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HOW DIFFERENT ARE DIFFERENT DEGREE CONSTRUCTIONS?

Penka T. Stateva, Ph.D.

University of Connecticut, 2002

At least from the point of view of English, it seems plausible that the comparative and the superlative degree words *more/less* and *most/least* have similar syntactic and semantic properties. This dissertation is concerned with the question whether the intuition is in fact warranted. Our discussion is based on a comparative study of the two comparison constructions in different syntactic environments like *so*-pronominalization, measure phrases, conditional sentences, etc. Benefiting from a cross-linguistic perspective, we argue that the comparative and the superlative constructions differ in many dimensions, the most important of which is the quantificational force of the degree words. We continue a debate about the quantificational status of degree operators between Kennedy (1999) and Heim (2000) and bring evidence that the comparative degree word is a scope bearing element, while the superlative isn't. To motivate our view, we examine paterns of scope interactions in the comparative conditional construction, and also split scope phenomena. Finally, we propose a non-unifying semantic and syntactic theory of comparison.

We give special attention to the question why the effects of the scopal properties of the comparative operator are difficult to be attested. Bulding on a suggestion in

Penka T. Stateva—University of Connecticut, 2002

Heim (2000) we examine the role of syntax in scope interactions between the comparative operator and other scope bearing elements. We reevaluate Heim's interface constraint, known as *Kennedy's generalization* and in light of new data that we discuss, we propose this constraint to be reduced to a more general constraint about intervention effects of quantifiers, independently motivated in Beck (1996).

As a consequance of our proposal, the following picture about natural language comparison emerges: comparsison can be encoded either non-quantificationally, or quantificationally. The superlative construction realizes the first option. The adjectives/adverbs on which it is based have a semantic type of a measure function in the spirit of Kennedy (1999). The second option is instantiated in the comparative construction. In it, the type of adjectives/adverbs is raised to provide a degree variable which the comparative operator binds, and thus quantifies over part of a scale. That view eliminates the undesirable consequence of other quantificational theories that the absolute adjectival construction has a built-in quantifier.

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Doctor of Philosophy Dissertation

HOW DIFFERENT ARE DIFFERENT DEGREE CONSTRUCTIONS?

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Table of Contents

INTRODUCTION

Natural language encodes comparison in more than one way. All languages grammaticalize the notion of comparison between two individuals with respect to some property by a comparative form which could be added to adjectives, adverbs, verbs, as the examples in (1) show:

(1) a. Scott is more industrious than Bill is.
b. Scott studied more industriously than Bill did.
c. Scott studied more than Bill did.

Most languages also grammaticalize the comparison between an individual and a non-singleton, non-empty set of relevant individuals by a special superlative form, which is often morphologically related to the comparative. To take again English as an example, the superlative phrases corresponding to the ones in (1) would *be the most industrious, the most industriously, study the most.* At least from the perspective of English then, it seems that it is desirable to analyze in similar terms the two comparison construction, the comparative and the superlative because they share a lot of common properties: (i) they use the same set of gradable adjectives/adverbs/verbs; (ii) they are related morphologically; (iii) there are negative and positive comparatives, as in *less charismatic* and *more charismatic* but also negative and positive superlatives, as in *the least charismatic* and *the most charismatic*; (iv) at least superficially, it looks like syntactically the constructions are derived in a similar way. Finally, both comparatives and superlatives are highly context dependent. Part of the context-dependency is inherited from the adjectives with which the comparative and

the superlative determiners combine.[1] But more importantly, comparatives, and superlatives are underdetermined and require input from the context in the sense that they can only instantiate a comparison if an appropriate scale of measuring the relevant property is provided. Schwarzschild and Wilkinson (2002) convince us of that. Suppose that Kitty and Red each own a house worth about ten million dollars. If in a particular context counting down to cents is irrelevant, i.e. the scale that the context makes relevant, does not represent cents as being significant, then we can't truthfully utter (2):

(2) Red is poorer than Kitty.

However, there might be contexts in which it is important to determine the exact value of each house, counting every cent. In such contexts, (2) might turn out to be true. It is easy to see that scales are context dependent in the same way with superlatives. The context dependency related to the scales comes from the adjective, not from the meaning of the comparative and the superlative determiner, but even so, it's a property that both constructions preserve and that makes an analogous analyses theory look good.

In this thesis we are going to explore the plausibility of a unifying analysis of comparison. *Chapter 1* is dedicated to finding the most plausible unifying theory of comparison. We will consider two types of unifying theories. One of these views the degree words as operators that bind a degree variable introduced by the scalar

[1] The comparative and the superlative constructions combine with gradable adjectives and adverbs, but also with gradable verbs. We choose the case with the adjectives to illustrate a point about context dependency but gradable verbs and adverbs show the same property.

predicate. The ability of the degree operator to bind a variable in its scope, leads one to expect that the operator, being in that sense a quantificational element, can interact with other scope bearing elements. Evidence for such interactions, as argued by Kennedy (1999), are hard to find. This motivates an alternative inherently non-quantificational analysis of comparison. The second theory advocates the view that the degree words have no binding force at all. But which theory is preferable? Each of the two unifying semantic theories is coupled with a syntactic theory of comparison. The quantificational theory is coupled with a view that the head of the extended adjectival projection is the adjective. In turn, the degree word, and the restriction on its domain, form a constituent to the exclusion of the adjective, i.e. this constituent, DegP, is syntactically mobile and can be interpreted not only in its base position, but also in a higher position. Therefore, DegP can potentially change its scope relations with other scopal elements in the sentence. The competing theory, in the spirit of Abney (1987), assigns the role of a structural head of the extended adjectival projection to the degree word. We discuss a semantic argument for the first theory, and a syntactic argument for the second. However, we show that the syntactic advantage that the second theory has, disappears under a proposal that degree phrase includes two shells. We conclude the chapter by arguing that if the unifying theory of comparison is correct, then it must be quantificational. Irrespective of the many similarities, however, we will end up arguing that comparative and superlative degree words, and their respective constructions, differ in many ways, the most important of which is their quantificational force.

In *Chapter 2*, we mostly focus on differences between the two constructions which undermine the unifying theory. We discuss a type of context, previously introduced in Sharvit and Stateva (2002), and referred to as "sandwich" scenarios, which illustrates that the theory he have chosen makes wrong predictions for superlatives in such contexts while this is not obvious for comparatives. Further, we introduce a number of other syntactic environments that highlight the different syntactic/semantic properties of the two constructions. The discussion is based on data involving measure phrases, ellipsis, comparative conditionals, modal adjectives, etc.

In order to account for these differences, we make a proposal for a non-unifying theory in *Chapter 3*, motivating it with observations from a cross-linguistic perspective. We argue that the quantificational theory is right in its view about comparatives, but not about superlatives. We develop a new, non-quantificational theory of superlatives in light of data from Slavic, which point to the conclusion that the superlative construction is a non-quantificational counterpart of the quantificational comparative construction. The superlative construction, we argue, is a projection of a comparative head, which doesn't have any degree binding properties. The argument that there are two types of comparative constructions in natural language implies that we use different types of adjectives/adverbs in the two constructions. We propose that the basic semantic adjectival type is <e,d>, as argued in Kennedy (1999). However, we make a claim that there is a general type-shifting rule that raises the adjectival type when the adjective combines with the quantificational comparative degree word. We address possible counteraguments to

the proposal, related to putative split-scope readings in superlatives and show that our proposal has the tools to account for the observed phenomenon. We also reexamine the bulk of the data, introduced in *Chapter 2*, in light of the non-unifying theory, and conclude that the observed contrasts between the two constructions are now explained away.

Chapter 4 returns to the question of the limitations of scope taking in the domain of comparison. We follow closely Heim (2000) in examining the role of syntax in scope interactions between the comparative operator and other scope bearing elements. We reevaluate Heim's interface constraint, known as *Kennedy's generalization*, and in light of our new data we propose to reduce it to a more general constraint about intervention effects of quantifiers, independently motivated in Beck (1996a) and Beck (1996b). We extend the proposal to distributive and cumulative readings of plurals.

Chapter 5 contains our thoughts about the bigger picture of comparison and possible extensions of Beck's filter to a larger domain of comparative constructions, including quantifiers in the *than*-clause. Also, we speculate that every comparison relation in natural language, *greater than, smaller than*, and *as great as*, can be expressed in quantificational terms or in non-quantificational terms. In other words, we want to extend our hypothesis regarding the relation between the comparative and the superlative construction to the pair of constructions that realize the relation *as great as*: the equative and the absolute construction.

Before we proceed, we take the opportunity to introduce briefly our formal assumptions and notation. We follow the framework of Heim and Kratzer (1998). Let

us define the formal language L that we are going to use. (3) and (4) list the semantic types of denotations and the semantic denotation domains:

(3) Semantic types:
   a. e is a type; the type of individuals.
   b. d is a type; the type of degrees.
   c. t is a type; the type of truth-values.
   d. s is a type; the type of possible worlds/time intervals.[2]
   e. If a and b are types, then <a,b> is a type.
   f. Nothing else is a type.

(4) Semantic domains:
   a. $D_e := D$ (the set of individuals)
   b. $D_d := \{d: d \text{ is a degree}\}$
   c. $D_t := \{0,1\}$ (the set of truth values)
   d. $W := \{w: w \text{ is a possible world}\}$
   e. If a and b are semantic types, then $D_{<a,b>}$ is the set of all functions from D_a to D_b.

The vocabulary of L contains constants and variables of each semantic type, as well as the logical connectives: &, $\vee$, $\rightarrow$, $\leftrightarrow$, and the operators $\forall$ and $\exists$. Variables denote individuals, relative to a variable assignment. Here is how Heim and Kratzer define the notion of variable assignment. Bear in mind that variables in LF are represented by indices on pronouns/traces:

(5) A variable assignment g is a partial function from $\mathbb{N}$ (the set of nutural numbers) into D.

Functions will be described in the Heim and Kratzer (1998) λ-notation. λ-terms like (6) consist of three elements: an argument variable α, a domain condition ϕ, and a value description γ:

(6) $\lambda\alpha: \phi.\gamma$

---

[2] Heim and Kratzer (1998) don't assume that *s* is a basic semantic type. In this respect, we follow an assumption from the translation language *Type 2*.

α is an arbitrary argument of the function in (6). ϕ is a condition that specifies the semantic domain of the function, thus it constraints the possible values for α. The condition is introduced by a colon. The value description is introduced by a period. It specifies the value that the function assigns to α. Using this λ-notation we give a sample lexical entry for the English verb *walk* in (7):

(7) $[[\text{walk}]] := \lambda x{:}x \in D.\textit{walk}(x)$

For all definitions, we will follow strictly this format. For convenience, however, we will often omit the domain condition in the interpretations of non-terminal syntactic nodes. The semantic rules that we adopt also from Heim and Kratzer (1998) are given in (8):

(8) a. Terminal nodes:
If α is a terminal node, $[[\alpha]]$ is specified in the lexicon.

b. Non-branching nodes:
If α is a non-branching node, and β is its daughter node, then $[[\alpha]] = [[\beta]]$.

c. Functional application:
If α is a branching node, $\{\beta,\gamma\}$ is the set of α's daughters, and $[[\beta]]$ is a function whose domain contains γ, then $[[\alpha]] = [[\beta]]([[\gamma]])$.

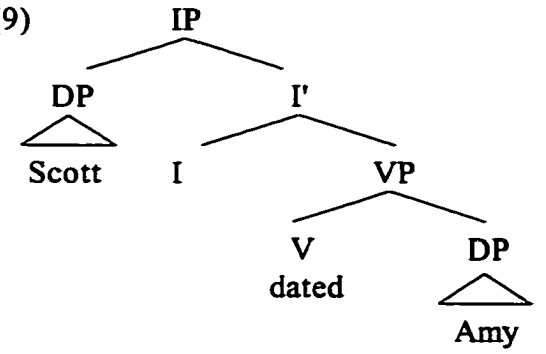
d. Predicate modification:
If α is a branching node, $\{\beta,\gamma\}$ is the set of α's daughters, and $[[\beta]]$ and $[[\gamma]]$ are both in $D_{<e,t>}$, then $[[\alpha]] = \lambda x{:}x \in D.[[\beta]](x) = [[\gamma]](x) = 1$.

e. Predicate abstraction:
Let α be a branching node with daughters β and γ, where β dominates only a numerical index i. Then, for any variable assignment a, $[[\alpha]]^a = \lambda x{:}x \in D.[[\gamma]]^{a\ x/i}$.

Let us see a few examples. Consider first (9):[3]

[3] We will ignore the contribution of tense, for simplicity.

(9)



Amy and **Scott** are constants. The denotation of both DPs is an individual (*Amy* and *Scott*, respectively). *Date* is a terminal node whose interpretation is specified in the lexicon:

(10) [[date]]:= λx:x∈D.[λy:y∈D.[*date*(x)(y)]]

Date is a function that maps an individual to a function from individuals to truth values. The DP, which is the sister of the verb *date*, as we said, is an expression of type *e*. Since the domain of the function that *date* denotes contains [[Amy]], by the rule of functional application in (8c), [[VP]]= [λx.λy.*date*(x)(y)(*Amy*) = λy.*date*(*Amy*)(y). If the semantic contribution of I is ignored, the interpretation of I' is the same as the interpretation of the VP. Finally, the interpretation of the IP is derived by applying the denotation of I' to the denotation of the DP, since the latter is in the domain of the former. [[IP]] is in D_t:

(11) [[IP]] = 1 iff [λy.*date*(*Amy*)(y)] (*Scott*) = *date*(*Amy*)(*Scott*)

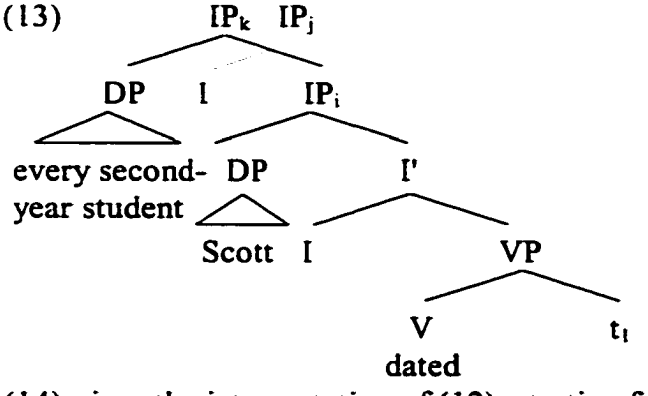
Now, let us see how predicate abstraction works. Consider (12):

(12) Scott dated every second-year student.

The direct object of *date* is an expression of type <et,t>. The verb is of type <e,et>. Obviously, functional application can't apply in the interpretation of the VP since neither denotation is in the domain of the other. By a standard practice, the type

mismatch is resolved by having Quantifier raising apply to the direct object at LF. The trace left in the object position is an individual variable, which now allows functional application to apply. But how is the variable interpreted? (8e) provides the solution. When the object DP is QR-ed, it creates a binder for the variable left behind. The binder has the same index as the index of the trace. It is adjoined to the sister of the moved element as in (13):

(13)



(14) gives the interpretation of (12), starting from bottom to top:

(14) $[[V]] = \lambda x{:}x \in D.[\lambda y{:}y \in D.\mathit{date}(x)(y)]$

For any variable assignment g: $[[VP]]^g = \lambda y{:}y \in D.\mathit{date}(g(1))(y)$ [by FA]

For any variable assignment g: $[[IP_i]]^g = 1$ iff $\mathit{date}(g(1))(\mathit{Scott})$ [by FA]

$[[IP_j]] = \lambda x{:}x \in D.\mathrm{date}(x)(\mathit{Scott})$ [by PA]

$[[IP_k]] = 1$ iff $\mathit{date}(\mathit{every\_second\text{-}year\_student})(\mathit{Scott})$

Now we are equipped to proceed with the discussion of the adequate theory of comparison.

CHAPTER 1

A common-sense theory of the comparative and the superlative degree words

1.1. Mainstream assumptions about comparatives

1.1.1. A quantificational type of analysis

Research on the semantics of comparatives is impressively extensive. Among the various proposals, two major approaches are currently competing: one which treats the comparative construction as a quantificational structure (cf. Seuren (1973), Cresswell (1976), Hoeksema (1983), Hellan (1984), Stechow (1984), Heim (1985), Heim (1998); Heim (2000), Rullmann (1995), Lerner and Pinkal (1995), (Beck (1997), Hackl (2000), Schwarzschild and Wilkinson (2002), etc.), and another which treats them as non-quantificational (cf. (McConnell-Ginet (1973), Bartsch and Vennemann (1972), Klein (1980), Klein (1982), Kennedy (1999)). The predominance of the quantificational type of analyses has affected the standard view on superlatives. Almost all spelled out semantic analyses of that construction view the superlative operator on analogy with the comparative operator as binding a free degree variable introduced by the gradable adjective/adverb/verb (Heim (1999), Bhatt (1999), Sharvit and Stateva (2002), etc.). Farkas and Kiss's (2000) analysis of superlatives, an extension of Kennedy's analysis of comparatives, is a current representative of the non-quantificational approach. However,

in that proposal, too, the underlying assumption is that the semantics of the superlative is in all relevant respects similar to the semantics of comparatives.

Let us start by introducing the quantificational theory first. Without being completely fair to any of the authors cited above, but preserving the spirit of the quantificational analysis, we specify below the basic assumptions about the semantics of the comparative operators *-er* and *less*. Under the view that degree words are quantificational elements, adjectives are assumed to relate individuals and degrees/extents/intervals on a scale. Therefore, the lexical entries for adjectives like *old* look like (1):

(1) $[[\text{old}]] := [\lambda x \in D_d . [\lambda y \in D_e . \text{ y is old to degree d}]]$ where *e* is a type for individuals, and *d* is a type for degrees ((Heim 2000), among others)

The comparative operator quantifies existentially over the degree position of the adjective. Before we specify its semantics we need to distinguish between two major kinds of comparatives, since semantic theories, to a great extent, depend on that distinction.

The comparative construction comes in two varieties, phrasal and clausal, as illustrated in (2) and (3), respectively:

(2) a. Scott is smarter than Keith.
b. Scott drove faster than Keith.
c. Scott failed more tests than Keith.
d. Scott flew a bigger kite than Keith.

(3) a. Scott is smarter than Keith is.
b. Scott drove faster than Keith did.
c. Scott failed more tests than Keith did.
d. Scott flew a bigger kite than Keith did.

Each sentence in the second set of examples seems to contain two predicates while this is not obvious for their counterparts in the first set. But since phrasal comparatives and their

respective sentential variants are synonymous, one would like to know whether they are transformationally related. After Bresnan (1973), the standard view about the clausal comparatives is that their derivation involves ellipsis. However, this view has been undermined by arguments from Kennedy (1999) and Lechner (1999). If it is questionable that sentential comparatives involve ellipsis, it is much more difficult to argue that phrasal comparatives involve ellipsis. Intuitively, it is attractive to argue that the two types of constructions are related: each pair of a phrasal and a corresponding sentential comparative conveys the same meaning. However, syntacticians are split in their opinions for or against the unifying analysis. From a semantic point of view, a non-unifying analysis implies that there should be two semantic theories of comparatives: one that uses the input of ellipsis and describes sentential comparatives, and one that directly interprets the structure of phrasal comparatives.

In *Section 1.4* we explain why we believe we don't need to take a stand in the dispute about ellipsis. When possible, we will try to avoid building arguments contingent on that. Since, at least in the semantics literature, there is some consensus about the status of sentential comparatives, we will base our discussion mainly on those.

The "classical" quantificational theory of comparatives is dependent on a particular syntactic assumption: that the comparative operator and the *than*-clause form a constituent at LF (see Bresnan (1973), Lehner (1999)).[1] This constituent is what Heim (2000) assumes to be the DegP in comparatives. The *than*-clause is seen to function as a

[1] This assumption, though widely assumed has been questioned and criticized (see, for example, Lerner and Pinkal (1995), Kennedy (1999)). For a more detailed discussion of the syntactic properties of the comparative construction in *Section 1.3*.

restriction of the comparative operator. As Heim observes, under this view, the comparative operator looks very similar to quantificational elements in DPs. The latter have a restriction which is a function from individuals to truth values and a nuclear scope of the same type. The comparative operator, on the other hand, is restricted by a function from degrees to truth values and takes as a second argument a function of the same type. Individuals and degrees are similar basic types. There's a natural analogy then between the <et,t>-type generalized quantifiers and DegP, which is highlighted by the quantificational theory of comparison: <αt,t> is a type of a quantifier (where α = d *or* e).

Given the assumptions about the types of arguments of the comparative operator and the order of combining, we can specify in (4) the lexical entries of *-er* and *less*:[2]

(4) a. $[[er]] := \lambda P: P \in D_{<d,t>}.[\lambda R: R \in D_{<d,t>}.\exists d[\neg P(d) \& R(d)]]$
b. $[[less]] := \lambda P: P \in D_{<d,t>}.[\lambda R: R \in D_{<d,t>}.\exists d[P(d) \& \neg R(d)]]$

We assume, for the purposes of the discussion of the quantificational theory, that adjectives (type <d,et>) are monotone functions in the sense of (5):

(5) A function R of type <d,et> is monotone iff
$\forall x,d,d_1[\, d > d_1 \,\&\, R(d)(x) \rightarrow R(d_1)(x)]$ (after Gawron (1995))

Let us illustrate the quantificational theory with an example. Consider (6). (6b) gives the D-structure of the sentence which feeds its LF:[3]

(6) a. Scott is more handsome than Bill is.
b. $[_{IP}$ Scott is $[_{AP}\, [_{DegP}$ more than Bill is ▲$[_{A'}$ handsome]]]]

DegP contains the *than*-clause and with it an ellipsis site but ellipsis resolution is impossible in the base position of DegP since the antecedent in the AP includes the ellipsis

[2] The entries are closest to Seuren's (1973) proposal.

[3] The assumption is that the *than*-clause is reconstructed at LF.

site. To overcome the difficulty, following a standard solution to the problem of antecedent contained deletion (ACD), DegP is adjoined to IP by Quantifier Raising (QR), leaving behind a trace of type *d*.[4] The movement creates a binder for the trace which is attached on the sister of the moved element (Heim and Kratzer (1998)). Now the antecedent of the elided AP is free of infinite regress and can be copied into the ellipsis site. The trace that is left from the movement of DegP is semantically a variable. It is bound in the main clause but in the *than*-clause the copied degree variable needs a binder too. The quantificational theory uses a proposal from Chomsky (1977) that there is a *wh*-operator in the CP-domain of the than-clause. That operator is assumed to bind the degree variable in the *than*-clause. With these assumptions, we arrive at (7a), as the LF of (6a), which feeds the semantic component. (7b) gives the corresponding semantic derivation:[5]

(7) a. $[_{IP2}[_{DegP}$ more $[_{CP}$~~than~~ wh_1 Bill is d_1 -handsome]]$[_{IP1}2[_{IP}$ Scott is $[_{AP}$ d_2-handsome]]]]

b. $[[AP]] = \lambda y{:}y \in D.handsome(d_2)(y)$
$[[IP_1]] = \lambda d_2{:}d_2 \in D_d.handsome(d_2)(Scott)$
$[[CP]] = \lambda d_1{:}d_1 \in D_d.handsome(d_1)(Bill)$
$[[Deg]] = \lambda P{:}P \in D_{<d,t>}.\lambda R{:}R \in_{<d,t>}.\exists d[\neg P(d) \& R(d)]$
$[[DegP]] = \lambda R{:}R \in D_{<d,t>}.\exists d[\neg handsome(d)(Bill) \& R(d)]$
$[[IP_2]] = 1$ iff $\exists d[\neg handsome(d)(Bill) \& handsome(Scott)(d)]$

[[Scott is more handsome than Bill is]] =1 iff There is a degree d such that Scott is handsome to a degree d and Bill is not handsome to that degree.

The derived interpretation closely reflects the intuitions one has about the meaning of (6a).

---

[4] The proposals for ellipsis resolution in ACD constructions are executed mainly by LF-copying ((May (1985), etc.). However, as Lasnik (1993), Lasnik (1999) shows, ACD in many cases can also be resolved through PF-deletion.

[5] The preposition *than* is assumed to be semantically vacuous.

1.1.2. A non-quantificational type of analysis

Under the analysis of adjectives as relations between a degree/ extent/ interval and an individual, the role of a binder for the degree variable is attributed to the degree operator *more* or *less*. Built in it, there is an existential (or in some analyses a universal) quantifier to close off the degree variable of the scalar predicate. That there is some implicit reference to degrees in the comparative construction has always seemed plausible since the first analysis due to Russell (1905). Therefore, most analyses have striven to capture that intuition. For the quantificational analysis, it is naturally and elegantly represented by the assumption that the scalar predicate introduces a degree into the meaning of a sentence. There are however, alternatives to the quantificational analysis, which too, succeed in capturing the reference to degrees in the interpretation of the comparative construction. Crucially, they assume a different semantics for adjectives which does not require the degree word to serve as an operator binding a degree variable. A notable example for that is Klein (1980) and Klein (1982).[6] The adjective under that view is assumed to denote a (partial) function from individuals to truth values. However, degrees are introduced in every adjectival construction by degree modifiers like *very, completely, extremely*. Some insights of Klein's theory are adopted in Kennedy' s (1999)proposal, which I will review in greater detail as a current representative of the non-quantificational framework.[7]

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[6] Klein's theory of adjectives is representative of the 'vague predicate' approaches pursued also by McConnell-Ginet (1973), Kamp (1975), Larson (1988), etc.

[7] Kennedy's proposal is closely related to Bartsch and Vennemann' s (1972)theory of adjectives and comparison.

For ease of exposition, let's call that approach to scalar predicates *the measure function approach*. For Kennedy, the adjective expresses a measure function: it maps an individual to a degree from a contextually specified scale, which is different in every model. Consider the following example which illustrates the point that scales are context dependent:

(8) My new computer is fast.

The range of the scale of fastness that might be relevant in the evaluation of (8) would be such to include degrees of fastness of personal computers. One of these degrees would correspond to my new computer and, quite plausibly, it can be in the upper subpart of that scale. But suppose that the context in which we evaluate the truth of (8) is broad enough to include not only personal computers but also the IBM mainframes. The range of the scale of fastness would then be respectively bigger. Given that the interval including the degrees starting from the one corresponding to my new computer to the upper limit of the scale will be considerably bigger than the respective interval in the previous model, my computer's degree of fastness would end up being in the lower portion of the scale.

Gradable adjectives, which under the measure function approach pair individuals with degrees of contextually provided scales, have lexical entries similar to (9):

(9) $[[\text{fast}]] := \lambda x : x \in D_e . \mathit{fast}(x)$

The denotation of the extended adjectival projection, however, is calculated not only from the contribution of the scalar predicate, but also from the contribution of a meaningful degree morpheme. That denotation is a property of individuals. Following Abney (1987), Kennedy assumes that even in sentences like (8), the adjectival predicate always corresponds categorially to a DegP, and semantically, it instantiates a comparison

construction, similar to the case with the comparative. The absolute and the comparative degree head provide a degree relation between two degree values: a reference value and a standard value. The reference value is the result of applying a measure function to the external argument of the degree word. For example, the reference value in (10) is whatever degree is assigned to [[tall]]([[Arthur]]).

(10) a. Arthur is tall.
b. Arthur is 190cm tall.
c. Arthur is taller than Ralf.

The standard value in an absolute construction can be given by a measure phrase, as in (10b). There is a more complex procedure of getting the standard value in an absolute construction like (10a). The standard value is highly context-dependent: it is provided by applying a "standard-identification" function, built into the semantics of the absolute degree word, to a measure function, and then to a property of individuals which form a relevant comparison class to yield a mean degree value. In (10a) the measure function is $\lambda x.tall(x)$, and the comparison class could be $\lambda x.$ *x is a man*, if the sentence is understood to mean 'Arthur is tall for a man'.[8] In the comparative construction, similarly to the absolute one in which there is a measure phrase, the standard degree is supplied by an overt linguistic expression: in this case, this is the *than*-clause.[9]

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[8] The idea that the interpretation of comparison involves specifying relevant comparison classes is due to Siegel (1976), and Klein (1982).

[9] The *than*-clause supplies directly the standard value only in the so called comparative subdeletion construction, as in (i):
(i) The field is longer than it is wide.
The reference value in this case is the degree that corresponds to the field in the scale of longitude. The standard value is the degree that corresponds to the field in the scale of latitude. For the rest of the comparative constructions, the *than*-clause provides the standard value indirectly.

The degree relations, the last component in a comparison construction, are provided by the meaning of the degree words. Note that Kennedy assumes that for each different type of comparison construction, there is a different degree word involved in it. More specifically, there are three lexical entries for each comparative degree word, corresponding to the three types of degrees that head the DegP in the subdeletion, comparative deletion (clausal comparative construction), and phrasal comparative construction. Also, there are two absolute heads which are involved in the construction with and without a measure phrase, respectively.

(11) a. $[[abs_1]] := \lambda G{:}G \in D_{<e,d>}.[\lambda d{:}d \in D_d.[\lambda x{:}x \in D.G(x) \geq d]]$
b. $[[abs_2]] := \lambda G{:}G \in D_{<e,d>}.[\lambda P{:}P \in D_{<e,t>}.[\lambda x{:}x \in D.G(x) \geq \text{STND}(G)(P)]]$

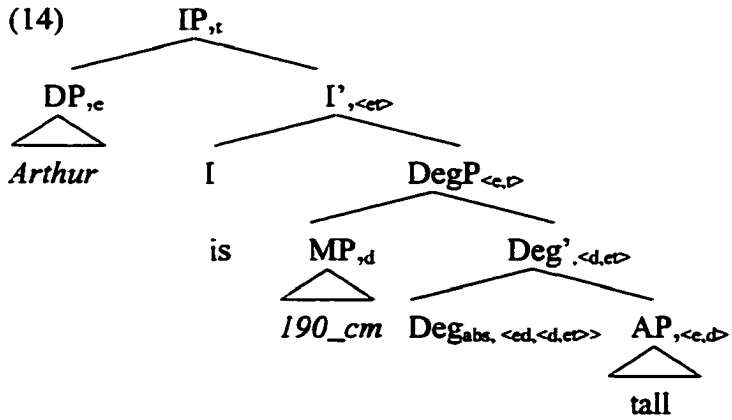
(12) a. $[[more_1]] := \lambda G{:}G \in D_{<e,d>}.[\lambda d{:}d \in D_d.[\lambda x{:}x \in D.G(x) > d]]$ (subdeletion)
b. $[[more_2]] := \lambda G{:}G \in D_{<e,d>}.[\lambda Q{:}Q \in D_{<ed,d>}.[\lambda x{:}x \in D.G(x) > Q(G)]]$ (comparative deletion)
c. $[[more_3]] := \lambda G{:}G \in D_{<e,d>}.[\lambda y{:}y \in D.[\lambda x \in D.G(x) > G(y)]]$ (phrasal comparatives)

(13) a. $[[less_1]] := \lambda G{:}G \in D_{<e,d>}.[\lambda d{:}d \in D_d.[\lambda x{:}x \in D.G(x) < d]]$ (subdeletion)
b. $[[less_2]] := \lambda G{:}G \in D_{<e,d>}.[\lambda Q{:}Q \in D_{<ed,d>}.[\lambda x{:}x \in D.G(x) < Q(G)]]$ (comparative deletion)
c. $[[less_3]] := \lambda G{:}G \in D_{<e,d>}.[\lambda y{:}y \in D.[\lambda x{:}x \in D.G(x) < G(y)]]$ (phrasal comparatives)

The final clause of each of these lexical entries specifies the relation between the reference degree (the left term) and the standard degree (the right term). The relation is *at least as great* in the absolute constructions, and *greater than/less than* in the comparative

constructions.[10] Let us illustrate the theory with some examples. (14) and (15) give the syntactic structure and the interpretation at every node for (10b) and (10c), respectively.[11]

(14)



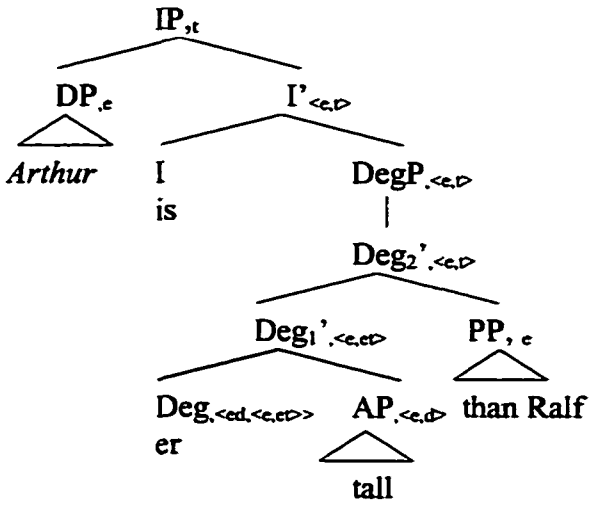
[[AP]] = λy:y∈D.*tall*(y)
[[Deg]] = λG:G∈$D_{<e,d>}$.[λd:d∈D_d.[λx:x∈D.G(x)≥d]]
[[Deg']] = λd:d∈D_d.[λx:x∈D.*tall*(x) ≥d]
[[MP]] = *190_cm*
[[DegP]] = λx:x∈D.*tall*(x) ≥*190_cm*
[[IP]] = 1 iff *tall*(*Arthur*) ≥ *190_cm*

[[Arthur is 190cm tall]] =1 iff
The degree, associated with Arthur on the scale of height, is at least as big as 190cm.

[10] Note that Kennedy's formulation of the degree relation is incompatible with the assumption that scalar predicates are monotone.

[11] The semantics of the comparative morpheme in the phrasal comparatives is designed to recycle the scalar predicate twice: once in computing the reference value and second in computing the standard value. The analysis is in the spirit of the 'direct' interpretation approach, introduced by Heim (1985), which rejects the view that phrasal comparatives involve ellipsis mediating the comparison between two terms. For a critique of the approach, which affects a subclass of the phrasal comparatives, see Lerner and Pinkal (1995).

(15)



[[AP]] = λz:z∈ D.*tall*(z)
[[Deg]] = λG:G∈ $D_{<e,d>}$.[λy:y∈ D.[λx.x∈ D.G(x)>G(y)]]
[[Deg'$_1$]] = λy:y∈ D.[λx:x∈ D.tall(x)>tall(y)]
[[PP]] = *Ralf*
[[Deg'$_2$]] =[[DegP]] = λx:x∈ D.tall(x) > *tall*(*Ralf*)
[[IP]]= 1 iff *tall*(*Arthur*)> *tall*(*Ralf*)

[[Arthur is taller than Ralf]] =1 iff
The degree, associated with Arthur on the scale of height is greater than the degree associated with Ralf on the scale of height.

1.2. Mainstream assumptions about superlatives

1.2.1. A quantificational type of analysis

The available proposals about the semantics of the superlative are not as many as there are about comparatives. There is a general tendency of preference for the quantificational approach (Heim (1985), Heim (1999), Bhatt (1999), Stateva (2000), Stateva (2000), Sharvit and Stateva (2000), Sharvit and Stateva (2002)). For the most part, the semantics of the superlative construction is suggested as a direct extension of the quantificational type of the semantics of comparatives. Two defining features are associated with these analyses: (i) the superlative degree word is viewed as an operator that binds the degree variable provided by the gradable adjective, and (ii) they all involve semantic ellipsis, to

borrow the term from Heim (2000). Semantic ellipsis refers to a feature in the lexical entries of some items that requires that a predicate be utilized more than once in a semantic derivation. Like in the cases with comparatives, there is an intuition about superlative constructions that they involve two occurrences of the same predicate in their interpretation and a comparison relation. For example, in '*Ina is the tallest*', the comparison is possible only if *tall* is predicated of the subject *Ina*, and also of a covert generalized quantifier of the type *everyone else*. The semantics of the superlative operator is blamed for that effect of semantic ellipsis. Therefore, its lexical entry is taken to contain two occurrences of the scalar predicate to which *-est* applies. (16) specifies the meaning of the superlative degree word:

(16) a. $[[\text{est}]] := \lambda C{:}C \in D_{<e,t>}.[\lambda R{:}R \in D_{<d,et>}.[\lambda x{:}x \in C \ \& \ \forall y[y \in C \rightarrow \exists d_1[R(d_1)(y)=1]]]. \exists d[\mathbf{R}(d)(x) \ \& \ \forall y \neq x[y \in C \rightarrow \neg \mathbf{R}(d)(y)]]]$
(Heim 1999)

where C is a comparison set, R is a a two-place relation like *high*, *tall man*, *bad*, and x is an individual.

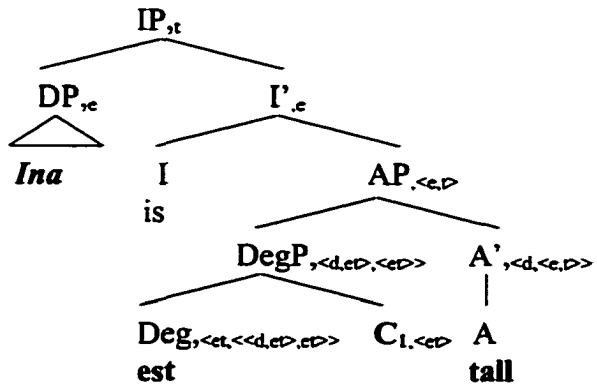
b. $[[\text{least}]] := \lambda C{:}C \in D_{<e,t>}.[\lambda R{:}R \in D_{<d,et>}.[\lambda x{:}x \in C \ \& \ \forall y[y \in C \rightarrow \exists d_1[R(d_1)(y)=1]]]. \exists d[\neg \mathbf{R}(d)(x) \ \& \ \forall y \neq x[y \in C \rightarrow \mathbf{R}(d)(y)]]]$
(Stateva 2000)

In *Section 1.4* we are going to discuss in more detail the syntactic assumptions that are necessary for each of the theories to work. For now, it is important to mention that the quantificational theory is coupled with a view on the syntax of comparison that in principle makes it possible for the operator *-est* and its restriction *C* to move for scope purposes.

Here are some sample semantic derivations involving a predicative and an attributive superlative, respectively. Consider first (17) with a predicative superlative construction. For simplicity, we disregard the contribution of the definite article:

(17) Ina is the tallest.[12]

(18)



$[[A]] = [[A']] = \lambda d{:}d \in D_d.[\lambda z{:}z \in D.\mathit{tall}(d)(z)]$
$[[Deg]] = \lambda C{:}C \in D_{<e,t>}.[\lambda R{:}R \in D_{<d,et>}.[\lambda x{:}x \in D.\exists d[R(d)(x) \& \forall y \neq x[y \in C \rightarrow \neg R(d)(y)]]]]$
$[[DegP]] = \lambda R{:}R \in D_{<d,et>}.[\lambda x{:}x \in D.\exists d[R(d)(x) \& \forall y \neq x[y \in C_1 \rightarrow \neg R(d)(y)]]]$
$[[AP]] = \lambda x{:}x \in D.\exists d[\mathit{tall}(d)(x) \& \forall y \neq x[y \in C_1 \rightarrow \neg \mathit{tall}(d)(y)]]$
$[IP]]=1$ iff $\exists d[\mathit{tall}(d)(\mathit{Ina}) \& \forall y \neq x[y \in C_1 \rightarrow \neg \mathit{tall}(d)(y)]]$

Comparison class C_1 = {x: x is a (relevant) girl}

[[Ina is the tallest]] =1 iff There is a degree d, such that Ina is tall to that degree while no other (relevant) girl is that tall.

(19) is an example of the attributive superlative construction.

(19) Scott climbed the highest mountain.

That construction is the source for splitting the quantificational theory into two varieties. One, the *in-situ* theory, requires that DegP is interpreted within the superlative nominal expression, and the other, the *movement theory*, allows DegP to move to a position for scope purposes. In (19) there is no other scope sensitive element. So why would DegP move? What is enough to motivate DegP movement to a higher interpretable position is changing the relation of comparison *R*, and as a result of that, changing the external argument of *-est*, which syntactically determines to some extent the value of the

[12] For ease of exposition, we will consistently drop from the sample calculations the presupposition conditions that come from the semantics of the degree word.

comparison class. In this sense, since changing the scope of *-est* affects the value of (at least) the comparison class, the second variety of the movement theory is to be considered **truly** quantificational. DegP can be moved, therefore we can expect scopal interaction between it and other scope bearing elements. Both quantificational theories equally adequately describe the bulk of the data.[13] For our purposes at this point, it suffices to limit the attention to that kind of data. (20) and (21) give each possible LFs for (19) and the respective derivation of the truth conditions for it:[14]

(20) $[_{IP}$ Scott climbed $[_{DP}$ ~~the~~ $[_{AP}$ $[_{DegP}$ est+C_2] $[_{A'}$ high mountain]]]]

in-situ theory

$[[A']] = \lambda d{:}d\in D_d.[\lambda z{:}z\in D.\textit{high\_mountain}(d)(z)]$
$[[DegP]] = \lambda R{:}R\in D_{<d,et>}.[\lambda x{:}x\in D.\exists d[R(d)(x) \ \& \ \forall y{\neq}x[y\in C_2 \rightarrow \neg R(d)(y)]]]$
$[[AP]] = \lambda x{:}x\in D.\exists d[\textit{high\_mountain}(d)(x) \ \& \ \forall y{\neq}x[y\in C_2 \rightarrow \neg \textit{high\_mountain}(d)(y)]]$
$[[DP]] = \lambda Q{:}Q\in D_{<e,t>}.\exists x[\textit{high\_mountain}(d)(x)\&\forall y{\neq}x[y\in C_2 \rightarrow \neg \textit{high\_mountain}(d)(y) \ \&Q(x)]]$
$[[IP]] = 1$ iff $\exists x[\textit{climbed}(x)(\text{Scott}) \ \& \ \textit{high\_mountain}(d)(x) \ \& \ \forall y{\neq}x[y\in C_2 \rightarrow \neg \textit{high\_mountain}(d)(y)]]$

Comparison class C_2 = {x: x is a (relevant) mountain}

(21) $[_{IP}$Scott$[_{VP2}[_{DegP}$ est+C$][1[_{VP1}$ $2[x_2$ climbed $[_{DP}$ ~~the~~$[_{AP}d_1[_{A'}$high mountain]]]]]]]]

movement theory

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[13] For differences in the predictions that the two theories make see Heim (1999), Sharvit and Stateva (2002)).

