey on MOST is reported in Coppock et al. (2017), but this work only discusses the existence of a proportional reading in addition to the superlative. The distinction between several syntactic and semantic types of proportional MOST, as well as the inclusion of other majority expressions in the typology, are novel results of our book.

In addition to constituting a piece of typological work, this book offers more than is usually found in the typology-oriented literature. For several languages, we have indeed provided case studies that go beyond the descriptions found in the literature. This applies not only to less studied languages (see our observations on the Japanese *hotondo* and the Chinese *dabufen*, the Latin *plērusque*, the Hindi *zyādātar*, Bulgarian *povečeto*, Turkish *çoğu*, Basque *gehien*, Wolof *li ëpp*, Syrian Arabic *aktar*, etc.) but also to well-studied languages (English, German, Scandinavian, Romance). These analyses bear not only on proportional MOST, but also on other expressions that have proportional meanings, which we briefly presented above.

1.1.2 Syntactic assumptions

This book is theoretically oriented. We have aimed to make explicit the abstract syntactic structures underlying the various types of MOST that we

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identified, and on the basis of those structures to propose semantic analyses that correctly capture the observable intuitive meanings.

Regarding syntactic representations, we will assume that in languages with articles, the maximal projection of nouns (N_{max}) is in the general case a DP, i.e. a constituent headed by the functional head D^0, which may be realized by articles, demonstratives,[5] quantificational determiners (*each*, *every*), etc.

Crucial for the analysis of our data will be an intermediate functional projection, postulated by Schwarzschild (2006) for the analysis of pseudo-partitives and used by Solt (2009; 2015) for her in-depth analysis of MANY/MUCH. Following Solt, we will use the label MeasP, which captures the fact that $Meas^0$ hosts various measure functions (volume, surface, length, width, etc., including cardinality) instead of Schwarzschild's MonP.[6] Spec,MeasP hosts Measure Phrases (300g, 2l, etc.) and cardinals, as well as MANY/MUCH and their degree variants, MORE and MOST. We have ignored the number head currently assumed in the syntactic literature since Ritter (1991),[7] which seems irrelevant for the analysis of MOST.

The exact analysis of DPs embedding MOST will prove to be particularly intricate. We will show that, for certain languages at least (see the Romanian *cel mai mult/cei mai mulți* 'the more much/many', French *le plus*), the definite article and MOST form a morphosyntactic constituent, which as a whole sits in Spec,MeasP.

In other languages, there is no evidence for a constituent [THE+MOST] in syntax, as THE can be replaced by other items such as possessives. We will argue, however, that in the case of $MOST_{dist}$ and $MOST_{cum}$ preceded by THE, the article is not interpreted.

Moreover, D^0 can sometimes be null, in which case MOST itself can sit not only in Spec,MeasP (the null D^0 being interpreted as an existential—see Scandinavian) but also in Spec,DP, with a null D^0 interpreted as an iota operator (see Romanian quality superlatives and possibly also superlative MOST in certain contexts). Another possibility is that MOST itself realizes D^0 (see the English proportional *most* in non-partitives).

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[5] We remain neutral as to whether demonstratives sit in D^0 or in Spec,DP.

[6] MonP abbreviates Monotonicity Phrase, which is meant to signal the fact that this projection is used for measuring functions that are monotonic on the part–whole structure of the measured entity.

[7] Some authors assume that number features do not correspond to a dedicated functional head but instead attach to functional heads that are independently generated on the syntactic spine (e.g. *little n*: see Bale 2017). Heycock and Zamparelli (2005) use the label NumP for the projection hosting cardinals and quantity adjectives (labeled MeasP in this book) and PlP for a lower projection whose head introduces the plural feature and, on the semantic side, the pluralization operation.

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The list in (13) summarizes the main configurations that we proposed for the various guises of proportional $\text{MOST}_{\text{dist}}$ we have identified:

(13) a. $[_{\text{DP}}\ [_{\text{D}}\ \text{MOST}]\ [\text{NP}]]$ ($\text{MOST}_{\text{dist}}$, Engl.)
b. $[_{\text{DP}}\ [_{\text{SpecDP}}\ [_{\text{MOST}}\text{THE MORE MANY}]]\ [\text{D}^0\ [\text{NP}]]]$ ($\text{MOST}_{\text{dist}}$, Ro.)
c. $[_{\text{DP1}}\ \text{THE}\ [_{\text{DP2}}\ \text{MOST NP}]]]$ ($\text{MOST}_{\text{dist}}$, Hung.)

The clearest case seems to be English: the absence of THE can be used as evidence in favor of MOST itself occupying D^0, hence its observable quantificational determiner status. For Romanian the evidence is also quite clear, because constituency tests clearly indicate that strings of the form THE + MORE + MANY/MUCH form a constituent, on a par with those strings in which we find quality adjectives in the position of MANY/MUCH:

(14) $[_{\text{DP}}[_{\text{SpecDP}}\ [\text{THE MORE GOOD}]]\ [\text{D}^0\ [\text{NP}]]]$
(superlative adjectives, Ro.)

Although configurationally identical to DPs embedding superlative adjectives (see (14)), those DPs that embed $[_{\text{MOST}}\text{THE MORE MANY}]$ (see (13b)) differ regarding the semantics of the null D^0, which is uninterpretable with MOST (letting MOST itself act as a determiner) and interpretable as the iota operator in DPs with quality superlatives.

The underlying syntax of Hungarian DPs is more complex in that it involves a higher functional level, assimilated to a DP-internal complementizer head by Szabolcsi (1994). This higher position being filled by THE, MOST itself arguably sits in D^0.

In sum, for those languages that have $\text{MOST}_{\text{dist}}$ we found some morphosyntactic evidence showing that $\text{MOST}_{\text{dist}}$ sits in D^0 or Spec,DP. This configuration is different from DPs embedding a superlative-interpreted MOST (which arguably sits in Spec,MeasP).

Turning now to languages with MOST_{cum}, we observed that the definite article is consistently obligatory. This led us to assume that at S-structure MOST sits in Spec,MeasP, but undergoes complex head formation with THE (either in overt syntax or at LF):

(15) $[_{\text{DP}}\ \text{THE}\ [_{\text{MeasP}}\ \text{MOST}\quad [\text{Meas}^0\ \text{NP}_{\text{pl/mass}}]]]$ (MOST_{cum})
LF: [THE+MOST] $[\text{Meas}^0\ \text{NP}_{\text{pl/mass}}]$

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Under our analyses, both $\text{MOST}_{\text{dist}}$ and MOST_{cum} are immediately dominated by DP at LF, and as such they act as quantificational determiners. There is, however, a crucial configurational difference between $\text{MOST}_{\text{dist}}$ and MOST_{cum}: the former takes NP as a complement, whereas the latter takes a MeasP complement. It is this configurational difference that is the basis for the denotational difference we have observed: the former is necessarily distributive, whereas the latter is a cumulative quantifier (see §1.1.3 and Chapter 3 for the semantic composition).

A null D^0 with the semantics of a maximalizing operator is assumed for the analysis of kind-referring bare NPs (e.g. *Cats are intelligent*). Following Matthewson (2001), we will propose that kind-referring DPs with a null D can occur not only in argument positions, as in (16a), but also as complements of MOST, as in (16b):

(16) a. Gold is yellow.
$[_{DP}\ [_{D}\emptyset]$ gold] is yellow

b. Most gold is yellow.
[Most $[_{DP}\ [_{D}\emptyset]$ gold]] is yellow

This does not mean, however, that English sequences of the form *most NP* always involve kind-referring complements (as proposed by Matthewson). We will indeed argue that English *most* can also take property-denoting, genuinely bare NPs as complements:

(17) Most students in this school had summer jobs last year.
Most $[_{NP}$ students in this school] had summer jobs last year.

Regarding partitive configurations, we opted for the two-NP hypothesis (cf. Jackendoff 1977; Milner 1978; Cardinaletti and Giusti 1992; 2006; Zamparelli 1998; Barker 1998), according to which partitive DPs of the type *two/many of the boys* contain a null N before *of*. For count partitives it is currently assumed that this N is a copy of the nominal element inside the *of*-DP. For mass partitives, which are much less studied, we have assumed a null grammatical N with a general meaning (STUFF). We adopted Zamparelli's (1998) hypothesis of a functional constituent labelled RP ("Residue Phrase") which has the partitive DP in the complement position and the null NP in the specifier position (see §4.2).

The parametric difference between languages with and without articles seems to be relevant for whether or not a given language allows the proportional reading of MOST: languages without articles may allow the superlative

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reading of MOST, but in the general case they disallow the proportional reading of MOST. (This observation goes back to Živanović 2007, who refers to languages that have a *definite* article.)

In order to suggest an explanation for this generalization, we need to know whether languages without articles are to be analyzed as "NP-languages" (Bošković 2005; 2008)—i.e. languages that lack the D-level—or as languages in which the D-level is projected but filled with null elements whenever nothing overt fills the D^0 position. The suggestion made in (18) represents an intermediate view, which seems sufficient for our purposes:

(18) In languages without articles, the D^0-level is projected only when an overtly realized determiner is merged in D^0.

We submit that the reanalysis of superlative MOST as a determiner element (filling D or SpecDP either in overt syntax or at LF) applies more easily, maybe only, in languages where the D-level is generalized.

1.1.3 Our semantic analyses in a nutshell

Corresponding to the three distributionally distinct types of MOST ($MOST_{dist}$, $MOST_{cum}$, and $MOST_{part}$ described in §1.1.1) uncovered by our empirical investigation, we will propose distinct compositional analyses, yielding a proportional reading via distinct syntax–semantics mappings. For each of our MOSTs, a recurrent issue will be whether a superlative-based analysis—which would have the advantage of accounting for the superlative morpho-syntactic form—is adequate.

The simplest case is $MOST_{dist}$, which according to our proposal is merged under D^0 and takes a property-denoting NP as a complement. We will show that for this type of MOST a superlative-based analysis is clearly inadequate, which will lead us to maintain Mostowski's (1957) analysis (see §1.2.1), to which we added the explicit constraint that the restrictor set contains only atoms (this restriction is needed because the complement of MOST is morphologically plural; we assume the so-called "inclusive" analysis, according to which plural NPs denote the closure under sum of the NP property, without excluding the atoms):

(19) $[\![MOST_{dist}]\!] = \lambda P.\, \lambda Q.|\{x: P(x) \wedge Atom(x)\} \cap \{x: Q(x)\}| > |\{x: P(x)) \wedge Atom(x)\} - \{x: Q(x)\}|$
defined iff P and Q contain atoms

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To illustrate, the example in (20) is true if and only if the condition in (21) is satisfied:

(20) Most people at the party were drunk.

(21) $\{x: people(x) \wedge at\text{-}the\text{-}party(x) \wedge Atom(x)\}| \cap \{x: drunk(x)\}| > |\{x: people(x) \wedge at\text{-}the\text{-}party(x) \wedge Atom(x)\}| - \{x: drunk(x)\}|$

For MOST_{cum} and MOST_{part}, a superlative-based analysis seems more plausible. We will, however, argue that both Hackl's (2009) and Hoeksema's (1983) implementations rely on ad hoc assumptions that should be avoided for a better understanding of the syntax–semantics analysis of MOST_{cum} and MOST_{part} (see §§3.3.1 and 3.3.2 respectively). A still different superlative-based analysis of MOST, due to Kotek et al. (2011), will be discussed and rejected in §4.8.

Our own proposal will be that MOST_{cum} denotes a quantificational determiner of the "cumulative" type (i.e. which takes a cumulative—plural or mass—property in its restrictor). A first version of the quantificational analysis of MOST_{cum} follows Higginbotham's (1994) analysis, according to which mass quantifiers compare the Meet of two entities with the difference between them (see §1.2.4). This type of denotation, designed for mass quantification, can be extended to cover collective quantification (for this extension, see Dobrovie-Sorin 2014; 2015):

(22) $[\![\text{MOST}_{cum}]\!] = \lambda P_{et}.\lambda Q_{et}.\mu(\sigma x.P(x) \cap \sigma y.Q(y)) > \mu(\sigma x.P(x) - \sigma y.Q(y)))$

In those cases in which all Ps are Q or no P is Q, this formula requires the assumption of a "zero region" of mereology (corresponding to the empty set of set theory), which is controversial. To avoid this problem, we will rewrite this formula by introducing an existential quantifier:

(23) $[\![\text{MOST}_{cum}]\!] = \lambda P\ \lambda Q\ \ \exists x\ \ (P(x)\ \wedge\ Q(x)\ \wedge\ \mu(x)\ > \mu(\sigma y.P(y)\text{-}x))$

Given this denotation, the example in (24) is true if and only if the condition in (25) is satisfied:

(24) Der meiste Wein aus meinem Keller wurde gestohlen (Ge.)
the most wine from my cellar was stolen
'Most of the wine in my cellar was stolen.'

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(25) $\exists x.(\text{wine}(x) \wedge \text{in-my-cellar}(x) \wedge \text{stolen}(x) \wedge \mu(x) > \mu(\sigma y.(\text{wine}(y) \wedge \text{in-my-cellar}(y))\text{-}x))$

Turning now to partitive configurations, our semantic analyses will be based on the syntactic hypothesis briefly invoked in §1.1.2, according to which *of-* or genitive-marked DPs occurring in the complement position of MOST -are RPs, headed by the partitive head R^0, which denotes the part-of relation. Depending on whether R^0 takes a mass DP, a plural DP, or a singular count DP as a complement, RP will denote a set of mass entities, of plural entities, or of parts of atoms.[8]

According to the "null hypothesis", any kind of determiner, in particular MOST (under any of its guises—i.e. $\text{MOST}_{\text{dist}}$ and MOST_{cum}, which can also occur in non-partitives, and $\text{MOST}_{\text{part}}$, which is specially designed for partitives)—may syntactically combine with any RP, regardless of whether the complement of R^0 is a mass, plural, or singular count DP. Some of these combinations will however be filtered out by the semantics. Indeed, since $\text{MOST}_{\text{dist}}$ can quantify only over sets of atoms, it will do so not only in non-partitives but also in partitives. We can thus explain why in Romanian and Hungarian (which only have $\text{MOST}_{\text{dist}}$) the constraints observed for MOST in non-partitives are not relaxed in partitive configurations: MOST is incompatible with mass DPs and can only take distributive readings when combined with plural DPs; additionally, singular count DPs are also ruled out, since they would yield mass quantification, which is ruled out by $\text{MOST}_{\text{dist}}$.

The analysis sketched here also explains why, although MOST_{cum} has the same denotation in non-partitives and partitives, this quantifier nevertheless exhibits an extra possibility in partitives, namely the possibility to quantify over parts of singular entities. In non-partitives, the variable introduced by MOST_{cum} (see *x* in (23)) is characterized by the NP property (see *P* in (23)), which excludes parts of singular entities (the parts of the atoms in the denotation of a noun do not belong to the denotation of that noun, therefore *x* in (23) cannot represent a part of a singular entity). Quantification over parts of singular entities is made possible for MOST_{cum} in partitives due to the R^0 head, which yields a set of parts of singular entities when applied to singular counts DPs. Since properties of parts of atoms are mass properties, and since MOST_{cum} is allowed to take mass properties in its restrictor, we expect MOST_{cum} to allow singular DPs in the complement position of R^0. The MOST

[8] In the latter case, R^0 triggers a "grinding" type-shifting by which the referent of the singular count DP is mapped onto the maximal sum of its material parts (see Landman 1991).

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that is specialized for partitives (notated $\text{MOST}_{\text{part}}$ above) has the same semantic type (see (23)) and the same combinatorial properties as the MOST_{cum} occurring in partitives.

Turning finally to expressions of the type THE LARGEST PART, we will adopt a superlative-based analysis. The main reason for this choice is the cross-linguistic productivity and the syntactic decomposability of THE LARGEST PART (where *largest* may be replaced by other adjectives—see expressions of the type *a large part of*, *a considerable part of*, etc.). In this analysis, the superlative chooses the largest cell of a binary partition of the DP introduced by *of*. This partition is not contextually established (by which it differs from the comparison class of relative superlatives), but is introduced as a variable that gets existentially bound above the DP level. Previous analyses have proposed that this binary partition is introduced by the quantity superlative MOST, as a choice of its comparison class (Hoeksema 1983; Kotek et al. 2011). However, the crosslinguistic rarity of proportional MOST is unexpected if the choice of such a comparison class is generally available. Therefore, we think that the introduction of a binary partition is due to the functional noun PART (see (26), where the lexical specification of the partition is indicated by the subscript *maj* on the noun PART):

(26) $[\![\text{PART}_{\text{maj}}]\!] = \lambda y.\lambda x.\ [\text{Partition}(P,y) \wedge x \in P \wedge |P| = 2]$

The constituent PART_{maj}+*of*-DP combines regularly with the superlative modifier LARGEST and the result takes the definite article because there is a unique largest cell in the partition. At the clausal level, the partition variable is existentially bound.

We will extend the superlative-based analysis to other majority expressions: MAJORITY-type nouns (§5.5), THE+MORE/MOST+*of*-DP (Italian, Albanian, see §4.4.3.2, an earlier stage of English, see §5.6). We will argue that a null PART component is also present in some configurations where the "whole" is not marked by *of* or genitive case (see Latin *plērusque* and Syrian Arabic *aktar*, discussed in §5.7).

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1.2 Previous semantic analyses of MOST

The study of MOST has been primarily undertaken by logicians and semanticists, who pointed out that the semantics of this element does not correspond to that of a logical quantifier. It is only relatively recently that the attention of linguists was drawn to the superlative make-up of MOST, due to Hackl (2009).

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Hackl's superlative-based analysis is however faced with empirical problems, which constitute the starting point of the investigation presented in this book. After a presentation of Hackl's work we will briefly review some other proposals that deal with various aspects of the semantic analysis of MOST. It would, however, have been too long and tedious to present here all of the analyses of MOST found in the recent literature. Some of these (e.g. Crnić 2009; Nakanishi and Romero 2004) will be reviewed in those sections where they become relevant.

1.2.1 The GQT analysis of MOST

According to Mostowski's (1957) analysis, MOST denotes the relation between the NP set (P in the formula below) and the set denoted by the clausal predicate (or more precisely by the lambda-abstract over the position of [MOST NP]), notated Q below:

(27) MOST (P) (Q) = |{x: P(x)} ∩ {x: Q(x)}| > |{x: P(x)} ∩ {x: ¬Q(x)}|

Given this analysis, examples of the type in (28) are true iff (29) is satisfied; ∩ notates the general lattice-theoretic operation "meet" (intersection is meet applied to sets):

(28) Most students in my class have left early.

(29) |{x: student(x)} ∩ {x:left-early(x)}|>|{x: student(x)} ∩ {x: ¬left-early(x)}|

In words, (29) says that the set of students in my class for which the property denoted by the VP (*leave early*) is true has a greater cardinality than the set for which the VP property is false. Given this widely assumed analysis, MOST is a quantifier that denotes the relation between two sets, on a par with universal distributive quantifiers such as *each* and *every*.

The view of MOST as a relation between sets is maintained in the classical GQT (see Barwise and Cooper 1983). However, this analysis cannot apply to the types of MOST that allow mass nouns, MOST_{cum} and $\text{MOST}_{\text{part}}$: in evaluating the German example in (24) or the sentence *most (of the) water is polluted*, one does not count all the portions of substance that satisfy the properties *wine* or *water*. A solution to this problem, as an extension of the GQT analysis, was elaborated by Higginbotham (1994); see §1.2.3.

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1.2.2 Hackl (2009): proportional MOST as a superlative adjective

Hackl's (2009) work represents an important step towards an investigation of MOST that is not only concerned with the correct truth-conditions of sentences built with MOST, but attempts to derive them compositionally from the morphosyntactic analysis. Hackl's analysis has been widely adopted and constitutes the background of all subsequent work on MOST. In the various chapters of this book, especially in Chapters 2 and 3, we will argue that his theory cannot account for our empirical observations. The presentation below is somewhat more detailed than what we find in the main chapters of the book, where we will repeat only the main ingredients of Hackl's analysis.

When talking about superlatives, it is important to distinguish between their *absolute* and *relative* (or *comparative*)[9] readings:[10]

(30) John climbed the highest mountain.

a. absolute reading: John climbed Mount Everest (or—a mountain higher than all the other mountains in a contextually restricted discourse domain)

a′. Set of degrees = {d|∃x. x is a mountain, x is d-high}

b. relative (or comparative) reading: among several individuals who climbed a mountain, the mountain climbed by John is higher than the mountains climbed by anybody else

b′. Set of degrees = {d|∃x ∈ {John, Hilda, Jack . . . } |x climbed a d-high mountain}

In the absolute reading, the set of entities that are compared is established on the basis of the DP-internal material, plus general contextual restrictions (see (30a)). The set of degrees associated with this set of entities can be written as in (30a′). The computation of the relative reading, illustrated in (30b), needs to take into account DP-external material: each degree in the set of compared degrees (see (30b′)) involves not only a different referent of the DP where the superlative is found (a different mountain, in (30)), but also a different referent

[9] We prefer the term "relative superlative" to the term "comparative superlative" because (i) all superlatives involve comparison and (ii) the term "comparative superlative" can wrongly be understood as referring to a special morphological realization of the superlative, identical with the comparative or based on it.

[10] The distinction had been drawn already in earlier work (Ross 1964; Bowers 1969; Jackendoff 1972) and rediscovered by Heim (1985) and Szabolcsi (1986) (see Heim 1999).

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in another position inside the clause (John and alternatives to John, in (12)), the so-called "correlate". What functions as a correlate is usually a wh-operator or a focus (see Szabolcsi 1986), e.g. *who* and *MARY* in (31):

(31) a. Who wrote the best essay?
b. MARY gave the best answer.

One way of capturing the difference between absolute and relative readings, as well as certain scope ambiguities found with relative superlatives discovered by Heim (1999), is to assume that on the relative reading the degree operator raises out of the DP, whereas on the absolute reading it raises to a scope position inside the DP:

(32) a. John [-EST λx λd [x climbed a d-high mountain]]
b. John climbed [the -EST λx λd [x a d-high mountain]]

The foundational article for the absolute/relative distinction of superlatives, Szabolcsi (1986), claimed that the quantity superlatives *most* and *fewest* lack an absolute reading, being compatible only with a relative superlative reading (see also Gawron 1995):

(33) Gloria has the most fans
= Among the members of a set of persons, Gloria has more fans than anybody else
Set of degrees = {d|∃x ∈ {Gloria, Linda, Alice . . . }|x has d-many fans}
LF representation with Deg-raising: Gloria -EST λx λd. [x has d-many fans]

Hackl (2009) argued that the absolute superlative reading of MOST is not absent, but in fact can be identified to the proportional reading of MOST. In other words, the proportional and relative readings of *most* in English (as well as German *meist(e)*) may be viewed as parallel to the absolute and relative readings of superlative quality adjectives (*the best*, *the nicest*, *the highest*).

According to Hackl's syntactic analysis, proportional *most* sits in a modifier position, just like *highest*. But whereas in the case of quality superlatives, the D position is occupied by the definite article *the*, in the case of proportional *most*, the same position would be filled with an empty category interpreted as ∃:

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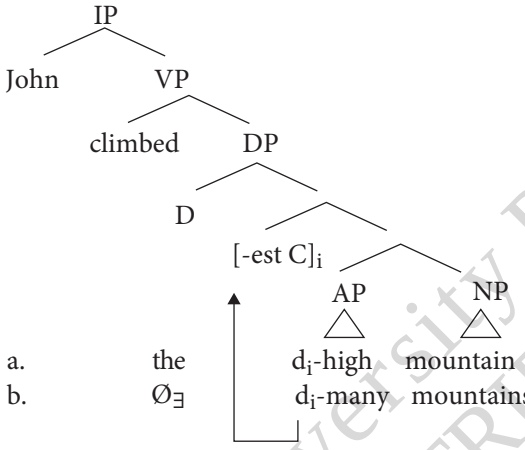
(34) a. John climbed [[$_D$the] [[$_{AdjP}$ highest] [$_{NP}$ mountain]]. (Hackl 2009)
b. John climbed [[$_D$Ø] [[$_{AdjP}$ most] [$_{NP}$ mountains]].

The proportional reading of *most* would thus depend on -EST raising inside the DP, which is parallel to the way in which the absolute reading of *the highest* is obtained under Heim's analysis:

(35)



Given this syntactic representation, the compositional semantics of proportional *most* would mimic the compositional semantics of absolute quality adjectives.

Hackl starts from the semantics of superlatives given in (36), roughly based on Heim (1999), where C is a covert variable over sets which provides the comparison class and D is a function from degrees into properties of individuals (<d,<e,t>>), corresponding to the denotation of the sister of the [-EST C] constituent after -EST raising (an [AP+NP] constituent for absolute superlatives, see (35) and (32b), and a clausal projection for relative superlatives, see (32a)):

(36) a. ⟦EST⟧ (C)(D)(x) = 1 iff $\forall y \in C[y \neq x \rightarrow \max\{d:D(d)(x) = 1\} > \max\{d:D(d)(y) = 1\}]$
b. ⟦EST⟧ (C)(D)(x) is defined only if $x \in C$ and $\exists y[y \neq x \wedge y \in C]$
(Hackl 2009: 37, 38)

On the absolute reading, the comparison class consists of all the elements inside the NP denotation (*modulo* contextual restrictions). In order to derive the proportional interpretation from the superlative interpretation, Hackl assumes that "two pluralities are non-identical (for the purpose of counting) only if there is no overlap between them" (Hackl 2009: 81). In sum, Hackl's

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proposal amounts to the formula in (36′), where the non-identity relation in the formula of quality superlatives (see (36a)) is replaced with non-overlap (the symbol ○ is read as "overlap"):[11]

(36′) a. ⟦EST⟧ (C)(D)(x) = 1 iff ∀y ∈ C[¬ y ○ x → max{d:D(d)(x) = 1} > max{d:D(d)(y) = 1}]
b. ⟦EST⟧ (C)(D)(x) is defined only if x ∈ C and ∃y[¬ y ○ x ∧ y ∈ C]

It can be shown that the property 'most mountains' thus defined is true of *any* plurality of mountains which contains *more than half* of the mountains in the universe of discourse. Take a plurality *a* in the set of mountains; by (36′), in order for *most(a)* to be true, *a* must be larger than the largest non-overlapping plurality, call it *b*; as *a* is compared with *all* non-overlapping pluralities, *b* is the supremum of all non-overlapping pluralities, which is the plurality which contains all mountains which are not in *a*. If *a* and *b* are equal, each of them represents what is called a *half* of the sum of all mountains; *a* is larger than *b* iff *a* contains more than half of all the mountains.

Here is a toy example illustrating this semantics:

(37) The universe of discourse, D, contains 5 mountains, {x1,x2,x3,x4,x5}
a. If X=x1+x2 the other elements of C are x3, x4, x5, x3+x4, x3+x5, x4+x5, x3+x4+x5. X is not larger than all of them (e.g. it is not larger than x3+x4). Hence, X is not in the denotation of *most mountains*.
b. If X=x1+x2+x3, the other elements of the comparison class are: x4, x5, x4+x5; X is larger than any of them. Hence, X is in the denotation of *most mountains*.
c. If X=x1+x4+x5, the other elements of the comparison class are: x2, x3, x2+x3; X is larger than any of them. Hence, X is in the denotation of *most mountains*.

According to Hackl, this semantics explains why in English there is no definite article with proportional *most*, in contrast to qualitative absolute superlatives, which obligatorily take the definite article (see (35a) vs. (35b)): the uniqueness/maximality requirement of the definite article cannot be satisfied because there

[11] Overlap is defined based on the parthood relation: two entities overlap iff they have a part in common:
(i) $x \circ y =_{def} \exists z\ (z \leq x \wedge z \leq y)$ (Champollion 2017: 14)

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is no single plurality which satisfies the semantics in (36′); *any* plurality that contains more than half of the members of the NP class (see (37)b and (37)c in our toy example) satisfies the formula (except for the supremum: if it is chosen as a value for x, the second conjunct of the definedness condition in (36′)[12] turns out false).

However, the lack of the definite article with proportional MOST does not hold in all languages (see Chapter 3). Hackl himself is aware of one such case, the German *die meisten*, for which he merely suggests in passing that in this language, the definite article is required by the superlative.

Hackl's analysis has two welcome consequences. First, it solves the problem of the lack of absolute readings of quantity superlatives: the absolute reading is not absent, but is simply the proportional one. Second, it explains why $\text{FEW}_{\text{superl}}$ does not have a proportional reading: there is no sum in a plural denotation which is smaller than any of the non-overlapping ones (taking the smallest possible elements, there will always be elements of equal size non-overlapping with them in the denotation of the overall DP); consequently, $\text{FEW}_{\text{superl}}(x)$ will always be false in the absolute reading.

In spite of its merits, Hackl's analysis is problematic on empirical grounds. One serious problem is the fact that in many languages, the superlative of MANY has the relative superlative reading but lacks the proportional reading. This observation was made by Živanović (2007), who examined 20 languages. More recently, based on a survey of 26 language families, Coppock et al. (2017) have come to the following conclusions:

(38) a. If a language has MOST (the superlative form of MANY), it will have a relative superlative reading.

b. Only in some languages in which MOST exists does it have a proportional reading.

For each language family, Coppock et al. (2017) calculated the proportion of subfamilies in which the proportional reading of the superlative of MANY is allowed and found that proportional readings arise at a rate of approximately 10 per cent. In §1.5, based on our own independent questionnaire-based research, we

[12] Note that if the supremum were allowed to satisfy the formula of proportional *most*, we would predict (i) to be true in case John climbed all the mountains in his country; but, as Hackl (2009: 82) notes, (i) is infelicitous, which he attributes to the fact that *most*(A)(B) is necessarily false if there are only two individuals in A (which follows from the denotation he proposes for *most* only if the supremum is excluded):

(i) ?? John has climbed most of the two mountains in his country.

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illustrate some languages in which the superlative form of MANY cannot have a proportional reading: Hebrew, Breton, Standard Eastern Armenian, Slavic languages, Baltic languages, Modern Persian, Turkish, Japanese, Chinese.

The existence of languages in which MOST cannot have the proportional reading argues against Hackl's view, according to which proportional MOST is to be analyzed as an absolute superlative reading of MANY. Indeed, the superlative forms of quality adjectives are crosslinguistically ambiguous between a relative and an absolute reading, and if the proportional reading of MOST were just the absolute superlative of MANY, we would expect it to be possible in all those languages that have a superlative form of MANY. Bošković and Gajewski (2009) and Pancheva (2015) proposed syntactic solutions to this problem.

Bošković and Gajewski (2009) start from a generalization according to which (i) every language that allows the majority reading of MOST has a definite determiner and (ii) every language that has a definite determiner (and has MOST) allows the majority reading. Their proposal is based on Bošković's (2008) hypothesis, according to which languages without articles are "NP-languages", i.e. they lack the D-level of representation. In such languages, the NP is an argument (compare DP languages, where it is the DP that is an argument) and as such it is not available for NP adjunction, due to the general ban on adjunction to arguments postulated by Chomsky (1986). Granting that NP adjunction is impossible in languages without articles, the lack of the proportional reading of MOST follows from Hackl's analysis, according to which the proportional reading of MOST relies on adjoining -EST to NP. Note however that the absence of a proportional reading of MOST is also found in languages with articles, such as Bulgarian, Hebrew, and Breton (see §1.5.1).[13] This constitutes evidence against the generalization stated in (ii) above, which considerably weakens Bošković and Gajewski's (2009) proposal. In the concluding chapter of this book we will propose a tentative explanation for the generalization in (i), which seems correct (*modulo* replacing "definite" article with "general argumental" article, for Basque).

Pancheva's (2015) account is based on the assumption that MANY and its degree forms MORE and MOST modify a null noun NUMBER (*many* = *large* NUMBER, *most* = *largest* NUMBER), which—depending on the language—may either head the nominal projection, as in (39a), or take part in a "measure"

[13] We may add certain languages where superlatives have the form of comparatives embedded in a definite DP—see Romance languages (with the exception of Romanian) and Albanian, discussed in §1.5.4. However, the absence of dedicated superlative morphology and the use of the definite article for signaling a superlative reading might allow for syntactic accounts compatible with Bošković and Gajewski's (2009) analysis.

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pseudo-partitive construction, more precisely sit in the specifier of the projection dedicated to quantity (our MeasP, which she calls MonP, following Schwarzschild 2006), as in (39b):

(39) a. [$_{DP}$ D [$_{MeasureNP}$ LARGEST [[$_{MeasureN}$ NUMBER] [$_{NP}$ articles]]]] (Bulg.)
* proportional, ✓ relative superlative

b. [$_{DP}$ D [$_{MonP}$ [$_{MeasureNP}$ LARGEST NUMBER] [Mon^{0} [$_{NP}$ articles]]]]
✓ proportional, ✓ relative superlative (Engl.)

Pancheva claims that in the structure in (39a), the comparison class only contains degrees of quantity (numbers, in the case of plurals), whereas in the structure in (39b), it contains the plural objects in the denotation of the lexical noun (in (39), pluralities of articles). Therefore, only those languages that have the structure in (39b) allow the Hackl-style derivation of the proportional reading.

In order to restrict the comparison class in (39a) to numbers, Pancheva proposes a semantics of "individuating" NUMBER which introduces existential binding of the external argument of the lexical NP (see (40a)); the gradable adjective *largest* that modifies this noun introduces a relation between degrees (see (40b)):

(40) a. $[\![\text{NUMBER}_i]\!] = \lambda P\, \lambda d\, \exists x\, [P(x)\ \&|x| = d]$ (Pancheva 2015: 41a)

b. $[\![\text{d-large NUMBER}_i \text{ (of) articles}]\!] = \lambda d'\, \lambda d\, \exists x\, [x \text{ is articles } \&\ |x| = d\ \&\ \mu\text{-size}(d) \geq d']$ (Pancheva 2015: 43)

As the variable *x* in this formula is in no way related to the main predicate, the paradoxical result of this semantic composition is that the overall DP will refer to a degree, so that *John read many articles* would mean that John read some number, rather than some articles. There may be ways of fixing this problem—for instance, one may use Grosu and Landman's (1998) analysis of degree relatives, which allows access to both the amount and the substance having a certain amount. The main idea would be that in the Bulgarian-type languages, the adjective only modifies the amount component of a pair $<d_{amount}, x_{entity}>$, so that the comparison class of -EST does not comprise various sums of articles.

However, other problems remain for Pancheva's analysis. First, as Pancheva herself admits, it is unclear why certain languages would disallow the "measuring" pseudo-partitive construction in (39b). Moreover, there is no independent evidence for the assumption that whenever MOST lacks the

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proportional reading, its structure is as in (39a), where NUMBER is by assumption "individuating".

Hackl's analyis also faces two other problems that the above-mentioned studies do not solve. The first problem is that it predicts that DPs with proportional MOST should be indefinite. However, in many languages proportional MOST comes with the definite article: as we will see in Chapter 3, all the languages with the German type of MOST, which we labeled MOST_{cum}, use the definite article with proportional MOST (see Dutch, Swedish, Danish, Norwegian, Greek, Basque); the use of THE in Germanic languages cannot be due to a formal requirement of superlatives (as Hackl suggests in a footnote), because superlatives are compatible with other determiners, including indefinite ones (see (41a)). Moreover, MOST is compatible with the absence of any determiner in Mainland Scandinavian, see (41b), but importantly, the interpretation is in this case necessarily superlative rather than proportional (for which the definite article is needed):

(41) a. Es gibt keine größte natürliche Zahl. (Ge.)
it gives no largest natural number
'There is no largest natural number.'

b. Vem läste flest böcker? (Sw.)
who read most books
'Who read the most books?'

The second problem is related to an observation made in §1.1. In certain languages, proportional MOST can be used with count, but not with mass nouns (see English in non-partitive and non-generic environments, Romanian, Hungarian, and Icelandic):[14]

(42) a. Cele mai multe case au fost renovate de curând. (Ro.)
the more many houses have been renovated recently
'Most houses have been recently renovated.'

b. *Cel mai mult vin a fost furat (*proportional reading)
the more much wine has been stolen
anul trecut.
year-the past
Intended: 'Most of the wine was stolen last year.'

[14] (42b) is only excluded on the proportional reading. It can have a relative superlative reading, in which *last year* is the correlate: the quantity of wine stolen last year is claimed to be bigger than the quantities of wine stolen in any other year.

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On its relative superlative reading, the superlative of MUCH is available in these languages:

(43) Cine a băut cel mai mult vin? (Ro.)
who has drunk the more much wine
'Who drank the most wine?'

The lack of a proportional reading with mass restrictors (as well as the lack of a proportional reading with collective predicates in the nuclear scope, which would yield collective quantification (see example (5) in §1.1), is a problem for Hackl's semantics, which should straightforwardly extend to mass restrictors. Since under Hackl's analysis proportional MOST is a superlative of quantity, it should be freely available with mass nouns as well as collective main predicates, on a par with MANY/MUCH and relative superlative MOST. The examples in (44) show that in Romanian, collective readings are allowed with the relative superlative MOST, but not with the proportional MOST:

(44) Când s-au întâlnit cei mai mulți colegi? (Ro.)
when REFL-have met the more many colleagues
'When did {the most (largest number of) / *most (of the)} colleagues meet?'
✓ relative, * proportional

The various empirical problems presented here suggest that there is some flaw in Hackl's semantic analysis and it seems reasonable to believe that the replacement of $\neq$ with $\neg_{\circ}$ (non-overlap) in the superlative entry for properties of pluralities is an illicit move.

This means that the problem of the absence of an absolute reading of MOST has actually not been solved by Hackl, and we should still look for an explanation. As already recalled above, the comparison class of absolute superlatives contains all the entities that satisfy the NP property, *modulo* appropriate contextual restrictions. In the case of quantity adjectives, which are properties of sums (pluralities or portions of stuff), the comparison class should consist of all the sums in the denotation of the NP. Such a comparison class clearly has no element smaller than all the elements distinct from the external argument (which may explain the impossibility of absolute *fewest*), but does have an element larger than any element distinct from it, namely the supremum. However, if we took the supremum as the entity that satisfies the absolute quantitative *most*, we would end up with an absolute *most* meaning *all*. This was observed by Teodorescu (2009), who proposed

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that absolute *most* does not exist because it is blocked by the more specific element *all*.

An alternative explanation would be to assume the following constraint on comparison classes:

(45) The elements of a comparison class cannot be ordered by part–whole relations.
$\forall x,y \in C \neg (x < y \vee y < x)$

Since join semi-lattices are sets with systematic part–whole relations between their elements, they are not legitimate structures for comparison classes.

Given the constraint in (45), the impossibility of the absolute reading of MOST would be due to an illegitimate computation: the semantics of superlatives requires a comparison class, but mass and plural NPs denote join semi-lattices, which cannot supply legitimate comparison classes.

1.2.3 Higginbotham's (1994) analysis of the mass quantifier MOST

Our empirical investigation has revealed the necessity of distinguishing—for non-partitive DPs—between a necessarily distributive MOST and a MOST that qualifies as a 'cumulative' quantifier, a notion that covers mass and collective quantifiers. Also cumulative is the MOST specialized for partitives.

The existent literature on this type of quantifier is practically inexistent, with the exception of Higginbotham's (1994) analysis of mass quantifiers as denoting relations between entities[15] (compare canonical quantificational determiners, which denote relations between sets). According to Higginbotham's implementation, mass NPs start out as set-denoting expressions and are shifted to entities via a nominalizing operator notated Σ,[16] which applies to both the restrictor and the nuclear scope:

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[15] The same idea can be found in Roeper (1983) and Lønning (1987). According to Parsons (1970) and Bennett (1975), what is needed in order to get the right readings is accessibility to the overall sum of the quantities of matter that satisfy the mass predicate and the overall sum of the quantities that satisfy the nuclear scope. The problem was that this intuitive analysis could not be implemented if one assumed that mass NPs denote sets of quantities that are devoid of any structure.

[16] Under Lønning's (1987) proposal, type-shifting is not necessary because he takes mass NPs (what he calls 'mass terms'), as well as one-place predicates (what he calls 'intransitive predicates') to denote entities rather than sets of entities.

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(46) a. ALL_{mass} (Σx. gold(x), Σx. yellow(x))
b. $\text{MOST}_{\text{mass}}$ (Σx. water(x), Σx. liquid(x))

It should be stressed that the Σ that occurs in these formulae is not the generalized join operator (which is not a nominalizing operator) but rather "a nominalizing operator that yields the supremum of P provided that any non-zero part M of the supremum also satisfies P and P only holds of parts of the supremum; Σ is undefined otherwise" (Higginbotham 1994: 456; *sup* denotes 'the *fusion* of what is P'):

(47) $(\Sigma x)P(x) = sup\{x: P(x)\}$, provided that
If $M \neq 0$, then $M \leq sup\{x: P(x)\} \leftrightarrow P(M)$
$(\Sigma x)P(x) = \emptyset$ (undefined) otherwise

In words, Σ applies to a lattice structure and picks up the maximal element in that set. This definition is similar, but not identical to the Max(imality) operator, notated σx.P(x) below, which applies to a set and picks up the maximal element of that set (the maximal element is the one that all other individuals in the set are part of), if there is one (undefined otherwise):

(48) $\sigma x.P(x) = \iota y(P(y) \wedge \forall z(P(z) \rightarrow z \leq y))$

The difference between Higginbotham's Σ and the maximality operator σ is that for the former, the requirement of having P extends to any part of *sup*{x: (P(x)}, because of the biconditional in the second line of (47): by virtue of (47), any part of an object included in the supremum must have P, because it is itself a part of the supremum.

As far as we can see, using Higginbotham's Σ instead of σ is problematic for collective quantification (e.g. examples of the type *Most of my colleagues will meet tomorrow*), which we have reasons to treat on a par with mass quantification (see Dobrovie-Sorin 2015 and Chapter 3): indeed, if a plural individual *x* is in the domain of *meet*, it does not follow that every part of *x* is in the domain of *meet* (singular individuals are excluded). Therefore, in various chapters of this book, we will rewrite Higginbotham's formulae by using σ.

According to Higginbotham (1994: 463), the examples in (49a,b) are true iff (50a,b) are satisfied:[17]

[17] It is important to point out that although we will adopt—*modulo* certain revisions—Higginbotham's semantic analysis of mass quantifiers, we do not endorse his view that in examples

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(49) a. All gold is yellow.
b. Most water is liquid.

(50) a. $\sigma x.gold(x) \cap \sigma x.\neg yellow(x) = 0$
b. $\mu(\sigma x.water(x) \cap \sigma x.liquid(x)) > \mu(\sigma x.water(x) \cap \sigma x.\neg liquid(x))$

Since here we are dealing with entities, not sets, "∩" is not set-intersection, but denotes the general operation *meet*, which applies to a domain of entities structured by the part–whole relation. The "meet" or "overlap" of two entities A and B is the maximal entity which is a part of both A and B. Based on this notion, we can also calculate the difference or complement of A and B, used in (50): the maximal sum of the parts of A which do not overlap with B.

Higginbotham's analysis of mass quantifiers was particularly useful for our analysis of the non-partitive proportional MOST that allows mass and collective quantification (see Chapter 3), as well as for the MOSTs that are used in partitive configurations (see Chapter 4). As we will see at the relevant places, we have proposed some revisions of the technical details. In addition to resorting to the maximalization operator (replacing Higginbotham's Σ), we have also rewritten the denotation of MOST in terms of an existential Q (see §§1.3 and 3.4).

1.2.4 On the difference between MOST and MORE THAN HALF: Solt (2016)

It is well-known that although [*most X*] *Y and* [*more than half of (the) X]* *Y* are truth-conditionally equivalent, there are a number of differences in the applicability of the two expressions. These differences concern all the types of MOST we have distinguished above ($MOST_{dist}$, $MOST_{cum}$, $MOST_{part}$). For both the description and the account of those differences, we refer to Solt (2016), whose conclusions are relevant for the formulae adopted throughout this book.

One difference is that *most* tends to be interpreted as 'significantly greater than half' (Peterson 1979; Westerståhl 1985; Huddleston and Pullum 2002;

such as those in (49a,b) the NPs are set-denoting expressions (see Ch. 2, where we argue that in such examples the NPs are in fact kind-referring DPs headed by a null D; for the analysis of examples of the type in (49b), see §4.5).

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Horn 2005), as illustrated by the contrast in acceptability between the two following sentences (Solt 2016: 67, ex. 4):

(51) a. #Most of the American population is female.
b. More than half of the American population is female.

Examining the use of *most* and *more than half* in the Corpus of Contemporary American English (COCA), Solt (2016) found that *most* is rarely used for values very close to 50 per cent and is found for values up to nearly 100 per cent, peaking at 80–85 per cent, whereas *more than half* is almost entirely restricted to values less than or equal to 60 per cent.

Another important difference pointed out by Solt (2016) is that *most*, contrary to *more than half*, can be found in cases where the dimension involved cannot be numerically evaluated (in more technical terms, it cannot be measured on a ratio scale). This can be observed with abstract nouns as in (52) or with count nouns whose elements are vague and hard to individuate (see (53)):

(52) Most/??more than half of sadness diminishes over time.
(Solt 2016: 72, ex. 6)

(53) a. Most/??more than half of pastel hues have a calming effect.
(Solt 2016: 73, ex. 7)

b. In most parts of the country, a westerly wind predominates.
(Solt 2016: 73, ex. 19b)

Most is clearly preferred to *more than half* in generic contexts:

(54) Now {most/??more than half of) people don't know how a lock works.
(Solt 2016: 74, ex. 21)

Another difference concerns the verification procedure used in interpreting *most* and *more than half*. Based on processing experiments, Hackl (2009) argues that in order to evaluate sentences of the form *most A are B*, speakers rely on comparing members of A that are B with members of A that are not B, whereas for *more than half of A are B*, speakers only look at members of A that are B and compare their number with the total number of A.

Solt (2016) accounts for these differences by proposing that the comparison introduced by *most (A, B)* has the form $\mu_S(A \cap B) > \mu_S(A\text{-}B)$, where the scale

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S is such that it allows a weaker precision of measurement. Solt builds on the distinction between three types of scales proposed in the theory of measurement (Stevens 1957 and for much subsequent work, see Solt 2016: 70): "ordinal scales", where there is ranking but no notion of distance between scale points, "interval scales", where there is a notion of distance between scale points, so that statements of magnitude of difference are possible (e.g. *Today is three degrees warmer than yesterday*), and "ratio scales", where in addition there is a zero point of the scale, which allows comparison of ratios (e.g. *This rock is twice as heavy as that rock*). Given these three types of scales, the difference between MOST and MORE THAN HALF can be explained by assuming that the scale involved in the measure function introduced by MORE THAN HALF can only be a ratio scale, whereas the measure function introduced by MOST can also be an ordinal or an interval scale.

Furthermore, in order to capture the fact that *most* is often used for very large proportions, Solt (2016: 91) suggests that *most* does not compete with proportional measures, but its competitors are other quantifiers (*some*, *all*), whereas *more than half* competes with measuring expressions such as *60 per cent* and *more than two thirds*. We might also think that *most* introduces a vague threshold *d* such that

(55) $\mu(A \cap B) - \mu(A-B) \geq d$

Westerståhl (1985) proposed that proportional *most* is ambiguous between the classical GQT reading (where the condition is that the intersection is larger than the difference) and a reading where it introduces a very high proportion (roughly paraphrasable with 'almost all').[18]

We shall not explore this issue any further. The important conclusions for the analyses proposed in this book are that reference to $^1/_2$ must be avoided in the semantic representations of MOST and the measuring function should avoid explicit reference to ratio scales, leaving the choice of a scale underspecified.

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1.3 Note on empirical coverage and methodology

Our crosslinguistic investigation provides information on majority expressions in 40 languages (representing 21 sub-families of 10 language families).

[18] An interpretation of this type was reported for Japanese *hotondo* by one of our informants.

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For 29 of these languages, we have used a translation-based questionnaire in which we tested the way of forming superlatives, the way of expressing the (relative) superlative of MANY/MUCH, and the way of expressing majority readings, with plural and mass restrictors, in generic and specific contexts, with distributive and collective predicates. Later, and less systematically, we checked the availability of the reading involving quantifications over parts of a singular count, and the availability of a proportional reading of MANY. The names of the informants are listed in the Acknowledgments. We have also used dictionaries, grammars, and the linguistic literature. For some languages we have relied only on written sources (English, Latin, Czech, Serbo-Croatian, Slovenian, Lithuanian, Latvian, Swahili, Adyghe). For Romanian and French we also relied on our native or near-native intuitions.

Here is a list of the languages on which our book provides information regarding their majority constructions, grouped by families and sub-families:

(i) Indo-European: Germanic (English, German, Dutch, Icelandic, Swedish, Danish, Norwegian), Italic (Latin, Romanian, Italian, French, Catalan, Spanish, Portuguese), Greek (Standard Modern Greek), Albanian, Slavic (Bulgarian, Serbo-croatian, Slovenian, Czech, Polish, Russian), Baltic (Lithuanian, Latvian), Armenian (Standard Eastern Armenian), Iranian (Persian), Indo-Aryan (Hindi), Celtic (Breton);
(ii) Turkic: Turkish;
(iii) Finno-Ugric: Hungarian;
(iv) Afroasiatic: Semitic (Hebrew, Syrian Arabic), Chadic (Hausa);
(v) Sino-Tibetan: Mandarin Chinese;
(vi) Niger-Congo: Atlantic Congo (Wolof), Bantu (Swahili);
(vii) Japonic: Japanese;
(viii) Basque;
(ix) Kartvelian: Georgian;
(x) Northwestern Caucasian: Adyghe.

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1.4 Organization of the book

Each of the various types of MOST distinguished in §1.2 will be treated in separate chapters. Chapter 5 is devoted to expressions of the type THE LARGEST PART and THE MAJORITY.

Chapter 2 demonstrates that the distributive MOST ($\text{MOST}_{\text{dist}}$) cannot be analyzed as a superlative quantitative adjective, but must instead be analyzed

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as a quantificational determiner. We argue that this semantics is read off syntactic configurations in which $\text{MOST}_{\text{dist}}$ sits in either Spec,DP or D^0. Another theoretically important issue is a definition of the mass-count distinction that is able to explain why object mass Ns, e.g. *furniture*, which have been argued to have atoms in their denotation, are nevertheless ruled out as restrictors of proportional MOST.

Chapter 3 is concerned with the cumulative MOST (MOST_{cum}), which is the most intriguing of all of our MOSTs. Its syntactic properties indicate quite clearly that it occupies the same position as quantitative adjectives such as MANY/MUCH, which strongly suggests a superlative-based analysis, which is also supported by the obligatory presence of the definite article. This generalization concerning the definite article argues however against Hackl's (2009) analysis, supporting instead the superlative-based analysis suggested in Hoeksema (1983). Because this superlative-based analysis is not completely satisfactory either, we have finally adopted a quantificational analysis inspired by Higginbotham's (1994) theory of mass quantifiers.

Chapter 4 analyzes MOST in partitives, where we find a split between languages where $\text{MOST}_{\text{dist}}$ preserves the distributional restrictions it has in non-partitives and languages where proportional MOST shows a special behavior ($\text{MOST}_{\text{part}}$). In order to account for these facts, we start by examining the general syntax of the partitive construction, which we will analyze as a nominal functional projection, RP, containing a null NP in the specifier (following Zamparelli 1998). The $\text{MOST}_{\text{part}}$ occurring in *most of* will be analyzed as a determiner selecting for RP. We will furthermore distinguish a $\text{MOST}_{\text{part}}$ taking a DP complement (labeled MOST_{DP}), found with generic bare nouns in English and with plural definites in Icelandic.

Chapter 5 is devoted to partitive proportional quantifiers based on nouns or nominalizations, among which the type THE LARGEST PART is particularly interesting from a semantic point of view because its transparent structure and high crosslinguistic productivity support a compositional analysis, based on PART and the superlative adjective. In order to develop such an analysis, we examine the noun PART, distinguishing a concrete and a functional use. Finally, we discuss a couple of exceptional partitive proportional quantifiers (found in Latin and Hindi), which are at first sight indistinguishable from non-partitive proportional quantifiers.

The rest of this introductory chapter comprises an Appendix with data from languages where MOST does not have a proportional reading, which constitute an important argument against Hackl's analysis of proportional MOST as the absolute superlative of MUCH/MANY.

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1.5 Appendix: Languages in which MANY/MUCH$_{superl}$ does not have the proportional reading

In this Appendix we illustrate languages that lack both MOST$_{dist}$ and MOST$_{cum}$. Since both types of MOST arise via grammaticalization, we expect that only some of the languages that have MOST$_{sup}$ have proportional MOST.

We have not tried to explain why grammaticalization occurred in the languages in which it occurred nor why a particular language chose one of the two patterns of grammaticalization. The only prediction that our analysis makes is that MOST$_{dist}$ is easier to obtain in languages with articles, on the assumption that such languages obligatorily project the D-level of representation (cf. Longobardi 1994; Bošković 2008). Indeed, among the languages with a proportional Det of our sample, MOST as a Det only appears in languages with articles (English, Icelandic, Romanian, Hungarian); a majority Det appears in a single language without articles (Turkish), where it is distinct from MOST (it is based on a nominalization of MUCH/MANY). However, there seems to be a more general correlation between the presence of articles and the existence of proportional MOST: not just MOST$_{dist}$, but also MOST$_{cum}$ appears to be absent from the languages without articles.[19] Some of these languages have majority quantifiers of the type MOST$_{cum}$ (see Chinese and Japanese), which are however not morphologically related to the superlative of MANY/MUCH. The languages with MOST$_{cum}$ (i.e. with a majority quantifier that is morphologically identical to the superlative of MANY/MUCH) all have articles: German,

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[19] Coppock et al. (2017) suggest that Georgian might be an exception—a language with no articles but yet with proportional MOST. Our informant did not confirm this claim: whereas for the examples of relative MOST$_{superl}$ she used *q'vela-ze met'i* 'all-on more', i.e. 'most', for the proportional uses she explicitly rejected both *q'velaze met'i* and the synthetic comparative/superlative forms *umravlesi* and *umet'esi*, using instead partitive constructions headed by nouns of the type MAJOR PART or MOST PART—*jiritadi nac'ili* 'fundamental/major part', *umet'esi nacili* 'more/most part' – or MAJORITY—*umet'esoba*, an abstract noun derived from the synthetic comparative/superlative form *umet'esi* (cf. Hewitt 1995: 49; for the abstract suffix *-oba*, see p. 102). Coppock et al. (2017) provide one example of a proportional reading of *q'velaze bevri* 'on-all much' (the superlative can be formed by placing *q'velaze* either before the comparative or before the positive form):

(i) Q'vela-ze bevri rje modis jroxis-gan. (Geo.)
all-on much milk comes cow.GEN-from
'Most milk comes from cows.'

However, it is possible that the informant assumed a relative superlative interpretation here, i.e. a comparison between various animals (or the special superlative reading examined in §4.8, where the quantities of milk coming from various animals are compared).

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Dutch, Swedish, Greek, Basque. The correlation between MOST_{cum} and the existence of articles in a language remains an open issue for our analysis.[20]

1.5.1 Languages with articles

In our sample of languages, we found four languages which have articles and a dedicated superlative form MOST (either analytic or synthetic) but lack the proportional reading of MOST. Three of them (Hebrew, Breton, Standard Eastern Armenian) only have partitive proportional quantifiers, whereas the fourth (Bulgarian) has a majority quantifier based on the comparative (THE MORE).

Hebrew has a superlative marker *haxi* that combine with *harbe* 'much, many', but the result only has a relative superlative interpretation:

(56) a. le-Dan yeš haxi harbe kesef (mi-kol ha-'amitim ʃel-i). (Heb.)
DAT-Dan EXIST SUP much money (from-all the-colleague-MPL of-me)
'John has the most money (of all my colleagues).'

b. le-Dan yeš haxi harbe xaver-im (mi-kol ha-'amit-im šel-i).
DAT-Dan EXIST SUP many friend-MPL (from-all the-colleague-MPL of-me)
'John has the most friends (of all my colleagues).'

c. Dan medaber haxi harbe (mi-kol ha-krov-im šel-i).
Dan speak.PTPL SUP much (from-all the-relative-MPL of-me)
'John speaks the most (among all my relatives).'

d. haxi harbe mehagr-im ba'-im me-hodu (be-hašva'a
SUP many immigrant-MPL come.PTPL from-India (in-comparison
le-medin-ot axer-ot).
DAT-states-FPL other-FPL)
'The most (largest number of) immigrants come from India (compared to other countries).'

[20] Živanović (2007) claims that the existence of a proportional determiner in a given language is contingent on the existence of *definite* articles (a correlation which he explains by an analysis in which the semantic representation of proportional MOST *contains* the semantic representation of THE). Although it is true that proportional MOST is normally found in languages with definite articles, it can nevertheless be found in a language without a definite article (Basque); moreover, among languages with no articles, majority quantifiers distinct from MOST can be found, even in non-partitive constructions, being thus determiner- or adjective-like: see Turkish, Chinese, Japanese, and Hindi.

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For proportional readings, *haxi harbe* cannot be used. Instead, the language uses a partitive construction, containing the noun *rov* 'majority, largest part' with a DP complement in the construct state:

(57) a. rov ha-yelad-im mehabdim et ha-hor-im
majority the-children-MPL respect.PTPL ACC the-parent-MPL
shel-ahem. (Heb.)
of-them
'Most children respect their parents.'

b. al kadur ha-'arec, rov ha-ma'im hem nozel.
on ball the-earth, majority the-water(PL) COP.PL liquid
'On Earth, most water is liquid.'

c. rov ha-xem'a ba-bait ha-ze rekuva.
majority the-butter in.the-house DEF-this rotten
'Most of the butter in this house is rotten.'

Breton has an inflectional superlative built with the suffix *-añ*. The superlative (like the comparative) of *kalz* 'many, much' is formed on the suppletive root *mui-*. The resulting form, *muiañ*, is only used as a relative superlative:

(58) a. Piv neus ar muiañ mignoned?/ Piv neus
who has the most friends who has
mignoned ar muiañ? (Bre.)
friends the most
'Who has the most friends?'

b. John a gomz ar muiañ.
John PART speaks the most

Proportional readings do not resort to (adjectival) *muiañ*, but must use a partitive construction with nouns ('the largest part' or 'the big/large') followed by an *of*-DP:

(59) a. Al lodenn vrasañ deus ar vugale neus resped evit o zud.
the part largest of the children has respect for their parents
'Most children respect their parents.'

b. Liñvel eo {ar braz / ar pezh brasañ / ar peuzvraz} eus
liquid is the large the piece largest the almost-big of
an dour war an Douar.
the water on the Earth
'On Earth, most water is liquid.'

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For (59b), our informant also offered a variant with *muiañ*, but in a partitive configuration and modified by a word meaning 'much':

(59) b′. Liñvel eo ar c'halz muiañ eus an dour war an Douar.
liquid is the much most of the water on the Earth
'On Earth, most water is liquid.'

In **Standard Eastern Armenian**, the superlative of *šat* 'many, much' is built regularly, with the prefix *amena-*. This form is only used as a relative superlative:

(60) a. Ov uni amena-šat ěnkerner? (Arm.)
who has SUP-many friends
'Who has the most friends?'

b. Amena-šat emigrantner-ě galis en Hndkastan-ic.
SUP-many immigrants-the coming are India-ABL
'The most (largest number of) immigrants come from India (compared to other countries).'

For the proportional reading, Armenian uses a partitive construction, based on *mec mas-ě* 'the large part':

(61) a. Erekhaner-i mec mas-ě hargum en irenc' cnołner-i-n.
children-GEN large part-the respecting are their parents-DAT-the
'Most children respect their parents.'

b. Erkragnd-i vra(yi) jr-i mec mas-ě hełuk vičak-um e.
Earth-GEN on water-GEN large part-the liquid condition-LOC is
'On Earth, most (of the) water is in a liquid state.'

In **Bulgarian**, the superlative of *mnogo* 'much, many' is built with the superlative prefix *naj-*. This form can only be used as a relative superlative:

(62) a. Koj ima naj-mnogo prijateli? (Bulg.)
who has SUP-many friends
'Who has the most friends?'

b. Naj-mnogo imigranti idvat ot India.
SUP-many immigrants come from India
'The most (largest number of) immigrants come from India.'

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For the proportional reading, the comparative of *mnogo*, a suppletive form, is used (*poveče*), carrying the suffixal definite article (*-to*). This form is invariable and so is the article (which has a neutral singular form, obviously a default form). *Poveče(-to)* is used with both plural and mass nouns, qualifying as MOST_{cum}:

(63) a. Poveče-to deca uvažavat roditelite si. (Bulg.)
more-the.NSG children respect parents-the REFL.DAT
'Most children respect their parents.'

b. Na zemjata poveče-to voda e tečna.
on earth-the more-the.NSG water(F) is liquid.FSG
'On Earth, most water is liquid.'

c. Povečeto maslo v taži kəšta e razvaleno.
more-the butter in this house is rotten
'Most of the butter in this house is rotten.'

d. *povečeto stena e bojadisana v bjalo
more-the wall is painted in white

1.5.2 Languages without articles

As we have mentioned already, the absence of a proportional reading of MOST is more widespread in languages without articles.

Below we give some examples of languages without articles which have MOST but use a different construction for the proportional reading.

(a) In the **Slavic** languages examined by Živanović (2007), MOST only has a relative superlative interpretation, as shown in (64):

(64) a. Nej-víc lidí pije pivo. (Cz.)
b. Naj-więcej ludzi piło piwo. (Po.)
c. Naj-više ljudi pije pivo. (S-C)
d. Naj-več ljudi pije pivo. (Sl.)
SUP-more people.GEN drink beer
= 'More people are drinking/drank beer than anything else'
(e.g. wine, water, etc.)
≠ 'Most people (the majority of the people)
are drinking/drank beer' (proportional) (Živanović 2007)

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The proportional reading is expressed by nouns derived from the root 'more', in a partitive configuration:

(65) a. Většina lidí pije **pivo**. (Cz.)
majority people.GEN drink beer

b. Większość ludzi piła piwo. (P.)
majority people.GEN drank beer

c. Većina ljudi pije pivo. (S-C)
majority people.GEN drink beer

d. Večina ljudi pije pivo. (Sl.)
majority people.GEN drink beer
'Most (the majority of the) people are drinking/drank beer.'
(Živanović 2007)

(b) In the **Baltic** languages, our lexicographic sources[21] indicate a similar situation: MOST—Lithuanian *daugiausia*, Latvian *visvairāk* (regularly built on the comparatives *daugiau* and *vairāk*, respectively)—has only a relative superlative reading translated as 'the most', and the proportional reading ('most') is expressed via nouns of the type 'majority' or 'largest part', which take a genitive complement: Lith. *dauguma* (derived from the root of 'many/much'), *didžiausia dalis* 'largest part', Latvian *vairākums* (derived from *vairāk* 'more'), *vairums* (derived from the root of 'more'), *vislielākais skaits* 'largest part'.

(c) In **Modern Persian**, the superlative of *many/much* is regularly built, from the comparative *bištar*, with the suffix *-in*. This form has only a relative superlative interpretation:

(66) a. Če kasi bištar-in dustān-rā dārad?
which person more-SUP friends-ACC has
'Who has the most friends?'

b. Bištar-in mohājerān az Hend mi-āyand.
more-SUP immigrants from India IMPF-come.PRES.3PL
'The most (largest number of) immigrants come from India.'

