

# The Syntax and Semantics of Multiple Degree Modification in English

Christopher Kennedy

University of Chicago

Louise McNally

Universitat Pompeu Fabra

Proceedings of the 12th International Conference on  
Head-Driven Phrase Structure Grammar

Department of Informatics, University of Lisbon

Stefan Müller (Editor)

2005

CSLI Publications

pages 178–191

<http://csli-publications.stanford.edu/HPSG/2005>

Kennedy, Christopher, & McNally, Louise. (2005). The Syntax and Semantics of Multiple Degree Modification in English. In Stefan Müller (Ed.): *Proceedings of the 12th International Conference on Head-Driven Phrase Structure Grammar, Department of Informatics, University of Lisbon* (pp. 178–191). Stanford, CA: CSLI Publications.

## Abstract

Focusing on the examples of multiple degree modification, this paper argues that the class of degree expressions in English is syntactically and semantically diverse, subdivided both according to the semantic effects of its members and according to the extent to which they permit, and participate in, multiple layers of modification. We argue that these two factors are linked, and result in (at least) a three-way distinction between TRUE DEGREE MORPHEMES, which map gradable adjectives to properties of individuals and combine with their arguments in a Head-Specifier structure; INTENSIFIERS, which are syntactic and semantic modifiers of properties constructed out of gradable adjectives; and SCALE MODIFIERS, which are also syntactic and semantic modifiers, but which combine with ‘bare’ gradable adjectives (relations between individuals and degrees) rather than properties formed out of gradable adjectives.

## 1 Introduction

In this paper we offer an integrated syntactic and semantic analysis of various cases of multiple degree modification in English, some examples of which appear in (1).

- (1) a. a new tower 10 feet taller than the Empire State Building
- b. an old department store a lot less taller than the city hall building than is the new company headquarters
- c. an engineer very much more afraid of heights than the architect

To our knowledge, no such integrated proposal exists for this kind of modification in the HPSG literature. Pollard and Sag (1994) broadly sketch a syntactic analysis of multiple degree modification, but because it lacks a semantics, their analysis does not make specific predictions about the restrictions on various combinations of multiple degree modifiers. Although some of these restrictions are matters of pragmatic or lexical semantic detail, others involve fundamental aspects of the syntax and semantics of degree modification. In contrast, Abeillé and Godard (2003) present a detailed syntax and semantics for French degree adverbs, but their analysis is situated in the context of a general analysis of adverbial modification, rather than in the context of a complete treatment of degree modification. As a result, their analysis does not address multiple degree modification or differences in the distributions of different subclasses of degree expressions (On the other hand, nothing in our analysis will conflict in important ways with their proposal.)

In this paper, we present a syntax and semantics of degree modifiers that includes elements of both Pollard and Sag’s specifier analysis and Abeille and Godard’s modifier analysis. Specifically, we argue for a subdivision of the set of degree modifiers into three subclasses, which differ both in their syntax and their

---

<sup>†</sup>We are grateful to the HPSG05 audience for comments. All errors are our own. This research reported here is based on work supported by the National Science Foundation under Grant No. 0094263 and by a grant from the Generalitat de Catalunya.

semantic types/functions. The class of TRUE DEGREE MORPHEMES (measure phrases, degree *that*, etc) combine with a gradable adjective in a head-specifier structure, and map the adjective (type  $\langle d, \langle e, t \rangle \rangle$  — a relation between individuals and degrees) to a property of individuals (type  $\langle e, t \rangle$ ). The class of INTENSIFIERS (*very*, *rather*, etc.) are predicate modifiers of a familiar sort (type  $\langle \langle e, t \rangle, \langle e, t \rangle \rangle$ ) that are semantically restricted to combine just with properties of individuals based on gradable adjectives. Finally, the class of SCALE ADJUSTERS (comparative morphology) are modifiers of gradable adjectives (type  $\langle \langle d, \langle e, t \rangle \rangle, \langle d, \langle e, t \rangle \rangle \rangle$ ), which ‘readjust’ the scale onto which an adjective maps its argument.

The paper is organized as follows. In section 2, we lay out our basic assumptions about the semantics of gradable adjectives, and the problems presented by cases of multiple degree modification. In section 3 we make the case for splitting the set of degree terms into three classes, outline our analysis of each class, and relate our proposals to previous work. We conclude in section 4 with a more general discussion of the implications of our proposals.