[14] All analyses that are considered here share one disadvantage. The definite article doesn't need to contribute to the meaning of the superlative construction a uniqueness implication, since that comes for free from the semantics of *-est*. It is important, however, that there be a binder for the variable introduced by the noun. The definite article could serve that purpose. For some of the theories, however, it is crucial that the definite article is considered an expletive (and the individual variable of the noun is closed by existential closure or else the definite article is replaced by an indefinite at LF). Since none of the theories has a satisfactory account of the obligatoriness of the definite article in the superlative construction, and also the view on its presence or absence is orthogonal to the properties of the theories that we are comparing, we will consistently treat the definite article as an indefinite. We will use the notation ~~the~~ when we replace the definite article with the indefinite in particular LFs.

$[[A']] = \lambda d{:}d \in D_d.[\lambda z{:}z \in D.\textit{high\_mountain}\ (d)(z)]$
$[[AP]] = \lambda z.\textit{high\_mountain}\ (d_1)(z)$
$[[DP]] = \lambda Q{:}Q \in D_{<e,t>}.\exists x[\textit{high\_mountain}\ (d_1)(x)\ \&\ Q(x)]$
$[[VP_1]] = \lambda x_2{:}x_2 \in D.\exists x[\textit{high\_mountain}\ (d_1)(x)\ \&\ \text{climbed}(x)(x_2)]$
$[[DegP]] = \lambda R{:}R \in D_{<d,et>}.[\lambda x_3{:}x_3 \in D.\exists d[R(d)(x_3)\ \&\ \forall y \neq x_3[y \in C_1 \rightarrow \neg R(d)(y)]]]$
$[[VP_2]] = \lambda x_3{:}x_3 \in D.\exists d \exists x[\textit{high\_mountain}\ (d)(x)\ \&\ \textit{climbed}(x)(x_3)\ \&\ \forall y \neq x_3[y \in C_3 \rightarrow$
$\neg \exists z[\textit{high\_mountain}\ (d)(z)\ \&\ \text{climbed}(z)(y)]]]$
$[[IP]] = 1$ iff $\exists d \exists x[\textit{high\_mountain}\ (d)(x)\ \&\ \textit{climbed}(x)(\textit{Scott}))\ \&\ \forall y \neq x_3[y \in C_3 \rightarrow$
$\neg \exists z[\textit{high\_mountain}\ (d)(z)\ \&\ \textit{climbed}(z)(y)]]$

Comparison class C_3 ={x: x is a (relevant) mountain-climber}

Potentially, the two sets of truth conditions might be logically equivalent. But this is only true for those values of C_2 for which the relevant mountains are mountains climbed by some relevant climber. Under such values of C_2 and C_3, (19) actually talks about comparing mountains but with respect to the achievements of their mountain climbers. In the literature on superlatives, this is known as the comparative/ relative superlative "reading" (cf. Ross (1964), Szabolcsi (1986), etc.).[15] With that intended "reading", (19) would be appropriate, for example, in a context in which 10 climbers are competing to conquer the mountain which is higher than the mountains climbed by the other competitors. In addition to the comparative "reading", superlative constructions can also have absolute "readings". Under its absolute reading, (19) can, for example, be intended to describe the fact that Scott climbed MtEverest, in other words, the highest mountain of the set of relevant mountains irrespective of whether other people have climbed them or

[15] We can't commit to calling the comparative use of superlative a separate reading. According to the *in-situ* theory it is enough to manipulate the choice of the covert restriction of *-est* in order to account for the different uses of superlatives. From that point of view, we aren't then dealing with separate readings, since the property of context dependency of the superlative alone suffices to explain the different usages. For a discussion of whether or not the comparative use is to be associated with a separate reading see Heim (1999) and Sharvit and Stateva (2000).

not in that context. Recall that the movement theory determines syntactically the <d,et>-type relation which in turn determines the choice of elements in the comparison set. In (21), the relation to which the denotation of DegP applies is $R= \lambda d.\lambda x.climb\_a\_d\text{-}high\_mountain(x)$. Since one of the presupposition conditions with which the superlative comes is that for each member x of the comparison set there is some degree d for which $R(d)(x)$ yields *True*, the only possible choice for members of the comparison set in (21) are people who climbed some mountain. That gives us the comparative "reading". To derive the absolute "reading", the movement theory uses the same LF the in-situ theory uses for both "readings", namely (20). The relation to which DegP applies in this case is $\lambda d\lambda x.high\_mountain(d)(x)$. The presupposition condition guarantees that we should collect mountains, not climbers in the comparison set of (20), as is necessary for the absolute reading.

To conclude the section, we presented the quantificational theory of superlatives, and discussed two versions of it. Like the quantificational theory of comparatives, this theory views the degree word as an operator which binds a degree variable provided by the scalar predicate. There is an important reason why we distinguished between the two quantificational theories. In essence the *in-situ* theory of comparatives stands in between the quantificational and the non-quantificational theories. On the one hand, the superlative operator is a quantificational element and should have quantificational properties. On the other hand, it is assumed to be inseparable from the scalar predicate with which it is base-generated. Therefore, it can't use its inherent abilities to interact scopally with other elements. As we are going to see in the next chapter it is very difficult to detect any possible scopal properties of the degree words, for independent reasons. But given the

theoretical possibilities, if we have enough evidence for the lack of scopal interaction involving superlatives, we should face a further choice: between a genuinely non-quantificational theory of superlatives and an *in-situ* quantificational theory.

1.2.2. A non-quantificational type of analysis

To my knowledge, Farkas and Kiss (2000) give the only spelled-out non-quantification analysis of superlatives. It is an extension of Kennedy's analysis of comparatives. Kennedy's proposal is intended to be general enough to cover all degree words, even though the superlative degree is not explicitly mentioned in his work. Here is the general format of the semantics of degree words, proposed by Kennedy, which is based on the assumption that scalar predicates denote functions from individuals to degrees:

(22) $[[\text{Deg}]] = \lambda G{:}G \in D_{\langle e,d\rangle}.[\lambda d{:}d \in D_d.[\lambda x{:}x \in D.R(G(x))(d)]]$

where G is a measure function, d is a standard degree value, x is an individual and R specifies the degree relation: if Deg is absolute, the relation between the reference value $G(x)$ and the standard value d is *at least as great as*; if Deg is comparative, the relation is *greater* or *less than*. Extending the semantics of the absolute and the comparative degree to the superlative is straightforward in this framework.[16] Let us start with formulating the desirable truth conditions for a sample superlative construction. Also let us make these

[16] The extension of Kennedy's proposal that we give here preserves the general idea of Farkas and Kiss' s (2000)proposal, but deviates slightly from it. The only substantial difference, which will be pointed out later, affects a condition on well-formedness, proposed in this work, which in Farkas and Kiss's proposal is taken to be a part of what is asserted by the superlative construction.

conditions compatible with the view of scalar predicates as measure functions. The conditions in (23b) are adequate for (23a):

(23) a. Ina is the tallest.
b. The degree associated with Ina on the contextually specified scale measuring height is greater than the maximum degree of the set of all relevant degrees from the same scale. A degree is relevant if it corresponds to an individual from the comparison class.

From (23b) we can extract the meaning of *-est*. It will contain two crucial characteristics that make it similar to the comparative degree on the one hand, and to the absolute degree, on the other. First, note that the degree relation must be the same as the one introduced by the comparative degree: *greater than*. It seems that under the measure function approach there is no alternative but to reduce the superlative construction to the comparative since the type of the degree relation is in the core of the meaning of every degree word.[17] So, in effect, there will be four, instead of three lexical entries for the positive comparative *more*, and as many for the negative comparative *less*, one of each group will correspond to the superlative. Second, the standard value in the superlative construction is not linguistically given, as is the case with one kind of absolute construction - the one without a measure phrase. Recall that Kennedy's proposal about the semantics of that absolute head made reference to a contextually specified comparison class in the determination of the standard value. The comparison class contains individuals that share a salient property with the individual which determines the reference value. For

[17] Interestingly, under Kennedy's approach not only the superlative and the comparative must be treated as instances of the same comparison construction, but also the absolute construction and the equative turn out to be inherently related. They both introduce the degree relation *at least as great as*.

example, (24b,c,d) are salient comparison classes in different contexts used to calculate the standard degree value in (24a):

(24) a. Ina is tall.
b. $C(c_1) = \{x: x \text{ is a child}\}$
c. $C(c_2) = \{x: x \text{ is a 7-year old child}\}$
d. $C(c_3) = \{x: x \text{ is a 7-year old girl}\}$

Sometimes, the comparison class in an absolute construction can be overtly expressed by a *for*-phrase, as in (25):

(25) a. Ina is tall for a child.
b. Ina is tall for a 7-year old child.
c. Ina is tall for a 7-year old girl.

Similarly, the comparison class in a superlative construction can be lexically specified too by a PP which either lists its members or characterizes them. Often these are *out of*-phrases, *in*- or *for*-phrases. Here are some examples:

(26) a. Ina is the tallest out of the second-graders in the Tolland elementary school.
b. C = {x: x is a second-grade student in the Tolland elementary school}

(27) a. Ina is the tallest second-grade girl in the Tolland elementary school.
b. C = {x: x is a second-grade girl in the Tolland elementary school}

Building on these two similarities between the superlative on the one hand, and the comparative and the absolute degrees on the other, the analysis of the superlative within the measure function approach can easily be executed. We already established the content of the degree relation - it is the same as the degree relation in the comparative. The second ingredient of the analysis is provided by the reference value. In the superlative construction, like in all other degree constructions, it should be the result of applying the denotation of the sister of the degree word, the scalar predicate, to the external argument of *-est*. The last question to be addressed is how exactly the standard value is derived from

the comparison class. Going back to the intuitive truth conditions of (23), we observe that it is desirable to collect in a set each degree associated with a member of the comparison class that is different from the individual with which the reference degree value is associated, and then find the maximum of that set. It will serve as a standard value. This will give us a lexical entry for *-est* as in (28):[18]

(28) $[[est]] := \lambda G{:}G \in D_{\langle e,d\rangle}.[\lambda P{:}P \in D_{\langle e,t\rangle}.[\lambda x{:}x \in D{:}\ x \in P \ \&\forall y[y \in P \rightarrow \exists d_1[G(y)=d_1]]].$
$G(x) > \max(\lambda d.\exists y \neq x[y \in P \ \&\ d = G(y)])]]$

(29) $\max := \lambda P{:}P \in D_{\langle d,t\rangle}.\ [[the]](\lambda d{:}d \in d_d.\ [P(d) \ \&\ \forall d_1[P(d_1) \rightarrow d_1 \leq d]])$
(Stechow (1984), Rullmann (1995),
Schwarzschild and Wilkinson (2002), Heim (2000))

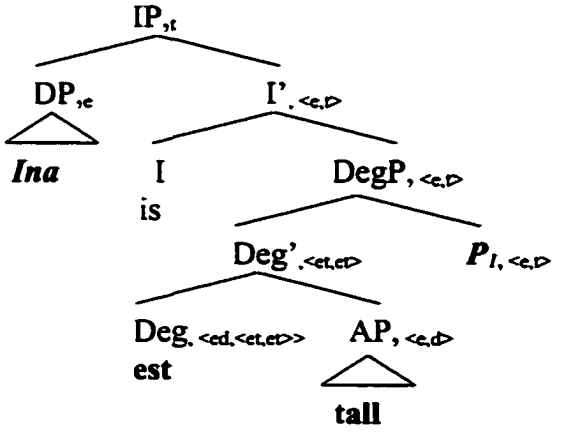
The semantics of *-est* is specified in such a way that we first combine the denotations of the degree word and the adjective *G*. The denotation of that node is combined then with the denotation of the comparison class *P* and finally with an individual *x* to yield *True* when the reference degree value is greater than the standard value. In addition to the major difference that distinguishes the non-quantificational Kennedy-style analysis from the quantificational, namely, not assigning quantificational force to the superlative degree word, there are two syntactic assumptions that have repercussions on the semantics of the superlative.

First, within the quantificational approach, it is assumed that the internal argument of *-est* is the comparison class. This is a natural solution, given that the superlative morpheme is treated as an operator and the comparison class functions as its restriction. Under the measure type approach, there is no such consideration for the order of

[18] Farkas and Kiss (2000) do not treat *-est* as presuppositional in the sense, suggested above.

combining *-est* with the adjective and the comparison class, since the degree word is no longer an operator, but rather a relation between degrees. Under the view of transparent LF, the comparison class has to be syntactically represented as a free variable whose value is to be fixed by the variable assignment, but given the syntactic assumptions that are paired with the measure function approach, that variable must be adjoined to Deg', rather than being a sister of *-est*. The reason is that in Kennedy's framework, the degree words are assumed to be heads of DegPs which select an AP complement, as in (30). The example also gives a sample semantic calculation of a sentence with a predicative superlative construction. For reasons of simplicity, let's assume again that the definite article is semantically vacuous and ignore it from the LF-structure of (30).

(30)



$[[AP]] = \lambda z{:}z \in D.\mathit{tall}(z)$
$[[Deg]] = \lambda G{:}G \in D_{<e,d>}.[\lambda P{:}P \in D_{<e,t>}.[\lambda x{:}x \in D.G(x) > \max(\lambda d.\exists y \neq x[y \in P \& d = G(y)])]]$
$[[Deg']] = \lambda P{:}P \in D_{<e,t>}.[\lambda x{:}x \in D.\mathit{tall}(x) > \max(\lambda d.\exists y \neq x[y \in P \& d = \mathit{tall}(y)])]$
$[[DegP]] = \lambda x{:}x \in D.\mathit{tall}(x) > \max(\lambda d.\exists y \neq x[y \in P_1 \& d = \mathit{tall}(y)])$
$[[IP]] = 1$ iff $\mathit{tall}(\mathit{Ina}) > \max(\lambda d.\exists y \neq x[y \in P_1 \& d = \mathit{tall}(y)])$

$P_1 = \{x: x \text{ is a (relevant) girl}\}$

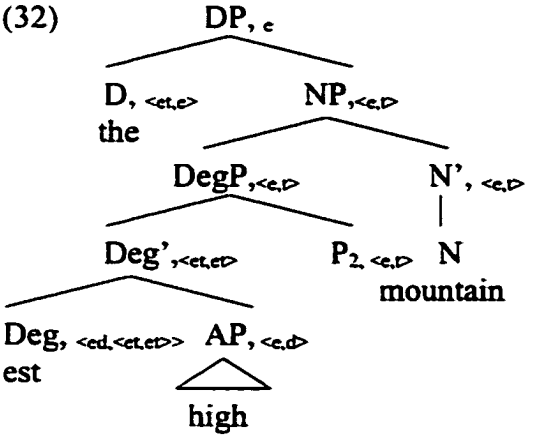
Second, the assumed syntactic structure of attributive superlatives is different in the two approaches. It is crucial for the non-quantificational approach that the superlative degree

word combines first with the adjective to form a DegP and then with the nominal head to form a NP which is a complement of the definiteness head. The reasons for this stand are mostly semantic: it is impossible to intersect the denotation of the noun, a property, with the denotation of the adjective which is a function from individuals to degrees. Even if we stipulate that the denotation of the adjective is of type <et,<ed>> in order to allow functional application, it would be impossible to finish the lexical entry in (31) because its final clause has to satisfy two incompatible conditions: (i) to correspond to an expression of type *d* and (ii) specify that *x* is a *P* in an expression of type *t*:

(31) $[[Adj]] = \lambda P{:}P \in D_{<e,t>}.[\lambda x{:}x \in D.\ [\ldots\ldots]]$

(32) is an example of attributive superlatives, giving both the assumed syntactic structure (under the measure function approach) and the denotations of each node:

(32)



$[[AP]] = \lambda z{:}z \in D.\mathit{high}(z)$
$[[Deg]] = \lambda G{:}G \in D_{<e,d>}.[\lambda P{:}P \in D_{<e,t>}.[\lambda x{:}x \in D.G(x) > \max(\lambda d.\exists y \neq x[y \in P \,\&\, d = G(y)])]]$
$[[Deg']] = \lambda P{:}P \in D_{<e,t>}.[\lambda x{:}x \in D.\mathit{high}(x) > \max(\lambda d.\exists y \neq x[y \in P \,\&\, d = \mathit{high}(y)])]$
$[[DegP]] = \lambda x{:}x \in D.\mathit{high}(x) > \max(\lambda d.\exists y \neq x[y \in P_2 \,\&\, d = \mathit{high}(y)])$
$[[N]]=[[N']] = \lambda b{:}b \in D.\mathit{mountain}(b)$
$[[NP]] = \lambda x{:}x \in D.\mathit{mountain}(x) \,\&\, \mathit{high}(x) > \max(\lambda d.\exists y \neq x[y \in P_2 \,\&\, d = \mathit{high}(y)])$
$[[DP]] = \mathit{the}(\lambda x{:}x \in D.\mathit{mountain}(x) \,\&\, \mathit{high}(x) > \max(\lambda d.\exists y \neq x[y \in P_2 \,\&\, d = \mathit{high}(y)]))$

$P_2 = \{x:$ x is a (relevant) mountain$\}$

The DP in (32) denotes the unique individual which is a mountain and its height exceeds the height of other relevant mountains.

1.3. Common properties of the comparison constructions

The analyses of comparatives and superlatives that we presented in this chapter differ with respect to the question of the quantificational force of the degree words but are in agreement that the degree words should receive similar treatment in the respective frameworks. This feature of the current research on comparison seems desirable given the variety of properties that are common to both comparison constructions. We mentioned some of them in the introduction: the set of gradable adjectives and adverbs that allow the use of the comparative is the set that allows the superlative. Also in many languages, among which English, the comparative and the superlative degree word are morphologically related. Both constructions are context dependent. Let us focus on some other properties that they share.

1.3.1. Patterns with ambiguities

Previously, we described two uses of the superlative construction: an absolute and comparative/relative. In its predicative use, the superlative can only have a comparative reading, i.e. (33) requires that we compare the subject of predication with other individuals with respect to the property of being tall:

(33) John is the tallest.
Comparison class: C={x: x is tall}

When the superlative is used attributively, and with flat intonation, in most cases both the comparative and the absolute readings are available.[19] Here are again two contexts that could help us distinguish between the two readings:

(34) Context A: Ralf bought a Trabant which cost 100 Euro. Tonio bought a Mini for 20 000 Euro. Arthur bought a BMW for 30 000 Euro.

Context B: Arthur considered buying the red Trabant, or the black Mini, or the silver BMW.

Context A makes prominent the comparative reading of (35), while context B makes prominent the absolute reading of the sentence:

(35) Arthur bought the most expensive car.

The comparatives haven't been classified in similar terms but the same distinction is present there. Lerner and Pinkal (1995) distinguish between two types of attributive comparative constructions: they call them wide-scope comparatives, exemplified in (36a), and narrow scope comparatives, exemplified in (36b), and similarly to the proponents of the movement quantificational theory assume different analyses for the two constructions:

(36) Arthur bought a more expensive car than Ralf.
Arthur bought a more expensive car than this Mini.

But if our context of evaluation is always sufficiently restricted, as is standardly assumed, the narrow scope reading of Lerner and Pinkal should be absolute, if we use the terms from the research on superlatives, while the wide scope reading should be relative, as the corresponding superlative reading is also referred to.

[19] For exceptions see Ross (1964), Szabolcsi (1986), Farkas and Kiss (2000) and Sharvit and Stateva (2002).

There are other similarities between the superlative and the comparative constructions with respect to their possible interpretations. One notable example is the reading "discovered" by Szabolcsi (1986) and Heim (1999) and called by Sharvit and Stateva (2000) 'upstairs de dicto'. That reading is attested with both constructions. Let us illustrate this similarity with examples.

Consider the sentence in (37):

(37) Scott needs to climb the least high mountain.

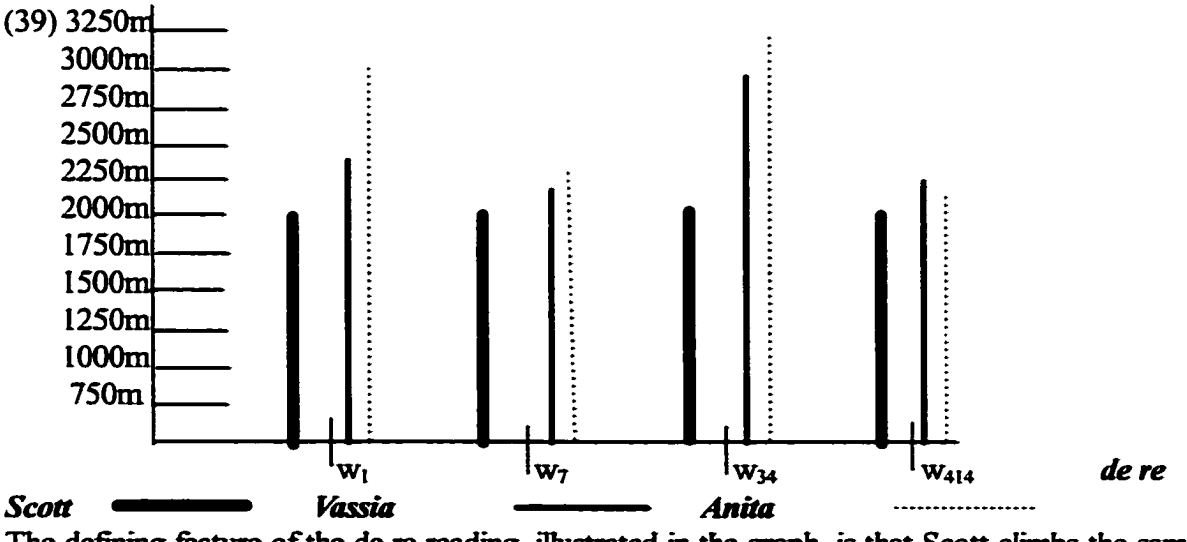
There is a *de re* reading associated with the superlative description in this sentence, according to which Scott needs to climb the mountain which is lowest among the relevant mountains. For example, if Scott is in a region in which there are 3 mountains, A, B and C, but all of them higher than 2000m, he might need to climb the lowest one because that mountain seems to him the easiest to climb. In such a context it would be appropriate to utter (37) with the *de re* reading in mind. (37) also has a *de dicto* reading. Under this reading, (37) is appropriate in a context in which Scott needs to climb the mountain that is lowest compared to the mountains climbed by other people. Suppose that Scott is preparing for a climbing competition and he doesn' t want the other competitors to know that he is in really good shape. So while they are practicing for the competition, he decides that he' ll climb a lower mountain than any of the mountains climbed by others. (37) has yet another reading which is neither *de re*, nor *de dicto*. This is the ' upstairs de dicto' reading. It is appropriate in the context in (38):

(38) Context C: Scott, Anita and Vassia are climbers who we interview about their plans for the upcoming climbing season. Here are their answers:

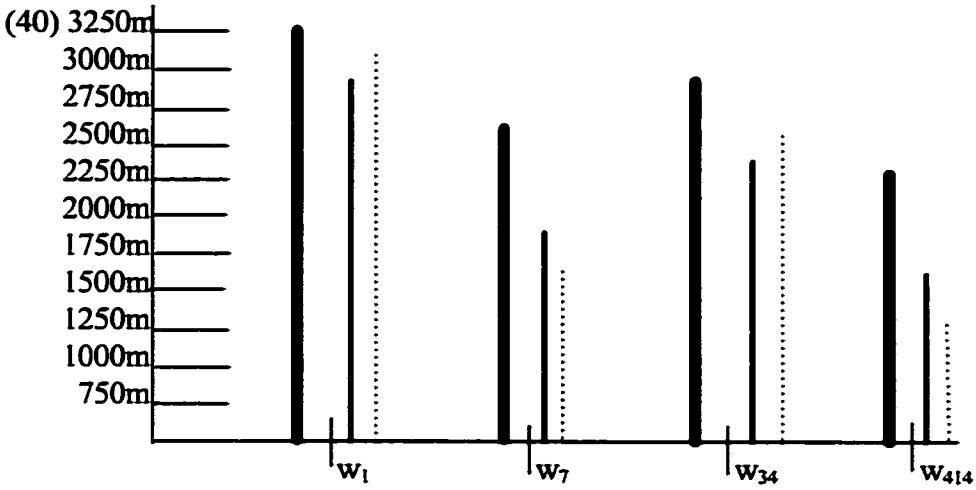
Anita: "I need to climb a mountain that is at least 3000m high."
Vassia: "I need to climb a mountain that is at least 2500m high."
Scott: "I need to climb a mountain that is at least 2000m high."

It is obvious, from the context that none of the climbers talks about particular mountains. So, the reading of (37) in that context is not a *de re* reading. Also, the heights that each of the climbers mentions will satisfy their minimal needs but each person will be happy if they do better. For example, some mountains that are consistent with Scott's needs (in the actual world) are 2100m high, others are 2500m high or even 3000m high; some mountains that are consistent with Vassia's needs are 2500m high, others 3100m high or 3500m high; and some mountains consistent with Anita's needs are high 3000m, 3200m or 3300m high, for example. It must be clear then that the 'upstairs de dicto reading of (37) is not a *de dicto* reading either, because such a reading makes Scott's's needs dependent on other people's achievements while the interview clearly reveals that this is not so. Crucially, (37) compares Scott's needs to other people's needs. To illustrate the difference between *de re*, *de dicto* and 'upstairs de dicto' readings, consider the respective graphs which characterize the "need" worlds of Scott, Vassia and Anita. First, lets look at (39):

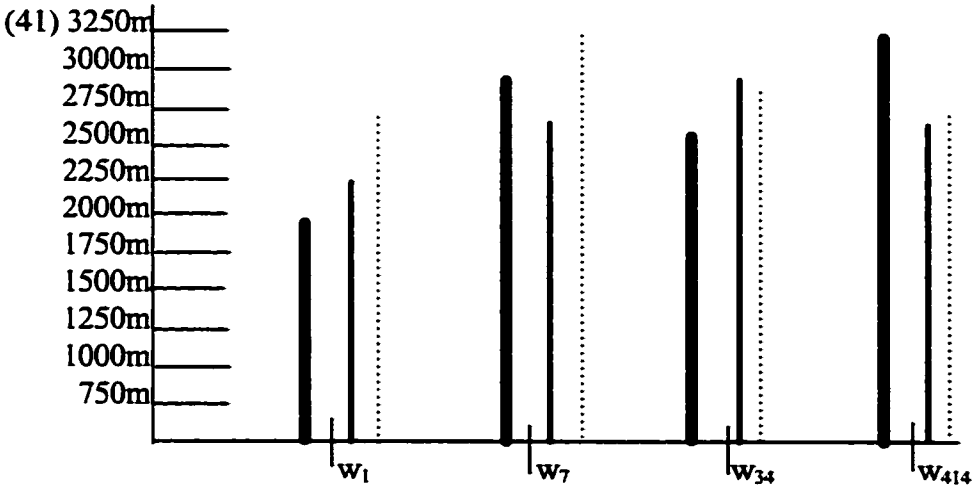
(39)



The defining feature of the de re reading, illustrated in the graph, is that Scott climbs the same mountain in all of his "need" worlds. That happens to be the lowest out of all relevant mountains. It is 2000m high. Consider now (40), which represents the *de dicto* reading of (37):



Scott climbs different mountains in different accessible worlds but most importantly, in each of Scott's "need" worlds, the mountain he climbs is lower than the mountains that any of the others climb in that world. Now, let's look at (41) to appreciate the point that the 'upstairs de dicto' reading is neither *de re* nor *de dicto*.



(41) makes it clear that Scott climbs different mountains in different worlds compatible with his needs but the lowest of the mountains climbed in these worlds by Scott is lower than the lowest mountain that Vassia or Anita climb in their respective "need" worlds.

Interestingly, negative superlatives like the one we just saw in *'Scott needs to climb <u>the least high mountain</u>'*, have more than one 'upstairs de dicto' reading (Stateva

(2000)). The second 'upstairs de dicto' reading, associated with (37), becomes prominent in the context in (42):

(42) Context D: Scott, Anita and Vassia are climbers who we interview about their plans for the upcoming climbing season. Here are their answers:

Anita: "I need to climb a mountain that is at most 3000m high. Otherwise I' ll be risking my health."
Vassia: "I need to climb a mountain that is at most 2500m high. I' m not trained to do more than that."
Scott: "I need to climb a mountain that is at most 2000m high."

It is easy to see that the reading of (37) which describes this new context is neither *de re*, no *de dicto*. The reasoning is the same as in the previous case: Scott doesn't need to climb a particular mountain. According to what he said, he would be satisfied if she climbs a 2000m high mountain, or a 1900m high mountain, or 1800m high mountain, for example. The reading is *not de dicto*, because again, as in the previous case, we observe that the mountain that Scott needs to climb does not depend on what the other people do. Here too, we are comparing different people's needs. However, in contrast with the previous 'upstairs de dicto' reading, we are not talking about the minimum of climbers' needs but about their maximum. To distinguish more easily the two 'upstairs de dicto' readings, following Sharvit and Stateva (2002), let's call the first one *at least 'upstairs de dicto'* and the second *at most 'upstairs de dicto'*.

Interestingly, 'upstairs de dicto' readings are attested in comparatives too. And, as we can expect, there are two 'upstairs de dicto' readings related to the negative comparative (Rullmann (1995), Heim (1998)). To illustrate that we can use the same contexts we used for the cases with superlatives. (43) is a good description of context C:

(43) Scott needs to climb a less high mountain than Anita does.

The sentence compares the minimal needs of the two climbers. This is the *at least* 'upstairs de dicto' reading in comparatives. When uttered in context D, (43) compares the maximal needs of Scott and Anita. This is the *at most* 'upstairs de dicto' reading in comparatives. The parallelism between the types of readings available in the comparative and the superlative construction is expected under a unifying approach to the semantics of degree words.

Comparatives and superlatives are similar in other respects with regard to ambiguities. Consider, for example, the phrasal comparatives in which the degree phrase modifies a verb phrase as in (44a). There we find two possible interpretations: (44b) and (44c).

(44) a. John likes Mary more than Sue.
b. John likes Mary more than John likes Sue.
c. John likes Mary more than Sue likes Mary.

Superlatives show the same type of ambiguity with transitive verbs (Bowers (1969) and Jackendoff (1972)):

(45) a. John likes Mary the most.
b. John likes Mary more than he likes anyone else.
c. John likes Mary more than anyone else likes Mary.

1.3.2. Comparison classes

Both the quantificational and the non-quantificational theory of superlatives rely on the notion *comparison class*. That notion had first proven useful in the theories about the absolute adjective construction (Siegel (1976) and Klein (1980)). It has been noted that when we evaluate sentences like (46), for example, in a particular context *c*, we naturally understand the predicate to have a restricted interpretation:

(46) Lana is clever. (Klein (1980))

Suppose the individuals in *c* are *chimps*, then we understand *clever* to mean *clever for a chimp*. Why do we do that? Klein's answer is that some notion of a *comparison class* is involved in the background assumptions that we have when we evaluate context dependent predicates. Here is how Klein defines a comparison class:

(47) In formal terms, a comparison class is a subset of the universe of discourse which is picked out relative to a context of use (p.13).

So, the comparison class restricts the domain of context dependent predicates. As Klein observes, a similar process is involved in restricting the domain of quantifier phrases.

With respect to the comparison constructions, the notion of comparison class was vital in defining the semantics of the superlative. Intuitively, it is understood that we need a standard to measure the degree to which a property holds of some individual against it. That standard is provided by the comparison class. In (48), for example, the most natural comparison class is a set that doesn't include all flying objects, but only the set of kites:

(48) My kite flew lowest.

Consider now the comparative construction and the example in (49):

(49) My kite flew lower than your kite.

It isn't immediately obvious that a comparison class plays a role in the evaluation of (49). But at a closer look, it seems that they do. The only difference in this case is that the comparison class has a linguistic antecedent. In other words, the comparison class for (49) restricts the property of flying low to individuals that are kites and it so happens that this set is further restricted by the overt comparative clause to only include two individuals: the referent of *my kite* and the referent of *your kite*. How about sentences like (50)?

(50) My kite flew lower than the stork flew.

We don't seem to understand the property of flying low as the property of flying low for a kite; and neither do we understand it as the property of flying low for a stork. But the intuition is very strong that the only possible comparison class contains the referent of *my kite* and the referent of *the stork*. It looks then like the comparison class plays a role (and an important one, too!) in introducing the relevant scale for evaluation of scalar predicates. For (50), that would be a scale, measuring the height of flying that could accommodate both kites and storks.

What we've learned from this is that the interpretation procedure regarding comparatives and superlatives shares one more property. That property regards reference to comparison classes. However, it seems that restricting the domain of use through comparison classes is not an intrinsic property of the two constructions but rather it comes from the semantics of the scalar predicates (gradable adjectives, adverbs, verbs) which are context dependent.

1.4. The syntax of comparative and superlative constructions

From the reviews of the semantic theories, we can conclude that comparatives and superlatives are given unifying analyses. The current syntactic theories, too, similarly to the current semantic theories, endorse a unifying analysis (in the relevant respects) for both constructions. One of the goals for this section is to highlight the points of syntactic similarities, which have lead to the unifying syntactic analysis of the constructions. In addition, we are going to specify the syntactic assumptions on which we are going to base our own proposal of the semantics of the comparison constructions. In *Chapter 2*,

however, we will discuss some data which undermine the assumption of strictly parallel structures and we will modify the proposal about the syntax of superlatives.

1.4.1. The comparative construction

1.4.1.1. Comparatives and ellipsis

The syntactic properties of the comparative construction are notorious for their complexity and the resistance to a common consensus on an analysis. We hinted earlier at some of the points of divergence between different theories. Perhaps the biggest of all problems is the question whether phrasal comparatives involve some sort of ellipsis (cf. Bresnan (1973), Bresnan (1975), Heim (1985), Hoeksema (1984), Stechow (1984), Lechner (1999), etc.). A related, though to some extent less disputed, question is whether comparative deletion in clausal comparatives is an instance of ellipsis. One argument against the ellipsis analysis is the fact that comparative deletion involves in some cases deletion of constituents like AP, AdvP, DP which is not independently attested with a construction different from the comparative (cf. Lechner (1999)). The answer to the question about phrasal comparatives has huge repercussions on the semantics of comparatives. If there is no ellipsis in the *than*-clause of phrasal comparatives, then the semantics of the comparative head must involve semantic ellipsis in order to ensure that there are two predicates in a comparison relation (cf. Heim (1985), Kennedy (1999)). On the other hand, whether comparative deletion in clausal comparatives should be analyzed as an instance of ellipsis is important but not crucial (for the purposes of choosing the better type of theory). The alternative to an ellipsis analysis involves operator movement in the *than*-clause but the operator is necessarily coindexed with the predicate in the main

clause (cf. Kennedy (1997)).[20,21] That solution has little impact on the semantics of *-er/less*. Furthermore, even proponents of the view that comparative deletion is not ellipsis agree that some of the instances of comparative deletion, like *'John wants to buy a cheaper bicycle than Bill does'*, involve VP-ellipsis. For our purposes, it is important to emphasize that since we are mostly interested in evaluating two types of theories with respect to the possible quantificational properties of the comparison words, we don't have to take a stand in the dispute about ellipsis. What we mean is that (we believe) the issue about ellipsis in the *than*-clause cannot (easily) tease apart the quantificational and the non-quantificational theories.[22] Either choice allows for an analysis within each of the theories. For example, Heim (1985) and Kennedy (1999) agree that there is no syntactic ellipsis in phrasal comparatives but analyze comparatives in general differently: quantificationally and non-quantificationally, respectively.

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[20] Note that assuming operator movement in the *than*-clause is part of the common consensus view after Chomsky (1977) showed that sentences with an island for *wh*-extraction in the *than*-clause are unacceptable. However, opinions differ with respect to the type of the variable that the moved *wh*-operator in the *than*-clause binds. The standard quantificational theory assumes that the operator binds a degree variable. The alternative is that the *wh*-operator binds a variable of a higher <e,t>-type and corresponds to a predicate in the *than*-clause.

[21] Kennedy's view of comparative deletion (CD) as operator movement is incompatible with discernable Condition C and Condition A effects in the AP of the *than*-clause. However, as Lechner (1999) argues, such effects do exist. Lechner's arguments then undermine the view of operator movement based resolution of CD, i.e. we need a syntactic account of CD.

[22] See Heim (2000) for a slightly different view on the relevance of ellipsis in the *than*-clause.

There is however, one aspect of the issue about ellipsis that could potentially be relevant to the quantificational status of the comparative degree word.[23] Lerner and Pinkal (1995), Beil (1997), and Beck (2000) discuss a definiteness effect related to the comparative construction. The generalization is that in the attributive comparative construction the nominal expression containing the comparative can only be indefinite, while for no obvious semantic reasons, DPs headed by 'every' or 'the' are not allowed. The contrast is illustrated in (51):

(51) a. George owns a faster car than Bill. (Lerner and Pinkal (1995))
b. *George owns every faster car than Bill.
c. *George owns the faster car than Bill.

Interestingly, it is observed that if the *than*-clause is dropped the restriction on the type of the determiner is lifted:

(52) a. George owns a faster car.
b. George owns every faster car.
c. George owns the faster car.

These facts can be explained under the assumption that the *than*-clause contains an ellipsis site. If this is an ACD-configuration, then ellipsis has to be resolved by movement. Extraction of the constituent *-er+ than*-clause across the definite article or a quantificational determiner is a violation of the Specificity constraint of Chomsky (1973) and Fiengo and Higginbotham (1981). Therefore, (51b) and (51c) are predicted to be ungrammatical and the prediction is confirmed. When there is no overt *than*-clause but rather a (deep) anaphoric element as the second term of comparison, movement is not necessary since there is no ellipsis in the comparative construction. The prediction again coincides with the facts: the definiteness restriction doesn't hold in (52).

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[23] The point was made by I.Heim at her 1999 seminar on adjectives.

The classical theory, which relies on ellipsis in the *than*-clause, makes a prediction about the definiteness restriction that is consistent with the facts. And it so happens that this theory is quantificational. Therefore, one might argue that indirectly, the above facts support the quantificational theory. However, it is not clear, at this point, that there is no alternative explanation that is not contingent on DegP movement for the purposes of ellipsis resolution.[24]

In what follows, we will discuss briefly the views on the constituent structure of comparatives and the implications for the semantic analysis of the construction. We will focus mainly on two issues: (i) what is the head of the comparative construction, and (ii) where is the *than*-clause attached. To have clarity on at least these two questions is obligatory for deciding how the semantic interpretation of comparatives proceeds.

1.4.1.2. What is the head of a degree construction?

The classical quantificational theory of comparatives is incompatible with the view that *-er/less* is the head of the comparative construction. Rather, it is assumed that the construction is headed by the adjective (Bresnan (1973), Jackendoff (1977)). Intuitively, in the comparative construction, the adjective must have some prominence: either the adjective is the head that projects, or some functional head, which takes the adjective phrase as a complement, projects. But if the degree word and the *than*-clause are assumed

[24] See Lerner and Pinkal (1995) for a different explanation of the definiteness restriction that does not rely on DegP movement to resolve ACD. They don't assume that *-er* and the *than*-clause form a constituent at all, so the ellipsis site, for whose existence they also argue, is not antecedent contained. Since the definiteness restriction in their view is not tied to the possible movement of DegP, these facts cannot be taken to be revealing with respect to the quantificational status of the degree word.

to form a constituent, then it seems impossible for the degree word to take the AP as a complement. The straightforward alternative option is to view the adjectival head as the head of the comparative construction. Following Bresnan (1973), the proponents of the classical theory assume that the surface order is derived by extraposing of the *than*-clause which is reconstructed to its base position at LF. (53) gives the basic surface structure of a comparative construction:

(53) Scott is $[_{AP}[_{AP}[_{DegP}$ er $t_i]$ tall] [than 180cm]$_i$]

Under this view, DegP, is a specifier of *tall*. (54) gives the assumed respective D- and LF structure:

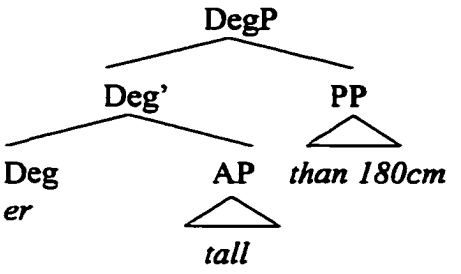
(54) Scott is $[_{AP}[_{DegP}$ er than 180cm] tall]

This view allows, in principle, for the possibility of DegP to move. Consequently, since movement is a prerequisite for participating in scope interactions, and *-er/less* have semantics defined in quantificational terms, this theory predicts that we should be able to detect evidence for its significant scopal properties.

Under the non-quantificational theory, the degree word is not an operator, hence doesn't have to move from its base position. Being an in-situ theory, it can be easily formulated both under the hypothesis that DegP is a specifier of AP, in which case the only change in the lexical entry we saw earlier will be to switch the positions of the first two arguments to which *-er/less* applies, or it can be cast syntactically within Abney (1987) hypothesis that extended projections of lexical heads have a more complex structure in which a functional word projects. Kennedy has chosen the second option. (55)

gives the Abney-type structure that he assumes. Zamparelli (1996), Corver (1990), Corver (1997) have independently argued for that structure too.[25]

(55)



Let us consider some arguments for the Deg-head hypothesis. (Abney 1987) establishes a parallel between the extended projections of the VP, NP and AP, which include the immediate projections of the lexical heads as complements of functional heads projecting respectively IP, DP and DegP. He observes that each of the three extended projections share some general properties. For example, the extended adjectival projection includes a measure phrase (MP), as in (56), which has some properties similar to subjects in IPs.