For the proportional reading, a partitive construction is used, in which the head is the comparative *bištar* 'more' or a noun meaning 'majority' (*aksar*,

[21] We used the following online resources: dict.com, available at https://www.dict.com/Lithuanian-English, for Lithuanian; https://www.dict.com/Latvian-English, for Latvian; Žodynas.lt, available at https://www.zodynas.lt/zodynai/anglu-lietuviu/ and Letonika.lv, available at https://www.letonika.lv/groups.

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aksariyyat, or *aqlab*), followed by a dependent genitive (introduced by the adnominal linker characteristic of Iranian languages, the so-called *ezafe*):

(67) a. Bištar e kudakān be vāledain e khod ehterām
more EZ children to parents EZ self respect
mi-gozārand. (Per.)
IMPF-pay.PRES.3PL
'Most children respect their parents.'

b. Dar zamin bištar e āb māye ast.
on Earth more EZ water liquid is
'On Earth, most water is liquid.'

c. Bištar e karah dar in khānah kharāb ast.
more EZ butter in this house spoiled is
'Most of the butter in this house is out of date.'

(68) {Aksare/Aksariyyat/Aqlab/Bištar} -e šāgerdā qāyeb-an
majority/majority/majority/more LNK students absent-are
'Most students are absent.' (Toosarvandani and Nasser 2017: 687)

1.5.3 Non-partitive majority quantifiers distinct from MOST_{sup}

Among the languages where MOST_{sup} does not have a proportional interpretation, we find three languages in which a non-partitive majority construction nevertheless exists.

In **Turkish,** MOST_{sup} is built regularly, with the superlative marker *en* combined with *çok* 'much, many'. This form only has a relative superlative interpretation:

(69) Kimin en çok arkadaşı var?
who.GEN SUP many friend.ACC is
'Who has the most friends?'

The proportional use is expressed by the special form *çoğu* (derived from the root *çok* 'much, many' with a suffix that originally represents the 3rd singular possessive agreement marker); it can appear as a determiner, before the noun (see (70a)) or in a partitive construction, preceded by the lexical noun in the genitive (see (70b)):

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(70) a. Çoğu çocuk ebeveyn-in-e saygı göster-ir(-ler). (Tur.)
most child parents-3SPOSS-DAT respect show-AOR-3PL
'Most children respect their parents.'

b. Dünya-da, suy-un çoğu sıvı(-dır).
Earth-LOC water-GEN most liquid(-GENERIC)
'On Earth, most water is liquid.'

c. Ev-de-ki tereyağın-ın çoğu çürük(-tür).
house-in-ATTR butter-GEN most rotten(-GENERIC)
'Most of the butter in the house is rotten.'

In **Mandarin Chinese**, the superlative of *duō* 'many, much' is built regularly, with the superlative marker *zuì*. The resulting constituent *zuì duō* only has a relative superlative interpretation (in (71b), it is used predicatively):

(71) a. Shui you zui duo pengyou? (Mand.)
who have SUP many friend
'Who has the most friends?'

b. (he qita guojia bijiao,) cong yindu lai-de
with other country compare from India come-RELATOR
yimin (ren-shu) zui duo
immigrant person-number SUP many
'(Compared to other countries), the most (largest number of) immigrants come from India' ('the immigrants who come from India are the most numerous')

The proportional interpretation is rendered by a modifier of the form 'large part', which qualifies as a cumulative majority quantifier:

(72) a. Dabufen-de haizi zuijing tamen-de (Mand.)
large-portion-RELATOR children respect they-RELATOR
fumu.
parent
'Most children respect their parents.'

b. Zai diqiu shang, dabufen-de shui shi yizhuang-de.
at Earth up large-portion-RELATOR water be liquid
'On Earth, most water is liquid.'

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c. Zhe-jian wuzi-li-de dabufen-de naiyou
this-CLS house-inside-RELATOR large-portion-RELATOR butter
dou huaidiao-le.
all rotten-PFV
'Most of the butter in this house is rotten.'

d. Wo dabufen-de tongshi mingtian hui jianmian.
1SG large-portion-RELATOR colleague tomorrow wil meet
'Most of my colleagues will meet tomorrow.'

Dabufen can also occur in partitive constructions, in which case the NP precedes it and is marked by the postposition *-de*:

(73) zhè miàn qiáng-de dábufen dōu fěnshuā le. (Mand.)
this CLS wall-RELATOR most-part ALL whitewash ASP
'Most of this wall has been painted.'

Japanese has a regular superlative of *takusan* 'many/much' and *ooku* 'many/much', formed with the superlative marker *mottomo*. These superlatives only have a relative superlative use:

(74) a. Dare-ga tomodati-ga mottomo takusan/ooku (Ja.)
who-NOM friend-NOM SUP many
i-masu ka.
exist-POLITE-PRES INT
'Who has the most friends?'

b. Mottomo takusan/ooku-no imin-ga Indo-kara
SUP many-GEN immigrant-NOM India-from
yattekuru./ Imin-ga mottomo takusan/ooku
come-PRES immigrant-NOM SUP many
Indo-kara yattekuru.
India-from come-PRES
'The most (largest number of) immigrants come from India (as compared to other countries).'

Proportional *most* is translated with a special quantifier *hotondo* or with the expression *dai-bubun* 'large part', which can combine both with plural and mass nouns, qualifying as cumulative majority quantifiers:

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(75) a. Hotondo-no/ Dai-bubun-no kodomo-ga ryoosin-o (Ja.)
most-GEN large-part-GEN child-NOM parents-ACC
sonkeesitei-ru.
respect-PRES
'Most children respect their parents.'

b. Tikyuu-de-wa hotondo-no/ dai-bubun-no mizu-ga
earth-on-TOP most-GEN large-part-GEN water-NOM
ekitai dear-u.
liquid be-PRES
'On Earth, most water is liquid.'

c. Ie-no naka-no hotondo-no mizu-ga osensaretei-ru.
house-GEN in-GEN most-GEN water-NOM polluted-PRES
'Most of the water in the house is polluted.'

As in Chinese, these quantifiers can also occur in partitive constructions, in which case the NP precedes them and receives the genitive case marker. The fact that the construction Genitive + *hotondo* is a partitive configuration can be inferred from Sauerland and Yatsushiro's (2017) observation that only in this configuration can the noun be interpreted as singular (Japanese does not mark number morphologically)—see (76a); in the *hotondo-no* + noun construction, in which *hotondo* is a modifier, the noun can only be interpreted as plural, see (76b):

(76) a. John-wa hon-no (Ja., Sauerland and Yatsushiro 2017: ex. 52)
John-TOP book-GEN
hotondo-o yonda.
most-ACC read
'John read most of the book / John read most of the books.'

b. John-wa hotondo-no hon-o yonda.
John-TOP most-GEN book-ACC read
= 'John read most of the books.'
≠ 'John read most of the book.'

1.5.4 Languages with no special superlative morpheme

In many languages, the superlative does not have a dedicated morpheme (free or affixal, see *most* and *-est* in English, e.g. *most beautiful*, *nicest*), but is

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expressed in other ways, in particular based on the comparative. The most common ways to obtain a superlative interpretation from a comparative are (i) using a universal as the standard degree argument of the comparative (*than all*) and (ii) embedding the comparative inside a definite DP (cf. Bobaljik 2012).

Interestingly, we find languages with no dedicated superlative morphology where the form that conveys the superlative meaning of MANY and MUCH also has a proportional interpretation. In Modern Greek, superlatives are expressed by embedding comparatives in definite DPs and MORE embedded in a definite DP may have a proportional interpretation. Since the proportional reading is allowed with mass NPs, such DPs must be assumed to be built with a majority quantifier that is an instance of MOST_{cum}. (Romanian is not exactly of this type because, as we will show in §2.3, the strong definite article form *cel* forms a constituent with the comparative.) Hausa, where the superlative is expressed by nominalizing a comparative construction with *exceed*, also has a proportional interpretation of $\text{MANY/MUCH}_{\text{superl}}$.

1.5.4.1 Romance languages

In the Romance languages, the superlative is expressed by combining a comparative with the definite article, but there are important differences between the languages, in the sense that the definite article may undergo various stages of grammaticalization steps towards becoming a superlative marker:

(i) In Romanian, the strong definite article *cel* forms a constituent with the comparative, actually functioning as a superlative marker (see §2.5).
(ii) In French, the comparative must be preceded by the definite article in postnominal position (see (77a))[22] and in the adverbial use (where a default form of the article, *le* 'the.MSG', appears), but can occur separated from the article prenominally (see (77c)), which indicates that the article has not become a superlative marker across the board:

(77) a. **le** livre **le** **plus** long
the book the more long
'the longest book'

[22] According to Alexiadou (2014: 68), the use of an article before postnominal comparatives with a superlative reading is also found in Rumantsch and certain varieties of Italian.

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b. **le** **plus** long livre
the more long book
'the longest book'

c. **les** deux **plus** longs livres
the two more long books
'the two longest books'

d. Marie parle **le** **plus** fort (de tous).
Maria speaks the more loud (of all)
'Marie speaks the loudest (of all).'

In addition to adverbs, another context in which the default form of the definite article may appear before a comparative without being interpreted as a definite D is in predicative position, in those examples in which the superlative has a relative reading in which the correlate is not the subject (cf. Grevisse 2008; Croitor and Giurgea 2016):

(78) C' est au milieu de ses enfants qu'une mère est
it is in-the middle of her children that a mother is
le **plus** heureuse.
the.MSG more happy.FSG
'It is among her children that a mother is happiest.'
(Grevisse 2008: 1229–30)

The difference in gender between the adjective *heureuse* (feminine) and the article *le* (masculine) clearly indicates that we are not dealing with a DP with noun ellipsis in the postcopular position, but rather with a predicative DegP. The fact that the predicate is not a DP is confirmed by the interpretation: if it were, we would get a comparison between mothers, or women (as in *the happiest woman*), but in (78) the comparison is between the circumstance of being among her children and other circumstances (as in *The woman is happiest when she is among her children*).

We may thus conclude that when a comparative is not embedded in a definite DP, a superlative marker *le* (invariable) is inserted. As for the postnominal use in (77a), it crucially differs from (78) in that the article *agrees*:

(79) la fille la/*le plus heureuse (Fr.)
the girl the.FSG/MSG more happy
'the happiest girl'

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This suggests that *le* in (77a) has a different status, perhaps signaling a reduced relative structure (cf. Kayne 2004) or a "close apposition" DP (cf. Alexiadou 2014, who analyzes close appositions as reduced relatives).

(iii) In Italian and Ibero-Romance, the definite article does not appear before postnominal comparatives, adverbs with a superlative interpretation, or predicative superlatives of the type in (78):

(80) a. **il** libro **più** lungo (It.)
the book more long
'the longest book'

b. Lei è quella che parla (*il) **più** forte (di tutti).
she is the-one that speaks the more loud (of all)
'She is the one who speaks the loudest (of all).'

(81) a. **el** libro **más** largo (Sp.)
the book more long
'the longest book'

b. Esta mujer es la que **más** rápido habla en el mundo.
this woman is the that more fast talks in the world
'This woman talks the fastest in the world.'

In predicative superlatives with a non-subject correlate, of the type in (78), the article cannot appear in Italian; moreover, the superlative must be embedded in a relative clause whose wh-word functions as the correlate (see Loccioni 2018):

(82) L'anno in cui Maria fu (*il/*la) **più** felice. (It.)
the-year in which Maria was (the.MSG/FSG) more happy
'the year when Maria was happiest (happier than in any other year)'

Inside DPs, comparative DegPs with a superlative interpretation can appear in a special prenominal position; evidence for this comes from the fact that, unlike the positive forms of most quality adjectives, they can be used with a *restrictive* interpretation in prenominal position:

(83) a. le più notevoli costruzioni settecentesche
the more noteworthy buildings eighteenth-century
(più notevoli: restrictive) (It.)
'the most noteworthy eighteenth-century buildings'

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b. le notevoli costruzioni settecentesche (*notevoli*: non-restrictive)
the noteworthy buildings eighteenth-century

Turning now to the comparative of MANY/MUCH, it has a suppletive uninflected form (Fr. *plus*, It. *più*, Sp. *más*, Cat. *més*, Port. *mais*). In French, this form, like the positive *beaucoup* 'much, many', occurs in a pseudo-partitive configuration (*plus de* NP 'more of NP'). The superlative is obtained by combining this form with the definite article *le* (the default MSG form). The result only has a relative superlative use (both attributive and adverbial, see (84)); the proportional use is out (see (85), which is built in such a way that a proportional reading for *le plus* is strongly favored):

(84) a. (Parmi mes élèves) c' est Jean qui a lu le
among my students it is Jean who has read the
plus de livres.
more of books
'(Among my students) it's Jean who read the most books.'

b. C' est Marie qui parle le plus.
it is Marie who speaks the most
'Marie speaks the most.'

(85) *Le plus de cygnes sont blancs.
the more of swans are white

In Italian and Ibero-Romance, MOST_{sup} is expressed by the comparative without the definite article (for further details, see Loccioni 2018):

(86) a. Gianni è quello che ha (*i) più amici (tra
Gianni is the-one who has (the) more friends among
tutti i suoi colleghi). (It.)
all the his colleagues
'Gianni is the one who has the most friends (among all his colleagues).'

b. En Joan és el que té (*els) més amics (Cat.)
the Joan is the who has (the) more friends
'Joan has the most friends.'

c. el que (*los) más amigos tiene (Sp.)
he who (the) more friends has
'the one who has the most friends'

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d. Quem tem (*os) mais amigos? (Port.)
who has (the) more friends
'Who has the most friends?'

As for the proportional reading of *most*, it is expressed by nominal constructions of the type MAJORITY or LARGEST PART (where the restrictor is an *of*-DP complement). French has a special noun formed by incorporating MORE into PART: *la plupart* 'the more-part':

(87) a. La plupart des enfants respectent leurs parents. (Fr.)
the more-part of-the children respect their parents

b. La maggior parte dei bambini rispetta/rispettano i loro genitori. (It.)
the larger part of-the children respects/respect the their parents

c. La majoria dels nens respecten els seus pares. (Cat.)
the majority of-the children respect the 3POSS.PL parents

d. La mayoría de los niños respetan a sus padres. (Sp.)
the majority of the children respect the 3POSS.PL parents

e. A maioria das crianças respeitam os seus pais. (Port.)
the majority of-the children respect the 3POSS.PL parents
'Most children respect their parents.'

(88) a. Sur Terre, la plus grande partie de l' eau est liquide. (Fr.)
on Earth the more large part of the water is liquid

b. Sulla terra, la maggior parte dell' acqua è liquida. (It.)
on-the Earth the larger part of-the water is liquid

c. A la Terra, la major part de l' aigua és líquida. (Cat.)
at the Earth the larger part of the water is liquid

d. Sobre el planeta Tierra la mayor parte del agua es líquida. (Sp.)
on the planet Earth the larger part of-the water is liquid

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e. Na Terra, a maior parte da água está na (Port.)
on-the Earth the larger part of-the water is in-the
forma líquida.
form liquid
'On Earth, most water is liquid.'

In addition, Italian may also use THE MORE (i.e. MOST) without an overt N, either with no restrictor or with an *of*-DP (i.e. a partitive construction). Compared to THE LARGEST PART-type, this is a dispreferred option, acceptable only by some speakers:

(89) a. I più (*uomini) credono che lei vincerà. (It.)
the more (people) believe that she will-win
'Most (people) believe that she will win.'

b. I più degli abitanti perirono pel ferro
the more of-the inhabitants perished by-the iron
e pel fuoco dei vincitori.
and by-the fire of-the winners
'Most of the inhabitants perished by the iron and fire of the winners.'
(*Biografia universale antica e moderna*, vol. XVI, Venice, 1824)

c. In Italia il più del riso è sopra gli uomini
in Italy the more of-the laugh is on the people
e i presenti.
and the.MPL present.MPL
'In Italy, most of the laughing is about people and about those present.'
(Giacomo Leopardi, *Discorso sopra lo stato presente dei costumi degl'Italiani*)

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1.5.4.2 Albanian

Albanian resembles Italian and Ibero-Romance insofar as it does not have a designated superlative form but only comparative forms that take superlative readings when embedded in a definite DP. The behavior of the uninflected comparative periphrastic form *më shumë* 'more many/much' also resembles the behavior of the corresponding synthetic (and suppletive) comparatives of MANY in Italian and Ibero-Romance insofar as it blocks the definite article while nevertheless allowing a superlative reading:

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(90) ai që ka më shumë(*t) shokë (Alb.)
he who has COMP many(-the) friends
'the one who has the most friends'

But Albanian differs from the above described languages in the following interesting way: in addition to the uninflected comparative form *më shumë*, it also has an inflected form *më të shumtë* 'COMP AGR.PL many-*t*-AGR', which has the regular syntax of adjectives: it occurs in the postnominal position and it co-occurs with the definite article not only when it is postnominal, but also in the prenominal position. This form has the relative superlative reading (see (91)), but not the proportional reading (except in a special construction in which it does not combine with an NP, but with a partitive DP—see (94) below):

(91) a. Mali më i rrezikshmë në botë ka
mountain-the more AGR dangerous in world has
turistët më të shumtë.
tourists-the more AGR many
'The most dangerous mountain in the world has the most tourists.' (www.lajmeonline.eu/)

b. Kosovarët, **azilkërkuesit më të shumtë** gjatë
Kosovars-the asylum-seekers-the more AGR many during
janarit në Austri.
January in Austria
'The Kosovars, the most numerous asylum-seekers in Austria during January.' (http://koha.net)

(92) a. *Fëmijët më të shumtë respektojnë prindërit e tyre
children-the more AGR many respect parents-the AGR their

b. *Më të shumtët fëmijë respektojnë prindërit e tyre
more AGR many-the children respect parents-the AGR their

For the proportional reading, the normal construction contains the noun MAJORITY, with a genitive DP complement:

(93) a. Shumica e fëmijëve i respektojnë (Alb.)
majority-the AGR children-the.GEN CL.PL.ACC respect
prindërit.
parents-the
'Most children respect their parents.'

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b. Në tokë, shumica e ujit është në gjendje
on Earth majority-the AGR water-the.GEN is in state
të lëngët.
AGR liquid
'On Earth, most water is liquid.'

Moreover, as in Italian, the proportional interpretation can also be expressed by THE+MORE in a partitive configuration (where the restrictor, if overt, can only be a genitive DP or a P+DP, not an NP). Note that the agreeing forms of MANY are used here:

(94) a. Në më të shumtët e netëve, pas
in COMP AGR many-the AGR nights-the.GEN, after
pune, shkon në shtëpi dhe shikon televizor. (Alb.)
work, goes to house and watches TV
'Most of the nights, after work, (s)he goes home and watches TV.'
(arkivi.peshkupauje.com/2013/03/te-jetosh-me-300-mije-leke)

b. Më të shumtët prej nesh bëjmë përkujtimore
COMP AGR many-the from us make requiem-masses
për shpirtrat e parafjetur thjesht si zakon.
for souls-the AGR asleep simply as custom
'Most of us hold memorial services for the souls of the deceased merely as a custom.'
(http://www.orthodhoksiaebashkuar.al/predikime-katekizma-artikuj/perkujtimoret-per-te-vdekurit/)

In addition, THE+MANY (followed by a genitive DP or used without an overt restrictor) may be used to convey the proportional reading (for the use of the positive degree as a majority quantifier, compare Turkish):

(95) Si të shumtët e njerëzve të pasionuar
like AGR.PL many-the.PL AGR people-the.GEN AGR passionate
pas futbollit në këtë vend, nuk kam shkuar asnjëherë në
after football in this land not have.1SG gone never on
stadium
stadium.
'Like most (of the) football fans in this land, I've never gone to the stadium.'
(gazetablic.com/dua-te-shkoj-te-dielen-ne-stadium-por/)

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1.5.4.3 Russian

Russian uses MORE + 'of/than all' for the relative superlative of MANY:

(96) U kogo bol'še vsex druzej?
to whom more than-all friends
'Who has the most friends?'

For the majority reading, the noun *bol'šinstvo* 'majority' is used:

(97) Bol'šinstvo detej uvažajut svoix roditelej. (Ru.)
majority children.GEN respect REFL.POSS parents
'Most children respect their parents.'

1.5.5 Conclusion

In this overview, we compared majority quantifiers with superlative MOST, providing empirical evidence against Hackl's (2009) attempt to equate the proportional reading of MOST with the absolute superlative reading. The data in §§5.1–5.3 are particularly relevant in this respect, as they illustrate languages where MANY/MUCH$_{superl}$ has only a relative superlative reading, and no proportional reading. In §5.4, we examined languages where the existence of a grammaticalized superlative is debatable. The general conclusion which emerges from the data presented in this section is that partitive majority quantifiers of various types (LARGEST PART, MAJORITY, MOST OF, MORE OF) are crosslinguistically more widespread, a conclusion which is also drawn in Keenan and Paperno (2017: 942): "Commonly, most = 'the majority of' or 'the greater part of'." The analysis of partitive majority quantifiers will be presented in Chapters 4 and 5.

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2
Distributive MOST

In this chapter we will be interested in those languages in which MOST allows the proportional interpretation when combined with count NPs but not when combined with mass NPs. Romanian, Hungarian, and Icelandic belong to this group of languages. In English, the same generalization is found with non-generic NP restrictors (see §2.1). In §2.2 we provide evidence in favor of analyzing the generic NP restrictors found with the English *most* as kind-referring DPs. Section 2.3 constitutes the core of the chapter, which is meant to explain the observed ban on mass quantification. After a brief background on the mass/count distinction (§2.3.1), we will show (§2.3.2) that the observed ban on mass NPs cannot be explained by Hackl's (2009) superlative analysis, nor by Matthewson's (2001) entity-restrictor MOST. We will argue that (in the relevant languages) proportional MOST is to be analyzed as a quantificational determiner that has the denotation proposed by Mostowski (1957). Section 2.3.3 will address the plural-marking on the restrictor of MOST and §2.3.4 will explain why mass NPs of the *furniture* type, which have been argued to have atoms in their domain, are nevertheless illegitimate as restrictors of MOST. Section 2.4 shows that the observed ban on mass NPs correlates with a ban on collective quantification. In §2.5 we provide syntactic evidence for the hypothesis that in Romanian and English the proportional MOST sits in Spec,DP and D^0, respectively. It thus appears that the quantificational-determiner semantics of MOST correlates with the highest syntactic level inside the DP.

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2.1 Proportional MOST and the count/mass distinction: Romanian, Hungarian, Icelandic

The examples in (1)–(3) show that in English, Romanian, and Hungarian the superlative forms of MANY/MUCH, although quite different from each other in terms of morphosyntactic complexity, all allow the proportional interpretation:

(1) Most students left early.

Majority Quantification and Quantity Superlatives: A Crosslinguistic Analysis of Most. Carmen Dobrovie-Sorin and Ion Giurgea, Oxford University Press (2021). © Carmen Dobrovie-Sorin and Ion Giurgea. DOI: 10.1093/oso/9780198791249.003.0002

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(2) Cei mai mulți elevi din clasa mea au plecat devreme.[1] (Ro.)
the more many students in class-the my have left early
'Most students in my class left early.'

(3) A legtöbb fiú már hazament.[2] (Hung.)
the most boy already is-gone-home
'Most boys have gone home already.'

Dobrovie-Sorin (2013b) observed that proportional mass quantification is not allowed with the superlative of MUCH in Romanian:

(4) a. *Cel mai mult lapte din frigiderul ăsta e acru.
the more much milk in fridge-the this is sour

b. *Cea mai multă mobilă din această casă e veche.
the.F more much.F furniture(F) in this house is old

Although she does not provide explicit examples, Szabolcsi (2012a; 2012b) makes it clear that in Hungarian the proportional reading of *a legtöbb* 'the most' is disallowed with NP_{mass}. This was confirmed by our informants (Anna Gazdik and Beáta Gyuris).

In both Romanian and Hungarian, mass quantification can be expressed by using partitive DPs of the type THE LARGEST PART of DP (see Chapter 5):

(5) a. Cea mai mare parte a laptelui din frigiderul ăsta e acru. (Ro.)
the more large part GEN milk-the.GEN from fridge-the this is sour
'Most (the largest part) of the milk in this fridge is sour.'

b. A Földön a víz legnagyobb része folyékony halmazállapotú. (Hung.)
the Earth.on the water largest part.POSS.3SG liquid state.POSS
'On Earth, most (of the) water is liquid.'

[1] On the make-up of Romanian superlatives, see §2.5.

[2] The fact that *sok* 'many/much', *több* 'more', and *a legtöbb* 'the most' are not marked as plural correlates with the fact that their NP complements, just like the complements of cardinals, are not plural marked in Hungarian, e.g. *három fiú* 'three boy' meaning 'three boys'. Plural marking and plural denotations will be discussed in §§2.3.3 and 2.3.4.

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Icelandic is another language where proportional MOST may combine with plural NPs but not with mass NPs (note that Icelandic lexically distinguishes *flest*, the superlative of MANY, from *mest*, the superlative of MUCH):[3]

(6) a. Flest börn virða foreldra sína. (Ice.)
most children respect parents-the REFL.POSS
'Most children respect their parents.'

b. *Á jörðinni er mest vatn vökvi.
on Earth is most water liquid
Intended meaning: 'On Earth, most water is liquid.'

c. *Mest smjör í ískápnum er úldið.
most butter in fridge-the is rotten
Intended meaning: 'Most of the butter in the fridge is rotten.'

The ban on mass quantification is suspended in partitive constructions, which can be headed either by *mest* or by a *majority*-type noun, as shown in (7a,b) and (7c), respectively:

(7) a. Á jörðinni er mest af vatninu vökvi. (Ice.)
on Earth is most of water-the liquid
'On Earth, most water is liquid.'

b. Mest af smjörinu í ískápnum er úldið.
most of butter-the in fridge-the is rotten
'Most of the butter in the fridge is rotten.'

c. Ég drakk megnið af mjólkinni. (Coppock 2019: 166, ex. 99)
I drank majority-the of milk-the
'I drank most of the milk.'

Importantly, all of the examples in (7) are alike in that they are not "simple" DPs built with a determiner followed by a NP complement. (7a,b) and (7c) are partitive DPs, which differ in that the former are headed by *mest*, whereas the latter is headed by a "majority" noun. This difference is important and

[3] Examples of the type in (6a) should be distinguished from those in which the nominal head is marked with the suffixal definite article:

(i) Flestum krökkunum í skólanum mínum finnst gaman að spila
most.DAT kids.DEF.DAT in school.DEF.DAT my.DAT finds.MPAS fun to play
á hljóðfæri. (Coppock 2019: 165, ex. 96)
on instruments
'Most of the kids in my school like to play instruments.'

This instance of MOST is to be analyzed as a quantifier above the D-level, like *all*. For this type of majority quantifiers, see Chapter 4.

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interesting in various respects, which is why each of these two types of partitive DPs will be examined separately (Chapters 4 and 5, respectively). However, for our present purposes all that matters is that *mest* can be used with an *af*-DP complement (as in (7a,b)), but not with a NP complement.

One of our informants also provided translations with a quantifier meaning 'almost all', *mestallur*, composed of *mest* 'most(SG)' and *allur* 'all':

(8) Mestallt smjörið í ískápnum er úldið. (Ice.)
most-all.NSG.NOM butter-the.NSG.NOM in fridge-the is rotten
'Most/Almost all of the butter in the fridge is rotten.'

Mestallt differs from the *mest* found in (7b) (and resembles *allur* 'all') in that its complement is not marked by the preposition *af*. But crucially, the complement of *mestallt* is a full DP, not a bare NP (compare (6c), in which the complement of *mest* lacks the definite article), which explains why mass quantification is allowed.

An interesting extension of the generalization observed here is provided by the Turkish majority quantifier *çoğu*, which is derived from *çok* 'much, many', but is not a superlative form:[4]

(9) a. Çoğu çocuk ebeveyn-in-e saygı göster-ir(-ler).
most child parents-3SPOSS-DAT respect show-AOR-3PL
'Most children respect their parents.'

b. * Dünya-da, [çoğu su] sıvı(dır).[5]
Earth-on most water liquid

c. Dünya-da, [suy-un çoğu] sıvı(-dır).
Earth-LOC water-GEN most liquid(-GENERIC)
'On Earth, most of the water is liquid.'

These examples show that the ban on mass NPs that we observed in non-partitive constructions for the proportional MOST (superlative of MANY/MUCH) found in Romanian, Hungarian, Icelandic, and English, also appears with *çoğu* (see (9a,b)). Mass quantification is allowed only in partitive

[4] The superlative form of *çok* exists (*en çok*), but it only has a relative superlative reading.
[5] This example is acceptable if *çogu* is analyzed as an adverb, 'mostly, usually'.

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constructions, which in Turkish are built with a preposed genitive (see *suy-un* 'water-GEN' in (9c)).

2.2 Proportional MOST and kind-referring bare NPs

2.2.1 Proportional MOST and the count/mass distinction in English

The ban on mass quantification with proportional MOST can also be observed in English if we restrict our attention to non-generic sentences. Examples (10a–c) are from Matthewson (2001: 174), who attributes them to V. Dayal (p.c.); (10d) is our example:

(10) a. *Most milk in this fridge is sour.
b. *I shoveled most snow that was in this yard.
c. *Most mud that you traipsed in the house ended up on my rug.
d. *Most furniture in this house is broken.

And again, as in Romanian, Hungarian, and Icelandic, mass quantification is acceptable in partitives, which in English (as in Icelandic) allows also *most of*, in addition to *the largest part of* (see Chapters 4 and 5, respectively):

(11) a. Most of the milk in this fridge is sour.
b. I shoveled most of the snow that was in this yard.
c. Most of the mud that you traipsed in the house ended up on my rug.

English differs from the other languages mentioned above in that *most* NP_{mass} is acceptable in generic contexts. Thus, the examples in (12) show a clear contrast with those in (10):

(12) a. Most water is liquid.
b. Most gold is yellow.

These examples are problematic if we take the *most* that occurs there as having a NP-denoting restrictor: indeed, if that were possible, we would not be able to explain why non-partitive *most* is ruled out in the other examples built with mass NPs, e.g. (10). The problem can be solved by assuming that the mass NPs in examples of the type in (12) are kind-referring bare NPs that can be

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analyzed as DPs headed by a null Det with the semantics of Chierchia's (1998b) *down* operator:[6]

(13) [[$_{QP}$Most] [$_{DP}$ [$_{D}$Ø] [$_{NP}$water]]] is liquid.

Given this syntactic representation, in examples of the type in (12) MOST occurs above the DP level, and as such it is parallel to the partitive examples in (11) rather than to the unacceptable examples in (10), in which MOST takes an NP complement.

Going back to the examples in (10), they cannot be assigned a representation of the type in (13) because modifiers referring to particular situations prevent bare NPs from referring to kinds. Hence, *milk in this fridge* can only be analyzed as a genuinely bare mass NP, which cannot function as a restrictor for MOST:

(14) *[[Most] [$_{NP}$milk in this fridge]] is sour.

Note that it is not modification *per se* that blocks kind-reference. Those modifiers that are compatible with kind-reference are allowed, e.g. *black* or *from old goats* in *black cats* or *milk from old goats* (but not *milk from my goat*):

(15) a. Most [$_{DP}$ [$_{D}$Ø] [$_{NP}$black cats]] are intelligent.
b. Most [$_{DP}$ [$_{D}$Ø] [$_{NP}$milk from old goats]] is sour.

Let us now consider the examples in (16), due to Matthewson (2001):[7]

(16) a. Most men who came to the party left early.
b. Most people at yesterday's rally were Democrats.
c. Most voters surveyed indicated that . . .

[6] Chierchia (1998b) assumes that for each natural nominal property (such as *dog* or *intelligent student*), there is an associated kind, which is an individual that consists, for any situation s, of the sum of all the entities that satisfy that property in s. The *down* function (notated $^{\cap}$) applies to a property and yields the associated kind:

(i) For any property P and world/situation s, $^{\cap}P = \lambda s\, \iota\, Ps$, if $\lambda s\, \iota\, Ps$ is in K
undefined, otherwise

where P_s is the extension of P in s, and K is the domain of all kinds (Chierchia 1998b: 351).
The converse of the *down* function is the *up* function (notated $^{\cup}$), which applies to a kind and yields the corresponding property.

[7] The reader should be aware that our analysis of these examples is in contradiction with that proposed by Matthewson (2001) herself, who assumes that the complement of MOST is a kind-referring bare NP (see §2.4.3).

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d. [context: Last night I threw a party and a bunch of linguists and philosophers got drunk]
Most linguists who got drunk merely passed out, but most philosophers who got plastered revealed interesting things about their colleagues.

These examples are built with s-level modifiers of the head N, and therefore they must be assumed to have a structure of the same type as that in (14):

(17) [[Most] [$_{NP}$men who came to the party]] left early.

We must thus conclude that when its restrictor is a genuinely bare NP, the English proportional *most* is subject to the same constraints as the MOST found in Romanian, Hungarian, and Icelandic: a plural NP restrictor is allowed, but not a mass NP restrictor.

The contrast in (18) provides further evidence in favor of the same generalization:

(18) a. I am sure most men will arrive late.
b. *I know most wine will be delivered late.

In this pair of examples the kind-reference of the restrictor is blocked by the fact that the sentence refers to a particular situation. We are again left with the only other possibility, a set-denoting restrictor, which is allowed with NP_{count} but disallowed with NP_{mass}.

In sum, the analysis of the proportional MOST is somewhat obscured in English by the fact that bare NPs in the complement position of MOST can be either genuine bare NPs or kind-referring DPs headed by a null D:

(19) a. MOST NP
b. MOST [$_{DP}$Ø NP]

The empirical generalization is that a mass kind-referring DP restrictor is allowed by MOST, whereas a mass NP restrictor is ruled out. The latter generalization is exactly the same as the one we described for Romanian, Hungarian, and Icelandic. For the analysis of those examples in which MOST is built with kind-referring DPs headed by a null Det, the reader is referred to §4.5.

In contrast to *most*, the English quantifier *all* cannot be followed by a bare NP in non-generic contexts:

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(20) a. *All girls went to the gym. (Brisson 1998: 7)
b. Most girls went to the gym. (Brisson 1998: 6)
c. #All pages in this book were torn. (Partee 1995: 583)
d. Most pages in this book were torn.

This impossibility can be explained by assuming that *all* cannot take a genuinely bare NP as a complement. It can only combine with full DPs, headed by either overt determiners (yielding reference to particular entities) or the null determiner (yielding reference to kinds):

(21) a. All (of) the girls went to the gym.
b. All (of) the pages in this book were torn.
c. All cats are intelligent.

In Romanian, a language which does not have kind-referring bare nouns (see §2.2.2), the difference between proportional MOST and ALL is clear-cut:

(22) a. Cei mai mulți politicieni {mint/au plecat din oraș}.
the more many politicians lie/have left from city
'Most politicians {lie/have left the city}.'
b. Toți politicienii {mint/au plecat din oraș}.
all politicians-the lie have left from city
'All politicians lie./All the politicians have left the city.'

These examples show that *cei mai mulți* 'the more many', meaning 'most', takes NP complements, whereas *tot/toți* 'all' always combines with definite DPs, which can refer to particular entities or to kinds.

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2.2.2 Kind-referring bare NPs across languages

Romanian examples of the type in (23) contrast with their English counterparts in (24):

(23) a. *Cea mai multă apă e lichidă.
SUP COMP much water is liquid
b. *Cel mai mult lapte de capre bătrâne e acru.
SUP COMP much milk of goats old is sour

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(24) a. Most water is liquid.
b. Most milk from old goats is sour.

This contrast is parallel to the contrast in (25) and (26), which shows that bare NPs in argument positions can be kind-referring in English but not in Romanian (Dobrovie-Sorin and Laca 1996; 1998; Farkas and de Swart 2007; Dobrovie-Sorin and Beyssade 2012):

(25) a. *Apă e lichidă.
water is liquid
b. *Lapte de capre bătrâne e acru.
milk of goats old is sour

(26) a. Water is liquid.
b. Milk from old goats is sour.

The two sets of contrasts can be correlated by the following empirical generalization:

(27) Kind-referring bare NPs are allowed in the complement position of MOST only if kind-referring bare NPs are allowed in argument positions.

Although we cannot provide an explanation for this generalization, the correlation between the two distributional patterns of bare NPs exists in the relevant languages and is compatible with the observation that:

(28) a. In English, bare NPs in the complement position of MOST can be kind-referring.
b. In Romanian, Hungarian, Icelandic, and Turkish, bare NPs in the complement position of MOST cannot be kind-referring.

Thus, the LF representation of the Romanian examples is as in (23′), which contrasts with (24′) in English, where the null D^0 applies to the set/property denoted by NP and yields the corresponding kind (see Chierchia's 1998b *down* operator):

(23)′ *[[$_{QP}$ cea mai multă] [$_{NP}$ apă]] e lichidă.
SUP COMP much water is liquid

(24)′ [[$_{QP}$Most] [$_{DP}$[$_{D}$Ø] [$_{NP}$water]]] is liquid.

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The Romanian examples in (23) are unacceptable because the sister of *cea mai multă/cel mai mult* is a mass NP, which is ruled out from the restrictor of MOST; the English examples in (24) are allowed because the restrictor of MOST is not an NP but rather a kind-referring DP. The explanation as to why such constituents allow mass quantification must wait until §4.5. For now it is sufficient to observe that such examples have an entity-denoting restrictor (kinds are particular types of entities) and as such are similar to the MOST occurring in partitives (Matthewson 2001).[8] The generalization is that for the languages under discussion here, mass quantification is allowed only with entity-denoting restrictors.

Hungarian resembles Romanian insofar as bare NPs cannot be kind-referring either in argument positions or as complements of MOST. Thus, our informants confirm that MOST cannot be used in the Hungarian version of (24) (actually, the tested sentence was *On Earth, most water is liquid*). They provided instead a translation using THE LARGEST PART:

(29) A Földön a víz legnagyobb része (Hung.)
the Earth.on the water largest part.POSS
folyékony halmazállapotú.
liquid state.POSS
'On Earth, most water is liquid.'

Note however that the possibility of kind-referring bare NPs in argument positions is not a sufficient condition for kind-referring bare NPs to be allowed as complements of MOST. Indeed, although in Icelandic and Turkish, kind-referring bare nouns are allowed in argument positions, they are ruled out with *mest* and *çoğu*, respectively:

(30) a. *A jörðinni er mest vatn vökvi. (Ice.)
on Earth is most water liquid

b. *Dünya-da, [çoğu su] sıvı(dır). (Tur.)
Earth-on most water liquid

This means that in Icelandic and Turkish, the ban on mass NPs in the restrictor of majority quantifiers is not due to the unavailability of

[8] Let us make it clear that we disagree with Matthewson's view that *all* NP complements of MOST are kind-referring. According to us, kind-referring restrictors are allowed, but not compulsory for proportional MOST.

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kind-referring bare NPs, but rather to the properties of *mest* and *çoğu*, respectively, which cannot select a kind-referring bare NP (see §4.5 on the analysis of English examples of the type in (24)).

Summarizing, in Romanian, Hungarian, and Icelandic, the ban on the proportional reading of examples of the form [MOST NP_{mass}] can be observed not only in episodic but also in generic contexts, because these languges lack a kind-restrictor MOST. The generalization extends to the Turkish majority quantifier *çoğu*.

2.2.3 Summary

We have shown that the following generalizations hold in English, Icelandic, Romanian, and Hungarian:

(31) a. MOST NP_{count} VP allows the proportional reading.
b. MOST NP_{mass} VP disallows the proportional reading.
c. Proportional mass quantification is allowed in partitive configurations and in constructions in which MOST takes an entity-denoting restrictor (kind-referring bare NP).

The analysis of partitive configurations (built with MOST or with THE LARGEST PART) will have to wait until Chapters 4 and 5, respectively. In Chapter 4 we will also examine the English DPs in which MOST takes a kind-referring restrictor (without the mediation of the partitive preposition *of*). In the present chapter we are concerned only with the proportional MOST that occurs in non-partitives, and our aim is to explain its sensitivity to the mass/count distinction.

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2.3 Proportional MOST and (in)compatibility with mass quantification

Why should the data be what they are? Why is it that in certain languages, proportional MOST is incompatible with mass quantification? To answer this question we need to show that the denotation of the type of majority MOST found in the four (or five, if we include Turkish) languages under discussion here is incompatible with the semantic properties of mass NPs. We will first make clear our assumptions regarding mass and plural NPs. Then we will turn

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to the analysis of MOST itself and argue that the ban on mass quantification disqualifies Hackl's (2009) superlative hypothesis. This will lead us to assume that in the languages under discussion in this chapter, MOST has the quantificational-determiner denotation proposed by Mostowski and currently assumed in GQT. This type of MOST will be called $\text{MOST}_{\text{dist}}$, as a reminder of its obligatory distributivity. In §2.5 we will present evidence that $\text{MOST}_{\text{dist}}$ sits in D^0 or Spec,DP.

2.3.1 Background on mass and plural NPs

According to the common linguistic intuition, mass nouns, e.g. *wine* or *sand*, refer to amounts of stuff.[9] Amounts of stuff are concrete entities (on a par with singular individuals), but they are special insofar as they entertain systematic part-of relations with each other. Compare singular count nouns, e.g. *student*, that do not entertain part-of relations with each other.

The systematic part-of relation that characterizes the denotation of mass nouns makes it impossible to analyze them within a purely set-theoretic framework, and calls for the use of mereological notions. Thus, according to Moravcsik (1973), mass nouns denote mereological sums and mass predication can be analyzed in terms of parthood. The predication in (32) can be judged true iff the parthood relation stated in (33) is satisfied. We use the maximality operator σ in order to notate 'all that is gold on the table' and 'all that weighs fifty grams':

(32) The gold on the table weighs fifty grams.

(33) σx.gold on the table (x) ≤ σx.weighs fifty grams (x)

As observed by Bunt (1985), an adequate analysis of sentences of the type in (32) is impossible within set-theory, in which definite mass NPs, e.g. *the gold on the table*, would have to denote the set of all the mass quantities that are referred to, which wrongly yields a nonsensical interpretation for (32), according to which each of those mass quantities weighs 50 grams.

[9] We ignore here abstract mass Ns, e.g. *beauty*, *courage*, which are not relevant for our main concerns.

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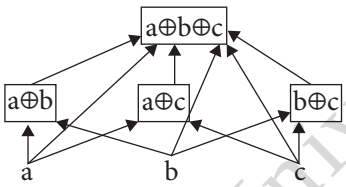
According to the purely mereological account, mass NPs do not denote sets of portions of stuff/matter, but rather maximal sum-entities that satisfy the nominal description, e.g. the noun *gold* denotes the sum of all the gold there is. One problem with this view is that in many languages, bare mass NPs, e.g. Romanian *aur* 'gold', cannot refer to the collection/sum of everything that is gold ('whatever is gold') but only to the property of being gold, which in extensional terms is the set of quantities of gold.

The framework currently assumed nowadays, which we will also adopt here, was initiated by Link (1983), who enriched set theory with mereological notions such as part-of relations and sum-entities. Within this algebraic semantic model, mass NPs are assumed to denote sets of portions of stuff, e.g. *gold* denotes the set of portions of gold. Such sets are ordered by systematic part-of relations, which amounts to saying that they denote join semi-lattices, as illustrated by the diagram in (34), where *a*, *b*, *c* are not assumed to be atoms; arrows represent the part-of relation:

(34)



The algebraic framework allows a simple solution to mass predication. Thus, the sentence in (32) is true iff the maximal sum of the set of portions of gold on the table is an element of the set of entities that weigh 50 grams:

(35) σx.gold on the table (x) ∈ {x: weighs fifty grams (x)}

According to Link (1983), mass NPs denote non-atomic join semi-lattices, which means that the elements on the bottom line of (34) are themselves sums of portions of gold. This view conflicts with our scientific knowledge of the divisiveness of substances: the minimal parts of water are not the molecules of H_2O, but rather the atoms those molecules are made of. Bunt's (1985) answer to this problem was to assume that the way in which substances are conceptualized in language does not depend on scientific knowledge, but rather on the fact that their minimal parts are not accessible to common-sense intuition. According to this solution, substance mass Ns qualify as divisive because they are divisive down to a certain granularity level (see Link 1987); what happens below that level is not relevant for the purposes of language. We will accept

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this solution, which means that we will assume that substance mass Ns denote non-atomic join semi-lattices, as initially proposed by Link (1983).[10]

But note now that mass Ns of the *furniture* type cannot be assumed to denote non-atomic join semi-lattices, because the minimal parts in the denotation of such Ns are clearly accessible to our common-sense intuition. This means that the current linguistic definitions of divisiveness and atomicity do not help in explaining why *furniture*, *cutlery*, etc. are classified as mass rather than count Ns. This impossibility has led most of the current research towards the conclusion that the traditional distinction between mass and count Ns should be abandoned in favor of a three-way distinction between count Ns, substance mass Ns, and object(-like) mass Ns. Crucially, according to such recent accounts (Landman 2011; Deal 2017), furniture-type Ns are not grouped together with substance type Ns. A careful examination of object mass Ns will be undertaken in §2.3.4, where we will define a notion of 'semantic' atom that allows object mass Ns to be grouped together with substance mass Ns: both types of denotation lack semantic atoms (under the proposed definition of semantic atom).

Plural NPs resemble mass NPs insofar as they also denote join semi-lattices, i.e. sets that are ordered by the part-of relation. However, plural NPs differ from mass NPs insofar as their semantics needs to take into account atomic entities. Crucially, when join semi-lattices are used to represent plural NPs (*students*), the bottom line consists of atomic entities, e.g. the individuals that satisfy the singular noun *student*, and the join semi-lattice as a whole represents the closure under sum of that set of atoms. Thus, the join semi-lattice in (34) can be used to represent the closure under sum of a singular count N, say *student* (provided that we assume that a, b, and c are atoms). Closure under sum is notated with Link's star operator:

(36) a. ⟦student⟧ = {a, b, c}

b. *⟦student⟧ = {a, b, c, a+b, b+c, a+c, a+b+c}

These denotations do not tell us what the denotation of the plural noun *students* is. According to some theoreticians (Link 1983; Chierchia 1998a),

[10] Is it possible to define the minimal parts of substances in such a way that they can be distinguished from the minimal parts of count Ns (and from the minimal parts of mass Ns of the *furniture*-type)? Attempts towards this end can be found in Chierchia (2010), Landman (2011), or Grimm (2012), who rely on notions such as "(un)stable minimal parts", (non-)overlapping minimal parts, and "strongly connected parts", respectively.

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the denotation of plural NPs is 'exclusive', i.e. it excludes the set of atoms from the denotation of the closure under sum of the corresponding singular noun (see (37b)). This view is confronted with various empirical problems regarding the distribution and interpretation of plural NPs (Krifka 1989; Sauerland 2003; Sauerland, Anderssen, and Yatsushiro 2005), which have led most theoreticians (including Chierchia 2010) to assume that the denotation of plural NPs is "inclusive", i.e. it includes the set of atoms from which the join semi-lattice is generated. In other words, according to the "inclusive" view of plural NPs, *students* denotes the closure under sum of the denotation of *student* (see (37a)). Farkas and de Swart (2010) assume that plural NPs are either inclusive or exclusive, depending on the syntactic context.

(37) a. ⟦students⟧ = *⟦student⟧ = {a, b, c, a+b, b+c, a+c, a+b+c}
b. ⟦students⟧ = *⟦student⟧ - ⟦student⟧ = {a+b, b+c, a+c, a+b+c}

We will adopt the inclusive view.

In sum, mass NPs and plural NPs are alike in that both types of nominals denote join semi-lattices, but an important difference remains: the denotation of plural NPs is obtained based on the denotation of the corresponding singular N; no comparable morphological alternation exists for mass Ns. Correlated with this difference is a difference regarding the part-of relation (cf. Link 1983): the join semi-lattice denoted by plural Ns is ordered by the individual part-of relation ($\leq_{ind}$), whereas the join semi-lattice denoted by mass Ns is ordered by the material part-of relation ($\leq_{mat}$). Given the similarities between the plural and mass domains, we will sometimes refer to the elements of both these domains as "sums" (or "sum-entities").

When dealing with compositional analyses of particular examples, we will need to use characterizing functions of sets rather than sets. What we find in the literature are formulae of the following sort:[11]

(38) ⟦water⟧ = λx.water(x)

(39) a. ⟦students⟧ = λx.students(x)
b. ⟦students⟧ = λx.*student(x)

[11] Sometimes capitals are used in order to indicate that the variables range over pluralities rather than over atoms (e.g. for (39a), λX.students(X)).

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The star on *student* in the (b) example is meant to signal that the variable ranges over the elements of the join semi-lattice obtained by applying the pluralization operator to the set of atoms denoted by the singular (unmarked) N *student*.[12]

2.3.2 Possible analyses of MOST and the count/mass distinction

Essentially three types of analyses can be found in the previous literature on MOST: the traditional GQT analysis, according to which MOST is a quantificational determiner; Hackl's (2009) superlative analysis; and Matthewson's (2001) view, according to which MOST denotes a function from entities into generalized Qs. In this subsection we will show that the ban on mass quantification exhibited by the MOST occurring in Romanian-type languages cannot be accounted for based on Hackl's or Matthewson's proposals, which leaves us with the GQT analysis.

As explained at some length in §1.2.2, according to Hackl's analysis the proportional reading of MOST is the absolute reading of the superlative form of the quantitative adjective *many/much*. More precisely, Hackl assumes the following denotation for the superlative morpheme (notated -EST) relevant for the analysis of MOST (recall that Hackl is obliged to replace the non-identity condition of Heim's (1999) denotation of -EST with a non-overlap condition). We have simplified the denotation by leaving aside its definedness conditions, which are not directly relevant here, and we have replaced *many* by a general measure function μ that can also cover *much* and represents the cardinality function in the case of *many*:

(40) $[\![\text{-EST}]\!](C)(\lambda d.\ [\![\text{d-many/much NP}]\!])(x) = 1$ iff $\forall y \in C[\neg\ y \circ x \rightarrow \max\{d{:}\mu(x) \geq d \wedge [\![\text{NP}]\!](x)\} > \max\{d{:}\mu(y) \geq d \wedge [\![\text{NP}]\!](y)\}$

In this formula, C is a covert variable over comparison classes, and μ is a measure function from individuals into degrees. In the case of mass NPs, the measure function is underspecified, being contextually identified as volume,

[12] According to the "Lexical Cumulativity Hypothesis" (Krifka 1989; 1992; Sauerland 2003; Sauerland et al. 2005; Chierchia 2010), count Ns are already pluralized in the lexicon, which means that semantic pluralization (the star operator) is not triggered by the morphological plural marking on Ns. In other words, both *student* and *students* are assumed to denote λx.*student(x). Because the Lexical Cumulativity Hypothesis is not directly relevant for our main concerns, we will stick to Link's view that unmarked count Ns denote sets of atoms.

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length, surface, etc., depending on the lexical properties of the NP, the VP, or the pragmatic context.

When combined with plural NPs, the formula is true iff the cardinality of x is larger than the cardinality of any y in the comparison class such that y does not overlap with x:

(41) $[\![\text{most students}]\!] = \lambda x.\ \forall y[(y \in C \wedge \neg\, y \circ x) \rightarrow \max\{d: \text{students}(x) \wedge \mu(x) \geq d\} > \max\{d: \text{students}(y) \wedge \mu(y) \geq d\}]$

According to this formula, *most students* describes a plural individual that is included in the maximal sum of students and has a greater cardinality than any non-overlapping plural individual in the comparison class. The comparison class is the set of all the non-maximal elements in the join semi-lattice denoted by *students* (for absolute superlative readings it is the NP that provides the comparison class, *modulo* appropriate contextual restrictions). As Hackl points out, this description is true of a plurality only if that plurality contains more than half of the students: if it did not, its complement (with respect to all the students) would be a non-overlapping element of the comparison class (the join semi-lattice of students) with a greater cardinality.

It is easy to see that Hackl's analysis trivially extends to mass NPs:

(42) $[\![\text{most water}]\!] = \lambda x.\ \forall y[(y \in C \wedge \neg\, y \circ x)] \rightarrow \max\{d: \text{water}(x) \wedge \mu(x) \geq d\} > \max\{d: \text{water}(y) \wedge \mu(y) \geq d\}]$

This NP should be able to describe a mass entity that is included in the maximal sum of water and has a greater volume (as already mentioned above, the measure function notated μ is underspecified, and volume is an appropriate measure function for water) than any non-overlapping mass entity in the comparison class. The comparison class is taken to be the set of all the non-maximal elements of the join semi-lattice denoted by *water*.

The problem is that in Romanian, Hungarian, Icelandic, and English, the proportional reading of MOST is allowed with plural NPs but not with mass NPs. We must conclude that Hackl's analysis is inadequate for the type of MOST found in these languages. The possibility is left open that Hackl's analysis may be appropriate for the MOST found in other languages, e.g. in German (see Chapter 3).

Let us now turn to Matthewson's (2001) proposal, based on the assumption that the English *most* necessarily takes an entity-denoting complement, either

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a full DP or a kind-referring bare NP (kinds are assumed to denote a special type of entities, following Carlson 1977a; 1977b):

(43) a. Most of this water is dirty.
b. Most water is liquid.

A detailed analysis of these examples will be provided in §4.5. For now, it is sufficient to observe that the assumption that MOST necessarily takes an entity-denoting complement cannot be true crosslinguistically. In particular it cannot be true for the Romanian-type languages: such languages do not have kind-referring bare NPs in either argument positions or in the complement position of MOST. Internal to English, Matthewson cannot explain the contrast between plural and mass NPs in episodic contexts (see examples (10) and (16)).

Let us now consider the Generalized Quantifier analysis of *most* (Mostowski 1957; Rescher 1964), which says that examples of the type in (44a) are true iff (44b) is satisfied; ∩ represents the general lattice-theoretic operation 'meet' (intersection is meet applied to sets):

(44) a. Most students in my class have left early.
b. |{x: student(x)} ∩ {x:left-early(x)}| > |{x: student(x)} ∩ {x: not-left-early(x)}|

In words, (44b) says that the set of students in my class for which the property denoted by the VP (*leave early*) is true has a greater cardinality than the set for which the VP property is false. According to this widely assumed analysis, MOST is a quantificational determiner that denotes the relation between two sets.

This analysis seems to have better chances at explaining why MOST cannot take mass NPs in its restrictor. Note indeed that by applying this formula to a mass denotation, what we obtain is an uninterpretable representation (we indicate this by using the symbol #):

(45) *Most milk in the fridge is sour.
#|{x: milk-in-the-fridge(x)} ∩ {x: sour(x)}| > |{x: milk-in-the-fridge(x)} ∩ {x: not-sour(x)}|

The set {x: milk-in-the-fridge(x)} comprises all the portions of milk, which are included in one another. As there are no minimal accessible elements in this

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set, or in the denotation of *sour*, the cardinality of {x: milk-in-the-fridge(x)} ∩ {x:sour(x)} cannot be computed.

2.3.3 Plural marking on the NP restrictor of MOST

According to the GQT analysis, MOST is a quantificational determiner, on a par with universal distributive quantifiers such as *each* and *every*. This analysis correctly captures the truth-conditions of MOST, but it seems problematic in view of a clear empirical generalization: in all the languages in which cardinals as well as MANY require plural marking on the NP, we also find plural marking on the NP-restrictor of MOST. Compare EACH and EVERY, which are incompatible with plural marking. This raises two questions: (i) why does MOST require plural marking, in contrast to EACH and EVERY? (ii) How can we make plural marking compatible with the semantics of MOST, which denotes a relation between sets of atoms?

The difference between the obligatory absence of plural-marking with EVERY/EACH and the obligatory presence of plural-marking with MOST can be attributed to a difference in c(ategory)-selection:

(46) a. Proportional MOST (in Romanian, Icelandic, and English) c-selects a [+pl] complement (on a par with MANY, FEW, or cardinals).
b. EVERY/EACH c-select a [+sg] complement.[13]

This formal difference in c-selection may be correlated with the fact that cardinality, which is obviously involved in the semantics of cardinals, as well as FEW and MANY, is also needed for the semantic analysis of MOST (see Mostowski's definition). Compare EVERY/EACH, the semantics of which does not involve cardinality.

Note that (46a) only holds in certain languages. In Hungarian, *a legtöbb* 'most' combines with NPs unmarked for number, on a par with cardinals and *sok* 'much, many'. This difference in the selection properties of the Hungarian quantity expressions does not mean that the denotation of the NP complement of the proportional *a legtöbb* is different from the denotation of the plural marked NP in Romanian or English. Indeed, on the inclusive view of the denotation of plural NPs (see §2.3.1), the plural-marked NP complement of MOST denotes the whole join semi-lattice, comprising atoms and the sums

[13] EVERY can also select a MeasP with cardinals, e.g. *every two days*.

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thereof. The same type of denotation can be assumed for the Hungarian unmarked NPs.

In sum, in order to capture the fact that crosslinguistically, proportional MOST has the same c-selectional properties as MANY, we will assume that the NP complement of MOST denotes an atomic join semi-lattice. But the semantics of MOST as defined by Mostowski is only interested in the set of atoms in the denotation of the NP. We therefore need to assume that the restriction to a set of atoms is contributed by $\text{MOST}_{\text{dist}}$ itself:

(47) $[\![\text{MOST}_{\text{dist}}]\!] = \lambda P.\, \lambda Q.|\{x: P(x) \wedge \text{Atom}(x)\} \cap \{x: Q(x)\}| > |\{x: P(x) \wedge \text{Atom}(x)\} - \{x: Q(x)\}|$

To illustrate, the English and Hungarian examples given below are true iff the condition in (49) holds. This formula is obtained by saturating the denotation of MOST with the NP and VP predicates:

(48) a. Most students arrived late.

b. A legtöbb diák későn érkezett. (Hung.)
most student late arrived

(49) $|\{*\text{student}(x) \wedge \text{Atom}(x)\} \cap \{x: \text{arrived}(x)\}| > |\{*\text{student}(x) \wedge \text{Atom}(x)\} - \{x: \text{arrived}(x)\}|$

For determiners such as EACH, which c-select NP_{sg}, the restriction to atoms is due to the interpretability of the [+sg] formal feature.

2.3.4 Object mass NPs and atomicity

Let us now consider again the central question of this section:

(50) Why is it that $\text{MOST}_{\text{dist}}$ cannot combine with mass NPs?

The answer is straightforward for examples built with substance mass NP, e.g. (51). In this section we will use English examples, because for most readers English is more accessible than Romanian or Hungarian:

(51) *Most milk in the fridge is sour.

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In order to check the truth of this example, we would need to check the condition in (52), written on the model of (44b):

(52) |{x: milk-in-the-fridge(x) ∧ Atom(x)} ∩ {x: sour(x)}|>|{x: milk-in-the-fridge(x) ∧ Atom(x)} ∩ {x: not-sour(x)}|

Given the hypothesis adopted here, according to which mass NPs denote non-atomic join semi-lattices (see §2.3.1), the set {x: milk-in-the-fridge(x) ∧ Atom(x)} will be the empty set in all models. As a consequence, the example in (52) would turn out false in all models: indeed, the intersection of the empty set with {x: sour(x)} is the empty set, and the difference between the empty set and {x:sour(x)} is also the empty set, so we would end up with the proposition μ(Ø)>μ(Ø), which is always false.

In order to be able to analyze the unacceptability of examples built with MOST NP_{mass} as being ill-formed (rather than always false), we need to introduce the atomicity condition as a definedness condition. Hence, we revise our definition of $MOST_{dist}$ by inserting the definedness condition:

(53) $[\![MOST_{dist}]\!]$= λP. λQ. |{x: P(x) ∧ Atom(x)} ∩ {x: Q(x)}|>
|{x: P(x) ∧ Atom(x)} - {x: Q(x)}|
defined iff P contains atoms

Supplied with this definedness condition, the denotation of $MOST_{dist}$ yields the correct results not only for plural count Ns (as well as for unmarked count Ns in Hungarian—see §2.3.3), but also for substance mass Ns. Since count NPs have atoms in their denotation, $MOST_{dist}$ can apply to them; since substance mass NPs do not have atoms in their denotation, $MOST_{dist}$ cannot apply to them.

Let us now consider 'object mass' nouns, i.e. mass nouns that describe collections of objects, e.g. *furniture* or *mail*.[14] According to most of the recent literature (Chierchia 1998a; Bale and Barner 2009; 2018; Landman 2011), object mass NPs denote atomic join semi-lattices, i.e. sets that contain a set of atoms and all the pluralities made up by applying the sum operation to those atoms. This type of denotation is supported by two tests that distinguish object mass Ns from substance mass Ns: (i) compatibility with 'stubbornly

[14] The term 'object mass noun' is due to Barner and Snedeker (2005). Various other terms can be found in the literature: "count mass" or "collective" (Doetjes 1997), "fake mass" (Chierchia 1998a; 2010), and "aggregates" (Huddleston and Pullum 2002; Grimm 2012).

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distributive adjective' such as *small* or *round* (Schwarzschild 2011) and (ii) 'comparison by number' (Barner and Snedeker 2005; Bale and Barner 2009). The following contrast illustrates the distributive adjective test:

(54) a. I need small chairs.
b. I need small furniture.
c. *I need small sugar.

This test not only distinguishes between two classes of mass Ns (see the b vs. c contrast) but moreover groups object mass Ns together with count Ns (the (b) example is on a par with the (a) example).

The relevance of 'comparison by number' as opposed to comparison by volume, surface, etc. can be observed in comparative sentences:

(55) a. Susan has more chairs than Mary.
b. Susan has more furniture than Mary.
c. Susan has more sugar than Mary.

As Barner and Snedeker (2005) showed experimentally, examples of the type in (b) involve counting the individual pieces of furniture that Mary and Susan respectively have: the sentence is understood as meaning that Susan has a larger number of pieces of furniture than Mary (again, this test groups object mass Ns together with count Ns: see the (a) example). Substance mass Ns, on the other hand, cannot be measured by number, but only along some other dimension (volume, mass, surface, etc.); thus the example in (c) is understood as comparing the measures of the two masses of sugar that Susan and Mary respectively have.

The hypothesis that object mass Ns have atoms in their denotation is supported by the following definition of atom of a property (cf. Krifka 1989: 78; Landman 1989: 561):

(56) $\forall x.\ [\text{atom}(x,P) \leftrightarrow \forall y((y \leq x \wedge P(y)) \rightarrow y = x)]$

Given this definition of atom, individual pieces of furniture, such as chairs, tables, etc. are the *atoms* in the denotation of the nominal predicate *furniture.*

The problem is that according to this analysis, object mass NPs are identical to plural Ns (both types of Ns denote atomic join semi-lattices), and therefore it seems difficult, if not impossible, to explain the fact that these two classes of Ns are treated as being distinct by the morphosyntax. The following examples

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illustrate the well-known facts relating to combination with cardinals and determiners such as *many*, *few*, or *several*:

(57) two cats/*furnitures

(58) {many, few, several} cats/*furnitures

The impossibility of combining with cardinals and determiners that c-select plural Ns is intriguing: why is it that the atoms in the denotation of *furniture* can be used for measuring by cardinality in examples built with quantity adjectives such as *more* (see examples in (55)) but cannot be used to satisfy whatever requirement cardinals may introduce on their complement NP? It is important to discard the simplistic answer that the examples above are ruled out just because cardinals would have a +pl c-selection feature, and since pluralization is ruled out for mass NPs, cardinals would also be ruled out. Such a solution does not work for a language such as Hungarian, in which the NP complement of cardinals is left unmarked, and yet cardinals cannot take object mass Ns as complements. Moreover, English and Romanian determiners that do not select plural NPs but semantically select for atoms are also ruled out: **each furniture, *a furniture*.