## 2 Gradable adjectives and degree expressions

As the syntax of multiple degree modification is tightly bound up with the semantics of the expressions involved, we begin by presenting our semantic assumptions. We will essentially follow Kennedy and McNally (2005) (and many others) in analyzing gradable adjectives and related expressions (such as the vague determiners *many* and *few*) as relations between degrees and individuals (type  $\langle d, \langle e, t \rangle \rangle$ ). Such expressions are converted to properties of individuals by degree expressions, which include measure phrases (e.g. *10 feet*), comparative morphemes (e.g. *-er/more*, *less*, *as*), intensifiers (e.g. *very*), and the phonologically null positive degree morpheme *pos* (for the ‘positive’, unmarked form of a gradable adjective, e.g., *(is) tall*). In Kennedy and McNally’s analysis, degree expressions convert a gradable adjective into a property of individuals by binding the degree argument of the adjective and restricting it to satisfy certain conditions, e.g. the property of measuring some amount in the case of a measure phrase, or the property of exceeding some other degree in the case of comparatives with *more*.

For example, the comparative constituent *more than*  $d_c$  (where  $d_c$  is the denotation of the comparative clause, a maximal degree; see von Stechow (1984)) has the denotation in (2).

$$(2) \quad \llbracket \text{more than } d_c \rrbracket = \lambda g \in D_{\langle d, \langle e, t \rangle \rangle} \lambda x. \exists d [d \succ d_c \wedge g(d)(x)]$$

A simple comparative predicate like (3a) is assigned the denotation in (3b): it is true of an object if it has a degree of height that exceeds the maximal degree to which the Empire State Building is tall, here abbreviated as  $d_{esb}$ .<sup>1</sup>

<sup>1</sup>We assume for simplicity here that the comparative clause is an ellipsis structure; this issue is orthogonal to the main concerns of this paper. See Kennedy (2002) for a compositional analysis. Likewise, we abstract away from the morphological alternation between *more* and *-er*.

- (3) a. [tall [er then the Empire State Building ~~is tall~~]]  
 b.  $\lambda x. \exists d [d \succ d_{esb} \wedge \mathbf{tall}(d)(x)]$

A problem with this approach is that multiple degree modification facts such as those illustrated in (1) and other data strongly suggest that neither comparative morphemes nor intensifiers really belong in the category of degree morphology as defined above. For example, (1b) shows that a comparative can modify another comparative, which is unexpected on this analysis, since degree expressions as a class are treated as type-changing. Kennedy and McNally (2005) would be forced to hypothesize that e.g. *less* can combine not only with expressions of type  $\langle d, \langle e, t \rangle \rangle$  (when it cooccurs with a simple adjective) but also with property-denoting ones (when it combines with a comparative+adjective complex). This is not a typical case of type polymorphism.

Similar comments apply to intensifiers. Although it is sometimes claimed to the contrary, a number of combinations of multiple intensifiers are possible (as even a simple Google search will demonstrate):

- (4) a. He specializes in swimwear and is quite very popular for it.  
 (www.thefashionspot.com/forums/archive/index.php/t-907.html)  
 b. *Lola Rennt*, or *Run, Lola, Run* in English, is the first German film I've ever seen. It's rather very inventive.  
 (www.rottentomatoes.com/vine)  
 c. He also writes...Comedy Variety shows such as...“The Lorne Elliott’s Really Rather Quite Half-Decent TV Special” for CBC-TV.  
 (lorne-elliott.com/about.htm)

Again, Kennedy and McNally’s treatment of intensifiers as type changing forces one to adopt a rather ad hoc type polymorphism to account for the fact that these expressions modify both adjectives and other intensifiers. They can furthermore modify comparative morphology, but not the other way around. This is illustrated by the examples in (5). (Here we follow Corver (1997) in treating *much* in (5) and (7) below as a dummy element.)