(56) The door is [$_{DegP}$ [$_{Deg'}$ six inches [$_{Deg'}$ er [$_{AP}$ wide] than before]]].

Like subjects of other extended projections, measure phrases can alternate with postponed PPs, as (57) indicates, which Abney interprets as evidence that they are theta-marked, similarly to agents in IPs :

(57) The door is wider than before **by six inches**.

Because of this parallel between sentential subjects and MPs, Abney proposes that MPs are generated in the specifier position of Deg.

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[25] Corver, in fact, argues for a more complex structure in which the comparative word is a head of a Q(uantificational) P(hrase), and other degree words like *too, so, as, how, that* are heads of DegP. In essence, however, his proposal patterns with Abney's and Kennedy's proposal since it assumes that a functional word, and not the adjective is a head of the extended adjectival projection.

Measure phrases can be used in another test to support the functional head hypothesis. As noted by Corver (1997), the impossibility to extract a measure phrase along with the degree word is easily accounted for since they don't form a constituent under the structure in (55). The competing theory, whose assumptions are represented by (54), has to resort to a different explanation of the data in (58):

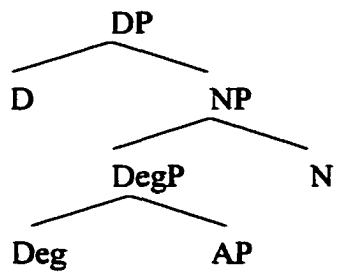
(58) a. ?How many IQ-points is John [t less smart]?
b. *How many IQ-points less is John smart?
c. [How many IQ-points less smart] is John?

Note that we only presented an argument that the comparative degree word heads the extended adjectival projection in the predicative comparative construction as in (59):

(59) John is $[_{DegP}$ er $[_{AP}$tall]]

However, nothing in the discussion so far hinges on the question whether in the attributive construction (*a taller man*) the adjective takes the noun as a complement, for which Abney has argued, or else the new DegP (which is headed by the degree word and has an AP complement) is a specifier in an extended nominal phrase. We will assume that the attributive comparative is an extended nominal projection, i.e. it corresponds to a DP in which DegP is a specifier in the NP. The abstract structure of attributive comparatives is given in (60):

(60)



In this way, we can keep constant our views about the structure of the comparative DegP, namely that it is always an extended adjectival/adverbial projection. What we have in

mind, is that the non-predicative comparative construction is possible not only with nominal expressions but also, for example, with verbs:

(61) John sold his painting much cheaper than that.

In this sentence, the comparative heads a degree phrase to the exclusion of the verb and its internal complement, as the *wh*-extraction test shows in (62):

(62) How much cheaper than that did John sell his painting?

Clearly, the DegP associated with verbs is an extended adverbial projection but the whole predicate isn't. We find it conceptually appealing that this be the case with DegPs associated with nouns too.

1.4.1.3. Syntactic proposal

To summarize, we looked at arguments that, contra the assumptions of the classical quantificational theory, the comparative degree word must be a head of the comparative construction. We now need to address the question where the *than*-clause is attached. There are two options available for the attachment of the than-clause which are consistent with the facts, presented so far. One of them is to assume that the *than*-clause is base-generated as an adjunct (or a right specifier) to/of DegP in the predicative construction and to NP, in the attributive construction. This is the position assumed by Lerner and Pinkal (1995), Corver (1997), Kennedy (1999). This option, however, would be less preferable if it turns out that the comparative degree word is an operator. Semantically, the *than*-clause functions as its restriction, under the quantificational theory, and by a standard assumption, we would expect the restriction on the domain of an operator to be

structurally its sister.[26] Also, as noted in Abney (1987) and Izvorski (1995), there is a close relation (statable in terms of selection) between the comparative degree word and the *than*-clause. The reason for such a conclusion is that each degree word, *-er/more/less, as to*, etc. takes a comparison clause that is introduced by a specified, semantically vacuous preposition: *than, as, to*, etc.. In other words, the ungrammaticality of examples like (63b) hints that a degree word and its respective comparison clause are more closely related structurally than a head and an adjunct within a maximal projection.

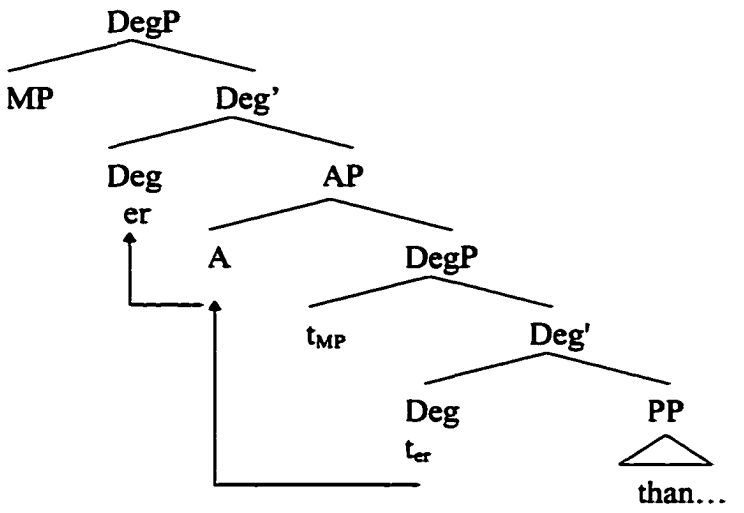
(63) a. John is taller than Bill.
b. *John is taller as Bill

There are other options to preserve the head status of the comparative degree word and yet not resort to adjoining the *than*-clause to the highest degree node (cf. Lechner (1999), Izvorski (1995), Larson (1993)). Recall that under Abney's functional head hypothesis, the AP must be a complement of the comparative degree word. On the other hand, the selectional restrictions of the comparative degree word with respect to the comparison clause imply that the *than*-clause should also be a complement of *-er*. In other words, the comparative degree word must take two complements. What could be concluded from these two requirements is that the comparative construction is in some sense similar to the double object construction. Building on this parallel between the comparative and the double object construction Izvorski (1995), Larson (1993) and Lechner (1999) propose a DegP-shell analyses for the comparative. The proposal we are going to make is somewhat different but following that spirit. We will modify the simpler

[26] We anticipate our conclusion in *Chapter 3* that *-er/more/less* indeed function as operators.

Abney-type structure of DegP we considered earlier by adding more layers to it. The basic structure is given in (64):

(64)



This structure has the desired properties: the functional word, *-er/more/less* is a head of the construction in line with Abney's functional head hypothesis. The close relation between the head and the comparison clause is structurally represented by the head-complement configuration. And finally, if the quantificational theory turns out to be the right one, then its necessary assumption that the comparative degree word and the comparative clause should be able to move together covertly for scope reasons and/or ellipsis resolution would be satisfied with this syntactic structure. More precisely, the lower copy of the chain created by the head movement of *-er* would be the one used in LF while the higher copy will be deleted.[27] A word about the syntactic position of MPs.

[27] The structure of attributive comparatives like *a taller man than Bill/a taller man than Bill is* requires that we make additional assumptions to derive the correct word order. We assumed that DegP is an extended projection of adjectives/adverbs. In the attributive construction DegP combines with the noun and forms a larger nominal constituent. We remain ignorant about the exact nature of the process that reorders the noun and the *than*-clause in the attributive construction. One possibility is to assume with Bresnan (1973) that the surface word order results from extraposing the *than*-clause. Unlike Bresnan,

Following the standard assumption of the functional head hypothesis, we assumed that MP appear in specifier positions of degree heads (cf. Abney (1987), Corver (1997), Izvorski (1995), etc.). Given the DegP shell-hypothesis, however, we need to make a clarification. Considerations about the surface word order dictate that we assume that MP surfaces in the specifier position of the higher shell. On the other hand, from a semantic point of view, the measure phrase has to be interpreted as a sister of the constituent *er+than*-clause (cf.*Section 3.2.4*). We said that we interpret -er in its base position in the lower shell. It follows then that there must be a position in that shell for MP too, and this is the position where the MP is interpreted. But for this to be possible, we need to assume that MP, too, like the head of DegP is generated in the lower shell and moves overtly to higher [Spec, DegP] position.

Finally, we'd like to discuss a set of data from Russian for which the proposal makes a correct prediction. There are two possible ways to form a comparative construction in Russian.[28] One possibility is to use the so called Genitive of comparison construction in which the compared element is directly (without preposition) introduced. It must, however, appear in the Genitive case:

(65) Ulica dlinnee kanala
street long-er canal-Gen
'The street is longer than the canal.'

The second option is to use a *wh*-element which introduces the compared constituent:

---

however, we don't need to assume an extraposition analysis for the predicative construction *taller than Bill/ taller than Bill is.*

[28] It is not clear that these types correspond to the English phrasal and clausal comparatives. One obvious difference is that the Russian candidate for the clausal comparative construction cannot surface with any auxiliary.

(66) Ulica dlinnee čem kanal
street long-er wh-than canal-Nom
'The street is longer than the canal.'

Measure phrases in the comparative construction in Russian can appear in three possible positions, as (67) shows:

(67) a. Ulica na 20m dlinnee čem kanal
street with/by20m long-er wh-than canal
'The street is 20m longer than the canal.
b. ?Ulica dlinnee na 20m čem kanal
c. Ulica dlinnee čem kanal na 20m

Perhaps it is a language particular property whether MP must move to the higher [Spec,DegP]. We will assume that in Russian, both options are available. This explains the appearance of MP in (67a) and (67b). For (67c), we assume that it corresponds (structurally) to the English comparative construction in which the MP is right adjoined to a higher projection in analogy with the agent in a passive construction.

Interestingly, with the Genitive of comparison construction, the MP cannot have a position between the adjective to which the comparative morpheme is affixed and the case-marked compared element. The other word orders are allowed, as we see in (68):

(68) a. $[_{IP}$ Ulica $[_{DegP}$ $[_{MP}$ na 20m] dlinn-ee$_i$ $[_{DegP}$ t_i kanala]]
street with/by 20m long-er canal-Gen
'The street is 20m longer than the canal.
b. *$[_{IP}$ Ulica $[_{DegP}$ dlinn-ee$_i$ $[_{DegP}$ $[_{MP}$ na 20m] $[_{Deg'}$ t_i kanala]]]]
c. Ulica dlinnee kanala na 20m

The explanation for the contrast in (68), we believe, is the following: the comparative degree word cannot alone theta-mark and assign case to the compared DP *kanal*, since as a funcional word, it can't *theta*-mark its complement. When the degree head raises to the adjective, the combined *theta*-feature of the adjective and the case feature of the degree word allow the complex to *theta*- and case-mark the DP *kanal*. However, case/theta roles

are assumed to be assigned in a local configuration. This implies that there is a functional projection above AP, say AgrP to whose specifier the DP moves, while the case/theta role assigner adj+-*ee* adjoins to Agr^0. Then, in a Spec-Head configuration case and a theta role is assigned. The proposal is reminiscent of a proposal in Saito and Hoshi (2000) about the Japanese light verb construction and Lasnik's (1995) analysis of partitive case, who argue that a complex head can jointly *theta* mark and assign case. Now, we can explain the ungrammaticality of (68b) by appealing to Relativized Minimality. The DP kanal has to raise to [Spec,Agr] across another specifier position which is filled by MP. That, consequently, that leads to ungrammaticality.[29] When there is no intervening MP, as in (68a) and (68c), the problem does not arise.[30] Crucially, these facts cannot straightforwardly receive an explanation in a theory assuming that the compared constituent is adjoined to DegP.

1.4.2. Superlatives

The superlative construction, unlike the comparative, hasn't attracted much attention from a syntactic point of view. Perhaps the clearest proposal on the syntax of superlatives is that of Abney (1987), which establishes a parallel with the structure of the comparative construction. Most importantly, the superlative degree word is assumed to be the head in

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[29] Note that this suggests a featural approach to *theta*-role assignment, as opposed to the standardly assumed configurational approach (cf. Lasnik (1999), Bošković (1994), Bošković and Takahashi (1998), Hornstein (1999), Stateva (2002)).

[30] For the cases in (67) in which no Genitive of comparison is assigned, we assume that the compared NP receives default case from the preposition. The comparative degree word is drawn from the lexicon without a case-feature and the adjective - without a comparative *theta* feature.

the extended adjectival projection. In many respects, the other spelled-out proposals of the syntax of comparatives are intended to be general enough to affect all degree words: *-er, -est, as, too, how, that, enough,* etc.[31] This is implied at least in Corver (1990), Corver (1997), Zamparelli (1996).

In *Section 1.2* we introduced the basic syntactic structures that feed the LFs according to the quantificational and the non-quantificational theories, respectively. Recall that the crucial difference between them was that according to the quantificational theory *-est* and its semantic restriction *C*, form a constituent. That constituent is in principle movable, regardless of whether the superlative construction comes with an obligatory definite article or not, as in some predicative superlatives. The definite article is replaced by an indefinite article at LF, as Szabolcsi (1986), for example, among others, has argued for. That allows for the possibility of DegP to interact scopally with other scope bearing elements. Under the alternative Abney-type functional head hypothesis, DegP includes the adjective in the projection of *-est*. If Kennedy's proposal of comparatives, which is an extension of Abney's proposal, is strictly followed for superlatives, then *-est* would not be able to move alone out of the description in which it is generated at least for syntactic reasons.

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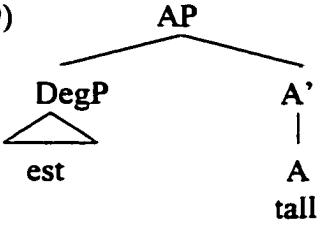
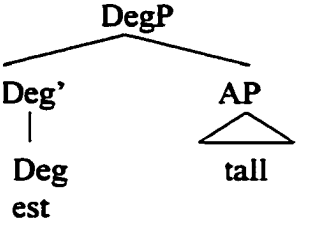
[31] Corver (1997) doesn't explicitly discuss the status of the superlative degree word. He argues that the comparative degree words and *enough* have the same structural position, a head of a QP which is a complement of DegP which when present in the structure is headed by one of the other degree words. Even though he distinguishes between two classes of degree words (*er* and enough vs. so, as, how, that too) in general all degree words receive the same type of analysis in Corver's framework: they are degree heads that extend the adjectival projection.

Let us review one of the standard arguments for the "functional head" hypothesis that applies to both the comparative and the superlative construction, and therefore, in effect is an argument for a unifying analysis. Corver (1997) considers the derivation of the synthetic form of the comparative/superlative adjective under the "classical" Bresnan (1973)/ Jackendoff (1977) structure, on the one hand, and under the Abney (1987) structure, on the other hand. These structures are repeated again in (69) and (70), respectively:

(69)



(70)



Corver (1997) following Emonds (1976) concludes that *-er* and *more* must originate in the same structural position since they are in complementary distribution. The same reasoning applies to *-est* and *most*. But, he argues, the synthetic form must be derived either by movement of the adjective to the unbound morpheme, or by movement of *-er/-est* to the adjective. Under the structure in (69), both types of movement would be to a non-c-commanding position. Not so, according to Corver, under the structure in (70). Therefore, the structure in (70) must be preferred. The point, he makes applies only to deriving the forms with *-er/-est*. But since he concluded that the unbound and the bound morphemes occupy the same the syntactic position, then the argument extends to both the synthetic and the analytical construction.

We believe that the structure in (70) must be preferred to (69) but not for this particular reason. The alternative to head adjunction of the adjective to the unbound

morpheme in (69) is head adjunction in (70), but like any head adjunction, it is to a non-c-commanding position under the most standard definition of c-command, which goes back to Reinhart (1976):

(71) α c-commands β iff neither α nor β dominates the other and the first branching node that dominates α also dominates β.

We conclude then, that the argument from head-to-head movement for the structure in (70) doesn't hold. However, it is instructive to review it merely as an illustration of the unifying spirit of the syntactic theories of comparison.

We believe that in the case of superlatives, as in the case of the comparatives, the extended adjectival projection is a DegP. However, in *Chapter 2* we will present evidence against the strict parallelism in the two structures.

1.5. The 'common-sense' proposal

In this chapter, we presented the two major trends in analyzing the comparative and the superlative constructions. We observed that each theory of comparatives or superlatives is stated in a general fashion which by extension covers both constructions. Further, we observed that there is good reason to believe in a unifying approach to the constructions of comparison, irrespective of whether it will be cast in quantificational or non-quantificational terms. Such motivation comes from the wide range of properties that the two constructions share and that we discussed in the previous section. We conclude then with a formulation of a common-sense theory of comparison: the comparative and the superlative construction pattern together with respect to their defining properties.

Of course, one would like to know what we mean by saying that these two constructions "pattern together". So do we need a unifying quantificational theory of comparison, or do we need a unifying non-quantificational theory? Up to this point, we actually haven't examined in detail the quantificational status of any of the constructions. Before we do that, we need to clarify what kind of evidence we are going to consider in order to tease the quantificational and the non-quantificational approach apart.

There are two notions of scope that we are going to discuss, and following a general practice, we will use them interchangeably. Let's call the first 'syntactic' and the second 'semantic' notion of scope.[32] The effects of syntactic scope are observed through the ability of an element to interact scopally with other scope bearing elements: if the scope of an element is its c-command domain, then syntactic scopal properties would be defined as the ability of an element to c-command different domains in the possible LFs of a sentence. In other words, we can relate syntactic scope to (non-lexical) ambiguity. We can also define a semantic notion of scopal prominence. Let's assume that an element has semantic scope if its lexical entry contains an operator which is intended to bind a non-local variable.[33] The major difference between the two competing theories that we discuss

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[32] Thanks to Y. Sharvit for bringing that distinction to my attention.

[33] The condition that the variable is non-local is supposed to exclude cases in which a logical operator has an inherently saturated bindee position. For example, in the quantificational version of the lexical entry of *-est*, we find two logical operators: en existential and a universal:
(i) $[[est]] := \lambda C{:}C \in D_{<e,t>}.[\lambda R{:}R \in D_{<d,et>}.[\lambda x{:}x \in D.\exists d[R(d)(x) \ \& \ \forall y \neq x[y \in C \rightarrow \neg R(d)(y)]]]]$
Here, the existential operator is intended to bind the degree variable of the adjective/adverb after applying the denotation of the superlative operator to the denotation of the scalar predicate. The universal operator however, doesn't quantify over a position outside of the superlative operator. According to our definition then, the semantic scope

is with respect to the existence of semantic scope in the meanings of degree words. In order to state the predictions of each theory and evaluate them, however, we should clarify what the relation between semantic and syntactic scope is, since we can only observe effects of syntactic scope but it is impossible to get direct and theory neutral evidence for the existence of semantic scope. In this respect we want to address the following questions: (i) does semantic scope imply syntactic scope; (ii) does syntactic scope imply semantic scope? The answers might seem trivial but it is instructive to state them.

Let us start with the first question. The prediction is that if semantic scope implies the existence of syntactic scope, then changing the c-command domain of an element (by movement), that is defined as having semantic scope will lead to truth conditions that are non-equivalent to the conditions derived without the movement, all else equal. Here is a relevant example:

(72) Some student likes every woman.

The subject and the object DPs have semantic scope: they bind a variable introduced by a one-place predicate:

(73) a. $[[\text{some student}]] = \lambda P{:}P \in D_{<e,t>}.\exists x[\text{student}(x) \,\&\, P(x)]$
b. $[[\text{every woman}]] = \lambda P{:}P \in D_{<e,t>}.\forall x[\text{woman}(x) \,\&\, P(x)]$

---

of the superlative operator, under the quantificational view is inherited from the existential but not from the universal quantifier.

The object DP is not of the appropriate type to combine with the verb. If the type of *like* is raised in order to allow it to combine with *every woman*, then the DP could be interpreted in its base position.[34] The derived interpretation would be as in (74):

(74) There is some student who likes every woman.

However, (72) has a second reading. It is paraphrazed in (75):

(75) For every woman, there is a student such that s/he likes her.

It is not possible to easily account for this ambiguity if the object DP stays in situ. But if it moves to a position above the subject DP, the second reading can be compositionally derived. In other words, if two elements have semantic scope then changing the c-command relations between them results in different interpretations.[35] We can conclude then that semantic scope implies the possibility for an expression to change its syntactic scope so that this leads to a different interpretation.

On the other hand, moving an element that has no semantic scope does not lead to new truth conditions. Nothing prevents us from moving the proper name *Tom* in each of the sentences in (76), above the respective scope bearing element. But that obviously has no effect on interpretation since the sentences are not ambiguous

(76) a. Every student likes Tom.
b. Scott needs to invite Tom to the party.

---

[34] Alternatively, and in fact, standardly assumed solution for resolving type mismatch is movement to an interpretable position. The closest appropriate site for movement of a quantified DP is the VP adjoined position (cf. Heim and Kratzer (1998), Fox (2000)).

[35] Not everybody agrees that indefinite DPs like some student have the semantics in (73). On the alternative view, the DP has an individual variable that is bound by bound by existential closure. But the point we are making is still valid even under this view: in that case that existential operator and the quantified DP in the object position interact scopally and the ambiguity in (72) results from that interaction.

This is not the whole story, however. Sometimes, sentences that contain more than one expression which has semantic scope, don't show expected ambiguities. (77) is such an example:

(77) Some student believes that every professor is crazy.

This sentence doesn't have a reading where the universally quantified DP takes scope over *some student*. It can't mean that for every professor there is a potentially different student who believes that that professor is crazy. It has been observed that quantified DPs originating in a tensed clause, can't take scope above expressions outside of that clause. (77) exemplifies that observation. The explanation for that must be syntactic since the syntactic context allows or disallows scope bearing expressions to interact scopally with other scope bearing elements. In other words, in principle, semantic scope implies syntactic scope but there are syntactic constraints on scopal configurations. That is to say, having more than one element with semantic scope in a sentence is not a sufficient condition to observe scopal ambiguity. But, it is a necessary condition. Changing the syntactic scope of expressions that have no semantic scope, like proper names, never leads to ambiguities. This is what (76) shows. Similarly, if we define a degree word as a non-scope bearing element, i.e. if such a word has no semantic scope, changing its syntactic scope will not lead to ambiguities. Let us illustrate this point. Consider (78):

(78) Scott needs to climb the highest mountain.

We have Kennedy's non-quantificational theory of comparison which can serve as a testing ground. We will check whether it is possible to derive different sets of truth conditions for (78) depending on the structural position of *-est*: above or under the intensional verb. Given the discussion above, we expect that no such difference will be

attested. But let us make sure that this is so. First, we will consider LF of (78) with *-est* in its base position. That LF and the corresponding interpretation are given in (79):[36]

(79) $[_{IP}$Scott $[_{VP}$ 1$[t_1$ needs$_w[_{CP}$ λw't$_1$ to climb$_{w'}$ $[_{DP}$ ~~the~~ $[_{NP}[_{DegP}$ [est+P$_{w'}$] high$_{w'}$] $[_{N'}$ mountain$_{w'}$]]]]]]

[[Deg]] = λP.P∈D$_{<e,D>}$.[λG:G∈D$_{<e,d>}$.[λx:x∈D.G(x)> max(λd.∃y≠x[y∈P & d = G(y)])]]
[[DegP]] = λx:x∈D.*high*$_{w'}$(x)> max(λd.∃y≠x[y∈P(w') & d = *high*$_{w'}$(y)])
[[N']] = λb:b∈D.*mountain*$_{w'}$(b)
[[NP]] = λx:x∈D.*mountain*$_{w'}$(x) & *high*$_{w'}$(x)> max(λd.∃y≠x[y∈P(w') &d = *high*$_{w'}$(y)])
[[DP]] = λQ:Q∈D$_{<e,D>}$.∃c[*mountain*$_{w'}$(c) & *high*$_{w'}$(c)> max(λd.∃y≠c[y∈P(w') &d = *high*$_{w'}$(y)]) &Q(c)]
[[CP]] = λw'.∃c[*mountain*$_{w'}$(c) & *high*$_{w'}$(c)> max(λd.∃y≠c[y∈P(w') &d = *high*$_{w'}$(y)]) & *climb*$_{w'}$(c)(b$_1$)]
[[VP]] = λb$_1$:b$_1$∈D.b$_1$ *needs*$_w$. λw'.∃c[*mountain*$_{w'}$(c) & *high*$_{w'}$(c)> max(λd.∃y≠c[y∈P(w') & d = *high*$_{w'}$(y)]) & *climb*$_{w'}$(c)(b$_1$)]
[[IP]] = *Scott needs*$_w$ λw'.∃c[*mountain*$_{w'}$(c) & *high*$_{w'}$(c)> max(λd.∃y≠c[y∈P(w') &d = *high*$_{w'}$(y)]) & *climb*$_{w'}$(c)(*Scott*)]

Comparison class: P(w')={a:a is a relevant mountain in w'}

[[Scott needs to climb the highest mountain]] = 1 iff in all worlds *w'*, compatible with what Scott needs in the actual world *w*, Scott climbs a mountain *x*, and the degree that corresponds to x on the scale measuring height is greater than the maximum of the set of degrees that correspond to some other relevant mountain on that scale.

Now, let us consider a LF for (78) in which the syntactic scope of *-est* is different, this time *-est* has the intensional verb in its scope. (80) is the relevant LF:

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[36] In order to make the experiment possible, let us assume, for the moment, a slight change in the order of applying *-est* to the function denoted by the adjective and to the comparison class. The straightforward extension of Kennedy's proposal for comparatives required the degree word to combine first with the adjective. That followed from the assumed head-complement configuration in which they are generated. Since the comparison class is a null element and thus the considerations for stating that it combines with the degree word only after the degree word combines with the adjective are theoretical, not empirical, let us decide for this particular case only that the comparison class is the most internal argument of *-est* even under the non-quantificational theory. To make that syntactically plausible, suppose that the variable that stands for the comparison class is adjoined to the degree word to form a complex head. This will allow us to have a syntactically mobile constituent related to *-est*.

(80) [$_{IP}$Scott [$_{VP2}$ est+P [2 [$_{VP1}$ 1 [t_1 needs$_w$ [$_{CP}\lambda w' t_1$ to climb$_{w'}$ [$_{Dp}$~~the~~ [$_{NP}$[$_{DegP}$ t_2 high$_{w'}$][$_{N'}$ mountain$_{w'}$]]]]]]]]]

What type would the trace of the QR-ed *-est+P* be? Since under the non-quantificational theory it doesn' t quantify over degrees it shouldn't be of type*d* but suppose we allow it to be. Then it won't be possible to combine it with the adjective, so we'll be stuck. Suppose we say that the trace is of type *e*. It combines with the adjective denotation, which under the measure function approach is of type <e,d>, to yield an expression of type *d* but after that we'll be stuck because *mountain* can't combine with a degree. So, the last option is to say that the trace is of the type of the moved element, namely, <ed,et>.[37] That move, however, as we see from the semantic calculations below, has the effect of semantic reconstruction, i.e. we end up with a set of truth conditions that are equivalent to the conditions derived without movement.[38]

(81)
[[Deg]] = r
[[DegP]] = r(λz:z.$\in$ D.*high*$_{w'}$(z))
[[N']] = λb:b$\in$ D.*mountain*$_{w'}$(b)
[[NP]] = λx:x$\in$ D.[r(λz.*high*$_{w'}$(z))](x) & *mountain*$_{w'}$(x)
[[DP]] = λQ.$\exists$c[[r(λz.*high*$_{w'}$(z))](c) & (*mountain*$_{w'}$(c) &Q(c)]]
[[CP]] = $\lambda w'$.$\exists$c[[r(λz.*high*$_{w'}$(z))](c) & *mountain*$_{w'}$(c) & *climb*$_{w'}$(c)(b_1)]
[[VP]]$_1$= λb_1:$b_1 \in$ D.b_1 *needs*$_w$.$\lambda w'$.$\exists$c[[r(λz.*high*$_{w'}$(z))](c) & *mountain*$_{w'}$(c) & *climb*$_{w'}$(c)(b_1)]

---

[37] This option is allowed if we assume with Heim and Kratzer (1998) the definition of variable assignment as in (i):
(i) A variable assignment is a partial function *a* from the set of indices to the set of all denotations, such that,
for every <i, τ> $\in$ dom(a), a(i,τ) $\in$ Dτ.

[38] This is a welcome result. Under the non-quantificational theory, the degree word is viewed as a predicate that relates two degree arguments. There are syntactic reasons to believe that raised predicates must be reconstructed at LF (cf. Huang (1993)). The reasoning from a semantic point of view converges with that conclusion.

$[[VP]]_2 = [\lambda r{:}r \in D_{<ed,et>}.\lambda b_l{:}b_l \in D.b_l\ needs_w.\lambda w'\exists c[[r(\lambda z.high_{w'}(z))](c)\ \&\ mountain_{w'}(c)\ \&\ climb_{w'}(c)(b_l)]](\lambda G{:}G \in D_{<e,d>}.[\lambda a{:}a \in D.G(a) > \max(\lambda d.\exists y \neq a[y \in P \&\ d = G(y)])]) \Leftrightarrow \lambda b_l{:}b_l \in D.b_l\ needs_w.\lambda w'.\exists c[mountain_{w'}(c)\ \&\ high_{w'}(c) > \max(\lambda d.\exists y \neq a[y \in P \&\ d = high_{w'}(y)])\ \&\ climb_{w'}(c)(b_l)]$

$[[IP]] = 1$ iff $Scott\ needs_w.\lambda w'.\exists c[mountain_{w'}(c)\ \&\ high_{w'}(c) > \max(\lambda d.\exists y \neq c[y \in P(w') \& d = high_{w'}(y)])\ \&\ climb_{w'}(c)(Scott)]$

Comparison class: P(w')={a:a is a relevant mountain in w'}

The different LFs (79) and (80) of the sentence in (78) lead to the same conditions. This is indeed what we expected to find, given that -est was not assigned any semantic scope.

Finally, it is harder to show empirically that ambiguity resulting from different syntactic scope of particular expressions imply the existence of their semantic scope. This follows by assumption (cf. May (1977), and Kiss (1987)).

To summarize the discussion about scope, we will assume that syntactic scope is intimately related to semantic scope, and therefore, we will treat attested scopal ambiguities as evidence for the quantificational nature of the elements that trigger them. With this in mind, we can go back to the question we posed earlier: what theory of comparison do we need? We formulated a common sense unifying hypothesis, based entirely on the fact that the two constructions we considered have a lot of common properties, and from a theoretical point of view they have traditionally been grouped together. But at this point it is hard to commit to the quantificational or the non-quantificational theory.

Recall that each of the semantic theories that we considered is coupled with a particular syntactic theory. From a syntactic point of view, the non-quantificational theory of comparison seemed to have an advantage, given Corver' s (1997)data from *Section 1.4.1.2.* which shows that the measure phrase and the comparative operator don' t form a

constituent (even in the absence of a *than*-clause) at the point of derivation when wh-movement applies. The Abney-type structure which is assumed by the standard non-quantificational theory, is consistent with the facts. But the Bresnan/Jackendoff structure which is coupled with the standard quantificational theory isn't. However, the DegP shell proposal takes away that advantage from the non-quantificational theory. Under that proposal, the comparative operator and the measure phrase form a constituent at LF but not when wh-movement applies.

We decided that we are going to be mostly concerned with patterns of ambiguities in order to decide on the preferable theory, and we already discussed some ambiguities in both constructions in *Section 1.3.1.* However, it is not clear whether these particular cases are true scopal ambiguities.[39] The closest to relevant kind of ambiguities involve 'upstairs de dicto' readings, which can be available in addition to *de dicto* and *de re* readings. At least intuitively, these readings arise because the degree word has an option of taking scope over an intensional predicate. Consider again (78), repeated in (82):

(82) Scott needs to climb the highest mountain.

It has a *de re* and a *de dicto* reading, similarly to the sentence *Scott needs to climb the least high mountain* which we considered earlier. And it, too, has an 'upstairs de dicto' reading which becomes prominent in a context like (83):

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[39] In many cases, ambiguities in comparatives are due to the different possible "sizes" of ellipsis in the construction. For superlatives, different choices of comparison classes might create the effect of having ambiguous readings in a sentence. To tease apart the quantificational and the non-quantificational theory, we need to abstract from these cases and look for ambiguities that clearly arise only in the presence of other scope bearing elements.

(83) Context: Three climbers are asked to describe their needs for the current climbing season:

Scott: "I need to climb a mountain that is at least 2500m high."
Bill: "I need to climb a mountain that is at least 2000m high."
Chris: "I need to climb a mountain that is at least 1800m high."

Earlier in this section, we saw for this particular example that changing the syntactic scope of the non-quantificationally defined *-est* , and moving it above the intensional verb in (82) doesn't lead to deriving different truth conditions, compared to those derived if *-est* is interpreted below the intensional verb. In other words, if the ambiguity between 'upstairs de dicto' readings and regular de dicto readings comes about as a result of the possibility for *-est* to interact scopally with the intensional verb, then the non-quantificational theory loses a point: (79) and (81) are logically equivalent - they correspond to the regular de dicto reading while the 'upstairs de dicto' is not derived at all.

On the other hand, as Heim (2000) argues, the quantificational theory can derive both readings. In fact the 'upstairs de dicto' reading is derived by raising *-est* above *need*, as in (84).

(84) $[_{IP}$Scott $[_{VP2}$est+C[2 $[_{VP1}$ I[t_1 needs$_w$[$_{CP}$ λw' t_1 to climb$_{w'}$ [$_{DP}$~~the~~ [$_{AP}$ d_2 [$_{A'}$high_mountain$_{w'}$]]]]]]]]]

It is easy to see from (85) that this leads to the desired truth conditions for (82), under its 'upstairs de dicto' interpretation:

(85) $[[A']] = \lambda d{:}d \in D_d.[\lambda z{:}z \in D.\textit{high\_mountain}_{w'}(d)(z)]$
$[[AP]] = \lambda z{:}z \in D.\textit{high\_mountain}_{w'}(d_2)(z)$
$[[DP]] = \lambda Q{:}Q \in D_{<e,t>}.\exists x[\textit{high\_mountain}_{w'}(d_2)(x) \& Q(x)]$
$[[CP]] = \lambda w'.\exists x[\textit{high\_mountain}_{w'}(d_2)(x) \& \textit{climbs}_{w'}(x)(b_1)]$
$[[VP]]_1 = \lambda b_1{:}b_1 \in D\, b_1\ \textit{needs}_w \lambda w'.\exists x[\textit{high\_mountain}_{w'}(d_2)(x) \& \textit{climbs}_{w'}(x)(b_1)]$
$[[VP]]_2 = \lambda b_2{:}b_2 \in D.\exists d_3[\, b_2\ \textit{needs}_w \lambda w'.\exists x[\textit{high\_mountain}_{w'}(d_3)(x) \& \textit{climbs}_{w'}(x)(b_2)] \& \forall y \neq b_2\,[y \in C \rightarrow \neg\, y\ \textit{needs}_w \lambda w'.\exists x[\textit{high\_mountain}_{w'}(d_3)(x) \& \textit{climbs}_{w'}(x)(y)]]]$

[[IP]] =1 iff $\exists d_3$[*Scott needs*$_w$ $\lambda w'$.$\exists x$[*high_mountain* $_{w'}$ (d_3)(x) & *climbs*$_{w'}$ (x)(Scott)] &$\forall y \neq$*Scott* [$y \in C \rightarrow \neg$ y *needs*$_w$ $\lambda w'$. $\exists x$[*high_mountain* $_{w'}$ (d_3)(x) & *climbs*$_{w'}$ (x)(y)]]]

Comparison class: C={a:a is a relevant person in w}

Obviously, the quantificational theory has the necessary tools to derive the 'upstairs de dicto' readings, since the desired scopal configuration can be achieved by syntactic movement of a scope bearing element, the degree operator, to an interpretable position above the intensional verb. On the other hand, there is no straightforward extension of the non-quantificational analysis that would account for 'upstairs de dicto' readings.

With this in mind, we conclude that the quantificational theory has some advantage over the non-quantificational. Furthermore, since the 'upstairs de dicto' derivation relied on long-distance movement of DegP, we also conclude, at this point, that the we identify the common sense theory of comparison with the movement quantificational theory.

CHAPTER 2

Problems for the common-sense theory

2.1. Asymmetries between the comparative and the superlative constructions

There are reasons to suspect that unifying the analysis of comparatives and superlatives, although intuitively appealing because of the points of similarities, might not be desirable. The common-sense theory views the semantic and the syntactic properties of the superlative construction as a direct extension of the properties of comparatives (in the relevant respects). Consequently, if a linguistic context is describable in terms of comparison, then both comparison constructions should equally well represent it. There is only one condition, though: that there are at least three objects of comparison in that context. The last condition is pragmatic and it is related to the superlative construction. Nothing in the semantics of the superlative specifies the number of elements in the comparison class but superlatives seem pragmatically appropriate if the comparison class contains at least three elements. And indeed this seems to be the case. Many researchers have noted that without any loss in the intended meaning, the superlative construction can be replaced by a comparative construction with a universal quantifier in the restrictive clause or a list of the compared individuals in the *than*-clause. Substitution works in the opposite direction, too. Any comparative construction, in which there are at least three

compared elements, can be replaced by a superlative. For example, (1a), (1b), and (1c) express the same thought:[1]

(1) a. The Barbie doll is the cheapest.
b. The Barbie doll is cheaper than every toy.
b. The Barbie doll is cheaper than the Lego set and/or the chess set.

In this chapter, however, we are going to present a number of contexts that apparently distinguish between the possibility to use a comparative construction and the possibility to use a superlative construction. The existence of such contexts undermine the common sense theory. We will start with a case presented in Sharvit and Stateva (2002), and then we will discuss some new cases: comparison and *so*-pronominalization, measure phrases, comparative conditionals, comparison and syntactic islands, possessive superlatives, and modal adjectives. We will conclude that some modifications are needed in our understanding of comparison in order to accommodate the differences in the domain of application of these constructions.

2.1.1. "Sandwich" contexts

Recall that the common sense theory that we considered in *Chapter 1* views the comparative and the superlative degree words as quantificational elements, and furthermore that they can be interpreted in a derived position. The possibility to move a comparison operator is a prerequisite to its ability to take inverse scope, which in turn is what we in principle expect from scope bearing elements. If by hypothesis, the comparative and the superlative operator pattern together, we should not expect any

[1] This is true, of course, only if it is clear from the context that the objects that are being compared are the ones explicitly mentioned in (1b).

contexts for which a movement analysis of the comparative and of a corresponding superlative sentence would make different predictions. However, such contexts do exist. Sharvit and Stateva (2002) discuss a context attributed to I. Heim. Consider (2) and the sentences in (3):

(2) Context 1: Bill climbed one mountain which is 2500m high and one - 1000m
Joe climbed a 2000m high mountain

(3) a. Joe climbed the least high mountain.
b. Bill climbed the least high mountain.
c. Joe climbed a less high mountain than Bill did.
d. Bill climbed a less high mountain than Joe did.

Consider (3), under their respective comparative readings and evaluate them after adding to the context in (2) the background question in (4):

(4) Without ignoring any people or mountains climbed, tell me who climbed the least high mountain?

Interestingly, under these contextual conditions, speakers have no trouble judging (3a) and (3b): the first one is intuitively false, while the second one is true. However, the comparative set of sentences in (3c) and (3d) are difficult to judge: some informants consider them both true, while others are uncertain about their status.

The common sense quantificational theory, however, has a clear prediction: (3a) and (3c) should be true under the same conditions; also (3b) and (3d) are predicted to be true under the same conditions. But the judgments in fact don't group together (3a) and (3c), and neither do they go in the same direction for (3b) and (3d), respectively. This fact weakens the common sense theory.

Let us show that the predictions contradict the facts. The quantificational theory of superlatives allows us to derive the comparative reading via movement of *-est/least* to a

position above the verb. In (3a,b) *least* moves outside the description in which it originates in order to take scope over the subject trace in the VP; thus we constrain the choice of elements in the covert restriction *C* of *least*. The relation to which [[est+C]] applies in this case is *λd.λx.x climbed a d-high mountain*. The external argument of *least* is the variable in the subject position, and because of the presupposition condition in the lexical entry of *least*, repeated below, we construct the comparison set in (6):

(5) $[[\text{least}]] = \lambda C{:}C \in D_{<e,t>}.\lambda R{:}R \in D_{<d,et>}.\lambda x{:}x \in D{:}\ \underline{x \in C \ \&\ \forall y[y \in C \rightarrow R(d)(y)=1]}.\exists d[\neg R(d)(x) \ \&\ \forall y \neq x[y \in C \rightarrow R(d)(y)]]$

(6) C={x: ∃d [x climbed a d-high mountain]}

Under the movement analysis, for (3a), we get the truth conditions in (7), which predict the sentence to be true in the context in (2).

(7) [[Joe climbed the least high mountain]] =1 iff $\exists d[\neg\ \exists x[$*mountain*(x) & *high*(d)(x) & *climbed*(x)(*Joe*)] & $\forall y \neq$*Joe*[y∈C →$\exists x[$*mountain*(x) & *high*(d)(x) & *climbed*(x)(y)]]]

C = {Bill, Joe}

The conditions specified in (7) are fulfilled, for the degrees *d* such that $2000 \leq d < 2500$. (3a) is then predicted to be true relative to the context in (2). That the prediction goes against intuitions.