Object mass Ns are also ruled out with the proportional MOST found in Romanian, English, etc.:[15]

(59) a. *Most furniture in this garden was damaged by the hurricane.
b. Most armchairs in this garden were damaged by the hurricane.

Recall that under the definition of MOST given in (47) above, the restrictor of MOST contains the set of atoms in the denotation of *armchairs*. The problem is that we have just argued that *furniture* also has a set of atoms in its denotation and therefore we expect the (a) example to be acceptable, on a par with the (b) example: MOST would just have to pick up the set of atoms out of the denotation of *furniture* and the computation would proceed smoothly.

The problems raised by object mass Ns point to the necessity of distinguishing between two types of atoms. Using Rothstein's (2010) terminology, we may call them "natural atoms" and "semantic atoms", respectively:

[15] Some speakers allow object mass Ns in certain contexts, e.g. *Most furniture on the beach was damaged by the hurricane* (example due to Alan Bale, p.c., Feb. 2019, also accepted by an OUP reviewer). Some kind of coercion could be involved (see the discussion in the main text below).

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(60) a. The atoms in the denotation of object mass Ns are natural atoms.
b. The atoms in the denotation of count Ns are semantic atoms.

For our present purposes it is not necessary to use Rothstein's (2010) theory of the mass/count distinction, which takes the notion of 'semantic atom' as a primitive and the notion of count N as derived from it. We will instead do the reverse, define the notion of 'semantic atom' in terms of the notion of count N.

We follow the traditional view (somewhat obscured by the Lexical Cumulativity Hypothesis) according to which count nouns denote properties of singular individuals and need the pluralization operator in order to acquire a join semi-lattice denotation, whereas object mass nouns, on a par with other mass nouns, denote properties of objects that have systematic part–whole relations between them. We propose the following recursive definition:[16]

(61) P is a count predicate iff
(i) P is a nominal lexical predicate and is not cumulative, or
(ii) P = *Q, where Q is count, or
(iii) P = Q ∩ R, where Q is count.

We need to refer to nominal *lexical* predicates in (61.i) in order to rule out non-cumulative mass NP denotations obtained by modification (e.g. *gold that weighs 50 grams*; this predicate is non-cumulative because by adding a sum of [gold that weighs 50 grams] to another sum of [gold that weighs 50 grams], the sum we obtain does not qualify as *gold that weighs 50 grams*; yet, the NP *gold that weighs 50 grams* shows syntactic mass behavior). (61.ii) distinguishes between semi-lattices formed via pluralizations, such as *chairs*, from join semi-lattices that represent the inherent denotation of a nominal concept, such as *furniture.*[17]

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[16] Krifka (1989) proposes a stronger constraint in the definition of what he calls "quantized predicates" (which, for him, are not the denotations of count nouns themselves, but are used in establishing this denotation):

(i) P is an atomic predicate iff:
P(x) is true and y is a proper part of x, then P is not true of y

Krifka notes that this definition is problematic for nouns such as *twig*, *sequence* (see also *object*, *group*: a car is an object and its parts—doors, wheels, etc.—are also objects; see Chierchia 1998a). Krifka's solution is based on Link's distinction between an *individual part* ($\leq_i$) and a *material part* ($\leq_m$) relation: he proposes that twigs or sequences contain other twigs or sequences as material parts, but not as individual parts. (i) can thus be read as:

(ii) P is an atomic predicate iff for any x,y: $[P(x) \wedge y <_i x] \rightarrow \neg P(y)$

[17] This distinction between non-pluralized and pluralized count Ns, on which our account relies, is not compatible with the Lexical Cumulativity Hypothesis. We may assume that the LCH does not concern lexical predicates (roots) but rather nPs, i.e. constituents of the form [n+Root], where little n is a categorizing head and the root may denote a cumulative or a non-cumulative property; for count

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(61.iii) is needed in order to be able to define a notion of 'atom' for complex noun phrases:

(62) a. [Most [students in my class]] are hard-working
b. *[Most [furniture in my house]] is old

Given these definitions, the notion of semantic atom can be defined as a relation between an entity and a count predicate:[18]

(63) $\forall x.\forall P\ [atom(x,P) \leftrightarrow [P(x) \wedge \forall y((y \leq x \wedge P(y)) \rightarrow y = x) \wedge count(P)]]$

Mass NPs, including *furniture*, are cumulative lexical predicates, hence they are not count. Because the definition of semantic atom in (63) requires count predicates, we obtain the desired result that object mass nouns do not have semantic atoms. If we assume that it is this notion of atom that is needed for the semantics of $\text{MOST}_{\text{dist}}$, cardinals, the singular indefinite article, etc., we can explain the morphosyntactic differences between object mass Ns and count Ns.[19]

2.3.5 On the restriction of $\text{MOST}_{\text{dist}}$ to atomic domains

$\text{MOST}_{\text{dist}}$ shares with EACH the impossibility of quantifying over mass domains. As shown in §2.3.4, this restriction is not just due to the impossibility of counting all the elements in the domain of a mass noun, because it is also found with object mass nouns such as *furniture*, which, in a given context, may

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nouns, n would introduce the pluralization operator, whereas for mass nouns, n would denote the identity function (see Bale 2017).

[18] Chierchia (1998a), who proposes that all mass nouns have a plural-type denotation in the lexicon (an atomic join semi-lattice), defines count predicates (which have an atomic denotation in the lexicon) by using a function SG that checks whether the predicate is a predicate of atoms or is the result of pluralizing a predicate of atoms (see Chierchia 1998a: 71):

i) For any set A, SG(A) = A, if A ⊆ At or if A = PL(B), for some B ⊆ At; undefined otherwise

[19] The alternative is to encode the restrictions of determiners such as MOST and EACH to count nouns via a c-selectional feature of the determiner. This alternative is explored in Bale (2017), who uses the features SG, PL, and CL (the latter, to be read as 'closure', comprises mass nouns and plurals; count nouns are SG in the lexicon; PL comes from a plural morpheme, that can only be added to a +SG N). Under this view, the selectional feature +PL of MOST_{Det} suffices to rule out mass complements. The notion of 'atom' would still be needed for the denotation of $\text{MOST}_{\text{dist}}$, but we would not need to bother with eliminating atoms of furniture: $\text{MOST}_{\text{dist}}$ doesn't apply to *furniture* not because of the way 'atom' is defined, but because of its c-selectional features.

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comprise a finite and countable number of elements (think of all the sums of furniture in a room). Dobrovie-Sorin (2013a) attributes this impossibility to a general constraint on domains of quantifiers, which excludes semi-lattice domains:[20]

(64) Variables ordered by part–whole relations cannot be bound by a distributive quantifier.

The restriction to distributive quantifiers is meant to leave aside on the one hand existential quantifiers and on the other hand mass quantifiers (see Chapter 3).

Interestingly, in §1.2.2 we proposed that a constraint similar to (64) is needed for the comparison classes of superlatives:

(65) The elements of a comparison class cannot be ordered by part–whole relations.

This is not unexpected given the fact that the semantics of superlatives involves universal quantification over comparison classes. The general constraint to which $\text{MOST}_{\text{dist}}$ is subject can be formulated as follows:

(66) In natural language, quantifiers that require examining all the elements of a set cannot apply to sets whose elements entertain part–whole relations with each other.[21]

Note indeed that in order to evaluate $\text{MOST}_{\text{dist}}$(N)(V), all the elements of the N-set must be examined. Therefore, the restriction of $\text{MOST}_{\text{dist}}$ to atomic domains follows from the principle in (66).

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[20] Such a constraint has been suggested by Kratzer (1995: 169) for quantification in general: "Quite generally, any sort of quantification seems to require that the domain of quantification is set up in such a way that its elements are truly distinct." From the examples she provides, it can be inferred that "truly distinct" means "not related to each other by the part–whole relation". As Kratzer uses existential closure for existential readings, we may assume that she does not include existentials in the category of "quantification".

[21] Free-choice *any* seems to be an exception, as it can apply to plurals (e.g. *You may take any books*). However, it has been argued that free-choice DPs are not universally quantified DPs, but rather indefinites that introduce alternatives distributed across worlds or situations (see e.g. Kadmon and Landman 1993; Kratzer and Shimoyama 2002; Chierchia 2006; Farkas 2006; Aloni 2007; Panaitescu 2013).

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2.3.6 Derived atoms in the restrictor of $\text{MOST}_{\text{dist}}$

In this section we will show that the atoms in the restrictor set of $\text{MOST}_{\text{dist}}$ may be of a special kind, the so-called "impure atoms". We use data from Romanian, a language that only has $\text{MOST}_{\text{dist}}$ (see §2.2). Some speakers of Romanian accept examples of the type in (67), which involve distribution over groups defined by a collective predicate:[22]

(67) a. Cele mai multe companii rivale au interese comune. (Ro.)
SUP COMP many companies rival have interests common
'Most competing companies have common interests.'

b. Cei mai mulți colegi de apartament împart
SUP COMP many colleagues of apartment share
aceeași baie.
same bathroom
'Most apartment mates share the bathroom.'

c. La maternitate anul acesta cei mai mulți
at maternity-hospital year-the this SUP COMP many
gemeni au fost identici.
twins have been identical
'This year, at the maternity hospital, most twins have been identical.'

The main predicates of these examples are collective (having common interests cannot apply to a single company, sharing the bathroom or being identical cannot apply to an individual), and correlatively, these examples involve quantification over groups of rival companies, apartment mates, and twins, respectively.

Examples of this type seem to contradict the restriction on distributive quantification proposed in (66) above. Indeed, part-of relations do exist between the elements in the denotation of the predicates, which allow distributivity to subgroups: if *a*+*b*+*c* are apartment mates, it follows that the groups *a*+*b*, *b*+*c*, and *a*+c are apartment mates. This is at odds with the principles in (64) and (66) above. A solution to this problem can be provided by observing that the predicates in the restrictor are not cumulative and by using a proposal made by Moltmann (1997) for examples in which ALL quantifies over groups. Note first that the predicates in the restrictor—*rival companies*, *apartment mates*, *twins*—are not the result of pluralization (they

[22] These examples are modeled after examples with *all* discussed in Moltmann (1997: 109–10).

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are not derived by the *operator from predicates of singular individuals) and, correlatively, their domain is not a join semi-lattice: if *a* and *b* are competing companies, and *c* and *d* are competing companies, it does not follow that *a*, *b*, *c*, and *d* are all competing with each other. In other words, the restrictor predicates are not cumulative, although they are distributive down to subgroups, as explained above. In order to explain why the constraint on $\text{MOST}_{\text{dist}}$ stated in formulated in (66) is satisfied with such predicates, we need to "disactivate" distributivity. This can be achieved by making use of the proposal made by Moltmann (1997) for similar examples involving *all*. Moltmann proposes that the groups quantified over are the maximal groups for which the restrictor holds—e.g. if A, B, and C live in the same apartment but nobody else lives with them, then only the group A+B+C will be quantified over, and not the smaller groups A+B, A+C, and B+C. This corresponds to our intuitions about the meanings of these sentences: in evaluating MOST (apartment-mates)(share-bathroom), each case of apartment sharing is counted once, no matter how many persons live in the apartment.

The elimination of subgroups from the restrictor may be conceived of as a coercion operation needed to make the restrictor comply to the constraints in (64)/(66):

(68) Maximalization of a predicate:
MAX(P) comprises all and only the elements of P that are not proper parts of other elements of P
$(\text{MAX}(P))(x)$ iff $P(x) \wedge \neg\exists y(P(y) \wedge x < y)$

The necessity of such an extra operation may explain why some speakers find these examples degraded.

A further issue which we need to address is whether these examples are covered by the definition of "atom" presented in §2.3.4. It is clear that the groups quantified over in these examples do not behave as atoms with respect to other tests: they are not counted by cardinals—*two competing companies* can only refer to two individual companies that are competing, it can't refer to two groups of competing companies—and, obviously, they are not accessed by singular number or singular determiners such as *each*. The reason for this is that the restrictor predicates are complex predicates consisting of a count predicate which becomes collective via intersection with another predicate. This is clear in the case of *competing companies*: *company* is a normal count noun; its pluralized form (**company*) is intersected with the collective predicate *compete*. The predicate *compete* is the plural version of a two-place

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symmetric relation (*compete with*). Via a general rule, predicates that are symmetric with respect to two argument positions (e.g. *a competes with b* → *b competes with a*) have a "plural'" reciprocal version where two arguments are collapsed into a single argument, a plurality which is such that the symmetric relations hold between all pairs of its members.

The nouns *mate* and *twin* are basically symmetric relations, subject to this rule of "reciprocal" pluralization. They incorporate a count predicate of individuals—*person* (e.g. apartment mates are *persons* who live in the same apartment, twins are *persons* with the same parents and born together).

The atomicity involved in cardinals and singular number tracks down the basic one-place count predicate that acts as the lexical head (*company* in (67a), and the *person* component in the other two examples). In the case of $\text{MOST}_{\text{dist}}$, on the other hand, for those speakers who accept the examples in (67), a different notion of "atom" must be assumed, which takes into account the collective nature of the predicates in the restrictor (*compete* in (67a), *apartment mates* in (67b), *twins* in (67c)). In (61), we defined count predicates in terms of non-cumulativity. As we have seen, reciprocal collective predicates are not cumulative. Note moreover that the atoms in the restrictor of MOST are also characterized by the absence of part–whole relations with other atoms, due to the maximalization operation in (68). They comply, therefore, with the definition in (63). The notion of "atom" can thus be extended to the groups in the denotation of reciprocal collective predicates, as proposed by Landman (1989). Link (1984) introduced the concept of "impure atom" for groups. We may also call them "derived atoms": with respect to the head-predicate, they are still sums, whose individual parts are accessible to counting. It is only with respect to the intersection between the head-predicate and the modifying collective predicate that they qualify as atoms. $\text{MOST}_{\text{dist}}$ seems to have access (at least for certain speakers) to such derived "impure atoms" predicates, in contrast to cardinals and singular number, for which a notion of atom is required that makes direct reference to the denotation of the head-predicate, disregarding the effects of further modification.[23]

The availability of derived atoms in the restriction of $\text{MOST}_{\text{dist}}$ shows that plural number marking is not completely devoid of meaning. Although most of the time $\text{MOST}_{\text{dist}}$ quantifies over singular individuals, it is not forced to do so by the morphosyntax, as is the case for EACH. Therefore, exceptionally, $\text{MOST}_{\text{dist}}$ can also quantify over impure atoms, an option excluded for EACH.

[23] For an elaborate system where the basic "atomic" denotation of count nouns can be accessed at a higher level of the structure, see Landman (2016).

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2.4 Proportional most and (in)compatibility

Interesting confirmation for the denotation of $\text{MOST}_{\text{dist}}$ proposed above comes from examples in which the nuclear scope (which in simple examples corresponds to the VP) is filled with a collective predicate.

2.4.1 The data

Roberts (1987) observed that *most* does not allow collective predicates in the nuclear scope, and van der Does (1993) pointed out that Roberts was right for non-partitive *most*, but not for partitive *most*:[24]

(69) a. *Most boys gathered in this room.
b. *Most students met yesterday.
c. *Most demonstrators rapidly dispersed.

(70) a. Most of the boys gathered in this room.
b. Most of the students met yesterday.
c. Most of the demonstrators rapidly dispersed.

The same holds for the cumulative reading of plurals:[25]

(71) a. Most of the voters voted for two parties: OK cumulative (Crnić 2009)
b. # Most voters voted for two parties: * cumulative

The observation is replicated in other languages that have $\text{MOST}_{\text{dist}}$, e.g. Romanian or Hungarian, with the difference that embedding MOST in a partitive construction does not improve the acceptability (see Chapter 4 for details). In these languages, the only majority quantifiers allowed with collective predicates are expressions of the type THE LARGEST PART and THE

[24] Van der Does's example (1993: 531) is *Most of the boys left together*, built on Roberts's example **Most boys left together*. We have changed it because Ileana Comorovski observed that van der Does's example was not fully acceptable, maybe not acceptable at all for certain speakers. However, the relative unacceptability of some examples does not threaten the generalization that collective predicates are allowed only with partitive *most*, not with non-partitive *most*.

[25] The term "cumulative" as used here refers to a possible reading of configurations in which a predicate takes two plural arguments. If x and y are pluralities and R is a relation, R(x,y) is true on the cumulative reading if for any member x′ in x there is a y′ in y such that R(x′,y′), and, conversely, for any y′ in y there is an x′ in x such that R(x′,y′). An example where only this reading makes sense (due to world knowledge) is (i):

(i) Today, three women gave birth to five babies.

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MAJORITY, which resemble the partitive MOST of English in that they take as complements *of*-DPs or genitive-marked DPs, which introduce the 'whole':

(72) a. *Cei mai mulți băieți s-au adunat în (Ro.)
the more many boys REFL-have gathered in
sala asta.
hall-the this

b. Majoritatea băieților s-a(u) adunat în
majority-the boys-the.GEN REFL.has/have gathered in
sala asta.
hall-the this
'Most of the boys gathered in this room.'

(73) a. ?? A legtöbb kollégám találkozni fog holnap. (Hung.)
the most colleague.my meet.INF will.3SG tomorrow

b. A kollégáim többsége találkozni fog holnap.
the colleague.PL.my majority meet.INF will.3SG tomorrow
'Most of my colleagues will meet tomorrow.'

As observed by Dobrovie-Sorin (2014; 2015), the contrast between non-partitive MOST and partitive constructions (built with MOST, THE LARGEST PART, or THE MAJORITY) shown by these examples is parallel to the one we observed with mass NPs in the restrictor (see (4), (5), (10), and (11)).

2.4.2 Explaining the data

In order to explain the unacceptability of (69a–c), we need to explain why the denotation of $\text{MOST}_{\text{dist}}$ given in (47) is inapplicable to these examples. If we apply (47) to (69) we need to compare the intersection between e.g. {x: *student(x) ∧ Atom(x)} and {x: meet(x)}, which is the empty set (no atomic student is in the denotation of *meet*, because this predicate can only be true of pluralities), complement of {x: meet(x)} with respect to {x: *student(x) ∧ Atom(x)}, which is the set of all students (because the intersection is empty). Since the measure of the empty set is smaller than the measure of the set of students (provided that there are students in the world),[26] the sentence in (69b) turns out as always false, i.e. false by virtue of its meaning.

[26] The non-emptiness of the restrictor is a property that MOST shares with other quantificational determiners; see Heim and Kratzer (1998: 164–72).

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However, (69b) is intuitively ill-formed rather than always false. Note now that the same feeling of ill-formedness appears whenever collective predicates apply to singular count nouns which do not refer to groups:[27]

(74) a. *A student met.
b. *The student gathered.
c. *John gathered.

These examples are unacceptable because a collective predicate, which denotes a set of groups, cannot apply to a singular individual.

The unacceptability of examples with MOST can be explained on the basis of the unacceptability of examples of the type in (74). Indeed, in order to check whether most students met, according to the GQT analysis of MOST, one must check for each of the atoms in the denotation of the NP whether this atom belongs to the denotation of *gather* or *meet*. It is at this point that a denotational clash arises—the type of entity provided by the restrictor (singular individual) is not one that can satisfy the nuclear scope predicate.

In order to see this clash more clearly, note that the GQT formula we have been using so far (see (53)) may be rewritten (using coordination instead of intersection) as in (81):

(75) $[\![\text{MOST}]\!] = \lambda P.\, \lambda Q.\, |\{x: P(x) \wedge \text{Atom}(x) \wedge Q(x)\}| > |\{x: P(x) \wedge \text{Atom}(x) \wedge \neg Q(x)\}|$
defined iff P contains atoms

Using this formula, we can see that if we combine *most-NP* with a collective predicate, the same variable will be characterized by two clashing predicates, an atomic and a collective predicate, hence the ill-formedness (indicated by #):

(76) # $[\![\text{Most students met}]\!] = |\{x: \text{student}(x) \wedge \text{Atom}(x) \wedge \text{meet}(x)\}| > |\{x: \text{student}(x) \wedge \text{Atom}(x) \wedge \neg\text{meet}(x)\}|$

[27] Count singular nouns denoting groups are acceptable as arguments of collective predicates. As expected, $\text{MOST}_{\text{dist}}$ is also acceptable:

(i) The committee met yesterday.
(ii) Most committees met yesterday.

The use of the singular number in (i) and of the determiner $\text{MOST}_{\text{dist}}$ in (ii) picks out the atoms from the NP property, which are groups (by virtue of the lexical meaning of *committee*) and therefore satisfy the selectional requirements of collective predicates such as *meet*. Hence the acceptability of the examples above.

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The issue of sentences which are ungrammatical due to the fact that they are tautologies or contradictions by virtue of their logical form has been discussed by Gajewski (2002), who proposes the term "L-analiticity" for such sentences. He proposes that L-analiticity is evaluated on logical skeletons, which are obtained from logical forms by replacing all non-logical elements by free variables. A sentence is L-analytical if its logical skeleton is always true or always false under all variable assignments. In order to extend this account to our examples involving collective predicates, we need to assume that collective predicates and predicates of singular individuals are distinct semantic types, such that the logical skeleton of sentences in (69) and (74) will contain variables ranging over collective predicates in the nuclear scope, and variables ranging over predicates of individuals in the restrictor. Such a logical skeleton will be false under all variable assignments, which amounts to being L-analytical.

2.4.3 An alternative analysis: Crnić (2009)

In §2.3.2 we argued that neither Hackl's (2009) nor Matthewson's (2001) analysis can explain the ban on mass quantification observed for proportional MOST in the languages examined in this chapter. The ban on collective quantification is equally mysterious under these proposals. According to Matthewson (2001), MOST always takes an entity-denoting restrictor, which is either a particular-referring definite DP (see partitives) or a kind-referring bare NP (see non-partitives). Thus, according to Matthewson, constituents of the form [*most* NP] are always formed with a kind-referring NP.

Given Matthewson's proposal, any difference between [*most* of DP] and [*most* NP] can only be related to the presumed kind-reference of the NP in [*most* NP]. And it is indeed kind-reference that was invoked by Crnić (2009) in his attempt to explain why *most* NP lacks collective as well as cumulative readings, whereas *most* of DP allows them. Crnić proposes that [*most*+NP] introduces, as an existentially bound variable that saturates the main predicate, a part of the kind which measures more than half of the total measure of the kind; crucially, this variable has a kind-type (see the k subscript on y in (77), which is based on the formulae in (24) in Crnić (2009); μ_s stands for the measure of an entity in the situation s):

(77) $[\![\text{most students}]\!] = \lambda P\, \lambda s\, \exists y_k\, (y_k \leq [\![\text{students}]\!] \wedge \mu_s(y_k) > \frac{1}{2}\, \mu_s([\![\text{students}]\!]) \wedge P(y_k,s))$

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Because the variable y_k in the formula above is of the kind type, it cannot combine directly with a predicate of individuals.[28] Following the mechanisms of solving this mismatch currently used for bare plurals (Carlson 1977b; Chierchia 1998b), Crnić proposes that in order to be able to combine with y_k, the VP first combines with a "mediating operator", which can be of two types: either Chierchia's (1998b) derived-kind-predication (DKP) operator or a generic operator. But DKP introduces an existentially bound variable which is a realization of the kind. In the particular case of (77), it will introduce an existentially bound variable that is a realization of a part of the kind which measures more than half of the measure of the kind. The sentence will therefore be true if any number of students, no matter how small, will satisfy P, because for any x included in the kind *students*, there is a part *y* of the kind *students* measuring more than half of the kind *students* such that x is included in *y*. We thus get a meaning where *most* means the same as *some* (because we apply the predicate to *some* entity *included* in the part of the kind denoted by [most NP]). Crnić proposes that this meaning is ruled out by competition with *some* in the set of scalar alternatives *some–most–all*. We are therefore left with the analysis relying on GEN; GEN is a distributive operator, hence the obligatory distributivity.

This account cannot be accepted because it requires to assume kind-reference for DPs referring to particular pluralities such as *students in my class* in (78a) and *people in the bus* in (75a) (see the other attested examples in (79), which come from the *Corpus of Contemporary American English* (COCA):

(78) a. Most students in my class left early.
b. *Most students in my class will meet tomorrow.

(79) a. her dark eyes reflecting the anger most people in the bus were feeling
(Mary McHugh, *Flamenco, Flan, and Fatalities*, 2015)

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[28] Note that (77) predicts that a *most* NP should be able to combine with kind-predicates e.g. *invent*, *extinct*, or with kind-selecting s-level predicates (*arrived in Europe in the sixteenth century*), and yield a part-of-kind reading. However, such examples do not yield a part-of-kind reading, but only a taxonomic reading, which involves distributive quantification over sub-kinds:

(i) Most elephants are extinct.
≠ A part of the kind *elephant* larger than half of the kind is extinct
= More than half of the subspecies of elephants are extinct

(ii) Most turkeys arrived in Europe in the sixteenth century.
≠ A part of the kind *turkey* larger than half of the kind arrived in Europe in the sixteenth century
= More than half of the subspecies of turkeys arrived in Europe in the sixteenth century

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b. Of course, from my perspective at least, most people in my family are not well.
(Kris D'Agostino, *The Sleepy Hollow Family Almanac: A Novel*, 2012)

c. The narratives of most students were thin and abbreviated.
(*Social Studies* 85(6): 256)

d. Mr. Lundwall had been unceremoniously forced out of his job in Texaco's finance department. Most colleagues ignored him.
(*New York Times*, March 16, 1997)

e. Graps would find out that her family was alive, most relatives living in Houston.
(NPR_Sunday, August 27, 2006)

Secondly, bare NPs can never be kind-referring in Romanian or Hungarian (see §2.2.2), which means that Crnić's proposal cannot account for the ban on collective predicates with *most* in these languages:

(80) a. *cei mai mulți studenți (din clasa mea) se
the COMP many students of-in class-the my REFL
vor întâlni mâine (Ro.)
will meet tomorrow

b. Cei mai mulți studenți din clasa mea sunt deștepți.
the COMP many students of-in class-the my are smart
'Most students in my class are smart.'

According to our own proposal, the ban on mass and collective quantification is due to the fact that $\text{MOST}_{\text{dist}}$ is necessarily distributive ($\text{MOST}_{\text{dist}}$ necessarily denotes a relation between sets of atoms). This explanation holds not only for Romanian and Hungarian, in which the bare NP complements of MOST are never kind-referring, but also for English, where there is evidence that the bare NP complements of MOST are not necessarily kind-referring (*contra* Matthewson and Crnić)—see the examples in (79).

In sum, we have argued that a refined version of the GQT analysis of MOST is adequate for $\text{MOST}_{\text{dist}}$, which is found in Romanian, Hungarian, and Icelandic, as well as in English non-generic sentences. This analysis also holds for the Turkish proportional determiner *çoğu* (see ex. (9) in §2.1). We have shown that this analysis can explain the ban on mass quantification (see §2.3.4) as well as the ban on collective quantification (see §2.4.2).

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2.5 On the syntax of MOST$_{dist}$ across languages

As used in GQT, the notion of "determiner" does not have a syntactic definition: regardless of the exact constituent structure, a "determiner" is the whole sequence that precedes the NP. It would however be desirable to correlate the quantificational-determiner semantics of MOST$_{dist}$ to the syntactic position it occupies. If such a correlation exists, we expect MOST$_{dist}$ to occupy a high position inside the DP, i.e. D^0 or Spec,DP. In what follows we show that these two options are arguably instantiated by the MOST$_{dist}$ found in English and Romanian, respectively.

In **English**, the determiner status of proportional *most* is supported by the fact that it is incompatible with the definite article, as shown in (81). Compare the relative superlative reading illustrated in (82), where the definite article is normally required (although it may exceptionally be absent (see (83)).

(81) a. (*The) most children respect their parents.
b. (*The) most students in my class passed the exam.

(82) a. John drank the most wine.
b. Who has the most friends?

(83) When only one promotional code can be used—pick the one that saves you most money! (Szabolcsi 2012a: ex. 27)

The ban on the use of the article in (81) follows straightforwardly from the assumption that proportional *most* is itself the D:

(84) [$_{DP}$ [$_{D}$ most] [$_{NP}$ children]]

Among Germanic languages, **Icelandic** patterns with English in lacking the definite article, which supports the hypothesis that in Icelandic, as in English, proportional MOST sits in a determiner position:

(85) Flest börn virða foreldra sína.
most children respect parents-the REFL.POSS
'Most children respect their parents.'

It is important to observe that in the other Germanic languages the definite article is obligatory with proportional MOST (see German, Dutch, standard Mainland Scandinavian languages, and Faroese as described by Coppock and

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Strand 2016). Anticipating the observations made in Chapter 3, the obligatory presence of the definite article with proportional MOST in these other languages confirms the correlation between syntactic position and semantic analysis: indeed, in those languages the proportional MOST occupies a different syntactic position, below the D^0 level (see §3.3.2).

In **Romanian**, it can be shown that the morphologically complex proportional quantifier *cei mai mulți* 'the more many' forms a single constituent that sits in Spec,DP, rather than representing a string consisting of a D and a DP-internal comparative, as in the other Romance languages and in Albanian (the arguments presented below reproduce those in Giurgea 2013a; Cornilescu and Giurgea 2013).

First, notice that unlike the other Romance languages, Romanian has two types of definite articles: a suffix inflected for gender, number (*-l*, *-a*, *-i*, *-le*), and case, which is used whenever the first constituent in the DP is the noun or an adjective, and a strong form *cel*, also inflected for gender, number (*cel/cea/cei/cele*), and case, which is used when the first constituent in the complement of D is a cardinal or a null N:

(86) a. băiat-ul (Ro.)
boy-the

b. [atât de priceput-ul] băiat
such of skillful-the boy

c. cei doi băieți
the two boys

d. cel [$_N$Ø] frumos
the beautiful
'the beautiful one'

Superlatives are formed by preposing *cel* to the comparative, which is always analytic (*mai* 'COMP' + AP).[29] *Cel* + comparative can appear DP-initially, marking the DP as definite:

(87) cea mai bună soluție (Ro.)
the/SUP.FSG COMP good solution
'the best solution'

[29] We gloss *mai* as COMP 'comparative' rather than as 'more' to stress the fact that, unlike Fr. *plus*, It. *più*, etc., it is only a degree head, not a whole quantity comparative: *more* in *I drank more*, *I like her more* is realized as *mai mult* 'COMP much'. Besides, a homonymous (and genetically identical) *mai* appears as a clitic adverb with a general additive interpretation ('again, still, more, also'), e.g. *am mai spus* '[I] have already said'.

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Here, Romanian superficially resembles the other Romance languages, giving the impression that *cel* is in D and the comparative is in a lower position. However, it can be shown that this is not the correct bracketing: *cel* is part of the superlative, a superlative morpheme added to the comparative (on the building of superlatives based on the comparative, see Bobaljik 2012, who argues that universally superlatives embed a comparative). This complex superlative constituent [*cel* COMP AP] can be asssumed to sit in Spec,DP, with D^0 being filled by a null element with the semantics of the definite article:

(88) $[_{DP}$ [cea mai bună] $[_{D}Ø_{+def}$ $[_{NP}$ soluție]]]
SUP.FSG COMP good solution

This analysis is supported by the contrast with examples such as (89), which are built with a DP-initial prenominal comparative. In such examples, the definite article is *not* realized as *cel* but as a suffix on the adjective, like with other DP-initial APs (see (86b)):

(89) a. [mult mai buna] soluție a lui Victor (Ro.)
much COMP good-**the** solution GEN the.GEN Victor
'Victor's much better solution'

b. Tot în acelaşi scop, dar cu [[mult mai
also in the-same purpose but with much COMP
dificil**ul**] obiectiv al recuperării Transilvaniei
difficult-**the** goal GEN recovery-the.GEN Transylvania-the.GEN
de nord-vest de la Ungaria], a fost editat albumul
of north-west from Hungary has been issued album-the
în două volume (..)
in two volumes
'For the same purpose, but with **the much more difficult goal** of getting back Northwestern Transylvania from Hungary, the album . . . has been issued in two volumes.' (http://www.basarabia91.net/2011/07/)

c. o soluție ar fi (. . .) să dăm un răspuns aleatoriu,
a solution would be SBJV give.1PL an answer random
sau [mai cinstit**ul**] 'nu ştiu'
or more honest-**the** not know.1SG
'a solution would be (. . .) to give a random answer, or **the more honest "I don't know"** '
(https://saccsiv.wordpress.com/2016/04/13/ . . .)

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This order is quite rare because the prenominal position of quality adjectives is marked, usually non-restrictive (see Cornilescu and Giurgea 2013). This does not hold for superlatives, for which both pre- and postnominal orders are unmarked. The acceptability of prenominal comparatives is facilitated if the comparative is modified by *mult* 'much', as in (89a,b).

In DPs with prenominal adjectives (other than superlatives), in particular in DPs with prenominal comparatives, the suffixal article is generated in D^{0}[30] and the adjective in an adjectival position (see (90b)), the same position as in indefinite DPs, see (90a):

(90) a. o mai bună soluție (Ro.)
a more good solution
'a better solution'

a′. [[$_{D}$ o] [[$_{DegP}$ mai bună] [$_{NP}$ soluție]]]

b. mai buna soluție
more good-the solution
'the better solution'

b′. [[$_{D}$-a] [[$_{DegP}$ mai bună] [$_{NP}$ soluție]]]

Subsequently, the definite article and the adjective are merged together, either by raising [$_{DegP}$Comp Adj] to Spec,DP or by lowering the definite article from D^{0} to [$_{DegP}$Comp Adj] (see Dobrovie-Sorin and Giurgea 2006; 2013b).

The example in (89a) forms a minimal pair with (88): given the presence of a suffixal definite in (89a), the strong form *cea* (instead of the suffix *-a*) in (88) cannot be explained by assuming that *cea* sits in D^{0} (from that position, the definite article should end up affixed to the adjective). We are thus led to conclude that some other analysis is needed and the hypothesis that *cel* is part of the superlative constituent is a natural one.

Further evidence in favor of this analysis comes from the observation that *cel* in superlatives must always occur *immediately* before the comparative, not only in postnominal, adverbial, and predicative contexts—a pattern that is also found in French (see (91a,b))— but also in prenominal positions (see (92a)), which is impossible in French (see (92b)):

[30] Some authors assume a lexicalist analysis, according to which the suffixal definite article represents an uninterpretable definiteness feature of Ns and Adjs, which is checked by an interpretable definiteness feature of D^{0} (see Cornilescu and Nicolae 2011). Under such an approach, our data shows that the definiteness inflection of comparative adjectives is able to enter a checking relation with the definiteness feature of the null definite D.

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(91) a. cartea **cea** mai lungă (Ro.)
book-the SUP.FSG COMP long

b. le livre le plus long
the book the more long

(92) a. [al doilea [**cel** mai bogat] om din lume]
the second SUP.MSG COMP rich man from world
'the second richest man in the world'

b. [la deuxième [plus riche] personne du monde] (Fr.)
the second more rich person of-the world

The French data show that when sequences of the form DEF COMP Adj occur in prenominal positions, the definite article can sit in D^0: this explains why the definite can be separated from [COMP Adj] by lexical material, e.g. *deuxième* 'second' in (92b). In Romanian, on the other hand, *cel* must remain close to the comparative, which supports the hypothesis that *cel* can never sit in D^0 but instead belongs to the superlative constituent.

A similar argument can be made based on examples built with cardinals: as shown in (93a), the sequence *cel*–COMP–Adj can appear before a cardinal, as in (93a). This word order is impossible in French (see (93b)), where the cardinal must intervene between the definite article and COMP–Adj (see (93c)). The Romanian pattern supports the hypothesis that *cel*– COMP–Adj forms a constituent that sits above the position dedicated to cardinals, arguably in Spec,DP. In French, on the other hand, the definite article sits in D^0, and since cardinals sit higher than adjectives, the expected word order is not the one in (93b) (which mimics Romanian), but the one in (93c). This word order cannot be obtained in Romanian (see (93d)),[31] because the *cel* of the superlative sequence cannot be generated in D^0.[32]

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[31] Some speakers also allow the order THE–cardinal–*cel*+comparative–N, which corresponds to the French order but requires *cel* to appear immediately before the comparative:

(i) [cei doi [**cei** mai puternici] oameni din stat] (Ro.)
the.MPL two sup.MPL comp powerful persons in state
'the two most powerful persons in the country'

(ii) [les deux [plus puissantes] personnes de l'état] (Fr.)
the two more powerful persons of the state

Besides our intuition, the fact that this order is dispreferred compared to the order in (93) is confirmed by Google searches: we found 29 hits for *cei mai bogați doi* 'SUP/the COMP rich two' ('the richest two') vs. 1 hit for *cei doi cei mai bogați* 'the two SUP COMP rich' ('the two richest'). For *cei mai mari doi* 'SUP/the COMP big two' we found 128 hits vs. 59 hits for *cei doi cei mai mari* 'the two SUP COMP big'. Regardless of a precise analysis, examples like (i) confirm the hypothesis according to which *cel* is part of the superlative, and as such does not sit in D^0.

[32] One may wonder why (93d) is not good even with an interpretation of *mai înalți* as a comparative ('the two higher mountains'). The reason is that comparatives, as restrictive adjectives in general, are normally placed after the noun. A prenominal placement, as in (89), is highly marked and is associated to an appositive construal of the modifier, which is excluded for (93d).

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(93) a. [**cei** mai înalți] doi munți
SUP.MPL COMP high two mountains
'the two highest mountains'

b. *les plus hautes deux montagnes (Fr.)
the more high two mountains

c. les deux plus hautes montagnes (Fr.)
the two more high mountains
'the two highest mountains'

d. ***cei** doi mai înalți munți (Ro.)
SUP.MPL two COMP high mountains
Intended: 'the two highest mountains'

Let us finally observe that prenominal *cel*–COMP–Adj can co-occur with an *indefinite* determiner, which clearly indicates that the superlative *cel* cannot be assumed to be a definite article sitting in D^0:

(94) a. Nu există [un [**cel** mai mare] număr]. (Ro.)
not exists a SUP COMP large number
'There is no largest number.'

b. Există [un [**cel** mai scurt] drum de la fiecare nod
exists a SUP COMP short way from every node
i la 1 care are cel mult n–1 arce].
i to 1 which has at most n–1 arcs
'There is a shortest way from each node i to 1 that has at most n–1 arcs.'
(http://id.inf.ucv.ro/~cpopirlan/ecnpd/curs11.pdf)

To conclude, in Romanian strings of the form *cel mai*–Adj, the strong definite article *cel* does not sit in D^0, but belongs to the superlative constituent, which occupies the highest position inside the DP. Since this constituent is phrasal, it must be assumed to sit in Spec,DP. The same syntactic position can be assumed for the proportional [*cei mai mulți*]. The fact that Romanian prenominal superlatives occupy Spec,DP has probably facilitated recategorizing MOST as a quantificational determiner.

We may now wonder whether the English *most* sits in D^0, as proposed above, or in Spec,DP, like its Romanian counterpart. Note that the lack of morphological complexity is not an argument against occupying Spec,DP, and the advantage would be a more unified crosslinguistic characterization of the

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syntax of proportional MOST. On the other hand, a structure with MOST under D and no specifier is simpler and does not need the stipulation of an uninterpreted null D (which is required for the analysis with MOST in Spec,DP). We leave the choice between these alternatives open.

In **Hungarian**, the article precedes a full superlative constituent in a sequence of the form THE SUP-MORE, as in (95):

(95) A legtöbb gyerek tiszteli a szüleit.
the SUP-more child respects the parents-POSS3-ACC
'Most children respect their parents.'

Unlike in Romanian, the article cannot be considered as being part of the quantifier, because it can be replaced by a nominative possessor (Hungarian has DP-initial nominative possessors, which trigger agreement on the head noun):[33]

(96) a. [az emberek] legtöbb problémája
the people most problem-POSS.3
'most of people's problems' (www.spiritflow.hu)

b. az én legtöbb szavam
the I.NOM most word-POSS.1SG
'most of my words' (Szabolcsi 2010: 196)

This order is also found with other quantifiers such as *minden* 'every':

(97) a. Mari minden szava
Mari every word-POSS.3
'every word of Mari' (Szabolcsi 1994: ex. (29))

b. az én minden szavam
the I.NOM every word-POSS.1SG
'every word of mine' (Szabolcsi 2010: 196)

Since nominative possessors may precede uncontroversial quantifiers such *minden* 'every', examples of the type in (96) are compatible with a quantificational analysis of *legtöbb*. However, *minden* differs from *legtöbb* in examples

[33] The Hungarian definite article has the form *a* before consonants and *az* before vowels.

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without nominative possessors: *minden* does not take the article (see (98)), whereas *legtöbb* does (see (95)).

(98) (*a) minden gyerek (Hung.)
the every child

Based on examples of the type (96b) and (97b), where the article precedes a pronominal possessor, Szabolcsi (1994) assumes a higher D position above nominative possessors and quantifiers, headed by a "subordinating" D which may be realized as *a(z)* or as zero. Under this analysis, the *a* in (95) may be seen as an overt realization of this higher D. This still leaves unexplained the difference between *legtöbb* and *minden* (see (95) vs. (98)). Arguably, the presence of the article with *legtöbb* has a historical explanation: the majority quantifier obviously originates in a quantity superlative, for which the use of the definite article is expected. When *legtöbb* was reanalyzed as a majority quantifier, *a* was reassigned the status of a 'dummy' article, realizing Szabolcsi's 'subordinating D' position.

Turkish illustrates another interesting type of reanalysis: the form *çoğu*, which functions as a proportional quantificational determiner (see §2.1), is not the superlative of MANY/MUCH, which has the form *en çok* 'SUP many/much' and can only be used as a relative superlative adjective.

Çoğu is basically a nominalization of *çok* 'many, much', which is built with a genitive expressing the 'whole' (a partitive genitive):

(99) a. Çocukların çoğu ebeveynler-in-e (Tur.)
children-GEN much-3POSS parents-3PL.POSS-DAT
saygı göster-ir-ler.
respect show-AOR-3PL

b. Ev-de-ki tereyağın-ın çoğu çürümüş.
house-in-ATTR butter-GEN much-3POSS rotten
'Most of the butter in the house is rotted.'

c. Duvarın çoğu yeni boyandı.
wall-GEN much-3POSS freshly is-painted
'Most of the wall is freshly painted.'

d. çoğ-u-muz
much-*u*-1PL.POSS
'most of us'

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In this partitive-like construction, *çoğu* follows the genitive as in (99)a–c or takes possessive agreement signaling a pronominal possessor restricted by the phi-features of the possessive agreement, as in (99)d. The example in (100) illustrates a different configuration, in which *çoğu* appears in the prenominal position (note that like with cardinals and other quantitatives, the noun does not take the plural inflection):

(100) Çoğu çocuk ebeveyn-in-e saygı (Tur.)
most child parents-3SPOSS-DAT respect
göster-ir(-ler).
show-AOR-3PL
'Most children respect their parents.'

In this type of example, only count nouns are allowed:

(101) *Çoğu tereyağı çürümüş.
most butter rotten

We conclude that *çoğu*+NP represents an instance of the quantificational determiner $\text{MOST}_{\text{dist}}$, which means that *çoğu* has two distinct subcategorization specifications, on the one hand as a functional proportional noun that takes a full DP as a complement, and on the other hand as a quantificational determiner that combines with an NP. This double subcategorization is probably the result of a reanalysis from the functional noun to the quantificational determiner One may wonder why the superlative of MANY/MUCH itself has not been reanalyzed as a proportional determiner The reason might be that its analytic form (*en çok*) made it more difficult for it to count as a D^0. In addition to being synthetic, *çoğu* also had the advantage of already functioning as a proportional quantifier in the partitive configuration.

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2.6 Conclusions

In this chapter we have identified $\text{MOST}_{\text{dist}}$, a type of proportional MOST that is necessarily distributive: it allows count NPs but does not allow mass NPs in its restrictor, nor collective predicates in its nuclear scope. We have argued that this distribution can be explained by assuming that $\text{MOST}_{\text{dist}}$ has the semantics of a quantificational determiner. We have also been able to find evidence supporting syntactic configurations in which MOST sits either in D^0 or in

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Spec,DP, depending on the language. This strongly suggests that despite the superlative morphological shape that it shows in four out of the five languages examined here, the syntactic category of $\text{MOST}_{\text{dist}}$ is not that of a quantitative adjective, but rather that of a determiner.

The fact that the form of the distributive majority quantifier $\text{MOST}_{\text{dist}}$ is identical to the superlative of MANY/MUCH suggests that $\text{MOST}_{\text{dist}}$ is the result of grammaticalization, i.e. a reanalysis process that led from a superlative to a proportional quantifier. However, the types of reanalysis differ from one language to the other, which is expected, given that reanalysis is not driven by a universal general pattern, but instead is an idiosyncratic process that applies depending on the morphosyntactic make up of particular constituents in particular languages.

Romanian illustrates the simplest type from the point of view of grammaticalization: no change in form, no change in syntactic position. In this language, Spec,DP hosts pre-nominal superlative adjectives, in which case D^0 is filled with a null determiner having the import of the Iota operator (the denotation of the definite article). The proportional denotation of *cei mai mulți* can be read off the same configuration (see §§2.1.1 and 2.2.2), with the minimal change that the null D^0 is expletive.

English and Icelandic illustrate a change in syntactic position: instead of the adjectival position that characterizes its relative superlative reading, the proportional MOST occupies a D^0 position, which explains both its quantificational determiner status and the obligatory lack of the definite article.

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3
Cumulative MOST

In this chapter we will show that in certain languages, proportional MOST (the superlative form of MANY/MUCH) differs from the MOST examined in Chapter 2 in that it is not restricted to count plural NPs, but can also combine with mass NPs. Moreover, in such languages proportional MOST allows collective predicates in the nuclear scope. Since mass and plural NPs denote cumulative properties, we will refer to this type of MOST as cumulative MOST (abbreviated MOST_{cum}). Section 3.1 illustrates MOST_{cum} with data from German, Scandinavian and Basque (§3.1.1), and Bulgarian (which uses THE +MORE, see §3.1.2). Subsection 3.1.3 demonstrates the existence of majority quantifiers that are not morphologically related to the superlative of MANY/MUCH (Japanese *hotondo* and Chinese *dabufen*) but nevertheless show the distribution of MOST_{cum}. Section 3.2 is concerned with the syntactic properties of MOST_{cum}. In §3.2.1 we observe that the definite article is obligatory (unless a possessor or a demonstrative is present) with MOST_{cum}. In §3.2.2 we argue that the possibility of taking mass NPs as complements and the consistent presence of articles suggest that MOST_{cum} does not sit in a determiner position, but rather in a lower position, Spec,MeasP, which is currently assumed to host quantity adjectives (MANY, MUCH, FEW, LITTLE). Section 3.3 presents arguments against Hackl's (2009) and Hoeksema's (1983) superlative-based analyses of MOST. In §3.4 we propose our own analysis, according to which MOST_{cum} is a quantifier, which nevertheless differs from $\text{MOST}_{\text{dist}}$: whereas $\text{MOST}_{\text{dist}}$ compares the cardinalities of two sets, MOST_{cum} compares the measures of two entities. In §3.5 we propose a modifier analysis for the Japanese *hotondo* and the Chinese *dabufen*. Section 3.6 is devoted to some further observations regarding the correlation between (in)definiteness and the various readings of MOST (superlative, distributive proportional quantifier, cumulative proportional quantifier).

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Majority Quantification and Quantity Superlatives: A Crosslinguistic Analysis of Most. Carmen Dobrovie-Sorin and Ion Giurgea, Oxford University Press (2021). © Carmen Dobrovie-Sorin and Ion Giurgea. DOI: 10.1093/oso/9780198791249.003.0003

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3.1 Cumulative majority quantifiers across languages

3.1.1 When majority MOST allows mass quantification

In this section we will examine several languages in which the distribution of proportional MOST systematically differs from the distribution of the $\text{MOST}_{\text{dist}}$ described in Chapter 2.

In **German**, a language which has superlative morphology, MOST allows a proportional reading not only with count Ns, but also with mass Ns in the restrictor or with collective predicates in the nuclear scope. Note that the definite article obligatorily precedes MOST:

(1) Die meisten Kinder respektieren ihre Eltern.
the most children respect their parents
'Most children respect their parents.'

(2) Maria hat den meisten Kaffee auf den Teppich verschüttet.
Maria has the most coffee on the carpet spilt
'Mary spilt most of the coffee on the carpet.'

(3) Die meisten Kollegen werden sich morgen treffen/ versammeln.
The most colleagues will REFL tomorrow meet gather
'Most of the colleagues will meet/gather tomorrow.'

In the translations (third line of each example, when it exists) of MOST_{cum} we will use the partitive form 'most of', which is the closest possible translation. But the reader should bear in mind that DPs built with MOST_{cum} are not partitives. Indeed, German *meist* cannot combine with a singular count noun in non-partitives, but allows a count singular DP in partitives:

(4) a. *Die meiste Stadt wurde zerstört.
the most city was destroyed

b. Der größte Teil der Stadt wurde zerstört./ Das meiste der Stadt wurde zerstört.
the largest part the.GEN city was destroyed the most the.GEN city was destroyed
'Most of the city was destroyed.'

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Dutch is another Germanic language that has MOST_{cum}, as indicated by the fact that the proportional reading of MOST is freely available with mass nouns. Like in German, MOST is obligatorily preceded by the definite article:

(5) a. Je hebt de meeste koffie gedronken. (Du.)
you have the most coffee drunk
'You drank most of the coffee.'

b. De meeste boter in het huis is bedorven.
the most butter in the house is rotten
'Most of the butter in the house is rotten.'

c. dat Jan het meeste geld uit zejn portefeuille (Roelandt 2014: 19)
that Jan the most money from his wallet
verloren heeft
lost has
'that Jan lost most of the money from his wallet'

In **Swedish**, **Norwegian**, and **Danish**, proportional MOST is acceptable with mass nouns, but these languages show a preference for using a partitive construction (THE MOST *of* DP) in this case. This preference was noticed by Coppock (2019) and confirmed by our informants for Swedish and Danish. Here are attested examples of non-partitive MOST+mass nouns (note that, as in German and Dutch, MOST is preceded by the definite article):

(6) a. Det mesta vattnet hadde slungats upp i luften. (Sw.)
the most water-the had thrown-MPAS up in air-the
(Garth Nix and Sean Williams, *Spirit Animals III*, trans. Jan Risheden)
The original English sentence: 'Most of the water had gone up in the air.'

b. Det mesta vattnet i Nyköpingsån kommer från Yngaren.
the most water-the in Nyköping-river-the comes from Yngaren
'Most of the water in Nyköpingsån comes from (the lake) Yngaren.'
(https://www.ekuriren.se/)

c. Det mesta arbetet gör han själv. (Holmes and Hinchliffe
the most work-the does he self 2013: 125)
'Most of the work he does himself.'

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(7) a. Det meste vin fra Alsace er hvidvin. (Dan.)
the most wine from Alsace is white-wine
'Most of the wine from Alsace is white wine.'
(www.dalsbakkegaard.dk/vin/)

b. Det meste vand i pelsen bliver suget op af det første
the most water in fur-the is sucked up by the first
håndklæde.
towel
'Most of the water in the fur is sucked up by the first towel.'
(cotondetulear-uldtotten.dk/)

Our Norwegian informant used non-partitive MOST for mass nouns in a generic context (see (8a)) and for collective predicates (see (8b)), but a partitive construction for a mass noun in a non-generic context (see (8c)):

(8) a. På Jorden er det meste vann flytende. (Norw.)
on Earth-the is the most water liquid
'On Earth, most water is liquid.'

b. De fleste kollegene vil møtes imorgen.
the most colleagues-the will meet tomorrow
'Most of the colleagues will meet tomorrow.'

c. Det meste av smøret i huset er råttent.
the most of butter-the in house-the is rotten

Another language with MOST_{cum} is **Basque**. This language has a specialized suffix *-en* for superlatives. The superlative of MANY/MUCH is formed by adding this suffix to the suppletive root *gehi-* (a root also found in the comparative). The resulting form *gehien* allows the proportional reading with both plural and mass terms. The examples below also show that majority *gehien* co-occurs with a determiner of the whole DP (this is not a definite article, because Basque does not mark definiteness; it is a general "argumental" article):

(9) a. Ume gehien-ek beren gurasoak errespetatzen dituzte.
child most-(ART)ERG.PL their parents respect.IMPF have
'Most children respect their parents.'

b. Ume gehien-a-k azkarrak dira.
child most-ART-PL intelligent are
'Most children are intelligent.'

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c. Lur-ean, ur gehien-a likidoa da.
Earth-on water most-ART liquid is
'On Earth, most water is liquid.'

d. Ur gehien-a kutsatua dago etxean.
water most-ART polluted is home.at
'Most water in the house is polluted.'

Like in German, it can be shown that *gehien* is not part of a partitive configuration because it cannot combine with a count singular (unlike *most of*):

(10) *Pareta gehien-a pintatuta dago.
wall most-ART painted is
Intended meaning: 'Most of the wall is painted.'

Modern Greek is another language in which majority MOST qualifies as MOST_{cum}. This language does not have a dedicated superlative morphology, but forms superlatives by embedding comparatives, which have both analytic and synthetic forms, in a definite DP. The article is not part of the superlative, as can be seen from the fact that it is absent in adverbs with a superlative interpretation (see (11b)). The superlative of MANY/MUCH is formed on MORE, which has both an analytic form (πιο πολύς) and a synthetic form based on a suppletive root (περισσότερος). The latter option is illustrated in (11c):

(11) a. το μακρύτερο δρόμο/ το πιο μακρό δρόμο
the longer road the COMP long road
'the longest road'

b. Ποιος τραγουδάει καλύτερα/ πιο καλά?
who sings better COMP well
'Who sings best?'

c. Ποιος έχει τους {περισσότερους/ πιο πολλούς} φίλους?
who has the more COMP many friends

The following examples show that [$_{\text{DP}}$THE [MORE NP]] can have a majority interpretation both with plurals and with mass nouns (see (12a–c)), and allows collective predicates (see (12d)):

(12) a. Τα {περισσότερα/ πιο πολλά} παιδιά σέβονται τους
the more COMP many children respect the
γονείς τους.
parents their
'Most children respect their parents.'

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b. Στη Γη, το {περισσότερο/ %πιο πολύ} νερό είναι υγρό.
on-the Earth the more COMP much water is liquid
'On Earth, most water is liquid.'

c. Το {περισσότερο/% πιο πολύ} βούτυρο σε αυτό το σπίτι
the more COMP much butter in this the house
είναι χαλασμένο.
is rotten
'Most of the butter in this house is rotten.'

d. Οι περισσότεροι φοιτητές θα συναντηθούν αύριο.
the more colleagues will meet tomorrow
'Most of the colleagues will meet tomorrow.'

Two of our three informants reported that the proportional use is more natural with the synthetic form, and one of them reported that the analytic form is not acceptable with mass nouns.

[$_{DP}$THE [MORE NP]] cannot be considered a partitive majority quantifier because, unlike *most of*, it cannot take singular count nouns; an explicit partitive construction (with a genitive DP or a PP) must be used with count singulars:

(13) a. *ο {περισσότερος/ πιο πολύς} τοίχος είναι βαμμένος.
the more COMP much wall is painted

b. Το μεγαλύτερο μέρος {του τοίχου/ από τον
the largest part the.GEN wall.GEN /from the
τοίχο} είναι βαμμένο.
wall is painted
'Most of the wall is painted.'

3.1.2 The majority quantifier (THE) MORE in Bulgarian

In Bulgarian, majority readings are expressed by using MORE followed by a suffixal definite article, which has the distribution of MOST$_{cum}$, being allowed with plural and mass nouns, but not with singular count nouns (see (14e)). Note that collective predicates are also allowed (see (14d)):[1]

[1] In Bulgarian, the definite article is suffixal. *Poveče* is decomposable into the comparative prefix *po-*, a suppletive root *več-*, and a neuter singular ending *-e*. The root *več-* is found in the comparative of 'much, many' across Slavic languages: see §1.5.2. The definite article does not agree with the noun, but shows a neuter singular form.

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(14) a. Poveče-to deca uvažavat roditelite si.
more-the.NSG children respect parents-the REFL.DAT
'Most children respect their parents.'

b. Na zemjata poveče-to voda e tečna.
on earth-the more-the.NSG water(F) is liquid.FSG
'On Earth, most water is liquid.'

c. Poveče-to maslo v taži kəšta e razvaleno.
more-the butter in this house is rotten
'Most of the butter in this house is rotten.'

d. Poveče-to moi kolegi šte se sreštnat utre.
more-the my colleagues will REFL meet.3PL tomorrow
'Most of my colleagues will meet tomorrow.'

e. *Poveče-to stena e bojadisana v bjalo.
more-the wall is painted in white

A count singular NP is allowed only in partitive configurations:

(15) Povečeto ot stenata e bojadisana v bjalo.
more-the of wall-the is painted in white
'Most of the wall is painted in white.'

The form *poveče-to* 'more-the' is not the superlative of 'much/many', which is formed by using the superlative marker *naj-* attached to *mnogo* 'much/many', a pattern common to all adjectives. As observed in §1.5.1 (the examples are repeated here under (16)), *naj mnogo* 'MOST_{sup}' only has a relative superlative reading and does not carry the definite article:

(16) a. Koj ima naj-mnogo prijateli?
who has SUP-many friends
'Who has the most friends?'

b. Naj-mnogo imigranti idvat ot India.
SUP-many immigrants come from India
'Most immigrants come from India.'

3.1.3 Languages with cumulative majority quantifiers other than MOST or MORE

Chinese and Japanese have majority quantifiers with the distribution of MOST_{cum}, which are however *not* built on MANY/MUCH.

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In **Mandarin Chinese**, an expression of the type LARGE PART (*dabufen*) can function as MOST_{cum}, being allowed with NPs interpreted as plural and with mass NPs (see (17)). The NP-modifier status of *dabufen* is indicated by the prenominal placement coupled with the relator *de*, which is typical of preposed modifiers. In (17d) we can see that *dabufen* occurs NP-internally, between a pronominal possessor (*wo* 'I, me, my') and the head noun. This suggests that the prenominal *dabufen-de* is syntactically a modifier rather than a determiner:

(17) a. Dabufen-de haizi zuijing tamen-de fumu.
large-part-RELATOR children respect they-RELATOR parent
'Most children respect their parents.'

b. Zai diqiu shang, dabufen-de shui shi yizhuang-de.
at Earth up large-part-RELATOR water be liquid
'On Earth, most water is liquid.'

c. Zhe-jian wuzi-li-de dabufen-de
this-CLS house-inside-RELATOR large-part-RELATOR
naiyou dou huaidiao-le.
butter all rotten-PERF
'Most of the butter in this house is rotten.'

d. Wo dabufen-de tongshi mingtian hui jianmian.
1SG large-part-RELATOR colleague tomorrow will meet
'Most of my colleagues will meet tomorrow.'

According to our informants, the construction *dabufen-de NP* cannot be used to translate partitive MOST with count singulars, as in *Most of the wall is painted*. In such cases, the NP must be preposed to *dabufen* and related to it by the postposition *de*, which indicates that we are dealing with a partitive configuration headed by *dabufen* (cf. English *the largest part of DP*, *most of DP*):

(18) zhè miàn qiáng-de dábufen dōu fěnshuā le
this CL wall-RELATOR large-part ALL whitewash ASP
'Most of this wall has been painted.'

Similar data are found in **Japanese**, where the word normally used to render proportional MOST is *hotondo*;[2] another possibility is *dai-bubun* 'large-part', which has the same distribution as *hotondo*.

[2] Note however that, according to Hayashishita and Ueyama (2012), *hotondo* is not a perfect equivalent of the English *most*, but rather means 'almost all', being used for very high proportions.

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Used as a modifier, *hotondo* appears before the noun and bears the genitive ending *-no* (this marking may also be found with other prenominal quantifiers and quantity words: cardinals, *subete* 'all', *suu* 'several'). *Hotondo-no* is allowed with plural as well as mass nouns, and can appear between a possessor and the head noun (see (19a)), which clearly indicates a DP-(or NP-)internal position:

(19) a. Watasi-no hotondo-no gakusee-ga ryoosin-o sonkeesitei-ru.
I-GEN most-GEN student-NOM parents-ACC respect-PRES
'Most students of mine respect their parents.'

b. Tikyuu-de-wa hotondo-no mizu-ga ekitai dear-u.
earth-on-TOP most-GEN water-NOM liquid be-PRES
'On Earth, most water is liquid.'

c. Ie-no naka-no hotondo-no mizu-ga osensaretei-ru.
house-GEN in-GEN most-GEN water-NOM polluted-PRES
'Most of the water in the house is polluted.'

This construction cannot be used with singular count restrictors, as we can infer from Sauerland and Yatsushiro's (2017) observation that in the example in (20a), *hon* 'book' can only be interpreted as plural (Japanese does not mark number morphologically). In order to allow a singular count restrictor, the noun must precede *hotondo* and be marked genitive, as in (20b):

(20) a. John-wa hotondo-no
John-TOP most-GEN
hon-o yonda.
book-ACC read
= 'John read most of the books.'
≠ 'John read most of the book.'
(Sauerland and Yatsushiro 2017: ex. 52)

b. John-wa hon-no hotondo-o yonda.
John-TOP book-GEN most-ACC read
'John read most of the book / John read most of the books.'

The difference between the (a) and (b) examples can be analyzed in terms of our distinction between a non-partitive cumulative majority quantifier, *hotondo-no* (+NP), and a partitive majority quantifier, *hotondo* (in partitive configurations of the form NP_{Gen}*-no hotondo*). As in run-of-the-mill partitives, a count noun can be interpreted as either singular or plural in (20b),

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whereas in (20a), built with the non-partitive *hotondo-no*, a count noun can only be interpreted as plural.

The analysis proposed here departs from Sauerland and Yatsushiro (2017), according to whom both of the two syntactic configurations are partitive. DPs of the form *hotondo-no* would be 'reverse partitives' of the type *most books of those*: [hotondo [$_{KP}$ ~~N~~ [-no]] [$_{NP}$ hon-]]][-o]. By this analysis, Sauerland and Yatsushiro try to account for the presence of the genitive marker *-no* on the quantifier: they assume that *-no* is all that remains from the partitive *of*-NP following the deletion of the N; the case affix *-no* (corresponding to partitive *of*) is attached to the quantifier because it needs a host. There is however no independent evidence for a partitive configuration in the quantifier-GEN construction. On the contrary, there are facts that speak against such an analysis. Thus, (21) does not presuppose that the three books read by Taroo are part of a larger set of books, as opposed to a real partitive construction in (22):

(21) Taroo-wa san-satu-no
Taroo-TOP three-CL-GEN
hon-o yomi-oeta.
book-ACC read-finished
'Taroo has finished reading three books.'
(Sauerland and Yatsushiro 2017: ex. 51)

(22) Taroo-wa hon-no san-satu-o yomi-oeta.
Taroo-TOP book-GEN three-CL-ACC read-finished
'Taroo has finished reading three of the books.'