- (5) a. This new building will give the University very much more effective support for teaching and research in the Social Sciences.  
 (http://www.bodley.ox.ac.uk/librarian/rhodes/rhodes.htm)  
 b. ...to establish why the Jullunduris have pressed their way upwards through the employment market, the housing market, and the educational system very much more rapidly than either the Mirpuris or the Sylhetis.  
 (http://www.transcomm.ox.ac.uk/wwwroot/ballard.htm)  
 c. In principle it is fairly simple and gives distributions very close to analytically calculated distributions with very much less computation time. (http://www.rlaha.ox.ac.uk/oxcal/math\_gi.htm)

- (6) a. This new building will give the University (\*more) very effective support. (\*[[more [very A]] N];  $\sqrt{[more [[very A] N]]}$ )  
 b. They moved (\*more) very rapidly than the others.  
 c. There was (\*less) very much computation time.

In contrast to the comparative morphemes and intensifiers stand a group of degree expressions that ‘close off’ the predicate they combine with, disallowing any amount of further modification (of any kind). These include (at least) measure phrases, degree *this/that*, proportional modifiers like *completely* and *half*, and the *wh*-degree morpheme *how*. These expressions can combine with an unmodified adjective or with a comparative (provided a system of measurement is defined for the adjective in the case of measure phrases), as shown in (7) for the measure phrase *2 meters* and degree *that*.

- (7) a. 2 meters/that tall  
 b. 2 meters/that much {taller, less tall, too tall}

However, they do not accept further modification (8a), nor can they further modify an intensifier (8b) (we assume the *much* in (7b) is a dummy element; see Corver (1997)):

- (8) a. \*rather 2 meters/that long  
 b. \*2 meters/that (much) very long

These observations lead us to the three way classification described at the beginning of the paper, which we will develop in detail in the next section.

### 3 Three classes of degree expressions and one lexical rule

#### 3.1 The positive form

Kennedy and McNally (2005) assume that the positive form involves a null degree morpheme *pos*, which maps a gradable adjective to a property of individuals that expresses a relation to a context-dependent standard of comparison (see also Bartsch and Vennemann (1972), Cresswell (1977), Klein (1980), von Stechow (1984), Kennedy (1999)). The positive form of an adjective like *tall* is thus analyzed as the predicate [<sub>AP</sub> *pos* tall], which denotes the property of having a degree of length that exceeds a standard of length whose value is determined based on features of the context of utterance (what is being talked about, the interests/expectations of the participants in the discourse, etc.; see Lewis (1970), Bogusławski (1975), Graff (2000), Barker (2002), Kennedy (2005)).

In this paper, we take the (possibly universal) absence of overt morphology in the positive form at face value and instead posit a lexical rule that maps measure functions to properties of individuals in the absence of overt degree morphology. This rule (whose particular implementation is not crucial for our purposes) is stated

in (9), where **stnd** is a context-dependent function from a measure function (a ‘basic’ gradable adjective meaning) to a degree in the range of the measure function (its scale) that represents an appropriate standard of comparison for the gradable property measured by the adjective in the context of utterance. (Compare Lewis’ (1970) and Barker’s (2002) DELINEATION FUNCTION.)

$$(9) \left[ \begin{array}{l} g \\ \text{syn} \left[ \begin{array}{l} \text{head} \quad \boxed{4} \text{adj} \\ \text{val} \quad \left[ \text{spec} \langle \text{deg} \rangle \right] \end{array} \right] \\ \text{sem} \left[ \begin{array}{l} \text{index} \quad \boxed{2} \\ \text{restr} \quad \left\langle \boxed{5} \left[ \begin{array}{l} \text{reln} \quad \boxed{1} \mathbf{g} \\ \text{arg1} \quad \boxed{2} x \\ \text{arg2} \quad \boxed{3} d \end{array} \right] \right\rangle \end{array} \right] \end{array} \right] \mapsto \left[ \begin{array}{l} g \\ \text{syn} \left[ \begin{array}{l} \text{head} \quad \boxed{4} \\ \text{val} \quad \left[ \text{spec} \langle \rangle \right] \end{array} \right] \\ \text{sem} \left[ \begin{array}{l} \text{index} \quad \boxed{2} \\ \text{restr} \quad \left\langle \boxed{5}, \left[ \begin{array}{l} \text{reln} \quad \mathbf{stnd} \\ \text{arg1} \quad \boxed{3} \end{array} \right] \right\rangle \end{array} \right] \end{array} \right]$$

With this as our starting point, we now turn to the analysis of degree morphology.