When would the comparative counterpart of (3a), namely, (3c) be true? Given the semantics of the comparative operator, repeated in (8), (3c) will be true under the conditions in (9):

(8) $[[\text{less}]] = \lambda P{:}P \in D_{<d,t>}.\lambda Q{:}Q \in D_{<d,t>}.\exists d[P(d) \ \&\ \neg Q(d)]$

(9) [[Joe climbed a less high mountain than Bill did]] = 1 iff $\exists d \exists x[$*mountain* (x) & *high*(d)(x) & *climbed*(x)(*Bill*) & $\neg\exists y[$*mountain* (y) & *high*(d)(y) & *climbed*(y)(*Joe*)]]

The conditions specified in (9) are fulfilled for all degrees *d* such that $2000 \leq d < 2500$. (3a) is then predicted to be true relative to the context in (2). Since the comparison class in the case of the superlative construction contains only the referents of Bill and Joe, the truth conditions for (7) and (9) are equivalent. But the judgments are not! And while it is clear that for the case of the superlative the common sense movement theory makes a wrong prediction, this is not clear for the case with the comparatives, since the judgment there is not clear cut. The same reasoning applies for (3b) and (3d). We can conclude then that "sandwich" scenarios create a problem for the unifying analysis of comparatives and superlatives.

2.1.2. So-pronominalization and superlatives

Corver (1997) discusses data involving the pronominal element *so* in the comparative construction. *So* can stand for an AP, as the data in (10) show:

(10) a. John is fond of Mary. Bill seems **more** *so*.
b. The police searched the big room carefully, but the small room **less** *so*.

Now let's check whether *so* can be licensed in the superlative construction. The expectation, from the point of view of the common sense theory, is that so-pronominalization should be possible in both constructions. However, the expectation is not borne out. Consider the data below:

(11) a. *John and Scott are fond of Mary. Bill seems the **most** *so*.
b. John and Scott are fond of Mary. Bill seems the most fond of her.
c. cf. John is fond of Mary. Bill seems **most** *so*.

(12) a. *John and Scott are really industrious. But Bill is the **most** *so*.
b. John and Scott are really industrious. But Bill is the most industrious.
c. cf. John is really industrious. But Bill is **more** *so*.

(13) a. *John was fond of mathematics in high school and in college, and he seems **most** *so* now that he entered a graduate program.
b. John was fond of mathematics in high school and in college, and he seems most fond of mathematics now that he entered a graduate program.
c. cf. John was fond of mathematics in high school and he seems **more** *so* now that he entered a graduate program.

(14) a. *The police searched the kitchen and the living-room very carefully but the bedroom the **least** *so*.
b. The police searched the kitchen and the living-room very carefully but the bedroom the least carefully.
c. cf. The police searched the living-room very carefully but the bedroom **less** *so*.

(15) a. *The story is interesting, perhaps the **most** *so* from what we heard tonight.
b. The story is interesting, perhaps the most interesting from what we heard tonight.
c. cf. The story is interesting, **more** *so* than what we heard tonight.

The contrast in the acceptability between the (c) sentences and the (a) sentences above is very robust: the comparative allows *so*-pronominalization, but the superlative doesn't. In each of the (b) examples, the superlative expression is felicitous, so what makes the (a) examples bad must be some violation of the condition for licensing *so*.[2]

2.1.3. Measure phrases

The common sense theory doesn't predict that there should be differences in the ability of the comparative and the superlative operators to be further specified. As the examples in (16) show, the comparative can freely take a measure/differential phrase, which *measures*

[2] It is possible that the difference between the comparative and the superlative construction with respect to their ability to license *so*-pronominalization is due also to a difference in the structural position of the respective restrictive clause. But even if this is so, we still have an argument for an asymmetry in the syntactic properties in the two constructions.

the difference between the degrees of the relevant property with which the compared individuals are associated.

(16) a. The Barbie doll is 5 dollars cheaper than the Lego set.
b. The Barbie doll is 5 dollars cheaper than the Lego, or the chess set, or the ball.

Certainly, in a situation in which every toy compared to the Barbie happens to have the same price, we can talk about an exact difference between the Barbie and the toys in the comparison set with respect to the relevant property. Recall, that under the common sense theory we expect every situation which is describable by a comparative sentence with a universal quantifier in the *than*-clause to be also describable by a superlative clause. But then (17) goes against this expectation: the measure phrase can be added to the comparative in (17b), but it is ungrammatical with superlative:

(17) a. *The Barbie is 5 dollars cheapest.
b. The Barbie is 5 dollars cheaper than every toy.

An adequate analysis of the comparison operators should be able to explain this contrast. However, the unifying analysis fails to do that. Since we assumed in *Chapter 1*, following standard practice, that the structural position of MP is [Spec,DegP], we conclude from the data above that either that position is inherently saturated in the case of the superlative, in which case the only candidate for that position is *-est* itself, or the syntactic structure of the two constructions is different and there is no position for MPs at all in the superlative construction. In any case, this implies that the superlative and the comparative construction have some differences which are not predicted by the unifying theory.

*2.1.4. Comparative conditionals/ *superlative conditionals*

There is a comparison construction, which is only possible with comparatives but not with superlatives. It is known as the comparative conditional/correlative (CCs) (cf.Fillmore (1987), McCawley (1988), Wold (1991), Beck (1997), Culicover and Jackendoff (1999)). Here are some examples:

(18) a. The kinder you are to him, the more he imposes on you. (McCawley (1988))
b. The hotter it was, the more tired Uli was. (after Beck (1997))
c. The fresher a sandwich looks, the more it costs. (after Beck (1997))

The comparative conditional construction, as argued by McCawley (1988) and Beck (1997), has properties of the two constructions, reflected in the name: comparatives and conditional sentences. Like in conditional sentences, there are necessarily two clauses in it, one, which states a condition, and a second one, corresponding to the consequence in genuine conditional sentences. Also, similarly to the "regular" conditional construction, as Beck argues, the CC involves universal quantification over pairs of worlds, times or individuals. For illustration, consider the informal interpretations of (18a,b,c), given in (19a,b,c), respectively. They represent each of these types:[3]

(19) a. $\forall w_1, w_2$ [$w_1 \in$ Acc & $w_2 \in$ Acc & you are kinder to him in w_1 than in $w_2 \rightarrow$ he imposes on you more in w_1 than in w_2]

(where Acc is a subset of the set of possible worlds W, such that each $w \in$ Acc conforms with what the speaker knows (cf. for a formal treatment of modality see Kratzer (1991))[4]

b. $\forall t_1, t_2$ [it was hotter at t_1 than it was at $t_2 \rightarrow$ Uli was more tired at t_1 than at t_2]
c. $\forall x,y$ [sandwich(x)& sandwich(y)& x looks fresher than $y \rightarrow$ x costs more than y]

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[3] More precisely, the claim is that as a default, there is universal quantification over pairs in CCs, which could be overriden in the presence of an overt adverb of quantification. As Beck notices, this is also the case with ordinary conditionals.

[4] The informal definition of Acc is taken from von Fintel's lecture notes on intensionality (MIT, Spring 2001).

The construction is relevant to our research question for two reasons: (i) it involves overt movement of a degree phrase. This allows us to expand the domain of study of the scopal properties of the comparative operator: syntactic movement can change scope relations, and having clear evidence for movement could be instrumental in attesting the significance of scopal properties. (ii) CCs can shed light on the semantic/syntactic properties of superlatives, too. Consider (20):

(20) *The fastest he drives, the earliest he'll get.

We expect (20) to have the meaning of (21) if we extend straightforwardly Beck's semantics of comparative conditionals to superlatives:

(21) When I drive the fastest, I get the earliest.

In other words, it is perfectly fine to describe the meaning of (20). Given Beck's assumption that in comparative conditionals, like in regular conditional sentences, there is hidden adverb of quantification that has universal force, we expect (20) to have the interpretation in (22):

(22) For all times *t*, when I sleep more at *t* than at any other time, then I eat more at t than at any other time.

However, it is impossible to pair that interpretation with the string in (20. This undermines the common sense theory.

2.1.5. The comparative and the superlative in syntactic islands

Recall that the common sense theory that we suggested in *Chapter 1* implies that the two degree words, *-er* and *-est* can move from their base-generated position. The strongest argument for movement comes from the assumption that they are quantificational elements

and as such they should be able to move in order to create particular scopal configurations. However, a movement analysis makes wrong predictions regarding possible readings involving the superlative construction, while it doesn't run into that problem with comparatives. Consider, for example, the context in (23):

(23) There are 7 relevant mountains: A, B, C, D, E, F, G. A is the highest, B-the second-highest, C-the third highest, etc. There is a climbing competition which is to be won by the person who achieves the most - the one who climbs a mountain (one of these seven) higher than anyone else's. John climbed mountain C, Bill -D, Joe -E.

(23) can truthfully be described by (24):[5]

(24) John climbed the mountain which was highest among the mountains climbed.

This (type of) reading is the comparative reading of the superlative that we discussed previously, i.e. in some sense we compare John to the other relevant climbers with respect to their achievements. Recall from *Chapter 1* that the movement theory requires the argument that provides the dimension of the comparison to be in the scope of *-est* at LF. So, in the case of (24), does that theory predict a comparative reading? Certainly, not. In order to do that, *-est* must raise above the VP-trace of *John*, i.e. across the relative clause and above the matrix verb to secure the right constraints on the formation of the comparison set.[6]

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[5] Some informants disagree with that judgment.

[6] Recall from *Chapter 1* that we argued for a DegP shell analysis of the comparative construction. We concluded that the structure is consistent with the assumptions of the movement quantificational theory. At LF, *-er* is reconstructed into its base position, and that lower DegP which also includes the *than*-clause is subject to LF movement. In *Chapter 1*, we also established a parallel between the syntactic properties of the comparative construction and the superlative construction. In that sense, *-est* in its reconstructed LF position forms a constituent with the variable denoting the comparison set, which could be dislocated at LF.

(25) a. John [[$_{DegP}$ est-C][1 [2 [t_2 climbed a mountain which$_3$ is t_3 d_1-high]]]]
b. C={x: x climbed a mountain which is high to some degree}

However, under standard assumptions, QR is very local, hence a quantifier inside a relative clause can't interact scopally with a quantifier in the matrix clause. This is illustrated by (26):

(26) Some student interviewed some football player who kissed every cheerleader.

The intuition about this example is that it is impossible for the universally quantified DP to scope above *some student* or the indefinite *some football player*. It should then be equally impossible to QR the superlative DegP out of the relative clause in (24).

The conclusion to be drawn is that in sentences with superlative expressions in relative clauses, there is a comparative reading which can't be accounted for under a theory that relies on DegP movement of the superlative. Such a theory undergenerates. An available alternative to derive that meaning is to manipulate the comparison set with the help of contextual cues, so that it contains only mountains that are climbed by John, Bill, or Joe and interpret DegP in situ.

Superlatives in relative clauses thus provide an argument against DegP movement in that construction. Recall, that the counterpart of comparative readings in superlatives are the so called wide-scope comparatives. Interestingly, wide scope comparatives are ungrammatical if embedded in a relative clause, as (27a) shows.

(27) a. *John climbed a mountain which is higher than Bill did.
b. cf. John climbed a higher mountain than Bill did.

The contrast between the attributive comparative construction (27b) and (27a), in which the comparative is embedded in a relative clause, is easily explained under the assumption that the lower DegP shell [$_{DegP}$ er than Bill] must undergo QR at LF above the matrix verb

in order to create the appropriate LF for the wide scope reading of the comparative. The movement in (27b) is local enough but in (27a) it's not since the targeted landing site of DegP is outside of the relative clause.

The facts are unexpected from the point of view of the common sense theory. They point to the conclusion that when they are embedded in islands for extraction, the comparative and the superlatives behave differently: the comparative construction is ungrammatical but the superlative isn't. We interpret this to mean that in this case the comparative DegP must move, while the superlative – can't.

*2.1.6. Possessive superlatives/ *possessive comparatives*

Ross (1964) discusses possessive superlatives of the type in (28):

(28) a. I had to work my hardest at a time when I lived in Storrs.
b. Beth looked her prettiest at the party last night.

Compare now (28) to the respective absolute constructions in (29) and (30):

(29) a. *I had to work my hard at a time when I lived in Storrs.
b. cf. I had to work hard at a time when I lived in Storrs.

(30) a. *Beth looked her pretty at the party last night.
b. cf. Beth looked pretty at the party last night.

We can conclude from the contrast between (28), on the one hand, and (29) and (30), on the other, that it is the superlative morphology that makes the possessive pronoun appropriate in (28). Whatever that property of the superlative for 'licensing' the possessive pronoun is, it can't be characteristic of the comparative since "possessive" comparatives are not grammatical:

(31) a. *At a time when I lived in Storrs, I had to work my harder than I had to work at a time when I lived in Plovdiv.

b. *At the party last night, Beth looked her prettier than she did at the party last week.

2.1.7. Modal adjectives and comparison

Superlatives differ from comparatives also in their ability to 'license' modal adjectives. Consider, for example (32):

(32) a. Try to find the [best possible] person for this job. Corver (1997)
b. What is the [longest possible] word in this language?
c. I'd like to buy the [cheapest possible] ticket to New York.

The modal adjective *possible* is associated with the adjectival modifier in all of these examples. In principle, *possible* can function as a non-intersective modifier of nouns. But in (32), it doesn't modify the respective nouns, because (32a) implies (33a); (33b) is pragmatically trivial but still implied by (32b), and (32c) implies (33c).

(33) a. Try to find a person for this job.
b. There is a word in this language.
c. I'd like to buy a ticket to New York.

These entailment relations would be surprising if *possible* modified the nouns in (32). As (34) shows, in clear cases of noun modification, we don't get the implication pattern we observed above:

(34) a. John is a possible Nobel Prize winner. $\not\Rightarrow$
b. John is a Nobel Prize winner.

It is also clear that the superlative morphology 'licenses' the modal adjective, since without it, the corresponding examples are ungrammatical:

(35) a. *Try to find a good possible person for this job.
b. *What is a long possible word in this language?
c. *I'd like to buy a cheap possible ticket to New York.

In contrast to the superlative, the comparative construction doesn't allow modal adjectives:

(36) a. *Try to find a better possible person for this job.
b. *What is a longer possible word in this language?
c. *I'd like to buy a cheaper possible ticket to New York.

Once again, we have to conclude that the comparative lacks some property of the superlative degree word that is responsible for the observed contrast.

2.2. DegP scope in comparative conditionals

Let us examine in greater detail CCs and check if the comparative degree word shows quantificational properties. The sentences that we need to look at should include a quantificational element, in addition to the comparative. The German example in (37) is of the appropriate type:[7]

(37) Je mehr Sonderangebote wir haben, umso öfter kommen viele Rentner
the more special-offers we have the more-often come many retirees
'The more special offers we have, the more often many retirees show up.'

Consider (37) in the following context:

(38) Context

At our shopping center, we periodically offer special deals to promote ourselves and make customers spend more money buying our goods. However, we've noticed a correlation: whenever we have these promotions, then instead of getting rich customers which can afford to buy a lot, we get a great number of customers that are retired people and don't spend much.

[7] The example is provided by Sigrid Beck.

(37) is appropriate to be uttered in that context. It expresses the thought that the greater number of promotions correlates with a greater frequency of having many retired people coming for the sales.

In addition to that, (37) has another very natural interpretation. Assume a slightly different context of uttering (37). This context is as in (39):

(39) At our shopping center, we periodically offer special deals to promote ourselves and make customers spend more money buying our goods. However, we've noticed a correlation: whenever we have these promotions, many retired people show up at the shopping center more often than they do in periods when we don't have promotions.

(37) is a good description of (39). We have to conclude that the consequent clause of (37) is ambiguous. But if this is so, then the source of the ambiguity must be the scopal interaction between the comparative element and the quantified DP *viele Rentner*. In other words, any reliable theory of comparatives should be able to account for the ability of the comparative operator to interact scopally with other scope bearing elements. A non-quantificational theory of comparatives can't do that because of its assumption that the comparative morpheme doesn't have significant scopal properties. It remains to be seen whether the particular version of the quantificational theory of comparatives that we assumed predicts the desired interpretations of ambiguous CCs. But at this point, we can safely conclude that only a quantificational theory of comparatives has the desired properties to deal with ambiguities involving the comparative DegP.

To summarize the section, CCs provide a convincing argument that the scope of DegP in comparatives is significant. This construction, as shown by Beck (1997) is found among numerous unrelated languages. However, to the best of our knowledge, none of these languages uses a corresponding superlative conditional construction. The weakest

conclusion we can make on the basis of these data is that the semantics of superlatives is consistent with the non-quantificational theory of comparison, while the semantics of comparatives is not.[8] So, most importantly, CCs give one more argument that the superlative and the comparative constructions differ from each other, i.e. they are not appropriate in the same sets of linguistic contexts.

2.3. Problems with detecting DegP movement

2.3.1. Heim's Kennedy Generalization

Some of the examples discussed so far supported an argument that DegP in superlatives can't move out of its base position unlike DegP in comparatives. If this is true, we would expect the comparative DegP to interact with quantifiers but not the superlative DegP. Detecting ambiguities involving a DegP, however, is quite difficult as noted by Kennedy (1999) and Heim (2000). In sentences like (40), for example, we don't observe any ambiguities, even though there is a quantificational element with which the comparative operator can potentially interact:

(40) Every physicist bought more books than my neighbor did.

Heim (2000) shows that in many cases, the available degree theories don't predict truth conditional differences between the comparison operator and a quantified DP, and therefore the lack of ambiguity can't be taken as an argument against them. We have analogous situations with sentences like (41):

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[8] We have to make a proviso that the 'upstairs de dicto' reading of the superlative construction embedded under intensional verbs can be explained without appealing to the *est*-movement analysis. Such an alternative will be discussed in *Chapter 3*.

(41) Every professor interviewed every applicant.

In (41), there are two quantified expressions but the two possible LFs, associated with that sentence amount to the same truth conditions:

(42) a. [[every professor] [1 [[every applicant] [2 [t_1 interviewed t_2]]]]]
a'. [[Every professor interviewed every applicant]] = 1 iff for any individual x which is a professor and any individual y which is an applicant, x interviewed y.

b. [[every applicant] [2 [[every professor] [1 [t_1 interviewed t_2]]]]]
b'. [[Every professor interviewed every applicant]] = 1 iff for any individual x which is a professor and any individual y which is an applicant, x interviewed y.

Here is a parallel (in the relevant sense) example involving comparatives:

(43) Every student is taller than Mary is.

If the comparative degree word is a quantificational element, we expect it to take scope either under or over the universally quantified DP. The corresponding LFs are those in (45a) and (45b), respectively. However, they lead to (logically) equivalent truth conditions. For reference, we repeat in (44) the lexical entry of *-er*, assumed by the quantificational theory:

(44) $[[er]] := \lambda P{:}P \in D_{<d,t>}.\lambda Q{:}P \in D_{<d,t>}.\exists d[\neg P(d) \,\&\, Q(d)]$

(45) a. [[every student] [1 [[-er than wh_3 Mary is d_3-tall] [2 [t_1 is d_2-tall]]]]]
a'. [[Every student is taller than Mary is]] = 1 iff
$\forall x[\text{student}(x) \rightarrow \exists d[\neg \text{Mary is d-tall} \,\&\, x \text{ is d-tall}]$

b. [[-er than wh_3 Mary is d_3-tall] [2 [[every student] [1 [t_1 is d_2-tall]]]]]
b'. [[Every student is taller than Mary is]] = 1 iff
$\exists d[\neg \text{Mary is d-tall} \,\&\, \forall x[\text{student}(x) \rightarrow x \text{ is d-tall}]$

The set of truth conditions in (45a') amounts to requiring that each student is such that she is taller than Mary. The conditions in (45b') require that the shortest of the students be taller than Mary. But the situations in which the conditions from (45a') will be fulfilled are

those situations in which the conditions from (45b') will be fulfilled. (43) is judged to be unambiguous, and the degree theories predict that.

A second problem with detecting the scopal properties of comparison operators, which Heim (2000) discusses is that in many cases the truth conditions derived from the compared LFs are not equivalent, but there's an independent reason for one of the LFs to be ill-formed. Again, the empirical facts that we don't detect any ambiguity in such sentences coincide with the prediction of the quantificational theory. In other words, such cases can't tease apart the quantificational and the non-quantificational theories since both theories make the same prediction.

So, let's look at those examples then, for which the quantificational and the non-quantificational theories make different predictions. Here is one of them:

(46) Every student is less tall than Mary is.

The sentence is unambiguous. From the point of view of the non-quantificational theory, this fact is trivially explained: there is only one quantificational element in it: *every student*. But under the quantificational view that DegP has significant scopal properties, we expect to find two readings in (46). We have two well-formed LFs from which we derive two unequivalent sets of truth conditions, as in (48). We repeat in (47), the lexical entry of the operator *less*:

(47) $[[\text{less}]] := \lambda P{:}P \in D_{<d,t>}.\lambda Q{:}P \in D_{<d,t>}.\exists d[P(d) \,\&\, \neg Q(d)]$

(48) a. [[every student] [1 [[less than wh_3 Mary is d_3-tall] [2 [t_1 is d_2-tall]]]]]
a'. [[Every student is taller than Mary is]] = 1 iff
$\forall x[\text{student}(x) \rightarrow \exists d[\text{Mary is d-tall} \,\&\, \neg\, x \text{ is d-tall}]$

b. [[less than wh_3 Mary is d_3-tall] [2 [[every student] [1 [t_1 is d_2-tall]]]]]
b'. [[Every student is taller than Mary is]] = 1 iff
$\exists d[\text{Mary is d-tall} \,\&\, \neg\forall x[\text{student}(x) \rightarrow x \text{ is d-tall}]$

(48a') represents the attested reading of (46), according to which the sentence is true if it is true of each student that she is shorter than Mary. (48b'), however, predicts that the sentence should be true if it is not the case that each student is shorter than Mary. These conditions are satisfied, for example, in a situation in which only the shortest student is shorter than Mary. However, such a reading doesn't exist.

It looks like some explanation is needed to account for the overgenerated reading of (46) in order to save the quantificational theory. Careful examination of different types of data lead Heim to formulate a syntactic condition on the well-formedness of LFs involving a DegP. This condition rules out (48b) and makes the quantificational theory consistent with the facts. Heim (2000) refers to this condition as the *Kennedy generalization*:

(49) If the scope of a quantificational DP contains the trace of a DegP, it also contains DegP itself.

It follows from the above discussion that if DegPs have significant scopal properties, we shouldn't expect them to be revealed in any linguistic context in which we find another scope bearing element. Since scope interaction involves movement, restrictions on DegP movement could prevent us from getting (otherwise expected) well-formed LFs. We need, then, to expand the domain of inquiry and look for configurations that circumvent Kennedy's generalization. Obviously, CCs are such domains since we already found out that they can be ambiguous. The data from CCs suggest that the quantificational theory of comparatives is preferable to the non-quantificational theory of comparatives (which doesn't predict such ambiguities). However, only a closer look at the

expanded set of data will tell us whether (49) is the right formulation of the condition on DegP movement. We will come back to this discussion in section 3.3.1.

2.3.2. LF movement out of a definite description?

In the previous chapter, we discussed the current state of the research on comparative and superlative constructions, concluding that they have to be analyzed in a parallel manner. In this chapter we brought evidence from CCs that comparatives are quantificational elements. However, if superlatives are also quantificational, that would imply, as we already said, that they can move out of their base position at least at a distance above the closest predicate. Since the definite article is obligatory in almost all superlative constructions, assuming such movement of the superlative DegP amounts to a claim that DegP is in some sense "exceptional" unlike *wh*-phrases, for example, since DegP can move out of a definite description.[9] The alternative, followed by Szabolcsi (1986), Heim (1999), Stateva (2000), Sharvit and Stateva (2002) is to assume some mechanism of replacing the definite article with an indefinite at LF. However, this move is not uncontroversial either.[10] After all, such a mechanism does not explain why an indefinite determiner should be spelled out phonologically as the definite determiner in an overwhelming majority of languages.

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[9] For discussion of the Specificity condition, which treats definite descriptions as islands for extraction, see Chomsky (1973), Fiengo and Higginbotham (1981), Mahajan (1992), Diesing (1992), Stepanov (2001), etc.

[10] For arguments supporting the assumption that some attributive superlatives are indefinite see Szabolcsi (1986). See also Sharvit and Stateva (2002) for a critical discussion of Szabolcsi's data.

On the other hand, it isn't obvious that the non-quantificational theory will have to resort to any of these controversial assumptions. More precisely, this theory is consistent with the view that superlative constructions are definite, but it is also consistent with the view that they might be indefinite, since that theory doesn't depend on DegP movement. In that sense, given the lack of clarity about the status of superlatives with respect to definiteness, the non-quantificational theory of superlatives may have some advantage compared to the quantificational theory of superlatives.

2.4. Conclusion

In this chapter, we discussed data involving "sandwich" scenarios, *so*-pronominalization, measure phrases, comparative conditionals, extraction from syntactic islands, possessive superlatives and modal adjectives, all of which present a problem for the unifying common sense theory of comparatives and superlatives. We also observed with respect to CCs that the semantics of comparatives is better described in quantificational terms, since they can interact scopally with other scope bearing elements. Superlatives, however, were shown to be incapable of instantiating a construction, corresponding to the CCs. Together, these asymmetries suggest that we need to abandon the common sense theory in favor of a new theory of comparison that accounts for the differences between comparatives and superlatives. This is what we will do in *Chapter 3*.

CHAPTER 3

Proposal: A non-unifying theory of comparison - comparatives have significant scopal properties, superlatives don't

3.1. The analyses

We concluded the previous chapter with an observation that there are many asymmetries between the comparative and the superlative degree words. That observation implies that we need to replace the unifying common sense theory of comparison with a new theory which could account for the observed differences. We also presented data from CCs, involving overt movement of the comparative DegP, which obviously circumvent Kennedy's generalization since they allow us to detect the scopal properties of the comparative operator: we showed that a clause in a CC can be ambiguous if there is a scope bearing element in addition to the comparative DegP. These data suggest that we need a quantificational theory of comparatives. On the other hand, the special conditional construction doesn't reveal if the superlative interacts scopally with other quantificational elements: "superlative conditional" aren't grammatical. So we couldn't find any evidence suggesting the quantificational nature of the superlative DegP. Moreover, as Sharvit and Stateva (2002) argue, the movement theory, makes wrong predictions for superlative sentences in "sandwich" scenarios. Therefore, we can't entertain the classical movement quantificational theory of superlatives, as we do for comparatives. This opens two possibilities for the analysis of superlatives: either the non-quantificational theory of superlatives is correct, or the superlative operator, even if it is a quantificational element,

must always be interpreted within the definite description in which it is base-generated. However, if the second option is correct, we also face the question why the superlative operator is different from other quantificational elements and can't move.

The main proposal that we are going to make in this chapter, against the spirit of the unifying theory, is that comparatives have significant scopal properties while superlatives don't. In this light, we are going to reconsider the differences between the comparative and the superlative construction that we observed previously, and show that the semantics of comparison we propose can account for them. The semantics of superlatives that we are ultimately going to endorse implies that there are differences in the syntactic structure of comparatives and superlatives. This, however, will be argued to be a welcome result.

3.1.1. Comparatives

The quantificational theory of comparison was right in its view about the comparative degree word. The classical analysis of comparatives that goes back to Seuren (1973) makes a correct prediction about the scopal properties of the comparative operator. Therefore, we will continue to maintain its major insight but assume with Stechow (1984), Rullmann (1995), and Heim (2000) that there is a built-in maximality operator in the meaning of *-er/less*.[1] The new lexical entries for *-er and less* are given in (1), and the entry of the maximality operator is repeated in (2):

(1) a. $[[er]] := \lambda P: P \in D_{<d,t>}.[\lambda R: R \in D_{<d,t>}.[\max(\lambda d.P(d)) < \max(\lambda d.R(d))]]$
b. $[[less]] := \lambda P: P \in D_{<d,t>}.[\lambda R: R \in D_{<d,t>}.[\max(\lambda d.P(d)) > \max(\lambda d.R(d))]]$

[1] Stechow (1984) and Rullmann (1995), unlike Heim (2000), assume that the maximality operator applies only to the denotation of the *than*-clause.

Heim (2000)

(2) $\max := \lambda P \in D_{<d,t>}. [[\text{the}]](\lambda d. [P(d) \& \forall d_1[P(d_1) \rightarrow d_1 \leq d]])$

Here is one argument from Rullmann (1995) supporting the assumption for the maximality operator in the semantics of comparatives. Downward entailing contexts can't license the comparative construction, as shown in the data from (3) to (6):

(3) a. *John weighs more than Bill doesn't weigh.
b.cf. John weighs more than Bill weighs.

(4) a. *John weighs more than nobody weighs
b.cf. John weighs more than everybody else weighs.

(5) a. *John weighs more than few people weigh.
b.cf. John weighs more than most people weigh.

(6) a. *John weighs more than Bill never weighed.
b.cf. John weighs more than Bill always weighed.

The negative island effect in the (a) examples above is predicted under the assumption that there is a maximality operator that applies to the denotation of the expression denoted by the *than*-clause. To see why, let's look at the LF and the predicted truth conditions for one of the examples. Consider again (3a), and its LF (7a) and derived truth conditions in (7b):

(7) a. [[-er than wh_2 Bill doesn't weigh t_2-much] [1 [John weighs t_1-much]]
b. [[John weighs more than Bill doesn't weigh]] =1 iff
$\max(\lambda d_2$.Bill doesn't weigh d_2-much) < $\max(\lambda d_1$.John weighs d_1-much)

The problem with (7b) is that one of the maximum degrees to which these truth conditions refer is undefined. The set of degrees d_2 such that Bill doesn't weigh d_2-much is infinite and therefore it doesn't have a maximum. Thus the ungrammaticality of (3a) is explained. The problem does not arise with comparatives in upward entailing contexts as we can see,

for example, from (8), which gives the LF and the truth conditions of (3b). Both sets of degrees to which the comparative operator applies in such cases have defined maximums:

(8) a. [[-er than wh_2 Bill weighs t_2-much] [1 [John weighs t_1-much]]
b. [[John weighs more than Bill weighs]] =1 iff
$\max(\lambda d_2.$Bill weighs d_2-much) < $\max(\lambda d_1.$John weighs d_1-much)

The explanation of the contrast between (3a) and (3b) carries over to (4), (5), and (6). That explanation, however, is not available if we stick to the Seuren-type analysis of comparatives since it is the application of the maximality operator to the set of degrees denoted by the *than*-clause that makes the truth conditions in the (a) examples undefined.

3.1.2. Superlatives

3.1.2.1. The quantificational DP-internal view

Most of the differences between the comparative and the superlative constructions can be accounted for (as we are going to see later in this chapter) if we assume that both degree words have semantic scope but they differ in that the comparative DegP, like all other quantificational elements can move (for reasons including scope, and possibly ellipsis resolution), while the superlative DegP can't. Plausibly, some additional condition that applies only to the case with the superlative disallows such movement. However, the DP-internal view has the burden of defining the nature of this condition. If this suggestion is on the right track, then the semantics of the superlative operators shouldn't be significantly different from the semantics of the comparative operators that we endorsed in the previous section. The differences between the two degree words will be associated with their syntactic properties. The revised lexical entries, under this view, for *-est* and *least* are as in (9):

(9) a. $[[est]] := \lambda P: P \in D_{<e,t>}.[\lambda R: R \in D_{<d,et>}.\lambda x: x \in C \ \& \ \forall y[y \in P \rightarrow \exists d_1[R(d_1)(y)=1]]].$
$[max(\lambda d.R(d)(x)) > max(\lambda d.\exists y \neq x[y \in P \ \& \ R(d)(y)])]]$

b. $[[least]] := \lambda P: P \in D_{<e,t>}.[\lambda R: R \in D_{<d,et>}.\lambda x: x \in C \ \& \ \forall y[y \in P \rightarrow \exists d_1[R(d_1)(y)=1]]].$
$[max(\lambda d.R(d)(x)) < max(\lambda d.\forall y \neq x[y \in P \rightarrow R(d)(y)])]]$
Heim (2000)

The alternative option for the semantics of superlatives, as we are going to see in the next section, would be to assume that the superlative DegP doesn't show any scopal effects since it doesn't have semantic scope. The quantificational DP-internal theory has, however, one advantage to this alternative. We will argue in *Section 3.2.3.* that only the quantificational theory of comparatives can account for their quantificational properties. But that theory depends on the assumption that gradable adjectives/adverbs provide a degree variable which the comparative operator binds. The adjectives/adverbs that allow both the comparative and the superlative construction will consistently be assumed to be functions from degrees to functions from individuals to truth values under the quantificational DP-internal theory of superlatives. Not so under the alternative non-quantificational theory of superlatives. If the superlative degree word can't function as a binder for the degree variable introduced in the superlative construction by the adjective, then how is that variable going to be bound? The solution comes at the cost of assuming that adjectives are systematically ambiguous between a type which is compatible with the quantificational nature of the comparative operator and another type which is compatible with the non-quantificational nature of the superlative degree word. The details of this solution will be worked out *in Section 2.1.3.* For now, it suffices to say that the quantificational DP-internal theory doesn't have to resort to postulating adjectival ambiguity in the lexicon.

There is one potential counterargument against the quantificational DP-internal theory that we want to address. Recall from *Section 2.2.1.* that Kennedy's generalization disallows the configuration in (10):

(10) * DegP Quantified expression t_{DegP}

Kennedy's generalization applies to the superlative DegP under the DP-internal theory of superlatives, because in essence the DP-internal theory is a quantificational theory (irrespective of the fact that it predicts that the superlative DegP doesn't have scopal properties). Therefore, we can't expect to derive grammatical utterances whose LF has the abstract form of (10). However, plural superlatives seem to behave unexpectedly. Consider the example in (11):

(11) Mount Everest and K2 are the highest summits.

(11) is an unambiguous sentence and it is true under the intuitive conditions specified in (12):

(12) The degree *d* to which Mount Everest is high is greater than the biggest degree d_1 to which some other mount different from it and different from K2 is high. The degree d_2 to which K2 is high is greater the biggest degree d_1 to which some other mount different from it and different from Mount Everest is high.

From (12), we conclude that the plural in (11) is read distributively.

Under standard assumptions, the distributive readings are derived by having a distributive operator (D-operator) in the LF (cf. Link (1983), Scha (1984), Roberts (1987), Schwarzschild (1996), etc.). The distributive operator is a scope bearing element: it interacts with other quantified expression. Here is an argument from Schwarzschild (1996). Consider (13):

(13) Each boy killed a dog.

(13) has a pragmatically plausible reading according to which it describes a series of dog killings by different boys. However, the sentence also has an implausible reading, which talks about multiple killings of the same dog. Indefinite noun phrases can serve as antecedents for pronouns when they have wide scope. If we add a sentence to (13) with such a pronoun, we force the implausible reading of (13). Thus, within the discourse of (14), for example, we can only attest that insensible reading of (13):

(14) Every boy killed a dog. It turned out to have nine lives.

These data illustrate the ability of the generalized quantifier to interact scopally with the indefinite NP. Similarly to (13), (15) is ambiguous between a sensible distributive reading describing two events of killing different dogs, and an implausible distributive reading about multiple acts of killing the same dog:

(15) John and Mary killed a dog.

The implausible reading, again, can easily be detected if forced by adding a sentence with a pronoun referring to the indefinite in (15) in a discourse, as in (16) :

(16) John and Mary killed a dog. It was buried in the parking lot.

The conclusion is that there is an operator in (15), which interacts scopally with the indefinite there, much like the generalized quantifier in (13) interacts with the indefinite. Since the only plausible candidate is the D-operator, it follows that the D-operator is a quantificational element.

Let's go back to (11). Combining the assumption that the D-operator is a scope bearing element (which we motivated above) with the assumption from the quantificational DP internal superlative theory that the superlative operator is also a quantificational element (but can't move out of the description in which it is generated)

leaves few options for a possible LF for (11). The most attractive option is to suggest a LF in which the D-operator is attached structurally higher than the superlative operator. Since by assumption the superlative operator can't move out of the containing definite description, we will correctly predict the lack of ambiguity in the sentence. That LF with the desired scopal ordering, is as in (17):

(17) [[MtEverest⊕K2][^{D}[1[t_1 (be) (the) highest summit]]]], where
(i) MtEverest⊕K2 is a plural individual
(ii) ^{D} is the distributive operator

The D-operator is assumed to have the semantics in (18):

(18) $[[D]] := \lambda P{:}P \in D_{<e,t>}.[\lambda X{:}D_e.\forall x[x \in X \rightarrow x \in P]]$
where *X* denotes a group individual, and *x* denotes a singular individual

As we see from the lexical entry of the D-operator, it applies to an <e,t>-type function and distributes the property denoted by that function down to individuals which are subparts of the argument of the predicate phrase. In (17), the D-operator is attached to the predicate *be the highest summit* and it is interpretable there since that predicate has the desired <e,t> semantic type.[2] However, the truth conditions derived from this LF are too strong, as we argued in Stateva (2000b). Let's see why. From (17) we arrive at the interpretation for (11), as in (19):

(19) [[Mount Everest and K2 are the highest summits]] =1 iff

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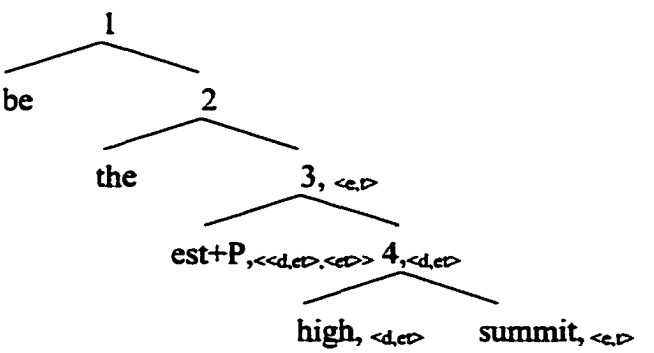
[2] The denotation of *'be the highest summit'* is of type <e,t> under the assumption that the definite article and the copula are semantically vacuous (alternatively, the copula denotes the identity function). If the definite article is contentful in the superlative construction, then the interpretation of sentences like (i) must be similar to the interpretation of (ii).
(i) MtEverest is the highest summit.
(ii) The Morning star is the Evening Star.
Crucially, even if *be* is not semantically vacuous in such cases, the denotation of *'be the highest summit'* and *'be the Evening star'* will be a function from individuals to truth values, too.

[MtEvereste∈ MtEverest⊕K2 → max(λd.high(d)(MtEverest) &
summit(MtEverest)) > max(λd.∃y≠MtEverest[y∈P & high(d)(y)& summit(y)])
& K2∈ MtEverest⊕K2 → max(λd.high(d)(K2) & summit(K2)) >
max(λd.∃y≠K2[y∈P & high(d)(y) & summit(y)])]

P={x: x is a summit}

(19) predicts that (11) will be true just in case each of the summits Everest, and K2 is the highest summit. But this will never be the case since K2 is lower than Mount Everest, and therefore one of the conditions requiring that the maximal height of K2 be higher of the height of any other mountain cannot be fulfilled. More generally stated, the problem is that the individual members of the denotation of a plural superlative differ among themselves with respect to the degree to which they have the compared property. What other options to derive the adequate truth conditions are there then? As we see from (20), which represents the predicate phrase in (11), the D-operator can't be adjoined to node *4*, because it is not of the appropriate <e,t>-type. So, for that reason, we can't distribute the relation *λd.λx.[high(d)(x) & summit(x)]*, which is the denotation of node *4*.

(20)



Also, the D-operator can't be attached to node *3* even though that node is of the appropriate semantic type since that solution reproduces the problem we faced with the LF in (17). Note that it is also impossible to distribute the property *λx.summit(x)* in this particular example. If we do that, we will derive too weak truth conditions for (11). The

sentence will be predicted to be true if the following two conditions are met: (i) each of the members of the group Mount Everest and K2 must be a summit, and (ii) the height of Mount Everest and K2 together should be greater than the height of each other summit. But the second condition clearly goes against intuitions. What we compare in (11) is the height of each of the summits Mt Everest and K2 to the height of each of the rest of the contextually salient summits. Instead, the condition in (ii) suggests that we compare the sum of the heights of Mount Everest and K2 to the height of each of the other summits. This is unacceptable.

A solution that we suggested in Stateva (2000b) was to attach the D-operator lower than the superlative operator and distribute the property *λx.high(d)(x) & summit(x)*. It's semantic type, <e,t> allows the D-operator to apply to it and the desirable truth conditions can be derived. However, one small change in the lexical entry of the superlative operator is needed for this to work. We have to specify further which members of the comparison class could be compared to the external argument of *-est*: not only those members of the comparison class that are different from the external argument of *-est* but also individuals that are different from any subpart of the external argument. In other words, if the external argument of *-est* is a group individual, then it is compared to all other relevant individuals from the comparison class whose denotation doesn't overlap with the denotation of that plural individual. The revised lexical entry of the superlative operators is now as in (21):

(21) a. $[[est]] := \lambda P: P \in D_{<e,t>}.[\lambda R: R \in D_{<d,et>}.\lambda x: x \in C \ \& \ \forall y[y \in P \rightarrow \exists d_1[R(d_1)(y)=1]]. [max(\lambda d.R(d)(x)) > max(\lambda d.\exists y[y \in P \ \& \ y \neq x \ \& \ \forall z[z \in x \rightarrow y \neq z] \ \& \ R(d)(y)])]]$

b. $[[least]] := \lambda P: P \in D_{<e,t>}.[\lambda R: R \in D_{<d,et>}.\lambda x: x \in C \ \& \ \forall y[y \in P \rightarrow \exists d_1[R(d_1)(y)=1]]. [max(\lambda d.R(d)(x)) < max(\lambda d.\exists y[y \in P \ \& \ y \neq x \ \& \ \forall z[z \in x \rightarrow y \neq z] \ \& \ R(d)(y)])]]$

Now, we are equipped to show that we can handle the distributive reading of plural superlatives. (22a) is the proposed LF, with which we derive the adequate truth conditions (22b) of (11):[3]

(22) a. [[MtEverest⊕K2] [(be) ~~the~~ [$_{DegP}$ **est+P** [1 [^{D}[t_1 high summit]]]]]]

b. [[Mount Everest and K2 are the highest summits]] = 1 iff
max(λd.[(MtEvereste∈ MtEverest⊕K2→ high(d)(MtEverest) & summit (MtEverest)) & (K2∈ MtEverest⊕K2→ high(d)(K2) & summit(K2))] > max(λd.∃y[y∈P & y≠MtEverest⊕K2 & ∀z[z∈MtEverest⊕K2→y≠z] & high(d)(y) &summit(y)])

P={x: x is a summit}

The truth conditions in (22b) predict that (11) should be true in all situations in which the lower of the summits Mount Everest and K2 is higher than any other relevant mountain.[4] The LF in (22a) is derived by short movement of the superlative DegP within the nominal expression in which it is base generated. The moved DegP leaves a *d*-type trace behind and thus creates the <e,t>-type property *λx.high(d)(x) & summit(x)* to which the D-operator can apply. In light of Kennedy's generalization, however, this solution has one disadvantage. Not only does it turn out that the superlative doesn't take a narrower scope with respect to the distributive operator, which is a scopal element, but the only admissible LF violates the filter behind Kennedy's generalization since the D-operator intervenes

[3] Assume for simplicity again that the definite article is semantically vacuous in the predicative superlative construction.