Likewise, no superset of students needs to be assumed for (23), which can thus be translated using a definite article:

(23) Watasi-wa [kinoo atta
I-TOP yesterday met
syootai-sita suu-nin-no gakusei]-o.
several-CL-GEN students-ACC invite-did
'I invited the several students I met yesterday.'
(Sauerland and Yatsushiro 2017: ex. 35a)

The authors explain these facts, as well as those noted in example (20), by stipulating that the elided N is not identical to the overt N, but can be a very general noun 'stuff'. Thus, they paraphrase (21) by *Taroo read three books of all the stuff in the world*. But elided NPs usually refer to salient concepts or entities. Here, 'three books of all the stuff in the world' does not say anything

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more than 'three books'. An analysis in terms of an elided NP is therefore questionable.

The modifier position of *hotondo* is also supported by the possibility of being preceded by *sono* 'that', as in the following example from Grosu and Hoshi (2019), which has the two possible readings given in (i) and (ii):

(24) Junya-wa [[Ayaka-ga hotondo-no ringo-o mui-ta]
Junya-TOP Ayaka-NOM most-GEN apple-ACC peel-PAST
sono hotondo-no ringo]-o tabe-ta.
that most-GEN apple-ACC eat-PAST
(i) 'Ayaka peeled most of the apples [in a contextually assumed heap] and Junya ate that majority of apples [all the apples peeled by Ayaka].'
(ii) 'Ayaka peeled most of the apples [in a contextually assumed heap] and Junya ate most of the apples peeled by Ayaka.'

This example contains a double-headed relative construction, where 'most apples' is the internal head of the relative [*Ayaka hotondono ringo muita*] and is resumed by a constituent containing *sono* 'that'. In the reading in (i), the second occurrence of *hotondo-no ringo* 'most apples' resumes the descriptive material of the internal head, characterizing the entity introduced by the relative clause as being 'a majority of apples'. In the reading in (ii), *hotondo* is not resumed from the relative clause, but takes scope over *sono*, selecting a majority from the sum entity introduced by the relative clause. These two interpretations suggest two distinct LF configurations. In the LF underlying the (i) reading, *hotondo* sits in a modifier position, whereas the (ii) reading could correspond to a reverse partitive of the type 'most apples of those' (Koji Hoshi, p. c.).

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3.1.4 Summary

The languages examined in §3.1.1 are alike insofar as their proportional MOST is MOST_{cum}, which can combine with mass NPs. This is in contrast with the ban on mass NPs that characterizes $\text{MOST}_{\text{dist}}$, which is found in the languages examined in Chapter 2. Moreover, this contrast correlates with the possibility vs. the impossibility of collective predicates as main-clause predicates in sentences built with a majority-interpreted MOST. The correlation between these two contrasts and the consistency of the data in all the languages that we have been able to investigate strongly suggests that majority MOST cannot be

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given a uniform analysis across languages. We have thus been led to assume two distinct elements, MOST$_{dist}$ (Chapter 2) and MOST$_{cum}$ (this chapter). We have also observed that some languages have majority quantifiers with a distribution similar to that of MOST$_{cum}$, although they are not lexically related to the superlative of MUCH/MANY (§§3.1.2 and 3.1.3). In what follows we will make explicit the syntactic structure of DPs built with MOST$_{cum}$ (§3.2) and their compositional semantics (§3.3).

3.2 The syntax of MOST$_{cum}$

The goal of this section is to assign an abstract syntactic structure to the DPs built with MOST$_{cum}$. In §3.2.1 we will present arguments in favor of the idea that MOST$_{cum}$ occupies a position lower than D. In §3.2.2 we identify this position with Spec,MeasP, the position of quantity modifiers.

3.2.1 MOST$_{cum}$ requires the definite article

As observed in §3.1, among our sample of languages the use of the definite article is obligatory with MOST$_{cum}$ in all the languages that have this type of proportional MOST and also have a definite article: German, Dutch, Mainland Scandinavian, and Greek. We repeat below the Dutch example:

(25) Je hebt de meeste koffie gedronken. (Du.)
you have the most coffee drunk
'You drank most of the coffee.'

A similar generalization can be observed in Basque, *modulo* the fact that *-a* is not a definite, but rather a general 'argumental' article:

(26) Ur gehien-a kutsatua dago etxean.
water most-ART polluted is home.at
'Most water in the house is polluted.'

Among Slavic languages, Bulgarian is the only language that uses the comparative form of MANY/MUCH in order to express proportional judgments (across Slavic languages, the superlative form of MANY/MUCH has only a relative superlative reading). This possibility correlates with the fact that

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Bulgarian is the only Slavic language that has developed a definite article, which is obligatorily used for the proportional reading of MORE:

(27) Poveče-to maslo v taži kəšta e razvaleno.
more-the butter in this house is rotten
'Most of the butter in this house is rotten.'

Another particularly telling paradigm is exhibited by the standard Mainland Scandinavian languages, in which the majority MOST requires the definite article, whereas the relative superlative MOST disallows the definite article (Coppock and Josefson 2015; Coppock and Strand 2016; Coppock 2019):

(28) a. Gloria har besökt de flesta kontinenterna.
Gloria has visited the.PL most continents-the
'Gloria has visited most continents (more than half of the continents).'

b. Gloria har besökt flest kontinenter.
Gloria has visited most continents
'Gloria visited the most continents (more continents than anybody else).'
(Coppock and Josefson 2015: exx. 3, 4)

Such a contrast in obligatory presence vs. absence of article between the proportional and the relative superlative readings of MOST also holds for Basque (the general article is necessarily absent with the relative superlative MOST) and Bulgarian (where the proportional reading of MORE requires THE, and the relative superlative reading is mostly expressed by MOST without THE).[3]

A contrast between relative and majority MOST regarding the use of the definite article has also been reported for Flemish Dutch, by Roelandt (2014): whereas majority MOST obligatorily uses the plural article (*de*) if the NP is plural, the relative MOST may also appear with a neuter singular form (*het*), which probably represents a morphological default (being also used with adverbial superlatives, as shown in (30)).

[3] The absence of the article with the relative superlative of MOST can also be observed in languages which lack a proportional MOST—see the Romance languages discussed in §1.5.4.1.

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(29) a. Jan heeft de meeste bergen beklommen.
Jan has the.PL most mountains climbed
'Jan climbed most of the mountains.'

b. Jan heeft het meeste bergen beklommen.
Jan has the.NGS most mountains climbed
'Jan climbed the most mountains.'

(30) Het meeste heeft Jan bergen beklommen.
the most has Jan mountains climbed
'Jan climbed mountains more than he climbed other things [e.g. ladders or buildings].'

According to Roelandt, the absence of agreement on *het* indicates that it forms a constituent with the superlative, rather than being the determiner of the DP that embeds the superlative. The D^0 position is assumed to be filled with a null determiner.[4]

To conclude, in these various languages DPs built with the relative superlative MOST have a null determiner in D^0, on a par with the indefinite DPs built with MANY/MUCH:

(31) [$_{DP}$[$_{D^0}$Ø] [$_{MeasP}$[MANY/MOST] [$_{Meas'}$Meas^0 [NP]]]]

In these same languages, the proportional MOST must be used with the definite article, as illustrated in (25)–(27) and (28a).

One might think of an analysis in which the whole string [THE MOST$_{cum}$] forms a constituent, a majority quantifier sitting in Spec,DP. This analysis is untenable in view of examples such as (32), which show that majority *meist* can follow not only the definite article, but also a prenominal possessor (the attested examples in (32) are not felicitous for all speakers, therefore we marked them with '%'):

(32) a. %Meine meisten Freunde tragen ja Picaldi-Sachen.
my most friends wear indeed Picaldi-things
'Most of my friends wear things from Picaldi.'
(Moritz Ege, *Ein Proll mit Klasse*, 362)

[4] A similar analysis has been proposed by Wilson (2018) for *the most* in English: *the* would form a constituent with *most*, and *[the most]* would sit in the specifier position of the projection dedicated to quantity modification, below the D level (Wilson 2018 adopts Schwarzschild's 2006 label MonP for this projection, which in this book is called MeasP (see §3.2.2)).

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b. % Meine meisten Beschwerden
my most complaints
sind komplett weg!
are totally away
'Most of my complaints have completely disappeared!'
(www.forumgesund.ch.)

The alternation *die/meine meisten NP* indicates that *meist* does not form a constituent with the definite article, but sits below it. In German, like in English, DP-initial possessives induce a definite interpretation of the DP.

We also found examples showing this order in Swedish, another language with MOST_{cum}:

(33) När jag var yngre var det morgonen, som
when I was younger was it morning-the that
födde **mina flesta tankar**.
gave-birth my most thoughts
'When I was younger, it was the morning that gave birth to most of my thoughts.'
(Ivar Lo-Johansson, *Astronomens hus: En roman om kärleken och äran*: https://books.google.ro/)

Note furthermore that English disallows the order Possessive-$\text{MOST}_{\text{prop}}$-NP, as expected under our analysis of English $\text{MOST}_{\text{dist}}$ as a determiner. Compare the compatibility between possessives and other superlatives (which take the definite article when the possessive is absent):

(34) a. *My most problems have vanished away.
b. My best friends are now abroad.
c. The best friends I've ever had are now abroad.

In sum, a definite article sitting in D^0 (or a null definite D^0 in DPs with prenominal possessors) is obligatory with MOST_{cum} in all the languages we have been able to examine. This is in contrast with the relative superlative readings of MOST, which in some of these languages either lack the definite article or have a definite article that does not sit in D^0 but is part of the superlative. Any analysis of MOST_{cum} must therefore be able to account for the obligatory presence of the definite article.

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3.2.2 MOST$_{cum}$ sits in Spec,MeasP

The obligatory presence of articles before MOST$_{cum}$ supports the idea that MOST$_{cum}$ occupies a lower syntactic position. We may therefore assume that MOST$_{cum}$ sits in the syntactic position of a 'quantity adjective', on a par with MOST$_{sup}$ and its base form MUCH/MANY. Quantity adjectives (MANY, MUCH, FEW, and LITTLE and their comparative and superlative forms), as well as cardinals and measure phrases, resemble quality adjectives insofar as they cannot be analyzed as syntactic determiners, since they can co-occur with determiners:

(35) a. these three girls
b. the few babies
c. the too many errors

Quantity adjectives are however different from quality adjectives by their high syntactic position (they must precede quality adjectives), which suggests that they belong to the functional domain of the noun phrase. Their functional status may explain why quantity adjectives may license N ellipsis, in contrast to quality adjectives:

(36) a. I took three /many [$_{N}$Ø]
b. I took new *(ones)

We follow Schwarzschild (2006) and Solt (2009) in analyzing quantity modifiers as specifiers of a functional head (called Mon^{0} by Schwarzschild and Meas^{0} by Solt) that introduces a measure function monotonic on the part–whole structure of the entity to which it applies.[5]

Because they are specifiers of Meas^{0} rather than functional heads, quantity modifiers can be phrasal:

(37) a. [$_{DP}$ the [$_{MeasP}$ [incredibly many] [Meas^{0} [$_{NP}$ details]]]]
b. [$_{DP}$ die [$_{MeasP}$ [mehr als fünf] [Meas^{0} [$_{NP}$ Jahre]]]] (Ge.)
the.PL more than five years

[5] A dimension Dim is monotonic wrt the part–whole structure of entities in the domain of a noun N iff for any x and y in this domain, if x < y (i.e. x is a proper part of y), then Dim(x) < Dim(y). Schwarzschild (2006) shows that monotonicity wrt the part–whole structure is the common property of the various measure functions—e.g. cardinality, volume, mass—that underlie quantity modification.

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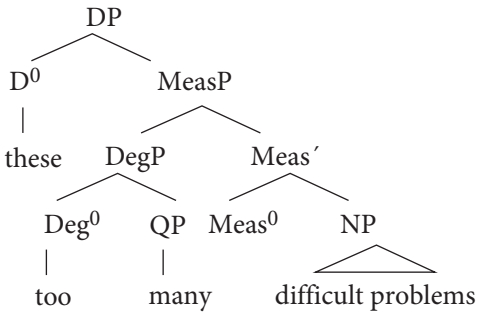
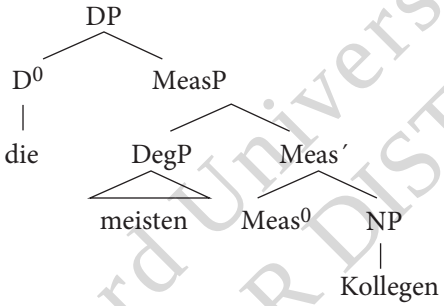
The scalar quantitatives MANY/MUCH and their comparative and superlative forms MORE and MOST are currently analyzed as DegP. We assume that the functional projection DegP occupies Spec,MeasP:

(38)



We assume a similar syntax for MOST_{cum}:

(39)



This analysis fits well with the fact that MOST_{cum} allows mass NP complements: Meas^0 is known to take NP_{pl} or NP_{mass} as complements, but not $\text{NP}_{\text{sg-count}}$.

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3.3 Superlative analyses of MOST_{cum}

Given the syntactic analysis proposed in the previous section, we may expect MOST_{cum} to have the semantics of a quantity modifier. Hoeksema (1983) and Hackl (2009) are two analyses based on the hypothesis that proportional MOST is indeed the superlative of a quantity superlative. In what follows we will show that both of these two analyses are problematic for MOST_{cum}. Hoeksema's proposal will however prove adequate (under a refined version) for the analysis of proportional expressions of the type THE LARGEST PART, which will be examined in Chapter 5.

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3.3.1 Hackl's (2009) analysis

As already summarized in §1.2.2, Hackl derives the proportional interpretation from the absolute interpretation of superlatives by assuming that, when applied to pluralities, the non-identity relation in the denotation of-EST should be interpreted as non-overlap (overlap is notated ○):

(40) $[\![\text{EST}]\!] = \lambda C_{<e,t>}.\, \lambda D_{<d,<e,t>>}.\, \lambda x.\, \forall y((y \in C \wedge \neg\, y \circ x) \rightarrow (\max\{d{:}D(d)(x){=}1\} > \max\{d{:}D(d)(y){=}1\}))$
Definedness conditions:
(i) $x \in C$
(ii) $\forall y\ (y\ \in\ C \rightarrow \exists d\ D(y,d))$
(iii) $\exists y[\neg\ y \circ x \wedge y \in C]$

Under this analysis, by applying MOST to a plural N we obtain the interpretation 'be a plurality of N whose cardinality is larger than the cardinality of any non-overlapping plurality of N'. As the largest plurality non-overlapping with x is the complement of x with respect to the maximal sum of N, we obtain that [MOST NP] denotes the property of being a plurality of N larger than the complement wrt the total sum of N. And this corresponds to the majority interpretation.

In the two previous chapters we have already brought up some empirical evidence against Hackl's analysis: (i) it cannot explain why most of the languages that have a superlative form for MANY/MUCH allow only the relative reading to the exclusion of the proportional one (see §§1.2.2 and 1.5); (ii) it cannot account for the type of proportional MOST examined in Chapter 2 (MOST$_{dist}$), which allows plural count NPs but not mass NPs.

We may nevertheless wonder whether Hackl's analysis might be adequate for the type of proportional MOST examined in the present chapter (MOST$_{cum}$): recall that MOST$_{cum}$ applies to both plural and mass NPs, as predicted by Hackl. One might thus assume that the denotation in (40) (which relies on the replacement of non-identity by non-overlap) only holds for the languages which have MOST$_{cum}$.

However, even this weaker position is untenable, because it cannot explain the obligatory presence of the definite article in DPs that have MOST$_{cum}$. Indeed, according to Hackl's semantics, NPs of the form [MOST NP] denote a set that has no maximal element, which is incompatible with the presence of a definite article. Note that, given a set with n elements, all pluralities

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containing more than n/2 elements satisfy the property denoted by [MOST NP] in Hackl's analysis, namely 'be a plurality of N whose cardinality is larger than the cardinality of any non-overlapping plurality of N'. This set of pluralities does not have a maximal element: note that the only plurality that includes all the pluralities of Ns containing more than half elements is the plurality containing all Ns, the supremum of the NP set. But this plurality does not satisfy the property [MOST NP]: this is because, if we choose x to be the maximal element, the definedness condition (40)(iii) is not satisfied: no matter how we build the comparison class, it will only contain members overlapping with x (the maximal element of a set overlaps with all the elements of the set); but (40.iii) requires that the comparison class should contain an element that does not overlap with x.

3.3.2 Hoeksema's (1983) analysis

Hoeksema (1983) derives the proportional reading from the superlative by using a particular type of comparison class. Hoeksema does not use the term "comparison class", but his analysis is equivalent to Heim's proposal for superlatives interpreted DP-internally: he proposes that the superlative does not apply to the entire NP set, but to the intersection of the NP set with a set K which is provided by the syntactic context. Hoeksema's proposal amounts to assuming that the absolute reading of MOST obtains when the set K is set to a set of sums with two members, namely, the sum of Ns that satisfies the main predicate, and the sum of Ns that does not satisfy it:

(41) Anton heeft de meeste boeken gelezen. (Du.)
Anton has the most books read
(i) relative: K = {the books read by Anton, the books read by Piet, . . . }
(ii) proportional: K = {the books Anton read, the books Anton did not read}

This idea is further developed in Coppock and Josefson (2015) and Coppock (2019), who use the notion of partition. Note that in this analysis, the comparison class is a specific binary partition of the total sum of Ns, whose cells are identified by resorting to the information provided by the rest of the clause.

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The notion of partition, initially defined for sets, can be defined for entities by using the part–whole relation instead of set membership:

(42) A set P is a partition of an entity x iff
(i) The sum of all the elements of P equals x: $\sigma(P) = x$
(ii) The elements of P do not overlap: $\forall y,z((y \neq z \wedge y \in P \wedge z \in P) \rightarrow \neg y \circ z)$

Under this analysis, MOST$_{cum}$ is a quantity superlative that is interpreted DP-internally (just like absolute superlatives). Using Heim's analysis of superlatives given in (43), which relies on non-identity (rather than on non-overlap, as in Hackl's analysis), the denotation of a [MOST$_{cum}$ + NP] constituent such as Ge. *meiste Kaffee* 'most coffee' will be computed as in (44), where we use the notation C_{maj} for the comparison class corresponding to the majority interpretation:

(43) $[\![\text{-EST}]\!] = \lambda C_{<e,t>}.\ \lambda R_{<d,<e,t>>}.\ \lambda x_{<e>}.\ \exists d\ (R(x,d) \wedge \forall y\ ((y \neq x \wedge y \in C) \rightarrow \neg R(y,d)))$ (modeled after Heim 1999: ex. 10)
Definedness conditions:
(i) $x \in C$
(ii) $\forall y\ (y \in C \rightarrow \exists d\ R(y,d))$ (Heim 1999: fn. 8)

(44) $[\![\text{meiste}_{maj}\ \text{Kaffee}]\!] = [\![[C_{maj}\ \text{-EST}]\ [[t_{\text{-EST}}\ \text{viel}]\ [\text{Meas}^0\ \text{Kaffee}]]]\!]$
$= [\![\ C_{maj}\ \text{-EST}]\!]\ (\lambda d \lambda x.\ d\text{-MUCH}\ (\lambda x.\text{coffee}(x))(x)) =$
$= \lambda x.\ \forall y[(y \in C_{maj} \wedge y \neq x) \rightarrow \max\{d\text{: coffee}(x) \wedge \mu(x) \geq d\} >$
$> \max\{d\text{: coffee}(y) \wedge \mu(y) \geq d\}]$
defined iff $x \in C_{maj} \wedge \exists y\ (y \neq x \wedge y \in C_{maj}) \wedge \forall y\ (y \in C_{maj} \rightarrow \exists d(\text{coffee}(y) \wedge \mu(y) \geq d))$
where C_{maj} is a Partition of $\sigma x.\text{coffee}(x)$ and $|C_{maj}| = 2$

If a binary partition with unequal cells is chosen as a value of C_{maj}, the property in (44) is uniquely satisfied, and as such it can combine with the definite article. We assume the denotation in (45) for the definite article, which combined with (44) gives us the denotation in (46) for the whole DP:

(45) $[\![\text{THE}]\!] = \lambda P\ \iota(P)$

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(46) [[der meiste Kaffee]] = ιx. ∀y[(y ∈ C_{maj} ∧ y ≠ x) → max{d: coffee(x) ∧ μ(x) ≥ d} > max{d: coffee(y) ∧ μ(y) ≥ d}]
defined iff x ∈ C_{maj} ∧ ∃y (y ≠ x ∧ y ∈ C_{maj}) ∧ ∀y (y ∈ C_{maj} → ∃d(coffee(y) ∧ μ(y) ≥ d))
where C_{maj} is a Partition of σx.coffee(x) and |C_{maj}| = 2

This analysis thus succeeds in explaining the use of the definite article, which is an advantage over Hackl's analysis. However, it has its own problems. Note that, as for Hackl, the crosslinguistic restriction on MOST_{cum} (the fact that not all languages which have superlative MOST also have MOST_{cum}) remains unexplained. Granting that the choice of C_{maj} proposed by Hoeksema is possible, it is not clear why it is available only in *certain* languages. This problem could be solved by assuming that C_{maj} is selected as a lexical property by certain superlatives. Under this assumption, only certain languages would have a MOST that selects C_{maj} as its comparison class.

A more serious problem is that Hoeksema's special definition of the comparison class C_{maj} relies on a notion of "context" that is very different from the pragmatic context that is used in identifying the comparison class of run-of-the-mill superlatives (see §1.2.2): on a relative reading such as (41a), the value of the comparison class C is set by resorting to the pragmatic context, which provides the identity of the people (Anton, Piet, etc.) each of whom read a different number of books. The notion of pragmatic context plays no role in Hoeksema's analysis of the proportional reading (see (41b)). Rather, it is the asserted sentence itself that provides the contextual information, namely the fact that there are sums of Ns that satisfy the nuclear predicate and sums of Ns that do not satisfy it. Thus, a sentence such as (47) can be uttered in a context where the issue whether there are students who are tired is not provided by the pragmatic context.

(47) Die meisten Studenten sind müde.
the most students are tired
'Most students are tired.'

Given that C_{maj} cannot be assumed to be provided by the pragmatic context, we may analyze it as a variable over binary partitions that is bound by clause-level existential closure.

However, the use of a partition as a comparison class appears to be too stipulative for the -EST morpheme. Therefore, we will not adopt this revised superlative analysis for MOST_{cum}. We will nevertheless develop a superlative-based analysis relying on partitions for the type THE LARGEST PART, a type where

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the majority interpretation is crosslinguistically widespread (see Chapter 5). We will propose that it is the noun PART that introduces the variable over partitions.

3.4 MOST$_{cum}$ as a proportional quantifier

3.4.1 A revised version of Higginbotham's analysis of mass quantifiers

As we have repeatedly stressed while presenting the data, the crucial property of MOST$_{cum}$ is that it allows for mass NPs in its restrictor. This distribution cannot be captured by the GQT analysis assumed for MOST$_{dist}$: as we saw in Chapter 2, the GQT analysis can only be adequate for distributive count quantification.

Analyses of proportional quantifiers with mass restrictors are extremely rare in the existing semantic literature. A welcome exception is Higginbotham (1994), who proposes that mass quantifiers denote relations between entities rather than relations between sets. The reader should be aware that in the formulae below we use the maximality operator σ instead of Higginbotham's Σ, for reasons presented in §1.2.3, where Higginbotham's analysis of mass quantifiers was briefly summarized. It is also important to bear in mind that although we assume the main insight of Higginbotham's semantic analysis, we do not endorse the details of his assumptions regarding the syntax–semantics interface. To make this as clear as possible, we first present Higginbotham's analysis on the example that he himself discusses. We then explain why we cannot adopt his analysis for that particular example. And finally we move on to our own proposal, which is to adopt Higginbotham's analysis for MOST$_{cum}$. In so doing we suggest some refinements of the technical implementation, and finally we bring up the problems raised by the syntax–semantics interface.

Higginbotham himself is not concerned with the German *meist* (nor with any of its crosslinguistic counterparts) but with the English *most* in examples of the type:

(48) Most water is liquid.

Assuming that in this example, *water* is a property-denoting NP, Higginbotham proposed that the denotation of the proportional mass quantifier *most* supplies nominalizing operators (notated σ below, instead of Higginbotham's Σ—see §1.2.3) for both of its two arguments (its NP sister and the main predicate), yielding two entities that constitute the restrictor and nuclear scope:

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(49) $[\![\text{most}]\!] = \lambda P_{et}.\ \lambda Q_{et}.\ \mu(\sigma x.P(x) \cap \sigma z.Q(z)) > \mu(\sigma x.P(x) - \sigma z.Q(z)))$

This denotation crucially relies on applying the operations "meet" (∩) and "difference" (-) to entities. The *meet* of two entities *x* and *y* is the maximal sum of everything which is a part of both *x* and *y*:

(50) For $x,y \in D_e$
$x \cap y =_{def} \sigma z.(z \leq x \wedge z \leq y)$

The *difference* of x and y (or the *complement* of y wrt. x) is the maximal sum of the parts of *x* which do not overlap with *y*:

(51) For $x,y \in D_e$
$x-y =_{def} \sigma z.(z \leq x \wedge \neg\ z \circ y)$

By applying the denotation in (49) to *water* and *liquid*, we derive the correct truth-conditions of the example in (48):

(52) $[\![\textit{Most water is liquid}]\!]$ = $\mu(\sigma x.\text{water}(x) \cap \sigma z.\text{liq.}(z)) > \mu(\sigma x.\text{water}(x) - \sigma z.\text{liq.}(z)))$

This formula requires that (the measure of) the Meet of the maximal sum of water with the maximal sum of liquid stuff be larger than the difference between these two maximal sums.

But let us now remind the reader that according to us, *water* in this kind of English example is not a property-denoting NP but rather an entity-denoting expression, more precisely a kind-denoting DP headed by a null Det with the semantics of Chierchia's Down operator (see §2.2). As such, the MOST that occurs in (48) is not to be analyzed as a genuine non-partitive MOST, but rather as a MOST that takes a DP in its restrictor (see §4.5). The point is important, because for this type of MOST we do not need to assume a type-shifter for the restrictor; the syntax itself supplies a kind-restrictor.

If mass quantification had been possible only in this kind of English example and in partitives (see Chapters 4 and 5), we could have assumed that Higginbotham was not right in assuming that proportional mass quantifiers allow property-denoting NPs in their restrictor. Such quantifiers would require the syntactic configuration itself to supply entity-denoting expressions (DPs headed by overt or null Dets) in their complement.[6]

[6] For this proposal, see Dobrovie-Sorin (2013b).

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The hypothesis that mass quantifiers necessarily require a full DP in their complement position is disconfirmed by MOST$_{cum}$ (see the data described in §3.1), which offers a clear example of a proportional mass Q that takes a NP rather than a (*of*) DP as its complement. Let us then assume that a Higginbotham-style analysis is adequate for proportional *meist* (and the other instantiations of MOST$_{cum}$ across languages). Based on this analysis, the semantic composition of an example such as (53) is shown in (54), where (54a) repeats (49). Note that for the time being we ignore the presence of the definite article, an issue to which we will return:

(53) Hans trinkt den meisten$_{prop}$ Kaffee.
Hans drinks the most coffee.
'Hans drinks most of the coffee.'

(54) a. $[\![\text{meist}_{prop}]\!] = \lambda P_{et}.\, \lambda Q_{et}.\, \mu(\sigma x.P(x) \cap \sigma z.Q(z)) > \mu(\sigma x.P(x) - \sigma z.Q(z)))$

b. $[\![\text{meisten}_{prop}\ \text{Kaffee}\ ]\!] = \lambda Q.\, \mu(\sigma x.\text{coffee}(x) \cap \sigma z.Q(z)) > \mu(\sigma x.\text{coffee}(x) - \sigma z.Q(z)))$

c. $[\![\text{Hans trinkt den meisten}_{prop}\ \text{Kaffee}\ ]\!]$
$= \mu(\sigma x.\text{coffee}(x) \cap \sigma z.\text{drinks}(\text{Hans},z)) >$
$\mu(\sigma x.\text{coffee}(x) - \sigma z.\text{drinks}(\text{Hans},z)))$

A problem of this analysis concerns the interpretation of these formulae in case the Meet between the two sum-entities is empty. Indeed, under the standard assumptions of mereology, there is no "empty/null element" which is a part of all the others, which would be the counterpart of the empty set of set theory (cf. Champollion and Krifka 2016: 515; Wągiel 2018: 200). This means that, in case there is no element which is part of both *x* and *y*, Meet(x,y) is undefined. But, definitely, *meist*(P)(Q) is false (rather than undefined) when no P is Q. Likewise, Difference(x,y) should be undefined if there are no parts of x which do not overlap with y. But *meist*(P)(Q) is true in case all Ps are Q.[7] These problems do not arise for Higginbotham's (1994) analysis, who

[7] In simple sentences, this is counterintuitive due to scalar implicatures (somebody would not use *Most boys left* if he knew that all boys left). But in downward entailing environments, one can easily see that MOST(P)(Q) as well as its German counterpart are true in case all Ps are Q, e.g. (i):

(i) Die Studie untersucht die Gemeinden, in denen die meisten Einwohner alt sind. (Ge.)
the study examines the communities in which the most inhabitants old are
'The study examines the communities in which most of the inhabitants are old.'

This sentence includes the communities where *all* inhabitants are old in the communities examined by the study.

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assumed a null element in the ontology (the mereological counterpart of the empty set), which he calls "a zero region", with the measure 0. If we want to preserve the standard ontology of mereology,[8] we can use an alternative implementation of the quantificational analysis, given in (55):[9]

(55) a. $[\![\text{meist}_{\text{prop}}]\!] = \lambda P.\ \lambda Q.\ \exists x\ (P(x) \wedge Q(x) \wedge \mu(x) > \mu(\sigma y.P(y)\text{-}x))$

b. $[\![(\text{der})\ \text{meiste}_{\text{prop}}\ \text{Kaffee}\ ]\!] = \lambda Q.\ \exists x\ (\text{coffee}(x) \wedge Q(x) \wedge \mu(x) > \mu(\sigma y.\text{coffee}(y)\text{-}x))$

This formula does not make use of the Meet of two maximal sums, but simply asserts the existence of a sum-entity that satisfies both the NP property and the nuclear scope. In case there is no x satisfying $P(x) \wedge Q(x)$, the sentence is false, and in case all Ps are Q, the sentence is true because we may find a value for x such that x satisfies the nuclear scope and its size is smaller than the maximal sum but larger than the difference.[10] Thus, (55) derives the correct truth-conditions without running into the problems which appear in case no Ps are Q or all Ps are Q and without assuming a zero entity in the ontology.

Dobrovie-Sorin (2013b; 2014) observed that the type of denotation proposed by Higginbotham (1994) for mass quantifiers is also needed for collective quantifiers.[11] And indeed, examples of the type in (56) are true iff the

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[8] Bylinina and Nouwen (2018) argue, however, in favor of a "zero element", based on the numeral *zero*.

[9] A denotation which uses an existential has been proposed for partitive *most* (*most* in *most of DP*) by Nakanishi and Romero (2004):

(i) "We assume that *most of the NPs* introduce ∃-quantification over a group x whose cardinality is greater than a half of the NPs" (Nakanishi and Romero 2004: 457).

This proposal differs from our proposal in (55) in two respects: (i) the first argument of *most* is an entity, which is due to the fact that they do not analyze the non-partitive configuration most NP, but rather the partitive *most of DP*; (ii) the measure of the part of which the nuclear scope is asserted is compared with half of the measure of the whole, instead of being compared with the difference. We avoid reference to exact ratios such as ½ for the reasons presented in §1.2.4.

[10] This formula still creates problems for those situations in which the collective predicate is true only of the maximal sum in the restrictor (see a predicate such as 'lift the piano', which can be true *only* of the supremum of the restrictor, being false of *any* proper part of the supremum). In order to avoid reference to the difference between the maximal sum of P and x (see *σy.P(y)-x* in the formula in (55)), we may rewrite it in either of the two following ways:

(i) $[\![\text{meist}_{\text{prop}}]\!] = \lambda P.\ \lambda Q.\ \exists x\ (P(x) \wedge Q(x) \wedge \neg\exists z\ (P(z) \wedge \neg z \bigcirc x \wedge \mu(z) \geq \mu(x)))$
(ii) $[\![\text{meist}_{\text{prop}}]\!] = \lambda P.\ \lambda Q.\ \exists x\ (P(x) \wedge Q(x) \wedge \forall z\ ((P(z) \wedge \neg z \bigcirc x) \rightarrow \mu(x) > \mu(z)))$

In words, '$\text{MOST}_{\text{cum}}(P)(Q)$' is true if there exists an entity x that satisfies P and Q and whose measure is larger than that of any other entities that satisfy P and have no overlap with x. This allows us to dispense with the sigma operator implied by the use of difference (see the definition in (51)).

[11] Note however that Dobrovie-Sorin (2013b; 2014) thought that mass and collective Qs were only possible in partitives.

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truth-condition in (57) is satisfied. We use here the revised formula with an existential:

(56) Die meisten Studenten werden sich morgen versammeln.
the most students will REFL tomorrow gather
'Most of the students will gather tomorrow.'

(57) ∃x (*student(x) ∧ μ(x) > μ(σy.*student(y)-x) ∧ gather(x))

According to this analysis, MOST$_{cum}$ is a collective Q whenever its restrictor is plural. This holds even for examples in which the interpretation is necessarily distributive:

(58) Die meisten Studenten respektieren ihre Eltern.
the most students respect their parents
'Most of the students respect their parents.'

The LF representation is parallel to the one given above. The only difference is that the main predicate is a distributive predicate that is pluralized:

(59) ∃x (students(x) ∧ μ(x) > μ(σy.*student(y)-x) ∧ *respect-parents(x))

Such a formula entails distributivity because by definition, a pluralized predicate is true of a plural entity iff it is true of all the singular entities in that plural entity.

3.4.2 The syntax–semantics interface

Let us now see how the denotation of *meist* (which we take to illustrate MOST$_{cum}$ crosslinguistically) relates to the syntactic properties described in §2, namely the correlated facts that (i) *meist* sits in Spec,MeasP and (ii) *meist* necessarily combines with a definite article that sits in D^0. These syntactic properties seem problematic for the proposal in (54a)/(55). Note first that the Spec,MeasP position is too low for MOST$_{cum}$ to be able to take a quantificational determiner denotation. Indeed, in order for MOST$_{cum}$ to denote a quantificational determiner, it needs to be immediately dominated by the DP: it is only under this condition that the sister of MOST$_{cum}$ supplies the restrictor and the VP (or more precisely the lambda abstract over the position of the DP) supplies the nuclear scope. The problem is that MOST$_{cum}$ is

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preceded by THE, which means that MOST_{cum} is not immediately dominated by the DP.

One possible solution to this problem is to assume that *meist* raises at LF above the definite article, as shown in (60):

(60) $[_{\text{QP}}$ meiste $[_{\text{DP}}$ der $[_{\text{MeasP}}$ ~~meiste~~ $[_{\text{Meas'}}\text{Meas}^{0}$ $[_{\text{NP}}$ Kaffee$]]]]$

In this configuration, the definite article applies to the NP *Kaffee*, and can thus be assumed to correspond to the maximality operator that appears in (54a)/(55a), which yields the "whole" (see (61b)) that is necessary for the interpretation of proportional quantifiers in general and for MOST_{cum} in particular. Note now that given the LF in (60), the first argument of the proportional *meist* is a full DP, which denotes an entity. This requires rewriting the denotation of proportional *meist* as in (61):

(61) a. $[\![\text{meist}_{\text{maj}}]\!] = \lambda x_{e}.\ \lambda Q_{et}.\ \exists y\ (y \leq x \wedge \mu(y) > \mu(x\text{-}y) \wedge Q(y))$

b. $[\![\text{der Kaffee}]\!] = \sigma x.\text{coffee}(x)$

c. $[\![\text{meist}_{\text{maj}}\ [\text{der Kaffee}]\ ]\!] = \lambda x.\ \lambda Q.\ \exists y\ (y \leq x \wedge \mu(y) > \mu(x\text{-}y) \wedge Q(y))\ (\sigma x.\text{coffee}(x))$
$= \lambda Q.\ \exists y\ (y \leq \sigma x.\text{coffee}(x) \wedge \mu(y) > \mu(\sigma x.\text{coffee}(x)\text{-}y) \wedge Q(y))$

According to this analysis, MOST_{cum} is morphosyntactically a quantity adjective but nevertheless a quantifier at LF. Elements of this type have been previously observed, e.g. *occasional* or *frequent* in the *occasional sailor* (see Zimmerman 2003) or *average* (see Kennedy and Stanley 2009). A very similar case is the German adjective *ganz* 'whole, entire', which in colloquial German may be used with the semantics of 'all', although keeping its DP-internal position (see Haspelmath 1995; Moltmann 1997):[12]

[12] Haspelmath invokes this use of *ganz* as illustrating an intermediate stage in the grammaticization process that lead from the concrete, adjectival meaning 'whole, intact, unbroken', which originally could apply only to singular entities, to the more abstract meaning 'all', which can also apply to mass and plural entities. Haspelmath points out that most of the instantiations of words meaning 'all' found across languages originate in adjectives meaning 'whole', e.g. Latin *totus* 'whole' is the ancestor of the words meaning 'all' in all the modern Romance languages (Fr. *tout*, Romanian *tot*, etc.)

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(62) a. Wer hat denn die ganzen (Haspelmath 1995: 366, ex. (6))
who has then the whole
Punkte hier gemalt?
dots here drawn
'Who has drawn all these dots here?'

b. Die ganzen Tassen sind verschwunden!
the whole cups are disappeared
'All the cups have disappeared!'

The LF-raising analysis of MOST$_{cum}$ suggested above is nevertheless confronted with some problems. A technical problem is that the trace of *meist* does not receive any interpretation. Compare other LF-raising operations, for which traces are interpreted as variables bound by a lambda-operator.

A further problem is that unlike majority quantifiers that combine with a DP, such as the English *most of* (see Chapters 4 and 5), MOST$_{cum}$ does not allow quantification over parts of a singular individual:

(63) a. Most of the city was destroyed.

b. *Die meiste Stadt wurde zerstört. (Ge.)
the most city was destroyed

The problem is that by raising *meist* over *die* we get *[meiste [die Stadt]] wurde zerstört*, which, given the denotation in (61a), could be assigned the meaning 'most of the city was destroyed'. We therefore expect (63b) to be acceptable, contrary to fact. An answer to this question is that the unacceptability of examples of the type in (63b) is not due to uninterpretability, but rather to syntactic ill-formedness: MOST$_{cum}$ is first merged in the Spec of Meas^0, which takes NP$_{mass}$ or NP$_{pl}$ but not NP$_{sg}$ as a complement;[13] therefore, the example in (63b) cannot be generated.

A more serious problem for the LF-raising analysis of MOST$_{cum}$ comes from the combination of *meist* with demonstratives. The analysis in (60) and (61a) predicts that the string [DEM *meist* NP] should have the interpretation 'most of these NP'. However, such an interpretation is unavailable in German, according to our informants:

[13] A Meas^0 that takes a singular count NP is only found when its Spec is occupied by the numeral *one*, cf. examples such as *the one thing, the one God*, and their German counterparts *die eine Sache, der eine Gott*, which indicate that *one* can occur in a position below D (presumably the same as for other cardinal numerals).

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(64) Diese meisten Studenten sind kluge.
these most students are smart
≠ Most of these students are smart.

The speakers who accept the combination of *meist* with demonstratives assign such examples an interpretation of the type 'this majority of…'. An attested example of this type is (65):

(65) In dem gleichen Modell sagt (2)(iii) dass es irrelevant ist,
in the same model says (2)(iii) that it irrelevant is
ob die Schwäne schwarz sind, da die meisten
whether the swans black are as the most
Individuen ja Hunde sind und nur über **diese**
individuals PART dogs are and only about these
meisten Individueen eine Aussage gemacht wird.'
most individuals an assertion made is
'In the same model, (2)(iii) says that it is irrelevant if the swans are black, because most individuals are dogs, and an assertion is made only about this majority of individuals.'
(Horst Lohnstein, *Formale Semantik und natürliche Sprache*, p. 227)

We are led to conclude that at least in examples with demonstratives (for those speakers who allow such orders), MOST has a quantity modifier denotation, paraphrasable as 'be a part of the total sum of N larger than the rest'—a type of interpretation that will be proposed for cumulative majority quantifiers in Japanese and Chinese: see the next section.

The impossibility of the scope *meist*>Dem in (64) remains mysterious in the raising analysis suggested above. All the more so that in DPs of the form [Dem *ganz* NP], the *ganz* that means 'all' does allow the scope *ganz*>Dem:

(66) a. Wer hat diese ganzen Leute eingeladen?
who has these *ganz* people invited
'Who invited all these people?' (www.ntower.de)

b. Was kann ich tun um diese ganzen Fehler zu beheben?
what can I do for these *ganz* errors to fix
'What can I do to fix all these errors?' (community.unitymedia.de)

This suggests that the LF-raising analysis suggested above may be adequate for *ganz* 'all', but not for MOST_{cum}.

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This takes us back to the syntax–semantics issue raised by (55a), repeated here:

(55) a. $[\![\text{meist}_{\text{prop}}]\!] = \lambda P.\ \lambda Q.\ \exists x\ (P(x) \wedge Q(x) \wedge \mu(x) > \mu(\sigma y.P(y)\text{-}x))$

This denotation ignores the presence of the definite article, which we have shown to be required with proportional MOST$_{cum}$ in all the languages that we have examined. This generalization is strengthened by the existence of languages that require the absence of THE with the relative superlative readings of MOST but require it for the majority reading (see Mainland Scandinavian, Basque, Dutch, examples (28)–(30) in §3.2.1).

The obligatory presence of the definite article observed for MOST$_{cum}$ can be reconciled with its quantificational-determiner semantic status if we assume that THE and MOST$_{cum}$ form a rebracketed constituent [THE MOST$_{cum}$]. It is this constituent rather than just MOST$_{cum}$ that has the denotation in (55a):

(67) $[\![\text{THE MOST}_{\text{cum}}]\!] = \lambda P.\ \lambda Q.\ \exists x\ (P(x) \wedge Q(x) \wedge \mu(x) > \mu(\sigma y.P(y)\text{-}x))$

The mechanism via which this rebracketed constituent is obtained is open to discussion. One possibility is movement at LF of MOST$_{cum}$ from Spec,MeasP to a position adjoined to D^0, which hosts THE (for movement from a Spec position to a head-adjoined position, see Roberts 2010 on clitic movement). Another possibility is that THE and MOST$_{cum}$ form a complex head [$_{D^0}$D^0 +Meas^0] via head-to-head Merge, which subsequently combines with MeasP. Bobaljik and Brown (1997) proposed this type of derivation, which they call "interarboreal Merge", in order to make the configuration [$_{HP}$[X H] [XP]], characteristic of head movement (e.g. V-to-Infl), comply with Chomsky's (1995) Extension Condition. Interarboreal Merge combines first a head H (e.g. Infl/Tense) with a copy of the head X of the complement of H (e.g. Infl is merged with V, yielding V-Infl), then the resulting [X H] is merged with XP (e.g. V-Infl is merged with VP). Dobrovie-Sorin (2001) extends this mechanism to complex heads of the type [Aux V], found in Romanian, where the order of the heads is not reversed. [THE MOST$_{cum}$] might be seen as a complex head of this type. Note that this account assumes that MOST$_{cum}$ is not a phrase in a specifier position, but rather the head of the complement of D. Rebracketing of two heads that are in an immediate c-command relation into a complex head has also been proposed by Matushansky (2008) as the final step (dubbed "m-merger") in the derivation of head movement. As indicated by the label "m-merger", Matushansky assumes that the formation

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of the complex head belongs to the morphological branch of the derivation. For MOST_{cum}, it is crucial that rebracketing feeds LF.

Under the rebracketing account, in examples with possessives (see (32) and (33)), the possessive would sit in Spec,DP, above [THE MOST_{cum}]. As for the interpretation, the possessive undergoes reconstruction at LF, being interpreted inside the restrictor of THE-MOST_{cum}.

3.4.3 On the majority reading of THE MORE (Bulgarian)

Bulgarian (see §3.1.2) resembles the languages with MOST_{cum} in that it has definite DPs in which a quantity modifier accompanied by a definite article takes the majority reading. The difference is that the quantity modifier is not the superlative of MUCH/MANY, but the comparative.

Bulgarian may receive the quantificational analysis proposed in the previous subsection. Since in this language the definite article is a suffix (*-to*) and is moreover uninflected, we may consider it to be part of an unanalyzable determiner *povečeto*.

As for diachrony, Greek influence is possible—recall that Greek, which uses comparatives embedded in definite DPs to express the superlative, has a MOST_{cum} with the form THE MORE (see ex. (12) above).

3.5 Cumulative majority quantifiers in languages without articles

In §3.1.3, we presented cumulative majority quantifiers in two languages without articles (Chinese and Japanese). The order Possessor–Maj.Adj.–N indicates a modifier position (possibly Spec,MeasP, see §3.2.1 above):

(68) a. watasi-no hotondo-no gakusee-ga ryoosin-o sonkeesitei-ru. (Ja.)
I-GEN most-GEN student-NOM parents-ACC respect-PRES
'Most students of mine respect their parents.'

b. Wo dabufen-de tongshi mingtian hui jianmian (Ch.)
1SG large-part-RELATOR colleague tomorrow will meet
'Most of my colleagues will meet tomorrow.'

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As Japanese and Chinese do not systematically mark entity denotation by determiners, it is disputable whether these languages project the D-level of representation (see Bošković 2005; 2008 for the treatment of article-less languages as "NP languages", where maximal nominal projections functioning as arguments can be NPs). Therefore, an analysis where the Chinese and Japanese majority quantifiers raises above the DP in order to combine with an entity-denoting argument is questionable.

Let us then assume that *hotondo/dabufen* are quantity modifiers with the denotation given in (69):

(69) $[\![\text{hotondo/dabufen}]\!] = \lambda P.\ \lambda x.\ (P(x) \wedge \mu(x) > \mu(\sigma y.P(y)\text{-}x))$

According to this denotation, *hotondo/dabufen* specify the measure of the external argument of the NP as greater than the measure of its complement with respect to the maximal sum of N in the context. They characterize the measure of an entity as larger than the measure of its complement with respect to the maximal sum in the NP denotation.

We did not envisage such an analysis for MOST_{cum} and $\text{MORE}_{\text{maj-adj}}$ because those items necessarily occur in definite DPs, and the semantics in (69) requires a D—if there is one—to be interpreted as indefinite (uniqueness cannot be satisfied, because there is no single part of an entity that measures more than its complement).

In sum, although *dabufen* and *hotondo* resemble MOST_{cum} by their distribution (possibility to combine with mass and plural-interpreted NPs, impossibility to combine with singular-interpreted NPs) and majority interpretation, they arguably differ from MOST_{cum} by their syntax and syntax–semantics mapping: whereas MOST_{cum} is a quantificational determiner, *dabufen* and *hotondo* are best analyzed as NP-modifiers.

A modifier analysis is supported by one of the two possible interpretations of ex. (24) in §3.1.3, resumed under (70) below:

(70) Junya-wa [[Ayaka-ga hotondo-no ringo-o mui-ta] **sono**
Junya-TOP Ayaka-NOM most-GEN apple-ACC peel-PAST that
hotondo-no ringo]-o tabe-ta.
most-GEN apple-ACC eat-PAST
Possible reading: 'Ayaka peeled most of the apples (in a contextually assumed heap) and Junya ate that majority of apples (all the apples peeled by Ayaka).' (Grosu and Hoshi 2019)

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In this reading, the boldfaced constituent introduces a majority that is anaphoric to the sum of apples peeled by Ayaka, which itself represents a majority of a contextually given sum of apples. This reading cannot be obtained if *hotondo* is treated as a proportional quantifier, because it would introduce an indefinite majority of apples. The operator that binds the external argument of the NP is not *hotondo*, but the demonstrative *sono*—which ensures the anaphoric relation. Note that this analysis is probably also needed for the German example in (65) above, repeated under (71).

(71) In dem gleichen Modell sagt (2)(iii) dass es irrelevant ist,
in the same model says (2)(iii) that it irrelevant is
ob die Schwäne schwarz sind, da die meisten
whether the swans black are as the most
Individuen ja Hunde sind und nur über **diese**
individuals PART dogs are and only about these
meisten Individueen eine Aussage gemacht wird.'
most individuals an assertion made is
'In the same model, (2)(iii) says that it is irrelevant if the swans are black, because most individuals are dogs, and an assertion is made only about this majority of individuals.'
(Horst Lohnstein, *Formale Semantik und natürliche Sprache*, p. 227)

The other reading of (70) is 'Junya ate a majority of the apples peeled by Ayaka, and the apples peeled by Ayaka represent a majority of a contextually assumed heap'. In this reading, *sono* does not take scope over *hotondo*, but the other way around: *sono* is only used to retrieve the entity introduced in the relative clause (a majority of a contextually given heap of apples) and functions as a partitive complement to *hotondo ringo* 'most apples' (the English equivalent of this phrase would be 'most apples of those').

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3.6 (In)definiteness with superlative and majority MOST

In this section we will propose tentative explanations for our observations regarding the (in)compatibility of the definite article with MOST_{cum} and $\text{MOST}_{\text{dist}}$, respectively. These explanations have already been suggested, but this is a place where we would like to set the generalizations and their explanations against the wider background that we have so far reached.

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3.6.1 Generalizations and questions

The empirical investigation carried out in Chapter 2 and §3.2.1 supports the descriptive generalizations in (72a) and (72b), respectively:

(72) a. Crosslinguistically, THE in D^{0}[14] is obligatorily present with $MOST_{cum}$.

b. $MOST_{dist}$ allows the lack of THE or a THE that is part of the superlative constituent (rather than merged in D^{0}).

It is interesting to observe that these generalizations can only be stated because we have been able to distinguish between two distinct distributional types of majority MOST, $MOST_{dist}$, and $MOST_{cum}$. In the absence of this distinction, the distribution of the definite article with "majority" MOST would have resisted any attempt at a deeper understanding.

It is also noteworthy that the distribution of THE with $MOST_{cum}$ is not subject to parametric variation. For $MOST_{dist}$ the data are less clear (because of Hungarian: see §2.5), but nevertheless the parametric variation is quite limited.

This contrasts with the distribution of the definite article with superlative MOST and quality superlatives:

(73) a. Languages with articles tend to use THE with superlatives.

b. The tendency is stronger with quality superlatives: among the languages we know of, only Scandinavian and Bulgarian allow THE to be absent with quality superlatives.

c. The tendency is much weaker for MOST: in a good number of languages, $MOST_{sup}$ allows or even requires the absence of THE.

The observed variation in the use of THE with superlatives does not bear on the meaning, but seems to be relevant for whether or not a superlative DP is subject to a c-command constraint by its correlate (Giurgea forthcoming).

Even if no difference in intuitive meaning seems discernable we may wonder whether the presence vs. absence of THE correlates with different LF representations. We might thus hypothesize that the presence of THE blocks

[14] When the DP contains a prenominal possessor an overt THETHE is banned, arguably because of a "doubly filled Det" filter comparable to the better known "doubly filled Comp". Thus, in configurations of the form Poss-$MOST_{cum}$-NP, D^{0} is filled with a null determiner that has the semantics of the definite article.

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the -EST raising proposed by Heim (1999), leaving an in situ analysis as the only option. This could be true for languages in which the use of THE is optional with superlatives, but certainly not for languages in which THE is obligatory: indeed, there is wide consensus that the so-called "upstairs de dicto reading" requires the raising of -EST, but this reading is clearly possible in the presence of THE (at least in cases in which THE is obligatory with superlatives). Thus the presence or absence of THE does not seem to be crucial for the analysis of superlatives: not only is THE irrelevant to the intuitive meaning, but it seems hard to demonstrate that it is relevant for choosing among LF representations. In sum, the ban on THE, the need for THE or its optionality with superlatives, seems to be a purely syntactic crosslinguistic distinction, with no bearing on LF.

We may next wonder whether the LF analysis of $\text{MOST}_{\text{superl}}$ is identical to that of quality superlatives. What seems fairly plausible is that bare superlatives (and in particular bare $\text{MOST}_{\text{superl}}$) rely on a -EST raising analysis. Depending on what evidence we have for the choice between a raising and an in situ analysis of definite quality superlatives, we will end up with a unified or differentiated analysis. It could be that the choice is parameterized for quality superlatives.

We will not continue this discussion, because the issues surrounding superlatives are only tangential to the analysis of majority MOST, which is our task at hand. This short presentation was only meant to point out that the LF representations of superlatives may be identical across languages, disregarding crosslinguistic differences in the distribution of the definite article. In contrast to this, majority MOST comes in two clearly distinguished guises, which differ by interpretation (distributive only or cumulative (mass, collective, or distributive)), subcategorization properties (only NP_{pl} or both NP_{pl} and NP_{mass}) as well as the distribution of the definite article. All of these differences strongly suggest different LF representations and semantic compositions, as we have already proposed in Chapter 2 and previous sections of the present chapter.

What we have not yet explained is the distribution of the definite article:

(74) a. Why is it that THE is obligatory with MOST_{cum} rather than with $\text{MOST}_{\text{dist}}$?

b. Why is it that in English, $\text{MOST}_{\text{dist}}$ is incompatible with a D^0 filled with THE?

In what follows we will first present some historical data that sheds light on this issue. We will then turn to a suggestion for an explanatory analysis.

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3.6.2 Some history

In order to make some sense of the generalizations formulated above regarding the distribution of THE with MOST_{cum} and $\text{MOST}_{\text{dist}}$, we need to make fine-grained observations regarding the timing of the introduction of definite articles and combine those with morphosyntactic parameters regarding case, DP-structure, etc. In what follows we will merely sketch possible lines of inquiry, concentrating on Germanic languages.

In line with what is generally known about the history of Germanic languages, we assume that superlatives, and in particular the superlative of quantity, precede the introduction of articles: the *-st* suffix is inherited from Indo-European, whereas the emergence of articles can be seen in the historical record; the oldest well-attested Germanic language, Gothic, only has an anaphoric definite article.

If the use of articles is generalized with superlatives before the grammaticalization of proportional MOST, we expect that proportional MOST will occur with the article. This seems to be the case of German, where (i) THE occurs both with the relative superlative *meist* and the proportional *meist* and (ii) the emergence of proportional *meist* is quite late—according to *Deutsches Wörterbuch* (DWB), the type *die meisten Leute* 'the most people' occurs later than the constructions *der meiste Teil* 'the largest part' and *die meiste Menge* 'the largest multitude/number' (where *meist* still has the old meaning 'largest'). The oldest example of proportional *die meisten* in *DWB*'s article on *meist* are from the seventeenth century.

In English on the other hand, the grammaticalization of superlative MOST as a proportional quantifier seems to have happened much earlier, before the generalization of the use of articles. This explains why majority MOST does not have THE in English. Thus, examples of proportional MOST can already be found in the Old English period:

(75) Him mon eac mid oþrum floccum sohte **mæstra**
them.DAT enemy also with other troups sought most.GPL
daga ælce oþþe on dæg oþþe on niht
days.G each either on day or on night
'But they were also sought after most days by other companies, either by day or by night' (*The Saxon Chronicle* [893], English translation by the Rev. J. Ingram, London: Longman, Hurst, Rees, Orme, and Brown, 1823)

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Based on the examples provided by the *OED* article on *most*, it appears that (i) the proportional reading is attested in English very early compared to German and (ii) the use of THE was unstable for a long period of time with both relative superlative and proportional MOST. Thus, the article continued to be absent with the relative superlative of MOST long after the definite article was introduced in the language. It is only in the seventeenth century that THE starts to appear with relative superlative readings, and the use is more or less generalized during the nineteenth century (for superlative readings in the absence of THE, which are nowadays restricted to very specific contexts, see §4.8).

During Early Modern English, instances of proportional MOST are found both with and without THE:

(76) a. Whereof **the most peple** were sory
(late 15th c., *Warkworth's Chronicle*, 1839)

b. Abrahams behaviour to these Hittites may shame **the most Christians**
(1650, J. Trapp, *Clavis to Bible*, Gen. 23:7, 180)

(77) Vertue is harbored in the heart of him that **most men** esteeme misshapen
(1578, J. Lyly, *Euphues* fo. 11)

We can conclude that the distribution of THE characteristic of Modern English MOST (presence vs. obligatory absence of THE with relative superlatives vs. proportionals, e.g. *Who read the most books*? vs. *Most students in my class failed the exam*) is quite recent. In any case, it occurred long after the appearance of the proportional reading and the generalization of definite articles in the language. The lack of THE with proportional MOST in Modern English is historically explained as being due to the early introduction of this reading, at a time where the use of THE had not yet become general. The presence of THE with the relative superlative MOST was probably introduced on the model of the other superlatives (quality-relative superlatives require the article in English).

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3.6.3 The syntax–semantics representation of MOST and definiteness

What we have seen so far is that the time at which majority MOST appeared in a given language explains the absence vs. the presence of the article. However, this does not explain why the presence of THE correlates with a cumulative

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quantificational analysis (which we have established for MOST_{cum}) and, conversely, why a distributive analysis (characteristic of $\text{MOST}_{\text{dist}}$) allows, maybe requires the absence of THE in D^0 (the stronger view depends on the analysis of Hungarian).

Let us observe that the labels "dist" and "cum" on MOST are potentially confusing because they directly signal a denotational/semantic distinction, as if these items were listed in the lexicon with those particular features, which would directly indicate that one denotes a cumulative and the other a distributive quantifier.

Under our analysis, $\text{MOST}_{\text{dist}}$ and MOST_{cum} are syntactically different. We proposed that MOST_{cum} is first merged in Spec,MeasP and raises to D^0, thereby forming a complex head [$_{D^0}$THE MOST] that takes MeasP as a complement. We would like to suggest that the presence of MeasP as a restrictor is crucial for the cumulative nature of the quantificational determiner [$_{D^0}$THE MOST], the contribution of the Meas^0 head being the selection of NPs with cumulative denotation, i.e. mass and plural NPs (see the denotation given in (67)). The presence of THE is itself crucial: when THE is absent, a MOST inserted in Spec,MeasP necessarily raises out of the DP (on a par with the positive forms MANY/MUCH, see Solt 2009), which results in a relative superlative reading of MANY/MUCH.

Turning now to $\text{MOST}_{\text{dist}}$, we have proposed that it is directly inserted (first-merged) in D^0 (in English) or in Spec,DP (in Romanian). In both cases, the complement of $\text{MOST}_{\text{dist}}$ is an NP constituent (rather than a MeasP constituent). Recall that we assume that Meas^0 is an optional functional category, which is projected only if its Spec position is needed. But in those configurations in which MOST is first merged in D^0 there is no element that would need to sit in Spec,MeasP. Granting that quantificational determiners that take NP complements denote relations between sets of atoms, we can explain the obligatory distributivity of $\text{MOST}_{\text{dist}}$ as being due to its being first-merged in in D^0 or Spec,DP. This hypothesis also explains the lack of THE observed in English. As to Romanian, THE is part of the superlative constituent *cei mai mulți* 'the more many' itself (see §2.5), which is inserted as a whole either in Spec,DP (yielding the proportional reading), forcing D^0 to be null (via the doubly filled Det filter) or in Spec,MeasP (yielding the superlative reading). Hungarian is problematic in that THE is obligatorily present with the proportional reading of *legtöbb* and does not form a constituent with it (at least not in the syntax). A solution to this problem is to consider THE as representing Szabolcsi's (1994) higher D-layer, which is found with other quantifiers and does not introduce definiteness (see §2.5).

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3.7 Conclusions

In this chapter we have examined MOST_{cum}, a type of majority MOST that allows mass and plural NPs in its restrictor and collective predicates in the nuclear scope (when the restrictor is filled with a plural NP). Singular count NPs in the restrictor are banned. We have shown that a similar distribution characterizes (THE) MORE in Bulgarian, as well as quantifiers that are not lexically related to MANY/MUCH (see Japanese *hotondo* and Chinese *dabufen*). We observed that the similarity in distribution is *not* necessarily due to an identical syntax–semantics analysis.

We showed that MOST_{cum} differs from $\text{MOST}_{\text{dist}}$ (see Chapter 2) not only in distribution (the latter can take only plural NPs in its restrictor and only allows distributive readings) but also in its internal syntax: whereas $\text{MOST}_{\text{dist}}$ arguably occurs in D^0 or in Spec,DP (see English and Romanian, respectively), MOST_{cum} occurs in Spec,MeasP and requires the presence of the definite article.

Regarding the semantic composition, we have argued against the superlative-based analyses proposed by Hoeksema (1983) and Hackl (2009). We have instead adopted a quantificational analysis inspired by Higginbotham (1994), according to which MOST_{cum} compares the measure of the external argument of the NP to the measure of its complement with respect to the maximal sum in the denotation of the NP. This analysis is arguably difficult to extend to the majority quantifiers *dabufen* and *hotondo*, for which we proposed a modifier analysis.

The quantificational analysis of MOST_{cum} relies on the hypothesis of a recategorization process that led from the *quantity modifier* MANY/MUCH in its superlative or comparative form to a majority *quantificational determiner*. Since recategorization is language-specific, the quantificational analysis explains why MOST does not have the majority reading in all the languages that have a relative superlative MOST.

The quantificational analysis of MOST_{cum} is theoretically welcome insofar as it allows us to envisage a unified analysis of $\text{MOST}_{\text{dist}}$ and MOST_{cum}: both are non-partitive majority quantifiers that involve comparing measures. The difference between them comes from what is measured: sets in one case and (parts of) entities in the other case.

In the next chapter we will examine the behavior of majority MOST in partitive configurations.

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4
Most in partitives

This chapter is devoted to the behavior of proportional MOST in partitive constructions. Recall that by "MOST" we mean the superlative form of MANY/MUCH. Expressions of the type THE LARGEST PART OF THE MAJORITY will be examined separately, in Chapter 5. In §4.1 we will present a puzzling contrast among the languages that have $\text{MOST}_{\text{dist}}$. Thus, Romanian preserves in partitive constructions the constraints characteristic of $\text{MOST}_{\text{dist}}$ in non-partitives: no mass restrictors and no collective predicates in the nuclear scope. But in English and Icelandic, those constraints are suspended. In order to propose an analysis of the data, we first give a brief overview of the current literature on partitives (§4.2). Section 4.3 is devoted to mass partitives, which are crucial for the analysis of our data, but have hardly been examined in the previous literature. In §4.4 we go back to our main concern, the behavior of proportional MOST in partitives. We will examine in turn the two types of proportional MOST identified in this book, MOST_{cum} (§4.4.1) and $\text{MOST}_{\text{dist}}$ (§4.4.2 and §4.4.3 for Romanian and English/Icelandic, respectively). The behavior of MOST_{cum} (and cumulative majority quantifiers in general) in partitives is crosslinguistically stable: in addition to allowing quantification over atomic and mass domains, it also allows quantification over parts of atomic entities, which is disallowed in non-partitives. Turning then to $\text{MOST}_{\text{dist}}$, the behavior of Romanian is captured by assuming that this language uses $\text{MOST}_{\text{dist}}$ not only in non-partitives, but also in partitives. English and Icelandic, on the other hand, will be shown to have a special type of MOST, which selects a partitive complement. We will then (§4.4.3) examine majority quantifiers that are specialized for partitives, and we will demonstrate that we need to distinguish between a MOST that takes a partitive constituent (headed by OF or marked with genitive case) and a MOST that takes a DP complement. Section 4.5 is devoted to the semantic analyses and §4.6 compares partitive MOST with ALL.