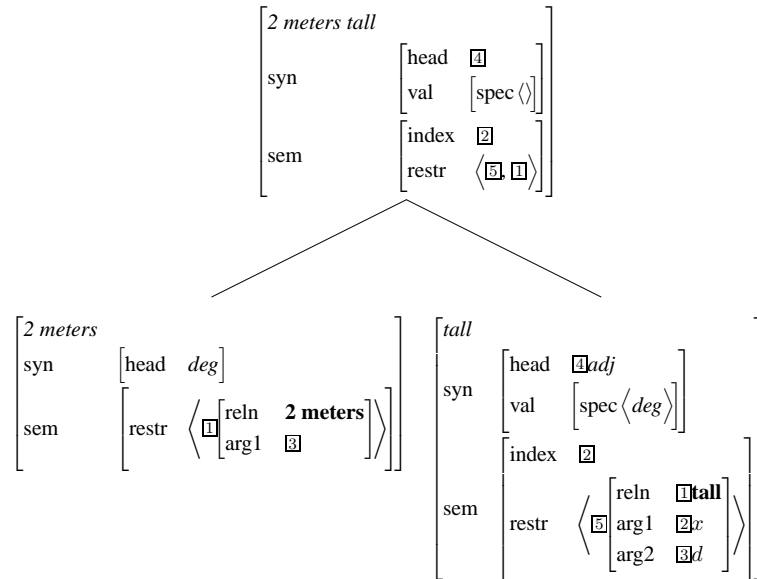
### 3.2 True degree morphemes

The class of true degree morphemes includes measure phrases, proportional modifiers, *that* and *how*; these are degree expressions that behave as assumed in Kennedy and McNally (2005). Syntactically, they combine in a Head-Specifier structure; semantically, they map a gradable adjective onto a property of individuals by restricting the degree argument of the adjective based on the content of the degree expression. The intuition underlying this analysis is that ‘true’ degree morphemes all directly supply a value for the degree argument of the adjective, fixing the standard degree that serves as the criterion for truthful ascription of a gradable predicate.

We illustrate our proposal with an analysis of the measure phrase *2 meters* in (10), and the predicate *2 meters tall* in (11), in which the restriction on the degree argument is based on the measurement expressed by the nominal.

$$(10) \left[ \begin{array}{l} 2 \text{ meters} \\ \text{syn} \quad \left[ \text{head} \quad \text{deg} \right] \\ \text{sem} \quad \left[ \text{restr} \quad \left\langle \left[ \begin{array}{l} \text{reln} \quad \mathbf{2 \text{ meters}} \\ \text{arg1} \quad d \end{array} \right] \right\rangle \right] \end{array} \right]$$

(11)



### 3.3 Intensifiers

Recall that intensifiers like *very* are special in that they can modify (apparently bare) adjectives as well as intensifier+adjective combinations and comparatives, but not true degree morpheme+adjective combinations, and they cannot themselves be modified by anything other than other intensifiers. We derive this distribution by analyzing intensifiers as traditional predicate modifiers (type  $\langle\langle e, t \rangle, \langle e, t \rangle\rangle$ ) that are restricted to apply only to predicates whose meaning is stated in terms of the **stnd** function — i.e., gradable predicates in the positive form.

The latter restriction sounds like a stipulation, but we claim that in fact it follows from their semantics. Specifically, building on proposals in Wheeler (1972); Klein (1980) and Kennedy and McNally (2005), we claim that the semantic function of an intensifier is to manipulate the **stnd** function introduced by the positive form rule in (9). This proposal is based on two observations. First, the semantic effect of intensification is to ‘adjust’ the contextually determined standard of comparison. Second, the distribution of degree modifiers is highly sensitive to the type of standard of comparison associated with particular *pos*+adjective combinations (whether the standard is context dependent or lexically determined by the adjectival head; see Kennedy and McNally’s (2005) analysis of *very* vs. *much*).

Consider for example the case of *very*. Both (positive form) *tall* and *very tall* require an object to exceed a contextual standard of height, but the standard of comparison introduced by the latter is greater than that used by the former. Implementing proposals in Wheeler (1972) and (1980), we derive this result by assuming that *very* adjusts the **stnd** function associated with its argument (a gradable adjective to which the lexical rule in (9) has applied) so that it computes a standard of comparison based on just the heights of those objects that its argument is true of.