[4] Note that even with the revised lexical entry of *-est* in (21) it is still impossible to derive the adequate truth conditions of (11) if the D-operator pluralizes the property *"be the highest mountain"* as in the LF in (17) which we initially considered.

between DegP and its trace.[5] To save the quantificational DP-internal theory of superlatives, we need an alternative solution to that in (22).

We suggest that the comparison set *P* in the superlative construction is more restricted than we previously assumed. More concretely, the comparison set must include only those individuals that are different from the external argument of *-est*, or its subparts if they are contextually salient elements of comparison. For example, a salient comparison class for (23a) might be (23b), (23c) or (23d) in context c_1, c_2, c_3, respectively.

(23) a. Ina and Anja are the tallest.
b. $P(c_1) = \{x: x \text{ is a girl } \& \ x \neq \text{Ina } \& \ x \neq \text{Anja}\}$
c. $P(c_2) = \{x: x \text{ is a second-grader and } x \neq \text{Ina } \& \ x \neq \text{Anja}\}$
d. $P(c_3) = \{x: x \text{ is a second-grade girl and } x \neq \text{Ina } \& \ x \neq \text{Anja}\}$

Since the value of the comparison class is a function of the context, we can allow the context to decide when it is appropriate to apply the exclusion condition to a plural individual or to its subparts. In (23), for example, the members of the comparison class must be different from the subparts of the plural individual Ina⊕Anja in c_1, c_2, and c_3. Imagine, however, the following context. We are among a group of acrobats who have a competition. The competitors are groups of acrobats who are supposed to build the highest human pyramid. If Ina and Anja won this competition, we can utter (23) truthfully in that context. The comparison set will then contain plural individuals and they will be different from the plurality denoted by Ina⊕Anja but it won't be necessary to specify the condition that the members of the comparison set are different from Ina or Anja which are subparts of Ina⊕Anja.

---

[5] Not all scope bearing elements are interveners for DegP movement, as Heim (2000) shows. The criticism to the solution in (22) is valid only if the D-operator is an intervener. We anticipate the results of *Chapter 4* which show that this is indeed the case.

Some support for this suggestion comes from the corresponding comparative construction in which the comparison set is abbreviated as a universal quantifier followed by *else*, which excludes the first term of the comparison from the domain of the universal quantifier. An example of this type is given in (24):

(24) Ina and Anja are taller than everyone **else**.

As a consequence of this proposal, we have to change again our view on the semantics of the superlative operator. We should no longer require the members of the comparison set *P* to be different from the external argument *x* of *-est/least* or any of its subparts since the comparison set by definition doesn't include the referent(s) of *x*. However, the presupposition conditions of each superlative operator have to be reformulated now that *x* is not a member of *P*. The superlative lexical entries then should look like (25):[6]

(25) a.$[[est]]:= \lambda P: P \in D_{<e,t>}.[\lambda R: R \in D_{<d,et>}.\lambda x: \exists d[R(d)(x) = 1] \& \forall y[y \in P \rightarrow \exists d_1[R(d_1)(y)=1]].[\max(\lambda d.R(d)(x)) > \max(\lambda d.\exists y[y \in P \ \& \ R(d)(y)])]]$

b. $[[least]]:= \lambda P: P \in D_{<e,t>}.[\lambda R: R \in D_{<d,et>}.\lambda x: \exists d[R(d)(x)=1 \& \forall y[y \in P \rightarrow \exists d_1[R(d_1)(y)=1]].\ [\max(\lambda d.R(d)(x)) < \max(\lambda d.\exists y[y \in P \ \& \ R(d)(y)])]]$

Under this proposal, plural superlatives pose no problem with respect to Kennedy's generalization. The adequate truth conditions for (11), logically equivalent to those in (22b) can now de derived from the LF in (17), repeated as (26a), where the superlative DegP is in the scope of the D-operator. No movement, even within the definite description, is required of DegP in this case.

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[6] Note that the presupposition conditions associated with the superlative operator are logically equivalent to the presupposition conditions we had earlier. In both (9) and (25) they amount to requiring the external argument of *-est/least* and the members of the comparison set to be *R* to some degree *d*, where *R* is the <d,et>-type argument of *-est/least*.

(26) a. [[MtEverest⊕K2][^{D}[1[t_1 (be) (the) highest summit]]]]

b.[[Mount Everest and K2 are the highest summits]] = 1 iff
[MtEvereste∈ MtEverest⊕K2 → max(λd.high(d)(MtEverest)
&summit(MtEverest)) > max(λd.∃y[y∈P & high(d)(y)& summit(y)])
& K2∈ MtEverest⊕K2 → max(λd.high(d)(K2) & summit(K2)) > max(λd.∃y[y∈P
& high(d)(y) & summit(y)])]

P={x: x is a summit & x≠Mt Everest & x≠K2}[7]

Crucially, with this modification about our assumptions regarding the comparison set, (11) is no longer predicted to be trivially false, since the truth conditions don't allow that we ever compare the height of Mt Everest and with the height of K2 but only the height of the lower one of the two with the height of the highest among the rest of the salient summits. This is a welcome result.

To summarize the section, we argued that the quantificational DP-internal theory of superlatives is consistent with the view that the superlative DegP doesn't have significant scopal properties (it doesn't interact scopally with other scope bearing elements). We also discussed distributive readings of plural superlatives in the context of Kennedy's generalization and concluded that we need to restrict further the comparison set associated with the superlative operator. That set must exclude the external argument of *-est/least* or its subparts, if they are contextually salient elements of comparison.

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[7] For this particular example, the context provides the information that all members of the comparison set must be singular (not plural) individuals. A more precise value of *P* is then the one in (i):

(i) P={x: x is a summit & x is a singularity & x≠MtEverest & x≠K2}

3.1.2.2. The reductionist view - a non-quantificational theory of superlatives

The proposal that the superlative degree word doesn't have significant scopal properties is easily implemented under the assumption that it is not a quantificational element at all. Let us remind ourselves briefly of the essentials of the non-quantificational theory of superlatives from *Chapter 1*. Under that theory adjectives are assumed to be measure functions: functions from individuals to degrees. The semantics of every degree word, including the superlative, comprises three elements: a reference value, a standard value and a comparison relation. The reference value is derived by applying the scalar predicate to the external argument *x* of *-est/least*. The standard value is the maximum degree of the set of degrees which correspond to members of the comparison set different from *x*. The comparison relation in the superlative construction is *greater than/ smaller than*. The lexical entries are repeated in (27):

(27) a. $[[est]] := \lambda G:G\in D_{<e,d>}.[\lambda P:P\in D_{<e,t>}.[\lambda x : x\in P \,\&\, \forall y[y\in P \rightarrow \exists d_1[G(y)=d_1]]].$
$G(x) > \max(\lambda d.\exists y\neq x[y\in P \,\&\, d = G(y)])]]$

b. $[[least]] := \lambda G:G\in D_{<e,d>}.[\lambda P:P\in D_{<e,t>}.[\lambda x : x\in P \,\&\, \forall y[y\in P \rightarrow \exists d_1[G(y)=d_1]]].$
$G(x) < \max(\lambda d.\exists y\neq x[y\in P \,\&\, d = G(y)])]]$

The proposal that superlatives don't have significant scopal properties, and consequently that this follows from a semantics of *-est/least* which is non-quantificational, accounts for some of the major differences between the superlative and the comparative construction: (i) no scopal ambiguities with superlatives versus scopal ambiguities with comparatives, (ii) a ban on the movement of *-est/least* versus no such prohibition for *-er/less*. This is a positive result. However, it is not sufficient. Recall, for example, that the comparative can take a measure phrase, while the superlative can't. This difference doesn't immediately follow from the assumption that one of the constructions is quantificational and the other

one isn't. Moreover, measure phrases are possible in the absolute construction, too, as (28) shows, and that construction, by standard assumptions, is non-quantificational:

(28) a. Mount Everest is **at least 8000m** high.
b. Scott is **30 years** old.

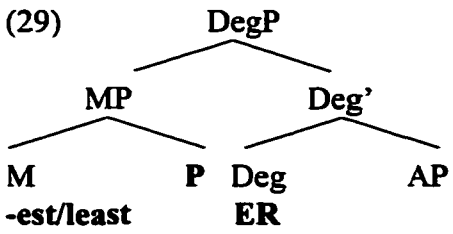
Also, we observed in *Chapter 2* that the comparative licenses *so*-pronominalization while the superlative can't. This difference isn't directly explained with an appeal to the difference in the quantificational properties of the two degree words.

We conclude then that we need to revise the non-quantificational proposal for the superlative degree word from *Chaper 1* in order to account for a bigger spectrum of differences between the two comparison constructions. We will stick to the spirit of the original proposal, assuming that in the superlative construction the adjective is an <e,d>-type function. Also, we will continue to assume that the head of the whole superlative phrase is a degree word, whose semantics involves a reference to a comparison relation, a standard value and a degree value. However, we will propose that this degree word is a null comparative head (ER) in the superlative construction, rather than *-est/least* itself. *-Est/least,* under our proposal, provides the standard value.

Before we develop a semantic proposal, we will lay out the revisions in our syntactic assumptions about the superlative construction. In *Section 1.4.* we argued for a DegP shell structure for the comparative construction. This proposal was based on the necessity to give the status of a complement of the degree head to both the AP and the *than*-clause. We gave the variable, which denotes the comparison set in the superlative construction, the status that the *than*-clause has in the comparative construction. Our revised proposal no longer views the superlative degree word as the head of DegP.

Therefore, the comparison set that *-est/least* introduces shouldn't be a complement of the null degree head, and consequently, we don't need to assume a DegP shell structure for the superlative construction. (29) illustrates all these assumptions:

(29)



Note that *-est/least* and the variable associated with the comparison set form a constituent which has the structural position of a measure phrase in other comparison constructions: it is a specifier of DegP.

Let us now implement these assumptions in a proposal about the semantics of the superlative construction. (30) specifies the meaning of ER_1 and ER_2, the null heads of the superlative DegP. ER_1 heads the positive superlative construction (*the most beautiful*), while ER_2 heads the negative superlative construction (*the least beautiful*).

(30) a. $[[ER_1]] := \lambda G{:}G \in D_{<e,d>}.[\lambda d{:}d \in D_d.[\lambda x{:}\ \underline{\exists d_1[G(x) = d_1]}.\ G(x) > d]]$

b. $[[ER_2]] := \lambda G{:}G \in D_{<e,d>}.[\lambda d{:}d \in D_d.[\lambda x{:}\ \underline{\exists d_1[G(x) = d_1]}.\ G(x) < d]]$

The null degree head in the superlative DegP provides the comparison relation *greater than/ smaller than*. In this respect our proposal is very similar to the proposal from *Chapter 1* -- the comparison relation assumed to be provided by *-est/least* was also *greater than/ smaller than*. Note also, that *ER* is related to the quantificational comparative head *-er/less* since *-er/less also* has a semantics through which it expresses the comparative relation *greater than/smaler than*. (30) says that *ER* applies to an adjective denotation *G* first, then to a degree *d*, which is the standard value, and finally to an individual *x* to yield *True* just in case the reference value (*G(x)*) is greater than the

standard value *d*. As usual, we assume that the superlative construction comes with a presupposition that there is some degree on the scale associated with the gradable adjective *G* that corresponds to the external argument *x* of the comparison head. This presupposition condition is now part of the semantics of *ER* and corresponds to the underlined part of its lexical entry.

-Est/least applies to the variable that denotes the comparison set and together they supply the standard value.[8] This is the function of any measure phrase. Given this parallel, our assumption that the superlative morpheme occupies the structural position reserved for measure phrases seems very natural. The semantics of *-est* and *least* that we propose is as in (31):

(31) $[[\text{-est/least}]] := \lambda P{:}P \in D_{<e,d>}.\max(\lambda d.\exists y[y \in P \ \& \ d = PRO(y)])$

-Est/Least apply to the denotation of the comparison set to yield a degree. That degree is the maximum of the set of degrees *d* such that *d* corresponds to some individual from the comparison set on the scale associated with the relevant gradable adjective. But how do we know which is the relevant gradable adjective? The idea is that *-est/least* contains an anaphoric element PRO which corresponds to a variable of the type of gradable adjectives <e,d>. The value of PRO is contextually fixed. Consider, for example, (32):

(32) Scott is the most charismatic.

Mentioning the measure function *charismatic* in the context of utterance of (32), makes the <e,d>-function $\lambda x.charismatic(x)$ appropriate as a value of PRO inside *most*.

---

[8] Note that the comparison class must exclude the individual which is the external argument of the head ER. This is a necessary assumption, as we showed in *Section 3.1.2.1.*, even for the quantificational DP-internal theory.

Support for the hypothesis that *-est/least* is partially anaphoric comes from the Russian superlative construction. Consider (33):

(33) a. Maša kupila **samyj** dorogoj učebnik
Maša bought most expensive textbook
'Maša bought the most expensive textbook.'

b. Maša kupila tot že **samyj** učebnik
Maša bought that same/identical textbook
'Maša bought that same/very textbook.'

Unlike English, Russian only has an analytical superlative adjectival construction illustrated in (33a).[9] The root of *samyj*, which means *most* is the root of the Russian word for *same/ identical*, as we can see from (33b). The fact that *same* is an anaphoric element suggests that *most* could be, too.

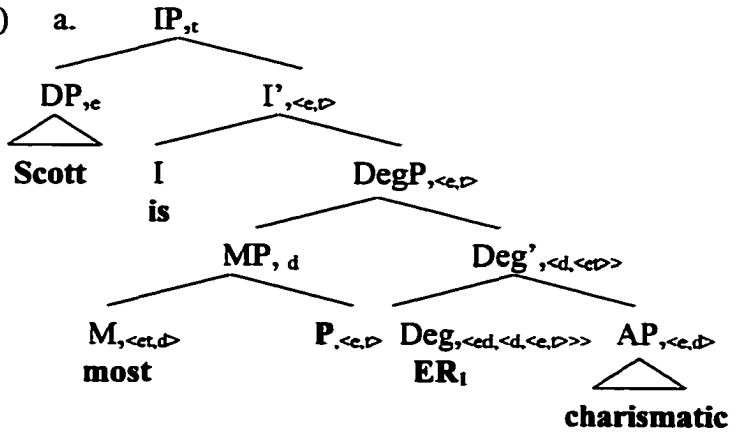
Note that since we placed the difference between negative and positive superlatives in the semantics of the corresponding null degree heads, we end up having the same semantics for *-est* and *least*. But then we would like to know why they have different phonological matrices (at least in English). Given our assumptions so far, that difference arises as a result of (spec-head) agreement between ER_1 and ER_2 with *-est* and *least*, respectively.

Let us illustrate the proposal with the sample calculation of the interpretation of (32). Its LF and the denotation at each node are given in (34a) and (34b):[10]

[9] There is another, less productive way to form the superlative construction in Russian. That pattern will be discussed later in this section.

[10] I assume again for simplicity that the definite article is vacuous here.

(34) a.



b. [[AP]] = λx.*charismatic*(x)
[[Deg]] = λG.[λd.[λy.G(y) > d]]
[[Deg']] = λd.[λy.*charismatic*(y) >d]
[[most]] = λP.max(λd.∃z[z∈ P & d = PRO(z)])
[[MP]] = max(λd.∃z[z∈ P & d = *charismatic*(z)])
[[DegP]] = λy.*charismatic*(y) > max(λd.∃z[z∈ P & d = *charismatic*(z)])
[[Scott is the most charismatic]] = 1 iff
charismatic(Scott) > max(λd.∃z[z∈ P & d = *charismatic*(z)])

PRO(c_1) = λx.*charismatic*(x)
P(c_1) = {x:x is an actor ≠Scott}

The analysis of superlatives that we developed here is based on the assumption that there is a null degree head, *ER*, in that construction, which is a non-quantificational counterpart of the comparative degree word *-er/less*. Both *ER* and *-er* express the same relation, *greater than*, only the latter also functions as an operator that binds a degree variable introduced by a <d,et>-type adjective.[11] The proposal could find support from some language, different from English, in which the superlative construction has an overt occurrence of ER.

[11] Recall from the discussion in the previous section that assuming a quantificational theory for comparatives and a non-quantificational theory of superlatives implies that each gradable <d,et> adjective in the lexicon is related to an <e,d>-type adjective. In the next section we are going to propose a general type shifting rule for relating the adjectives of the two types.

Such turn out to be a number of Slavic languages. Consider the following examples from Old Bulgarian:[12]

(35) a. vâ ty **naiskorjae** vâxoditâ djavolâ
in you **most** quick-**er** enters devil
'The devil enters in you most quickly.'
(Klotsov sbornik (Codex Clozianus) 8a37 through Duridanov (1991))

b. jaže sotâ **naitrjabjši** poti oučeniju
I am **most** useful-**er** path enlightenment
'I am the most useful path to enlightenment.'
(Suprasulski sbornik (Codex Suprasliensis) 339.30 through Duridanov (1991))

The adverbial superlative form in (35a) and the adjectival superlative form in (35b) are formed by prefixing the superlative particle *naj* to the comparative form of the adverb *quick* and the adjective *useful*, respectively. In other words, the superlative construction in Old Bulgarian uses two comparison words. That would be a mystery under any other theory of superlatives considered so far. But under the proposal we made, this is not so. The head of the superlative phrase would be the comparative degree word, while the superlative particle is its specifier.

Serbo-Croatian is similar to Old Bulgarian in that respect. The superlative form of gradable adjectives and gradable adverbs is formed by adding *naj* (the superlative particle) to the comparative form, as in (36a) and (37a). Prefixing *naj* to the absolute form is ungrammatical as (36b) and (37b) show. (38) illustrates the comparative construction:

(36) a. Ivan je **najpametniji**
Ivan is most-smart-er
'Ivan is the smartest.'

b. *Ivan je **najpametan**
Ivan is most-smart

[12] Translations are ours. Glosses for the superlative forms are from Duridanov (1991).

(37) a. Ivan se ponašao **najpametnije**
Ivan behaved most-wisely-er
Ivan behaved most wisely (compared to everyone else).'

b. *Ivan se ponašao **najpametno**
Ivan behaved most-wisely

(38) a. Ivan je pametn**iji** od Milene
Ivan is smart-er than Milena
'Ivan is smarter than Milena.'

b. Ivan se ponašao pametn**ije** od Milene
Ivan behaved wisely-er than Milena
'Ivan behaved more wisely than Milena.'

These data, too, support our hypothesis that a counterpart of the comparative degree word heads the superlative construction.

Finally, let's consider some data from Russian. Although not very productive, there is a pattern of forming the superlative construction in Russian in a way similar to Old Bulgarian and Serbo-Croatian. Consider (39) and (40), which illustrate the superlative construction with adverbs and with adjectives:

(39) a. Ivan skonstruiroval dvigatel' **nai**bolee effektivno
Ivan designed engine most-more effectively
'Ivan designed an engine the most effectively.'

b. Oleg skonstruiroval dvigatel' **nai**menee effektivno
Oleg designed engine most-less effectively
'Oleg designed an engine the least effectively.'

c. *Ivan skonstruiroval dvigatel' **naieffektivno**
Ivan designed engine most-effectively

(40) a. Ivan **nai**bolee vydajuščijsja učenyj
Ivan most-more outstanding scholar
'Ivan is the most outstanding scholar,'

b. Oleg **nai**menee vydajuščijsja učenyj
Oleg most-less outstanding scholar

'Oleg is the least outstanding scholar.'

c. *Ivan **nai**vydajuščijsja učenyj.
Ivan most-outstanding scholar

Judging by the contrast between the (a) and (b) examples and the (c) examples, on the other hand, we conclude that the construction requires both the superlative particle *nai* and *bolee/ menee* which are the forms of the comparative degree words used in the analytical comparative construction, illustrated in (41) and (42):

(41) a. Ivan skonstruiroval dvigatel' **bolee** effektivno čem Oleg
Ivan designed engine more effectively than Oleg
'Ivan designed an engine more effectively than Oleg.'

b. Oleg skonstruiroval dvigatel' **menee** effektivno čem Ivan
Oleg designed engine less effectively than Ivan
'Oleg designed an engine less effectively than Ivan.'

(42) a. Ivan **bolee** vydajuščijsja učenyj čem Oleg
Ivan more outstanding scholar than Oleg
'Ivan is a more outstandig scholar than Oleg.'

b. Oleg **menee** vydajuščijsja učenyj čem Ivan
Oleg less outstanding scholar than Ivan
'Oleg is a less outstanding scholar than Ivan.'

These data from Russian support further our proposal that a comparative degree word heads the superlative adjectival/adverbial phrase. A more general conclusion is that crosslinguistically, there are two options for realizing the head of the superlative construction: English-type languages use a null counterpart of the quantificational comparative degree word, while Slavic-type languages use a an overt comparative word in

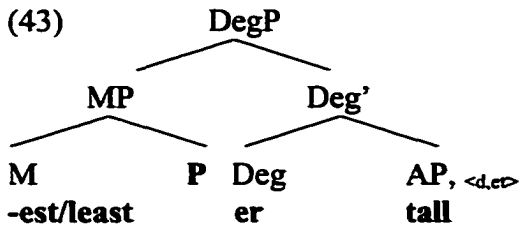
the superlative construction, which is homonymous with the quantificational comparative degree word used in the comparative construction.[13]

The semantics for *-est/least* that we developed has an advantage over the other proposals since that it is the only proposal which can accommodate the Slavic data. Later we will show that it also straightforwardly accounts for many other properties of the superlative construction.

There are a few important theoretical consequences of the proposal. One of them is related to the question of major concern, the quantificational status of the superlative. Suppose that we wanted to account for the Slavic data by keeping the suggestion that the superlative construction is headed by a comparative head, and the superlative morpheme is a specifier of that head. In our proposal, we assumed a non-quantificational semantics for the comparative head in the superlative construction. But is this a necessary assumption? Could it be that the head of the superlative construction is the quantificational comparative morpheme? If *-er* instead of *ER* is used in the superlative construction, then the putative quantificational force in the superlative DegP would come from the comparative head, rather than the superlative morpheme. But is this at all possible? Let us consider an example:

[13] It would be interesting to study the acquisition of the superlative construction with respect to this proposal. If the difference between English and Slavic is parametrized, all else equal, we would expect children to make mistakes before they learn which pattern their language belongs to. Most significant would be mistakes like 'most taller' for English speaking children, and '**naj**mudro' (most wisely) for children acquiring Serbo-Croatian, for example. Thanks to Y. Sharvit for suggesting that.

(43)



The quantificational comparative head combines with adjectives of type <d,et>. Suppose that *tall* in our example is of that type and denotes the relation $\lambda d.\lambda x.[tall(d)(x)]$. Still, *-er* cannot directly combine with the adjective and must raise, as it does in the comparative construction, leaving behind a *d*-type trace. In this way, we can resolve the type mismatch and get an interpretation for Deg'. [[Deg']], under these assumptions, will be of type <e,t>. But we face another problem with the interpretation of DegP. Neither [[MP]] can apply to [[Deg']], nor [[Deg']] can apply to [[MP]]. Given our proposal, MP$\in D_d$. In fact, in general, MPs like *30 years, 190sm, 5kg,* etc. are all of type *d* and our proposal about the semantics of the superlative fits nicely into the standard view about the semantic type of MP. But this very type for MPs creates a problem for interpretation in (43) because Deg' can't combine with a sister of type *d*. This implies that if we want to stick to the assumption that the head of the superlative construction is the quantificational comparative *-er*, we need to change again our views about the semantics of *-est*. But how exactly, is not clear at all. To make DegP interpretable, we will have to assign MP either a type <et, et>, so Functional Application could apply, or type <e,t> in order to allow Predicate Modification. But it will be hard, if not impossible to do that with the interpretation of a MP. Most importantly, we have to find a way of expressing the meaning of a measure phrase without any reference to degrees in order to come up with an appropriate type. Whether such a solution exists isn't obvious to us. We conclude then

that our proposal indirectly supports the non-quantificational view about the superlative DegP: the superlative morpheme has a non-quantificational semantics, and so does the comparative ER, which heads the superlative construction.

Another theoretical consequence of our proposal regards the type of *-est/least*. With the proposed semantics, *-est/least* becomes much more similar to the definite article than it was under any other proposal. *The* applies to s set of individuals to yield a unique individual, while *-est/least* applys to a set of individuals to yield a unique degree related to some individual from that set. This too, we believe, is a good result, since now the fact that both the definite article and the superlative degree word trigger a uniqueness implication doesn't seem accidental.

Finally, and most importantly, our proposal establishes the following picture of comparison in natural language. The comparative and the superlative construction instantiate the same comparison relation: *greater than/ smaller than*. This is why the interpretations of pairs like (44a) and (44b) are equivalent in the same context.

(44) a. John is the tallest.
b. John is taller than everyone else.

However, we have an option of using a quantificational or a non-quantificational form of that relation. The first option comes with the comparative construction, while the second comes with the superlative. The existence of a dichotomy of that kind is not specific to the domain of comparison. A classical example of coexistence of a quantificational and non-quantificational option for encoding a concept comes from DP arguments. They are either generalized quantifiers like *every student, few professors*, etc. or proper names and

definite descriptions like *John, the student, the professors*, etc.[14] With our proposal about comparison, the split among arguments is no longer unique in natural language.

The parallel between comparison constructions and DPs goes even further. DPs come in three varieties, as we mentioned: generalized quantifier, definite description and proper name. Now with our non-unifying theory of comparison we end up with three similar types of comparison phrases: generalized quantifiers (comparative DegP: *-er+than-*clause), definite description of a degree (superlative MP: *-est+P*), proper name (*20 years, 5kgs, 20sm*).

3.1.2.3. Two types of adjectives?

We postponed for this section a question we raised in *Section 3.1.2.1*. Recall that in light of our main proposal that superlatives don't have significant scopal properties we entertained two superlative theories: a quantificational DP-internal theory and a non-quantificational theory. The second theory has better empirical coverage. More evidence of that, we are going to see in *Section 3.2*. But, as we mentioned in the earlier discussion, if we endorse the non-quantificational theory of superlatives, we will need to explain how is it possible for the comparative construction to use <d,et>-type scalar predicate, while in the superlative construction the type of the scalar predicate is different: <e,d>. We propose that there is a general type-shifting rule that relates gradable adjectives/adverbs of

[14] For a discussion on the status of definite descriptions with respect to quantification see Russell (1905), Hintikka (1981), Heim (1982), Neale (1990), Groenendijk et al. (1995), Matthewson (1996), among others.

type <e,d> to adjectives/adverbs of type <d,et>.[15] Here is how we can implement the proposal. Assume that in the lexicon we only have a list of <e,d>-type gradable adjectives/adverbs. Assume also that there is a type shifting operator ξ which applies to an <e,d>-type predicate by Functional application to yield the corresponding <d,et> scalar predicate. (45) defines the meaning of ξ:

(45) $[[\xi]] := \lambda G{:}G \in D_{<e,d>}.[\lambda d{:}d \in D_{d}.[\lambda x{:}x \in D.[G(x) = d]]]$

The type-shifter ξ applies first to a measure function *G*, then to a degree *d*, and finally to an individual *x* to yield *True* just in case *d* equals the degree that corresponds to *x* on the scale associated with *G*. But the interpretation of the expression that results from applying [[ξ]] to [[G]] is equivalent to the meaning of gradable adjectives assumed by the classical quantificational theory. This is exactly what we wanted.

Let's illustrate that with an example.

(46) a.

b. $[[\text{tall}_1]] = \lambda x.\textit{tall}(x)$
$[[\xi]] = \lambda G.[\lambda d.[\lambda x.[G(x) = d]]]$
$[[\text{tall}_2]] = \lambda d.[\lambda x.[\textit{tall}(x) = d]]$

3.2. Empirical consequences

3.2.1. Measure phrases explained

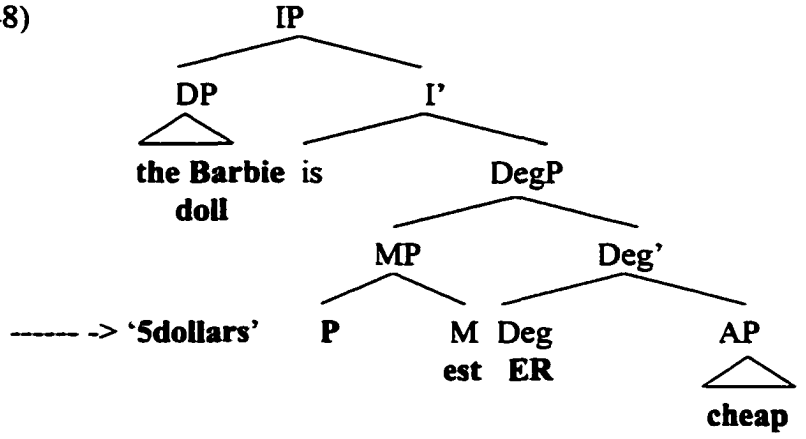
In *Section 2.1.3* we observed that the superlative and the comparative construction differ with respect to their ability to allow measure phrases. Given the assumptions of the unifying syntactic and semantic theory the contrast in (47) was claimed to be unexpected.

[15] Thanks to R. Schwarzschild for the suggestion.

(47) a. *The Barbie doll is 5 dollars cheapest.
b. The Barbie doll is 5 dollars cheaper than every toy.

Now, we are in a much better shape to handle this difference between the two constructions. According to the non-unifying theory, the comparative and the superlative constructions differ in the following relevant way: the superlative construction is an inherently specified comparison construction, unlike the comparative. (47a) can't take a MP like *5dollars* because there is a MP in the specifier position of DegP. That MP contains *-est* and its restriction, the variable denoting the comparison set, as the surface structure of (47a) in (48) shows.

(48)



Ž. Bošković (p.c.) raises a question regarding the example in (49):

(49) The Barbie doll is the cheapest in the store.

Given our proposal for the structure of DegP, we will need two DegP shells in order to accommodate the PP *in the store*. The structure (49) will be as in (50):

(50) [$_{IP}$ [$_{DP}$ the Barbie doll] is [$_{DegP}$ [$_{MP}$ P-est] ER [$_{AP}$ cheap [$_{DegP}$ t_{ER} [$_{PP}$ in the store]]]]]

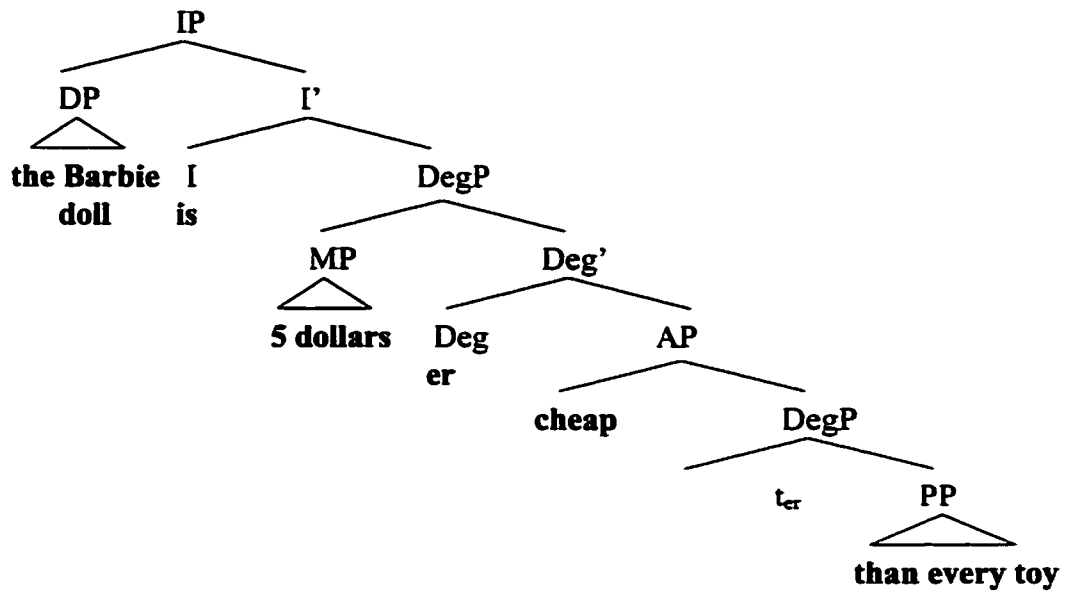
But if this is so, then we have two [Spec, DegP] positions: one of them filled with the MP *P-est*, the other one not. The question is whether we predict that in (49) we could fit a MP in the lower DegP, and consequently whether we wrongly predict (51) to be true:

(51) *The Barbie doll is the cheapest 5 dollars in the store.

The problem does not arise given our assumption from *Chapter I* that the MP in any comparison construction is generated in the lowest [Spec, DegP] position and raises overtly to the highest one. The independent evidence for this assumption is based on the semantics of MP in comparatives: the MP has to be a sister of the Deg' constituent (-*er*+*than*-clause) at LF. But at that component, *-er* must be reconstructed into the lowest DegP. It follows then that there should be a position within that DegP to which the MP can be reconstructed, too. But such a position will be available only if the MP was generated there in the first place.

In contrast to superlatives, as we see from (52), the MP in the comparative construction in (47b) can fill the specifier position of the comparative DegP:

(52)



Note, however, under the quantificational DP-internal hypothesis this difference between comparatives and superlatives remains unexplained. The semantics that the DP-internal hypothesis assigns to *-est/least* is such that it must be the only degree word in the

construction. But then since we argued that the extended adjectival projection in comparison constructions is a DegP, *-est* must occupy the head position of DegP. It follows then that noting in principle should prevent *-est* from having an MP specifier like *5 dollars*. Consequently, we conclude that MPs provide an argument for the non-quantificational theory of superlatives.

3.2.2. So-pronominalization contrast explained

Recall from the discussion in *Section 2.1.2.* that so-pronominalization is possible with the comparative construction but not with the superlative. (53) is a repeated minimal pair:

(53) a. John is really industrious. But Bill is **more** *so*.
b. *John and Scott are really industrious. But Bill is the **most** *so*.
c.cf. John and Scott are really industrious. But Bill is the most industrious.

The contrast between (53a) and (53b) also follows from the non-unifying theory of comparison. Our non-quantificational proposal about *-est/least* is coupled with a syntactic proposal which predicts the ungrammaticality of (53b). The head of the superlative construction, we argued is *ER*, which is a null element in English. Ormazabal (1995) argues that all null heads have affix-like properties and they need a phonological host. Even though *so* can replace an AP, it is not an appropriate phonological host for the comparative head. Evidence for that comes from the comparative construction. Recall that there are two comparative allomorphs *more* and *-er*. The second one, *-er* is an affix and needs an adjectival host. Its phonological requirements are met in (54).

(54) John is taller than Bill is.

However, these requirements are not met in (55a). *So* can't serve as a phonological host for *-er*. But since *more* has the same syntactic and semantic properties as *-er*, and crucially

it is not an affix, *more* can be used in the *so*-pronominalization construction. Moreover, *more* is used even in cases in which *so* stands for an adjective, like *tall*, that otherwise forms a comparative with *-er* in the non-elliptical construction, as shown in (55b):

(55) a. *Bill is tall. But John is even so-**er.**
b. Bill is tall. But John is even **more** so.

Now, let's go back to (53b). Since *ER* is an affix, dependent on the adjective to meet its phonological requirements, then we would expect (53b) to be ungrammatical. The sentence violates a phonological condition on licensing the clitic *ER*. Unlike *-er*, *ER* dosn't have a non-clitic counterpart with the same syntactic and semantic properties which could surface in (53b). That is why (53b) and all superlative sentences with the surface anaphor *so* are ungrammatical. Most importantly, the analysis of the facts involving the superlative construction and *so*-pronominalization doesn' t extend to the comparative construction. The contrast is thus explained.

Our account makes a prediction: in languages, in which the head of the superlative construction is not an affix, ellipsis phenomena, similar to the English *so*-pronominalization should be possible with superlatives. The prediction is borne out. Ž. Bošković (p.c.) provides an example from Serbo-Croatian:

(56) ?Ivan je najmanje pametan, a Petar je najviše
Ivan is most-less smart but Peter is most-more
'John is the least smart but Peter is the most smart.'

Again, we have to conclude that this explanation of the different properties of the superlative and the comparative construction with respect to *so*-pronominalization is available only with the non-quantificational theory of superlatives that we proposed. The

quantificational DP-internal theory predicts (53b) to be grammatical since *most* must be viewed as a head governing the AP under that theory.

3.2.3. Comparative conditionals again

In *Chapter 2* we discussed comparative conditionals in two contexts: on the one hand, the construction with the overt moved DegP is only available with comparatives but not with superlatives. This contrast is unexplained by the unifying common sense theory of comparison. On the other hand, comparative conditionals allowed us to observe that the comparative DegP can interact scopally with other scope bearing elements. This motivated our proposal that comparatives must be analyzed quantificationally. In this section we are going to show that Beck's semantics of comparative conditionals, coupled with the quantificational theory of comparatives offers the desired account of the ambiguity in CCs. In light of these data in the next chapter we are going to reconsider the empirical domain covered by Kennedy's generalization and offer a revision to that generalization. We are going to argue that the principle behind Kennedy's generalization is to be reduced to Beck (1996)'s Minimal Quantified Structure Constraint (MQST) - a constraint operating on LF-movement. In this section, we are also, going to address the question why superlatives aren't felicitous in this special conditional construction. We conclude the section by supporting our proposal that a non-unifying theory of comparison is preferable to the unifying theory of comparison.

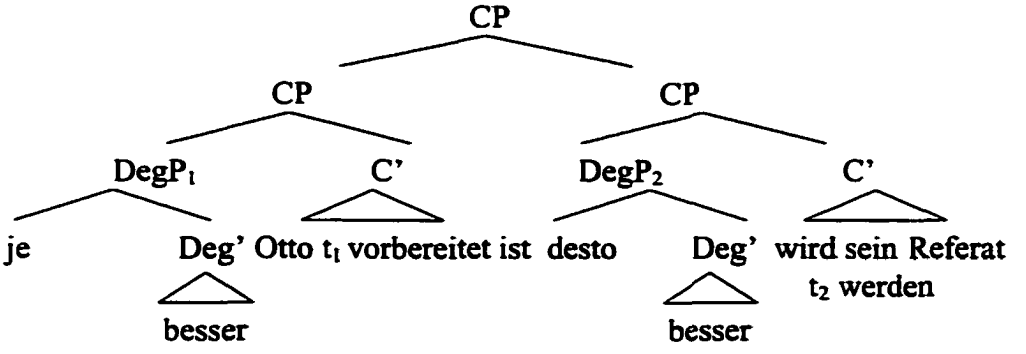
3.2.3.1. The semantics of the construction: Beck (1997)

As we mentioned in *Chapter 2*, Beck (1997) proposes to interpret CCs as genuine conditional sentences. One of the clauses is viewed as an antecedent, the other, as a consequent. But let us start with the syntactic assumptions. Consider Beck's example in (57) from German:

(57) Je besser Otto vorbereitet ist, desto besser wird sein Referat werden.
The better Otto prepared is the better will his talk become
'The better Otto is prepared, the better his talk will be.'

Je besser and *desto besser*, which are assumed to form DegPs, are understood to modify their respective VPs. However, they surface fronted in their respective clauses: the antecedent *Je besser Otto vorbereitet ist* and the consequent desto besser wird sein Referat werden. The proposed surface position where each fronted DegP lands within its clause is [Spec,CP]. The consequent is the main clause. The antecedent is adjoined to it. (58) illustrates the assumed syntactic structure for (57):

(58)



Consider the intuitive truth conditions for (57), which are given in (59):

(59) $\forall w_1, w_2$ [$w_1 \in$ Acc & $w_2 \in$ Acc & if Otto is better prepared in w_1 than he is prepared in w_2 then Otto's talk is better in w_1 than it is in w_2]

There are some observations that Beck makes on the basis of (59), which become crucial for the proposed analysis of the construction. First, Beck notices that in both the

antecedent and the consequent there is a part of the clause that is used twice in the interpretation. Informally, these are the incomplete clauses *Otto is prepared d-well* and *Otto's talk is d-good.* But then it follows that everything except for *je/desto* and the comparative operator *-er* is used twice. Beck draws two conclusions: (i) either *je/desto* or *-er* must be blamed for using the interpretation of each of these clauses twice. Her proposal is that *je/desto* are defined to do that. This is a case of what Heim (2000) calls semantic ellipsis: an instruction in the semantics of a lexical item that requires an argument to which that item applies to be used more than once in a semantic derivation. (ii), the adverb from each DegP must be reconstructed to its base position at LF in order to create the appropriate incomplete clause which is recycled in the interpretation procedure.