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4.1 The data

In non-partitive configurations, MOST_{cum} allows quantification over atomic as well as mass domains, but disallows quantification over parts of atomic entities:

(1) Der meiste Wein aus meinem Keller wurde gestohlen. (Ge.)
the most wine of my cellar was stolen
'Most of the wine in my cellar was stolen.'

(2) *Die meiste Wand ist gestrichen.
the most wall is painted

The ban on quantification over parts of atoms disappears in partitives. Note that in this type of example, the definite article of the overall DP is necessarily neuter, yielding gender mismatch with the main N whenever the gender of the latter is not neuter:[1]

(3) Das meiste der Stadt wurde während dem zweiten
the.NSG most the.FSG.GEN city(F) was during the second
Weltkrieg zerstört. (Ge.)
world-war destroyed
'Most of the city was destroyed during World War II.'

In §4.4.1 we will show that the contrast between non-partitives and partitives wrt the distribution of MOST_{cum} follows from the properties of partitive constructions combined with the analysis of MOST_{cum} proposed in Chapter 3.

Turning now to those languages that were shown to have $\text{MOST}_{\text{dist}}$, they exhibit an intriguing crosslinguistic puzzle, observed in Dobrovie-Sorin (2017): whereas Romanian preserves in partitives the constraints exhibited by non-partitives, in English those constraints are suspended in partitives.

The contrast between partitives and non-partitives can be observed in English for mass restrictors as well as for examples built with collective predicates in the nuclear scope:

(4) a. Most of [$_{\text{DP}}$ the butter in the fridge] is rancid. (mass restrictor)
b. *Most [$_{\text{NP}}$ butter in the fridge] is rancid.

[1] For a discussion of this issue, see §§4.3 and 4.4.1.

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(5) a. Most of [$_{DP}$ the students in my class] immediately dispersed.
(collective predicate)
b. *Most [$_{NP}$ students in my class] immediately dispersed.

A similar contrast between partitive and non-partitive MOST appears in Icelandic. Whereas non-partitive MOST is only acceptable with plural NPs, partitive MOST also allows mass NPs:

(6) a. *Á jörðinni er mest vatn vökvi.
on Earth is most water liquid
b. Á jörðinni er mest af vatninu vökvi.
on Earth is most of water-the liquid
'On Earth, most water is liquid.'

(7) a. *Mest smjör í ískápnum er úldið.
most butter in fridge-the is rancid
b. Mest af smjörinu í ískápnum er úldið.
most of butter-the in fridge-the is rancid
'Most of the butter in the fridge is rancid.'

However, not all the languages that have MOST$_{dist}$ suspend the restriction on mass terms (and collective predicates in the nuclear scope) in partitives. Thus, the examples below show that in Romanian, MOST$_{dist}$ is not sensitive to (non-) partitivity:

(8) a. Cei mai multi studenți din grupa mea au
the more many students of-in group-the my have
picat la examenul de lingvistică.
fallen at exam-the of linguistics
b. *Cel mai mult vin din pivnița mea a fost
the more much wine of-in cellar-the my has been
furat anul trecut.
stolen year-the past'

(9) a. Cei mai multi din studenții mei au picat la
the more many of students-the my have fallen at
examenul de lingvistică.
exam-the of linguistics

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b. *Cel mai mult din vinul meu a fost furat anul trecut.
the more much of wine-the my has been stolen year-the past'
'Most of the wine in my cellar was stolen last year.'

c. *Cei mai mulți studenți din clasa mea
the more many students from class-the my
s-au risipit imediat.
REFL-have dispersed immediately

In Romanian, (4a) and (5a) are rendered by using an expression of the type THE LARGEST PART:

(10) Cea mai mare parte a untului din frigider e stricat.
the more large part GEN butter-the.GEN from fridge is rancid

(11) Cea mai mare parte a studenților din clasa mea
the more large part GEN students-the.GEN from class-the my
s-au risipit imediat.
REFL-have dispersed immediately

In order to propose an analysis of the data presented above we will first need to make explicit our assumptions regarding the structure of partitive constructions in general (sections 2–3). We will then show (§§4.4.1 and 4.4.2) that the distributions observed above for Romanian on the one hand and for German on the other can be explained based on the analyses that we have proposed in the two previous chapters for $\text{MOST}_{\text{dist}}$ and MOST_{cum} in non-partitive configurations. We will then turn to English (and Icelandic), which does not behave as expected, but instead exhibits partitive configurations in which MOST can apply to mass domains (in contrast to non-partitives, where it cannot do so).

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4.2 The structure of partitive constructions

According to a possible analysis, defended by Ionin et al. (2006), partitive constructions, e.g. (12), involve NP-adjunction of an *of*-DP with the denotation 'be a part of/belong to ⟦DP⟧' to an NP headed by a null N that precedes *of*:

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(12) a. {three/many/some/any/each} [$_{NP}$[$_{NP}$Ø] of his novels]
b. {much/a lot/some/any} [$_{NP}$[$_{NP}$Ø] of the gold produced in our country]

The unacceptability of (13) goes against an NP-adjunction analysis:

(13) a. *a novel of the books I received
b. *the old (one) of my friends

From a semantic point of view, there is nothing wrong with the structures in (13) (we can combine the property 'novel' or 'old (person/friend)' with the properties 'be an (individual) part of the books I received' or 'be an (individual) part of my friends', by Predicate Modification). The observed unacceptability must therefore be due to syntactic constraints: (13a) shows that the two members of the partitive construction cannot contain different lexical nouns (cf. Cardinaletti and Giusti 2006) and (13b) shows that restrictive modification in the first member is disallowed.

Certain restrictive modifiers, e.g. ordinals, superlatives, and relative clauses, are however allowed to occur above the *of*-DP constituent (these examples will be discussed below, in relation to the anti-uniqueness constraint):

(14) a. the first of these hypotheses
b. the longest of the two roads
c. those of my colleagues who believe this.

Given that they cannot be analyzed as adjuncts, partitive *of*-DPs must be assumed to be introduced due to the functional structure of the noun phrase. There are essentially two main views regarding the functional structure of partitives: (i) the *of*-DP is a complement of the various functional words occurring in DP-initial position; thus, examples of the type in (12) would rely on a [D [*of* DP]] configuration, with no invisible structure (see Kupferman 1999; 2004; López 2000; Matthewson 2001; Gagnon 2013; Shin 2016); (ii) the *of*-DP signals an invisible functional layer of the DP, and this layer is *independent* of the various functional items that occur before the *of*-DP in (12) (see Zamparelli 1998; Giurgea and Nedelcu 2009). Note that analyses of type (i), in which partitive *of*-DPs are selected by certain indefinite determiners and quantity words, cannot account for examples of the type in (14), for which they would need to postulate another structure. Note furthermore that analyses of type (i) need to postulate two subcategorization frames (two types of

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c-selection) for all the functional items which can occur before the *of*-DP: they would allow either an NP complement or an *of*-DP complement.

These stipulations are not needed for analyses of the type described in (ii). The possible choices of functional items which can occur before *of*-DPs can be subsumed by the following generalizations:[2]

(15) a. Anti-uniqueness: Definite determiners cannot appear with a partitive unless the partitive combines with a high restrictive modifier (ordinal, superlative or relative clause).

b. The functional item (e.g., indefinite determiner or cardinal) that occurs in the environment _ *of DP* must also be able to occur in the environment _ [$_{NP}$Ø] (i.e. in DPs with no overt N).

According to Barker (1998), anti-uniqueness is obtained if the inclusion relation introduced by the partitive construction is interpreted as a proper part relation ("<" instead of "≤"): in other words, whereas an unmarked DP denotes an entity, an *of*-DP constituent would denote the set consisting of all of the proper parts of that entity (the part that is identical to the entity denoting by the DP is excluded from this set)—e.g. *[of the children]* denotes the set of all the sums of individuals included in [*the children*] except the sum of all children. Therefore, definite determiners, which introduce a maximality presupposition, are excluded:

(16) *{those/these/mine} of the books

Although they are built with definite articles, examples of the type in (14) are acceptable, because they are built with modifiers that restrict the denotation so as to obtain a subset with a maximal element that differs from the maximal element in the overall set (see Barker 1998; Zamparelli 1998): e.g. in (14a,b), the superlative and ordinal modifiers reduce the set to a singleton set; in (14c), 'be a proper part of my colleagues' is intersected with 'who believe this'. The set {x: x is a proper part of my colleagues and x believes this} has a maximal element that is different from the maximal sum of my colleagues.

As we have seen in (13b), not just any modifier licenses a definite determiner—for instance, adjectives and possessives do not:

[2] For (15a), see Jackendoff (1977), Barker (1998) and Zamparelli (1998). For (15b), see Jackendoff (1977).

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(17) a. *the good (ones) of the books
b. *mine of the books

This can be accounted for by assuming that the partitive *of*-PP is attached at a high level of the structure—presumably a functional layer—and the modifiers allowed are those that sit in a position that is higher than that functional layer (cf. Zamparelli 1998). The adjectives *old* in (13b) or *good* in (17a) are disallowed because they are NP-adjuncts, which cannot attach above the functional layer introduced by the partitive.

Possessives are also banned, as illustrated for *mine* in (16) and (17b). It is known that possessives, although they seem to occupy Spec,DP in English, may be interpreted NP-internally, at least when they express arguments of relational nouns, and can also be interpreted below prenominal adjectives, as shown by examples such as (18) (see Larson and Cho 2003):

(18) my former colleague

In order to explain the ban on *mine* in (16), we need to assume that at the level of LF (Logical Form), possessives cannot remain above the partitive layer, and that it is the LF position of the modifier rather than its overt syntactic position that counts.

As for superlatives, it is known that even when they are interpreted DP-internally, they take scope over the NP (Heim 1999). This may correlate with the possibility of being inserted in a higher position, on a par with ordinals.

Barker's semantic explanation of anti-uniqueness was questioned by Ionin et al. (2006), who proposed instead a pragmatic account: the partitive preposition *of* introduces parthood, rather than proper parthood, and combining a definite determiner directly with the partitive is ruled out by the Gricean maxim of Manner: since the non-partitive construction Det-NP and the partitive construction Det-of-Det-NP are in this case equivalent, the simpler one, Det-NP, is chosen.[3] We believe that the truth lies somewhere in between. On the one hand, we agree with Ionin et al. (2006) that the partitive construction introduces parthood rather than proper parthood. Evidence for this

[3] The argument presented in the text is ours. Ionin et al. (2006) give as evidence for their proposal the fact that the anti-uniqueness constraint is suspended with *all* and *both*—see *all of the children*, *both of them*. Note however that this construction seems to be a peculiarity of English. Other languages, such as Romance, do not allow *of* in such cases, showing no example in which the overall DP denotes the "whole". Barker (1998) has not discussed this construction because his main concern was the partitive genitive construction of the type *a friend of John's* (which he analyzes as a particular type of partitive), and in this construction *all* is not allowed (**all friends of John's*).

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comes from downward-entailing environments. Take example (19), in which the overall partitive DP is in a conditional clause, and consider the non-specific interpretation, in which the speaker does not have in mind a particular group of guests. Imagine a situation in which only the whole group of the guests can lift the piano, and no sub-part of that group can do it:

(19) If [some of the guests] can lift the piano (together), it will all be fine/I'd be very surprised.

According to our intuition, in the situation just described, the claim made in (19) is that it will all be fine/the speaker would be surprised: in other words, the situation in which *some of the guests* denotes the entire group of guests belongs to the set of situations which constitute the restriction of the conditional. This means that the denotation of *of the guests* cannot be the set of the proper parts of ⟦the guests⟧, but rather the set of parts, which includes the maximal sum in the denotation of ⟦the guests⟧.

On the other hand, the deviation illustrated in (16) seems too severe for a purely pragmatic explanation. For this case we may invoke a ban on a vacuous use of parthood, which disallows definite determiners that directly combine with the partitive functional layer, i.e. which apply to a property of the type 'be a part of x'. Since both determiners and the partitive preposition are functional elements, the ultimate explanation might be a general principle disallowing pleonastic combinations of functional elements ('THE of THE NP' has the same meaning as 'THE NP').

The use of the general part-of relation (≤) instead of proper parthood (<) will be important in the analysis of partitive MOST that we will propose in §4.4.3.2.

Let us now turn to the constraint in (15b) (the fact that functional items occurring in partitives must be able to occur in the environment _ $[_N Ø]$), illustrated in the following examples. For mass nouns, the contrast can be illustrated with the Romanian examples in (23):

(20) a. I took {one/two/several/many/each/none/the best/the first} of the books
b. I took {one/two/several/many/each/none/the best/the first}

(21) a. *I took a/every/no of the books
b. *I took a/every/no

(22) a. {Those/*The} of you who don't want to listen may get out
b. {Those/*The} who don't want to listen may get out

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(23) a. Am cumpărat {ceva/mult/nişte} unt. (Ro.)
have.1 bought some/much/some butter

b. (Ca unt,) am cumpărat {ceva/mult/*nişte}.
as butter have.1 bought some/much/some
'(As for butter), we bought some/much.'

c. Am consumat {ceva/mult/*nişte} din unt.
have.1 consumed some/much/some of-in butter
'I/We consumed some/much of the butter.'

Some of the determiners allowed to combine with partitives and with elided Ns (or more generally with null Ns)[4] have shorter forms when used before overt nouns. The two variants can be considered contextual variants of one and the same word (allomorphs): *no–none*, *a–one*, Ro. *un–unul* 'a–one', *alt–altul* 'another', Fr. *chaque–chacun* 'each', etc. (Note moreover that the distal demonstrative in contexts such as (22) is equivalent to the definite article; cf. Wolter 2006.)

A natural account of the constraint in (15b) is to assume that an empty N is present before the *of*-DP. This hypothesis is adopted in many analyses of the partitive construction—see Jackendoff (1977), Milner (1978), Cardinaletti and Giusti (1992; 2006), Barker (1998), Zamparelli (1998), Sleeman and Kester (2002), Sauerland and Yatsushiro (2004), Ionin et al. (2006), and Sleeman and Ihsane (2016).

Putting together the null N^0-hypothesis with the idea that the *of*-DP attaches to a functional layer, we obtain several possible structures:

(24) a. $[_{DP}$ D . . . $[_{RP}$ [NP] $[[_{R}$of] DP]]]
b. $[_{DP}$ D . . . $[_{XP}$ [X [NP]] *of*-DP]]
c. $[_{DP}$ D . . . [NP $[_{XP}$ *of*-DP [X ~~NP~~]]]]

[4] A missing noun can be interpreted "non-anaphorically", i.e. without retrieving an antecedent, using general concepts such as 'person', 'female' (for languages with gender), 'thing' (cf. Giurgea 2008; 2010):

(i) This is a book for those who still believe in romance (N = Person)

(ii) a. Mi-a spus multe (N = Thing) (Ro.)
me-has told many.FPL
'He told me many things.'

b. Au venit mulți (N=Person)
have come many.MPL
'Many people came.'

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In the configuration in (24a), proposed by Zamparelli (1998), the relevant functional head is the partitive preposition itself, and the NP in the first member sits in its Spec. The functional head is labeled R for "Residue" (according to Zamparelli, who follows Barker's account of anti-uniqueness, R eliminates the supremum (denoted by the *(of) DP*) from the set of pluralities denoted by the NP in Spec,RP).

In both of the other two alternatives, illustrated in (24b,c), the NP in the first member first combines with a certain functional head (labeled X), and then the partitive *of*-DPs is attached; *of-DP* can be a right-hand adjunct or a second complement (see (24b)), or it can be generated as a left-ward specifier of the functional head X, followed by remnant movement (which is needed in order to derive the adjacency between D and a null N (see (24c))).

Note that in the structures shown in (24), further intermediate layers may intervene between D and R/X, e.g. MeasP, the position that hosts quantity words (*much*, *many*, *20 grams*, etc.); other intermediate layers may be needed for ordinals and superlatives (see (14a,b)).

The hypothesis of a null NP before *of* is further supported by examples such as (25), which show that an overt NP is possible before the *of*-DP constituent:

(25) a. three letters of those received yesterday
b. some books of those that you recommended

There is evidence that examples of this type represent a variety of the partitive construction. Thus, they show anti-uniqueness effects that are exactly parallel to those observed for canonical partitives (see the discussion of examples (14)–(16) above). Examples (26a–c) show that definite determiners are ruled out, unless a superlative modifier is present (see (26d,e)). Furthermore, they also obey the general ban on distinct lexical nouns in the two members of the construction (cf. Milner 1978; Cardinaletti and Giusti 1992; 2006), as shown in (27) and (13a):

(26) a. *those letters of the many (letters) received yesterday
b. *the children of those who came yesterday
c. *copiii din/dintre cei care au venit ieri (Ro.)
children-the of-in/of-among those who have come yesterday
d. the best book of those that you recommended
e. cea mai bună carte din cele recomandate (Ro.)
SUP/the COMP good book of-in those recommended

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(27) a. *some novels of the books received yesterday

b. *Ho letto molti romanzi (It., Cardinaletti and Giusti 2006)
have.1 read many novels
dei libri che mi avevi consigliato.
of-the books you me had.2SG recommended

c. *O fată din studenții mei este turcoaică. (Ro.)
a girl of students-the my is Turkish

Note that a PP modifier which indicates inclusion in a group via locative inclusion shows neither anti-uniqueness nor the ban on distinct lexical nouns:

(28) a. the children in our group/in our class.

b. copiii din grupul nostru/din clasa noastră. (Ro.)
children-the of-in group-the our/of-in class-the our

The contrast between (26c) and (28b) is also relevant for our discussion of Romanian data: it shows that, although Romanian partitives do not use the functional preposition 'of', but prepositions with a locative form, composed of adnominal *de* 'of, from' + *în* 'in' (> *din*) and *între* 'between, among' (> *dintre*), they behave syntactically like English *of*-partitives and not like locative adjuncts with an inclusion interpretation. In the rest of this book, we use the gloss 'of' for partitive *din/dintre*.

When the N in the first member is null, it cannot receive NP-modifiers (although empty Ns in general do allow modifiers), as illustrated in (29) (see also (13b) for English):

(29) a. *Trois grandes de ces fenêtres (Fr., Kupferman 2004: 6.15)
three big of those windows
étaient sales.
were dirty
'*Three big (ones) of those windows were dirty.'

b. *He llegit molts interessants (Cat., Martí i Girbau 2010: 214)
have.1SG read many interesting
dels llibres que m'havies recomanat
of-the books that me-had.2SG recommended
'*I read many interesting (ones) of the books you had recommended to me.'

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c. *Am invitat patru celebri dintre profesori (Ro.)
have.1 invited four famous of professors

This fact has been used as an argument against the presence of a null N in the first member of partitives (Kupferman 2004; Martí i Girbau 2010; Shin 2016). Under the null NP-approach, we may explain these data by assuming the following constraint on partitives with null N:[5]

(30) The null NP in the first member of partitives cannot have a richer descriptive content than the *of*-DP.[6]

Turning now to the issue of the content of the null N, it is currently assumed that the null N(P) is identical to the overt N(P) in the second member, being null as a result of copy deletion or ellipsis (Zamparelli 1998; Magri 2008).[7] This view is supported by the obligatory gender agreement between the items preceding *of* (determiners and possible adjectives) and the noun inside the *of*-DP. This is particularly clear in cases in which the gender feature is purely grammatical, not interpretable as "natural gender":[8]

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[5] Another argument brought up against the two-N hypothesis (by Kupferman 2004; Martí i Girbau 2010) is the absence of the *en/ne* clitic which some Romance languages (French, Italian, Catalan) use with indefinite objects with a null N (ex. (i) shows that the clitic is obligatory when N is null; (ii) shows that it is ruled out in partitives with no overt N in the first member):

(i) J' *(en) ai pris dix/ beaucoup (Fr., Corblin 1995: ch. 4, ex. 53)
I *en* have taken ten many
'I took ten/many.'

(ii) J' (*en) ai pris dix/beaucoup de ces pommes
I en have taken ten/many of these apples
'I took ten/many of these apples.'

Under the functional projection analysis of partitives proposed by Zamparelli (1998), these facts can be explained without abandoning the hypothesis of a null NP in the first member: let us assume that *en/ne* only appear with DPs whose lexical head is elided. Partitive constructions in (ii) do not fall within this category, because the lexical NP is *overt* inside the second member of the construction (the *of*-phrase). Crucial to this account is that we do not have two separate extended N-projections, but a single one, with the first member hosting an NP which is either a copy of the NP in the second one (plural partitives) or a grammatical N STUFF (mass partitives).

For another account of these data within a two-NP hypothesis, see Cardinaletti and Giusti (2006).

[6] Recall that in examples of the type in (14), with superlatives (*the best of these*) or ordinals (*the first of our ancestors*), the modifier does not modify the null NP, but is attached *above* the RP projection.

[7] Magri (2008) assumes the null N to be similar to the pro-N *one(s)*, the content of which is identified with that of the N in the second member (for *many [ones] of the boys*, Magri assumes that *ones* is interpreted as *boys*).

[8] Similar facts have been observed for French by Sleeman and Ihsane (2016), who also point out some exceptions in partitives built with superlatives. According to these authors, the exceptions would be due to the insertion of a natural gender feature on a gender functional head of the first member in case the N is unspecified for gender.

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(31) a. mulți /*multe din aceşti acizi (Ro.)
many.MPL many.FPL of these acids(M)

b. una /*unul din cărțile mele
one.FSG/ one.MSG of books(F)-the my

Such agreement facts can be captured by assuming a copying operation, i.e. movement, under the copy theory of movement (Zamparelli 1998; Sleeman and Kester 2002; Sleeman and Ishane 2016). Alternatively, we could be dealing with NP ellipsis, taking the NP inside the *of*-DP as an antecedent. If it is a copy operation, and this involves the entire NP, the ban on an overt NP-internal modifier follows straightforwardly.

Note that total identity between the two NPs is not required when the NP in the first member is overt (Giurgea and Nedelcu 2009). Thus, in the following example the adjective *interesting* is not interpreted as a modifier of the null N inside the *of*-DP—the sentence does not say that all the recommended books are interesting:

(32) I read some interesting books of those you recommended.

A possible account of these facts is that copying is at work when it is the first N that is deleted, whereas when the first N is overt, we are dealing with ellipsis of the second N. For examples of the type *two of them*, *some of us*, N copying can be assumed under a D+NP analysis of personal pronouns; see Postal (1969) and much subsequent work.

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4.3 Mass partitives

The fairly rich literature on partitives briefly reviewed above has mainly concentrated on count partitives (by "count" partitives, we refer to the count status of the overall DP). Some authors implicitly assume that the underlying syntax of count partitives extends to mass partitives, whereas others explicitly argue in favor of a different syntax (Magri 2008).

In what follows we will propose that a structure based on the functional category RP with a null N in Spec,RP can also be assumed for mass partitives, which are however special in that in the general case the null N is not a copy of the NP inside the *of*-DP constituent, but rather an abstract N with the meaning STUFF.

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Evidence against a copied N in Spec,RP comes from gender agreement in Romanian (for German, see (44a) below). Both count and mass partitives can be built with the quantity modifier *mult* 'much' (which normally inflects for gender and number), but the agreement pattern is clearly different:

(33) a. Am citit multe din cărțile recomandate.
have.1 read many.FPL of books(F)-the recommended
'I read many of the recommended books.'

b. S-a produs mult /?multă din brânză[9] (Ro.)
REFL-has produced much.MSG much.FSG of cheese(F)
fără adaosuri.
without additives
'Much of the cheese has been produced without additives'

Agreement is obligatory in the count partitive illustrated in (33a). In (33b), all speakers accept the non-agreeing version, and only some of them also accept the agreeing version (see the feminine-marked *multă)*.[10]

We assume that the position of *mult* in partitives is the same as in non-partitives, namely Spec,MeasP (see §3.2.2).

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[9] After most accusative-taking prepositions, definite DPs do not realize the definiteness inflection (the so-called suffixal article) if the complement of D consists of the noun alone. This is why the noun *brânză* 'cheese' in this example must occur in the bare form, although the DP is interpreted as definite. See Dobrovie-Sorin (2007) and Dobrovie-Sorin et al. (2013) for discussion.

[10] In subject positions, a higher number of speakers (maybe all of them) accept agreement in free variation with the non-agreeing pattern (see (i)) and even prefer agreement in examples with predicative adjectives (see (ii) and (iii)):

(i) {Multă/mult} din apa asta provine de la munte.
much.FSG/much.MSG of water(F)-the this comes from mountain
'Much of this water comes from the mountains.'

(ii) Multă din apa asta e poluată.
much.FSG of water(F)-the this is polluted.FSG
'Much of this water is polluted.'

(iii) ??Mult din apa asta e poluat.
much.MSG of water(F)-the this is polluted.MSG
'Much of this water is polluted.'

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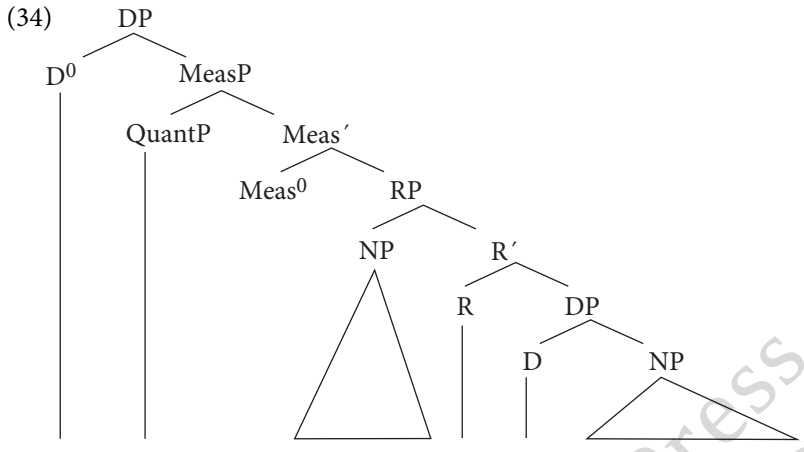
(34)



a. Ø multe ~~cărți recomandate~~ din [+def] cărți(le)~~+def~~ recomandate
many.FPL of books(F)-the recommended

b. Ø mult $Ø_{STUFF}$ din [+def] brânză
much(MSG) of cheese(F)

In the configuration shown in (34a), *multe*$_{FPL}$ agrees with the null N inside the *of-DP*. Granting that this null N is a copy of the N inside the *of*-DP (which implies that it has the same φ-features), this structure explains the observed obligatory agreement of *multe*$_{FPL}$ in number (always plural, because count partitives are necessarily built with a plural *of*-DP) and gender with the N inside the *of*-DP constituent.

In the mass partitive example given in (33b) and (34b) on the other hand, the preferred version is the one in which *mult* is unmarked, although the N inside the *of*-DP is feminine. The lack of agreement can be explained by assuming a null N^0, which is however not a copy of the lexical N, but rather an abstract N with the meaning STUFF. Under this analysis, the absence of agreement in mass partitives follows from the fact that the null N STUFF has its own gender feature (the feature normally used for inanimate reference in the language). The version of (33b) with agreement, which is accepted only by some speakers, can be assumed to rely on the same structure as count partitives, i.e. the null N is a copy of the overt N rather than an abstract N with the meaning STUFF.

The absence of agreement is compatible with an alternative view, according to which no null N^0 is present in mass partitives (in contrast to count

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partitives).[11] Note however that mass partitives are subject to the constraint on functional elements preceding the *of*-DP (only forms that allow a null N are allowed before the *of*-DP, see ex. (23)), which suggests that the syntax of mass partitives involves a null N (on a par with count partitives). We will therefore assume the structure proposed in (34)b above, according to which a null N with the meaning STUFF sits in the Spec position of RP.

Examples built with count singular *of*-DPs constitute a particular case of mass partitives:

(35) a. Much of his book deals with religion problems.

b. Am citit deja mult din cartea lui. (Ro.)
have.1 read already much.MSG of book-the.F his
'I've already read a lot/a large amount of his book.'

In this type of example, gender agreement is impossible:

(36) Se vede puțin /*puțină din fată.
REFL sees little.MSG /little.FSG of girl
'One can see little of the girl.'

The impossibility of agreement is due to the fact that N-copying, which is possible with *of*-DP_{mass} for some speakers (see the agreeing version of (33b)), is excluded with *of*-$DP_{sg\text{-}count}$. Indeed, N-copying would yield a count partitive in which the singular count N embedded in the *of*-DP would be copied upstairs, in the first member of the partitive construction. But such a syntactic configuration is uninterpretable (a property denoted by singular count nouns cannot apply both to an entity and to its proper parts, e.g. a part of a girl is not a

[11] This is the view held by Magri (2008), according to whom a null N in the first member is only justifiable for count partitives: assuming that the *part-of* relation generalizes both over the relation between a sum and its members (Link's individual–part relation) and over the relation between the referent of a singular count noun and its parts (Link's material–part relation), the expression *of the boys* by itself would yield not just sums of boys, but also sums of parts of boys; in order to restrict to sums of individuals the result of applying part-of to plurals, Magri assumes that the property 'be part of the boys' intersects with the property **boy*, and therefore a null N interpreted as identical to the N inside the *of*-DP is necessary for interpretation. Note however that the same restriction to sums of individuals is found in constructions which use the word *part* + a plural complement, in many unrelated languages, as pointed out by Wągiel (2018)—see also §4.5.2. This suggests that it is not the presence of a null count N^0 that is responsible for the fact that when applied to plural DPs, the 'part-of' relation can only yield sums of individuals, not sums of parts of individuals. In §4.5.1 we will follow Landman (1991) in assuming that the general "≤" relation can only access the elements of the join semi-lattice denoted by the nominal property that characterizes its first argument. Parts of singular individuals can only be accessed by means of a grinder function, which applies to atoms denoted by singular count DPs occurring as complements of R^0 or of the noun *part*. We are therefore not convinced by Magri's semantic argument in favor of restricting the null N^0 to count partitives.

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girl), and as such it is ruled out. Compare count partitives with plural *of*-DPs: as the parts of a plurality characterized by *P are also sums of individuals characterized by *P, copying of N is unproblematic (see fn. 80 for further discussion).

Examples of the type in (35) and (36) are allowed precisely because copying of the singular count N does not apply (as indicated by the obligatory lack of gender agreement). Instead, such examples are *mass* partitives, in which the null N^0 is an abstract N with the meaning STUFF. In this configuration, a quantity modifier that normally requires a mass N can combine with an *of*-DP headed by a count N. This syntactic configuration is interpreted as follows:[12]

(37) $[\![_{RP}\ [_N\ \emptyset_{STUFF}\ [_R \text{of}\ [\text{the girl}]]]]\!] = \lambda x.\text{stuff}(x) \wedge x \leq \iota y.\text{girl}(y)$

This constituent denotes a mass property ('be stuff that is part of the girl'), because 'be a part of x' is cumulative—if x and y are parts of z, then x+y is also a part of z.

Note that unlike count partitives, where coordination of singular nouns in the *of*-DP is problematic in English, mass partitives are fine with coordination of singular names in the second member:[13]

(38) a. % one of Jane and Jacky (De Hoop 1997: 156, ex. 11b)
b. We cannot see much of [Jane and Alex] in the photo.

Count partitives are disallowed because the constituent *Jane and Alex* presumably does not provide an N that can be copied in the first member. Mass partitives, on the other hand, do not require copying of an N, and as such examples of the type in (38b), which refer to some part of the complex object denoted by 'Jane and Alex', are allowed.[14]

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[12] Later we will argue that a more adequate semantic representation of these constructions includes a grinder function that turns the referent of the singular count DP into the maximal sum of its material parts (see §4.5.1).

[13] De Hoop (1997) gives (38a) as ungrammatical, but reports that some speakers accept this type of examples (therefore we used the symbol % instead of her *). De Hoop hypothesizes that those who accept these examples interpret them as reflecting a construction with different properties, normally realized by *out of*+DP (i.e. *one out of Jane and Jack*).

[14] With collective nouns in the *of*-DP, we encounter what seem to be count partitives:

(i) Three of this team are foreigners.

Note however that this construction does not show the hallmarks of count partitives: the first member allows an overt N distinct from the N in the *of*-DP (see (ii)) and there is no anti-uniqueness restriction on the determiners (see (iii)).

(ii) The women of this team are very capable.

(iii) Those of this team are better.

Therefore, this construction might involve an adjunct *of*-DP, rather than the functional projection RP.

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4.4 Majority quantifiers in partitives

Let us now turn to the main issue of this chapter, the behavior of proportional MOST in partitives. The main problem to solve is an intriguing contrast between Romanian and English presented in §4.1. Both of these languages have an obligatorily distributive MOST ($\text{MOST}_{\text{dist}}$) in non-partitives, but they differ when it comes to the use of MOST in partitives: in Romanian, the constraints on proportional MOST are the same in partitives and non-partitives (only quantification over atoms is allowed), whereas in English, the constraints observed on proportional MOST in non-partitives (by and large the same as those observed in Romanian) disappear in partitives: mass and collective quantification are allowed, in addition to quantification over atoms. Before addressing this problem we will briefly examine MOST_{cum} (the type of proportional MOST found e.g. in German): since MOST_{cum} differs from $\text{MOST}_{\text{dist}}$ in allowing mass and collective quantification in non-partitives, we expect that possibility to survive in partitives. Mass partitives built with MOST_{cum} are however noteworthy in that they can combine not only with *of*-DP_{mass} and *of*-DP_{pl}, but also with *of*-$\text{DP}_{\text{sg-count}}$ (on a par with MUCH—see §4.3).

These various cases will be examined in turn. We will start by assuming the "null hypothesis", which has proved correct for the analysis proposed above for the partitives built with MUCH: any instantiation of majority MOST (MOST_{cum} or $\text{MOST}_{\text{dist}}$) occupies the same syntactic position and presumably has the same denotation in partitives and non-partitives. This identity is assumed in the analyses of count partitives reviewed in §4.2, and was extended to mass partitives in §4.3: partitives rely on the functional projection RP headed by a null N, which in the case of mass partitives is a null N^0 with the meaning of STUFF.

This hypothesis will prove correct for the proportional MOST found in Romanian (instantiating $\text{MOST}_{\text{dist}}$) as well as for the proportional MOST found in German (instantiating what we have called MOST_{cum}).

The English data cannot be explained on the basis of this hypothesis. We will propose that the English *most* found in partitives is a MOST that has a special subcategorization feature, requiring an RP complement (hence the label MOST_{RP}). We will also discuss a second type of MOST that combines with a DP introducing the whole, which takes a DP directly, without the mediation of the R head (hence the label MOST_{DP}). Both types of MOST are found in English and Icelandic. We will also discuss majority quantifiers other than MOST that are specialized for partitives, arguing that at least some of them can be analyzed as superlative modifiers.

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4.4.1 Cumulative majority quantifiers in partitive constructions

Since MOST_{cum} allows mass and collective quantification in non-partitives (see Chapter 3), we expect it to show the same properties when occurring in partitive constructions. Examples such as those in (39), which demonstrate the expected acceptability judgments, can therefore be analyzed as involving MOST_{cum}:

(39) a. Das meiste des auftreffenden Lichtes wird (Ge.)
the most the.GEN incident light.GEN becomes
reflektiert.
reflected
'Most of the incident light is reflected.'

b. Das meiste meiner Freizeit verbringe ich
the.NSG most my.FSG.GEN free-time(F) spend.1SG I
mit meiner Familie.
with my family
'Most of my free time, I spend with my family.' (https://www.fcsl.de › realschule › mitarbeiter › benjamin-einhorn)

c. Die meisten meiner Kollegen werden sich hier treffen.
the most my.GEN colleagues will REFL here meet
'Most of my colleagues will meet here.'

Let us assume the "null hypothesis", according to which (i) (39a) relies on the structure in (40), representing a mass partitive (the partitive head R^0 is read off the genitive morphology on the DP it introduces) and (ii) *meist* 'MOST_{cum}' has the denotation shown in (41), which we have assumed for MOST_{cum} in non-partitive configurations (see §3.4.2):

(40) $[_{\text{DP}}$ THE $[_{\text{MeasP}}$ MOST_{cum} $[_{\text{RP}}$ $[_{\text{N}}$ $\emptyset_{\text{STUFF}}]$ $[R^0$ DP]]]
das *meiste* *des auftreffenden Lichtes*

(41) $[\![\text{MOST}_{\text{cum}}]\!] = \lambda P_{et}.\ \lambda Q_{et}.\exists x\ (P(x) \wedge Q(x) \wedge \mu(x) > \mu(\sigma y.P(y) - x))$

The hypothesis that mass partitives headed by *meist* rely on the presence of $[_{\text{N}}\emptyset_{\text{STUFF}}]$ is supported by the lack of agreement between THE (neuter singular) and the noun of the *of*-DP (see (39b), where *Freizeit* is feminine), which

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replicates the Romanian data brought up in §4.3. The constituent [$_{RP}$ [$_{N}$ $Ø_{STUFF}$] [$_{R'}$of DP]]] has a mass denotation, which as such is able to combine with $MOST_{cum}$. The overall partitive DP denotes the generalized quantifier shown in (42b):

(42) a. $[\![[_{RP}\ [_{N}Ø_{STUFF}]\ \ [R^0\ [\text{des Lichtes}]]]\!] = \lambda x.(\text{stuff}(x) \wedge x \leq \sigma z.\text{light}(z))$

b. $[\![[\text{das meiste}\ [_{RP}[_{N}Ø_{STUFF}]\ [R^0\ [\text{des Lichtes}]]]]\ ]\!] =$
$= \lambda Q.\ \exists x\ (\text{stuff}(x) \wedge x \leq \sigma z.\text{light}(z) \wedge Q(x) \wedge \mu(x) >$
$\mu(\sigma y.(\text{stuff}(y) \wedge y \leq \sigma z.\text{light}(z))\text{-}x))$

A similar analysis can be adopted for the example in (39c), where the nuclear scope is supplied by a collective predicate:[15]

(43) a. $[\![[_{RP}\ [_{N}\text{~~Kollegen } t_{\text{meine}}\text{~~}]\ [R^0\ [\text{meiner Kollegen}]]]\!] = \lambda x.(*\text{colleague}(x,$ Speaker) $\wedge x \leq \sigma z.*\text{colleague}(z,\text{Speaker}))$

b. $[\![\text{die meisten}\ [_{RP}\ [_{NP}\ \text{~~Kollegen } t_{\text{meine}}\text{~~}]\ [R^0\ [\text{meiner Kollegen}]]]]\!] =$
$\lambda Q\ \exists x\ (*\text{colleague}(x,\text{Speaker}) \wedge x \leq \sigma z.*\text{colleague}(z,\text{Speaker})) \wedge Q(x) \wedge$
$\mu(x) > \mu(\sigma y.(*\text{colleague}(y,\text{Speaker}) \wedge y \leq \sigma z.*\text{colleague}(z,\text{Speaker})) - x))$

In (43b) the variable bound by the existential is a plural variable to which the collective predicate in the nuclear scope can apply (see Q(x)).

Let us now turn to mass partitives built with $MOST_{cum}$ and an *of*-$DP_{sg\text{-}count}$ complement (see (44a)).[16] The example in (44b) shows that in non-partitives,

[15] As the parts of σx.P(x) have the property P (see the discussion in §4.5.1 on the relation '≤'), the formula in (43b) can be simplified by removing the redundant parts:

(i) $[\![\text{die meisten}\ [_{RP}\ [_{NP}\ \text{~~Kollegen } t_{\text{meine}}\text{~~}]\ [R^0\ [\text{meiner Kollegen}]]]]\!] = \lambda Q\ \exists x\ (x \leq \sigma z.*\text{colleague}(z,\text{Speaker})$
$\wedge Q(x) \wedge \mu(x) > \mu(\sigma y.(*\text{colleague}(y,\text{Speaker})) - x))$

[16] For certain examples, some speakers report a reduced acceptability of mass partitives with *meist*, preferring the LARGEST PART construction instead:

(i) %Das meiste der Wand ist gestrichen.
the most the.GEN wall is painted

(ii) Der größte Teil der Wand ist gestrichen.
the largest part of-the wall is painted
'Most of the wall is painted.'

This difference in acceptability may be attributed to the N STUFF, which is absent from constructions of the type LARGEST PART (the latter only express the general part-of relation, without any further characterization of the part; see Ch. 5). This suggestion finds some support in certain intuitions reported to us by Eva Remberger (p.c.): in some cases, examples of the type *das meiste*-of-*x* highlight the complex content of *x*, e.g. for *das meiste der ehemaligen DDR* ('most of the former GDR') one can get the interpretation 'most ideas/products/buildings/… of the former GDR', or, for *das meiste der Wohnung* ('most of the apartment'), 'most of the content of the apartment'. This meaning enrichment

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(THE) MOST_{cum} cannot combine with a count singular NP (on a par with the positive and comparative forms of MUCH, see *viel* and *mehr* in German):

(44) a. Das meiste der Stadt wurde zerstört.
the.NSG most the.FSG.GEN city(F) was destroyed
'Most of the city was destroyed.'

b. *Die meiste Stadt wurde zerstört.
the most city was destroyed

As discussed in §4.3, the fact that partitives allow count singular *of*-DPs with determiners such as *viel* or *meist*, which select mass NPs, can be accounted for based on the hypothesis that mass partitives rely on a null N^0 with the meaning of STUFF:[17]

(45) $[\![_{RP}\ [_{N}Ø_{STUFF}]\ [R^0\ [\text{der Stadt}]]]\!] = \lambda x.(\text{stuff}(x) \wedge x \leq \iota y.\text{city}(y))$

The acceptability of (44a) is expected because MOST_{cum} can combine with mass terms. The unacceptability of (44b) is due to the fact that in non-partitives the NP is a singular count NP, which denotes a quantized, non-cumulative property (a set of atoms) and as such cannot combine with MOST_{cum}, which selects constituents denoting cumulative properties.

Let us now turn to other morphological types of cumulative majority quantifiers. In Chapter 3 we showed that in non-partitive configurations, Japanese *hotondo* and Chinese *dabufen* have the same distribution as MOST_{cum}: they can appear with count and mass NPs, but not with singular count NPs. The ban on combining with singular count NPs is suspended in partitives, which is again similar to MOST_{cum}:

is arguably due to the fact that a null N needs some content. The reduced acceptability of (i) can be attributed to the fact that in this type of examples there is no natural content enrichment, but rather the mere part–whole relation, which is normally expressed by *Teil* 'part' (see Ch. 5). We find a similar subtle difference in the following Romanian contrast, which involves the positive *mult* 'much' and its near equivalent *o mare parte* 'a large part' (for the abstract use of *part*, see the following chapter): although both examples can refer to a sum of sections of the film, it appears that (iii) more easily allows the interpretation 'many aspects of the film' (e.g. music, characters, dialogue):

(iii) Mult din film e de apreciat. (Ro.)
much from movie is to appreciate
'Much of the film is worthy of appreciation.'

(iv) O mare parte din film e de apreciat.
a big part of movie is to appreciate
'A large part of the film is worthy of appreciation.'

[17] The observation made in fn. 12 also applies here. See §4.5.1 for a refined representation.

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(46) John-wa hon-no (Sauerland and Yatsushiro 2017: ex. 52)
John-TOP book-GEN
hotondo-o yonda.
most-ACC read
'John read most of the book / John read most of the books.'

(47) zhè miàn qiáng-de dábufen dōu fěnshuā le.
this CLS wall-RELATOR most-part ALL whitewash ASP
'Most of this wall has been painted.'

In (46), *hon* 'book' is marked as a partitive complement by its position (Japanese is consistently head-final) and by the use of the genitive marker *-no*. This is the regular way of building partitives in Japanese (cf. Sauerland and Yatsushiro 2017). As for the Chinese example (47), given that *dabufen* contains the noun *bufen* 'part', we may be dealing with a construction with a nominal head, of the type LARGE(ST) PART/MAJORITY (see Chapter 5). Note that *zhè miàn qiáng* 'this wall' is marked as a partitive complement by the use of the general postposition *-de*.

In sum, quite independent of their morphological make-up, cumulative majority quantifiers show an interesting crosslinguistic contrast between their non-partitive and partitive uses: only in the latter can they quantify over parts of atomic entities.

4.4.2 Distributive MOST in partitives: Romanian

As already observed in sections §§4.3.2 and 4.3.3, partitives built with MANY/MUCH are crosslinguistically allowed. We therefore correctly expect the superlative forms of MANY/MUCH to be allowed in Romanian:

(48) a. Cine a citit [cele mai multe din cărțile recomandate]?
who has read the more many of books-the recommended
'Who read the most of the recommended books?'

b. Cine a mâncat [cel mai mult din
who has eaten the.MSG more much.MSG of
smântâna din frigider]?
fresh-cream-the.FSG of-in fridge
'Who ate the most of the fresh cream in the fridge?' (mass, relative superlative)

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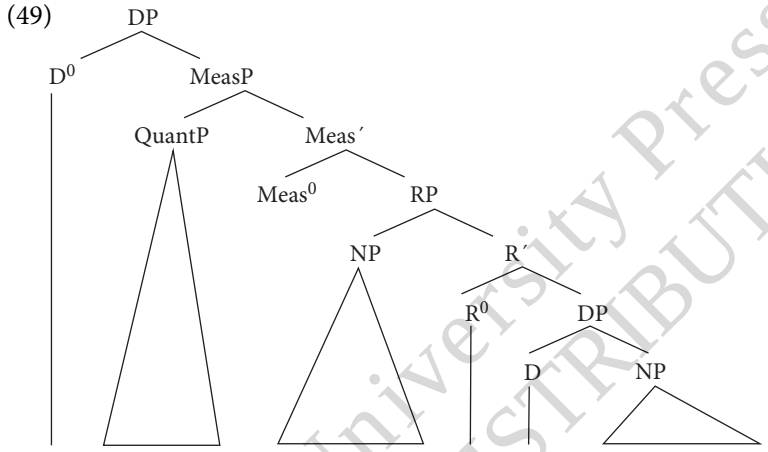
Unsurprisingly, both these examples have the relative superlative reading. As argued in §4.2.5, the three elements of the strings *cei mai mulți*, *cel mai mult* (lit. 'the more many', 'the more much') belong to the superlative constituent itself (in particular, *cel* does not sit under D^0), which is inserted as a whole in a single syntactic position. If we assume that (i) partitives rely on the structure in (24a) (with a RP projection), and (ii) the superlatives of MANY/MUCH are inserted in the same position as their positive forms (see the structures in (34a,b)), the examples above can be represented as follows:

(49)



a. Ø cele mai multe ~~cărți recomandate~~ din [+def] cărți(le)$_{+def}$ recomandate
SUP COMP many books recommended of books-the recommended

b. Ø cel mai mult $Ø_{STUFF}$ din [+def] smântân(a)$_{+def}$ din frigider
SUP COMP much of cream-the of-in fridge

Like for the positive form *mult*, the superlative *cel mai mult* 'MUCH$_{sup}$' is preferentially invariable in partitives (it does not agree in gender with the N embedded inside the of-DP constituent, which is feminine). Therefore, a null N $Ø_{STUFF}$ is assumed in the first member of the construction (see §4.3).

In §2.5 we assumed that DP-initial quality superlatives are to be analyzed as sitting in Spec,DP, with a D^0 filled by a null element with the semantics of the definite article:

(50) [$_{DP}$ [cea mai bună] [$_{D}Ø_{+def}$[$_{NP}$ soluție]]]
SUP COMP good solution
'the best solution'

The configuration in (49) differs from that in (50) insofar as the quantity superlative does not sit in Spec,DP, but in Spec,MeasP, i.e. in the position in

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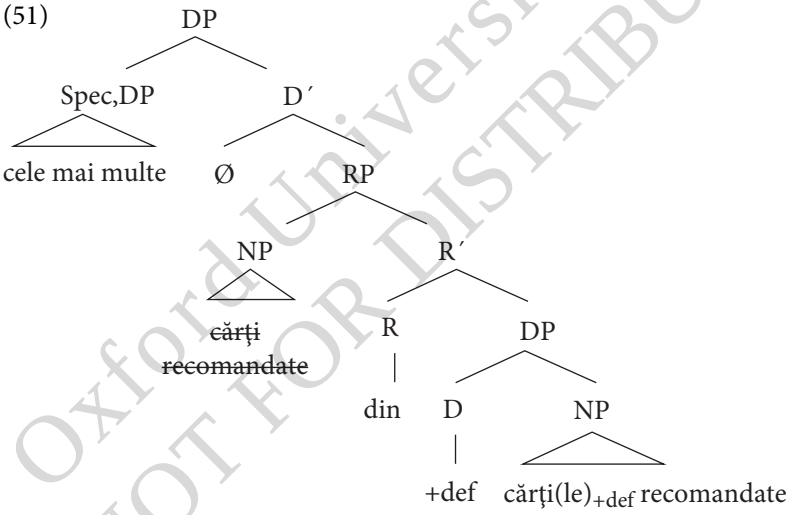
which MANY/MUCH themselves are inserted. Correlatively, D^0 is not filled with a definite-like null determiner (like in quality superlatives) but rather with an existential. The indefinite-like nature of DPs embedding quantity superlatives is particularly clear in many languages, e.g. Scandinavian (see §3.2.1), Italian, Ibero-Romance (see §1.5.4.1), or Albanian (see §1.5.4.2). The reader should be aware that the syntactic indefiniteness of quantity superlatives described here should be kept distinct from the semantic indefiniteness of relative superlatives in general, quantity and quality alike (see Szabolcsi 1986; Heim 1999).[18]

Let us now turn to our main concern, the proportional reading of *cei mai mulți/cel mai mult*. In Chapter 2 we argued that the proportional reading of *cei mai mulți* cannot be read off the syntactic configuration characteristic of quantity superlatives. We instead proposed that the proportional *cei mai mulți* is a quantificational determiner notated $\text{MOST}_{\text{dist}}$, which sits in Spec,DP. According to the null hypothesis, the same analysis is to be adopted for partitives:

(51)



As we explained in Chapter 2, $\text{MOST}_{\text{dist}}$ can only quantify over sets of atoms (in clear contrast with MOST_{cum}). Now, if the *cei mai mulți* occurring in partitive configurations is an instantiation of the $\text{MOST}_{\text{dist}}$ that occurs in non-partitives,

[18] An analysis of examples with quantity superlatives along the lines of (50), with raising of *cel(e) mai mult(e)* 'most' from Spec,MeasP to Spec,DP, cannot be ruled out based on Romanian-internal arguments. In fact, such an analysis may hold for the type of superlative MOST in the Appendix to this chapter, in which -EST is interpreted DP-internally.

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we correctly predict that it will be incompatible with the collective reading not only in non-partitive but also in partitive configurations:

(52) *Cei mai mulți din studenții din clasa mea
the more many of students-the from class-the my
s-au risipit imediat.
REFL-have dispersed immediately

Because $\text{MOST}_{\text{dist}}$ cannot quantify over mass domains, we correctly expect mass quantification to be excluded in partitives, on a par with non-partitives:

(53) *Cel mai mult [din smântâna din
the more much.MSG of fresh-cream-the.FSG of-in
frigider] e expirat(ă).
fridge is out-of-date

Quantification over parts of atoms is, expectedly, also disallowed (the intended meaning of examples of this type can be expressed by using THE LARGEST PART—see Chapter 5):

(54) *Cel mai mult din oraș e nou.
the more much of city is new
Intended meaning: 'Most of the city is new.'

In sum, the acceptability judgments observed for proportional MOST in Romanian partitives are the same as those observed in non-partitives. This generalization is expected if we assume the null hypothesis, according to which partitive configurations are built with the same proportional MOST as that found in non-partitives, namely $\text{MOST}_{\text{dist}}$, which is a necessarily distributive quantifier (quantifies over the set of atoms in the denotation of plural properties). The null hypothesis was also shown to be correct for MOST_{cum} (see §4.4.1).

4.4.3 Majority Quantifiers specialized for partitives

In this section we will examine majority quantifiers that can only occur in partitive configurations. This type of data is particularly important, given the generalization stated in (55) (pointed out in Chapters 1 and 3), which holds

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not only for MOST but also for all the other majority quantifiers that we have been able to identify in unrelated languages:

(55) Majority quantification over parts of singular entities is only allowed in partitive configurations.

We will start by examining English and Icelandic, which have two types of "partitive" MOST, respectively subcategorized for a partitive complement (RP) and a DP. In §4.4.3.2 we will deal with languages in which DPs of the form THE MORE +RP have a majority interpretation; we will analyze them as definite DPs with a superlative in the position of a quantity modifier. Finally, in §4.4.3.3 we will observe the existence of languages without articles in which the positive and the comparative forms of MUCH/MANY yield majority readings when occurring in partitives.

4.4.3.1 Two partitive MOSTs: English and Icelandic

Let us consider English partitives built with MOST:

(56) a. Most of the butter in the fridge is expired. (mass restrictor)
b. Most of the students in my class immediately dispersed. (collective predicate)

These examples show that in partitive configurations, the English *most* allows majority readings with mass restrictors and collective predicates. This contrasts with non-partitives:

(57) a. *Most [$_{NP}$ butter in the fridge] is expired. (mass restrictor)
b. *Most [$_{NP}$ students in my class] immediately dispersed. (collective predicate)

The contrast between partitives and non-partitives is unexpected. Given our current knowledge of partitive configurations, the expected generalization is the one observed for Romanian, namely that the distribution of MOST in partitives inherits the constraints from the non-partitive configuration. We are thus led to assume that in English, the *most* that occurs in partitives is a special item, distinct from the one that shows up in non-partitives.

Regarding the syntactic representation, there are two possibilities. The first option is that the MOST that occurs in partitives has a selectional feature which forces it to occur in the partitive construction—it selects the functional

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projection involved in partitives (RP under the analysis in (24a), where *of* sits in the head position R^0). In what follows we will refer to this possible type of partitive MOST by using the notation $MOST_{RP}$:

(58) $[_{DP}$ $MOST_{RP}$ $[_{RP}$ $[_{NP}$ Ø] $[_{R'}[_{R^0}$of] DP]]]

The second option is that the MOST that occurs in partitives resembles *all* and *half* when they combine with an *of*-DP, e.g. *all/half of the time*. The fact that these quantifiers allow *of* to be absent (*all/half the time*) may suggest that *of* is not the partitive functional head that heads an RP constituent, but just a case marker (hence the KP notation used below) with no semantic import (see Matthewson 2001):

(59) $[_{QP}$ most $[_{KP}$ of $[_{DP}$ them/the time]]]

(60) a. $[_{QP}$ all/half $[_{KP}$ of $[_{DP}$ them/the time]]]
b. $[_{QP}$ all/half $[_{DP}$ the time]]

Under this analysis, the notion of "partitive MOST" should not be understood as referring to the canonical partitive construction discussed in §4.2. The descriptive label "partitive" is indeed currently used to refer to various other constructions that involve an embedded *of*-DP that introduces "the whole", such as constructions of the type *part/quarter/half of the book* or the measuring construction with *per cent*. In such constructions, *of* does not count as the functional head R^0 but rather as a case marker/linker that introduces a DP complement of functional nouns such as *part* or *per cent*. The term "partitive" is sometimes used even for the variants without *of* in (60b).

The analysis in (58) is supported by Icelandic, a language with a specialized partitive MOST, as evidenced by the fact that majority MOST can take mass restrictors only in partitives (see (6) and (7) above). In this language, which has rich phi-feature marking, the MOST that occurs in singular DPs before the partitive preposition *af* 'of' has its own gender (neuter), distinct from the gender of the noun in the *of*-DP:

(61) Ég drakk mest af mjólkinni. (Ice., Coppock 2019: 166, ex. 99b)
I drank most.NSG.ACC of milk.DEF.FSG.DAT
'I drank most of the milk.'

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In plural DPs, however, MOST agrees with the noun inside the *of*-DP (realized as a genitive or as an *af*-PP):[19]

(62) a. Flestir {bílanna /av bílunum} hava (Ice.)
most.MPL.NOM cars(M).DEF.GEN of cars(M).DEF.DAT have
aldrei verið keyrðir.
never been driven
'Most of the cars have never been driven.'
(Coppock 2019: 164, ex. 95a,b)

b. Flestar af vörunum okkar koma frá París
most.FPL.NOM of products(f).DEF.DAT our come from Paris
'Most of our products come from Paris.' (https://skvisubudin.is)

This data recalls the observations about gender in partitive constructions involving RP (see §§4.2 and 4.3). Under the analysis in (58), in which partitive MOST takes an RP complement, the lack of agreement in (61) is explained by the neuter gender feature of the null N STUFF that occupies Spec,RP in mass partitives, whereas the presence of agreement in (62) follows from the copying of the lexical N of the *of*-DP into Spec,RP—recall that in count partitives, the N in the second member is copied into the first member.

Under the analysis in (59), the difference in gender agreement depending on number is unexpected.[20] We are thus led to conclude that the Icelandic DPs under discussion here are not to be analyzed as involving the configuration in (59), but rather the one in (58), in which the complement of MOST is not a DP but rather an RP constituent, as represented in (63):

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[19] For the plural, the fact that we are dealing with a specialized partitive MOST ($MOST_{RP}$) is demonstrated by the acceptability of collective predicates in the nuclear scope (see (i)), which are ruled out in the MOST+NP construction (see (ii)):

(i) Flestir {strákanna /af strákunum } munu hittast í garðinum
most.MPL.NOM boys.DEF.GEN of boys.DEF.DAT will meet in garden.DEF.DAT

(ii) ?? Flestir strákar munu hittast í garðinum
most.MPL.NOM boys.NOM will meet in garden.DEF.DAT

[20] We might explain the lack of agreement with mass DPs (see (61)) by assuming that the preposition *af* closes off the domain of concord, and neuter shows up as a default. But then we expect lack of agreement not only with singular but also with plural DPs, contrary to fact (see (62)). Conversely, if we started from the plural examples in (62), which show agreement, we would need to assume that MOST can agree with an N inside an *af*-phrase. But then, we expect MOST to be able to agree with the N inside the *af*-phrase also in (61), contrary to fact.

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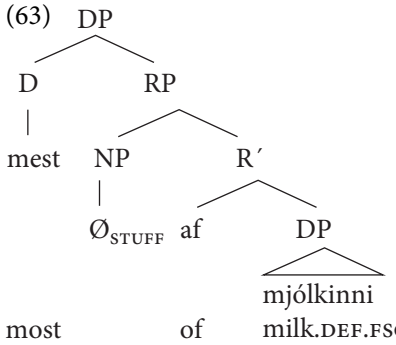
(63)



Icelandic offers evidence for the coexistence of MOST_{RP} and a DP-selecting MOST, which we will label MOST_{DP}. In addition to the partitive constructions illustrated in (62), Icelandic can also use a construction where *flestir* is followed by a definite DP which shows the case of the overall constituent headed by *flestir* (in other words, there is agreement in gender, number, *and case* between *flestir* and the DP):

(64) Flestir bílarnir hava aldrei verið keyrðir.
most.MPL.NOM cars(M).NOM.DEF have never been driven
'Most of the cars have never been driven.'
(Ice., Coppock 2019: 164, ex. 95c)

The fact that the embedded DP is not marked for genitive case (but instead agrees in case with *flestir*) is evidence in favor of analyzing this type of DP on a par with DPs introduced by ALL, e.g. *all the cars* in English.

In sum, Icelandic *flestir*, which can only introduce plural nominals, is structurally ambiguous, being analyzable either as MOST_{RP} (which takes an *af* -DP or a DP_{Gen} as a complement) or as MOST_{DP} (which takes a case-agreeing DP). The case-agreeing pattern is not found with *mest*, which combines with singular DPs. Given what we have said so far, the *mest* occurring in partitives is to be analyzed unambiguously, as an instantiation of MOST_{RP}. Note however that case agreement can be observed in the singular for the compound *mestall* 'almost all' (see §4.2.1). This morphosyntactic behavior is exactly the same as that found with *all* 'all' (note that *mestall* is composed of *mest* 'most' and *all* 'all').

Given this evidence for the existence of a MOST_{RP} distinct from MOST_{DP}, it seems preferable to analyze MOST in MOST OF as an instance of MOST_{RP} (as in (58)) not only in Icelandic, but also in English. Moreover, as we will show in §4.5.1, the categorial distinction between a DP and an RP complement may account for the fact that only MOST OF can combine with singular count nouns.

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Note now that the *most* that appears "pronominally", i.e. without an overt restrictor, behaves on a par with partitive MOST, allowing quantification over mass domains in episodic contexts, as well as collective predicates:

(65) a. We had a lot of snow last week, but **most** has melted.
b. Some guests remained in their rooms, but **most** gathered in the hall.

This recalls the generalization that the determiners allowed in partitive constructions are also allowed in DPs without an overt N (see (15b)). Within our MOST_{RP} analysis, the pronominal use can be accounted for by allowing for the whole RP to be elided:

(66) $[_{\text{DP}}\ \text{MOST}_{\text{RP}}\ [_{\text{RP}}\ \emptyset]]$

So far we illustrated the coexistence of MOST_{RP} and MOST_{DP} for Icelandic. But let us recall that English itself has a type of MOST for which we argued, in Chapter 2, that what looks as an NP-restrictor is in fact a kind-referring DP with a null D. The evidence for this analysis is based on the restriction of proportional *most* followed by mass NPs to generic contexts:

(67) a. On Earth, most water is liquid.
b. *Most butter in the fridge is rancid.

The example in (94b) is unacceptable because the NP-selecting *most* is distributive (it is an instance of $\text{MOST}_{\text{dist}}$) and as such it cannot apply to a cumulative property:

(67)′ b. $*[_{\text{DP}}\ \text{MOST}_{\text{dist}}\ [_{\text{NP}}$ butter in the fridge]]

In §2.2 we argued that in examples of the type in (67a) the complement of *most* is not just an NP, but rather a kind-referring DP headed by a null D. Thus, English also has an instance of MOST_{DP}, but different from the Icelandic one in being restricted to kind-referring DPs:

(67)′ a. $[_{\text{QP}}\ \text{MOST}_{\text{DP}}\ [_{\text{DP}}\ [_{\text{D}}\emptyset]\ [_{\text{NP}}$ water]]]

Note that this is another case where a proportional quantifier must be assumed to have a special subcategorization feature: assuming that kind-referring bare

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nouns have a null D [$_{\text{D-Kind}}$Ø] with the semantics of Chierchia's Down operator, the English MOST$_{\text{DP}}$ must be lexically specified for selecting [$_{\text{D-Kind}}$Ø].

Hungarian resembles Romanian in that examples with mass nouns are degraded in the partitive construction (see (68)). But unlike for Romanian, we could find attested examples with singular count restrictors (see (69)):

(68) ?? A cukor legtöbb-je-t ki kell dobni. (Hung.)
the sugar most-POSS.3-ACC out must throw.INF
'We have to throw out most of the sugar.'

(69) a. A város legtöbb-je a tengerszint alatt van
the city most-POSS.3 the sea-level below is
'Most of the city is below sea level.' (https://hun.worldtourismgroup.com/)

b. A lakosság legtöbb-je katolikus vallás-ú
the population most-POSS.3 Catholic religion-ADJ
'Most of the population is Catholic.' (galosfa.hu/telepuleskepi-arculati-kezikonyv-galosfa.pdf)

c. az ország legtöbbje a tengerszint alatt van
the country most-POSS.3 the sea-level below is
'Most of the country is below sea level.' (https://hu.carolchanning.net/)

This suggests that, at least in certain environments which should be further clarified, Hungarian makes use of a type of MOST$_{\text{RP}}$ that seems to be specialized for singular count *of*-DPs. Note that not all speakers accept the examples in (69), which indicates that some speakers only have MOST$_{\text{dist}}$ in their grammar.