> To put it bluntly, the comparative morpheme occurs as a separate argument of *je* because the rest of the clause is used twice in the semantics, to get the two arguments of *-er*. The comparative morpheme itself, of course, is not used twice, and is thus treated differently from the adjective at the level at which the operation denoted by *je* applies. One would like to know whether this is a necessary consequence of the analysis of CCs that I have suggested. I think that it is... (p.266)

Note however, that if Beck is right that the interpretation of CCs requires *-er* to be interpreted separately from the adjective/adverb with which it is associated, that must be taken as an argument in support of the quantificational theory of comparatives. It is that theory only that allows the comparative morpheme to move and be interpreted outside of the scalar predicate.

But, let us go back to the interpretation of (57). As became obvious, the LF of (57) differs from its surface structure because the adverb associated with the comparative morphology must be reconstructed to its base position, leaving behind the remnant DegP. Also, in parallel with the LF of genuine conditionals, Beck proposes that there is an

implicit adverb of universal quantification which is adjoined to CP and binds a pair of world variables, as in (60):[16]

(60) $\forall$[$_{CP}$ [$_{DegP1}$ je(w_1,w_2) -er][1[Otto is prepared d_1-well]]][$_{CP}$ [$_{DegP1}$ je(w_1,w_2) -er] [2[Otto's talk is d_2-good]]]

The final ingredient that we need for interpreting (57) is the assumed semantics of *je/desto*. Beck proposes that *je* and *desto* (and their counterparts in other languages) have the same semantics: each of them takes the following arguments: a pair of worlds, the denotation of *er*, and an incomplete proposition like *λw.λd.[Otto is prepared d-well]*. (61) is the proposed lexical entry:

(61) [[je/desto]](<w_1,w_2>)([[er]])($D_{<s,<d,t>>}$) = 1 iff [[er]](D(w_2))(D(w_1))

For convenience, we repeat the semantics of *-er*, in (62):

(62) [[er]]($P_{<d,t>}$)($Q_{<d,t>}$) = 1 iff max(λd.P(d)) < max(λd.Q(d))

Now we are ready to interpret (57). Let us start with the antecedent clause. Its LF and the interpretation of each of its nodes is given in (63a) and (63b), respectively.

(63) a. [$_{CP2}$ [$_{DegP1}$ je(w_1,w_2) -er][$_{CP1}$ 1[$_{IP}$ Otto is prepared d_1-well]]]

b. [[well]] = λd.[λP:P∈$D_{<e,t>}$.[λx.[*well*(d)(P)](x)]
[[IP]] = [*well*(d)(λx.*prepared*(x) in w)](*Otto*)
[[CP_1]] = λw.λd.[[*well*(d)(λx.*prepared*(x) in w)](*Otto*)]
[[DegP]] = λD.[max(λd.D(d)(w_1)) < max(λd.D(d)(w_2))]
[[CP_2]] = λw_1.λw_2.[max(λd.[*well*(d)(λx.*prepared*(x) in w_1)](*Otto*)) < max(λd.[*well*(d)(λx.*prepared*(x) in w_2)](*Otto*))]

(64a) and (64b) give the LF and the interpretation of the consequent clause:[17]

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[16] As a metalanguage, we will continue to use English.

[17] Technically, the lexical entry for *good* should be as in (i) given that in *Section 3.1.2.3* we argued that the basic semantic type of adjectives is <e,d> and the <d,et>-adjectives which are used in the comparative construction are derived by a type shifting operation.
(i) [[$good_2$]]:= λd.λx.[$good_1$(x) =d]

(64) a. $[_{CP2}\,[_{DegP1}$ je(w_1,w_2) -er$][_{CP1}$ 1$[_{IP}$ Otto's talk is d_1-good]]]

b. [[good]] = λd.λx.[*good*(d)(x)]
[[IP]] = *good*(d)(*Otto's_talk*) in w
[[CP_1]] = λw.λd.[*good*(d)(*Otto's_talk*) in w]
[[DegP]] = λD.[max(λd.D(d)(w_1)) < max(λd.D(d)(w_2))]
[[CP_2]] = λw_1.λw_2.[max(λd.[*good*(d)(*Otto's_talk*) in w_1]) <
max(λd.[*good*(d)(*Otto's_talk*) in w_2])]

Putting these two clauses together we derive the interpretation of the whole CC clause in (65):

(65) ∀w_1,w_2,[w_1∈Acc & w_2∈Acc & [max(λd.[*well*(d)(λx.*prepared*(x) in w_2)](*Otto*)) < max(λd.[*well*(d)(λx.*prepared*(x) in w_1)](*Otto*))] ⇒[max(λd.[*good*(d)(*Otto's_talk*) in w_2]) < max(λd.[*good*(d)(*Otto's_talk*) in w_1])]]

Now we are equipped with a semantic analysis of CCs and can check whether the quantificational theory of comparatives can account for the ambiguity in CCs that we observed in *Chapter 2*.

3.2.3.2. Ambiguities in CCs: Comparatives do have significant scope

In *Chapter 2* we discussed an example of CCs which involved a quantified DP in addition to the comparative DegP. This sentence, repeated in (66b), is ambiguous between two readings. We hypothesize that they result from different scopal configurations involving the comparative DegP and the quantified DP. Consider again (66a). (66b) and (66c) represent the intuitions about the two readings associated with (66a):

(66) a. Je mehr Sonderangebote wir haben, umso öfter kommen viele Rentner
the more special-offers we have the more-often come many retirees
'The more special offers we have, the more often many retirees show up.'

However, for ease of exposition only, we are going to stick to the standard notation for <d,et> adjectives which we introduced in *Chapter 1* since there is no principled difference between the representation in (i) and the standard adjectival representation.

b. $\forall t_1,t_2$ [where t_1 and t_2 are relevant periods of time, if we have more special offers at t_2 than we do at t_1, then many retirees show up more often at t_2 than they show up at t_1]

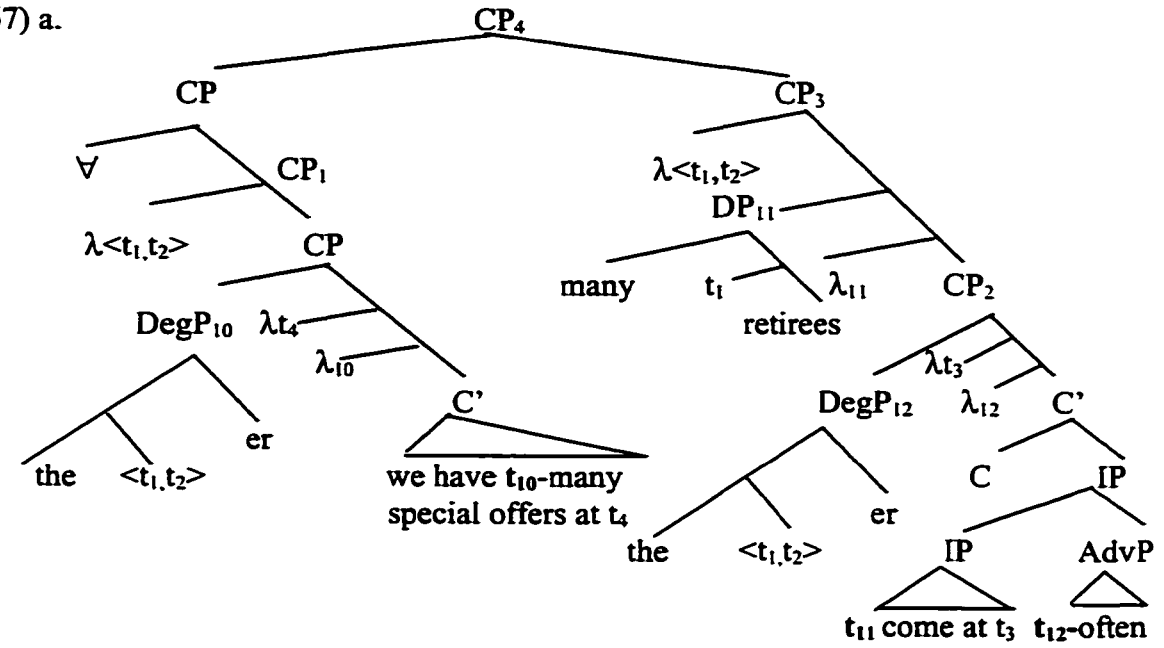
c. $\forall t_1,t_2$ [where t_1 and t_2 are relevant periods of time, if we have more special offers at t_2 than we do at t_1, then we have more often many retirees showing up at t_2 than we have many retirees at t_1]

Let us try to distinguish more clearly the two readings with more elaborate contexts. Suppose that we have about 200 regular customers that are retirees. Assume also that at least 50 counts as "many retirees". For example, (66b) will be true if each time when we increase the number of special offers, at least 50 retired people come more often at the period with more special offers than they come when we have fewer special offers. (66c) will be true if at a period when we have more special offers more often we get many customers that are retirees compared to a period when we have fewer special offers.

Are these two readings predicted by the quantificational theory of comparatives? By assumption, the comparative operator is a scope bearing element, so given that there is another scope bearing element in the consequent clause, we can represent that clause by two LFs: one in which the DP *viele Rentner* has the comparative operator in its scope, and another, with the reverse scopal ordering. (67a) represents these the first option. (67b) gives the semantic interpretation derived by this LF. Note that the gradable adverb with which the comparative operator is associated is reconstructed to its base position at LF. We argued in the previous section, following Beck (1997), that this is necessary because the gradable adverb/adjective is used twice in the semantics, so it must be a part of the recycled <s,dt>-type argument of the comparative operator at LF:[18]

[18] $t_{1,\ldots n}$ are variables over periods of time. $t_{1,\ldots n}$ are traces of moved elements.

(67) a.



b. antecedent clause CP_1

$[[DegP_{10}]] = \lambda D.[\max(\lambda d.D(d)(t_1)) < \max(\lambda d.D(d)(t_2))]$
$[[CP_1]] = \lambda t_1.\lambda t_2.[\max(\lambda d.$we have d-many special offers at $t_1) <$
$\max(\lambda d.$we have d-many special offers at $t_2)]$

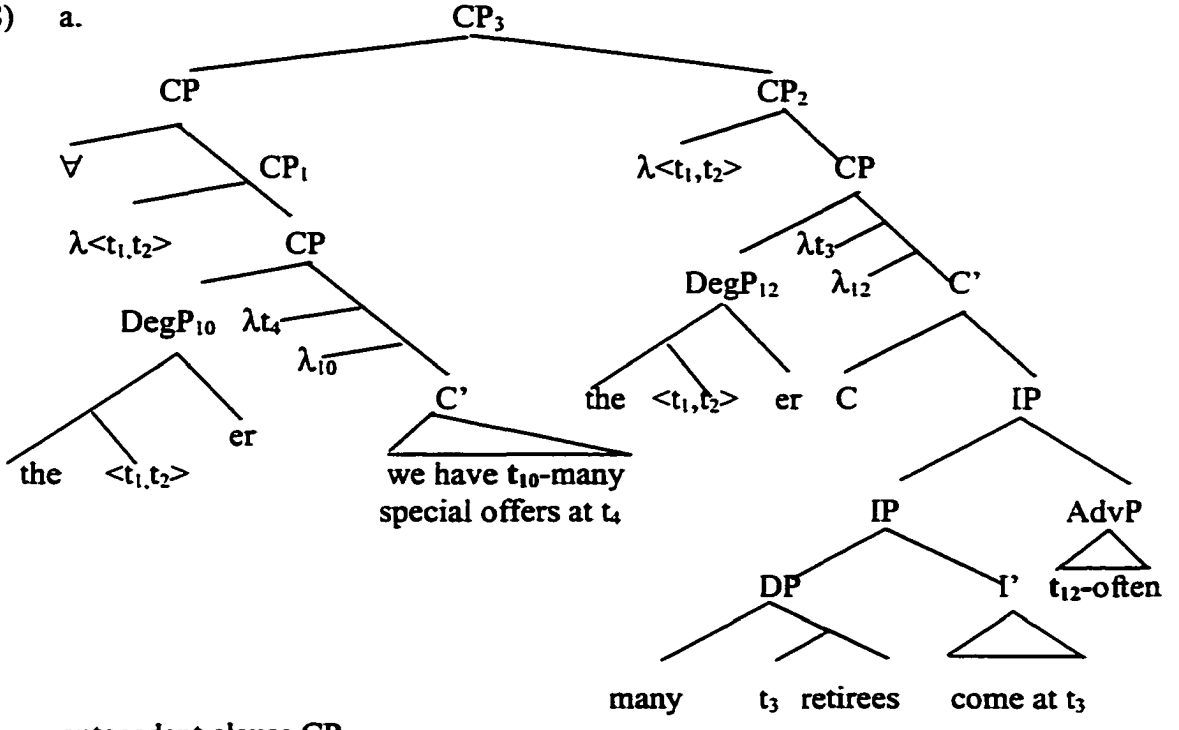
consequent clause CP_3
$[[DegP_{12}]] = \lambda D.[\max(\lambda d.D(d)(t_1)) < \max(\lambda d.D(d)(t_2))]$
$[[CP_2]] = \max(\lambda d.$d-often, x comes at $t_1) < \max(\lambda d.$d-often, x comes at $t_2)$
$[[CP_3]] = \lambda t_1.\lambda t_2.$for many retirees$(t_1)$ x, $\max(\lambda d.$d-often, x comes at $t_1) <$
$\max(\lambda d.$d-often, x comes at $t_2)$

CP_4
$[[CP_4]] = 1$ iff $\forall(t_1,t_2)$ [$\max(\lambda d.$we have d-many special offers at $t_1) <$
$\max(\lambda d.$we have d-many special offers at $t_2)] \Rightarrow$
for many retirees(t_1) x, $\max(\lambda d.$d-often, x comes at $t_1) <$
$\max(\lambda d.$d-often, x comes at $t_2)$

The truth conditions that we derived by scoping the quantified DP in the consequent clause above its respective DegP predict (66a) to be true when for all pairs of time periods t_1 and t_2, if the number of special offers at t_2 exceeds the number of special offers at t_1 then for many retirees x the number of visits of x (to our shopping center) at t_2 exceeds the

number of visits of x at t_1. These truth conditions correspond to one of the intuitive readings we associated (66a) with, namely, (66b). It remains to be seen whether the truth conditions derived from the LF representing the reverse scopal configuration involving DegP and the DP will adequately represent the second reading of the sentence, (66c). Let's see that. (68) gives the relevant LF and the truth conditions derived by it:

(68) a.



b. antecedent clause CP_1

$[[DegP_{10}]] = \lambda D.[max(\lambda d.D(d)(t_1)) < max(\lambda d.D(d)(t_2))]$
$[[CP_1]] = \lambda t_1.\lambda t_2.[max(\lambda d.$we have d-many special offers at $t_1) <$
$max(\lambda d.$we have d-many special offers at $t_2)]$

consequent clause CP_3
$[[DegP_{12}]] = \lambda D.[max(\lambda d.D(d)(t_1)) < max(\lambda d.D(d)(t_2))]$
$[[CP_2]] = \lambda t_1.\lambda t_2.max(\lambda d.$d-often, many retirees$(t_1)$ come at $t_1) <$
$max(\lambda d.$d-often, many retirees(t_2) come at $t_2)$

CP_3
$[[CP_3]] = 1$ iff $\forall(t_1,t_2)$ [$max(\lambda d.$we have d-many special offers at $t_1) <$
$max(\lambda d.$we have d-many special offers at $t_2)] \Rightarrow$
$max(\lambda d.$d-often, many retirees(t_1) come at $t_1) <$
$max(\lambda d.$d-often, many retirees(t_2) come at $t_2)$

According to the truth conditions of (66a), derived from (68a), the sentence should be true when for all pairs of time periods t_1 and t_2, if the number of special offers at t_2 exceeds the number of special offers at t_1, then more frequently at t_2 than at t_1 the shop gets many retirees as customers. These are adequate truth conditions for (66a) because they represent the intuitive second reading of the sentence.

To summarize, we found out that CCs like (66a) can be ambiguous when there is a scope bearing element in one of the clauses in addition to the comparative operator. Using the quantificational semantics of *-er*, we were able to derive from two different LFs (which are possible LFs from the point of view of the quantificational theory), adequate truth conditions representing both intuitively attested readings of such sentences.[19] On the other hand, we don't see how the non-quantificational theory of comparatives can achieve such

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[19] One might be concerned whether we correctly identified the source of ambiguity in (66). Could it be that the sentence is ambiguous not because the quantified DP in the consequent clause interacts with *-er* but because it interacts with the adverb which is part of *öfter*. We have two arguments against such a view. First, if this were true, then the wide scope reading of *viele Rentner* should be derived by raising it above the adverb but lower than the comparative head. The resulting interpretation for (66) would be as in (i):

(i) $\forall t_1,t_2$ [where t_1 and t_2 are relevant periods of time, if we have more special offers at t_2 than we have t_1, then the lowest degree d such that many retirees visit us d-frequently is greater at t_2 than it is at t_1.

This reading is unavailable. So, on the one hand, one of the available readings of (66) cannot be derived at all, and on the other, a non-existing reading is predicted if we assume that the adverb in *öfter*, rather than the comparative operator is responsible for the ambiguity.

Second, the "regular" comparative counterpart of (66),(ii) which is to be discussed later in this section and in more detail in *Chapter 4* is not ambiguous.

(ii) (Frank kommt in unsere Laden enmal pro Woche.) Viele Rentner kommen öfter.
(Frank comes in our shop once a week) many retirees come more-often
'(Frank comes to our shop once a week.) Many retirees show up more often than that.'

As we argue in Chapter 4, the "missing" wide scope DegP reading is to be attributed to Kennedy' s generalization. That account is unavailable under the alternative hypothesis considered here.

results. According to that theory, there will be only one scope bearing element in (66a), by assumption, and respectively only one (type of) LF that could represent that sentence. The only chance that the non-quantificational theory of comparatives stands is to claim that the ambiguity is not structural, but it is reducible to something different. At this point, however, we don't see any such viable alternative. We then conclude that the non-quantificational theory of comparatives, and more generally, the non-unifying theory of comparison, once again yields desirable empirical results: ambiguity in CCs is a strong argument for it.

Let us consider some more examples:

(69) The bigger the departmental budget, the more every student is likely to be funded.

(70) The bigger the departmental budget, the likelier every student is to be funded.

We found the following split among English speakers. With one exception, all of them accept as grammatical (70). The status of (69) varies with speakers. Those who accept it as a grammatical sentence also associate it with the two readings in (71):[20]

(71) a. For every pair of times t_1 and t_2, if the budget of the department is bigger at t_2 than it is at t1, then for each of the students it is more likely that she will be funded at t_2 than it is likely that she will be funded at t_1.

b. For every pair of times t_1 and t_2, if the budget of the department is bigger at t_2 than it is at t_1, then the likelihood of all students being funded at t_2 is greater than the likelihood of all students being funded at t_1.[21]

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[20] (69) also has an amount reading which we would like to disregard. According to it the raise in the departmental budget correlates with bigger scholarships for each of the students.

[21] Note that the two readings are logically independent. If the likelihood of funding all students at t_2 is bigger than it is at t_1, it doesn't follow that the chances of each particular student have improved. Also, since *every student* can pick different sets of students at t_2 and t_1, it doesn't follow that if the chances of each student at t_1 have improved at t_2, then the chance of funding everyone, who is a student at t_2 has improved at t_2.

Those informants who don't accept (69), but only (70), find (70) ambiguous between the readings in (71).[22] Most importantly, since all speakers perceive at least one of these sentences as ambiguous, we can conclude that the comparative operator related to the predicate *likely* interacts scopally with the quantified DP (provided, of course, that we prove formally that the ambiguity follows from the two logically possible scopal orderings of *-er* and *every student*).[23] Let us now see if our theory derives these readings.[24] Consider (72). This is the LF of (69), in which the quantified DP scopes above DegP at LF:

(72) a. $[_{CP3}[_{CP1}[_{DegP}$ the -er] [1$[_{C'}$ the departmental budget is t_1-big]]]
$[_{CP2}[_{DP}$ every student] [2 $[_{CP}[_{DegP}$ the more][3 $[_{C'}$ t_2 is t_3-likely to be funded]]]]]]

b. antecedent clause CP_1

$[[CP_1]] = \lambda t_1.\lambda t_2.[\max(\lambda d.d\text{-}big(the\_departmental\_budget) \text{ at } t_1) < \max(\lambda d.d\text{-}big(the\_departmental\_budget) \text{ at } t_2)]$

consequent clause CP_2

$[[CP_2]] = \lambda t_1.\lambda t_2.[\forall x[\text{student}(x) \text{ at } t_1 \rightarrow [\max(\lambda d.d\text{-}likely(funded(x)) \text{ at } t_1) < \max(\lambda d.d\text{-}likely(funded(x)) \text{ at } t_2)]$

CP_3

$[[CP_3]] = \forall(t_1,t_2)[\max(\lambda d.d\text{-}big(the\_departmental\_budget) \text{ at } t_1) < \max(\lambda d.d\text{-}big(the\_departmental\_budget) \text{ at } t_2)] \Rightarrow [\forall x[\text{student}(x) \text{ at } t_1 \rightarrow [\max(\lambda d.d\text{-}likely(funded(x)) \text{ at } t_1) < \max(\lambda d.d\text{-}likely(funded(x)) \text{ at } t_2)]$

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[22] We were told that (71a) is a preferred, most natural reading but nevertheless (71b) is also possible.

[23] For one of our informants, there is a contrast between (69) and (70). Both sentences are grammatical for him but only (69) is ambiguous. It is, no doubt, an important question why this should be so. However, for the point we are making, it suffices that that speaker finds at least one of these sentences ambiguous. We leave for further research the question why for that speaker, the contrast between these two sentences exists.

[24] In the relevant respect, (69) and (70) make the same point, so we will use only one of the examples to show that we can derive compositionally the two readings of (71).

The LF in which every student scopes above DegP leads to the following truth conditions: for any pair of time periods t_1 and t_2, if the departmental budget is bigger at t_2 than it is at t_1, then for every student the likelihood that she'll get funded is bigger at t_2 than at t_1. This truth conditions are appropriate for the reading we described in (71a).

Consider now the LF in (73), where DegP scopes above *every student*:

(73) a. $[_{CP3}[_{CP1}[_{DegP}$ the -er] [1[$_{C'}$ the departmental budget is t_1-big]]]
$[_{CP2}\ [_{DegP}$ the more][2 [$_{C'}$ t_2-likely every student to be funded]]]]

b. antecedent clause CP_1

$$[[CP_1]] = \lambda t_1.\lambda t_2.[\max(\lambda d.d\text{-}\textit{big}(\textit{the\_departmental\_budget}) \text{ at } t_1) < \max(\lambda d.d\text{-}\textit{big}(\textit{the\_departmental\_budget}) \text{ at } t_2)]$$

consequent clause CP_2

$$[[CP_2]] = \lambda t_1.\lambda t_2.[\max(\lambda d.d\text{-}\textit{likely}(\forall x[\textit{student}(x) \text{ at } t_1 \rightarrow \textit{funded}(x) \text{ at } t_1])) < \max(\lambda d.d\text{-}\textit{likely}(\forall x[\textit{student}(x) \text{ at } t_2 \rightarrow \textit{funded}(x)] \text{ at } t_2]))$$

CP_3

$$[[CP_3]] = \forall(t_1,t_2)[[\max(\lambda d.d\text{-}\textit{big}(\textit{the\_departmental\_budget}) \text{ at } t_1) < \max(\lambda d.d\text{-}\textit{big}(\textit{the\_departmental\_budget}) \text{ at } t_2)] \Rightarrow [\max(\lambda d.d\text{-}\textit{likely}(\forall x[\textit{student}(x) \text{ at } t_1 \rightarrow \textit{funded}(x)) \text{ at } t_1])) < \max(\lambda d.d\text{-}\textit{likely}(\forall x[\textit{student}(x) \text{ at } t_2 \rightarrow \textit{funded}(x)) \text{ at } t_2]))$$

Let us now figure out what these truth conditions require. And let's start with the consequent clause. We have to find first the greatest degree out of all degrees that satisfy the clause $\lambda d.d\text{-}\textit{likely}(\forall x[\textit{student}(x) \text{ at } t_2 \rightarrow \textit{funded}(x)) \text{ at } t_2])$. But which degrees satisfy that clause? Suppose that at t_1 we have five students. Their chances of getting funded at t_1 are respectively 15%, 20%, 35%, 40% and 50%. Then, the degrees *d* that satisfy the clause above are such that $0 < d < 15\%$. In other words, the maximum of the degrees that satisfy this clause is the biggest degree of likelihood of being funded at t_1 that all students share. But, note that this is exactly the greatest degree of likelihood that **all** the students at t_1 will be funded at t_1. Next, we have to find the greatest degree *d* such that *d* satisfies the

clause λd.d-*likely*(∀x[*student* (x) at t_2 →*funded*(x)) at t_2]). By applying the same rationale, that degree must be the greatest degree of likelihood that **all** the students at t_2 will be funded at t_2. It follows then that the consequent clause will be satisfied if the likelihood of funding all students at t_1 is smaller than the likelihood of funding all students at t_2. Now, if we add to that the requirements of the antecedent clause, we end up with the following truth conditions for (69): whenever the budget of the department is bigger, the likelihood of funding all students is bigger. This is what we were after - it represents the second intuition that we had about (69). This is a welcome result - we accounted for the ambiguity in (69) by using the two LFs made legitimate by the quantificational theory of comparatives.

Let us go back to CCs. Our informants agree that in many of the relevant cases, where we have a quantified DP in addition to the comparative operator, the wide scope reading of the DP is more easily accessible, preferred. Let's look now at some data that make the narrow reading very natural.[25] Consider (74) in the shopping context we had earlier for (66):

(74) Je mehr Sonderangebote wir haben, umso öfter kommen lauter Rentner
the more special-offers we have the more-often come many retirees
'The more special offers we have, the more often a lot of retirees show up.'

The example differs minimally from (66). Instead of the quantifier *viele Rentner*, here we have used the quantifier *lauter Rentner*. *Lauter* is a weak quantifier which takes very narrow scope. It behaves predictably consistently in (74): it can't scope above *-er* at LF, and the only reading that we get for (74) is the narrow reading of the DP - the reading

[25] Examples provided by Sigrid Beck.

which is harder to get with stronger quantifiers. (75a) describes the intuitions behind the only available reading and (75b) gives its semantic representation:

(75) a. $\forall t_1,t_2$ [where t_1 and t_2 are relevant periods of time, if we have more special offers at t_2 than we do at t_1, then we have more often many retirees showing up at t_2 than we have many retirees at t_1]

b. [[CP]] =1 iff $\forall(t_1,t_2)$ [max(λd.we have d-many special offers at t_1) < max(λd.we have d-many special offers at t_2)] ⇒ max(λd.d-often, many retirees(t_1) come at t_1) < max(λd.d-often, many retirees(t_2) come at t_2)

(76) is one other similar example. Consider it under the following context: our shop is periodically closed for renovation. We've noticed that there is a correlation between the length of the periods in which we are closed and the length of the periods in which we have only few customers visiting us.

(76) Je länger wir zuhaben, umso länger kommen wenige Kunden
the longer we are-closed the longer come few customers
'The longer we close, the longer we have few customers.'

The narrow scope reading of the DP *wenige Kunden* is very natural. (77a) describes it informally, and (77b) represents the corresponding truth conditions for the reading.

(77) a. $\forall t_1,t_2$ [where t_1 and t_2 are relevant periods of time, if we are closed for longer periods of time at t_2, than we are closed at t_1, then for longer periods of time we have few customers at t_2 than we have at t_1.

b. [[CP]] =1 iff $\forall(t_1,t_2)$ [max(λd.we are closed for d-long at t_1) < max(λd.we are closed for d-long at t_2)] ⇒ max(λd.d-long, few customers(t_1) come at t_1) < max(λd.d-long, few customers(t_2) come at t_2)

Not only is the narrow scope reading of the DP very natural for (76), but like the example with the weak determiner *lauter*, it is the only reading of the sentence. Whatever the reason for the absence of the wide scope reading of the DP might be, the data are still relevant for the point we want to make. We believe that the comparative operator and

wenige-DPs can in principle interact scopally, since in regular comparative sentences, we only get a reading derived from the reverse scope relations - wide scope for the DP and narrow scope for the comparative operator as we see from (78):

(78)a. (Frank kommt in unsere Laden enmal pro Woche.) Viele Rentner kommen öfter.
(Frank comes in our shop once a week) many retirees come more-often
'(Frank comes to our shop once a week.) Many retirees show up more often than that.'

b. Many retirees x are such that x shows up more often than once a week.
[[CP]] = 1 iff for many retirees x, max(λd.x comes d-often) > once a week

c. #The frequency of having many retirees is greater than once a week.
max(λd.d-often, many retirees come) > once-a-week

To summarize the section, we showed that the ambiguity we observed in CCs in *Chapter 2* finds a natural explanation if we assume that the comparative morpheme is a scope bearing element. Beck's proposal for deriving compositionally the meaning of CCs, coupled with a quantificational type of semantics for *-er* accounts adequately for the range of data we considered.

3.2.3.3. Why are there no superlative conditionals?

In *Chapter 2* we simply acknowledged the fact that there is a special conditional construction that is also a comparative construction but there is no corresponding superlative construction. Now we are better equipped to answer why (79) is good but (80), isn't:

(79) The more Scott jogs, the more he sweats.

(80) *The most Scott jogs, the most he sweats.

Recall, that Beck's proposal to derive the meaning of (79) relies on the assumption that there is a covert adverb of quantification that quantifies universally over the times that are compared:

(81) $\forall t_1, t_2$ [Scott jogs more at t_2 than at t_1] $\Rightarrow$ [Scott sweats more at t_2 than at t_1]

As we previously argued, if we extend the proposal to superlatives we should assign the interpretation in (82) to (80):

(82) $\forall t$ [Scott jogs most at t than at any other time t'] $\Rightarrow$ [Scott sweats mote at t than at any other time t'][26]

But that proposition cannot be expressed through the string in (80). The only available option is (83):

(83) When Scott jogs the most, he sleeps the most.

The explanation of these facts is straightforward, given the assumptions we've made so far. On the one hand, Beck's semantics of CCs requires that DegP is interpreted in a different position from its base generated position, since everything else is used twice in the interpretation procedure. In fact, we can see from CCs that DegP movement is required since it is overt. On the other hand, we argued that the superlative DegP can never move out of its base position. But if the special conditional construction is contingent on the possibility for DegP movement, then the absence of superlative conditionals is explained with the absence of DegP movement.

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[26] We believe, that there is some contextually fixed boundary that defines what counts as jogging more than any other time. If, for example, Scott usually jogs for an hour every day, but has never jogged for more than 3 hours, then jogging for at least 2 hours and at most 3 hours might count as being the maximum in the amount of time invested in jogging.

3.2.4. Other scope ambiguities with comparatives

The strongest empirical evidence in support of the quantificational theory of comparatives comes from attesting scope ambiguities involving DegP, as we also argued in the previous section about CCs. In *Section 2.2* we discussed Kennedy's generalization, which is intended to reveal the independent reasons that rule out many configurations as possible domains of quantifier interaction. The main observation is that DegP takes the narrowest scope possible. However, as argued by Heim (2000), intensional verbs are not subject to Kennedy's generalization. In other words, the configuration in (84), where DegP scopes above an intensional verb is in principle possible:

(84) ✓ DegP_1 intensional verb t_1

This means that intensional verbs can allow us to check if DegP has any quantificational force. Heim (2000) has found such examples in which the readings derived when DegP scopes above or under an intensional verb are distinct, and they are both attested. Consider (85) in the context of the sentence in brackets:

(85) (This draft is 10 pages.) The paper is required to be exactly 5 pages longer than that.

Under one reading, (85) is understood to mean that the paper must be exactly 15 pages and it can't be longer than that. There is a second reading, however. According to it, the requirement will be fulfilled if the paper is at least 15 pages. Interestingly, these two readings are predicted by the quantificational theory of comparison, if (84) is holds. The first reading is derived if the comparative DegP takes narrower scope with respect to the predicate *is required*, as the LF in (86a) shows. The second reading corresponds to a

configuration where DegP scopes above the intensional verb, as shown in the LF in (86b):[27]

(86) a. [$_{CP}$ required [$_{IP}$ [$_{DegP}$ [exactly 5 pages] er than that] [1[$_{IP}$ this paper be t_1 long]]]]
b. [[$_{DegP}$ [exactly 5 pages] er than that] [1[$_{CP}$ required [$_{IP}$ this paper to be t_1 long]]]]

The respective truth conditions, derived from (86a) and (86b) are as in (87a) and (87b):

(87) a. $\forall w$: $w \in$ Acc: max($\lambda d.$*long*(d)(*this_paper*) in w) = 15*pages*
b. max($\lambda d.$ $\forall w$:$w \in$ Acc: *long*(d)(*this_paper*) in w) = 15*pages*

The conditions in (87a) will be fulfilled only if in each of the accessible worlds, the length of the paper is 15 pages. The conditions in (87b), on the other hand, will be fulfilled if in those worlds where the paper is the shortest it is 15 pages. Crucially, the latter set of conditions are consistent with the existence of worlds, where the paper is, for example, 18 pages or 17, or 20 pages, unlike the conditions, specified in (87a). We conclude then that

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[27] Recall that in *Chaper 1* we discussed 'upstairs de dicto' readings of sentences like (i) and (ii):
(i) Scott needs to climb a les high mountain than Bill does.
(ii) Scott needs to climb the least high mountain.
In the relevant respect the 'upstairs de dicto' readings of (i) and (ii) are similar to (86b). The 'upstairs de dicto' readings of these sentences seem to represent the scopal configuration DegP>> intensional verb. Consequently, we argued that the common sense unifying theory must be quantificational. However, we are going to see in the next section that for the superlative sentence in (ii), there is an alternative analysis, according to which the ordering DegP>> intensional verb is only apparent, and the desired truth conditions of the 'upstairs de dicto' reading of (ii) can be derived without scoping DegP above *need*. In other words, the 'upstairs de dicto' reading in (ii) can't be taken as evidence for the quantificational nature of the superlative Degp, which is in line with the proposal we made in this chapter. That alternative account can be extended under certain assumptions to (i), too. However, these assumptions are incompatible with the semantics of *er* that we've been advocating and motivating here. Therefore (85), must be taken as empirical evidence for the truly quantificational nature of the comparative DegP.

such patterns of ambiguity in comparatives provide another argument in support of the quantificational theory of comparatives.

Hackl (2000) discusses a similar ambiguity in amount comparatives. The ambiguity there, too, supports the quantificational theory of comparatives. Consider (88):

(88) (Bill read 3 papers.) John is required to read exactly 2 papers more than that.

The quantificational theory of comparatives predicts that the following two LF, are available for (88):

(89) a.[$_{CP}$ required [$_{IP}$[$_{DegP}$ [exactly 2 papers] er than that] [1[$_{IP}$ John to read t_1-many papers]]]]
b.[[$_{DegP}$ [exactly 2 papers] er than that] [1[$_{CP}$ required [$_{IP}$ John to read t_1-many papers]]]]

These LFs give rise to the truth conditions in (90):

(90) a. $\forall w$: $w \in$ Acc: max(λd.*reads*(d-*many papers*)(*John*) in w) = 5*papers*
b. max(λd. $\forall w$:$w \in$ Acc: λd.*reads*(d-*many papers*)(*John*) in w) = 5*papers*

As expected, the truth conditions correspond to the two readings that are attested in (88). The sentence has a reading according to which John is required to read exactly 5 papers. That reading corresponds to (90a). There is a second reading of (88), according to which John is required to read at least 5 papers. This reading is reflected in the conditions in (90b).

3.2.5. 'Upstairs de dicto' readings in superlatives

The arguments we gave so far in the discussion support the non-unifying theory of comparison that we proposed in this chapter: comparatives have significant scopal properties, while superlatives don't. There is, however, one important issue that we've been postponing until now. This regards the decisive argument from *Chapter 1* in favor of

the unifying quantificational theory of comparison. It is related to 'upstairs de dicto' readings attested in both comparative and superlative constructions. To remind ourselves of these consider (91) in the context in (92):

(91) a. John needs to climb the highest mountain.
b. John needs to climb a higher mountain than Bill needs to climb.

(92) John, Mary and Bill are climbers, who tell us in a survey what they need to do during the upcoming season:

John: "I need to climb a mountain that is 2500m high (or higher) to improve my ranking."
Mary: "I need to climb a mountain that is 2000m high (or higher) to improve my ranking."
Bill: "I need to climb a mountain that is 1800m high to improve my ranking."

(91a) and (91b) truthfully describe the situation in (92). By uttering, for example, the first one, we assert that the least high mountain that John climbs in any of the worlds compatible with his needs is higher than the least high mountain that Bill or Mary climb in worlds compatible with their respective needs. The quantificational theory of comparison gives a special status to this reading, to which we referred as the 'upstairs de dicto' (cf. Szabolcsi (1986), Rullmann (1995), Heim (1998), Heim (1999), Heim (2000), Stateva (2000a), Hackl (2000), Sharvit and Stateva (2000), Sharvit and Stateva (2002)). The reason is the following. The other attested readings of (91a) and (91b), the regular *de dicto* and *de re* readings, illustrated with an informal description in (93) and (94), can't reveal if DegP, which is a part of the nominal expression *the highest mountain/ a higher mountain than Bill needs to climb*, can interact scopally with the intensional verb.

(93) a. For all worlds w compatible with John's needs in the actual world, he climbs in w the actual mountain that is higher than any other relevant actual mountain. **(de re)**

b. For all worlds w compatible with John's needs in the actual world, he is the best mountain climber in w. **(de dicto)**

(94) a. For all worlds w compatible with John's needs in the actual world, he climbs in w the actual mountain that is higher than any other relevant actual mountain. **(de re)**

b. For all worlds w compatible with John's needs in the actual world, he is a better climber in w than Bill is. **(de dicto)**

Within the quantificational theory, however, the 'upstairs de dicto' reading is taken to represent a 'scope splitting' phenomenon: the nominal expression which contains structurally DegP in its base position is interpreted in the scope of the intensional operator, while DegP needs to be interpreted above that operator. But if the generalization about scope splitting is correct, then the only theory compatible with it is the quantificational theory, since it is impossible to formulate a scope splitting requirement without acknowledging that the split parts are quantificational elements. As a reminder, here is again the LF for a sentence like (91a), that is suggested by the quantificational theory and the interpretation derived from it. The LF is derived by raising DegP above *need* at LF and interpreting it outside the scope of the intensional operator:

(95) $[_{IP}$John $[_{VP2}$est+C$[2\ [_{VP1}\ 1[t_1$ needs$_w[_{CP}\ \lambda w'\ t_1$ to climb$_{w'}\ [_{DP}$~~the~~ $[_{AP}\ d_2[_{A'}$high mountain$_{w'}$]]]]]]]]]

(96) [[IP]] =1 iff max(λd.[John needs$_w$ λw'.∃x[high(d)(x) & mountain $_{w'}$ (x) & climbs$_{w'}$(x)(John)]) > max(λd.∃y≠John [y∈C → y needs$_w$ λw'. ∃x[high(d)(x)& mountain $_{w'}$(x) & climbs$_{w'}$ (x)(y)]]]

The derived interpretation corresponds to the intuitions one has about the 'upstairs de dicto' reading of (91a). We leave it to the reader to convince herself that the same strategy allows that we derive the 'upstairs de dicto' reading with comparatives like (91b). But if we stand by our proposal that superlatives don't have significant scopal properties, we need to address the question how 'upstair de dicto' readings with the superlative construction could be derived under our current assumptions.

Sharvit and Stateva (2000), Sharvit and Stateva (2002) argue that (95) cannot be a legitimate LF. If it were, then it should have been possible to move the superlative DegP in other constructions. However, there's clear evidence that this is undesirable.

In *Chaper 2*, we discussed "sandwich" contexts with the goal of showing that there is a breakdown in the judgments that speakers give about comparative and superlative sentences in these contexts and thus argue against the unifying theory of comparison. Now, we will turn again to "sandwich" contexts with the purpose of showing that movement of the quantificational superlative DegP at LF leads to inadequate truth conditions. Consider again (97) in the climbing competition context of (98):

(97) a. Joe climbed the least high mountain.
b. Bill climbed the least high mountain.

(98) Context: Scott climbed a 2800m high mountain.
Bill climbed one mountain which is 2500m high and one - 1000m
Joe climbed a 2000m high mountain.

Under the Ross/Szabolcsi comparative reading (97a) is judged as false. (97b) is intuitively true. But if we move DegP to an interpretable position above the verb in order to derive that comparative reading, we end up with a counterintuitive interpretation for both sentences. (99) gives the LF and the truth conditions of (97a). (100) represents (97b):

(99) a. $[_{IP}$ Joe $[_{VP}[_{DegP}$ est+C] [1[2$[_{VP}$ t_2 climbed $[_{DP}$ ~~the~~ $[_{AP}$ t_1-high mountain]
b. [[IP]] =1 iff max(λd.∃x[*mountain* (x) & *high*(d)(x) & *climbed*(*Joe*)(x)]) < max(λd.∀y≠*Joe*[y∈C → ∃z[*mountain* (z) & *high*(d)(z) & *climbed*(*y*)(z)]])

C = {Scott, Bill, Joe}

max(λd.∃x[*mountain* (x) & *high*(d)(x) & *climbed*(*Joe*)(x)]) = 2000m
max(λd.∀y≠*Joe*[y∈C →∃z[*mountain* (z) & *high*(d)(z) &*climbed*(*y*)(z)]]) = 2500m
[[IP]] = 1 iff 2000m < 2500m

(100) a. $[_{IP}$ Bill $[_{VP}[_{DegP}$ est+C] [1[2$[_{VP}$ t_2 climbed $[_{DP}$ ~~the~~ $[_{AP}$ t_1-high mountain]

b. [[IP]] =1 iff max(λd.∃x[*mountain* (x) & *high*(d)(x) & *climbed*(*Bill*)(x)]) < max(λd.∀y≠*Bill*[y∈C → ∃z[*mountain* (z) & *high*(d)(z) & *climbed*(y)(z)]])

C={Scott, Bill, Joe}

max(λd.∃x[*mountain* (x) & *high*(d)(x) & *climbed*(*Bill*)(x)]) = 2500m
max(λd.∀y≠*Bill*[y∈C →∃z[*mountain* (z) & *high*(d)(z) &*climbed*(y)(z)]]) = 1000m
[[IP]] = 1 iff 2500m < 1000m

(97a) is predicted to be true in the context in (98) only if it is true that 2000m < 2500m. Since it is true that 2000m is a smaller degree than 2500m, (97a) must also be true. But speakers intuitions go in the opposite direction. On the other hand, (97b) is predicted to be true in the same context only if it is true that 2500m < 1000m. But since 2500m is not a smaller degree than 1000m, (97b) must also be not true. This prediction, too, goes against the intuitions.

If DegP movement is not allowed, we derive adequate truth conditions for both sentences:

(101) a. [$_{IP}$ Joe climbed [$_{DP}$ the [$_{AP}$ [$_{DegP}$ est+C] high mountain]
b. [[IP]] =1 iff Joe climbed ι(λx. mountain(x) & max(λd. *high*(d)(x)) < max(λd.∀y≠x[y∈C → *high*(d)(y)]))

C = {x: x is a mountain climbed by Scott, Bill or Joe}

(102) a. [$_{IP}$ Bill climbed [$_{DP}$ the [$_{AP}$ [$_{DegP}$ est+C] high mountain]
b. [[IP]] =1 iff Bill climbed ι(λx. mountain(x) & max(λd. *high*(d)(x)) < max(λd.∀y≠x[y∈C → *high*(d)(y)]))

C = {x: x is a mountain climbed by Scott, Bill or Joe}

According to the conditions in (101), (97a) is true only if Joe climbed the unique mountain whose height is smaller than the height of any other mountain in the comparison set. The least high mountain from that set is the 1000m mountain. But it was not climbed by Joe - Bill climbed the 1000m mountain. Therefore, (97a) is correctly predicted by (101) to be

false. Correspondingly, (102) predicts (97b) to be true in accord with intuitions. From this discussion, we conclude that DegP movement in the superlative construction should not be allowed.[28] But what about the 'upstairs de dicto' readings? We argued against the LF in (95) but what alternative do we have? The conclusion reached by Sharvit and Stateva (2000) and Sharvit and Stateva (2002) is that it is incorrect to describe 'upstairs de dicto' readings (in the case of superlatives) as a case of scope splitting. We claim that even in 'upstairs de dicto' readings the intensional predicate has the whole superlative description in its scope. But if we are on the right track, assuming a quantificational semantics for the superlative DegP is no longer a necessity.

The alternative analysis of 'upstair de dicto' readings that proposed in Sharvit and Stateva (2000) and Sharvit and Stateva (2002) is couched in quantificational terms, although, we repeat, this is not a necessary assumption for the proposal we make there. In other words, the original proposal fits best the quantificational DP-internal semantics of superlatives. This theory, like the non-quantificational theory of superlatives, predicts the lack of quantificational force of the superlative DegP. However, we saw a number of arguments in this chapter that point to the conclusion that the non-quantificational theory of superlatives is superior to the DP-internal quantificational theory of superlatives. Therefore, we are now going to show how 'upstairs de dicto' readings in superlatives can be handled with the Sharvit and Stateva (2002) proposal but this time we are going to use our new non-quantificational semantics for *-est/least*.

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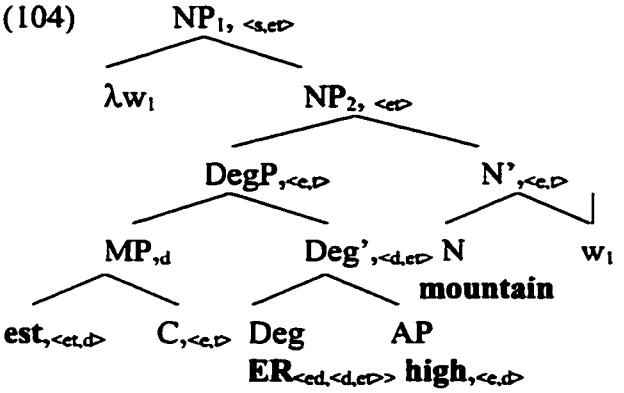
[28] Note that, as we claimed in *Chapter 2*, it is not clear that movement of DegP in the comparative construction creates similar problems since speakers are in general uncertain in judging if 'Joe climed a less high mountain than Bill did' is true or false in the "sandwich" context.

The proposal is based on the following assumption: a superlative expression like *the highest mountain* can be interpreted as an individual, or as a property of individuals. As a property of individuals, *the highest mountain* is interpreted only in 'upstairs de dicto' readings.[29] So in (91a), which we repeat again as (103), under its 'upstairs de dicto' reading, the DP is interpreted as a property:

(103) John needs to climb the highest mountain.

Let us start with the interpretation of the NP *highest mountain*. Its derivation is given in (104):

(104)



[[AP]] = λx.*high*(x)
[[Deg]] = λG.[λd.[λy.G(y) > d]]
[[Deg']] = λd.[λy.*high*(y) >d]
[[most]] = λP.max(λd.∃z[z∈P & d = PRO(z)])
[[MP]] = max(λd.∃z[z∈P & d = *high*(z)])
[[DegP]] = λy.*high*(y) > max(λd.∃z[z∈P & d = *high*(z)])
[[N]] = λb.*mountain*(b)
[[NP2]] = λy.[mountain w1 (y) & *high*(y) > max(λd.∃z[z∈P & d = *high*(z)])]
[[NP1]] = λw1.[λy.[mountain w1 (y) & *high*(y) > max(λd.∃z[z∈P & d =*high*(z)])]]

C ={x:x is a relevant mountain}

The interpretation of *high mountain* proceeds as usual up to the node NP_2. But if we want to interpret *the highest mountain* as a property, we add more structure to the DP. We

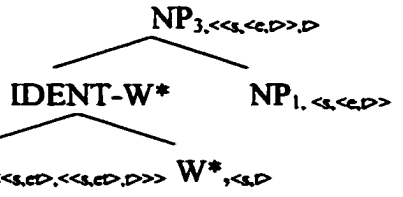
[29] For ways to derive this restriction on the choice see Sharvit and Stateva (2002).

adjoin an operator *IDENT-W** to NP_2 at LF, which functions as a type shifter. It applies to NP_2, which is a property, to yield a set of properties. This operation is an extension of Partee (1987)'s type-shifting operation IDENT, which applies to an individual to yield the property of being that individual. (105) defines the operator IDENT:

(105) $[[\text{IDENT}]] := \lambda W^*: W^* \in D_{<s,t>}[\lambda P: P \in D_{<s,<e,t>>}.[\lambda P': P' \in D_{<s,<e,t>>}.[\forall w \in W^* \rightarrow P(w)=P'(w)]]]$

IDENT applies first to a specified set of worlds *W**. The value of *W** is contextually supplied. It contains only those accessible worlds *w*, made salient by the context, in which *P* and *P'*, the two properties to which IDENT applies, have the same extension. In the case we are considering above, *P* is denoted by NP_1. It is the property of being the highest mountain, as we saw from the calculations in (104). So, by adding more structure to NP_2 we derive the following interpretation for NP_3, which is the complement of the definite article in *the highest mountain*:

(106)

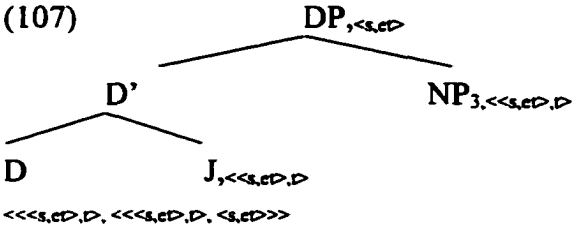


$[[\text{IDENT-W}^*]] = \lambda P.[\lambda P'.[\forall w \in W^* \rightarrow P(w)=P'(w)]]$
$[[NP_1]] = \lambda w_1.[\lambda y.[\text{mountain}_{w1}(y) \,\&\, \textit{high}(y) > \max(\lambda d.\exists z[z \in P \,\&\, d = \textit{high}(z)])]]$
$[[NP_3]] = \lambda P'[\forall w \in W^* \rightarrow \lambda w_1.[\lambda y.[\text{mountain}_{w1}(y) \,\&\, \textit{high}(y) > \max(\lambda d.\exists z[z \in P \,\&\, d = \textit{high}(z)])]](w) = P'(w)]$

The interpretation of NP_3 is a set of properties *P'* such that for every world *w* from the specified set of worlds *W**, *P(w)* is the property of being the highest mountain in *w*. NP_3 combines next with the definite article. We assume with Jacobson (1994) that the definite article is crosscategorial. In our case it applies to a set of properties to yield a unique property. Also, following a standard assumption that determiners have restricted domains

(c.f. Fintel (1994)), we assume that the domain of the definite determiner is restricted by a variable **J**. Since *the* applies here to a set of properties, the value of **J** must also be a set of (relevant) properties. The properties that are made salient by the context in (92) when (103) is uttered are *be a 2500m high mountain*, *be a 2000m high mountain*, *be a 1800m high mountain*. DP has the structure in (107) at LF:

(107)



DP denotes the unique property *P* which is a member of *J* and in every world in *W**, *P* has the same value as the property of being the highest mountain.

Finally, we need to explain which worlds make it into the specified set of worlds to which IDENT applies. An appropriate value for W* given our context will be that in (108):

(108) W*={w: for all x∈{John, Bill, Mary}, x climbs in w one mountain only, of the lowest possible height according to x's bneeds in the actual world, and the mountains that John, Bill, and Mary climb in w are the only mountains in w}

To put it more generally, W* contains worlds in which everyone's needs are minimally satisfied. The unique property *P* that the DP denotes is the property of being a 2500m high mountain and being the highest mountain in all worlds in W*.

Now that we know what the interpretation of *the highest mountain* is in (103), we can think about the interpretation of the whole clause. The LF that we use to derive the 'upstairs de dicto' reading in (103) is given in (109):

(109) $[_{IP}$ John needs$_w$ [2[PRO to climb$_{w2}$ $[_{DP}$ the-J$[_{NP3}$[IDENT-W*] $[_{NP1}$ I$[_{NP2}[_{DegP}[_{MP}$ est-C] ER high] mountain]]]]$_{w2}$]]]

After we apply the denotation of DP to a world variable, we derive an expression of type <e,t>. The verb *climb* cannot combine with this argument because *climb* needs an *e*-type argument. To resolve the type mismatch, we can either move the whole DP minimally (above the embedded verb) and allow its *e*-type trace to combine with the verb, or we can raise the type of *climb* to make it appropriate for combining with an <e,t> argument. Any of these options lead to the following truth conditions for (103):

(110) In all worlds *w* compatible with John's actual needs, there is an *x* such that *x* is a member of [[the-J]]([[IDENT-W*]]([[1[[ER]] ([[high]])([[est-C]]) [[mountain$_{wl}$]]]]))(w) and John climbs x in w.

These conditions are logically equivalent to the truth conditions derived in (96) under the quantificational theory of superlatives. This is exactly want we wanted. Note, that this analysis of 'upstair de dicto' is context dependent. The reader is referred to Sharvit and Stateva (2002) for a detailed discussion on the mechanisms restricting the choice of values for the contextually dependent variables, assumed in the analysis. Most important is the study of the role of focus for constraining the possible values of *J*, the restriction on the domain of the determiner heading the superlative expression.

Recall, that *in Chapter 1*, following a discussion in Stateva (2000a), we showed that negative superlatives like *the least high mountain* embedded in intensional contexts can have multiple 'upstairs de dicto' readings. It is important to note that the Sharvit and Stateva (2002) proposal not only accounts for 'upstairs de dicto' readings with positive superlatives, as we saw above, but it also captures all 'upstairs de dicto' readings in negative superlatives. The idea is to posit just one LF (corresponding to all 'upstairs de dicto' readings in a sentence) and manipulate the defining property of the specified set of

worlds, W*. We refer the reader to that work for more details. We also saw from the previous example with a positive superlative expression, that the context-dependent analysis of 'upstairs de dicto' readings can straightforwardly be stated in terms of the non-quantificational semantics of superlatives that we proposed here. Therefore, it must be possible to apply it to negative superlatives, too.

Since it is possible to account for the 'upstairs de dicto' readings in superlatives without the assumption that *-est* is a scope bearing element, then the quantificational theory of superlatives loses its motivation (or at least its strongest argument). Given the wider empirical coverage of the non-quantificational theory of superlatives, we can once again conclude that the non-quantificational theory of superlatives is the preferable one.

It is worth noting that in Sharvit and Stateva (2002), we extend the analysis of superlative 'upstairs de dicto' readings to comparative 'upstairs de dicto' readings.[30] However, we do that merely for the sake of uniformity, following a common assumption that the constructions are very similar. In contrast with the case of superlatives, we have no evidence for comparatives that an in-situ analysis of 'upstairs de dicto' readings is needed and we acknowledge that in the paper. Given our current view on comparatives, however, we believe that the 'upstair de dicto' readings in comparatives, although similar to the 'upstairs de dicto' readings in superlatives, are truly a case of scope splitting. We conclude that from the fact that it seems impossible to extend the Sharvit- Stateva proposal to comparatives if we stick to our basic assumption about the semantics of *-er/less*. We argued here that the comparative DegP is a constituent, and that the

[30] We refer the reader to the original paper for details of the analysis.

comparative operator takes two <d,t> type arguments. This assumption is incompatible with the in-situ analysis of comparatives that we suggest in Sharvit and Stateva (2002).

To summarize the section, we renewed the discussion about 'upstairs de dicto' readings triggered by embedding the superlative description under an intensional verb. In *Chapter 1*, such readings were taken to support the quantificational theory of superlatives. Building on our earlier work in Sharvit and Stateva (2000) and Sharvit and Stateva (2002), we showed that the non-quantificational theory of superlatives that we proposed can also account for 'upstairs de dicto readings'. We thus believe that we knocked down the strongest argument against the non-quantificational theory of superlatives.

3.2.6. Comparison and relative clauses revisited

In *Chapter 2* we showed that a superlative expression embedded in a relative clause can give rise to a comparative reading like the one in (111), uttered in the context in (112):

(111) John climbed the mountain which was highest of the mountains climbed.

(112) There are 7 relevant mountains: A, B, C, D, E, F, G. A is the highest, B-the second-highest, C-the third highest, etc. There is a climbing competition which is to be won by the person who achieves the most - the one who climbs a mountain (one of these seven) higher than anyone else's. John climbed mountain C, Bill -D, Joe -E.

In contrast, not only is the comparative reading unavailable in the corresponding comparative construction in (113), but since this is the only potential reading of (113), the sentence is ungrammatical.

(113) a. *John climbed a mountain which is higher than Bill did.
b. cf. John climbed a higher mountain than Bill did.

This contrast between superlatives and comparatives is predicted by our non-unifying theory. The ungrammaticality of (113a) can be explained as an island violation: DegP has been QR-ed too far so that the relevant wide scope reading of the comparative could be derived: across a finite clause. Note that in the acceptable (113b) example, QR is local.[31]

On the other hand, we argued that the superlative DegP is a non-quantificational element, and therefore it doesn't need to move syntactically in order to specify the relation of comparison. In fact, not only do we claim that *-est/least* doesn't have to move but we actually showed with the previous example from "sandwich" contexts that it can't move. The comparative reading of the superlative construction, under the non-quantificational (and the DP-internal) theory of superlatives is derived from the same LF as the absolute reading. The source of the difference is in the choice of elements that enter the comparison set. Therefore, the comparative reading is available in (111): it doesn't rely on syntactic movement and all else equal superlatives could be embedded in islands for extraction. The context makes (114) a salient comparison set for the comparative reading:

(114) C={mountain D, mountain E}

Since, according to the given context John climbed mountain C, which is higher than any of the mountains in the comparison set, we predict that (111) should be a possible and a truthful description of (112).

[31] Given our DegP shell proposal for the syntax of the comparative construction, (113a) cannot be analyzed as an ECP violation. The trace of the moved DegP is properly governed by the adjective ***high***.

Unfortunately, there are few syntactic contexts in which we can test the predictions of the non-quantificational theory of superlatives. For example, suppose that we embed a superlative expression in an adjunct, as in (115):

(115) John left after climbing the highest mountain.

Certainly, (115) has a comparative reading: John left after he climbed the mountain which is higher than any mountain climbed by other people. However, even the movement quantificational theory of superlatives predicts that the sentence should have that reading. Within the assumptions of the quantificational theory, it suffices for DegP to raise above the verb inside the adjunct in order to create the appropriate relation *λd.[λx.[∃y[mountain (y) & high(d)(y) climb(y)(x)]]* , as we show in the LF in (116):

(116) John left [$_{PP}$ after [PRO [$_{DegP}$ est-C [2[1[$_{VP}$ t_1 climbing ~~the~~ t_2-high mountain]

In other words, to derive a comparative reading, under the quantificational theory of superlatives, it almost always suffices to raise DegP at a very minimal distance. Therefore the predictions of the quantificational and the non-quantificational theory can hardly be distinguished on the basis of constraints on syntactic movement. Relative clauses are a nice exception to this generalization. And, the data we observed with them, support our theory.

We need, however, to acknowledge a potential problem for the non-quantificational, and also for the DP-internal non-quantificational theory of superlatives. We argued that 'upstairs de dicto' readings with superlatives are not derived by syntactic movement of *-est/least* above the predicate of the main clause. The competing quantificational theory, relies on such movement in deriving the LF for these readings. The

fact that the 'upstairs de dicto reading' is not attested in sentences like (117), for example, as argued by Heim (1999), finds a natural explanation within the quantificational theory.

(117) John said that Mary climbed the highest mountain.

Within the quantificational theory, the lack of 'upstairs de dicto' reading can be explained as an island violation: for the appropriate LF to be derived, DegP must be QR-ed across a finite clause.

3.2.7. Conclusion

In light of the differences between the comparative and the superlative construction that we discussed in *Chapter 2*, we proposed a non-unifying theory of comparison. We argued that the comparative degree word must be analyzed as a quantificational element. We also argued that superlatives don't have significant scopal properties. This property, we claimed, could be accommodated in two types of superlative theories: a DP-internal quantificational theory and a non-quantificational theory. We re-evaluated the bulk of the empirical data from *Chapter 2* in light of the proposal and observed that the differences between the two comparison constructions can be accounted for within our proposal. We also concluded that the non-quantificational theory of superlatives has a much wider empirical coverage than its DP-internal quantificational counterpart, and therefore it is superior to it. This chapter makes a contribution also with the discussion of new data involving plural superlatives. We introduced new data from CCs that support unambiguously the quantificational theory of comparatives. We also brought to light a crosslinguistic variation regarding the superlative construction which suggests that the superlative construction contains a comparative element in addition to the superlative

degree word. There are a few differences between the comparative and the superlative construction that we mentioned in *Chapter 2* but never discussed here: these regard possessive superlatives and modal adjectives. We leave for future research the analysis of these differences.

CHAPTER 4

Intervention Effects

4.1. The status of Kennedy's generalization

4.1.1. A puzzle

Let us summarize the major findings so far. At least from the point of view of English, it seemed desirable that comparatives and superlatives should be given similar analyses: the two constructions use the same set of gradable adjectives; the degree words *more* and *most*, and *less* and *least*, respectively, also they seem morphologically related, etc. However, we saw in the previous discussion that many properties of the comparative and the superlative construction cannot be explained in a unifying analysis. One major difference regards the quantificational properties of the superlative and the comparative DegP. On the basis of "sandwich" scenarios and the lack of "superlative conditionals" we argued that the superlative DegP doesn't have significant scope. On the other hand, we found empirical arguments that the comparative DegP is a scope bearing element. This state of affairs implies strongly that the original Kennedy view that the comparison constructions have non-quantificational nature is not correct, and Heim's proposal that there must be some syntactic constraint that limits the possibilities for DegP to interact scopally is on the right track. Contra Heim, however, we are led to conclude that the syntactic explanation of the limited scopal properties of DegP is true of the comparative operator but not of the superlative. But we are faced with another puzzle. Why is it that CCs allow us to detect ambiguities while the "regular" comparatives in general don't.

Let's look at a familiar, by now, example in (1) and a corresponding non-conditional comparative in (2):

(1) Je mehr Sonderangebote wir haben, umso öfter kommen viele Rentner
the more special-offers we have the more-often come many retirees
'The more special offers we have, the more often many retirees show up.'

(2) (Frank kommt in unsere Laden enmal pro Woche.) Viele Rentner kommen öfter.
(Frank comes in our shop once a week) many retirees come more-often
'(Frank comes to our shop once a week.) Many retirees show up more often than that.'

(2) can be construed with the two readings, repeated in (3) And (4). We showed in *Chapter 3* that these arise as a consequence of scoping DegP below or above the quantified expression *viele Rentner*.

(3) a. $\forall t_1,t_2$ [where t_1 and t_2 are relevant periods of time, if we have more special offers at t_2 than we do at t_1, then many retirees show up more often at t_2 than they show up at t_1]

b. $\forall(t_1,t_2)$ [max(λd.we have d-many special offers at t_1) <
max(λd.we have d-many special offers at t_2)] ⇒
for many retirees(t_1) x, max(λd.d-often, x comes at t_1) <
max(λd.d-often, x comes at t_2)

(4) a. $\forall t_1,t_2$ [where t_1 and t_2 are relevant periods of time, if we have more special offers at t_2 than we do at t_1, then we have more often many retirees showing up at t_2 than we have many retirees at t_1]

b. $\forall(t_1,t_2)$ [max(λd.we have d-many special offers at t_1) <
max(λd.we have d-many special offers at t_2)] ⇒
max(λd.d-often, many retirees(t_1) come at t_1) <
max(λd.d-often, many retirees(t_2) come at t_2)

On the other hand, (2) is judged to be unambiguous. It can only have the interpretation in (5) which results from having DegP take narrower scope than the DP. The interpretation in (6), which reflects the reverse scopal order is unavailable.

(5) a. Many retirees x are such that x shows up more often than once a week.
b. [[CP]] = 1 iff for many retirees x, max(λd.x comes d-often) > once a week

(6) a. #The frequency of having many retirees is greater than once a week.
b. max(λd.d-often, many retirees come) > once-a-week

What we need to do in order to solve the puzzle is to find the property that distinguishes the LF corresponding to (4b) from the LF corresponding to (6b). That property must be blamed for the unacceptability of (6). In the relevant respects, these LFs seem very similar: they are derived by moving DegP above another quantified expression in the clause. The only difference is that while DegP movement is covert in the case of the "regular" comparative, it is overt in the comparative conditional construction.

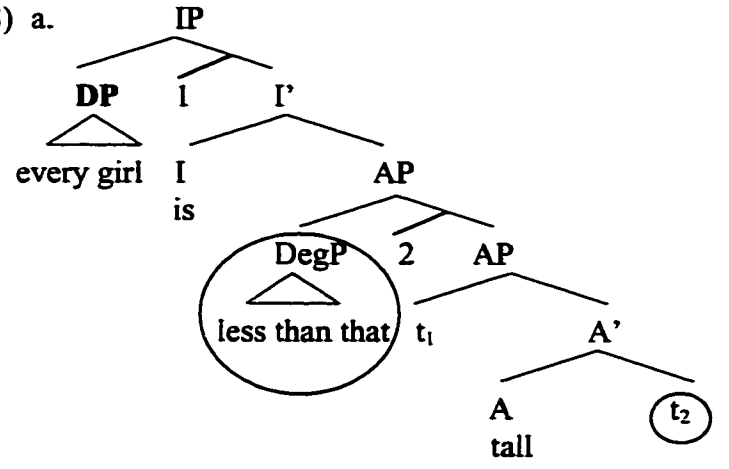
Before we conclude that overt versus covert movement is the property that distinguishes the relevant LFs and look at the theoretical implications of this conclusion, it will be instructive to look at other examples with a "missing" wide scope reading of the comparative DegP. Here is one of Heim's (2000) examples:

(7) (John is 4' tall.) Every girl is less tall than that.

(8) and (9) give two LFs for (7), predicted by the quantificational theory:[1]

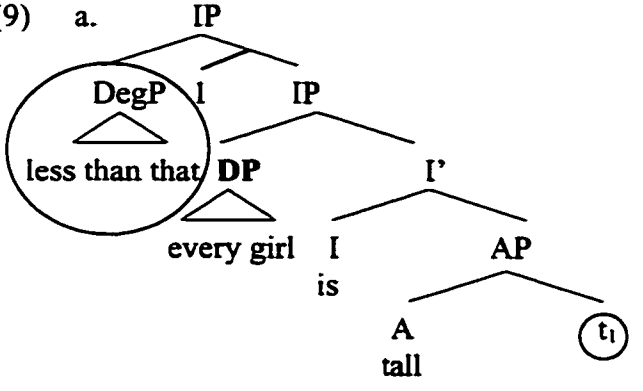
[1]Recall that we argued in *Chapter 1* for the DegP shell structure of the comparative construction. That structure was intended to accommodate three requirements: (i) *-er* and the *than-clause* form a constituent; (ii) the extended adjectival projection is headed by Deg (Abney (1987)); (iii) we have to account for the surface word order. The LF in (8) is in line with our proposal, since we also proposed that at LF, *-er* is reconstructed to its base position: the higher DegP shell is deleted since it doesn't contribute to the interpretation of the sentence.

(8) a.



b. $\forall x[girl(x) \rightarrow max(\lambda d.tall(d)(x)) < 4']$

(9) a.



b. $max(\lambda d.\forall x[girl(x) \rightarrow tall(d)(x)]) <4'$

(8) leads to the only attested reading of (7): 'the height of the tallest girl is smaller than 4'. (9) is illegitimate in light of Kennedy's generalization: the trace of DegP is c-commanded by the quantified DP but DegP is not c-commanded by that DP. That explains why the reading that could be derived from (9), 'the height of the shortest girl is smaller than 4', is unavailable.

The constraint behind Kennedy's generalization must be at work in (10), too.

(10) (The frostline is 3 and a half feet deep.) Mary set every post exactly 2 feet deeper than that.

The only reading of (10) is the one in which the universally quantified DP scopes above DegP. The sentence is interpreted to mean that each of the posts is set exactly 2 feet deeper than the frostline. Had it been possible for DegP to scope above the DP *every post*, (10) would have been true in a situation in which Mary set only the least deep post 2 feet below the frostline. But it isn't. If Kennedy's generalization is correct, then the missing reading corresponds to a LF in which the DP c-commands the trace of DegP but not DegP itself, similarly to (9a). This seems to be correct. The DegP *exactly 2 feet deeper than that* modifies the predicate. Under Larson's (1988) view, the VP modifier is generated as the lowest VP argument. Within Larson's framework, the direct object must c-command into the adverbial but if this is so, we get for (10) the illegitimate Kennedy configuration when DegP is raised across the direct object. And, this explains why the reading corresponding to that LF is unavailable. This is illustrated in (11):

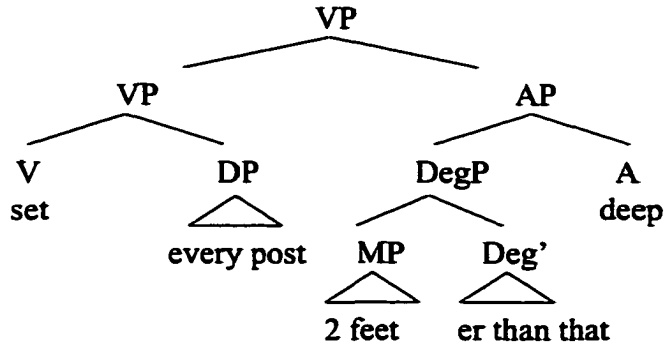
(11) $[_{IP}[_{DegP}$ 2 feet er than that] [1 $[_{IP}$ Mary $[_{VP}$ set$_j$ $[_{VP}[_{DP}$every post] $[t_j$ $[_{AP}$deep $t_1]]]]]]]$

However, Larson's view about the VP structure has been seriously challenged (cf. Lasnik (1999), Stjepanović (1997)). But one doesn't have to resort to the Larsonian structure in order to subsume the missing reading of (10) under Kennedy's generalization. Even under the more traditional VP structure, where the adverbial phrase is adjoined to VP, the direct object c-commands the trace of DegP given some assumptions that are independently needed. A short digression is in order to show that.

Let's look first at the 'traditional' VP structure, related to (10):[2]

[2] The phrase marker reflects the S-structure of the VP.

(12)



The DP *every post* asymmetrically m-commands DegP: the first maximal projection that dominates DP also dominates DegP. Under the standard definition of c-command which refers to the first branching node (rather than the first maximal projection) DegP, and consequently its trace after DegP movement, is not in the scope of DP. So, under the most standard assumptions we lose the explanation about the missing reading in (10) based on Kennedy's generalization. Yet it seems correct that whatever accounts for the missing reading in (7) must also account for the missing reading in (10).

Bošković (1997) faces a similar problem regarding the c-command relations between an object phrase and a VP adjunct in his discussion of *wh*-movement in Bulgarian. He observes that in a multiple *wh*-question in Bulgarian, the accusative *wh*-phrase must precede in linear order any adjunct *wh*-phrase, as the data in (13) and (14) shows:[3]

(13) a. Kogo kak e celunal Ivan
whom how is kissed Ivan
'How did Ivan kiss who?'

b. *Kak kogo e celunal Ivan

(14) a. Kogo kâde e vidjal čovekât
whom where is seen man-the
'Who did the man see where?'

[3] Bošković, following Rudin (1988) argues that the *wh*-phrase that comes first in the linear order moves first to [Spec,CP].

b. ???kâde kogo e vidjal čovekât

The two *wh*-phrases in each of the examples m-command each other at D-structure.[4] *Wh*-movement is subject to the Superiority condition, requiring that the structurally higher phrase is raised first (cf. Chomsky (1973)). So, if neither phrase is higher than the other, as it seems to be the case with the D-structures of (13) and (14), we can expect that any *wh*-phrase could move first in the Bulgarian multiple *wh*-questions. In other words, all else equal, (13b) and (14b) should be acceptable just like (13a) and (14a) are. But they aren't. The explanation of these data that Bošković gives is the following: the accusative *wh*-phrase moves first to AgrO to have its Case licensed. But at this point, it asymmetrically c-commands the adjunct *wh*-phrase, and therefore it must move first to [Spec,CP].

The conclusion relevant to our discussion of the missing reading in (10) is that we can maintain the explanation based on Kennedy's generalization under standard assumptions, if we assume with Bošković that the VP internal argument *every post* in (10) raises to a c-commanding position out of the VP in which it its base-generated. The reason for moving the Bulgarian accusative *wh*-phrase carries over to the DO in (10): it moves for case reasons. Note also that a quantified DO is not interpretable (unless type shifting applies) in is base position and has to move at a minimal distance also to resolve type mismatch (cf.Heim and Kratzer (1998), Fox (2000)). In sum, we need some additional theoretical assumptions to explain why DegP can't take wide scope with respect to the quantified DP in (10). But these assumptions support the intuition that we are dealing with the same constraint in (10) as we are in (7), which is an appealing result.

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[4] The term D-structure is used for ease of exposition only, without commitment to a view acknowledging its existence as a level of representation.

Now, let's think about CCs again. Consider (15):

(15) The more I learn about comparatives, the more I appreciate every paper on the topic.

In the relevant respects, (15), or more exactly its consequent clause, is very similar to (10). There is a quantified DP in the object position and a comparative phrase, and a DegP that structurally modifies the VP. Like (10), (15) has a reading that reflects the scopal order DP>>DegP. It is schematized in (16):

(16) a. [$_{CP}$ [$_{CP}$ [$_{DegP}$ the more] [$_{C'}$ [1[$_{IP}$ I [$_{VP}$[$_{VP}$ learn [$_{PP}$ about comparatives]] [$_{AP}$$t_1$-much]]]]]][[$_{DP}$ every paper on the topic][2 [$_{CP}$[$_{DegP}$ the more] [$_{C'}$[3[$_{IP}$I [$_{VP}$[$_{VP}$ appreciate t_2] [$_{AP}$$t_3$-much]]]]]]]]]

b. $\forall(t_1,t_2)$ [max(λd.[d-*much* (λz.*learn* (*about_comparatives*)(z) at t_1)](I)) < max(λd.[d-*much* (λz.*learn* (*about_comparatives*)(z) at t_1)](I)) ⇒ ∀x[*paper_on_the topic* at t_1(x) → max(λd.[d-*much*(λy.*appreciate*(x)(y) at t_1)](*I*)) < max(λd.[d-*much*(λy.*appreciate*(x)(y) at t_2)](*I*))]]

Unlike (10), however, (15) has an unexpected reading, that is best characterized by scoping DegP above the quantified DP in (15). Very informally, this reading amounts to asserting that if I've learned more about comparatives at a time period t_2 than at t_1, then the general level of my appreciation of every paper on the topic is greater at t_2 than it is at t_1. (17) represents the relevant LF and truth conditions:[5]

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[5] While our informants agree that unlike (10), (15) is ambiguous, they disagree about the exact conditions that make the second reading of (15) true. For some of them, the conditions are the ones we derive in (17). They amount to requiring that the minimal level of appreciation of a paper at t_2 is greater than the minimal level of appreciation of a paper at t_1, where t_2 is a period when I've learned more about comparatives than at t_1. For other informants, these conditions are stronger than needed. According to that intuition, (17b) make (15) true but for (15) to be true it suffices that some paper is better appreciated at t_2 than at t_1. As a speculation, we think that the intuitions differ for the following reason: whenever I read a paper, I increase my level of knowledge and every consecutive paper is read with a greater appreciation than the paper before that. In other words, the time periods might be too small to fit the dynamically changing level of appreciation, because that level changes with every new paper. While we readily agree that (17) does not do

(17) a. [$_{CP}$ [$_{CP}$ [$_{DegP}$ the more] [$_{C'}$ [1[$_{IP}$ I [$_{VP}$[$_{VP}$ learn [$_{PP}$ about comparatives]] [$_{AP}$$t_1$-much]]]]]][$_{CP}$[$_{DegP}$ the more][$_{C'}$[3[$_{IP}$ I [[$_{DP}$ every paper on the topic] [2 [$_{VP}$[$_{VP}$ appreciate t_2] [$_{AP}$$t_3$-much]]]]]]]]]

b. $\forall(t_1,t_2)$ [max(λd.[d-*much* (*λz.learn* (*about_comparatives*)(z) at t_1)](I)) < max(λd.[d-*much* (*λz.learn* (*about_comparatives*)(z) at t_1)](I)) ⇒ max(λd.[∀x[*paper_on_ the_ topic*(x) at t_1 →[d-*much*(λy.*appreciate*(x)(y) at t_1)](*I*)]]) < max(λd.[∀x[*paper_on_ the_topic*(x) at t_2 → [d-*much*(λy.*appreciate*(x)(y) at t_2)](*I*)]])

Most importantly for us, (17) is an instantiation of the structural configuration in (18), which is disallowed by Kennedy's generalization (more exactly by the principle behind it):

(18) DegP quantified DP t_{DegP}

At the beginning of this section, we alluded to the possible reason that allows (18): whenever DegP movement is overt, DegP and it trace can be separated by a quantified expression; if DegP movement is covert (18) is illegitimate. Now, we have enough evidence to conclude that this is indeed the case. We considered the "regular" comparative in (10), and a CC in (15) that have the same syntactic structure (in the relevant respect). They only differ with respect of the timing of DegP movement: overt in the CCs and covert in the other case. Therefore, that difference must be crucial in allowing (18) in CCs. We believe that this difference accounts also for the contrast between the two types of comparatives sentences in German that we discussed at the beginning.

The conclusion we reached calls for a modification of Kennedy's generalization. We suggest the formulation in (19):

(19) If the scope of a quantificational expression contains the **LF** trace of a DegP, it also contains DegP itself.

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justice to the second type of intuitions, we believe that it is the best approximation and leave for future research its more finely grained structure.

That formulation raises a question about the status of the constraint related to Kennedy's generalization. Is it an independent principle of grammar? As an interface condition, (19) is strongly reminiscent of Beck's (1996a) Minimal Quantified Structure Constraint (MQSC), given in (20):

(20) If an LF trace β is dominated by a Quantifier-Induced Barrier (= the first node that dominates a quantifier, its restriction, and its nuclear scope) α, then the binder of β must also be dominated by α.

MQSC is formulated as a more general interface principle about intervention effects induced by a quantified expression, while (19) covers a smaller empirical domain which falls under it. We propose then, that Kennedy's generalization be reduced to MQSC. In the next section, we briefly review Beck's independent evidence for MQSC.

4.1.2. Independent evidence for the constraint on LF-movement

Beck (1996a) discusses four cases from German, related to *wh*-movement, that motivate MQSC. All of them point to the conclusion that LF movement is more constrained than overt movement. A quantified expression intervening between a moved element and its trace leads to ungrammaticality or loss of ambiguity. But this is true only if traces result from LF movement. Let's look at some data. Beck considers the following constructions: scope-marking questions, exemplified in (21a), multiple wh-questions, exemplified in (21b), the *wh-alles* construction in (21c) and a construction in which the restriction of a *wh*-phrase is left behind after overt *wh*-movement, as in (21d):

(21) a. Was glaubt Luise wen Karl gesehen hat?
What believes Luise whom Karl seen has
'Who does Luise believe that Karl saw?'

b. Wen hat Luise wo gesehen?

Who has Luise where seen
'Where did Luise see whom?'

c. Wen hat Luise alles gesehen?
Whom has Luise all seen
'Who-all did Luise see?'

d. Wen hat Luise von den Musikern getroffen
whom has Luise of the musicians met
'Which of the musicians did Luise meet?'

The scope-marking question in (21a), as Beck argues, is interpreted like a regular long-distance question in German. That requires that the *wh*-phrase *wen*, from the embedded clause, is covertly raised to take scope over the whole question. Beck also argues on semantic grounds that each of the underlined expressions in the rest of the examples must raise at LF: the *wh*-phrase in-situ in (21b) must be interpreted in [Spec,CP]; *alles* in (21b) universally quantifies over a question denotation, so it must take scope over the whole question at LF; and finally the restriction of the D-linked *wh*-phrase must be interpreted along with the *wh*-element, so the restriction must also raise to [Spec,CP].

Raising the underlined phrases is possible in each of the examples in (21), since they are acceptable. However, if the proper name, which, being in the subject position c-commands the moved element, is replaced by a quantified expression, the status of the sentences changes: they become unacceptable:

(22) a. ??Was glaubt niemand wen Karl gesehen hat?
What believes nobody whom Karl seen has
'Who does nobody believe that Karl saw?'

b. ??Wen hat niemand wo gesehen?
Who has nobody where seen
'Where did nobody see whom?'

c. ??Wen hat niemand alles gesehen?
Whom has nobody all seen

'Who-all did nobody see?'

d. ??Wen hat keine Studentin von den Musikern getroffen
whom has no student of the musicians met
'Which of the musicians did no student meet?'

The conclusion to be drawn from the contrast between (21) and (22) is that the quantified expressions in (22) intervene between each moved element and its trace. That causes the ungrammaticality in the latter case. However, that conclusion is too strong. As (23) shows, the quantified expressions don't cause a problem if they separate an overtly moved expression and its trace:

(23) a. Wen glaubt niemand daß Karl gesehen hat ?
What believes nobody that Karl seen has
'Who does nobody believe that Karl saw?'

b. Wo hat niemand Karl gesehen?
Where has nobody Karl seen
'Where did nobody see Karl?'

c. Wen alles hat niemand gesehen?
Whom all has nobody seen
'Who-all did nobody see?'

d. Wen von den Musikern hat keine Studentin getroffen
whom of the musicians has no student met
'Which of the musicians did no student meet?'

The contrast between (22) and (23) requires a characterization of intervention effects that makes reference to the type of movement involved in creating the offending configuration in (24):

(24) *Q_1 Q_2 t_1

Therefore, MQSC, which Beck proposes, applies only to LF movement.

From a different empirical point, we reached the same conclusion, namely, that LF movement of DegP is more restricted than overt movement. We have also observed that Beck's filter is general enough to cover also the cases related to comparatives.

Finally, it is important to mention that Bošković (1998) and Bošković (2000) reach independently Beck's conclusion that LF movement is more restricted than overt movement. Here is one of Bošković's arguments. French is a language that has overt *wh*-movement but allows a *wh*-phrase to remain in situ in certain well defined contexts. This is illustrated in (25):

(25) a. Tu as vu qui?
you have seen whom
'Who did you see?'
b. Qui as-tu vu

Bošković brings evidence that the *wh*-phrase in-situ in (25a) must undergo movement to C at LF. In long-distance questions, however, *wh*-phrases can't remain in situ. Consider (26) in this respect:

(26) a. *Jean et Pierre croient que Marie a vu qui
Jean and Pierre believe that Marie has seen whom
'Whom do Jean and Pierre believethat Marie saw?'
b. Qui Jean et Pierre croient-ils que Marie a vu

Like in (25a), the *wh*-phrase in the long-distance question (26a) must undergo LF-movement to the matrix C. But the contrast between (25a) and (26a) shows that long distance *wh*-movement is clause-bounded at LF. Crucially, this is not so with overt movement, as we can see from (26b). Therefore, Bošković concludes, LF-movement must be more restricted than overt movement. Bošković offers an account in terms of feature movement. Under Chomsky's (1995) Move F hypothesis, LF movement applies to feature bundles, not to whole lexical items. Feature movement is an instance of head movement.

Consequently, crossed heads are interveners in the sense of Relativised Minimality. In (26a) the embedded complementizer, an A' head, blocks the LF movement of the *wh*-features to the matrix C, also an A' head. Since overt movement applies to whole categories, no intervention effect is observed in (26b).