To sum up, MOST$_{\text{RP}}$ and MOST$_{\text{DP}}$ are alike insofar as they cannot appear in non-partitives (in contrast to cardinals, the relative superlative MOST, MOST$_{\text{dist}}$, MOST$_{\text{cum}}$), but they are *specialized for partitives*, hence the label "partitive MOST", which we use for both of them. These MOSTs subcategorize for nominal projections that are higher than the NP, but those projections are different, either DP or RP, as indicated by the distinct labels. Compare MOST$_{\text{dist}}$ and MOST$_{\text{cum}}$, which may occur in partitives (in addition to non-partitives), but when they do so they occupy the same syntactic positions as in non-partitives: the canonical D^0 position and Spec,Meas, respectively.

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Regarding the syntactic category, MOST_{DP} can be analyzed on a par with ALL, as a "high" quantifier, i.e. a Q^0 that takes a DP as a complement. The variant of (70) with THE is found in Icelandic (see example (64)), whereas English only has the variant with $[_{\text{D-kind}}\emptyset]$:

(70) $[_{QP}\ \text{MOST}_{DP}\ [_{DP}\ [_{\text{D-kind}}\emptyset]/\text{THE}\ \text{students}]]$

(71) $[_{QP}\ \text{ALL}\ [_{DP}\ [_{\text{D-kind}}\emptyset]/\text{THE}\ \text{students}]]$

Let us now turn to MOST_{RP}:

(72) $[_{DP}\ \text{MOST}_{RP}\ [_{RP}\ [_{NP}\ \emptyset]\ [_{R'}\text{of DP}]]]$

Since this structure does not contain any determiner preceding or following MOST, and moreover there is no reason to assume a null D^0, it is reasonable to treat MOST itself as a quantificational determiner sitting in the D^0 position.

4.4.3.2 The majority reading of THE MORE in partitives

In Italian, THE+MORE can function as a majority quantifier in partitive configurations[21] (see §1.5.4.1). The existence of an RP construction is supported by gender agreement, which is visible on the article: gender agreement with the nominal inside the *of*-phrase is found in the plural (see examples in (73)), but not in the singular, where a default masculine singular occurs (see examples in (74)).

(73) a. **I più degli abitanti** perirono pel ferro
the.MPL more of-the inhabitants(M) perished by-the iron
e pel fuoco dei vincitori. (It.)
and by-the fire of-the winners
'Most of the inhabitants perished by the iron and fire of the winners.'
(*Biografia universale antica e moderna*, vol. 16, Venice, 1824)

b. Anzi **le più delle cose** delle quali si ride
indeed the.FPL more of-the things(F) of-the which REFL laughs
ordinariamente, sono tutt'altro che ridicole in effetto.
usually are all-other than ridicule actually
'Actually, most of the things people ordinarily laugh at are anything but ridiculous.'
(Giacomo Leopardi, *Dette memorabili di Filippo Ottonieri*, in *Operette morali*, 1827)

[21] These constructions are nowadays bookish, THE LARGEST PART being preferred.

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(74) a. Trascorriamo **il** **più** **della** **settimana** a
spend.1PL the.MSG more of-the week(F) to
sbrigare svariati impegni quotidiani fino a quando
take-care various tasks daily until
non arriva il weekend a darci un po' di sollievo.
not arrives the weekend to give-us a little relief
'We spend most of the week carrying out various daily tasks until the weekend comes to give us a bit of relief.' (https://www.scuolissima.com/2018/10/buon-weekend-buon-fine-settimana-frasi.html)

b. Tra più volte **il** **più** **della** **città** è
several times the.MSG more of-the city(F) has
stata arsa e rifatta.
been burned and rebuilt
'Several times most of the city was burned and rebuilt.' (Ricordano Malespini and Giacotto Malespini, *Storia Fiorentina*, ed. Vincenzio Follini, Florence, 1816, p. 93)

c. come suole **il** **più** **della** **gente**
as has-the-habit the.MSG more of-the.FSG people(F)
'as most people do' (www.fondazionemyriamperipoveri.it › meditazioni)

The same construction is found in Albanian, but only in the plural:

(75) a. **më** **të** **shumtat** **e** **shkronjavet** iu
more AGR.PL many.FPL.DEF AGR.PL letters(F)-the.GEN CL.DAT
shëmbëllejnë atyre t' abecesë glagolitike
resemble those.DAT AGR.PL.DAT alphabet-the.GEN Glagolitic
e cirilike sllave.
and Cyrillic Slavic
'Most of the letters resemble those of the Slavic Glagolitic and Cyrillic alphabet.'
(Abaz Ermenji, 'Vendi që zë Skënderbeu në historinë e Shqipërisë', ch. 18: http://www.ermenji.org/historia/chap18.html)

b. **Më** **të** **shumtët** **e** **banorëve**
more PL many.MPL.DEF AGR.PL inhabitants(M)-the.GEN
lidheshin me martirët e Luftës së
were-related with martyrs-the AGR.PL war-the.GEN AGR.FSG.GEN

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Dytë Botërore kundër fashistëve.
second global against fascism
'Most of the inhabitants are related with the martyrs of World War II against fascism' (https://www.almakos.com › rruga)

Italian differs from Romanian in that the definite article is not part of the superlative constituent, but rather sits in D^0, as can be seen from examples where the comparative is separated from the D position by another constituent:[22]

(76) a. **il** secondo **più** **ricco** paese (It.)
the second more rich country

b. vend**i** i dytë **më** **i** **pasur** (Alb.)
country-the AGR second COMP AGR rich
'the second richest country'

Recall that we characterized MOST_{RP} as a determiner selecting for an RP. The Italian and Albanian data could be covered by this analysis only if we assume that the article has become part of a complex determiner [il-più], possibly as an agreement marker, but such an assumption is ad hoc, especially for Italian. Since in Albanian definiteness is marked by definite inflection, one may assume that MOST_{RP} happens to carry the same inflection as definites as a morphological peculiarity, without this indicating the presence of a definite D.

We are thus led to assume, at least for Italian, that what looks like a "partitive MOST" involves THE under D and MORE in a lower position.

We therefore propose that *più* 'more' in the Italian *i(l) più* (and arguably also *më shumtë* in Albanian) is a quantity modifier with a superlative interpretation (an interpretation licensed for comparatives in definite DPs). In Chapter 3 we envisaged possible ways of deriving the majority interpretation from the superlative in definite DPs, concluding that we need an element that introduces a binary partition over a DP. In the following chapter, we will propose that the word PART can do this job in the construction THE LARGEST PART. Granting that R^0, an element with the same general denotation as PART, can also introduce a binary partition, MORE in Italian and Albanian partitive constructions can be analyzed as an absolute superlative quantity modifier,

[22] An exception, in Italian, is the construction *il più carina possibile* 'the.MSG more pretty.FSG possible', discussed by Loccioni (2018); but in that construction, the article is non-agreeing, which is not the case in our examples.

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with the majority meaning being made possible by the binary partition of the maximal sum in the denotation of the DP. The details of this analysis will be presented in Chapter 5 (see §5.6.2).

A similar analysis can be suggested for the construction used to express majority quantification in Wolof. This language, which uses verbal syntax for concepts typically realized as adjectives in other languages (see Mc Laughlin 2004), has an 'exceed'-type strategy for expressing comparison (with verbs translatable as 'be-more', 'have-more') and lacks dedicated superlative morphology. Majority quantification is expressed via a free relative with the verb *ëpp* 'be-more/have-more' followed by a P+DP construction indicating the whole:

(77) a. Li ëpp ci xale yi, dañu (Wol.)
what be-more among children the MODAL-3PL
weg seeni waajur.
respect their parents
'Most children respect their parents.'

b. Ci suuf si, li ëpp ci ndox mi, liquid la.
on earth the, what be-more among water the liquid is
'On Earth, most water is liquid.'

c. Li ëpp ci samay liggéeyandoo dinañu
what be-more among my colleagues MODAL-3PL
daje ëllëg.
meet tomorrow
'Most of my colleagues will meet tomorrow.'

Although it is not a partitive construction of the Indo-European type, the Wolof construction is similar insofar as it contains a preposition introducing the part-of relation (*ci* 'among'), followed by a DP referring to the whole (see the definite article on 'children' and 'water'). Moreover, since free relatives involve maximalization (see Grosu and Landman 1998), the use of a free relative resembles the use of the definite article in Italian and Albanian. We may thus conclude that the majority interpretation is achieved via superlative + partition, as in Italian (for the details of the analysis, see §5.6.2), although syntactically the structure is different due to the different syntax of comparison in the two languages.

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4.4.3.3 MUCH/MANY and MORE in partitive constructions

In some languages, we find other forms of MUCH/MANY with a majority use in partitive constructions. Thus, the positive form (MUCH/MANY) is found in Turkish (*çoğu* contains the base *çok-* 'many, much' and a possessive agreement marker, which agrees with the genitive-marked partitive complement; cf. *çog-u-muz* 'most of us'):[23]

(78) a. [İnsanlar-ın **çoğ-u**] ölümden kork-ar. (Tur.)
people-GEN much-POSS.3 death fear-AOR
'Most people fear death.' (Göksel and Kerslake 2005: 340)

b. Dünya-da, [suy-un **çoğ-u**] sıvı(dır).
Earth-LOC water-GEN much-POSS.3 liquid(GENERIC)
'On Earth, most water is liquid.'

c. Ev-de-ki [tereyağı-nın **çoğ-u**] çürük(tür).
house-LOC-in butter-GEN much-POSS.3 rotten(GENERIC)
'Most of the butter in the house is rotten.'

d. [İş arkadaşlar-ım-ın **çoğ-u**] yarın buluş-acak(lar).
work colleagues-my-GEN much-POSS.3 tomorrow meet-FUT(3PL)
'Most of my colleagues will meet tomorrow.'

The comparative (MORE) is used in Persian and Adyghe:

(79) a. [**Bištar** e kudakān] be vāledæyn e khod ehterām (Per.)
more EZ children to parents EZ self respect
mi-gozār-and.
IMPF-pay-3PL
'Most children respect their parents.'

b. Dār zamin [**bištar** e āb] māye ast.
in Earth more EZ water liquid is
'On Earth, most water is liquid.'

[23] Recall that *çoğu* (lit. 'much-POSS.3') can also be used as a proportional quantifier in non-partitives:

(i) Çoğ-u çocuk ebeveyn-in-e saygı göster-ir(-ler).
much-*u* child parents-POSS.3-DAT respect show-AOR(-3PL)
'Most children respect their parents.'

In examples of this type *çoğu* can be assumed to sit in D^0 or Spec,DP, on a par with the various instantiations of $MOST_{dist}$ examined in Ch. 2. In this configuration, *-u* is no longer an agreement marker, the whole complex *çoğu* being an unanalyzable unit.

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c. [**Bištar** e hamkārān e man] ferdā didār khāhand dāsht.
more EZ colleagues EZ my tomorrow sight will.3PL had
'Most of my colleagues will meet tomorrow.'

d. [**Bištar** e divār] rang šode bud
more EZ wall paint become-PSPT was
'Most of the wall was painted.'

(80) [txəl-ew aš' qə-š'a-ʁe-m **nahə-be-r**] (Ady.)
book-ADV he DIR-bring-PST-OBL COMP-many-ABS
adəʁa-bza-ʁ
Adyghe-language-PST
'Most of the books that he brought were in Adyghe.'
(Nikolaeva 2012: 51)

In Persian, the use of the *ezafe*, as well as examples of the type in (79d), with a count singular, indicate that *bištar* is a majority quantifier specialized for partitives.

These quantifiers can be analyzed as instances of MOST_{RP}. Alternatively, as these languages lack articles, we cannot rule out a modifier analysis for the examples with MORE (Persian, Adyghe): assuming that R can introduce the binary partition, MORE can be seen as a modifier that chooses "the larger cell", i.e. a cell larger than the other. This requires an 'internal' reading of the comparative, with the unexpressed *than*-argument being provided by the RP—"the other entity that satisfies the RP-property". Whether such an analysis is feasible requires a study of the comparative constructions of these languages which we leave open for specialists of these languages.

4.4.4 Summary

In this section we began by examining partitive configurations in which proportional MOST can be analyzed as being the same element that occurs in non-partitives, either MOST_{cum} or $\text{MOST}_{\text{dist}}$, depending on the language (§4.4.1 and §4.4.2, respectively). Section 4.4.3 was devoted to majority quantifiers specialized for partitives, which are morphosyntactically diverse across languages. For some of these quantifiers (see Italian, Albanian, and Wolof) we argued that a superlative analysis is appropriate, which will be developed in §5.6.2. A theoretically interesting result is the distinction between two types of

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MOST specialized for partitives, MOST_{DP} and MOST_{RP}. In §4.5 we propose distinct semantic analyses corresponding to this morphosyntactic distinction.

4.5 The semantic analysis of partitive MOST

4.5.1 The semantics of MOST_{RP} and MOST_{DP}

Under the syntactic analysis proposed in §4.3.1 (see (58) and (63)), the first argument of MOST_{RP} is $[_{\text{RP}}\ [_{\text{NP}}\ \emptyset]\ [_{\text{R'}}\text{of DP}]]]$, which is a plural or mass property (recall that, depending on the type of N inside the *of DP*, the null $[_{\text{NP}}\ \emptyset]$ is either a plural NP copied from inside the *(of) DP* or a null N with some general meaning, e.g. STUFF (see §§4.2 and 4.3)).

Given that its first argument is a plural or mass property, MOST_{RP} is to be analyzed as a cumulative Q, which compares the measures of two parts of the entity in the complement of R^0. More precisely, the formula in (81), which was proposed in §4.3.4 for MOST_{cum}, as a refinement of Higginbotham's (1994) analysis of mass quantifiers, can be assumed as the denotation of MOST_{RP}:

(81) $[\![\text{MOST}_{\text{RP}}]\!] = \lambda P.\ \lambda Q.\ \exists x\ (P(x) \wedge Q(x) \wedge \mu(x) > \mu(\sigma y.P(y)\text{-}x))$

According to this formula, MOST_{RP} looks for a property P and yields a generalized quantifier over cumulative properties that requires the existence of an entity x that satisfies both P (the restrictor) and Q (the nuclear scope) such that the measure of x is larger than the complement of x wrt to σy.P(y), the maximal entity in the denotation of P. The fact that the property P is cumulative follows from the subcategorization of MOST_{RP}: given the denotation of R^0 and the structure of RP proposed in §§4.2 and 4.3, the denotation of RP will be a cumulative property of the type 'λx.x ≤ a ∧ N(x)', where N is a plural or mass noun denotation and a is the referent of the DP inside the *of*-phrase (adopting for R^0 the part-of relation, instead of proper-part—see the discussion in §4.2—ensures cumulativity).

Assuming that MOST_{RP} has the denotation in (81), the semantic composition of the Icelandic [*mest af mjólkinni*] 'most.NSG.ACC of milk.DEF.FSG.DAT' and its English counterpart *most of the milk* runs as follows:

(82) [most of the milk]/[mest af mjólkinni]
$[\![_{\text{RP}}\ [_{\text{N}}\emptyset_{\text{STUFF}}]\ [\text{of [the milk]}]]\!] = \lambda x.(\text{stuff}(x) \wedge x \leq \sigma z.\text{milk}(z)) = \lambda x.\ x \leq \sigma z.\ \text{milk}(z)$

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$[\![\text{MOST}_{RP}]\!] = \lambda P.\ \lambda Q.\ \exists x\ (P(x) \wedge Q(x) \wedge \mu(x) >\ \mu(\sigma y.P(y)\text{-}x))$
$[\![\text{MOST}_{RP}]\!]([\![_{RP}\ [_{N}\emptyset_{STUFF}]\ [\text{of [the milk]}]]\!]) =$
$[\lambda P.\ \lambda Q.\ \exists x\ (P(x) \wedge Q(x) \wedge \mu(x) >\ \mu(\sigma y.P(y)\text{-}x))](\lambda x.\ x \leq \sigma z.\ \text{milk}\ (z)) =$
$\lambda Q.\ \exists x\ (x \leq \sigma y.\ \text{milk}(y) \wedge Q(x) \wedge \mu(x) >\ \mu(\sigma y.\ y \leq \sigma z.\ \text{milk}(z)\text{-}x)) =$
$\lambda Q.\ \exists x\ (x \leq \sigma y.\ \text{milk}(y) \wedge Q(x) \wedge \mu(x) >\ \mu(\sigma y.\ \text{milk}(y)\text{-}x))$

Similarly, for the MOST_{RP} built with a plural NP in the *of*-DP constituent:

(83) Most of the students met yesterday
Flestir {nemendanna /af nemendunum } (Ice.)
most.MPL.NOM students-the.GEN of students-the.DAT
hittust í gær
met yesterday
$[\![_{RP}\ [_{N}\text{~~students~~}]\ [\text{of [the students]}]]\!] = \lambda x.(*\text{student}(x) \wedge x \leq \sigma z.\ *\text{student}(z))$
$[\![\text{MOST}_{RP}]\!]([\![_{RP}\ [_{N}\text{~~students~~}]\ [\text{of [the students]}]]\!]) =$
$[\lambda P.\ \lambda Q.\ \exists x\ (P(x) \wedge Q(x) \wedge \mu(x) >\ \mu(\sigma y.P(y)\text{-}x))](\lambda x.\ (*\text{student}(x) \wedge x \leq \sigma z.*\text{student}(z))$
$= \lambda Q.\ \exists x\ (*\text{student}(x) \wedge x \leq \sigma z.*\text{student}(z) \wedge Q(x) \wedge \mu(x) >\ \mu(\sigma y(*\text{student}(y) \wedge y \leq \sigma z.*\text{student}(z))\text{-}x))$
$= \lambda Q.\ \exists x\ (*\text{student}(x) \wedge x \leq \sigma z.*\text{student}(z) \wedge Q(x) \wedge \mu(x) > \mu(\sigma z.\ *\text{student}(z)\text{-}x))$

As x is a plural variable, Q may be a collective predicate, which explains the well-formedness of (83). The distributive reading of examples such as *Most of the students are blond* is obtained via pluralization of the nuclear scope predicate, like with other plural subjects (e.g. *The students/Some students are blond*).

Note that this analysis, like the one of MOST_{cum} in partitives discussed in §4.4.1, involves the application of the maximalization operator σ to the property denoted by the RP sister of MOST (in order to obtain the "whole" necessary for the computation of the proportional interpretation). This application requires the use of improper part in the denotation of R^{o} (≤), an analysis that we have adopted for independent reasons in §4.2. If the RP had denoted the set of *proper* parts of an entity, it would have had no maximal element.

Turning now to MOST_{DP}, the semantic composition will be slightly different, taking an entity referring to the whole as an argument. Let us start with the Icelandic MOST_{DP}, which can combine with any plural definite DPs:

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(84) a. Flestir bílarnir hava aldrei verið keyrðir.
most.MPL.NOM cars(M).NOM.DEF have never been driven
'Most of the cars have never been driven.'
(Coppock 2019: 164, ex. 95c)

b. Flestir þessir men eru veikir.
most.MPL.NOM these.MPL.NOM men(NOM) are ill.MPL.NOM
'Most of these men are ill.'

In this case, MOST_{DP} introduces a variable over a part of the entity denoted by its first argument:

(85) $[\![\text{MOST}_{\text{DP}}]\!] = \lambda x.\ \lambda Q.\ \exists y\ (y \leq x \wedge Q(y) \wedge \mu(y) > \mu(x\text{-}y))$
$[\![$ flestir bílarnir$]\!] = [\![\text{MOST}_{\text{DP}}]\!]\ ([\![\text{bílarnir}]\!])$
$[\![\text{bílarnir}]\!] = \sigma x.{*}\text{car}(x)$
$[\![\text{MOST}_{\text{DP}}]\!]\ ([\![\text{bílarnir}]\!]) =$
$[\lambda x.\ \lambda Q.\ \exists y\ (y \leq x \wedge Q(y) \wedge \mu(y) > \mu(x\text{-}y))]\ (\sigma x.{*}\text{car}(x)) =$
$\lambda Q.\ \exists y\ (y \leq \sigma x.{*}\text{car}(x) \wedge Q(y) \wedge \mu(y) > \mu(\sigma x.{*}\text{car}(x) - y))$

In sum, under both of the syntactic analyses (MOST_{RP} and MOST_{DP}) proposed above, the partitive MOSTs occurring in Icelandic or English have the semantics of cumulative quantifiers, which explains why they can apply to *of*-DPs that embed not only plural NPs but also mass NPs (see examples (56a) and (61)) and correlatively they also allow collective predicates in the nuclear scope of examples built with *of-DP*$_{pl}$ (see examples (56b) and (86)).

(86) Flestir {strákanna /af strákunum} munu (Ice.)
most.MPL.NOM boys.DEF.GEN of boys.DEF.DAT will
hittast í garðinum
meet in garden.DEF.DAT

Further evidence in favor of this analysis comes from the contrast in (87), which shows that a DP headed by partitive *most* can occur after *be*, as opposed to a DP headed by the non-partitive *most*, which in English is an instantiation of $\text{MOST}_{\text{dist}}$ (see Chapter 2):

(87) a. These are most of the dogs in the neighborhood.
b. ?? These are most dogs in the neighborhood.

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Since partitive MOST introduces an existential quantifier, (87a) can be analyzed as involving identity *be*, identifying the referent of *these* with the variable bound by the existential, which corresponds to the intuitive interpretation of the sentence:

(88) $\exists y\ (y \leq \sigma x.{*}dog(x) \wedge \mu(y) > \mu(\sigma x.{*}dog(x) - y) \wedge y = [\![these_i]\!])$

Assuming a simple analysis of *these*, as introducing an indexed free variable, the interpretation of (87a) under a variable assignment function *g* is given in (89):[24]

(89) $([\![(87a)]\!])^g = \exists y\ (y \leq \sigma x.{*}dog(x) \wedge \mu(y) > \mu(\sigma x.{*}dog(x) - y) \wedge y = g(i))$

Since $\text{MOST}_{\text{dist}}$ does not involve existential quantification, DPs built with $\text{MOST}_{\text{dist}}$ cannot occur after copular *be*.[25]

The analyses of MOST_{DP} and MOST_{RP} involve very similar computations, but they differ in the introduction of the part entity over which the existential quantifies. For MOST_{RP}, the part entity comes with the denotation of the RP complement, where the part-of relation is introduced by an R^0 (lexicalized as

[24] The same result can be achieved by using Partee's (1986) type-shifting operator BE, which maps generalized quantifiers into properties:

(i) $\text{BE} = \lambda Q_{<et,t>}\ \lambda x.\ Q\ (\lambda y.y = x)$

(ii) $[\![\text{most of the dogs}]\!] = [\![\text{MOST}_{\text{RP}}]\!]\ ([\![\text{the dogs}]\!])$
$= \lambda P.\ \exists y\ (y \leq \sigma x.{*}dog(x) \wedge \mu(y) > \mu(\sigma x.{*}dog(x) - y) \wedge P(y))$

(iii) $\text{BE}\ ([\![\text{most of the dogs}]\!]) =$
$\lambda x.\ [\lambda P.\ \exists y\ (y \leq \sigma x.{*}dog(x) \wedge \mu(y) > \mu(\sigma x.{*}dog(x)\text{-}y) \wedge P(y))](\lambda y.y = x) =$
$\lambda x.\ [\exists y\ (y \leq \sigma x.{*}dog(x) \wedge \mu(y) > \mu(\sigma x.{*}dog(x)\text{-}y) \wedge y = x)]$

By applying BE to *most of the dogs*, we obtain the property of being identical to some sum that represents a majority of the dogs, which gives the correct interpretation of (87a):

(iv) $(\text{BE}\ ([\![\text{most of the dogs}]\!]))\quad([\![\text{these}]\!]) =$
$\exists y\ \ (y \leq \sigma x.{*}dog(x) \wedge \mu(y) > \mu(\sigma x.{*}dog(x) - y) \wedge y = [\![\text{these}]\!])$

[25] Note that if we try applying the operator BE to $\text{MOST}_{\text{dist}}$, we obtain an absurd result—the property obtained by the computation in (i) applies only to the single dog in a context where there is a single dog in the neighborhood, and to no entity in other contexts (because the set {y: y=z} has the cardinality 1 for a given value of z, in order for its intersection with the set of dogs to be larger than the difference, z must be a dog and the cardinality of the set of dogs should be smaller than 2):

(i) $\text{BE}\ ([\![\text{most dogs in the neighborhood}]\!]) = \text{BE}\ ([\![\text{MOST}_{\text{dist}}\ \text{dogs in the neighborhood}]\!])$
$[\![\text{MOST}_{\text{dist}}]\!] = \lambda P.\ \lambda Q.\ |\{x:\ \ P(x) \wedge Atom(x)\} \cap \{x: Q(x)\}| > |\{x: P(x)) \wedge Atom(x)\}\text{-}\{x: Q(x)\}|$
$[\![\text{MOST}_{\text{dist}}\ \text{dogs i.n.t.}]\!] = \lambda Q.\ |\{x: dog\text{-}i\text{-}n(x)\} \cap \{x: Q(x)\}| > |\{x: dog\text{-}i\text{-}n(x)\} - \{x: Q(x)\}|$
$\text{BE}\ ([\![\text{most dogs i.n.t.}]\!]) = \lambda z\ |\{x: dog\text{-}i\text{-}n(x)\} \cap \{y: y = z\}| > |\{x: dog\text{-}i\text{-}n(x)\} - \{y: y = z\}|$

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either *of* or genitive case) that applies to the entity denoted by its complement and yields the set of parts in the denotation of that entity. Thus, in our examples (82) and (83), R^0 applies to the overall sum of milk/students and yields the property of being a part in that sum; MOST_{RP} supplies just the existential, which binds a variable that satisfies the property denoted by RP (be a part of the sum denoted by the complement of R^0). With MOST_{DP}, on the other hand, the part-of relation is contributed by the denotation of this quantifier itself.

There is however an empirical difference between these two types of MOST that does not follow from the analyses proposed so far: it is striking that MOST_{DP} is only found with plurals and mass DPs (in Icelandic only with plurals, but see the English MOST_{DP} with generics, which will be discussed in the next section), whereas MOST_{RP} can be used to express quantification over parts of singular individuals. In other words, the MOST_{DP} counterpart of (90a) is found neither in English (see (90b)) nor in Icelandic (see (90c), which contrasts with the plural MOST_{DP} in (91)):

(90) a. [MOST_{RP} [of the book]]
b. *[MOST_{DP} [the book]]
c. *mest bókin (Ice.)
most book-the

(91) flestar bækurnar
most.FPL.NOM books.the.FPL.NOM

In the next chapter we will see that majority quantification over parts of singular individuals is generally attested in the constructions THE LARGEST PART and THE MAJORITY, which involve a *part*-introducing noun heading an *of*-DP (or genitive) complement.

The ban on count singular DPs as complements of MOST_{DP} and their well-formedness with MOST_{RP} suggests that the part-of relation that applies to singular individuals (which requires OF or genitive marking) needs to be distinguished from the part-of relation that applies to NP_{pl} or NP_{mass} (which can be supplied not only by OF/genitive, but is also allowed with MOST_{DP}). This difference may be captured in the plural logic framework of Link (1983) and Landman (1991), which distinguishes between singular entities *qua* atomic individuals and singular entities *qua* sums of their material parts. According to Landman (1991), the run-of-the-mill part-of relation "≤" cannot access the

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material parts of atomic individuals. Therefore, Landman (1991:319) defines a *grinder* function that maps an entity in the domain of count predicates into the maximal sum of its material parts—in the formal definition, given in (92), C represents the count domain and M represents the mass domain. The definition of Landman's grinder function involves a material part relation K, which holds between the atoms in the denotation of count properties and their material parts.[26] In the definition below we replaced Landman's notation for the supremum by "sup":

(92) the grinder function *g* is that function g: C → M such that for every c ∈ C: g(c) = sup {x ∈ M: x K c}

The grinder function is only needed for singular count nouns. Landman (1991: 319) uses the part-of relation "$a \leq b$" for the relation between the elements in the domain of plural and mass properties. Given this set-up, *most of the books* does not access sums of parts of books, but only sums of books.

We may thus define the denotation of R^0 as a relation that introduces the grinder just in case its first argument belongs to the domain of atoms:

(93) $[\![R]\!] = \lambda x.\lambda y.\ part(y,x)$
where part(y,x) iff $[x \in At \wedge y \leq g(x)]$ or $[x \notin At \wedge y \leq x]$

This analysis will be extended to all those elements that allow access to parts of singular entities, e.g. the noun *part* or MAJORITY nouns (see Chapter 5).

Adopting this background, we may explain the observation that $MOST_{DP}(x)$ may combine with plural or mass DPs, but not with singular count DP. The reason is that the part of relation contributed by $MOST_{DP}$ itself is the unmarked part-of relation notated "≤", which is the one that holds among the elements of a join semi lattice. By applying "≤" to the referent *a* of a plural or mass entity, we can access proper parts of that entity. But by applying "≤" to the referent *a* of a singular count noun, we can only access *a* itself (singular count Ns denote

[26] Link (1983) distinguished between an individual–part relation that holds between the elements in the join semi-lattice formed by the closure under sum of count predicates, and a material part relation which is more general, applying also to mass domains, in addition to the domain of individuals. The label "material part" is not entirely satisfactory because parts of singular entities are not limited to parts of material objects: we may say *most of the problem*, *most of this theory*, etc., where the entities referred to as well as their parts are not reducible to matter. It appears that the nominal concept expressed by various nouns is crucial for determining what counts as parts of an entity.

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sets of atoms), which is an improper part of *a*. Since proper parts are crucial for the semantics of majority MOST, we derive the result that MOST_{DP} cannot take singular count DPs as complements.

In order for its parts to become visible, an atomic entity *a* must be shifted to the maximal sum of its material parts, by the grinder function *g*. If we assume, as in (92), that R (as well as the noun *part*, as will be explained in Chapter 5) can perform the grinder function, we can explain why MOST_{RP} can apply not only to plural and mass DPs but also to singular DPs.

In sum, MOST_{DP} cannot quantify over parts of atoms because it only introduces the relation "≤", without the grinding function.

The semantic distinction between MOST_{RP} and MOST_{DP} we proposed here provides further support for the idea that we are dealing with two distinct quantifiers, as opposed to Matthewson (2001), who treats both types of *most* in English as MOST_{DP} (quantifiers taking an entity-denoting argument, where *of* is a dummy preposition).[27]

4.5.2 MOST_{DP} with kind-referring bare nouns

Let us now turn to the semantic analysis of the English MOST_{DP}, which combines with kind-referring restrictors—see (94), for which we have assumed the analysis in (94′):

(94) On Earth, most water is liquid.

(94′) $[_{\text{QP}}$ MOST $[_{\text{DP}}$ $[_{\text{D}}\text{Ø}]$ $[_{\text{NP}}$ water$]]]$

Recall that the analysis of *water* in (94) as a kind-referring DP is supported by the unacceptability of examples such as (95):

(95) *Most butter in the fridge is rotten.

As explained in §2.2, the presence of the s-level modifier *in the fridge* blocks a kind-referring interpretation of the restrictor. The observed unacceptability of

[27] This does not mean that we believe that R^0 must always be overt. We do not exclude the possibility that in certain languages R^0 be covert, and supplied by default whenever a quantifier takes a DP complement (see §5.7 for potential examples). The crucial point is that for quantification over parts of atoms to be possible with MOST, we need a contentful R^0 head (compare Matthewson 2001, who assumes *of* to be dummy, i.e. nonexistent for the interpretation).

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(95) is due to the fact that $\text{MOST}_{\text{dist}}$ cannot take property-denoting mass NPs in its restrictor.

Chierchia (1998b: 349) formalizes kinds as functions from worlds/situations into entities, which, for each world/situation, return the sum of all the instances of the kind in that world/situation. A property-denoting expression can be turned into a kind-referring one by applying the "Down operator", notated "$^{\cap}$" (the definition of the Down operator comes with a definedness condition: the property P must be of the sort that has an associated kind):

(96) $[\![^{\cap}]\!] = \lambda P.\, \lambda s\, .\, \iota P_s$, if $\lambda s\, \iota P_s$ is in K
undefined, otherwise
where Ps is the extension of P in s, and K is the domain of all kinds.
(Chierchia 1998b: 351)

The intuitive interpretation of sentences with MOST+kind-referring DPs, e.g. (94), involves measuring the maximal sum that realizes the kind in the situation under discussion (in (94), *on Earth* restricts the current situation; the sentence says that the largest part of the total sum of water on Earth is liquid).

Note now that, if (96) is taken to be the denotation of the null D that heads the complement of MOST, we do not get an entity-denoting expression in the restrictor of MOST, but rather a function from situations into entities (see (97); in order to be consistent with our notations, we use σ for the maximalization operator):

(97) $[\![[_{\text{D}}\emptyset]\ [_{\text{NP}}\ \text{water}]\ ]\!] = [\lambda P.\, \lambda s.\ \sigma x.P(x)(s)](\text{water}) = \lambda s.\ \sigma x.\text{water}(x)(s)$

At this point, there are two options for the semantic composition: either the situation argument gets saturated before combining with MOST, or it is taken over by MOST, which would then be of type <se><<e,st>,st>.

In the first alternative, before combining with MOST_{DP}, the situation argument of the kind would get saturated with an indexed situation variable attached at the DP-level, which may be bound by higher operators in the sentence or get a value from the context. A problem of this analysis is that the kind-denoting DPs in the complement of MOST are not distinguished from definite DPs, which also involve the saturation of the situation argument by an indexed free variable (cf. Hinterwimmer 2013; Schaden 2013). This does not predict contrasts of the type in (98), which show that in circumscribed,

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episodic situations, MOST+kind-DP is disallowed, as opposed to MOST+*of* +definite-DP:

(98) a. *At the party, most wine was from France.
a′. At the party, most of the wine was from France.
b. *In this room, most water is liquid.
b′. In this room, most of the water is liquid.
c. ?In this house, most heat comes from the solar panels.
c′. In this house, most of the heat comes from the solar panels.

A solution to this problem is to impose a constraint on the situation variable that saturates the first argument of the kind, requiring it to be sufficiently "general". A characterization of "general" could be reference to a sum of disconnected situations. A large spatial location and temporal interval, as in (99a,b), can license the use of the kind-term:

(99) a. On Earth, most water is liquid.
b. During the Hadean period, **most water** was dissolved in the magma, only to come out later when Earth cooled.
(James Trefil, *Astronomy* 35(12): 33–7, from COCA)

Temporal unboundedness may facilitate the use of a kind-term even when the location is spatially very restricted: this explains why (98c), with a generic present, is not as bad as (98a,b). An attested example of this type is given in (100):

(100) Production of water from the two water plants, which have their own separate SCADA systems, is monitored and adjusted for predicted demand Changes. **Most water** is pumped a second time at one of the 14 remotely operated pump stations.
(*Water Engineering and Management* 147(11) (2000): 30)

In other examples, the situation variable is bound by a quantifier, as in (101), which probably involves generic quantification:

(101) The very tips of plants' roots take up **most water and nutrients**, and link to essential soil microbes.
(Therese Ciesinski, *Organic Gardening* 54(4): 48–53, from COCA)

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Let us now consider the second way of taking care of the situation variable in the denotation of kind-referring terms, according to which MOST would have a special denotation, of type <se,<<e,st>,st>:

(102) $[\![\text{MOST}_{DP}]\!] = \lambda k_{<s,e>}.\ \lambda P_{<e,<s,t>>}.\ \lambda s.\ \exists x\ (x \leq k(s) \wedge \mu(x) > \mu(k(s) - x) \wedge P(x)(s)))$

In this formula, k(s) introduces the sum of all realizations of the kind k in situation s. The existentially bound variable x is a part of this sum, which is larger than the rest and satisfies the nuclear scope predicate. The whole QP *most water* would then have the following denotation:

(103) $[\![\text{MOST}_{DP}\ [_{DP}\ [_{D}\emptyset]\ [_{NP}\ \text{water}]]\!] = \lambda P_{<e,<s,t>>}.\ \lambda s.\ \exists x\ (x \leq \sigma y.\text{water}(y)(s) \wedge \mu(x) > \mu(\sigma y.\text{water}(y)(s) - x) \wedge P(x)(s))$

This analysis requires a way of further manipulating the situation variable left unsaturated by *most* so as to derive the contrasts in (98) and the data in (99) and (100). This is a complex issue which can only be solved against the background of a fully worked-out analysis of genericity. We leave this issue for further research.

4.6 Some notes on similarities and differences between partitive MOST and ALL

In previous sections we established the existence of two distinct distributional types of partitive MOSTs, MOST_{RP}, and MOST_{DP}, which respectively take RP and DP complements. We have also shown that this distinction is not simply morphosyntactic, but has semantic import:

(104) MOST_{DP} cannot apply to singular count DPs.

We have, however, not paid sufficient attention to another generalization that can be extracted from our empirical investigation:

(105) MOST_{DP} is crosslinguistically rare compared to MOST_{RP}.

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Nothing said so far can explain why this should be so. In this section we will suggest an account by bringing ALL into the picture. This proposal will provide further evidence in favor of our analysis of MOST_{RP}.

4.6.1 Distributional differences between MOST and ALL

ALL resembles partitive MOST in combining with DPs or *of*+DPs. We might therefore want to extend our analysis of partitive MOST to ALL. We may in particular distinguish—on the model of partitive MOST—between ALL_{RP} and ALL_{DP}, depending on whether the complement of ALL is an RP or a DP.

This differentiated analysis allows us to observe that the generalizations regarding MOST stated in (104) and (105) need to be negated or reversed for ALL:

(106) ALL_{DP} can apply to singular count DPs (e.g. in Romance languages, Greek, Albanian, Icelandic); the use of the word for 'all' with count singulars is also found in languages without articles (e.g. Russian, Lithuanian, Latvian, Turkish).

(107) ALL_{DP} is crosslinguistically overwhelmingly frequent compared to ALL_{RP}.[28]

The generalization in (106) is illustrated in (108) with French and Romanian examples:

(108) a. Toute la maison était en flammes. (Fr.)
all the house was in flames
'The whole house was on fire.'

b. Tot lacul e înghețat. (Ro.)
all lake-the is frozen
'The whole lake is frozen.'

In English, the use of *all* with singular count nouns is more restricted (see Huddleston and Pullum 2002: 375). The counterparts of (108) are degraded (see (109a,b), but other examples, such as (109c,d), are acceptable:

[28] As far as we know, only English has the type *all of*, which might be described as ALL_{RP}.

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(109) a. ??All the house was on fire.
b. ?? All the lake is frozen.
c. I haven't read all the book. (Huddleston and Pullum 2002: 375)
d. I spent all the day cooking. (Huddleston and Pullum 2002: 375)

Note that English uses the adjective *whole* in the counterparts of (108) (see the translations). One might think that this more specialized item blocks the use of *all* with singular count nouns, but this cannot be the reason, because Romanian and French also have an adjective corresponding to *whole*, which can be used to paraphrase the examples in (108), exactly like *whole* in English:

(110) a. La maison entière était en flammes. (Fr.)
the house whole was in flames
'The whole house was on fire.'
b. Întregul lac e înghețat. (Ro.)
whole-the lake is frozen
'The whole lake is frozen.'

In these examples, *whole* resembles *all* in that it indicates that the clausal predicate applies to all the parts of an entity. The adjectives used in (109) and (110)—English *whole*, Fr. *entier*, Ro. *întreg*—also have the meaning 'unbroken, intact', which characterizes an entity as having all its necessary or natural parts; see the attested example in (111), taken from COCA:

(111) Mash beans in bowl with potato masher (some **whole** beans may remain).
(*Vegetarian Times* 398 (Nov. 2012): 28–34)

Diachronic data show that an adjective meaning 'intact, unbroken' is a frequent source for *all* (see Haspelmath 1995 and the discussion in §3.4.2, which exemplifies German *ganz*, a word with the adjectival syntax of *whole* but which can be used with mass and plural nouns with a meaning corresponding to English *all*). The meaning 'entity having all its natural/required parts' can easily evolve to 'entity *x* such that no part of *x* is outside the domain of the main predicate' (this is an intuitive rendering of *all* and *whole* in (108), which will be made more precise in §4.5.2.2). As the meaning 'unbroken, intact' only applies to entities described by singular count nouns—entities which constitute an integrated whole (see Moltmann 1997; Wągiel 2018)—the adjective, even in its new meaning, can preserve a restriction to count singulars. This is

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the situation of the English *whole*. Whether this use blocks *all* with singular count nouns, as in English, or does not (see Romanian and French, where *întreg/entier* do not block the use of *tot/tout*), is a language-specific property for which we have no explanation.

We may now wonder why the generalization in (106) holds, in clear contrast with the generalization in (104). Given the explanation for (104) proposed in §4.5.1 above, we might want to attribute the possibility stated in (106) to the fact that it is the lexical semantics of ALL that introduces the grinder function that is necessary for quantification over parts of singular entities.

Such a difference between the lexical semantics of ALL vs. MOST (as to the grinding function) will however not help in explaining the contrast between the extremely high crosslinguistic frequency of MOST_{RP} and the extremely low crosslinguistic frequency of ALL_{RP}.

4.6.2 ALL as a homogeneity remover

We propose that the distributional differences between ALL and MOST can be explained by assuming that ALL is not a cumulative quantifier (on a par with partitive MOST) but rather a "homogeneity remover" (Löbner 2000; Križ 2016), i.e. a function that applies to a homogeneous predicate and removes its homogeneity.

A predicate is homogeneous if, when applied to an entity, it triggers a truth-value gap if only a part of that entity is in the extension of the predicate (see Löbner 1987; 2000; Schwarzschild 1994; Gajewski 2005; Križ 2016). Homogeneity was first noticed in the case of plural definite DPs, in examples such as the following:

(112) The children are asleep
  a. all 20 children are asleep: true
  b. 10 children out of a total of 20 are asleep: undefined
  c. no children is asleep: false

This phenomenon is not limited to plurals, as shown in (113):

(113) The table is red
  a. the whole table is red: true
  b. 50 per cent of the table is red: undefined
  c. no part of the table is red: false

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According to Križ (2016), a homogeneous predicate is a predicate for which (114) holds (cf. Križ 2016: 517):[29]

(114) A homogeneous predicate P is undefined for an entity *a* if it is not true of *a* but there is an entity *b* that overlaps with *a* such that P is true of *b*.

Križ (2016; 2017) relates the property of homogeneity to the phenomenon of "non-maximality" (Brisson 1998; Lasersohn 1999). Non-maximality can be observed in (112), which can be considered true in a situation where 18 out of the 20 children in a kindergarten are asleep, as well as in (113), which can be considered true if just a small part of the table is not red. The use of *all* removes non-maximality (cf. Moltmann 1997; Brisson 1998; Lasersohn 1999). Thus, (115) is false in case John did not read one of the books:

(115) John read all the books.

The same holds for *whole* with singular count nouns. Thus, (116) is false in case a part of the table in not red:

(116) The whole table is red.

Based on the observation that *all* and *whole* remove both homogeneity and non-maximality, Križ (2016) argues that non-maximality (the allowance of exceptions) is due to pragmatic principles that apply in predications with truth-value gaps, making them acceptable in situations where the existence of exceptions is not relevant for the issue under discussion. For example, if the issue under discussion is how Sue's talk was received, the sentence in (117) can be used even if one of the professors did not smile:

(117) The professors smiled.

However, in a situation involving an experiment about sleep, (118) will not be accepted as appropriate in case one of the subjects is not asleep (example taken from Lasersohn 1999):

[29] This definition is formulated in terms of overlap, instead of proper-part, in order to account for examples such as (i), which is undefined in case all the students, comprising boys as well as girls, performed the play (Križ 2016: 517):

(i) The boys performed Hamlet.

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(118) The subjects are asleep.

Križ devises a formal implementation of the idea that such exceptions are only allowed if under the literal reading, the sentence has a truth-value gap, instead of being false. Thus, according to Križ, the maximalizing effect (i.e. the removal of non-maximality) of *all* and *whole* can be explained if their semantic contribution is to eliminate the truth-value gap that arises with homogeneous predicates.[30] In this system, *all* and *whole* (in the relevant use) denote a homogeneity removing operator (notated ALL) that can be defined as follows:[31]

(119) Given a predicate P and an entity x,
ALL(P)(x) is true iff P(x) is true; otherwise, ALL(P)(x) is false.
Definedness condition: ALL(P)(x) is defined iff P is homogeneous.

This semantics directly applies to the floated quantifier *all*. For the adnominal *all*, we may assume the denotation in (120):

(120) $[\![\text{all}_{DP}]\!] = \lambda x.\lambda P.\ \text{ALL}(P)(x)$

There is evidence for this analysis against an alternative view, recently defended by Champollion (2017), according to which *all* is a distributive operator, requiring that all the parts of an entity, up to a certain level of granularity, satisfy the main predicate. Champollion's analysis can explain why *all* is acceptable with some collective predicates, e.g. *gather*, but disallowed with others, e.g. *numerous*:[32]

[30] Križ proposes a concept of sufficient truth in order to characterize the status of the acceptable exceptions. He assumes that the issue under discussion triggers a partition of the set of possible worlds, such that worlds with exceptions fall in the same cell of the partition as worlds where the sentence is literally true—e.g. in (117), the worlds where all professors smiled and the worlds where all except Smith smiled fall in the same cell, the one in which Sue's talk was well received. A sentence is *true enough* with respect to an issue I, in a world w, if it is literally true in a world w′ and w and w′ are in the same cell of the partition characterizing the issue I (Križ 2016: 501). The allowance of exceptions is then explained by a pragmatic principle requiring the use of sentences believed to be true enough (a modification of Grice's maxim of quality). Moreover, a sentence cannot be used if it is literally false. Therefore, in the context imagined for the example (117), *All the professors smiled* cannot be used to describe the situation. As a consequence, only sentences which, literally taken, have no truth-value can qualify as acceptable exceptions.

[31] Non-quantificational analyses of ALL were suggested by Partee (1995: 579–84) and implemented by Brisson (1998), Lasersohn (1999), and Burnett (2012). We adopted Križ's (2016) proposal because it offers a plausible explanation of the correlation between homogeneity and non-maximality.

[32] The contrast illustrated in (121) is due to Dowty (1987). Attempts at defining the distinction between two types of collective predicates can be found in Winter (2002) and Dobrovie-Sorin (2014). Dobrovie-Sorin proposes that divisiveness (down to pluralities) is the property that distinguishes between the two classes of collective predicates, but—unlike Champollion (2017)—she does not treat *all* as a distributive quantifier.

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(121) a. All the boys gathered.
b. *All the ants in the colony were numerous.
(Champollion 2017: 244)

As acknowledged by Champollion (2017) himself, his proposal (according to which in sentences built with collective predicates *all* is a distributive quantifier over subgroups) is confronted with a number of exceptions: *be a group*, *be a motley crew*, *be small in number* do distribute to subgroups but are nevertheless unacceptable with *all*; conversely, *form a pyramid* is a non-divisive predicate, but nevertheless allows *all* (see (122)):

(122) Some of the boys were crying, but eventually (and after much discussion), all the boys formed a (nice) pyramid. (Champollion 2017: 244)

An analysis of *all* as a homogeneity remover can account for these data. Notice that (122) involves a homogeneous property (see the definition in (114)). Thus, (123) is neither true nor false if only a part of the boys formed a pyramid. (123) can be used to describe a situation in which 18 out of 20 of the boys in a class formed a pyramid, due to non-maximality (the exception tolerance of homogeneous predicates).

(123) The boys formed a pyramid.

Turning now to those predicates that distribute to subgroups but do not allow *all*, exemplified by *be a group*, *be a motley crew*, *be small in number*, they can be argued to be non-homogeneous. The predicate *be small in number* is similar to *numerous*: evaluating the number of individuals in a sum or group requires taking into account all the members. If a group/sum x is not in the extension of *be small in number*, no truth-value gap arises if this group/sum overlaps with a group that is small in number—the sentence *x is small in number* is simply false rather than undefined. Correlatively, it makes no sense to speak of members of the group/sum which are not taken into account when a sentence with *be small in number* is evaluated.[33] Finally, predicates such as *be a group* or *be a motley crew* denote

[33] Löbner (2000) uses the term "integrative" to refer to such predicates and "summative" to refer to the homogeneous predicates. In the case of predicates of singular entities, non-homogeneity is quite common. Thus, *mad*, *intelligent*, and many more are all non-homogeneous when applied to singular DPs. Such predicates become homogeneous due to pluralization. Homogeneity is thus the default case for plural predication, with the exception of those predicates that are concerned with measuring, e.g. *numerous*, *be a group of five*, *be a large crowd*, *be few in number*, *heavy*, *weigh 3 tons* (see Dowty 1987; Brisson 1998).

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sets of groups, which are impure atoms (Link 1984; Winter 2002). Since atoms do not overlap with each other, the issue of undefinedness in case of overlap does not arise. Therefore, such predicates are not homogeneous. This explains why ALL cannot apply to this type of collective predicates.

4.6.3 Homogeneous predicates and cumulative quantification

According to Winter (2002), Dowty's (1987) observations regarding the necessity of distinguishing between two classes of collective predicates hold not only for DPs built with ALL, but for all quantificational DPs, including MOST, as well as non-specific indefinites:

(124) a. *{Most of the/No/At least two/Many/Few/Exactly four/Between four and ten boys} {are a good team/numerous}.
b. {Most of the/No/At least two/Many/Few/Exactly four/Between four and ten boys} {met/gathered in the hall/are similar}.
(Winter 2002: 497)

Since none of these examples can be assigned a distributive reading, it is clear that Champollion's analysis, even if it had been correct for ALL, cannot be extended to cover the contrasts above. Which strengthens the case against the distributive analysis of ALL.

On the other hand, the contrasts in (124) cannot be explained by assuming a non-quantificational (homogeneity-remover) analysis comparable to the one suggested for ALL in §4.6.2. And yet the contrasts in (124) are triggered by exactly the same distinction between two classes of collective predicates that is relevant for ALL. Note indeed that here also, *form a pyramid* groups together with *gather*, *meet*, and *be similar* rather than with *be a good team/mafia/numerous*:

(125) {Most of the/No/At least two/Many/Few/Exactly four/Between four and ten boys} formed a pyramid.

In sum, we need to account for the contrasts in (124) by explaining why a quantificational DP (see the analysis proposed for MOST_{RP} in this chapter) is ruled out with a subtype of collective predicates (the diacritic # notates illegitimate LF representations):

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(126) a. Most of the boys formed a pyramid.
b. *Most of the boys are a good team.

(127) a. $\exists x$ (*boy(x) $\wedge$ x $\leq$ σz.*boy(z) $\wedge$ formed-a-pyramid(x) $\wedge$ μ(x) > μ(σz. *boy(z)-x))
b. #$\exists x$ (*boy(x) $\wedge$ x $\leq$ σz.*boy(z) $\wedge$ good-team(x) $\wedge$ μ(x) > μ(σz.*boy(z)-x))

Assuming Winter's distinction between "set predicates" and "atom predicates" (see footnote 34), the example in (127b) is ruled out because the same variable cannot be assigned both a "set predicate" and an "atom predicate". No problem arises in (127a) if we assume that *form a pyramid* is a "set predicate". In our system, Winter's 'set predicates' are to be understood as predicates of sums.

The ill-formedness illustrated in (126b) also appears for indefinites:

(128) *Ten students are a good team.

Referential DPs (definites, demonstratives, as well as specific indefinites for which overt material indicates a specific reading) are allowed with any kind of collective predicate, in particular with atom predicates:

(129) {The students/Five students I know/Mary and John} are a good team.

These examples are acceptable because referentially interpreted plural DPs can be shifted to group-denoting DPs, and as such they are legitimate arguments of predicates that denote atoms.

In sum, Winter's distinction between atom/set predicates allows us to account for the data regarding MOST (as well as non-specific indefinites) based on our analysis of cumulative quantification.

We still need to address two interrelated problems. On the one hand, Winter provides no clear definition of his distinction,[34] and he even mistakingly lists *form a pyramid* among "atom predicates". On the other hand, we

[34] Winter (2002: 497) only proposes an empirical criterion for distinguishing set predicates from atom predicates: if the sentences in (i) and the corresponding sentences in (ii) are equally acceptable and, if acceptable, are semantically equivalent, then PRED is an *atom predicate*; otherwise, it is a *set predicate*:

(i) {All the/No/At least two/Many} NP_{pl} PRED

(ii) {Every/No/More than one/Many a} NP_{sg} PRED

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need to come back to ALL and consider the choice between the homogeneity remover analysis proposed in §4.6.2 and an envisageable cumulative quantificational analysis.

The notion of homogeneity introduced in §4.6.2 (which corresponds to Löbner's definition of "summative predicates") proves to be useful for Winter's "set predicates". We suggest that all homogeneous collective predicates are "set predicates". Group predicates are clearly non-homogeneous, as explained in §4.6.2. Nevertheless, some non-homogeneous predicates behave as set predicates—thus, *suffice to defeat the US Army* is clearly non-homogeneous (if it is true of a proper part of *x*, it is necessarily *true* of *x*), yet it allows non-specific indefinite subjects, showing that it is not a group predicate:

(130) No more than 25,000 soldiers would suffice to defeat the US Army.

Interestingly, such predicates (which are non-homogeneous but yet qualify as set predicates) appear to accept the adnominal *all*, at least for some speakers (see Champollion 2017, who cites (131) as another counterexample to his theory), but not the floated *all* (see (132)):

(131) I know it sounds kind of crazy but in fact all the weapons in this little village would suffice to defeat the US Army.
(Champollion 2017:244)

(132) *The weapons in this village all suffice to defeat the US army.

This suggests that the adnominal *all* is not always a mere homogeneity remover, but can also have a cumulative quantificational analysis, along the lines in (133), which yields (134) as the interpretation of (131). Under this analysis, *all* may still act as a homogeneity remover for the nuclear scope predicate, turning the referential denotation of the DP into a quantificational denotation. But crucially, it does not *need* to do homogeneity removal, and this is why it is accepted with non-homogeneous predicates. Its role seems to be that of emphasizing the number, which corresponds to the reference to measuring in the formula.[35]

[35] Without *all*, the sentence in (131) can mean that the weapons in that village may defeat the US Army due to their particular qualities. *All* stresses the fact that their number is the relevant factor on which victory is based. We speculate that this special meaning can arise due to a scalar contrast that involves the series *some–many–most*. A similar number-oriented meaning appears in examples such as (i):

(i) All the expenses amount to 30,000 dollars.

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(133) $[\![\text{ALL}_Q]\!] = \lambda x\, \lambda P\, \exists y\, (y \leq x \wedge P(y) \wedge \mu(y) = \mu(x))$

(134) $\exists y\, (y \leq [\![\text{the weapons in this village}]\!] \wedge \text{suffice-to-defeat-the-US-army}\,(y) \wedge \mu(y) = \mu([\![\text{the weapons in this village}]\!])$

This shows that the sensitivity to the distinction between collective predicates exhibited by DPs of the form [ALL DP] does not force us to adopt a non-quantificational analysis. As far as we can tell, the evidence in favor of a non-quantificational analysis is mainly distributional: crosslinguistically, ALL preferentially takes OF-DPs as complements and can be used as a floated quantifier. As shown in (132), the floated *all* can only be analyzed as a homogeneity remover.

4.6.4 Back to the distributional differences between ALL and MOST

The analysis of *all* as a homogeneity remover sheds light on its distribution: as shown in (119), *all* modifies the predication relation between an entity and a homogeneous predicate. This explains why it attaches above the DP-level, to entity-denoting DPs, and may also account for the floated quantifier use, allowing an analysis where *all* directly applies to the predicate.[36]

The fact that homogeneity is also found with singular count DPs (see (113)) explains why in many languages ALL can combine with singular count DPs (see the generalization in (106) and the examples in (108)). Moreover, since ALL, in this analysis, does not involve quantification over parts of entities, its use with singular count DPs is unproblematic for the generalization in §4.5.1, according to which quantification over parts of atoms requires an element that may introduce the grinder—compare MOST, which requires the head R^0 in order to quantify over parts of atoms.

MOST differs from ALL in that it is a genuine quantifier. It also triggers the removal of homogeneity, but this is a general effect of quantification (see Löbner 2000). This may explain why direct attachment of MOST above the DP-level, without the mediation of R^0, is crosslinguistically rare, as opposed to ALL.

[36] See Brisson (1998) for an analysis in which floated quantifiers directly apply to the predicate, and for evidence that floated quantifiers are not stranded DP-quantifiers.

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4.6.5 More on the distribution of ALL in English

The semantic analysis proposed above, according to which ALL applies to an entity, neatly corresponds to the observable syntax of the examples examined so far, in which ALL occurs above definite DPs, which are entity-denoting expressions.

It should however be observed that English allows adnominal *all* in three other contexts: with NPs (*all books*), with numeral+NP (*all ten books*), and with *of*+DP (*all of the books*):

To illustrate the first context, let us consider the following examples:

(135) a. All desks are brown. (Partee 1995, from Matthewson 2001: 169)
b. I admire all linguists. (Matthewson 2001: 169)

These examples are at first sight problematic for our analysis: bare NPs denote properties of entities and as such should be incompatible with ALL, which needs to apply to entities.

The problem can be solved by assuming that the NP complement of *all* is not genuinely bare, but rather a DP headed by a null D with the semantics of a maximalizing operator. In other words, the apparently bare NPs in the examples above are in fact entity-referring DPs.

Evidence in favor of this assumption is provided by the contrast between examples like (135), in which *all*+NP occurs in generic contexts, and examples that refer to particular situations, as in (136) (see Matthewson 2001 and references therein):

(136) a. #All pages in this book were torn.
(Partee 1995, from Matthewson 2001: 169)
b. *All girls went to the gym.
(Brisson 1998, from Matthewson 2001: 169)
c. Last night I threw a party and a bunch of linguists and philosophers came.
#All linguists got drunk. (Matthewson 2001: 170)

As Matthewson notices, non-generic contexts are restricted to Condoravdi's (1994) "functional" reading, where a bare noun can receive a quasi-universal reading:

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(137) In 1985 there was a ghost haunting the campus . . .
a. Students were aware of the danger.
b. All students were aware of the danger. (Matthewson 2001: 170)

As observed by Dobrovie-Sorin and Laca (1998), the kind-referring and the quasi-universal readings group together across languages: a given language allows both readings or neither of them. This suggests that for both readings a null D^0 with the semantics of a maximalizing operator is present in the underlying syntax.

In sum, for examples of the type in (137), NP complements of *all* are to be analyzed as DPs with a null D, as we proposed for *most*+NP_{mass} in English (see §§2.2 and 4.5.2).

Let us now consider the examples below:

(138) a. All three visitors left early. (Huddleston and Pullum 2002: 376)
b. Did you read all ten books?

In this case, we are not dealing with *all* attached above a DP headed by a cardinal, because (i) DPs headed by cardinals are not affected by homogeneity (*I read ten books* is false if I read just nine) and (ii) in these examples, the DP is interpreted as definite (cf. Huddleston and Pullum 2002: 376). We propose, therefore, that these examples involve a null D with the semantics of the Iota operator, licensed in this very specific context:

(139) [all $[_{DP}$ $[_{D}Ø]_{+def}$ $[_{MeasP}$ three [visitors]]]]

Finally, *all* may combine with *of*+DP:

(140) All of my friends came to the party.

If this *of* represents an instance of R^0, it is difficult to explain why it combines with *all*, because *all* requires an entity-denoting expression and RP is property-denoting. We can suggest two analyses that are compatible with the analysis proposed in this section. One possibility would be to assume that in this particular context *of* is a dummy preposition, as proposed by Matthewson (2001); or this is another instance of the null definite D licensed by *all*, as in (141):[37]

[37] Note that, although partitive constructions in general obey the anti-uniqueness constraint (see §4.2—ex. of the type **these of the books*), English is peculiar in allowing certain exceptions, which are not restricted to constructions with *all*, but also appear with cardinals—see the type *the three of them*.

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(141) [all [$_{DP}$ [$_{D}$Ø]$_{+def}$ [$_{RP}$ of my friends]]]

Romance languages lack these three constructions, consistently using an overt definite determiner with *all*.

To sum up, the crosslinguistic contrast in the distribution of OF with ALL and MOST supports the difference between the quantifier MOST and the homogeneity remover ALL.

4.7 Conclusions

In this chapter, we examined first the behavior of MOST$_{dist}$ and MOST$_{cum}$ in partitive configurations. Romanian allowed us to illustrate the behavior of a language with MOST$_{dist}$. When used in partitive configurations, MOST is necessarily distributive (as in non-partitives), which indicates that it is an instance of MOST$_{dist}$. This also holds to a certain extent in Hungarian (subject to speaker variation). Turning to MOST$_{cum}$, we observed that the presence of a partitive complement allows, as a further possibility compared to non-partitives, quantification over parts of singular entities. This follows from the fact that in partitives, we can have a null N^0 with the meaning STUFF in a configuration in which *of* (which realizes R^0) takes as a complement a singular count DP. In non-partitives, on the other hand, MOST$_{cum}$ cannot combine with NP$_{sing}$ (because MOST$_{cum}$ sits in Spec,Meas and NP$_{sing}$ cannot be a complement of Meas^0).

We have also shown that the contrast in (im)possibility of quantifying over parts of singular entities in (non-)partitives holds not only for MOST$_{cum}$ but also for cumulative quantifiers such as the Japanese *hotondo* or the Chinese *dabufen*, which are not lexically related to MANY/MUCH.

Our first result can thus be summarized as follows:

(142) The behavior of the Romanian MOST$_{dist}$ (obligatory distributive interpretation) on the one hand and on the other the behavior of the cumulative majority quantifiers, MOST$_{cum}$ in particular (possibility of quantifying over parts of singular entities) are predicted by just combining the semantics each of these elements have in non-partitives with the semantics of partitives.

Our second result was the observation that in certain languages, the MOST that occurs in partitives is "specialized", in the sense that it cannot be analyzed as a

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MOST that could also occur in a non-partitive, but instead must be assumed to subcategorize for an RP constituent, hence the label MOST_{RP}. We argued that in English and Icelandic, the MOST that occurs in partitives cannot be analyzed as $\text{MOST}_{\text{dist}}$ (which is the type of MOST these languages have in non-partitives) but must be analyzed as MOST_{RP}. This proposal explains why mass restrictors as well as collective predicates in the nuclear scope of MOST are allowed in English and Icelandic partitives, but not in non-partitives.

The existence of majority quantifiers subcategorized for RP (partitive constituents) can also be observed in those languages that lack non-partitive majority quantifiers. Cases in point are Italian or Albanian, which have proportional MOST (or, more precisely, MORE embedded inside a definite DP) only in partitives. A variant of this case is found in Persian and Adyghe, where the majority quantifier is expressed by the comparative (rather than by the superlative) of MANY/MUCH (in the absence of a definite article), and in Wolof, where it is expressed by a comparative verb "be more". Like in Italian and Albanian, the majority reading can only appear in partitives.

Summarizing:

(143) Certain languages have MOST_{RP}, i.e. a MOST that subcategorizes for partitives.

Finally, we distinguished MOST_{RP} from a much rarer partitive MOST, which takes a DP complement without the mediation of a functional head R^0, hence the label MOST_{DP}. We argued that the Icelandic *flestir* is a MOST_{DP} in those configurations in which it takes a definite DP with which it agrees in gender, number, and case. We also proposed that MOST_{DP} is adequate for analyzing the English MOST that takes a kind-referring bare NP as a complement, e.g. *Most water is liquid.*

The distinction between MOST_{RP} and MOST_{DP} is important not only because it allows a fine-grained description of the syntax of MOST in partitives, but also because it highlights an important crosslinguistic difference between MOST and ALL: MOST canonically takes RP complements (additionally, but only very rarely, it can also take DP complements), whereas ALL canonically takes DP complements (additionally, but only very rarely, it can also take an RP complement, e.g. *all of the students* in English). We suggested that this difference in subcategorization provides syntactic evidence in favor of a non-quantificational analysis of ALL (Partee 1995; Brisson 1998; Lasersohn 1999; Burnett 2012; Križ 2016), as opposed to MOST_{RP}, which behaves as a cumulative quantifier.

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4.8 Appendix: On a special superlative reading of MOST

The aim of this section is to discuss a particular superlative reading of *most (of)*, which has been presented in Kotek et al. (2015) as evidence in favor of the superlative analysis of proportional *most* (we discuss it here because Kotek et al.'s examples involve partitive *most*). We acknowledge the existence of this reading, in relation to which we basically agree with the analysis proposed by Kotek et al. (2011), but we observe that the existence of this reading provides no argument in favor of the superlative analysis of the majority MOST. We will moreover argue that Kotek et al.'s (2011) superlative analysis of majority MOST, which is significantly different from Hackl's (2009) implementation (presented in §1.2.2), has its own problems, in addition to being confronted with the same empirical counterevidence as is that of Hackl (2009).

The type of superlative reading of *most (of)* that Kotek et al. (2011; 2015) established experimentally had been observed by de Hoop (2006):

(144) Why are most babies born on a Tuesday? (de Hoop 2006)

De Hoop points out that in this example *most* does not have the majority reading: the question asked in (144) does not say that more than half of the newborn babies are born on a Tuesday, but rather that Tuesday is the day of the week when the largest number of births take place. This shows that the superlative reading of *most* is allowed even if *the* is absent, but under special conditions that need to be clarified. This constitutes the puzzle that de Hoop (2006) pointed out and left open (for Krifka to solve in the years to come after his anniversary).

The detailed study reported in Kotek et al. (2011), as well as our own research, support the following solution of de Hoop's puzzle: examples of the type in (144) do not involve the canonical superlative MOST (which in English requires *the*), but rather a different superlative MOST. More precisely, the LF representation of the superlative *most* (without *the*) is different from the LF underlying the canonical superlative *the most*: whereas for the latter, -EST raising out of the DP is required (as proposed by Heim 1999, a short presentation of which can be found in §1.2.2), the former involves an LF in which -EST remains inside the DP that embeds *most*.

In order to support the hypothesis of an LF difference between the superlative *most* illustrated in (1) above and *the most*, we need to compare the constraints on their respective distributions.

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Farkas and Kiss (2000) observed that relative superlatives (in English) must be m-commanded by the correlate.[38] They use as evidence the quantity superlative *fewest*, which—on a par with *most*—lacks the absolute reading but, unlike *most*, is not ambiguous between a superlative and a proportional reading. (145b) shows that the correlate—signaled here by underlining—cannot be in the VP when the superlative-embedding DP is the subject of an active clause:[39]

(145) a. John received the fewest votes.
b. *The fewest voters voted for John. (Farkas and Kiss 2000: 427, ex. 24)

Our informants confirmed that *the most*—which can only be superlative—is unacceptable or marginal in subject position when the correlate is postverbal:

(146) a. ?? The most immigrants come from India.
b. ?? The most babies are born in July.

However, some speakers allow the intended superlative reading to be expressed by using bare *most*, without *the*, which confirms de Hoop's observation:

(147) a. Most immigrants come from India.
b. Most babies are born in July.

We have tested the *immigrants* example with bare *most* in a partitive environment (*most* + *of* + DP). A superlative reading (in which the proportion of immigrants coming from India may be well below 50 per cent) was accepted by 3 out of 7 informants:

(148) % Most of the immigrants come from India.

[38] On the notion of correlate, see §1.2.2.

[39] Farkas and Kiss (2000) formulate the constraint in terms of m-command, instead of c-command, in view of examples such as (i):

(i) Voters cast the fewest votes for John.

Moreover, they claim that the constraint applies to the base position of the superlative DP, because examples where the superlative is the subject of a passive are acceptable:

(ii) The fewest votes were cast for John.

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Examples of the type in (147) can also be found on the Internet:

(149) a. **Most babies** are born in September, in fact stats from Harvard say September 16 is the most common birth date (in the US at least). (www.telegraph.co.uk › Men › Relationships)

b. In 2016, **most immigrants** came from Mexico (26.5%), India (5.6%), and China (4.9%). Mexico and Central American countries, including Cuba, accounted for the largest proportion of legal and illegal immigrants, but not the majority. Asia represented slightly more than 20%, with the rest of the world comprising 42.5%. (https://www.moneycrashers.com/immigration-effects-us-economy/)

In sum, the superlative "bare" *most* (which is quite rare) differs from *the most* on the one hand by the absence of *the* and on the other hand by the fact that it is not subject to the m-command constraint observed by Farkas and Kiss (2000).

Similar observations were independently made by Kotek et al. (2011), based on experimental data. These authors investigated the availability of superlative readings for examples of the type *the most NP* and *most of DP* in subject and object position, and with respect to different positions of the correlate—c-commanding and non-c-commanding. Whereas for the object position (in which case they only use a c-commanding correlate), the contrast is clear between *the most NP* (only superlative) and *most of DP* (only proportional) (see (150)), for the subject position they report a complex picture. Only some speakers allow *the most NP* in (151) (recall that in this example and the rest of the section, we indicate the correlate by underlining):

(150) a. The triangle is touching most of the circles. (proportional only)
b. The triangle is touching the most circles. (superlative only)
(Kotek et al. 2011: ex. 5)

(151) % The most circles are touching the triangle.
(Kotek et al. 2011: ex. 3b)[40]

[40] Kotek et al. (2011: 356) do not mark the example as degraded, but write that some people "find *the most* ungrammatical in subject position". Therefore, we have marked their example (3b) '%'.

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Some of the speakers who do not allow *the most* in (151) allow a superlative reading for *most+of+DP* in this position:[41]

(152) Most of the circles are touching the triangle. (Kotek et al. 2011: ex. 3a)
% superlative

Interestingly, Kotek et al.'s experimental result regarding the fact that the superlative reading of *most of* is not allowed by all speakers matches with the result of our small questionnaire: as already said above, only 3 out of our 7 informants accept examples of the type in (148).

The relevance of c-command is shown by the fact that the speakers who do not accept *the most* in (151) find it either fully acceptable or still marginal, but less deviant, if the subject is c-commanded by the correlate, as in (153):[42]

(153) (%) Which shape are the most circles touching?

Kotek et al. (2011) also notice the existence of a special interpretation for the superlative in non-c-commanded position, in (151) and (152), for some of the speakers who accept these examples: the set of compared groups of circles (i.e. the set made up of the groups of circles that respectively touch the four shapes that they use in the experiment: a triangle, a square, a pentagon, and a hexagon) should represent a partition of the total sum of circles. The necessity of a partition was established based on an experiment in which the informants were asked to evaluate the truth of the tested sentences with respect to a picture representing circles touching four shapes. Kotek et al. (2011) used two figures, representing the following scenarios:

(154) Scenario 1 (each circle is touching only one shape):
5 circles are touching the triangle
2 circles are touching the square

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[41] The availability of a superlative reading for examples of the type in (152), for some speakers, was further confirmed by a larger experimental study reported in Kotek et al. (2015). They claim that 56 out of 135 participants in the experiments allow a superlative reading for examples of the type in (i), judging this sentence as true in case the number of blue dots is greater than the number of dots of other colors, but smaller than 50%:

(i) Most of the dots are blue.

[42] The fact that the constraint on the subject position can be independent from c-command or m-command was also confirmed by two of our informants, who reported that they can only use bare *most* in (i), in spite of the c-commanding correlate:

(i) It's from Italy that (*the) most intellectuals emigrated. (superlative)

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1 circle is touching the pentagon
3 circles are touching the hexagon

(155) Scenario 2 (one circle is touching two shapes):
1 circle is touching both the triangle and the square
4 circles are touching only the triangle
2 circles are touching only the square
1 circle is touching the pentagon
3 circles are touching the hexagon

For the c-commanded positions, no problems arose for interpreting the superlative in Scenario 2. However, for the non-c-commanded positions in (150) and (152), some speakers could not interpret the sentence as true in Scenario 2: those who accepted *the most* in (150) found this sentence impossible to use in this context, and those who accepted *most of* with a superlative interpretation (see (152)) only allowed a proportional interpretation in this case, judging the sentence, accordingly, as false.

Kotek et al.'s (2011) explanation of their observations can be summarized as follows: (i) in the special partition-based reading, the comparison class of the superlative consists of maximal sums of circles that are touching a certain shape; -EST is interpreted DP-internally and the comparison class is built via association with focus (following an analysis suggested by Heim 1999); (ii) in the unmarked superlative reading, where there is no partition requirement, the comparison class consists of the various shapes; -EST is interpreted via raising out of the DP, to a position immediately below the correlate (as in Heim's raising analysis of the superlative); (iii) there is a general requirement of non-overlap between the members of the comparison class. From (iii), coupled with the fact that for DP-internal -EST the comparison class must exhaust the NP-domain, it follows that a DP-internal interpretation of MOST requires a partition of the comparison class: the pluralities whose numbers are compared must not share any element and their sum must equal the maximal sum of Ns. Thus, the need for a partition observed for the superlative *most* can be explained if we assume that this superlative reading relies on a DP-internal scope of -EST.[43]

[43] The fact that some speakers who use (152) as a superlative allow the shared circle in Scenario 2 may be explained if the partition requirement is weakened to a requirement that the compared groups should be in principle disjoint, with a tolerance for accidental instances of overlap.

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The contrast in terms of c-command can also be explained: -EST raising out of the DP seems to be able to apply (in certain languages at least, and subject to some speaker variability) only if the correlate c-commands the superlative in overt syntax. If this condition is not fulfilled, a superlative interpretation can be obtained only by leaving -EST inside the DP and building a comparison class via focus association.

In Heim (1999), deriving relative readings via raising of -EST out of the DP (immediately below the correlate) or via raising of -EST inside the DP (in which case C is restricted via focus association) are presented as *alternative* analyses, as schematized in (157) for the sentence in (156):

(156) John climbed the highest mountain.

(157) a. [John [λx [-C-EST] [λd λx. x climbed a d-high mountain]]] (DP-external -EST)

b. [the [λx [C-EST [λd λx. d-high-mountain(x)]]]] [λx [[John]$_F$ climbed x] ~S]]

(DP-internal -EST with focus association)

On both analyses -EST has the same denotation:

(158) ⟦-EST⟧= $\lambda C\, \lambda R_{<d,<e,t>>}\, \lambda x\, \exists d\, (R(d)(x) \wedge \forall\, y\, ((y \in C \wedge y \neq x) \rightarrow \neg R(d)(y)))$

⟦-EST⟧ (C)(R)(x) is defined iff

a. $x \in C$

b. $\forall y\ (y \in C \rightarrow \exists d\ R(d)(x))$ (adapted after Heim 1999)

In the raising analysis in (157a), the comparison class (C) comprises the correlate (John) and other individuals that climbed a mountain and the compared degrees are of the type 'd: x climbed a d-high mountain'.

In the analysis in (157b), in which -EST only raises above the [AP+NP] constituent, but stays inside the DP, in the complement of D, C consists of mountains (via the definedness condition in (158b) and the compared degrees are of the form 'd: x is a d-high mountain'. C is constrained to be the union of the focus variable S. The operator ~ defines S as a subset of the focus value of the constituent to which it attaches (cf. Rooth (1992)):

(159) $S \subseteq \{P: \exists y[P = \lambda x.$ y climbed x$]\}$

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The union of S is a set of individuals of the type {x: ∃y.y climbed x}, where y ranges over John and other individuals in a contextual set of alternatives (let us use the label 'contrast set' for this set of individuals, following Farkas and Kiss 2000). C is identified with this union-set, therefore it only comprises objects climbed by somebody in the contrast set. Putting together the definedness condition of -EST and focus association, we arrive at the result that C consists of mountains climbed by somebody in the contrast set.

Kotek et al. (2011) use this type of analysis for the special partition-based reading of superlative *most*, with certain amendments of which one is crucial:[44] the comparison class is not identified with the union of S, but with the set of the maximal sums of the properties in the focus variable S:

(160) [(the) [C-EST [d-many (of the) circles]]] [λx [x touches [the triangle]$_F$]~S]
S ⊆ {P: ∃y[P = x touches y]}
S = {λx.x touches the triangle, λx. x touches the square, λx. x touches the pentagon, λx. x touches the hexagon}
C = {σx.x touches the triangle, σx. x touches the square, σx. x touches the pentagon, σx. x touches the hexagon}

Kotek et al. (2011) propose that the type-shifting that S undergoes in order to generate C is a costly operation, and this is why the in situ relative reading is severely restricted (it appears only in non-c-commanded environments and only for some speakers).

We would like to suggest an alternative explanation. Notice first that *the most* is marginal in non-c-commanded positions anyway (see also (146)). This indicates that *the most* normally involves -EST raising (we will come back to this issue below). It is only the bare *most* that can remain in a DP-internal position at LF, but this form is homophonous with proportional *most*. Since we do not consider proportional *most* as a special reading of the superlative, we may assume that those speakers who cannot get a superlative reading of *most* simply lost superlative *most* altogether, as a result of the competition with the proportional determiner (MOST$_{RP}$). Those who still allow superlative *most*, only use it as a last resort when *the most* is excluded (in those configurations in which the c-command constraint on *the most* is not satisfied).

[44] For readability purposes, we skip over other amendments which do not seem to us to bring any significant improvement to Heim (1999).

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We conclude that both derivations (with DP-external and DP-internal -EST) can underlie relative superlative readings.[45] As suggested by Kotek et al. (2011), the choice between them is influenced by the correspondence between LF and the surface structure. In subject positions, see (160), the superlative DP c-commands the focus variable at surface structure. This provides an immediate input for the computation of C. With object superlatives, as in (157b), the in situ derivation requires QR of the object above the subject. This may be a reason for ruling out the in-situ strategy for *most* in object position (see (150)).

One issue that seems problematic for our account is why *the most* is not more productively used for the in situ strategy—in other words, why isn't (151) fine for all speakers, with an in situ derivation? No competition with proportional *most* appears in this case. This is all the more puzzling if we take into account the fact that in the case of the DP-internal scope of -EST, the superlative DP is expected to be definite—only in the raising analysis is the superlative DP interpreted as indefinite (see (157a), and Szabolcsi 1986, Heim 1999).[46] A possible answer is provided by Wilson (2018). She argues on independent grounds that the definite article found with the superlative *most* is not the article of the entire DP, but rather forms a constituent with *most*, and the entire DP is headed by a null indefinite D.[47]

[45] Heim (1999) presented the two analyses as competing versions, and finally decided for the raising analysis, based on the existence of a special reading which appears in modal contexts, in which -EST is interpreted *de re* although the superlative DP is interpreted *de dicto* (hence the label "upstairs *de dicto* reading"):

(i) John wants to climb the highest mountain.
a. *de re* reading: John wants to climb a certain mountain, which is higher than the mountains the others want to climb.

b. "downstairs" *de dicto* reading: John wants that the mountain he will climb should be higher than the mountains the others will climb.

c. "upstairs" *de dicto* reading: John wants to climb any mountain that has a certain height; this height is greater than the height the others want the mountains they climb to have.

In the reading in (i)(c), the degree operator scopes above the modal (the comparison is *de re*), but the DP that contains the superlative scopes below (there is no specific mountain of a certain height, unlike in (i)(a)):

(ii) John [λx C-EST [λd λx x wants (∃y. y is a d-high mountain ∧ x climbs y)]]

Because this reading can only be derived if -EST is allowed to raise out of the DP, as in (157a), Heim concludes that the raising analysis is preferable. More recently, several authors argued that both strategies, with DP-external and DP-internal scope of -EST, are used in relative readings (see in particular Pancheva and Tomaszewicz (2012) and Croitor and Giurgea (2016)).

[46] Other languages where two ways of expressing superlative MOST can be found, depending on the position of the correlate, show the expected picture: the bare *most* appears in a position C-commanded by the correlate, whereas *the most* appears in the non-c-commanded position, reflecting the in situ strategy (see Giurgea forthcoming, who invokes examples from Eastern Standard Armenian, Basque, and Mainland Scandinavian).

[47] Wilson's evidence comes from the availability of NP-internal correlates (see (i)), which have been argued to be restricted to indefinite relative superlatives (Pancheva and Tomaszewicz 2012):

(i) He ate [the most chocolate mini-cupcakes]
= He ate more chocolate mini-cupcakes than he ate of any other type (Wilson 2018: 26, ex. 31)

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Let us now turn to the main reason for which we inserted this section in our book. Is it true, as Kotek et al. pretend, that the existence of a superlative reading of bare *most* constitutes an argument in favor of the superlative reading of proportional *most*? We believe Kotek et al.'s (2011) account of the special partition-based superlative reading actually makes a superlative analysis of the proportional even more problematic, compared to Hackl's (2009) original version. Kotek et al. (2011) introduce the requirement that no element of the comparison class (C) can overlap with another. For Hackl (2009), the only non-overlap condition was related to the definition of -EST, requiring that the external argument of the NP should only be compared with elements of C that do not overlap with it (and recall that non-overlap was assumed to correspond to non-identity for pluralities). If there is a non-overlap requirement between *all* the members of C, then how can this requirement be satisfied in the case of the proportional reading? Notice that on the analysis of the relative reading relying on the DP-internal raising of EST, the context provides focal alternatives which are used to restrict C to a set of non-overlapping elements—the maximal sums corresponding to each alternative (see (160)). Kotek et al. (2011) claim that in the proportional reading, the focus is on the external argument of the NP (which they represent syntactically as a PRO inside a clausal projection embedded under D) and that the comparison class is reduced to two members because of a requirement that "every plurality in C must be as big as possible" (p. 365). But there is no empirical evidence for a focus on the external argument of the NP in the proportional reading, and the requirement that the members of C should be "as big as possible" is an *ad hoc* assumption, for which no evidence is provided.

Our view is that, when the context does not provide a suitable C for a DP-internal -EST, a superlative reading of MOST is impossible (see Szabolcsi 1986, Gawron 1995 and §1.2.2). This is in agreement with the clear empirical evidence that the proportional interpretation does not arise automatically for any superlative MOST (see Chapters 1 and 2). In sum, it seems to us that Kotek et al. (2011) weakens rather than strengthens Hackl's (2009) claim that proportional MOST is an absolute quantity superlative. This article shows that DP-internal scope is indeed possible for the -EST of MOST, but in this case a special reading emerges, with a comparison class consisting in disjoint sums in the NP-denotation, associated to the alternatives provided by focus. We do not see how the existence of this reading can be viewed as constituting evidence in favor of majority MOST being an (absolute) superlative.

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5

Majority quantifiers based on nouns

The largest part, the majority

Strings of the type THE LARGEST/LARGER PART or (THE) LARGE PART are probably the most widespread means of expressing majority judgments. One reason is the fact that they take a DP complement, which explicitly introduces the "whole" with reference to which the majority interpretation is computed. But why is it that the word PART combined with (the superlative OF) LARGE is crosslinguistically easily interpreted as meaning 'the major part'? Our answer will be that the majority reading is compositionally obtained by combining the adjective LARGEST (or LARGER, LARGE) with the functional noun PART, which introduces an unspecified binary partition. We will discuss a possible extension of this analysis to other nominal majority quantifiers built with abstract nouns of the MAJORITY type, derivationally related to LARGER, MANY/MUCH, or MORE (e.g. Sp. *mayoría* < *mayor* 'larger, bigger', Alb. *shumica* < *shumë* 'much, many'). Section 5.1 illustrates (THE) LARGE(ST) PART across languages. Section 5.2 examines the noun PART, distinguishing a concrete and a functional use, the latter of which is relevant for THE LARGE(ST) PART. The semantic composition of (THE) LARGE(ST) PART will be proposed in §5.3. An alternative quantificational analysis of LARGEST is discussed in §5.4. Section 5.5 is devoted to proportional nouns of the type MAJORITY: see §5.5.1 for their internal structure and §5.5.2 for their semantic analysis. Section 5.5.3 is devoted to the observation that some of these MAJORITY nouns allow a peculiar type of relative superlative reading (in addition to their majority reading). Section 5.6 discusses a possible extension of the partition-based analysis to partitive MOST and shows that the English partitive MOST is at least historically related to the LARGEST PART type of majority quantifiers. Finally, §5.7 examines majority quantifiers in Hindi, Latin, and Syrian Arabic.

5.1 (THE) LARG(EST) PART across languages

The majority reading of expressions of the type THE LARGEST PART can be found both in languages that lack proportional MOST and in languages that

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have proportional MOST. The first group is exemplified by Breton, Russian, Serbo-Croatian, and Lithuanian (which have distinct superlative morphology), French, Italian, Ibero-Romance, and Albanian (where the superlative is expressed by embedding a comparative in a definite DP—see §1.5.4), and Latvian (where comparatives with the "definite" inflection are also used as superlatives). Note that in Italian and Ibero-Romance, the comparative used in these configurations is suppletive (exx. (7)–(10)); Italian also has a regularly built superlative (THE+MORE+LARGE) which is however less frequent (see (11)):

(1) a. Al lodenn vrasañ deus ar vugale neus resped (Bre.)
the part largest of the children has respect
evit o zud.
for their parents
'Most children respect their parents.'

b. Liñvel eo ar pezh brasañ eus an dour war an Douar.
liquid is the piece largest of the water on the Earth
'On Earth, most water is liquid.'

(2) a. Ból'šaja čast´ naselénija živët v bédnosti. (Ru.)
largest part population.GEN lives in poverty
'Most of the population lives in poverty.'

b. Ból'šaja čast´ vadý na Zemlé žídkaja.
largest part water.GEN on Earth liquid
'Most water on Earth is liquid.'

(3) Najveći dio planeta su dijamanti. (S-C)
largest part planet.GEN are diamonds
'Most of the planet consists of diamonds.' (metro-portal.hr/pronadjen-planet-dijamant/)

(4) Didžiausia gyventojų dalis gyveno Nepriklausomos
largest.NOM inhabitants.GEN part.NOM lived independent.GEN
Lietuvos lūkesčiais. (Lith.)
Lithuania.GEN expectations.INST
'The largest part of the population lived in the expectation of Independent Lithuania.' (genocid.lt/Leidyba/1/audrone.htm)

(5) La plus grande partie des ressources est attribuée (Fr.)
the more large part of-the ressources is allocated
à la production.
to the production
'Most of the resources are allocated to production.'

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(6) Pjesa më e madhe e vendit është (Alb.)
part-the COMP AGR large AGR country-the.GEN is
e sheshtë.
AGR flat
'Most of the country is flat.'

(7) a. La maggior parte dei bambini rispetta/rispettano (It.)
the larger part of-the children respects/respect
i propri genitori.
the own parents
'Most children respect their parents.'

b. Sulla terra, la maggior parte dell' acqua è
on-the Earth the larger part of-the water is
allo stato liquido.
at-the state liquid
'On Earth, most water is liquid.'

c. La maggior parte dei miei colleghi si
the larger part of-the my colleagues REFL
incontreranno/incontrerà domani.
meet.FUT.3SG/3PL tomorrow
'Most of my colleagues will meet tomorrow.'

(8) A la Terra, la major part de l'aigua és líquida. (Cat.)
to the Earth the larger part of the water is liquid
'On Earth, most water is liquid.'

(9) Sobre el planeta Tierra la mayor parte del agua es
on the planet earth the larger part of-the water is
líquida. (Sp.)
liquid
'On Earth, most water is liquid.'

(10) Na Terra, a maior parte da água está na forma
on-the Earth the larger part of-the water is in-the form
líquida. (Port.)
liquid
'On Earth, most water is liquid.'

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(11) Il Duce ha contro di sé la più grande
the duke has against himself the more large part
parte dell'Europa. (It.)
of-the Europe
'The Duke has most of Europe against himself.' (https://www.ilsole24ore.com/art/notizie/2012-05-13/)

(12) Lielākā daļa pašreizējās kontinentālās garozas
larger.DEF part current.DEF.GEN continental.DEF.GEN crust.GEN
veidojusies pirms 3,4 — 2,4 miljardiem gadu. (Latv.)
developed before billions years.GEN
'Most of the current continental crust developed 3.4–2.4 billion years ago.'
(https://lv.wikipedia.org/wiki/Zemes_garoza)

Here are illustrations of THE LARGEST PART in languages that have majority MOST (see English and Icelandic, which have $\text{MOST}_{\text{dist}}$ and partitive MOST, German, Dutch, Swedish, Norwegian, and Greek, which have MOST_{cum}, Bulgarian, which has (THE) MORE as a cumulative majority quantifier, and Romanian and Hungarian, which have $\text{MOST}_{\text{dist}}$):

(13) a. The largest part of our planet is under water.

b. For the largest part of Americans of the period, religion must be assessed as a vital agent.
(https://peoplescontest.psu.edu/essays/religion)

(14) A Földön a víz legnagyobb része folyékony
the Earth.on the water largest part.POSS.3SG liquid
halmazállapotú. (Hung.)
state.POSS
'On Earth, most (of the) water is liquid.'

(15) Stærsti hluti framleiðslunnar er seldur til Evrópu
largest.DEF part production.DEF.GEN is sold to Europe
og Bandaríkjanna. (Ice.)
and United-States.DEF
'The largest part of the production is sold to Europe and the United States.'
(https://hbgrandi.is/hb-grandi/vorur/vignir/)

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(16) Der größte Teil der Untertanen lebt elend und
the largest part the.GEN subjects lives miserably and
müselig. (Ge.)
laboriously
'The largest part of the subjects lives a miserable and laborious life.'
(title of a book edited by Michael Hochedlinger and Anton Tantner)

(17) Ik heb ook het grooste deel van de milk gedronken. (Du.)
I have also the largest part of the milk drunk
'I drank most of the milk, too.' (Coppock 2019: 132)

(18) a. Den största delen av befolkningen är katoliker. (Sw.)
the largest part.DEF of population.DEF is Catholic
'The largest part of the population is Catholic.'
(https://sv.wikipedia.org/wiki/Montevideo)

b. Den största delen av väggen är målad.
the largest part of wall-the is painted
'Most of the wall is painted.'

(19) I den største delen av verden lider svært mange kvinner. (Norw.)
in the largest part of world-the suffer very many women
'In most of the world, a lot of women suffer.'
(https://www.vg.no/protokoll/)

(20) a. Το μεγαλύτερο μέρος των πολιτικών δυνάμεων
the larger part the.GEN political.GEN forces.GEN
είναι όμηροι των ηθικών αυτουργών (Gr.)
are hostages the.GEN moral.GEN authors.GEN
της χρεοκοπίας.
the.GEN bankruptcy.GEN
'Most of the political forces are hostages of the moral authors of the bankruptcy.' (https//twitter.com/vangelis_85/)

b. Το μεγαλύτερο μέρος {του τοίχου /από τον τοίχο}
the larger part the.GEN wall.GEN/from the wall
είναι βαμμένο.
is painted
'Most of the wall is painted.'

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(21) Naj-goljamata část ot knigite e na bəlgarski ezik. (Bulg.)
SUP-large-the part of books-the is in Bulgarian language
'Most of the books are in Bulgarian.' (bolgarkultura.hu/bg/biblioteka)

(22) Cea mai mare parte a tablourilor a fost furată. (Ro.)
SUP/the COMP large part GEN painting-the.GEN has been stolen
'Most of the paintings have been stolen.'

In Romanian, THE LARGEST PART must be used for quantification over mass and plural domains because majority MOST is restricted to distributive quantification (recall that Romanian has $\text{MOST}_{\text{dist}}$ but no partitive MOST). However, this does not hold for the other languages illustrated above: English and Icelandic also have a partitive MOST, which allows quantification over mass and plural domains, as well as quantification over parts of singular entities (see §4.4.3). In languages that have MOST_{cum}, quantification over parts of singular entities can be achieved by embedding MOST_{cum} in a partitive configuration (see §4.3). For German, however, our informants report that THE LARGEST PART is preferable for quantifying over parts of atoms—thus (23a) is preferred to (23b):

(23) a. Der größte Teil der Wand ist gestrichen.
the largest part the.GEN wall is painted

b. Das meiste der Wand ist gestrichen.
the.NSG most the.FSG.GEN wall is painted
'Most of the wall is painted.'

LARGEST PART is sometimes used even in contexts in which $\text{MOST}_{\text{dist}}$ or MOST_{cum} (without a partitive PP) could be used (see (13b), (16), (20a), (21)). Its low frequency in these contexts is explained by the competition with the more specialized $\text{MOST}_{\text{dist}}$ and MOST_{cum}.

In some languages, we find the adjective in its positive form—THE LARGE PART (see Armenian in (24)), or, if the language has no definite article, LARGE PART (see Turkish in (25)), although these languages have superlative morphology (see §§2.4.1 and 2.4.3):

(24) a. [Yerexaneri **mec masĕ**] hargum en irenc'
children.GEN large part-the respecting are their
cnołnerin. (Arm.)
parents.DAT-the
'Most children respect their parents.'

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b. Yerkragndi vrayi [ǰri **mec masě**] heł uk ē.
Earth.GEN on water.GEN large part-the liquid is
'On Earth, most water is liquid.'

c. [Im koleganeri **mec masě**] khandipen valě.
my colleagues.GEN large part will-meet tomorrow
'Most of my colleagues will meet tomorrow.'

(25) Hesab-ım-da-ki para-nın **büyük kısm-ı**.
account-my-LOC-in money-GEN large part-POSS.3S
'Most of the money in my account.'
(Tur., Göksel and Kerslake 2005: 164)

A form glossable as 'big, large' may also be found in languages without degree morphology, such as Swahili:[1]

(26) [**Idadi kubwa** y-a wa-toto] wa-na-cheza nje. (Swa.)
CLS9.part AGR9.large AGR9-of CLS2-child AGR2-PRES-play outside
'Most of the children are playing outside.'
(Zerbian and Krifka 2008: ex. 32a)

The fact that LARG(EST) PART can apply to any kind of domain is clearly related to the word PART, which can take any kind of DP (mass, plural, singular count) as a complement. The large applicability of LARG(EST) PART does not, however, explain why it can take the majority reading in such a wide variety of unrelated languages. To explain this fact we need to show that the majority reading of LARG(EST) PART is "compositional", i.e. it can be obtained by combining the meanings of LARGE, PART and—for the languages that have it—the superlative (or the comparative with a superlative meaning). Most importantly, the semantic composition should also explain the obligatory presence of the definite article (in those languages that have a definite article).

5.2 The noun PART

A remarkable characteristic of the word PART when used in THE LARGEST PART is that the overall DP does not refer to a specific part, distinguished from other parts by independent criteria of identification; the only information available about that part is that it satisfies the property expressed by the

[1] In Swahili the comparative is expressed by combining a *than* phrase with the positive or with a verb of the type *exceed*, and the superlative is expressed by adding the phrase *than all* (see Thompson and Schleicher 2001; Almasi et al. 2014).

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main predicate. This type of interpretation is, however, not restricted to THE LARGEST PART, but can also be observed in the following examples, where *large* (or *small, significant*) is in the positive (unmarked) form:

(27) a. A large part of the population was in debt.
b. A large part of the water on Earth is beneath the surface.

When used in this way, the noun PART denotes a function that applies to an entity and yields the set of elements that entertain a part-of relation with that entity:

(28) $[\![\text{PART}]\!] = \lambda y\, \lambda x.\ x \leq y$

(29) a. $[\![\text{PART}]\!]([\![\text{DP}]\!]) = \lambda x.\ x \leq [\![\text{DP}]\!]$
b. $[\![\text{PART}]\!]([\![\text{the water}]\!]) = \lambda x.\ x \leq \sigma y.\text{water}(y)$

This use of the noun PART contrasts with what we may call a "concrete" use, in which it refers to parts distinguished from other parts by independent criteria, e.g. *parts of a car*/*of a symphony*/*of the body*. In the "concrete" use, PART may be analyzed as referring to "structured parts", which are "cognitively salient parts of the whole". Structured parts are themselves "integrated wholes and not just a random collection of parts" (Champollion and Krifka 2016: 513, who cite Simons 1987; Moltmann 1997; Varzi 2010). We will show that there are certain distinctions between the two uses of PART that suggest that when used with the general, "logical" meaning in (28), PART is a "functional noun" (in the sense that it is part of the grammatical vocabulary of the language).

In Romanian, the concrete use of PART seems to allow only a genitive complement (whereas the functional word PART also allows a PP with the partitive/ablative preposition *din* 'from' = *de* 'of/from' + *în* 'in', e.g. *o parte din copii* 'a part of the children'):

(30) a. Două părți ale simfoniei au fost cântate
two parts GEN symphony.the.GEN have been played
în tempo prea rapid. (Ro.)
in tempo too fast

b. # Două părți din simfonie au fost cântate în
two parts from symphony have been played in
tempo prea rapid.
tempo too fast

c. părțile corpului, părțile plugului, părțile unui articol
parts-the body-the.GEN parts-the plough-the.GEN parts-the a.GEN article
'the parts of the body, of the plough, of an article'

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d. # părțile din corp, părțile din plug, părțile dintr-un articol
parts-the from body parts-the from plough parts-the from-an article

The distribution of case-marking and *din*-marking is, however, trickier than it appears at first sight. Indeed, the word PART in the following examples cannot be viewed as functional (see the explanation that follows immediately after the examples) and nevertheless *din* is preferred:

(31) a. NASA le permite oamenilor să "adopte"
NASA CL.DAT allows people-the.DAT SBJV adopt.3
părți din planetă.
parts from planet
'NASA allows people to "adopt" parts of the planet.'
(https://www.viata-libera.ro › Magazin)

b. A transportat două părți din cadavru.
has transported two parts from corpse
'(S)he transported two parts of the corpse.'

The DPs in (31) do not refer to structured parts such as body parts or parts of a symphony, but nevertheless involve a concrete use of PART, because the parts satisfy a spatial contiguity criterion and are defined by properties independent from the main predicate: in (31a), it is supposed that first a territory on the surface of that planet is more or less arbitrarily delimited, and then NASA allows somebody to adopt that delimited territory; (31b) is about a murderer who first sliced the dead body of the victim and then carried away some of the slices. Based on these criteria of identity, the parts can be distinguished from each other and counted (see the plural number). In the functional use of PART, where spatial contiguity does not play any role, plural number and counting are impossible:

(32) a. O parte {a deputaților /din deputați} au (Ro.)
a part GEN deputies-the.GEN /from deputies have
votat împotrivă.
voted against

b. *Două părți {ale deputaților /din deputați} au
two parts GEN deputies-the.GEN /from deputies have
votat împotrivă.
voted against
'{A part / *two parts} of the deputies voted against.'

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The part thus introduced, insofar as it lacks even the contiguity property, cannot be resumed anaphorically by a DP with the word PART:

(33) O parte a deputaților au votat împotrivă. # Această
a part GEN deputies-the.GEN have voted against this
parte se va opune probabil și următoarei propuneri a
part REFL will oppose probably also next-the.GEN proposal GEN
guvernului. (Ro.)
government-the.GEN
'Part (some) of the deputies voted against. # This/that part will probably also counter the next proposal of the government.'

In sum, we can distinguish between two types of concrete uses of the word PART, which differ as to whether the parts referred to are "natural parts", i.e. parts with individuation criteria with a conceptual basis, stable across time and space (the so-called "structured parts") or "unstructured concrete parts" with occasional, contextual individuation criteria. Natural parts disallow *din*-complements in Romanian (allowing only genitives), whereas unstructured parts allow them. The (im)possibility of *din*-marking cuts across the distinction between functional and concrete PART: in addition to being allowed with occasional concrete parts, *din*-marking is allowed with the functional use of PART.

A formal characterization of the concrete use of PART is developed in Wągiel (2018), who builds on Casati and Varzi's (1999) theory of integrated wholes and its application to count nouns by Grimm (2012). Since in its concrete use, PART is a count noun (see (30) and (31) and the discussion below), the elements in the denotation of [PART *of DP*] must be disjoint from each other and qualify as integrated wholes. In formal terms, they do not overlap and each of them is "maximally self-connected" (this is a formalization of the requirement of spatial contiguity that we have observed; see Wągiel 2018: 209–12, 226–7 for details). Wągiel (2018) concludes that, in a given context, the property denoted by [PART *of DP*] ranges over a partition of the denotation of the DP, whose cells are maximally self-connected.[2]

[2] Wągiel proposes that what we call "concrete *part*" is obtained by combining our "functional" *part* (defined as in (28)) with an individuating element -IND, which introduces the requirement of being a partition with maximally self-connected elements (-IND can be realized as an overt or null suffix; the first option is illustrated by the Polish suffix *-k-*, found in the nouns for 'part', 'half', and 'quarter').

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A further difference between functional and concrete PART is that only functional PART allows gender and number agreement of the main predicate with the lexical noun inside the *of*-DP. Plural agreement with *a part of the deputies* (Ro. *o parte a deputaților*) has already been illustrated in (32a). In (34a), we see gender agreement on the main predicate: besides feminine agreement with the noun *parte* 'part', the predicate can also show masculine, agreeing with the neuter noun *timp* 'time' (in Romanian, neuter nouns trigger masculine agreement in the singular and feminine agreement in the plural). In (34b) we see that the concrete use of *parte* 'part' prohibits agreement with the noun inside the *of*-DP. The same facts carry over to gender agreement on resumptive clitics: (34c) shows that resumptive clitics may agree in gender with the noun in the *of*-DP in the case of functional PART. This is impossible with concrete PART: see (34)d.

(34) a. O mare parte a timpului a fost
a large part(F) GEN time(N)-the.GEN has been
consumat(ă) cu discuții inutile.
spent.MSG/FSG with discussion pointless
'Much of the time was spent on pointless discussions.'

b. Partea a doua a concertului a fost
part(F)-the second GEN concert(N)-the.GEN has been
{cântată/*cântat} prost.
performed.FSG/.MSG badly
'The second part of the concerto has been badly performed.'

c. O parte a timpului {l-am petrecut/am
a part(F) GEN time(N)-the.GEN 3MS.ACC-have.1 spent /have.1
petrecut-o} scriind mailuri.
spent-3FSG.ACC writing e-mails.
'I spent part of the time writing e-mails.'

d. O parte a concertului {*l-au
a part(F) GEN concert(N)-the.GEN 3MS.ACC-have.3PL
cântat /au cântat-o} prost.
performed /have.3PL performed-FSG.ACC badly.
'They performed a part of the concerto badly.'

This provides support for the idea that *parte* can have a functional (or "semi-lexical") use. Further support comes from the possibility of occurring without an article, which is found in some languages (which otherwise have an

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indefinite article) for the functional PART, but never for the concrete PART. English is one of those languages, as can be seen in (35). Functional PART may appear bare, as in (35a), or with an indefinite article, as in (27), whereas concrete PART cannot appear bare—see (35b):

(35) a. Part of the harvest was lost.
b. *Part of this symphony is too long.

In Romanian, the bare use is more restricted; it is most readily available with the adjective *mare* 'big, large':

(36) Mare parte din economie este falimentară.
large part from economy is bankrupt
'A large part of the economy is bankrupt.'

The bare use of functional PART is also found in Italian:

(37) Parte dei ragazzi erano in Texas. (Schwarzschild 1996: 186)
part of-the boys were in Texas
'Some/Part of the boys were in Texas.'

Since spatial contiguity is hard to be satisfied by pluralities, PART combining with plurals is usually an instance of functional PART—see examples (32), (33), and (37). In English, the use of PART with plurals is not accepted by all speakers (examples (38b–d) reflect our informants' judgments: some accepted all the examples, some rejected all of them or found them marginal, some accepted certain examples and rejected others). The reluctance of the English PART to combine with plural NPs is not due to a requirement that PART itself should satisfy spatial contiguity, as shown by (38e) (we thank an anonymous OUP reviewer for this example):

(38) a. #Part of the boys were in Texas. (Schwarzschild 1996: 165)
b. %Only (a) part of the proposals were accepted.
c. %A large/significant part of the papers addressed the issue of climate change.
d. %Only a small part of the MPs will agree with the bill.
e. Part of the team were in Texas.

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We do not know of any other language with such a restriction. According to Wągiel (2018: 27–8, 32–4), the word PART shows no restriction when combining with plurals in all the other languages he could test: German (*Teil*), Dutch (*deel*), Polish (*część*), Czech (*část*), Russian (*čast´*), Italian (*parte*), Portuguese (*parte*), Irish (*cuid*), Hungarian (*rész*), Basque (*zati*), Hebrew (*xelek*), Japanese (*ichibu*).

Notice now that, when applied to a plurality X, the functional PART only yields atomic elements of X and sums thereof, e.g. boys in (37), proposals in (38b), excluding parts of boys or parts of individual proposals. This fact may be explained by invoking Landman's (1991) use of the material part relation,[3] which we have reviewed and used in §4.5.1 (in connection with the differences between MOST_{DP} and MOST_{RP} with respect to quantification over parts of singular entities). According to Landman, the part-of relation "≤" applied to an entity *a* only gives access to the elements of the join semi-lattice of the nominal property of the DP that denotes *a*. Singular count nouns denote atoms of the lattice, therefore "≤a", where *a* is the denotation of a singular count DP, only returns *a* itself. In order to access parts of singular entities, Landman (1991) proposes a material part relation and based on it a grinder function *g* that maps an entity into the maximal sum of its material parts. Notating the material part relation with K, the grinder function can be represented as follows:

(39) $g(a) = \sigma x.K(x,a)$

The property $\lambda x.K(x,a)$ is a join semi-lattice, whose maximal element is g(a). Therefore, when applied to g(a), the relation "≤" can access any x that belongs to this semi-lattice (i.e. that stands in the relation K with a). The behavior of the noun PART shows that the grinder function is only resorted to when the complement of PART is "atomic", i.e. when there is no y, other than x itself,

[3] Wągiel (2018: 256) takes a different approach. He maintains that the relation "≤" holds both between pluralities and their members and between a singular individual and its parts, and proposes that the restriction of *part*-words applied to pluralities to sums of individuals is due to an independent principle of interpretation, formulated as "the set partitive constraint" (in his terminology, partitives applying to pluralities are labelled "set partitives"):

(i) $\forall P_{\text{MSSC}}\ \forall y\ \forall x\ [(^{+}P_{\text{MSSC}}(y) \wedge x \sqsubset y) \rightarrow {}^{*}P_{\text{MSSC}}(x)]$

$P_{\text{MSSC}}(x)$ means that x is maximally strongly self-connected with respect to the property P, a notion that ensures that P is a count property. ^{+}P is the property comprising all pluralities generated from P, without the atoms. "⊏" stands for the proper part-of relation. (i) says that a part of a plurality generated from the count property P will necessarily have the count property *P (i.e. will be either an element of P or a sum of elements of P).

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such that y ≤ x. We may thus notate the grinder in the semantic entry of PART as a last-resort procedure used when the complement of PART is atomic:

(40) ⟦PART⟧ = λx.λy. y ≤ x iff ∃z, z ≠ x such that z ≤ x (in other words, x has proper parts) or λx.λy.y ≤ g(x), otherwise

Note now that this last-resort mechanism is also needed for other expressions introducing parts, which we may call "partitive predicates" (relational predicates that introduce the part-of relation): the R^0 head of the partitive construction (see Chapter 4) but also fraction words such as *half*, *quarter* (see *Half of the table is green*, which does not require that the table be separated into two concrete, spatially contiguous parts, showing that we are dealing with an usage based on the general relation denoted by functional PART). Therefore, we may assume that *partitive predicates* are partitive shifters:

(41) Partitive shifting:
If *P* denotes a partitive predicate and *D* denotes an atomic entity, then apply the grinder function *g* to the denotation of *D*:
⟦P of D⟧ = ⟦P⟧ (g(⟦D⟧))

Partitive shifting does not always involve material part. When applied to a collective noun, such as *population* in (27a), PART only accesses human individuals and sums thereof, but not material parts of individuals. Under the assumption that collective nouns denote groups (see Link 1984; Landman 1989), these examples may be an analyzed as relying on the type-shifter that turns groups into sums of their members, notated "↓" by Landman (1989):

(42) Partitive shifing (groups):
If *P* denotes a partitive predicate and *D* denotes a group, then shift the denotation of *D* to the sum of its members:
⟦P of D⟧ = ⟦P⟧(↓ (⟦D⟧))

In the following, we will continue to use "≤" for the denotation of PART, with the qualification that "≤x" must be read as "≤g(x)" or "↓(x)" whenever x is an atom.

In the examples given so far, the identification of the domain of PART in its concrete use was based on world knowledge (see parts of bodies or symphonies in (30)) or context (see (31), with parts of a planet or of a corpse). Another way of restricting the domain of PART is by using a modifier that introduces a property by which one part is distinguished from the others:

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(43) a. The active part of the population will suffer the most because of the tax raising.

b. The forested part of the country still has a rich wild fauna.

Note that in these examples, no spatial contiguity is required. We nevertheless treat these instances as representing a "concrete" use because the modifier preceding the word *part* provides a way of identifying a part disjoint from other parts (i.e. non-overlapping with other parts).

Functional PART only allows modifiers that characterize the size of the part (see also (27)):

(44) a. A large part of the population had to flee.

b. A significant part of the oil production was exported.

(45) a. O parte considerabilă a populației trăiește sub
a part considerable GEN population-the.GEN lives beneath
pragul de sărăcie. (Ro.)
threshold-the of poverty
'A considerable part of the population lives beneath the poverty threshold.'

b. Ce s-a realizat reprezintă o parte infimă a
what REFL-has realized represents a part insignificant GEN
lucrărilor necesare.
works-the.GEN necessary
'What has been accomplished constitutes an insignificant part of the necessary works.'

Such adjectives do not allow individuating a part non-overlapping with other parts—e.g. if the sum a+b+c counts as a big part of the sum a+b+c+d +e, the same will be true of a+c+d, a+d+e, b+c+d, etc., which all overlap with a+b+c.

Note that, since according to our proposal in (28) functional PART just introduces the general part-of relation (≤), the property denoted by the constituent [PART of DP] will qualify as cumulative: if x is a part of y and z is a part of y, then $x+z$ (the sum of x and z) will also be a part of y.[4] In §2.3.2 we

[4] The set $\lambda x.\ x \leq [\![DP]\!]$ has the structure of a join semi-lattice, with the denotation of the DP as the maximal element. This differs from the concrete use of *part*: because *concrete* parts are defined based on criteria of individuation, the property denoted by an NP headed by a concrete *part* is not a join semi-lattice, but an unordered set.

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argued that when it is not the result of pluralization, cumulativity is the defining property of mass nouns. Indeed, functional PART does not qualify as count, insofar as it disallows plural number and cardinals (see (32) above). Nevertheless, it does not behave like mass nouns either: it does not allow quantitatives (**much part of the population*) and it often combines with an indefinite article (see (35)–(37) for cases in which the article may be absent; with adjectives, the article is normally present—see (44) and (45)).

We may suggest that this behavior is due to the existence of a purely formal [+sg] feature on functional PART, which distinguishes it from mass nouns on the assumption that mass nouns are unspecified for number (except for plural mass nouns such as *groceries*, *supplies*, which have a lexical plural feature). The indefinite article is a determiner that is sensitive to this formal [+sg] feature, rather than to the presence of semantic atoms, which characterizes genuinely count predicates (see §2.3.2). Cardinals, as well as all determiners requiring semantic atoms are excluded with functional PART. Thus, the following examples are unacceptable, unless PART is interpreted as concrete, based on further contextual information:

(46) a. # Every/Each part of the oil is exported.
b. # Three/Most parts of the population are rich.

In sum, DPs built with the functional PART have cumulative denotation but nevertheless pattern syntactically with count nouns, due to the formal properties of the noun PART.

In what follows we will be interested only in the functional use of PART, which is the only relevant one for the majority reading of LARGEST PART.

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5.3 The semantic composition of THE LARGEST PART

In §3.3 we examined several possible ways of deriving the majority reading from a superlative. We showed that Hackl's (2009) proposal is incompatible with the use of the definite article, which is systematically present with MOST_{cum}.

In this section, we offer an analysis of THE LARGEST PART based on a considerably revised version of Hoeksema's (1983) analysis. In Chapter 3 we argued that Hoeksema's (1983) partition-based analysis provides an account for the obligatory use of the definite article with MOST_{cum}, but is problematic

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because of the stipulative way of fixing the comparison class of the superlative. In what follows we will show that this problem does not arise for THE LARGEST PART, because in this case the bipartition (necessary for deriving the majority reading) is supplied the noun PART. No *ad hoc* stipulations regarding the comparison class of the superlative need be assumed.

As we saw in §3.3.2, in the partition-based analysis (see Coppock and Josefson's 2015 and Coppock's 2019 updated version of Hoeksema's analysis), the majority meaning of the constituent [THE [MOST NP]] is obtained by choosing as a comparison class for MOST a binary partition of the maximal sum that satisfies the NP property in the context. Hoeksema (1983) proposes that the two members of the comparison class are the maximal sum of elements that satisfy the NP property and either do or do not satisfy the main predicate of the clause. We argued that this way of establishing the comparison class is problematic, because it does not rely on independently available contextual information.

This problem can be solved if the partition is introduced as an existentially bound variable. Thus, (48) correctly paraphrases (47):

(47) [[THE MOST_{cum} NP] VP]

(48) There exists a binary partition P of the maximal sum of NP such that **the largest element of P** satisfies the VP.

The boldfaced constituent in (48) represents the denotation of the DP that contains the majority quantifier. The use of a binary partition is crucial for accounting for the definite article. Given any choice of P in which its cells are unequal in size, only one element of P satisfies the property of being larger than all the other elements of P.

The DP that contains the majority quantifier, which we will call "the majority DP", is thus a dependent definite,[5] which accounts for its lack of specificity: it is dependent on an existentially closed variable, the partition P. This means that the reference of the majority DP co-varies with choices of P.

[5] Here are some examples of dependent definites:

(i) You have to tell [the capital of every American state].
(ii) This application can calculate [the distance between any two cities].
(iii) Vancouver is [the capital of no province].(https://www.quora.com/)

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The partition variable must be closed immediately above DP, below other operators. This can be seen in contexts such as (49), with downward-entailing operators. (49) says that you'll pass the test if *any* set of questions which you answer correctly constitutes a majority. This means that P must be existentially bound below the conditional.

(49) Dacă rezolvi cea mai mare parte a întrebărilor
if solve.2SG the more big part of questions-the.GEN
vei trece testul. (Ro.)
will.2SG pass test-the
'If you solve the majority of the questions you will pass the test.'

Let us now see how the meaning of the majority DP is composed based on its internal structure. The crucial issue is which element introduces the partition. Hoeksema's view, adopted by Coppock and Josefson (2015) and Coppock (2019), is that the bipartition is a particular specification of the comparison class of -EST:

(50) $[\![\text{-EST}]\!] = \lambda C_{<e,t>}.\ \lambda R_{<d,<e,t>>}.\ \lambda x_{<e>}.\ \exists d\ (R(x,d) \wedge \forall y\ ((y \neq x \wedge y \in C) \rightarrow \neg R(y,d)))$
(modeled after Heim 1999, ex. 10)

Definedness conditions:
(i) $x \in C$
(ii) $\forall y\ (y \in C \rightarrow \exists d\ R(y,d))$ (Heim 1999: n. 8)

For concreteness, under this analysis, in a majority DP involving MOST_{cum}, such as Ge. *der meiste Kaffee* 'most coffee', the constituent [*meiste Kaffee*] will have the following denotation:

(51) $[\![\text{meiste}_{maj}\ \text{Kaffee}]\!] = [\![[C_{maj}\ \text{-EST}]\ [\ [t_{\text{-EST}}\ \text{viel}]\ [\text{Meas}^0\ \text{Kaffee}]]]\!]$
$= [\![\ C_{maj}\ \text{-EST}\ ]\!]\ (\lambda d \lambda x.\ d\text{-MUCH}\ (\lambda x.\text{coffee}(x))(x)) =$
$= \lambda x.\ \exists d\ [\text{coffee}(x) \wedge \mu(x) = d \wedge \forall y[(y \neq x \wedge y \in C_{maj}) \rightarrow \neg\ (\text{cofee}(x) \wedge \mu(x) = d)]]$
defined iff $x \in C_{maj} \wedge \forall y\ (y \in C_{maj} \rightarrow \exists d(\text{coffee}(y) \wedge \mu(y) = d))$
where C_{maj} is a Partition of $\sigma x.\text{coffee}(x)$ and $|C_{maj}| = 2$

Note that this proposal requires an *ad-hoc* specification for C_{maj}, involving the application of the maximality operator σ to the sister of $[\![C_{maj}\ \text{-EST}]\!]$:

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(52) In the LF configuration [C_{maj} -EST][R], where R is of type <d,<e,t>>, C_{maj} is a binary partition of σx.(∃d. R(d)(x)).

The stipulative nature of (52) made us abandon the superlative-based analysis of MOST_{cum}. In what follows we will show that a bipartition-based analysis of majority interpretations is adequate for THE LARGEST PART. For this construction, we may dispense with (52) by assuming that the bipartition is not introduced as a special comparison class C_{maj}, but rather contributed by PART itself. Since PART is an element of the lexicon, it is suitable for making a special meaning, in contrast to comparison classes, which in the general case are covert arguments of -EST. Let us then assume a special variant of PART labeled PART_{maj}, with the following denotation:

(53) $[\![\text{PART}_{maj}]\!] = \lambda y.\lambda x.\ [\text{Partition}(P,y) \wedge x \in P \wedge |P| = 2]$

As explained in §5.2, PART_{maj}, on a par with PART, triggers partitive type-shifting when it combines with singular count complements, mapping *y* into the sum of its material parts (or, in the case of groups, into the sum of its members).

Our proposal explains the difference in crosslinguistic productivity between MOST_{cum} and THE LARGEST PART: a compositional superlative analysis is impossible for MOST_{cum}, because there is no natural motivation for the comparison class being specified as a bipartition. A compositional analysis is instead possible for THE LARGEST PART, granting the existence of a lexical item PART_{maj} that introduces the bipartition.

Indeed, once (53) is adopted, the majority reading is obtained without assigning any special meaning to the superlative adjective:

(54) $[\![\text{largest } [\text{part}_{maj} \text{ of DP}]\ ]\!] = [\![[\text{C-EST}]\ [\ [t_{\text{-EST}}\ \text{large}]\ [\text{part}_{maj} \text{ of DP}]]\ ]\!]$
$= \lambda x.\ \exists d\ [\text{large}(d)(x) \wedge \text{Partition}(P, [\![\text{DP}]\!]) \wedge x \in P \wedge |P|=2 \wedge$
$\forall y.\ ((y \in C \wedge y \neq x) \rightarrow \neg\ [\text{large}(d)(x) \wedge \text{Partition}(P, [\![\text{DP}]\!]) \wedge x \in P \wedge |P|=2]]$
defined iff
(i) $x \in C$,
(ii) $\forall y(y \in C \rightarrow \exists d.\ (\text{large}(d)(y) \wedge \text{Partition}(P, [\![\text{DP}]\!]) \wedge y \in P \wedge |P|=2)$

Note moreover that we can even dispense with the use of C.[6] Indeed, in the case of absolute superlatives, the contextual restrictions on the set of compared elements

[6] See Krasikova (2012), who dispenses with the use of a comparison class for absolute superlatives.

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may follow from the usual domain restrictions found with quantifiers (which can be represented using situation semantics; see e.g. Recanati 1996; 2004; Kratzer 2004). Thus (54) can be simplified as follows:

(55) $[\![\text{largest } [\text{part}_{\text{maj}} \text{ of DP}]\ ]\!] = \lambda x.\ \exists d\ [\text{large}(d)(x) \wedge \text{Partition}(P,[\![\text{DP}]\!]) \wedge x \in P \wedge |P|=2 \wedge \forall y.\ ((y \in P \wedge y \neq x) \rightarrow \neg\ \text{large}(d)(y))]$

Given a certain choice of P, the property in (55) is satisfied by a unique entity, which explains why LARGEST PART *of* DP combines with the definite article. We assume the denotation in (56) for the definite article, which combined with (55) yields the denotation in (57) for the whole DP:

(56) $[\![\text{THE}]\!] = \lambda P\ \iota(P)$

(57) $[\![\text{the largest } [\text{part}_{\text{maj}} \text{ of DP}]\ ]\!] = \iota x.\ \exists d\ [\text{large}(d)(x) \wedge \text{Partition}(P,[\![\text{DP}]\!]) \wedge x \in P \wedge |P| = 2 \wedge \forall y.\ ((y \in P \wedge y \neq x) \rightarrow \neg\ \text{large}(d)(y))]$

The partition variable P is existentially bound above the DP, by existential closure at the clausal level. To take an example, the sentence in (58) will have the representation in (58′):

(58) Ion a rezolvat cea mai mare parte a problemelor. (Ro.)
Ion has solved the more big part GEN problems-the.GEN
'Ion solved most of the problems.'

(58)' $\exists P\ [\text{solved}(\text{Ion}, \iota x.\ \exists d\ [\text{large}(d)(x) \wedge \text{Partition}(P,\sigma z.\text{problems}(z)) \wedge x \in P \wedge |P|=2 \wedge \forall y.\ ((y \in P \wedge y \neq x) \rightarrow \neg\ \text{large}(d)(y))])]$

Let us stress that the use of the "maj" subscript indicates that the proposed analysis does not rely on the general denotation of the word PART, which does not introduce a partition, but instead denotes the set of all the parts of a given entity (which has the algebraic structure of a join semi-lattice). Note however that a partition-based denotation of PART is needed independently of the majority reading of THE LARGEST PART, e.g. for the use of (concrete) PART as a count noun (e.g. *three parts of this apple*): since the general principles of counting require that the domain of counting consists of integrated wholes that do not overlap with each other, the general property 'be a part of x' must be narrowed down to a partition (Wągiel 2018). As for the fact that for THE

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LARGEST PART the partition is binary, this may be thought to be a default when no specific partition is provided by the context.

Note that this semantic composition relies on a specific meaning of PART, which means that the LARGEST PART construction is partially lexicalized: it is not undecomposable, but nevertheless relies on a meaning of PART that is only found in this configuration. Supporting evidence for this partial lexicalization comes from two facts.

The first observation is that we do not know of a parallel construction expressing "minority" readings; in other words, there is no THE SMALLEST PART construction used for the smallest element of a binary partition ('less than half').

Secondly, we usually find a specific adjective for the majority reading (which varies from one language to the other), other size adjectives lack this reading:

(59) a. The {largest/#biggest/#greatest} part of the Milky Way is invisible to us.

b. Cea mai {mare/#întinsă/#vastă} parte a Căii
the more big /wide /vast part GEN way-the.GEN
Lactee este invizibilă. (Ro.)
milky is invisible

The fact that near synonyms of LARGE do not yield the majority reading suggests that the majority reading of THE LARGEST PART is not based on the 'regular' meaning of LARG(EST), but instead relies on a special meaning.

Note also that Italian, Spanish, and Catalan use a synthetic suppletive comparative form (see *maggior, mayor, major* in (7)–(10) above; regular comparatives in these languages are "analytic", built with an independent degree word—*più* in Italian, *más* in Spanish, *més* in Catalan).

Note furthermore that in Romanian, the majority reading only appears with prenominal *cel mai mare* '(the) largest':

(60) {Cea mai mare parte/ #Partea cea mai mare} a
the more large part part-the the more large GEN
galaxiei este invizibilă.
galaxy-the.GEN is invisible
'The largest part of the galaxy is invisible'

The postnominal position in (60) is only acceptable if we compare predefined (concrete) parts; it does not have a majority reading, but is a regular absolute superlative.

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The compulsory prenominal position distinguishes the majority reading of *cel/cea mai mare* from the superlative reading of *mare* 'big, large', which is possible in both positions, as shown in (61a). The prenominal use is preferred with the positive form *mare parte* 'large part', but examples of postnominal use can be found (see (61b)):

(61) a. cea mai mare planetă /planeta cea mai mare
the more large planet planet-the the more large
'the largest planet'

b. O parte mare a populației active a plecat
a part large GEN population-the.GEN active has left
din Romania.
from Romania
'A large part of the active population has left Romania.'
(www.contributors.ro › Analize › Global/Europa › Opinie)

In sum, PART_{maj} is a version of PART that is lexically specified as occurring with a specific modifier, LARGEST (this element can be seen as a selected specifier of PART_{maj}).

Like all the majority quantifiers for which the whole is introduced as a DP (see Chapter 4), LARGEST PART allows quantification over parts of individual entities:

(62) a. Cea mai mare parte a orașului a fost distrusă. (Ro.)
the more large part GEN city-the.GEN has been destroyed

b. Der größte Teil der Stadt wurde zerstört. (Ge.)
the largest part the.GEN city was destroyed
'Most of the city was destroyed.'

The acceptability of (62) correlates with the possibility to combine functional PART with a count singular (see §5.2, as well as (63)):

(63) a. O mare parte a orașului a fost distrusă de
a large part GEN city-the.GEN has been destroyed by
bombardament. (Ro.)
bombardment
'Much/A large part of the city has been destroyed by the bombardment.'

b. A large part of the population lives under the poverty threshold.

c. From here I can only see part of the screen.

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5.4 A quantificational analysis of proportional THE LARGEST PART?

Since in the previous chapters we proposed quantificational analyses for complex constituents—see Ro. *cei mai mulți* 'SUP COMP many', analyzed as a distributive quantifier (Chapter 2) and the complex [THE MOST_{cum}] in the languages discussed in Chapter 3—one may wonder whether a similar analysis can be developed for THE LARGEST PART.

One possibility is that [THE LARGEST PART] has been reanalyzed as a complex determiner with the syntax and interpretation of MOST_{RP}:

(64) a. [[THE LARGEST PART] $[_{\text{RP}}\ R^0\ [\text{DP}]]]]$

b. $[\![\text{THE LARGEST PART}]\!] = \lambda P.\ \lambda Q.\ \exists x\ (P(x) \wedge Q(x) \wedge \mu(x) > \mu(\sigma y.P(y)\text{-}x))$

This analysis is, however, problematic because PART preserves its nominal properties, and some languages provide evidence against RP in the complement of PART: thus, in Romanian and Albanian, THE LARGEST PART allows a genitive complement (see (62) and (6) above), whereas partitive constructions only use a preposition (Ro. *din*, Alb. *nga*). Moreover, the genitive used in Romanian and Albanian shows agreement with the noun PART, which clearly indicates that PART is the nominal head of the construction.