We take the fact that Beck (1996a) and Bošković (1998) converge on their view about the relative restrictedness of LF-movement to indicate that the conclusion is on the right track. But, although they make a very similar claim, the empirical basis for each of the accounts is somewhat different and it isn't immediately obvious that either account can be extended to the whole set of data. Beck's account refers to inherently quantified elements as interveners. Also, very importantly, the cases that Beck considers involve phrasal movement. Bošković identifies a different set of interveners. Perhaps it is desirable, on conceptual grounds, that the two sets of data find a common explanation. In the lack of an obvious general proposal, however, we side with Beck's account because our data are, in the relevant respect, very similar to the data for which MQSC was originally proposed.

4.2. Plural operators as interveners

The following generalization emerges from our discussion of the quantificational properties of comparatives: quantified DPs are interveners for LF movement of the comparative DegP and Beck's filter, MQSC, applies to these cases; intensional verbs are not interveners, therefore split scope readings with comparatives are possible *(cf. Section*

3.2.4).[6] The conclusion about intensional verbs is in line with Swart (1992), Beck (1996a) and Honcoop's (1998) conclusion that intensional verbs do not count as interveners for a quantifier and its restriction, i.e. they can separate the two.

In this section, we address the question whether plural operators are interveners. We argued previously, along with Schwarzschild (1996) and others, that the plural operators are scope bearing elements. But then, we would like to know whether they pattern with quantified DPs or with intensional verbs with respect to causing intervention effects. We apply the tests that Heim (2000) uses for quantified DPs to constructions involving distributive and cumulative readings on the assumption that these readings come about from the application of a distributive or cumulative operator (cf. Link (1983), Scha (1984), Roberts (1987), Schwarzschild (1996), Brisson (1998), Sternefeld (1998), Beck (2000), etc.). We will conclude that plural operators pattern with quantified DPs: they are interveners.

4.2.1. The distributive operator

How do we interpret (27)? What intuitions do we have about it?

(27) (Mary is 180sm tall.) Scott and Bill are less tall than that.

Under the hypothesis that the distributive (D-) operator is not an intervener, i.e. it patterns with intensional verbs, all else equal, (27) should give rise to two readings, corresponding to a wide and narrow scope of DegP with respect to the scope of the D-operator. The intuitions, however, don't go in that direction. The sentence has a distributive reading

[6] Since we argued that the superlative DegP doesn't have significant scopal properties, MQSC is irrelevant to the superlative DegP.

according to which Scott is shorter than 180sm and Bill is shorter than 180sm. No other distributive reading is intuitively available for (27).

But let us see under what conditions (27) would be predicted to be true if both scopal orders were possible. Consider first (28). It gives a LF where the D-operator has wider scope:

(28) a. $[_{IP}\ [_{DP}$ Scott and Bill$]\ {}^{D}[1[[_{DegP}$ er than that$]$ $[2[\ t_1$ is t_2 tall$]]]]]$
b. $[{}^{D}\lambda x.\ \max(\lambda d.\textit{tall}(d)(x))<180sm]$ (Scott⊕Bill)

Recall that in *Chapter 3* we assumed that the D-operator has the following semantics:

(29) $[[D]] := \lambda P{:}P\in D_{<e,t>}.[\lambda X{:}D_e.[\forall x[x\in X \rightarrow x\in P]]]$
where X denotes a group individual, and x denotes a singular individual

(28b) predicts (27) to be true just in case every member of the group denoted by Scott⊕Bill has the property $\lambda x.[max(\lambda d.tall(d)(x))<180sm]$. In simpler language, if Scott's height is less than 180sm and Bill's height is less than 180sm, then sentence will be true. The resulting interpretation supports our intuitions.

Now let's check the alternative LF with DegP taking wider scope than the D-operator.

(30) a. $[_{IP}\ [_{DegP}$ er than that$][2[[_{DP}$ Scott and Bill$]\ {}^{D}[1\ [\ t_1$ is t_2 tall$]]]]]$
b. $\max(\lambda d.[{}^{D}\lambda x.\text{tall}(d)(x)](\text{Scott}\oplus\text{Bill})) < 180sm$

According to (30b), (27) should be true only if the maximal height of the lower of the two men, Scott and Bill, is lower than 180sm. These conditions are counterintuitive. We can appeal to MQSC to rule out the LF in (30b): the D-operator intervenes between the LF-moved DegP and its trace. But then we must assume that the D-operator is similar to quantified DP and it is an intervener.

Let's look at one more example to support further the conclusion. Heim (2000) showed that MPs allow to derive two logically unequavalent sets of truth conditions in comparative sentences with a quantified DP. MPs give the same theoretical possibility for comparative sentences with distributive readings. Consider (31):

(31) (Scott is 175sm tall.) Mary and Amy are exactly 5sm taller than that.

Like in the example above, having the D-operator take wider scope than DegP at LF allows us to derive the only attested reading of (31): Mary is 5 sm taller than Scott and Amy is 5sm taller than Scott. (32) illustrate the point:

(32) a. $[_{IP}\ [_{DP}$ Mary and Amy$]\ ^{D}[1[[_{DegP}$ 5sm er than that$]\ [2[\ t_1$ is t_2 tall$]]]]]$
b. $^{D}\lambda x.\ [\max(\lambda d.\textit{tall}(d)(x)) = 175+5sm]$ (Mary$\oplus$Amy)

If DegP moves across the D-operator, we get counterintuitive truth conditions: (31) is predicted to be true iff the height of the shortest girl is exactly 180sms, as we see from (33):

(33) a. $[_{IP}\ [_{DegP}$ [5 sm] er than that$][2[[_{DP}$ Mary and Amy$]\ ^{D}[1\ [\ t_1$ is t_2 tall$]]]]]$
b. $\max(\lambda d.[^{D}\lambda x.\text{tall}(d)(x)](\text{Mary}\oplus\text{Amy})) = 175+5sm$

The LF in (33b) can be ruled out by MQSC. But then again, we have to conclude that the D-operator intervenes between DegP and its trace.

4.2.2. The cumulative operator

We concluded in the previous section that one of the plural operators, the D-operator patterns with quantified DPs and not with intensional verbs with respect to causing intervention effects for DegP movement. Now, we are going to examine the properties of another plural operator, the cumulative operator.

The cumulative operator, also known as the co-distributive or the **-operator, is at work in the interpretation of sentences like (34a) with the intended reading in (34b).

(34) a. Ina and Amy married Scott and Bill.
b. Ina married Scott or Bill and Amy married the other one.

The **-operator is defined in the spirit of Krifka (1986), Sternefeld (1998), Sauerland (1998), Beck (1999), as in (35):

(35) $[[**]] := \lambda R{:}R \in D_{<e,et>}.\lambda X{:}X \in D_e.\lambda Y{:}Y \in D_e.[\forall x[x \in X \rightarrow \exists y[y \in Y \ \& \ R(x)(y)]] \ \& \ \forall y[y \in Y \rightarrow \exists x[x \in X \ \& \ R(x)(y)]]]$

Let us briefly illustrate how we derive the desired interpretation for (34a) with the help of the **-operator before we go back to the question of main interest, namely whether that operator is an intervener in the sense of MQSC. As we see from (35), the cumulative operator applies first to a two place relation *R*, so we must find such a relation in the LF of (34) and adjoin the operator to the node related to *R*. The appropriate *R* for (34) is $\lambda y.\lambda x.$*married*(y)(x). That's where the cumulative operator will be attached:

(36) a. [[Ina and Amy][Scott and Bill] [**[2 [1 [t_1 married t_2]]]]]

b. $[**\lambda y.\lambda x.\text{marry}(y)(x)](\text{Scott} \oplus \text{Bill})(\text{Ina} \oplus \text{Amy}) \Leftrightarrow$
$\forall y[y \in \text{Scott} \oplus \text{Bill} \rightarrow \exists x[x \in \text{Ina} \oplus \text{Amy} \ \& \ \text{married}(y)(x)]] \ \&$
$\forall x[x \in \text{Ina} \oplus \text{Amy} \rightarrow \exists y[y \in \text{Scott} \oplus \text{Bill} \ \& \ \text{married}(y)(x)]]$

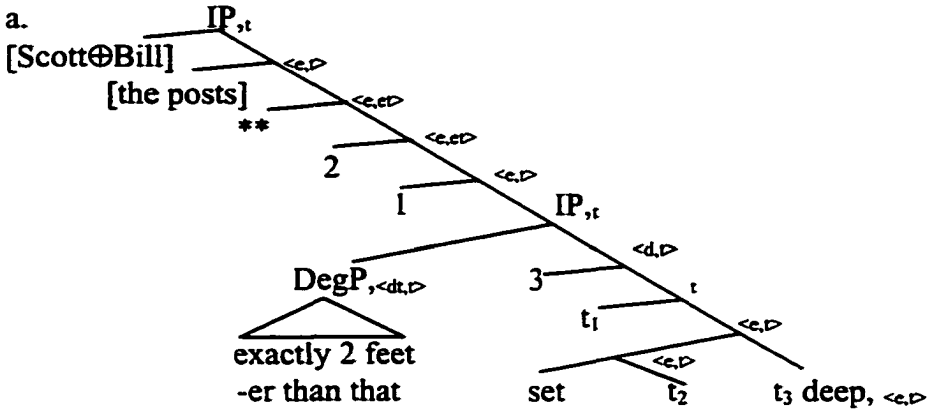
The truth conditions we ended up with in (36) require that for any of the members *y* of the group individual Scott⊕Bill there is a member of the group individual Ina⊕Amy who married y. Also, for any of the members *x* of the group Ina⊕Amy there is some member of the group Scott⊕Bill whom *x* married.

Back to comparative constructions. Consider (37), which is similar to Heim's example in (10) which we discussed earlier. This time, there is no quantified DP in it. Instead, judging by the intuitive interpretation, there is a **-operator in (37):

(37) (The frostline is 3 and a half feet deep.) Scott and Bill set the posts exactly 2 feet deeper than that.

Following a by now familiar practice, we examine the two possible LF that result from having DegP scope under or above the **-operator. (38) illustrates the first option:

(38) a.

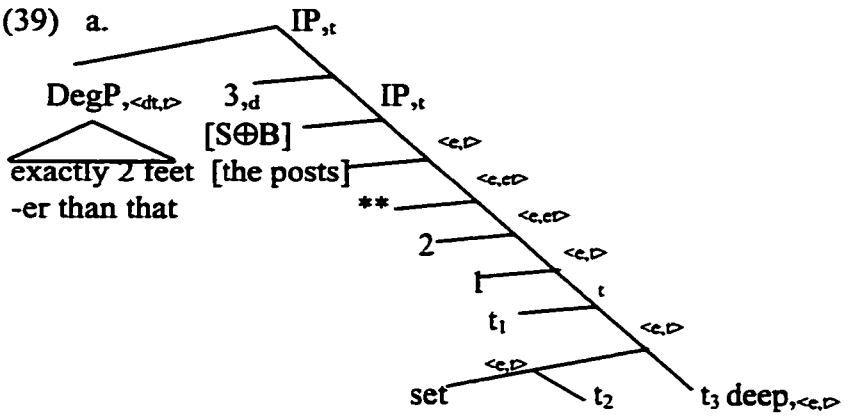


b. [**λx.λy.[max(λd.[d-deep(λz.set(y)(z))](x)) = 3+2 feet]]([[the posts]])(Scott⊕Bill)

Given the LF in (38), where DegP has narrower scope than the cumulative operator, (37) is predicted to be true just in case that for any member *y* of the group [[the posts]] there is an individual, who is a member *x* of the group Scott⊕Bill such that x set y exactly 2 feet below the frostline and for any member *x* of the group Scott⊕Bill, there is a member *y* of the group denoted by [[the posts]] such that *x* set y exactly 2 feet below the frostline. These conditions coincide with the intuitions one has about the meaning of (37). In fact, this is the only reading that (37) has.

Now let's look at the other logical possibility to order the scope relations between DegP and the **-operator. (39) suggests the corresponding LF:

(39) a.



b. max(λd.[**λx.λy.[d-deep(λz.set(y)(z))](x)]]([[the posts]])(Scott⊕Bill)) = 3+2 feet

(39b) predicts (37) to be true if and only if for any of the members of the group Scott⊕Bill it is true that he sets some posts and for any of the members of the set of posts it is true that that post is set by Scott or Bill. In addition the posts that are set the least deep must be exactly 2 feet below the frostline. That allows some posts to be set 3 feet below the frostline, others 4 feet, etc. But these conditions are counterintuitive. Therefore, the LF in (39) must be excluded. We have a way of doing that by MQSC. However, this is only possible on the assumption that the cumulative operator is an intervener.

4.3. A derivational versus a representational approach to locality of LF-movement

Transformational grammar, uses well defined constraints that restrict its derivational power. There is an ongoing debate whether constraints apply derivationally or at levels of representation. The list of relevant references extensive, and we can only point to a tiny fraction of it: Browning (1991), Brody (1995), Lasnik (2001), Uriagereka (1998), Chomsky (1998), Epstein (2000).

The discussion of plural operators and comparatives provides us with a semantic argument for the representational approach to locality of LF-movement. Here is why. Recall that the configuration in (40) is banned by Beck's MQSC, from which we deduced Kennedy's generalization.

(40) *DegP Operator t_{DegP}

Depending on whether MQSC is taken to apply derivationally or representationally, we end up with different predictions for the well-formedness of some LFs that contain operators with no phonological input. Building on Chomsky (1995), Bošković (1998) argues that nothing prevents elements which lack phonological features from entering the syntactic structure in the covert component. Also nothing prevents elements lacking semantic features from being inserted in PF. The reasoning goes like this. If a lexical item like *yesterday* is inserted after Spell-Out in the phonological component, its semantic features will be uninterpretable at that component. Consequently, the derivation will crash. If the same word is inserted in LF, the derivation will crash because the phonological features of that lexical item will be uninterpretable at LF. Therefore words that are contentful semantically and have phonological features must be inserted in the overt syntactic component. PF strips the phonological features, and the semantic features proceed into LF. But if an item is defective in the sense that it lacks semantic of phonological features, it can enter the structure after Spell-Out. We will be interested in the first option we mentioned: to have an item without phonological features be inserted into the structure at LF. The cumulative operator, to the best of our knowledge, has no

attested covert counterpart.[7] It doesn't have to enter the structure in LF but having that option suffices to avoid a violation of MQSC, assuming that MQSC applies derivationally. In other words, (41) should be a possible LF configuration if MQSC applies derivationally:

(41) ✓DegP **-operator t_{DegP}

The timing of inserting the **-operator and applying MQSC could be the following: (i) move DegP, (ii) apply MQSC, (iii) insert the **-operator.

If, on the other hand, MQSC is a constraint on representations, the option of inserting the cumulative operator late can't help to save an LF from violating MQSC.

We argued in this thesis that the comparative operator is a quantificational element. So is the cumulative operator. But we also observed in the previous section that in those linguistic contexts where MQSC could, in principle, rule out a LF, only one of the possible two scopal orders is attested for DegP and the **-operator (similarly to the cases involving a quantified DP instead of the **-operator). In other words, in those revealing contexts where no other potential reason, except MQSC, can account for the ill-formedness of a LF, we found that DegP cannot scope above a c-commanding **-operator (cf. 39). If MQSC were a derivational constraint, the LF in (39) could have been saved by the loop-hole of inserting the potential intervener after MQSC has applied. But then, contrary to fact, (37) should have been ambiguous. Therefore, we conclude that MQSC is a constraint on representations.

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[7] Following the spirit of the Schwarzschild (1996)'s analysis of *together*, we assume that *respectively* is not the cumulative operator but an adverbial that is a "plurality seeker" i.e. its semantics requires that it be attached to cumulated VPs.

Note that even if (37) were ambiguous, that would not have been considered a clear evidence that MQSC is derivational. Merely, the derivational view would have been consistent with the facts. Two conclusions would follow if (37) were ambiguous: either that the **-operator is not an intervener and MQSC could apply derivationally or representationally, or that the **-operator is an intervener and MQSC is a derivational constraint. But since (37) is unambiguous and the only reading it allows is derived through a LF that doesn't violate MQSC, we must conclude that MQSC is a representational approach, and also, that the cumulative operator is an intervener.

This argument for a representational approach to constraints on locality supports independently Beck's (1996b) view. Beck also argues that MQSC cannot be stated in derivational terms. The argument she gives is based on *wiefiel* (how many) questions in negative islands.[8] In short, *wiefiel* questions, which are usually ambiguous between what is known as a referential and a non-referential reading of the *wiefiel-* phrase, lose the non-referential reading in the context of negation, as (42) illustrates:

(42) a. Wiefiele Hunde hat Karl nicht gefüttert
how many dogs has Karl not fed
'How many dogs didn't Karl feed?

b. For which n: There are n dogs that Karl hasn't fed.

c. #For which n: It is not the case that Karl has fed n dogs.

Following a suggestion from Heim (1992), Beck argues that the non-referential reading of (42) is derived by reconstructing part of the *wiefiel*-phrase in the scope of negation. The

[8] We will not review the argument in detail here because that would require reviewing thoroughly the compositional interpretation of questions. The interested reader is referred to Chapter 4, *Section 4.2.2.* of Beck (1996b).

reconstructed part contains the trace of the wh-operator that stays outside the scope of negation. This configuration is ruled out by MQSC but only on the assumption that MQSC applies representationally. If MQSC applied derivationally, (42c) should have been a possible reading of (42) because reconstruction could follow the application of MQSC.

To conclude, we converge with Beck that MQSC must be stated as a constraint on representations.

CHAPTER 5

The Bigger Picture

5.1. Schwarzschild and Wilkinson's problem and MQSC

The major proposal that we made in the thesis is that there is no scope bearing degree element in the superlative construction, while the head of the comparative construction is a quantificational element. In *Chapters 2* and *4* we discussed contexts like (1) which don't allow one to observe any scope interaction between the quantified DP and the comparative operator:

(1) (Scott is 180sm tall.) Every girl is less tall than that.

As the discussion so far made it clear, there is a "missing" reading in (1): a reading derived from having the comparative operator scope above *every girl*. If that reading were attested, (1) would be true in any situation in which the shortest girl is taller than 180sm. But this goes against the intuitions one has for (1): it is not ambiguous and is true just in case the tallest girl is shorter than 180sm. Following Heim (2000), we appealed to an interface constraint that disallowed the LF derived by scoping the comparative DegP across the quantified DP. We further argued, on the basis of cases involving overt movement of DegP, that Heim's constraint should be reduced to the more general Beck filter on LF-movement. There is a set of data involving the comparative construction, which we have carefully avoided so far, and which, in the relevant respect poses a similar question to the quantificational theory of comparatives. We offer here some speculations about that. These data involve quantifiers in the *than*-clause. The problem has been known

for many years, but recently examined in great detail in Schwarzschild and Wilkinson (2002). A few examples are given in (2):

(2) a. Scott is taller than every girl.
b. Scott is taller than every girl is.
c. Scott is taller than most of the others.
d. Scott is taller than most of the others are.
e. Scott is taller than exactly three girls.
f. Scott is taller than exactly three girls are.

Similarly to (1), all of the sentences in (2) are unambiguous. And, again, the quantified DP cannot stay in the scope of the comparative operator. To see that, let us look more carefully at (2b), for example. If *every girl* is interpreted in-situ, we derive counterintuitive truth conditions, as (3b) shows. The LF in (3a) results from resolving ellipsis in the *than*-clause through LF copying:[1]

(3) a. $[[_{DegP}$ er than wh_2 every girl is $\mathbf{t_2}$-**tall**$]$ $[1[_{IP}$ Scott is t_1-tall$]]]$
b. $\max(\lambda d.\textit{tall}(d)(\text{every girl})) < \max(\lambda d.\textit{tall}(d)(\textit{Scott}))$

According to (3b), (2b) is true only if Scott is taller than the shortest girl. To derive the intuitive truth conditions, which make the sentence true only if Scott is taller than each of the girls, i.e. he is taller than the tallest girl, one has to allow the universal quantifier in (2b) to QR above the *than*-clause outside of the scope of the comparative operator. And further, one has to stipulate that QR in this context is obligatory since the reading derived when QR doesn't apply is unattested, as we saw from (3). So, let's make sure that QR leads to the desirable truth conditions:

(4) a. $[$[every girl]$]$ $[3[_{DegP}$ er than wh_2 t_3 is $\mathbf{t_2}$-**tall**$]]$ $[1[_{IP}$ Scott is t_1-tall$]]]$
b. $\forall x[\text{girl}(x) \rightarrow \max(\lambda d.\text{tall}(d)(x)) < \max(\lambda d.\text{tall}(d)(\text{Scott}))$

[1] The degree variable which is copied along with the scalar predicate *tall* in the *than*-clause is bound by a *wh*-operator in the same clause. This is a standard assumption of the quantificational theory of comparatives, which we discussed in *Chapter 1*.

These are indeed the desired results. But does MQSC, which we argued to be accountable for "missing" readings like those in (1) also extend to quantifiers in the *than*-clause? Since quantifiers behave similarly in the two types of contexts, we expect that their inability to appear in the scope of the comparative operator to have the same explanation. If we are on the right track, then the answer is Yes, MQSC rules out the LF in (3a), and this creates the effect of illusionary obligatoriness of QR. Let us elaborate.

We picked the clausal comparative in (2b), as an exemplary case because it is somewhat easier to see the relevance of MQSC in clausal comparatives. Recall, that the standard quantificational theory assumes that ellipsis in the *than*-clause is resolved similarly to ACD in sentences like *John dated every girl Bill did. -er* and its restriction, the *than*-clause with which it forms a constituent, is QR-ed in the covert component, which makes it possible to reconstruct the elided predicate. That predicate contains the trace of the moved DegP. QR itself doesn't violate MQSC, unlike in the wide scope DegP "reading" of (1). DegP in (3a) doesn't raise across an intervener. What makes (3a) illegitimate is reconstructing the trace of DegP in the *than*-clause and thus creating the configuration *DegP intervener* t_{DegP}. We argued in *Chapter 4* that MQSC must apply representationally rather than derivationally. Now we can see that if we are correct in assuming that a violated MQSC accounts for the missing readings in (2), we have one more argument that the condition applies representationally. If it applied derivationally, the LF in (3a) could be saved by having MQSC apply before LF-copying.

Some explanation is now in order for the phrasal comparatives in (2a), (2c), and (2e). Recall from our discussion in *Chapter 1* that there is no agreement on the question

whether these involve ellipsis in the *than*-clause. If they do, then the "missing" wide scope DegP reading must be attributed to MQSC without further discussion: the reconstructed predicate *be d-tall* contains an offending trace which is separated from its binder by an intervener.

The (semantic) alternative to an ellipsis-based analysis of phrasal comparatives is the direct analysis, suggested by Heim (1985). We will briefly review a close relative of that proposal and after that we will consider its implications for the "missing" readings in the phrasal comparatives in (2).[2]

Any comparative construction, be it causal or phrasal, needs two predicates: one to be ascribed of the subject, and another, of the DP-complement of the preposition *than* in the case of phrasal comparatives, or the subject of the *than*-clause in the case of clasal

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[2] In a nutshell, Heim proposes that phrasal comparatives contain a comparative operator with the following semantics: *-er* has two arguments: an ordered pair of individuals, and a scalar predicate - a relation between a degree and individual. It is defined as in (i):

(i) $[[\text{-er}]]^{<x,y>}(R_{<d,et>}) = 1$ iff $\max(\lambda d.R(d)(x)) > \max(\lambda d.R(d)(y))$

For example, the LF of (iia), is derived without reconstruction in the *than*-clause. Rather, the DP *Amy* adjoins to the subject of the main clause, and *-er* adjoins to that constituent, as in (iib):

(ii) a. Scott is taller than Amy.

b. $[_{IP}$ [er $[_{DP}$Scott Amy]] [1[2[t_2 is t_1-tall]]]]

(6b) leads to the interpretation in (iii):

(iii) $\max(\lambda d.\textit{tall}(d)(\textit{Scott})) > \max(\lambda d.\textit{tall}(d)(\textit{Amy}))$

According to (8), (6a) is true only if the degree to which Scott is tall is greater than the degree to which Amy is taller. The conditions correspond to speakers' intuitions. However, as Lerner and Pinkal (1995) point out the syntactic status of these two adjunction operations, especially the adjunction of the DP that starts in the *than*-phrase to the subject, is unclear. In addition, we also believe that the semantic interpretation in not, strictly speaking compositional. If it were, [[-er]] would not apply to the pair of individuals denoted by each DP but rather to the denotation of the constituent that dominates the two DPs. But it isn't obvious to us that the denotation of that constituent in an ordered pair of individuals. To avoid these problems, we consider a variant of the original proposal. It is in the spirit of the direct analysis, and is a straightforward extension of Heim's (1999) proposal about the interpretation of superlatives.

comparatives. The surface representation of comparatives, however, contains only one such predicate (cf.(2)). The standard solution for clausal comparatives, as we discussed many times by now, is to assume that the predicate in the *than*-clause is syntactically reconstructed. The alternative, that Heim suggests and exploits in her 1985 paper on comparatives is semantic ellipsis. Recall that semantic ellipsis refers to a phenomenon triggered by an operator that requires using the denotation of an expression twice in the interpretation. The direct analysis gives such semantics to the comparative operator: one of its arguments is a relation between a degree and an individual: it applies once to the individual denoted by the subject and once more to the individual denoted ny the DP in the *than*-clause. For this to be possible, however, DegP must always raise at a minimal distance above the main verb in order to derive the appropriate relation which can be an argument of *-er*. *-er* is specified in the lexicon as in (5):

(5) $[[er]] := \lambda y{:}y \in D.[\lambda R{:}R \in D_{<d,et>}.[\lambda x{:}x \in D.\max(\lambda d.R(d)(x)) > \max(\lambda d.R(d)(y))]]$

As we see from (5), *-er* applies first to the denotation of the *than*-phrase. Since *than* is semantically vacuous, the denotation of the PP is the denotation of the DP, an individual. The second argument of *-er* is a relation. Finally, *-er* takes an individual as an argument to yield true just in case the maximal degree of the set of degrees related to the individual from the main clause is bigger than the maximal degree of the set of degrees related to the individual from the *than*-phrase. A sample derivation involving phrasal comparatives is given in (6):

(6) a. Scott is taller than Amy.
b. $[_{IP}$ Scott $[_{DegP}$ er than Amy] [1[2[t_2 is t_1-tall]]]]
c. $[[er]]([[Amy]])(\lambda d.\lambda x.tall(d)(x))([[Scott]]) = 1$ iff
$\max(\lambda d.tall(d)(Scott)) > \max(\lambda d.tall(d)(Amy))$

Now, we are ready to go back to (2a): *Scott is taller than every girl.* Under Heim's proposal, (7) is the LF of (2a):

(7) $[_{IP}$ Scott $[_{DegP}$ er than every girl] [1[2[t_2 is t_1-tall]]]]

In phrasal comparatives, in contrast to clausal comparatives, *-er* must apply directly to the denotation of the DP in the *than*-phrase. However, in (2a) that DP is not of the appropriate type. -er's first argument is an individual but *every girl* denotes an expression of type <et,t>. To resolve the type mismatch, *every girl* must be QR-ed. And no matter how short than movement is, it will be above the scope of the comparative operator. But this, in turn, explains why in phrasal comparatives like (2a), (2c), and (2e), the only attested reading is the one where DegP scopes below the quantified DP.

To summarize the discussion so far, we addressed the question about missing readings in the comparative construction, involving quantified expressions in the *than*-clause. We extended the MQSC-based explanation to at least clausal comparatives. Crucially, we argued that the disallowed configuration in which a quantified expression intervenes between DegP and its trace is created as a result of the reconstruction process in the *than*-clause. We argued that even if phrasal comparatives do not involve ellipsis, there is an alternative explanation that accounts for the wide scope of a universal quantifier there.

We need to acknowledge, however, that Schwarzschild and Wilkinson (2002) present an argument against QR-ing a quantified expression out of a *than*-clause. And this might be a potential problem for us since we argued that such DPs cannot be interpreted in the scope of DegP , rather they must move out of the c-command domain of DegP in LF. We leave our answer to this challenge for future research. But first, let us present

Schwarzschild and Wiskinson's argument. It involves sentences with a quantifier in the *than*-clause buried in the scope of another scope bearing element. (8) is such an example:

(8) Bill did better than John predicted most of his students would do.

Consider (8) in the context where John predicts that most of his students will get a score between 80 and 90 on the exam. If John gets 96 points, (8) can truthfully be uttered in this context. But how is the sentence interpreted? The problem with the quantifier *most of his students* in the *than*-clause resurfaces as it did in (2). If it is interpreted in situ, we get too weak truth conditions for (8). The sentence is predicted to be true if John makes a prediction that the bigger portion of his students will score within a particular range and Bill scores more than the lower limit that John sets but not more than the higher limit. For example, if Bill gets 81 points, (8) will still be true in the context where John predicts that most of his students will get between 80 and 90 points. This type of problem was explained as a violation of MQSC in clausal comparatives in (2) and resolved by QR-ing the quantifier out of the *than*-clause. But, for (8) that solution doesn't work. Suppose we QR that quantifier and give it wider scope than DegP. Then (8) will have the truth conditions in (9):

(9) Most of John's students are x such that: Bill did better than John predicted x would do.

The problem with (9) is that the first argument of the comparative operator, *λd.John predicted x to do d-well*, is the empty set since John made no predictions about the scores of particular students. The *max* operator cannot apply to an empty set of degrees because the maximum of that set is undefined. And consequently, contrary to speakers' intuitions (8) is not predicted to be true in the context we considered. As a solution, Schwarzschild

and Wilkinson (2002) develop a new theory of scalar predicates where the degree argument of gradable adjectives/adverbs is in fact an interval, rather than a point on the scale.[3]

This is not to say that the MQSC account of "missing" readings, for which we argued, must be wrong. Rather, the solution relying on QR out of the *than*-clause, is problematic in light of (8). Either, there is an alternative strategy altogether that is used in deriving the interpretation of (8) and the interpretation of the sentences in (2), or such a strategy is available along with QR out of the *than*-clause but for an independent reason, it is the only option when the quantifier is embedded under another scope bearing element in the *than*-clause.

5.2. Comparison in natural language

The common sense quantificational theory of comparison, which has been, in general, the standard theory of comparison, implies that (10a) and (10b) contain quantificational elements:

(10) a. Ina is taller than Scott.
b. Ina is the tallest.

Since the gradable adjective/adverb provides a variable to be bound by the comparative or superlative operator, it follows that even in the absolute construction, illustrated in (11), there is a quantificational element that binds the degree variable of the scalar predicate. If

[3] We will not review that proposal here, since that lies beyond the scope of our research question related to the relevance of MQSC to quantifiers in the *than*-clause. It is worth pointing out, however, that the interval-based approach, although very appealing as an alternative to the degree-based approach in light of the data in (8), faces problems with accounting for split scope readings in intensional contexts. For that, see also Hackl (2000).

such an operator is absent, the degree variable of *tall* will remain unbound. Let us illustrate the point with (11):

(11) Ina is tall.

The degree operator in the absolute construction is often assumed to be a similar to *-er* differing only with respect to the comparison relation: *(at least) as great as*, as opposed to *greater than*. Its lexical entry is specified in (12):

(12) $[[\text{abs}]] := \lambda d{:}d \in D_d.[\lambda R{:}R \in D_{<d,t>}.\max(\lambda d.R(d)) \geq d]$

The standard of comparison is provided by some contextually relevant degree. (11), then, will have the LF within the lines of (13a), and an interpretation as (13b), which predicts the sentence to be true just in case the height of Ina exceeds some degree d_c (on the same scale) that the context makes salient. For example, if Ina is a 9-year old child, d_c could be 140sm:

(13) a. [[**-er** than d_c] [1[Ina is t_1-tall]]]
b. $\max(\lambda d.\textit{tall}(d)(\textit{Ina})) > d_c$

The interpretation derived through (13) is adequate but there is no evidence for the assumption that the degree phrase involves a quantifier over parts of a scale. Suppose we are wrong and such evidence exists. Where should we look for it? We argued here that comparative conditionals circumvent the problem with intervening quantifiers on the way of DegP taking widest scope. So, if "absolute conditionals" existed, we could have found in them support for the LF and the interpretation in (13). But (14) is ungrammatical:

(14) a.*The tired Ina gets, the annoyed she becomes.
b.#When Ina gets more tired than normal, she becomes more annoyed than normal.

Recall also that Heim (2000) showed that intensional verbs are not interveners, therefore DegP can scope under or above such predicates. So, we can expect split scope

readings under the assumption that there is a degree quantifier in the absolute construction. (15) is a relevant example:

(15) (Papers that are above 20 pages are considered long.) This paper is required to be long.

The two logical possibilities for interpreting DegP would be as in (16a) and (16b). The derived interpretations, that correspond to each LF are as in (17a) and (17b), respectively:

(16) a.$[_{CP}$ required $[_{IP}[_{DegP}$ er than $d_C]$ $[1[_{IP}$ this paper be t_1 long]]]]
b.$[[_{DegP}$ er than $d_c]$ $[1[_{CP}$ required $[_{IP}$ this paper to be t_1 long]]]]
c. d(c) = 20pages

(17) a. $\forall w$: $w \in$ Acc: max($\lambda d.$*long*(d)(*this_paper*) in w) $\geq$ 20 *pages*
b. max($\lambda d.$ $\forall w$:$w \in$ Acc: *long*(d)(*this_paper*) in w) $\geq$ 20 *pages*

For the sentence to be true, (17a), which corresponds to the LF where the intensional verb has wider scope, requires that in every accessible world, the paper is at least 20 pages long. Given speakers' intuitions, this is an attested reading. In fact, the only reading of (15). (17b), which is derived from the LF where the intensional verb has narrower scope with respect to DegP predicts the sentence to be true only if the paper is at least 20 pages long in those accessible worlds where it is shortest. but these truth conditions are equivalent to the ones derived in (17a).

The weakest conclusion that we can make considering the fact that there are no "absolute conditionals", and no attested split scope readings is that there is no evidence for the quantificational nature of the degree head of the absolute construction. The strongest conclusion would be that we can't find such evidence because it doesn't exist: the absolute DegP doesn't have significant scope. So, analyzing the absolute construction by using a degree head with the semantics in (12) would be a wrong move. However, we are in a better position than the classical quantificational theory. We argued that the comparative

operator is a degree quantifier but the head of the superlative construction isn't. Moreover, we argued that the basic semantic type of adjectives, that is used in the superlative construction doesn't introduce a degree variable to be bound by some operator. We argued that adjectives are measure functions that map individuals to degrees on a scale, as suggested by Kennedy (1999), and they raise their semantic type to <d,et> only if they are combined with the shifting operator ξ. Adjectives with the raised type are used in the comparative construction but under the non-unifying theory, they don't have to be used in the absolute construction. We view then the absolute construction as a relative of the superlative construction, and side with Kennedy about the semantics of the absolute head, which doesn't give *abs* any quantificational force. For convenience, we repeat the relevant lexical entries from Kennedy (1999) in (18), and refer the reader to Section 1.1.2. for a more detailed discussion on the semantics of the absolute degree words. As a reminder, abs_1 is used in those cases in which there is a measure phrase in the absolute construction (*Ina is 145sm tall*), while abs_2 is used for the cases without measure phrases:

(18) a. $[[abs_1]] := \lambda G{:}G \in D_{<e,d>}.[\lambda d{:}d \in D_d.[\lambda x{:}x \in D.G(x) \geq d]]$
b. $[[abs_2]] := \lambda G{:}G \in D_{<e,d>}.[\lambda P{:}P \in D_{<e,t>}.[\lambda x{:}x \in D.G(x) \geq \text{STND}(G)(P)]]$

There is another comparison construction that uses the relation *(at least) as great as*, similarly to the absolute construction. This is the equative, illustrated in (19):

(19) a. Scott is as tall as Amy.
b. Scott is as tall as Amy is.

What about this construction? Does the equative DegP have scopal properties? More, and careful research is needed to answer this question. Our major goal was to study the comparative and the superlative constructions from a comparative point of view, and our thoughts about the rest of the degree constructions are rather speculative. But we believe

that the answer to the question about the equative construction is **Yes**. In many respects the equative construction is similar to the comparative construction, and if we are on the right tract with our conclusions about the comparative, they should be extended to the equative, too. To start with, similarly to the comparative construction, the equative has an overt comparative clause/phrase, introduced by a preposition: in (19) these are the PPs *as Amy* and *as Amy is*. A second point of similarity is the fact that equative, too, can be either phrasal, as (19a) or clausal, as (19b). Third, there is a very intimate relation between a comparative and a negated equative: they are semantically equivalent as the example in (20) shows. This has been noted by many researchers (cf. Bierwisch and Lang (1989) and references therein).

(20) a. Scott is taller than Amy.
b. Amy is not as tall as Scott is.

An important observation is that equatives have split scope readings. Consider (21):[4]

(21) Scott doesn't need as much money as Amy does.

(21) has a "regular" de dicto reading, according to which in every world compatible with John's needs he has less money than Amy has. (21), with the intended de dicto reading is appropriate in a context in (22):

(22) Context:

> Scott is Amy's brother. They are both students, supported by their parents. Amy is spending too much money in college, in Scott's opinion. He thinks that their parents are getting poorer because of her. He tells his parents that he needs to be given less money than Amy is given.

[4] The example is suggested by an anonymous *Linguistics and Philosophy* reviewer of Sharvit and Stateva (2002). The observation is also due to that reviewer.

For our purposes, the more interesting reading of (21) is its 'upstairs de dicto' reading, available contexts like (23):

(23) Context:

Scott says: "I need at least $1000 per month."
Amy says: "I need at least $1200 per month."

Amy's needs will be satisfied if he has sometimes, for example, has $1500 for a month, sometimes $1300, but never lower than $1200. In that sense her needs are more demanding than Scott's needs since he can be satisfied with amounts like these - $1500, $1300, or $1200 but his needs will also be met is he only gets an amount of $1000. That amount is smaller than the minimum amount that satisfies Amy's needs. Recall that we argued in *Chapter 1*, along with Heim (2000), that 'upstairs de dicto' readings support the quantificational view on a degree operator because they are derived by scoping DegP above an intensional verb. Recall also that following Sharvit and Stateva (2002) we discussed an alternative analysis of 'upstairs de dicto' readings which accounts for them without syntactic movement of DegP above the intensional verb, and thus undermines the 'upstairs de dicto' argument for the quantificational force of DegP It is important to remind ourselves, however, that Sharvit and Stateva's (2002) analysis is restricted to superlatives only. As claimed in that work, there is evidence that motivates that in-situ analysis of 'upstairs de dicto' readings in superlatives (wrong predictions in "sandwich scenarios"), but no such evidence is available for comparatives. There is no motivation for a Sharvit&Stateva-type of analysis in equatives either. Furthermore, as we said in *Chapter 3*, even if the in-situ analysis could be extended to comparatives, as it is in Sharvit and Stateva (2002), this comes at the cost of assuming a syntactic structure for comparatives

that is incompatible with conclusions that we reached here about the syntax of comparatives, one of which is that the *than*-clause is a complement of *-er*. Therefore, we argued in *Chapter 3*, that 'upstairs de dicto' or split scope readings in comparatives give genuine evidence for the quantificational nature of the comparative operator. By extension, if the syntactic properties of the equative construction is, in the relevant respects, the same as the syntactic properties of the comparative construction, and if there is no motivation for an in-situ analysis of comparative readings of equatives, the 'upstairs de dicto' reading of (21) should be taken to support the hypothesis that the equative DegP has significant scopal properties. But let us illustrate the point that that reading can be derived by moving DegP above *need* in (21). To do that, we have to specify the meaning of *as*. If *as* is a quantificational element and instantiates the comparison relation *(at least) as great as*, its semantics must be similar to the semantics of the absolute degree word which we entertained at the beginning of the section, and argued against later. The relevant entry is given in (24):

(24) $[[as]]:=\lambda P:P\in D_{<d,t>}.[\lambda R:R\in D_{<d,t>}.\max(\lambda d.R(d)) \geq \max(\lambda d.P(d))]$

When the equative DegP, which contains *as* and its restriction, the PP *as Amy does* is raised above the intensional verb *need*, we derive the LF in (25a). The interpretation that results from it is as in (25b):

(25) a. $\neg[_{IP}$Scott [as ~~as~~ [3 [Amy needs t_3-much money]] [2 $[_{VP}$ 1 [t_1 needs$_w$[$_{CP}$ λw' t_1 to have$_{w'}$ [$_{DP}$ t_2-much money]]]]]]]

b. [[IP]] =1 iff $\neg$max(λd.[Scott needs$_w$ λw'.Scott_has_d-much_money in w' $\geq$ max(λd.[Amy needs$_w$ λw'.Amy_has_d-much_money in w']

For the sentence to be true, according to (25b), it should not be the case that in all worlds compatible with John's needs, John has at least as much money as Amy has in all worlds

compatible with her needs. We've arrived at the desired interpretation: the conditions correspond to the intuitions one has about (21) when uttered in the context in (23).

Further evidence for the quantificational nature of the equative DegP could come from a language in which there are "equative conditionals". Y. Sharvit (p.c.) offers such an example from Hebrew:

(26) kama Se-hu mag?il ele-ha, kaxa hi ohevet oto
how-much that-he obnoxious to-her that-much she loves him
'As much as he is obnoxious to her, so much/that much she loves him'

We believe, that we have accumulated enough facts that are at least suggestive that the equative construction, like the comparative construction contains a quantificational element: a degree operator. In that sense, the absolute and the equative construction share a relation similar to the relation between the superlative and the comparative construction; they express the same comparison relation in different terms with respect to the quantificational force of the degree head. If this is on the right track, the following typology about natural language comparison emerges:

(27)

comparison relation	**quantificational force of DegP**	**no quantificational force of DegP**
greater than/ smaller than	comparative	superlative
as great as	equative	absolute

A further research goal will be to figure out where, from a typological point of view, stand the rest of the comparison constructions, headed by *so*, *too*, *enough*, etc.

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