Granting that PART (rather than $[_{\text{R}^0}\text{OF}]$) is the lexical head of the construction in the syntax, one might still adopt a quantificational analysis by using a mechanism of LF-rebracketing similar to the one suggested for MOST_{cum} in Chapter 3. Under such an analysis, one would have to assume that this quantifier behaves like MOST_{DP}, taking an entity-denoting restrictor and introducing itself the part-of relation:

(65) [THE LARGEST PART] [DP] (LF-structure)
$[\![\text{THE LARGEST PART}]\!] = \lambda x.\ \lambda Q.\ \exists y\ (y \leq x \wedge Q(y) \wedge \mu(y) > \mu(x\text{-}y))$

However, we argued in §4.5.1 that quantification over parts of atomic entities requires an element specialized for the part-of relation, which introduces partitive shifting (see §5.2). If we adopt (65), we have to assume that partitive shifting can also be introduced by quantifiers.

Besides these problems, there are other reasons for which the superlative analysis of the majority reading of THE LARGEST PART seems preferable: its

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high productivity across languages and its coexistence with more specialized forms such as partitive MOST (under its two guises distinguished in Chapter 4, MOST_{RP}, MOST_{DP}) or MOST_{cum} strongly suggest that the meaning is compositionally obtained, rather than relying on a non-decomposed quantificational meaning such as the ones in (64b) or (65).

5.5 Nouns of the MAJORITY type

5.5.1 The internal structure of MAJORITY nouns

Let us now consider examples built with majority nouns, which may be derived from the comparative form LARGER/BIGGER (Romance languages, Russian, Czech, Polish, Serbo-Croatian, Slovenian) or from MANY/MUCH in the positive degree (Albanian, Lithuanian):

(66) a. La majoria dels nens respecten els seus pares. (Cat.)
the majority of-the children respect the POSS.3 parents
'Most children respect their parents.'

b. La majoria dels meus col·legues es trobaran demà.
the majority of-the my colleagues REFL meet.FUT tomorrow
'Most of my colleagues will meet tomorrow.'

(67) a. La mayoría de los niños respetan a sus padres. (Sp.)
the majority of the children respect DOM POSS.3 parents
'Most children respect their parents.'

b. La mayoría de mis colegas se encontrarán mañana.
the majority of my colleagues REFL meet.3PL tomorrow
'Most of my colleagues will meet tomorrow.'

(68) a. Bol'šinstvo poetov mečtajut. (Ru., Paperno 2012)
majority poets.GEN day-dream
'Most poets daydream.'

b. Bol'šinstvo studentov vstretilis' včera.
majority students.GEN met yesterday
'Most of the students met yesterday.'

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(69) a. Většina lidí pije pivo. (Cz.) (Živanović 2007)
majority people.GEN drink beer

b. Większość ludzi piła piwo. (Po.)
majority people.GEN drank beer

c. Većina ljudi pije pivo. (S-C)
majority people.GEN drink beer

d. Večina ljudi pije pivo. (Sl.)
majority people.GEN drink beer
'Most (the majority of the) people are drinking/drank beer.'

(70) *shumë* 'much, many' → *shumicë* 'majority, most of, largest part' (Alb.)

a. [**Shumica** e fëmijëve] i respektojnë prindërit.
majority-the AGR children-the.GEN CL.ACC respect parents-the
'Most children respect their parents.'

b. Në tokë, [**shumica** e ujit] është në gjendje të lëngët.
on Earth majority-the AGR water-the.GEN is in state AGR liquid
'On Earth, most water is liquid.'

c. [**Shumica** e kolegëve të mi] do të takohen nesër.
majority-the AGR colleagues-the.GEN AGR my will SBJV meet tomorrow
'Most of my colleagues will meet tomorrow.'

(71) *daug* 'much, many' → *dauguma* 'majority, most of, largest part' (Lith.)

a. Dauguma amerikiečių nepritaria pranešimams,
majority.NOM Americans.GEN not-approve.3 messages.DAT
kuriuos JAV prezidentas Donaldas Trumpas
which.ACC USA president.NOM Donald.NOM Trump.NOM
skelbia savo asmeninėje "Twitter" paskyroje.
announce.3 self.GEN personal.LOC Twitter account.LOC
'Most/the majority of Americans don't approve of the messages USA President Donald Trump makes public on his personal Twitter account.' (http://pasaulis.lrytas.lt/ivykiai/2017/07/17/news/)

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b. Tas faktas, kad dauguma vandens yra užterštas
this fact that majority.NOM water.GEN is polluted.NOM
radono–...
radon.GEN
'the fact that most water is polluted with radon'
(http//lt.mymedinform.com/others/protection-radiation.html)

Majority-nouns can also be cultural borrowings (French *majorité* < Latin *maioritas* < *maior* 'bigger, larger'; English *majority* and Romanian *majoritate* come from French).

Majority nouns prefer combining with plural DPs (see Cat. *majoria*, Sp. *mayoría*, Ru. *bol'šinstvo*), but this preference has not become a strict rule holding for all speakers (for all these items we have been able to find attested examples, on the Internet, with singular DPs).

These nouns also have a normal lexical use, in which case they may take the indefinite article or determiners other than THE, e.g. demonstratives (see (75)):

(72) A majority of the people are against the government's tax policy.

(73) Për herë të parë **një shumicë britanikësh** shpreh keqardhjen
for time first a majority Britons.gen expresses regret-the
për vendimin për t'u larguar nga Bashkimi Evropian. (Alb.)
for decision-the to leave from Union-the European
'For the first time, a majority of Britons express regret for the decision to leave the European Union.' (https://ekonomiaonline.com/)

(74) **Una mayoría de los españoles** quiere una reforma ambiciosa
a majority of the Spaniards want a reform ambitious
de la Constitución. (Sp.)
of the Constitution
'A majority of Spaniards want an ambitious reform of the Constitution.'
(https://www.elmundo.es/)

(75) Eto bol'šinstvo opasno. (Ru.)
this majority dangerous
'This majority is dangerous.' (https://news.ngs.ru)

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On the interpretation equivalent to THE LARGEST PART and partitive MOST, which will be loosely referred to as "majority quantifier use", these words obligatorily take the definite article (if the language has articles), see (66), (67), and (70).

Some forms never behave like regular nouns: such is the case of French *la plupart* in (76) and Norwegian *flesteparten* in (77), which are also remarkable by their forms: they are compounds of MORE/MOST (Fr. *plus* 'more', Norw. *fleste* 'most') and PART, and always take the definite article (Fr. *la* 'the.FSG', Norw. *-en* '-the'). Another example is Albanian *e shumta* in (78), which represents a nominal use of the agreeing quantitative adjective *i shumtë* 'much/many, numerous' (derived from the non-agreeing *shumë* 'much/many' with a *-t-* suffix):

(76) a. La plupart des enfants respectent leur parents. (Fr.)
the more-part of-the children respect their parents
'Most children respect their parents.'

b. La plupart de mes collègues se rencontreront demain.
the more-part of my colleagues REFL meet.FUT tomorrow
'Most of my colleagues will meet tomorrow.'

(77) Flesteparten av muslimer bidrar positivt. (Norw.)
most-part-the of Muslims contribute positively
'Most of the Muslims contribute positively.'
(https://www.utrop.no/Nyheter/Innenriks/32439)

(78) e shumta e nxënësve (Alb.)
FSG much-the FSG pupils-the.GEN
'the majority of the pupils'

The existence of an element PART and a comparative/superlative makes *la plupart* and *flesteparten* similar to the type THE LARGEST PART. However, we have included them in this separate section because they are not free combinations (the exact counterpart of THE LARGEST PART is *la plus grande partie* in French, (see (5)) and *den største delen*—in Norwegian (see (19)).

Fr. *plupart* and Norw. *flesteparten* can be analyzed as a morphological version of LARGEST PART with a complex head made up of LARGEST and PART_{maj}. For complex head formation, one could assume a morphological restructuring operation, like that proposed by Matushansky (2006) in her

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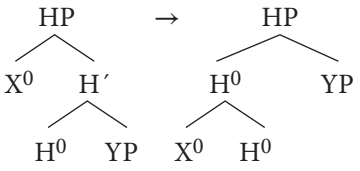
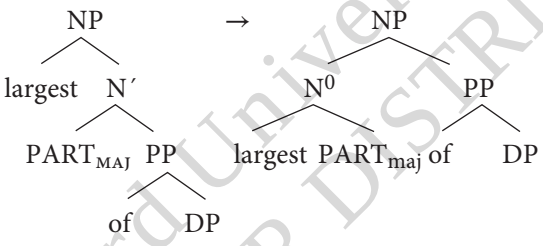
account of head movement. This operation, called *m-merger* ("morphological merger"), creates a complex head out of a head and an X^0-specifier of that head, as shown in (79) (in standard cases, X^0 is Y^0, with Y^0 moved out of the YP, see in particular clitic movement out of an argument position) but the system also allows cases where X^0 is distinct from Y^0, in which case X^0 is base-generated in Spec,HP:

(79) 

As this operation belongs to the morphological component, it does not affect interpretation. In our case, we may assume that LARGEST and PART_{maj} undergo m-merger, but continue to be interpreted as in THE LARGEST PART (see the analysis in §5.3):

(80) 

In other words, the input for interpretation is the first (left-hand) tree in (80), which makes the analysis in §5.3 applicable with no change.

For other *majority* nouns, we may assume that the adjectival part is spelled out as the adjectival basis, and the N-part as the nominalizing suffix (by the Vocabulary Insertion rules of distributed morphology—see Halle and Marantz 1993):

(81) $[\text{LARGEST PART}_{\text{maj}}] \rightarrow$ *major-ity*

5.5.2 The semantic analysis of MAJORITY nouns

MAJORITY nouns require the definite article, just like LARGEST PART. In order to account for this empirical generalization, we have proposed that a singleton set (i.e. a set with a unique element) can be obtained by using binary partitions:

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the property 'be an element of a bipartition of x' combined with the size superlative LARGEST will yield the property 'be the largest element in the bipartition of x'; the binary partition is introduced by a special version of PART and gets bound by existential closure in the clause. This analysis can apply to MAJORITY nouns if we assume a superlative component as part of the structure, as we suggested in §5.5.1. Evidence for this assumption will be provided in §5.5.3.

As for THE LARGEST PART and partitive MOST, we may also analyze MAJORITY nouns as quantifiers, assuming that THE is not interpreted. Under such an analysis, since there is no independent syntactic component introducing the part (compare THE LARGEST PART and MOST_{RP}, where PART and the R^0 contribute the part bit of the LF), majority nouns will directly combine with an entity-denoting expression, like MOST_{DP}:

(82) $[\![\text{THE MAJORITY}]\!] = \lambda x.\ \lambda Q.\ \exists y\ (y \leq x \wedge Q(y) \wedge \mu(y) > \mu(x\text{-}y))$

Note that for the combination with singular count nouns, this analysis must assume that MAJORITY can trigger partitive shifting, as explained in §5.2 (see (41) and (42)).

5.5.3 On a peculiar type of relative superlative reading

Evidence for a superlative-based analysis of MAJORITY nouns comes from the existence of superlative readings. At least for some speakers, (83a) has a reading on which the number of immigrants coming from Africa is larger than the number of immigrants coming from any other regions, but not larger than 50 per cent of the total number of immigrants.[7] Due to world knowledge, this is also the most plausible reading for (83b):

(83) a. La plupart des immigrants viennent d'Afrique.
the more-part of-the immigrants come from Africa
(i) 'The largest number of immigrants, compared to other regions, come from Africa.'
(ii) 'The majority of immigrants come from Africa.'

[7] Judgments of this type of sentences vary across French speakers: for some speakers, *la plupart* can only have a majority reading, and speakers thus judged our examples as unacceptable. However, more than half of our 10 informants accepted the examples.

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b. La plupart des bébés naissent le lundi.
the more-part of-the babies are-born the Monday
The most plausible reading: 'Monday is the day with the most births.'

We also found this type of non-majority interpretation for MAJORITY nouns that do not contain a morphological component identifiable as PART: Spanish *la mayoría* and Albanian *shumica* (supporting the analysis in (81)). According to a Spanish informant, the sentences in (84) do not require that more than 50 per cent of the babies/immigrants satisfy the predicate. Likewise, two native speakers of Albanian confirmed that in (85), there is no requirement that at least 50 per cent of the immigrants come from India.[8]

(84) a. La mayoría de los bebes nacen los lunes. (Sp.)
the majority of the babies are-born the Mondays
(i) 'Most babies are born on Monday.'
(ii) 'The largest number of babies are born on Monday.'

b. La mayoría de los inmigrantes provienen del continente
the majority of the immigrants come from-the continent
africano.
African
(i) 'Most of the immigrants come from Africa.'
(ii) 'The largest number of immigrants come from Africa.'

(85) Shumica e imigrantëve vijnë nga India. (Alb.)
majority-the AGR.FSG immigrants-the.GEN come from India
(i) 'Most of the immigrants come from India.'
(ii) 'The largest number of immigrants come from India (compared to other countries).'

From the point of view of the intuitive interpretation, such examples are similar to relative superlatives: in the "immigrants" examples, we compare the numbers of immigrants coming from various countries (thus, *Africa* behaves as a correlate in (83a) and (84b)); in the "babies" examples, we compare the numbers of babies born on the various days of the week (thus,

[8] In some languages there are speakers for whom there is a distinction between *majority* and *largest part*, the first being restricted to a majority interpretation. This is the case in English and French, and the same judgment was reported by our Catalan informant.

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Monday behaves as a correlate in (83b), (84a), and (85)). Giurgea (forthcoming) nevertheless argues that in these examples, -EST does not raise out of the DP (as assumed for relative readings of superlatives by Heim 1999), but should be analyzed as having DP-internal scope (on a par with absolute superlatives). Compare the following examples, in which the relative superlative reading is expressed by using MORE:

(86) a. el que tiene (*los) más amigos (Sp.)
the that has (the) more friends

b. ai që ka më shumë(*t) shokë (Alb.)
he that has COMP many(-the) friends
'the one who has the most friends'

Note that in these examples, the definite article is necessarily absent (see §§1.5.4.1 and 1.5.4.2)[9] and the correlate must c-command the superlative. These syntactic properties indicate that in these examples, the relative reading can only be obtained via the raising of the superlative (in this case expressed by a comparative form) out of its host DP (see Szabolci's 1986 and Heim's 1999 raising analysis).

In §4.8, we showed that superlatives of quantity may rely on two LF representations, one with -EST raising out of the DP, for which some languages impose a c-command requirement, and one with a DP-internal -EST, where the comparison class is established via association with focus. In this section, we have argued that the superlative reading of examples built with *majority* nouns rely on the latter LF (with DP-internal -EST). This "non-raising" analysis explains why examples built with *majority* nouns resemble absolute superlatives from the syntactic point of view: they are necessarily built with the definite article and they do not require that the correlate be c-commanded. They also resemble absolute superlatives from the semantic point of view insofar as the comparison set is built based on DP-internal material, introducing a partition of the complement of the PART-component (the total sum of immigrants, or of babies). But unlike in genuine absolute superlatives, the cells are built via association with DP-external material (e.g. various countries, or various months of the year) that is provided by the focus.[10]

[9] In the French *le plus* 'the more', the obligatory definite article is not in the D^0 position of the overall DP, but instead belongs to the superlative constituent (see §1.5.4.1).

[10] For the possibility of deriving relative superlative readings from a DP-internal scope of -EST based on association with focus, see Heim (1999), Kotek et al. (2011), Pancheva and Tomaszewicz (2012), and §4.8.

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5.6 Extending the partition-based analysis to partitive (THE) MOST

Given the productivity of the type LARGEST PART and the possibility of obtaining the majority meaning compositionally in this case, along the lines proposed in §5.3, we may wonder whether a similar analysis cannot be assumed for the English partitive MOST and its crosslinguistic counterparts.

5.6.1 A note on the history of the English partitive *most*

For English, such an analysis finds some support in the history of *most* (in what follows, we rely on the article *most* in the *Oxford English Dictionary* (*OED*)). First, *most* initially also meant 'largest' ('greatest in size, stature, bulk, or extent'; it was the superlative of the adjective *micel* 'great, large')—this is, in fact, the original meaning: see Harper (2010). With this meaning, it could combine with the noun PART, a use which still survives today in the frozen expression *for the most part*. We find examples of *most* used with a noun meaning *part* (Old and Middle English *dæl*, then, from the fourteenth century, the French borrowing *partie/part*) used to express majority quantification:

(87) a. (. . .) baernde eall þa maeste dæl of þa
burned all the most part of the
tuna. (1116, *Anglo-Saxon Chronicle*)
village
'Most of the village burned completely.'

b. The mooste partie of that compaignye han scorned this olde wise man.
(*c.*1390, Geoffrey Chaucer, 'The Tale of Melibeus', 2225)

c. The moste parte of the peple of the cyte
(1483. William Caxton, translation of Jacobus da Voragine, *Golden Legend*, 394/2)

This pattern precedes the construction *most*+*of*+DP, for which the earliest examples in the *OED* article are from the fifteenth–sixteenth century (with singular DPs, the earliest example is from the sixteenth century—see (88b)):

(88) a. I schal gyf to hym the moste of my goodes. (*c.*1450 *King Ponthus*)

b. He cometh naughtily by moste of that, whiche he hath.
(1553, Thomas Wilson, *The Arte of Rhetorique*)

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Examples of MOST+NP_{pl} are attested as early as Old English. Note that MOST does not always show agreement, although case morphology and concord were still present in Old English. Thus, in the following examples, MOST is singular and the NP is in the genitive plural:

(89) Mest manne him gremede mid scorne.
most man.PL.GEN him reviled with mockery
'Most men reviled him with mockery.'
(1200, *MS Trin. Cambr.* in R. Morris (ed.), *Old English Homilies* (1873), 169)

This suggests that *most*, even when used with plurals, started from the meaning 'greatest part, bulk, amount" This type of diachronic meaning evolution is attributed by von Wartburg (1946: 876) to the Fr. *beaucoup,* which originally meant 'nice piece (part cut off from something)', went through a stage where it meant 'big piece', and ended up meaning 'many, much' and being used in the pseudo-partitive construction.

Note also that the use of the article, expected if $MOST_{RP}$ comes from THE LARGEST PART, is attested in the earliest examples (see (88a)) and continues to appear, alongside the articleless use, throughout Early Modern English and later until the nineteenth century:

(90) a. The most of them woulde neuer deale in that lawe at home.
(1588, John Udall, *The State of the Church of England*)

b. The most of my patrons are boys.
(1882, R. L. Stevenson, *New Arabian Nights* I, 45)

For a synchronic analysis of MOST+*of*+DP as THE LARGEST PART, the loss of the article raises a problem: as we saw in §5.3, the partition-based analysis of majority interpretations assumes a superlative selecting the largest element of a bipartition, and therefore the use of the definite article is expected. We may thus assume that, as long as MOST-*of* was used with the article, it represented the spell-out of a complex LARGEST-PART, as proposed for MAJORITY nouns in §5.5. Later on, MOST was reanalyzed into a quantifier with the semantics given in §4.4.3, and correlatively lost the article.

For the other languages with $MOST_{RP}$ discussed in §4.4.3, morphology raises another problem for a LARGEST-PART analysis. As we have seen in §4.4.3.1, MOST agrees in number and gender with the *of*-DP in the plural, which is

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characteristic of the functional partitive construction (RP)—this is why we used the label MOST_{RP}. An incorporated or null PART-element predicts absence of agreement (since nouns have inherent phi-features). A PART element can at most be assumed for the singular, where there is no agreement (but as absence of agreement also characterizes mass partitives in general, this use is compatible with MOST_{RP}). Possible evidence for such a variety of partitive MOST comes from Coppock's (2019) observation that her Swedish informers prefer using the partitive construction for mass domains:

(91) a. ?Jag drack den mesta mjölken.
I drank the.COM most milk(COM)-the

b. Jag drack det mesta av mjölken.
I drank the.NEUT most of milk(COM)-the
'I drank most of the milk.' (Coppock 2019: 138, ex. 61)

Such a preference is unexpected for MOST_{cum}, which should be equally fine with plural and mass nouns. This might show that in Swedish there are two competing grammars, one like German, with MOST_{cum} across the board, and one like English, with $\text{MOST}_{\text{dist}}$ and a MOST specialized for partitives. But note that, unlike English, what we may treat as a partitive MOST has the definite article (see (91b)). The use of the definite article allows an analysis of this variety of MOST as representing the LARGEST-PART type, with MOST spelling out the LARGEST-PART complex.

5.6.2 Reanalyzing partitive MOST when preceded by the definite article

Note now that a semantic analysis of the LARGEST-PART type, based on partitions + superlative modifier, may extend to (some of) the majority quantifiers that select for the partitive construction RP (see Chapter 4), if we assume that the bipartition variable can be introduced not only by the noun PART but also by the head R itself. Note, indeed, that the head R resembles the functional noun PART in that it introduces the abstract part-of relation. The difference between the two items is morphosyntactic—PART has nominal features, in particular a [sg] feature which makes it syntactically non-mass, whereas R is a functional head with no φ-features of its own; the φ-features as well as the count/mass feature of the entire construction come from the

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null NP in SpecRP. An analysis in which R plays the role of PART in the LARGEST-PART construction is possible wherever the majority quantifier dedicated to RP-constructions comes with a definite article. Recall that according to the semantic analysis proposed in §3 above, LARGEST in THE LARGEST PART is a superlative modifier inside a DP headed by a definite article.

In §4.4.3.2, we suggested that such an analysis may apply to the cases of partitive MOST embedded in a definite DP—the Italian type *i/le/il più di* + DP 'the.MPL/FPL/MSG more of', the Albanian type *më të shumtët* + DP_{Gen} 'more many-the of'—to which we added the Wolof proportional construction involving the verb 'be/have more' (*li ëpp ci xale yi* 'what be-more among children the'). We resume below two of the Italian examples discussed in that section:

(92) a. **I** **più** **degli** **abitanti** perirono pel ferro
the.MPL more of-the inhabitants(M) perished by-the iron
e pel fuoco dei vincitori. (It.)
and by-the fire of-the winners
'Most of the inhabitants perished by the iron and fire of the winners.' (1824, *Biografia universale antica e moderna*, vol. 16)

b. Tra più volte **il** **più** **della** **città** è stata
several times the.MSG more of-the city(F) has been
arsa e rifatta.
burned and rebuilt
'Several times most of the city was burned and rebuilt.'
(1816, Ricordano Malespini and Giacotto Malespini, *Storia Fiorentina*, ed. Vincenzio Follini, p. 93)

Given that Italian comparatives embedded under a definite article sitting in D^0 yield a superlative interpretation (see Loccioni 2018 and references therein), we may assume that *più* 'more' in this configuration has the semantics of MOST and R introduces a bipartition of the referent of its DP complement (the inhabitants in (92a), the city in (92b)). The semantic composition runs exactly as for THE LARGEST PART. The difference is formal: as the members of the bipartition are not characterized by the functional noun PART, but rather by the count plural noun in SpecRP *abitanti* 'inhabitants' in (92a) and by a null mass noun in (92b), the superlative that selects the largest cell of the bipartition takes the form of a quantity superlative adjective, MOST. Notating R_{maj} the variant of the R head that introduces the bipartition, the structure of these examples can be represented as follows:

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(93) a. $[_{DP}$ i $[_{MeasP}$ più $[_{RP}$ $[_{NP}$ ~~abitanti~~] $[R_{maj}$ $[_{DP}$ gli abitanti]]]]]
b. $[_{DP}$ i $[_{MeasP}$ più $[_{RP}$ $[_{NP}$ $Ø_{STUFF}$] $[R_{maj}$ $[_{DP}$ la città]]]]]

The semantic composition of example (92a) runs as follows:

(94) $[\![R_{maj}$ [gli abitanti]$]\!]$ = λx. [Partition(P,σy.inhabitants(y)) ∧ x ∈ P ∧ |P| =2]
$[\![[_{RP}$ $[_{NP}$ ~~abitanti~~] $[R_{maj}$ [gli abitanti]]$]\!]$= λx. [inhabitants(y) ∧ Partition(P,σy.inhabitants(y)) ∧ x ∈ P ∧ |P| =2]
= λx. [Partition(P,σy.inhabitants(y)) ∧ x ∈ P ∧ |P| =2]
$[\![[_{MeasP}$ più $[_{RP}$ $[_{NP}$ ~~abitanti~~] $[R_{maj}$ $[_{DP}$ gli abitanti]]]] $]\!]$=
$[\![$ -EST $[t_{\text{-EST}}$ MANY $[_{RP}$ $[_{NP}$ ~~abitanti~~] $[R_{maj}$ $[_{DP}$ gli abitanti]]]] $]\!]$=
λx. ∃d [|x| =d ∧ Partition(P, σy.inhabitants(y))) ∧ x ∈ P ∧ |P|=2 ∧ ∀z. ((z ∈ P ∧ z≠x) → |z| < d)]
$[\![[_{DP}$ i $[_{MeasP}$ più $[_{RP}$ $[_{NP}$ ~~abitanti~~] $[R_{maj}$ $[_{DP}$ gli abitanti]]]]] $]\!]$=
ιx. ∃d [|x| =d ∧ Partition(P, σy.inhabitants(y))) ∧ x ∈ P ∧ |P|=2 ∧ ∀z. ((z ∈ P ∧ z≠x) → |z| < d)]
$[\![[_{DP}$ i più degli abitanti] perirono $]\!]$= ∃P (perished (ιx. ∃d [|x| =d ∧ Partition(P, σy.inhabitants(y))) ∧ x ∈ P ∧ |P|=2 ∧ ∀z. ((z ∈ P ∧ z≠x) → |z| < d)])

5.7 Majority quantifiers in Hindi, Latin, and Syrian Arabic

The partitive configurations of various sorts (built with $MOST_{cum}$, *dabufen, hotondo*, $MOST_{RP}$ or THE LARGE(ST) PART) examined so far clearly differ from non-partitives in allowing quantification over parts of singular individuals. This possibility is arguably related to two properties that all partitive configurations share: (i) their syntax supplies a part–whole relation introduced either by functional words such as PART or MAJORITY or by the functional head R; and (ii) the whole is directly introduced as the DP complement of PART/MAJORITY or of the R head.

In this section, we will examine two majority quantifiers, Latin *plērusque* and Hindi *zyādātar*, which take singular count N complements that do not have the overt syntax of a full nominal projection (DP in languages with articles). Crucially, however, both languages are languages without articles, where bare NPs can have an argument-type denotation in the absence of any determiner. We may thus assume that the singular count NP with which Latin *plērusque* or Hindi *zyādātar* combine is entity-denoting (a DP, if one assumes that argument denotation is achieved via a null D). This situation is similar to that of Japanese *hotondo* and Chinese *dabufen* when these items occur in

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partitive constructions: the partitive complement is a *-no/-de*-marked bare nominal which, given its syntactic position, must be assumed to have an entity-denotation (e.g. Japanese *hon-no hotondo* 'book-GEN most' = 'most of the book(s)'). In what follows we will see that Hindi provides evidence for this analysis. We will then turn to Latin, where *plērusque* can be included in a series of adjectives that characterize a part of the entity denoted by their NP sister. We will show (see §5.7.3) that a similar construction exists in Syrian Arabic, where the entity denotation of the nominal the adjective combines with is clearly indicated by the use of the definite article.

5.7.1 The Hindi majority quantifier

The majority quantifier *zyādātar* of Hindi[11] is used with all types of restrictors (plural, mass, singular count). Examples (95a–c) show a distribution typical of MOST_{cum}. Indeed, in addition to distributive readings ((95a)), *zyādātar* allows collective predicates ((95b)) and mass restrictors ((95c)):

(95) a. [Zyādātar bacce] apne mātā-pitā=kī izzat
most children self's mother-father=GEN.F respect(F)
kar-te hāĩ.
do-HAB.MPL be.PRS.PL
'Most children respect their parents.'

b. [Mere zyādātar sahkarmi] kal milenge.
my most colleagues tomorrow meet.FUT
'Most of my colleagues will meet tomorrow.'

c. [Fridge=me rakhā zyādātar makkhan] kharāb hai.
fridge=in kept most butter bad is
'Most of the butter in the fridge is rancid.'

[11] *Zyādātar* is etymologically related to the word for 'more' (*zyādā*), both coming from Persian; in Persian, *zyādatar* means 'more', but, according to our Hindi informant, *zyādātar* is specialized for the proportional reading. However, according to Živanović's (2007:61) informant, Hindi *zyādātar* can also have a superlative reading:

(i) Zyādātar log BIR pirhete.
most people beer were-drinking
'More people were drinking beer than other beverages.'

(ii) Zyādātar bir pijagaja.
most beer was-drunk
'Beer was drunk the most.'

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Note that examples (95b,c) indicate that *zyādātar* is placed inside the NP (i.e. it sits in a position that is lower than the D-level of representation): in (95b), *zyādātar* intervenes between a possessive and the noun, and in (95c), *zyādātar* intervenes between a participial modifier and the noun.

Yet, unlike MOST_{cum}, *zyādātar* may also take a count singular NP as a complement yielding an interpretation in which it cumulatively quantifies over parts of an individual:

(96) [Zyādātar sheher] laṛāī=ke daurān tehes nehes ho gayā.
most city war=GEN during destroyed be go.PFV
'Most of the city was destroyed during the war.'

This type of example seems to contradict the generalization according to which majority quantifiers occurring inside a simple DP (i.e. a DP that does not embed another DP) are unable to quantify over parts of singular individuals.

The problem can be solved, because there is evidence that *zyādātar* in (96) does not occupy the same structural position as in (95b,c). Indeed, the insertion of a preposed possessive is impossible in (96), in clear contrast with (95b):

(97) *jang=ke dauraan [hamārā zyādātar sheher] tehes-nehes ho
war=GEN during our most city destroyed be
gayaa thaa.
go.PFV.MSG be.PST.MSG
Intended: 'During the war, most of our city had been destroyed.'

The example in (97) is structurally identical to (95b,c): because *zyādātar* intervenes between the possessive and the head N, it can only be analyzed as occupying a modifier position inside a plural or mass NP, qualifying as a cumulative majority quantifier (on a par with MOST_{cum} in non-partitive configurations (see §3.2) or the Chinese *dabufen* and Japanese *hotondo* in modifying positions, see §3.3.4.2). The observed unacceptability of (97) is predicted by the generalization that we pointed out at the beginning of this section: whenever a majority quantifier occurs inside the minimal DP, it cannot take a singular count NP as a complement.

Going back to (96), its acceptability indicates that in this example *zyādātar* does not occupy a modifier position, but instead takes an entity-denoting NP as a complement. Since Hindi does not have articles, bare NPs normally denote entities in argument positions. In order for examples of the type in (96) to be covered by our analysis of majority quantifiers we only need to

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assume that in Hindi bare NPs can refer to entities not only in argument positions, but also when they occur in the complement position of *zyādātar*. It is interesting to recall that in §2.2 and §4.5 we observed a similar correlation for kind-referring bare NPs in English: they can occur not only in argument positions, but also in the complement position of MOST_{DP}.

Turning now to the semantic analysis, examples of the type in (96)—in which *zyādātar* occurs above the DP—can be assumed to have the semantics of MOST_{DP} (see §4.4.3.2), see (98); like MOST_{DP}, *zyādātar* should be assumed to trigger partitive shifting when combined with singular count NPs (see §5.2, (41), and (42)):

(98) $[\![\text{zyādātar}_{\text{DP}}]\!] = \lambda x.\ \lambda Q.\ \exists y\ (y \leq x \wedge Q(x) \wedge \mu(y) > \mu(x\text{-}y))$

When it occurs inside the DP, with plural and mass NPs (see (95b,c), *zyādātar* can be analyzed on a par with the cumulative majority quantifiers in languages without articles discussed in Chapter 3 (see Japanese *hotondo* and Chinese *dabufen*):[12]

(99) $[\![\text{zyādātar}_{\text{NP}}]\!] = \lambda P.\ \lambda x.\ P(x) \wedge \mu(x) > \mu(\sigma y.P(y)\text{-}x)$

5.7.2 Latin *plērusque*

Latin has a dedicated proportional quantifier, *plērusque*, decomposable into an inflected base (NOM MSG *plērus,* FGS *plēra*, NSG *plērum*, MPL *plērī*, etc.) and the "universal" particle *-que* (also found in *quisque* 'everybody', *ubique* 'everywhere', etc.).[13] *Plērusque* agrees in gender, number, and case with the lexical noun and normally precedes it:

(100) habent hunc mōrem **plērīque**
have.3PL this.ACC habit.ACC most.MPL.NOM
argentāriī (Plautus, *Curculio*, 377)
money-dealers(M).PL.NOM
'Most money dealers have this habit.'

[12] Note that the adnominal phrases that precede *zyādātar* in (95b,c) must be interpreted in its scope (either via reconstruction or via LF-raising of *zyādātar*), as shown by their English translations.

[13] The adjectival base *plērus*, still occurring independently in Old Latin (see (110) below), is derived from the root *plē-* of *plēre* 'to fill', *plēnus* 'full'. The quantity comparative and superlative (*plūs, plūris* 'more', *plūrimus* 'a very large number/amount, the most') are old derivatives of the same root (cf. Ernout and Meillet 1932), but synchronically the relation between these series of forms is no longer visible.

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In Latin, partitive constructions are marked with genitive case or a preposition, and complements of nouns (including PART) show the genitive. But in (100), the lexical noun (*argentāriī*) is not genitive or introduced by a preposition, but has the case assigned to the overall nominal constituent, i.e. the same case as *plērusque*. Therefore, *plērusque* seems to be a majority quantifier that does not take a full DP as a complement. However, like Hindi *zyādātar*, *plērusque* can combine with singular count nouns:

(101) a. anteā **plēraque** **nōbilitās** inuidiā
before most.FS.NOM nobility(F).NOM envy.ABL
aestuābat (Sallustius, *De coniuratione Catilinae*, 23.6)
was-seething
'Before this period, most of the nobility was burning with envy.'

b. comae ... **plēramque** eius ... contegēbant
tresses most.FS.ACC his were-covering
faciem (Apuleius, *Metamorphoses*, 9.30)
face(F).ACC
'The tresses/hair covered most of his face.'

This shows that *plērusque* cannot be analyzed on a par with MOST_{cum} and the other similar items discussed in Chapter 3, which were argued to sit in Spec,MeasP and cannot combine with singular count NPs. As Latin has no articles, we may apply the analysis proposed in §7.1 for *zyādātar* + singular count, assuming that the NP to which *plērusque* applies is already shifted to a type e denotation, possibly due to the presence of a null D. Evidence for the DP-status of the nominal *plērusque* combines with comes from examples such as (102), where we see a personal pronoun following *plērusque*:

(102) plēraeque eae sub uestimentīs sēcum
most.FPL.NOM they.FPL.NOM under garments with-themselves
habēbant rētia
had nets
'Most of them had with them nets beneath their garments.'
(Plautus, *Epidicus*, II, 215)

Further evidence comes from ancient Greek, where we find examples of the form Adj+THE+NP,[14] in which it is clear that the adjective attaches to a full DP:

[14] Greek developed a definite article very early, before the classical period.

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(103) a. ἐπὶ ἄκρα τὰ δένδρα
on extreme.NPL.ACC the.NPL.ACC trees.NPL.ACC
'on the top of the trees'
(Hellanikos, from Liddell and Scott 1882: 109)

b. ἥ κατὰ **μέσην** **τὴν** **νῆσον** ἔκειτ'
which on middle.FSG.ACC the.FSG.ACC island(F).ACC lay
ἐν ἱερῷ Ποσειδῶνος
in temple Poseidon.GEN
'which lay in the middle of the island, in the temple of Poseidon'
(Plato, *Critias*, 119d)

Granting that *plērusque* takes a DP complement, it may be treated on a par with Hindi *zyādātar*, as taking a type e restrictor:

(104) ⟦plērusque ⟧ = λx. λQ. ∃y (y ≤ x ∧ Q(x) ∧ μ(y) > μ(x-y))

Note now that other Latin data suggest that *plērusque* relies on a covert PART element introducing parthood, which makes it similar to the LARGEST PART construction. Thus, Latin has other adjectives which may refer to a certain part of an entity: *summus* 'top (of)', *īmus* 'bottom of, the lowest part', *medius* 'middle of', *extrēmus* 'the end of', *prīmus* 'the beginning/first part of':

(105) a. in summō monte
in topmost.MS.ABL mountain.ABL
'on the top of the mountain'

b. ad īmam quercum (Phaedrus, *Fabulae* II, 4)
to bottom-most.FSG.ACC oak(F).ACC
'at the foot of an oak'

c. ab īmīs unguibus usque ad uerticem
from bottom-most.PL.ABL nails.ABL until at top-of-the-head
'from top to toe' (lit. 'from the lowest part of the nails up to the top of the head') (Cicero, *Pro Roscio Comaedo*, 7)

d. per mediam urbem
through middle.FSG.ACC city(F).ACC
'through the center of the city'

e. duo signa quae in mediīs aedibus sunt
two signs.NPL.NOM which.NPL.NOM in middle.PL.ABL house.PL.ABL are
'two statues, which are in the middle of the house'
(Cicero, *In Verrem* I, 51)

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f. in extrēmō librō tertiō (Cicero, *De oficiis* III, 2)
in endmost.MS.ABL book.MS.ABL third.MS.ABL
'at the end of the third book'

g. prīmā nocte ē castrīs Heluetiōrum
first.FS.ABL night(F).ABL from camp.PL.ABL Helvetii.GEN
ēgressī
gone-out.MPL.NOM
'having escaped from the camp of the Helvetii at nightfall'

These adjectives are not specialized for the partitive meaning, but also have a regular meaning where they situate or characterize a whole entity: *summus* 'highest, topmost', *īmus* 'bottom-most, lowest', *medius* 'middle, intermediary', *extrēmus* 'situated at the edge, occurring at the end, uttermost, hindmost', *prīmus* 'first'.

The partitive meaning exhibited in the examples above can be explained by assuming that Latin allows incorporation of an element meaning 'part' into adjectives which are used to describe certain conceptually salient parts of entities: *media pars urbis* 'the middle part of the city' > *media urbs* 'the middle of the city' (lit. 'the middle city'), *summa pars montis* 'the uppermost part of the mountain' > *summus mons* 'the top of the mountain' (lit. 'the highest mountain'), etc.

Because this meaning enrichment (by which 'Adj' becomes 'Adj-part-of') is restricted to a small class of adjectives, we propose that the element that introduces the parthood relation is a null *derivational* affix (in the sense of being an affix that selects for certain lexemes, rather than for a whole category):

(106) $[_A\ [_A$ summus $[\emptyset_{PART}]]$

The non-partitive, canonically adjectival meaning, on the other hand, would be read off a distinct structure, one in which the adjective is a regular adnominal modifier (with no null element PART). A second issue is to establish how the element PART gets its first argument. Given that the noun PART takes a type e expression as a first argument, we may assume, as we did for the analysis in (104), that the nominal projection to which the constituent in (106) applies is an entity-denoting expression (as Latin has no articles, a covert operation must be assumed for passing from a property denotation to an argument denotation; here, we note this operation by changing the label from NP to DP, assuming a covert D that performs the operation):

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(107) a. $[_{NP}\ [_{AP}$ summus$]\ [_{NP}$ mons$]]$ (modifier use)
b. $[[_{AP}\ [_{A}$ summus $[\emptyset_{PART}]]\ [_{DP}$ mons$]]$ (partitive use)

Under this analysis, the element $\emptyset_{PART}$ may be assigned the following denotation:

(108) $[\![\emptyset_{PART}]\!] = \lambda A_{et}\ \lambda x.\ \lambda y.(y \leq x \wedge A(x))$

By applying this denotation to the adjective *summus*, we obtain for $[_{A}$ summus $[\emptyset_{part}]]$ the denotation in (109):

(109) $[\![\text{summus } \emptyset_{PART}]\!] = \lambda x_{e}.\ \lambda y.(y \leq x \wedge \text{upper}(x))$

Since Latin has this null PART suffix for examples of the type (105), its presence can be assumed in *plērusque*. Unlike the spatial adjectives presented above, *plērusque* cannot appear without -$\emptyset_{PART}$, but the form *plērus*, without the *-que* element, which functions as a less frequent synonym of *plērusque*, is attested, in the preclassical language, as a modifier of an overt noun *pars* 'part':

(110) Plēra pars pessum datast (Pacuvius, *Tragedies*, 320)
most.FSG.NOM part(F).NOM to-the-bottom is-given
'Most of them were annihilated.'

Under this decomposition (see (111)), we may assume that the majority meaning is achieved in the same way as for THE LARGEST PART (see §5.3): the null element PART contributes a bipartition, and the adjective extracts the largest element of this partition:

(111) plērusque = [largest $\emptyset_{PART_{MAJ}}$]

The semantic composition of the nominal *plēraque nōbilitās* 'most of the nobility' unfolds as follows:

(112) [plēraque nōbilitās] = [[-EST] [λd [[t_d-large $PART_{maj}$] $[_{DP}$ nōbilitās]]]]
$[\![[t_d\text{-large } PART_{maj}]]\!]$ = λx.λy.λd. (Partition(P,x) ∧ y ∈ P ∧ |P| = 2 ∧ large(d)(y))
$[\![[t_d\text{-large } PART_{maj}]\ [\text{nōbilitās}]]\!]$ = λy.λd. (Partition(P,σz.nobility(z) ∧ y ∈ P ∧ |P| = 2 ∧
large(d)(y))

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⟦-EST [λd [[t_d-large PART_{maj}] [nōbilitās]]]⟧ = λx. ∃d [large(d)(x) ∧ Partition(P, σz.nobility(z)) ∧ x ∈ P ∧ |P|=2 ∧ ∀y ((y ∈ P ∧ y ≠ x) → ¬ large(d)(y))]

The partition variable P is existentially bound in the clause, yielding the following representation for (101):

(113) ∃P burn-of-envy(ιx. (∃d [large(d)(x) ∧ Partition(P, σz.nobility(z)) ∧ x ∈ P ∧ |P|=2 ∧ ∀y ((y ∈ P ∧ y≠x) → ¬ large(d)(y))]))

In this analysis, the partitive shifting necessary for applying the quantifier to singular count nouns is performed by PART_{maj} (exactly as in the LARGEST PART construction).

5.7.3 A counterpart of Latin *plērusque* in Syrian Arabic

The structure we have proposed for Latin *plērusque*, with a part-selecting adjective combining with an entity-denoting nominal expression, is overtly realized in Syrian Arabic, a language where the DP status of the nominal is indicated by definiteness marking. The data come from Hallman (2019). The examples in (114) show that superlative adjectives combining with a definite DP, in a construct state, introduce the part of the entity denoted by the DP that satisfies the superlative description (possesses a property to a higher degree than the other parts):

(114) a. aʕla ʒ-ʒabal
highest the-mountain
'the highest part of the mountain' (i.e. the summit)

b. aʔdam l-masʒid
oldest the-mosque
'the oldest part of the mosque'

c. aħsan l-madāris
best the-schools
'the best of the schools'

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The same construction is used for expressing majority quantification, with proportional MOST:

(115) a. aktar l-maṣāri
most the-money
'most of the money'

b. aktar l-madāris
most the-schools
'most of the schools'

Hallman proposes that the DP combines with a null N PART and the adjective modifies this noun (with -EST taking scope internally to the overall DP). As the null element PART is not a regular N, but is only licensed by the presence of certain adjectives, we may analyze it as a functional N that requires a superlative in its specifier. As for the superlative used for the proportional reading, it is important to observe that it has the form of a quantity superlative, instead of the size superlative used with the overt noun PART in many languages (see §5.1). This difference can be explained as follows: as we have proposed in §5.2, the *overt* functional PART cannot combine with quantity adjectives because it has a purely formal count feature, [sg] (although semantically, the functional PART is cumulative); the *null* element PART of Syrian Arabic may combine with the quantity superlative MOST because—due to its being covert—it lacks the [sg] feature.

This difference falls into place if we consider the general way of expressing the 'part-of' relation of logic (≤) in natural language. As expected for such a primitive relation, it can be expressed by purely grammatical material—the head R^0 discussed in the previous chapter or the null element PART found in Latin or Arabic. When it is expressed by a lexical noun, we are dealing with the grammaticalization of a term with a more concrete meaning. This is the case of the noun PART, whose concrete use was described in §5.2. As concrete PART is a count noun, the [sg] feature is preserved in its use as a functional noun (which does not denote a set of entities but merely expresses the general part-of relation).

To summarize, among the three languages in our sample that allow quantification over parts of singular entities without an overt item introducing parthood (such as R^0 or the noun PART), two—Latin and Syrian Arabic—show evidence for the existence of a covert PART component. Further research on the way of expressing parthood in Hindi is needed in order to check whether a

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similar analysis can be assumed for this language. If it can, we are entitled to make the following generalization (which extends the suggestions in §4.5.1):

(116) Majority quantification over parts of singular entities is always achieved with the mediation of an item introducing parthood.

5.8 Conclusions

In this chapter we have examined majority expressions built with a nominal element that selects a DP complement introducing the whole. We have distinguished two types: complex expressions of the form THE LARGEST PART or LARGE PART, consisting of a size adjective (usually in the superlative, sometimes in the positive) and the noun PART, and nouns of the type MAJORITY.

For the first type, the presence of three independent elements (definite article, superlative adjective, and PART) and the high crosslinguistic productivity favor a superlative-based analysis: PART introduces the property of belonging to a binary partition of its DP complement, and LARGEST can be given a superlative analysis. We have also suggested that this analysis can be extended to the English partitive MOST, at least in an earlier stage of English, when it could be accompanied by the definite article.

MAJORITY nouns can be given a simple quantificational analysis, the same as that of MOST_{DP}, or a decomposed analysis as that of LARGEST PART. The decomposition is often reflected in morphology (some nouns are compound, cf. Fr. *plu-part* 'MORE-PART', others are derived from an adjective meaning LARGER or MANY/MUCH). For certain MAJORITY-nouns, a superlative analysis is supported by the existence of genuine superlative readings, where they select the largest element of a contextually established partition.

Finally, we discussed majority quantifiers in Hindi and Latin, which have an adjectival form and yet may express quantification over parts of singular individuals. We argued that they combine with an entity-denoting nominal projection. For Latin, we presented evidence for the existence of a null component PART in this construction. A counterpart of the Latin construction was found in Syrian Arabic, a language with definiteness marking, which overtly marks the sister of the quantifier as entity-denoting.

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6
Conclusions

6.1 Summary of empirical findings

The main results of this book are empirical. By combining partial descriptions of MOST found in the linguistic literature for some languages (English, Hungarian, Romanian, German, Scandinavian) with a questionnaire-based investigation of around 30 languages, we were able to reveal the existence of two distinct types of MOST occurring in non-partitive configurations, which we have dubbed $\text{MOST}_{\text{dist}}$ and MOST_{cum}. These labels point to the respective semantic properties of each of these MOSTs: the former can only be interpreted distributively, whereas the latter can also express proportional judgments about the measures of parts of plural and mass entities. In terms of syntactic subcategorization, the distinction is not clear-cut, yet noteworthy: both $\text{MOST}_{\text{dist}}$ and MOST_{cum} can combine with NP_{pl}, only MOST_{cum} can combine with NP_{mass}. And none of them can combine with $\text{NP}_{\text{sg-count}}$. We have also examined partitive configurations and explained the observable difference in distribution between partitives headed by $\text{MOST}_{\text{dist}}$ and MOST_{cum} as following from the difference between these elements in non-partitives, against the background of a unified analysis of partitive configurations. We have moreover revealed the existence of a MOST that is specialized for partitives, which we have labeled MOST_{RP} (as a reminder of the RP (ResidueP) constituent postulated by Zamparelli 1998 for partitives) and a MOST that takes a DP complement. We have proposed compositional analyses that explain why MOST_{RP}, as well as MOST_{cum} in partitives, can quantify over parts of atoms by applying to singular count DPs (in addition to DP_{pl} and DP_{mass}). Compare MOST_{cum} in non-partitives, which can combine with NP_{pl} or NP_{mass}, but not with $\text{NP}_{\text{sg-count}}$. Finally, we have offered analyses of proportional nominals of the type THE LARGEST PART and THE MAJORITY. All those majority quantifiers that combine with a DP (or an *of*-DP) qualify as "cumulative" quantifiers.

The empirical generalizations briefly summarized above cannot be explained by previous analyses of MOST, which fall into essentially three groups: the GQT set-quantificational analysis, Hackl's (2009) superlative-based analysis, and

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Matthewson's (2001) view according to which the restrictor of MOST is always entity-denoting (a particular entity in partitives and a kind in DPs of the form [MOST[NP]]). We have argued that the GQT analysis must be assumed for $\text{MOST}_{\text{dist}}$, but quite obviously has nothing to say about the other types of MOST, all of which are cumulative quantifiers. The obligatory distributivity of the non-partitive MOST observed in English, Icelandic, Romanian, or Hungarian is unexpected under Matthewson's unified entity-restrictor analysis. Crnić (2009) attempted to solve this problem for English, but his solution is problematic and does not extend to Romanian or Hungarian. Hackl's proposal is clearly incorrect for $\text{MOST}_{\text{dist}}$ because on the superlative analysis MOST is wrongly predicted to apply to mass NPs and to allow collective quantification. We have moreover argued that Hackl's analysis is inadequate even for MOST_{cum}, because it treats DPs embedding MOST_{cum} as indefinite, which is at odds with the consistent use of the definite article we have observed with MOST_{cum}. A more general problem of Hackl's superlative analysis is that it predicts that majority readings should be very productive, appearing whenever a quantity superlative may scope DP-internally. Our crosslinguistic investigation, as well as Coppock's parallel one (see Coppock et al. 2017; Coppock 2019), have shown this not to be the case. Across the languages of the world, the majority use of MOST is an exception rather than the general rule.

The rather complex picture presented above is made clearer by the use of abstract syntactic representations, in which functional categories play the leading role. Particularly relevant for the analysis of MOST is an intermediate functional projection, MeasP (this is Solt's (2009) label for Schwarzschild's (2006) MonP), which intervenes between the D-layer and the NP. In this book we have argued—based on the distribution of the definite article—that MOST_{cum} sits in Spec,MeasP, in contrast with $\text{MOST}_{\text{dist}}$, which sits in a higher position, either Spec,DP (in Romanian) or D^0 (in English). In DPs headed by $\text{MOST}_{\text{dist}}$, the intermediate MeasP projection is not generated (this is not theoretically problematic: MeasP is an optional functional category, which projects only if needed). We attributed the obligatory distributivity of $\text{MOST}_{\text{dist}}$ to the fact that it takes an NP complement. Compare MOST_{cum}, which combines with MeasP.

The correlation between cumulative quantification and the projection of MeasP raises interesting questions that we were not able to fully address within the limits of this book. But, importantly, we do have a syntactic basis for the semantic distinction between distributive and cumulative quantification: the restrictor of MOST is syntactically realized as an NP on the one hand and as MeasP on the other hand.

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6.2 The "why" questions: degree quantifiers, quantificational determiners, and homogeneity removers

We may now wonder why the data are what they are. Why is it that we find two, and only two, types of non-partitive MOST across languages, a distributive and a cumulative one? In particular, why don't we have a third MOST, which would apply to singular count NPs, e.g. **der meiste Tisch* 'the most table' meaning 'most of the table'? As far as we can tell, this third type is universally ruled out.

In principle, we would expect only one denotation per quantificational Det. Indeed, if we assume that the semantics of a quantificational Determiner is read off a configuration in which MOST sits in the D position, and given that we have just one D position inside the minimal DP, how come we have two distinct types of non-partitive proportional MOSTs? In Chapter 3 we suggested a line of analysis, leaving a fully worked-out implementation for further research. The core idea is that *qua* quantificational Det's, both of the two proportional MOSTs carry a categorial feature D, which requires MOST to target D^0 (or Spec,DP). For $MOST_{dist}$ this requirement is satisfied by First Merge in D^0/Spec,DP,[1] as shown in (1), whereas $MOST_{cum}$ is first-merged in Spec,MeasP, raises to D^0, and forms a complex head [THE MOST] that takes MeasP as a complement, see (2):

$MOST_{dist}$

(1) a. $[_{DP}$ $[_{D^0}$most] $[_{NP}$students]] (Engl.)

b. $[_{DP}$ $[_{Spec,DP}$ cei mai mulți] $[_{D'}$ $[_{D^0}Ø]$ $[_{NP}$ studenți]]] (Ro.)
SUP COMP many students

$MOST_{cum}$

(2) a. $[_{DP}D^0$ $[_{MeasP}$ Spec,MeasP$[_{Meas'}Meas^0$ NP]]]]
der meiste Kaffee 'the most coffee' (Ge.)
die meisten Studenten 'the most students'

Complex head formation =>

b. $[[_{D^0}$ D^0-$Meas^0]$ $[_{MeasP}$ $Meas^0$ $NP_{pl/mass}]]]]$
der meiste Kaffee 'the most coffee' (Ge.)
die meisten Studenten 'the most students'

[1] The absence of *the* with proportional *most* in English is the main empirical evidence in favor of (1a); for evidence in favor of (1b), in Romanian, see §2.5, as well as Giurgea (2013a) and Cornilescu and Giurgea (2013).

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To these distinct syntactic representations correspond distinct denotations:

(1′) $[\![\text{MOST}_{\text{dist}}]\!] = \lambda P.\ \lambda Q.\ |\{x\colon P(x) \wedge \text{Atom}(x)\} \cap \{x\colon Q(x)\}| > |\{x\colon P(x) \wedge \text{Atom}(x)\} - \{x\colon Q(x)\}|$

(2′) $[\![\text{THE MOST}_{\text{cum}}]\!] = \lambda P.\ \lambda Q.\ \exists x\ (P(x) \wedge Q(x) \wedge \mu(x) > \mu(\sigma y.P(y)-x))$

In Chapter 3 we envisaged but rejected another possible analysis of MOST_{cum}, according to which its D-feature would be satisfied by raising at LF to a position above THE. In this LF representation THE would have its standard interpretation and MOST would take an entity-denoting restrictor:

(3) $[_{DP}$ Spec,DP $[_{D'}D^0$ $[_{MeasP}$ Spec,MeasP $[_{Meas'}$Meas^0 NP]]]]

der	meiste	Kaffee	‘the most coffee’ (Ge.)
die	meisten	Studenten	‘the most students’

The reason we abandoned this analysis was empirical (see §3.4.2 for details), in particular the reading of examples built with demonstratives. Examples of the type in (4) are not accepted by all speakers (as indicated by the diacritic %) and, if accepted, never have a reading where *most* takes as a restrictor Dem+NP. In other words, these examples do not mean ‘most of these NP’:

(4) %Diese meisten Studenten sind kluge.
these most students are smart
≠ Most of these students are smart
only possible reading: ‘this majority of students are smart’[2]

But quite interestingly, this same type of example is possible with the German *ganz* ‘whole’ when it is interpreted as ‘all’—an interpretation allowed in the colloquial register reported by Haspelmath (1995) and Moltmann (1997):

(5) a. Wer hat diese ganzen Leute eingeladen?
who has these *ganz* people invited
‘Who invited all these people?’ (www.ntower.de)

[2] In this reading, *meist* may be analyzed as a quantity modifier with the following denotation (see Ch. 3 for details):

(i) $[\![\text{meist}]\!] = \lambda N.\lambda x.\ N(x) \wedge \mu(x) > \mu(\sigma y.(N(y) \wedge \neg\, x \circ y))$

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b. Was kann ich tun um diese ganzen Fehler zu beheben?
what can I do for these *ganz* errors to fix
'What can I do to fix all these errors?'
(community.unitymedia.de)

Thus, the contrast between *meist* 'most' and *ganz* 'all' regarding compatibility with demonstratives suggests that whereas the former does not raise at LF, the latter does:

(6) [ganzen [diese [t_{ganzen} Leute]]]
all these people

We may now wonder why this should be so. A plausible line of inquiry is to derive the observed contrast from the difference in syntactic category: regardless of whether it means 'whole' or 'all', the categorial feature of *ganz* is "adjective", whereas the categorial feature of the superlative MOST is "degree quantifier", just like MANY/MUCH (Solt 2009). By attaching to the DP as in (6) above, *ganz* 'all' does not change its categorial feature; arguably, the only role of this LF raising operation is that of allowing *ganz* to function as a "homogeneity remover" (see §4.6.2). MOST_{cum}, on the other hand, is a quantificational determiner, and we may postulate that this categorial feature needs to be satisfied in the syntactic component. The hypothesis of a complex head [THE MOST] proposed in §3.4.2 and briefly recalled above is thus supported not only by empirical evidence (incompatibility with demonstratives) but also by a theoretical principle according to which the quantificational determiner feature needs to be satisfied in the syntax.

The contrast observed above DP-internally between MOST_{cum} and the German *ganz* is paralleled by another contrast we observed, between MOST and ALL when they occur higher up, above the minimal DP level in the syntax. Indeed, whereas in such contexts MOST preferentially requires a partitive complement (hence the label MOST_{RP}), ALL normally takes a DP that is "bare", i.e. not preceded by a partitive preposition (nor genitive-marked). As discussed in §4.6, this difference in partitivity marking is evidence in favor of the fact that the differentiated treatment of proportional MOST and ALL proposed above for "minimal" DPs also holds for partitive DPs or DPs involving "high" quantifiers: MOST_{RP} is a quantificational determiner that takes an RP as a complement, whereas ALL is a "high" quantifier (but crucially not a quantificational determiner) that functions as a homogeneity remover.

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6.3 Compositional issues, the relation between majority interpretations and superlatives, grammaticalization

The denotations we proposed for proportional MOST do not take into account the morphosyntactic complexity of the expressions identified as $\text{MOST}_{\text{dist}}$ or MOST_{cum}, as can be seen from (2′) for MOST_{cum}, and (1′) for $\text{MOST}_{\text{dist}}$, which corresponds not only to the English *most* but also to the complex constituent *cei mai mulți* 'SUP.MPL COMP many.MPL' in Romanian. Denotations assigned to whole trees, rather than syntactic atoms, are well known from the literature on idioms. In our case, we are dealing with a type of idioms which differ from those discussed in the literature by the fact that all their components belong to the functional vocabulary of the language (quantity adjectives belong to a closed class and can therefore be considered as functional elements, on a par with the superlative and comparative morphemes and the definite article). We may use the term "grammatical idioms" for these type of expressions.

Those analyses that take into account the internal structure of these expressions (Hoeksema 1983; Hackl 2009) try to derive the proportional interpretation from the superlative. We have shown that the proportional interpretation does not arise automatically from the quantity superlative. We argued that the proportional interpretation can be compositionally obtained from the superlative only if we include in the structure an element that introduces a binary partition, in the form of a variable over partitions that is existentially bound above the DP-level. We used this type of composition for the LARGEST PART type, identifying the element that introduces the binary partition with the functional word PART. Compared to Hoeksema's (1983) view, in which the partition is introduced as a possible value of the comparison class of the -EST in MOST, our solution is preferable for two reasons: (i) the composition is more straightforward, as the whole that is partitioned is the denotation of the sister of PART; (ii) it explains why the type THE LARGEST PART is crosslinguistically the most productive type used for majority readings (it is found not only in languages that lack proportional MOST but also in languages that have a proportional MOST). We have argued that the semantic composition proposed for THE LARGEST PART may also underlie other majority expressions: MAJORITY nouns, which we analyzed as decomposable into LARGEST and PART (§5.5), and the partitive proportional MOST/MORE found in the configuration THE $\text{MOST/MORE}_{\text{RP}}$, for which we proposed that R^0 introduces the partition (§5.6).

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Having rejected the superlative analyses of proportional MOST, we explained the superlative form as a result of a historical process, by which a quantity superlative acquires a D feature and, correlatively, a quantificational determiner denotation. The D-feature may replace the Quant feature completely, leading to base generation in D or SpecDP (see $\text{MOST}_{\text{dist}}$, ex. (1)) or may coexist with it, leading to base generation in SpecMeasP and subsequent head-merger with D (see MOST_{cum}, ex. (2)).

We suggest that this historical evolution may explain the correlation between the existence of proportional MOST and the existence of articles (Živanović 2007; Bošković and Gajewski 2009): the reanalysis of a quantity adjective into a quantificational determiner obtains more easily if the language has a generalized D-level (this explanation relies on the assumption that bare nouns in languages without articles are NPs rather than DPs: see Bošković 2005; 2008).

6.4 "Essentially" quantificational, reference to sums, distributivity, and part–whole relations

A noteworthy contribution of this book is its concern with cumulative quantification, a notion that covers mass quantification and collective quantification. The existing linguistic literature on proportional quantification is almost never interested in mass quantification, with the notable exception of Higginbotham (1994). Collective quantification is a widely discussed topic, but the main focus is on the distributive vs. collective readings of definite or cardinal DPs. The similarities between mass and collective quantification are only very rarely brought up.

To say the least, proportional mass quantification is under-studied. When semanticists propose generalizations regarding quantificational DPs, they quite systematically ignore mass quantifiers. To illustrate, let us consider the following quote from Szabolcsi (2010: 133):

> Partee (1995, p. 564) conjectures (extending a claim in Gil 1989, 1995) that all essentially quantificational DPs are distributive. To make Partee's point perhaps even stronger, let me reinterpret "essentially quantificational" as those DPs whose determiner is not purely intersective and which cannot be taken to denote (atomic or plural) individuals, either.

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MOST$_{cum}$ is not intersective, and since constituents of the form [THE MOST$_{cum}$ NP] do not denote individuals, MOST$_{cum}$ is essentially quantificational. And yet, it is not distributive. MOST$_{cum}$ thus teaches us that we must dissociate obligatory distributivity from "essentially quantificational". The essentially quantificational nature of MOST$_{cum}$ is due to its proportional semantics, which requires computing the relation between the measure of a part and the whole. Proportionality is indeed the crucial difference that separates MOST$_{cum}$ from intersective determiners: MOST$_{cum}$ does not talk about just one sum-entity, but rather about the relation between a sum-entity and its complement with reference to the whole.[3]

MOST$_{dist}$, on the other hand, is necessarily distributive, as expected for a well-behaved essentially quantificational determiner. In being distributive, MOST$_{dist}$ resembles universal Qs such as *each* and *every*. Should we then group MOST$_{dist}$ together with universal Qs? There are, however, some noteworthy differences that set MOST$_{dist}$ apart: (i) MOST$_{dist}$ takes plural NPs in languages that allow plural NPs with quantity adjectives;[4] (ii) in Hungarian, the definite article *a* is obligatorily present with *legtöbb* and obligatorily absent with the universal quantifier *minden* (Szabolcsi 1994; 2010); (iii) in Hungarian, the left-peripheral position of *a legtöbb*-DPs is higher than that of DPs headed by the universal Q *minden* (Szabolcsi 2010). We leave for future research an explanation of the differences between MOST$_{dist}$ and universal quantifiers.

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[3] Note also that the proportionality of MOST is not of the same type as the one found with MANY/MUCH: the latter, which is much more widespread across languages, is not due to a special lexical entry, but rather to the following factors (discussed in Solt 2009; 2017, and Dobrovie-Sorin and Giurgea forthcoming): (i) the possibility of using proportional measure scales and (ii) the fact that the setting of the standard degree (or neutral range of the scale) involved in the interpretation of the positive degree must take into account the measure of the "whole" whenever the measured entity is interpreted—due to the linguistic or pragmatic context—as being part of a larger entity.

[4] For a semantic difference between MOST$_{dist}$ and singular distributive quantifiers that is correlated to the plural marking, see the possibility of quantifying over derived atoms (groups derived from pluralities), discussed in §2.3.6.

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