That is,  $[_{AP} \textit{very tall}]$  is (syntactically and semantically) just like  $[_{AP} \textit{tall}]$ , except that the standard of comparison for the former is computed by considering only those objects that count as tall in the context of utterance. General principles of informativity ensure that the modified **stnd** function will select a new standard of comparison partitions the domain of  $[_{AP} \textit{very tall}]$  into things it is true of and things it is false of, effectively boosting the base standard associated with  $[_{AP} \textit{tall}]$  (i.e., some tall objects will not count as very tall).

This proposal is made explicit in (12).

$$(12) \quad \left[ \begin{array}{l} \textit{very} \\ \text{syn} \left[ \begin{array}{l} \text{head } \textit{int} \\ \text{val} \left[ \begin{array}{l} \text{mod } \langle \textit{adj} \rangle \end{array} \right] \end{array} \right] \\ \text{sem} \left[ \begin{array}{l} \text{restr } \left\langle \begin{array}{l} \text{reln } \mathbf{very} \\ \text{arg1 } \mathbf{stnd} \\ \text{arg2 } \textit{d} \end{array} \right\rangle \end{array} \right] \end{array} \right]$$

Syntactically, the iterativity of intensifiers argues for combination via a Head-Modifier structure; for the purposes of illustration, we adopt Kasper's (1997) treatment of nonintersective modification, where the MOD feature is split up into information about the ARGument of the modifier (including its internal content) vs. the (External) CONtEnt of the resulting phrase. (13) illustrates the analysis of *very tall*.

$$(13) \quad \left[ \begin{array}{l} \textit{very tall} \\ \text{syn} \left[ \begin{array}{l} \text{head } \boxed{4} \\ \text{val } [\text{spec } \langle \rangle] \end{array} \right] \\ \text{sem} \left[ \begin{array}{l} \text{index } \boxed{2} \\ \text{restr } \langle \boxed{5}, \boxed{6} \rangle \end{array} \right] \end{array} \right]$$
  

$$\left[ \begin{array}{l} \textit{very} \\ \text{syn} \left[ \begin{array}{l} \text{head } \textit{int} \\ \text{val} \left[ \begin{array}{l} \text{mod } \langle \textit{adj} \rangle \end{array} \right] \end{array} \right] \\ \text{sem} \left[ \begin{array}{l} \text{restr } \left\langle \boxed{6} \left[ \begin{array}{l} \text{reln } \mathbf{very} \\ \text{arg1 } \boxed{1} \\ \text{arg2 } \boxed{3} \end{array} \right] \right\rangle \end{array} \right] \end{array} \right]$$
  

$$\left[ \begin{array}{l} \text{syn} \left[ \begin{array}{l} \text{head } \boxed{4} \textit{adj} \\ \text{val } [\text{spec } \langle \rangle] \\ \text{index } \boxed{2} \end{array} \right] \\ \text{sem} \left[ \begin{array}{l} \text{restr } \left\langle \boxed{5} \left[ \begin{array}{l} \text{reln } \mathbf{tall} \\ \text{arg1 } \boxed{2} \textit{x} \\ \text{arg2 } \boxed{3} \textit{t} \end{array} \right], \left[ \begin{array}{l} \text{reln } \boxed{1} \mathbf{stnd} \\ \text{arg1 } \boxed{3} \end{array} \right] \right\rangle \end{array} \right] \end{array} \right]$$

Since *very tall* itself is a predicate whose meaning is stated in terms of the **stnd** function, nothing precludes further intensification, deriving the result that intensifiers can modify intensifier+adjective combinations. At the same time, our



analysis explains why measure phrases (or rather, measure phrase + adjective combinations) cannot be intensified, even though their semantic (and syntactic) type should in principle allow for it. The difference between  $[_{AP} \text{ MP A}]$  (a type  $\langle e, t \rangle$  predicate consisting of a measure phrase plus gradable adjective) and  $[_{AP} \text{ A}]$  (a positive form gradable adjective to which the rule in (9) has applied) or  $[_{AP} \text{ Int A}]$  (an intensifier plus gradable adjective combination) is that the standard of comparison for the latter two structures is defined in terms of the **stnd** function, while that of the former is defined in terms of the measure phrase. As a result, there is no value for an intensifier to manipulate, and the addition of an intensifier has no semantic effect.

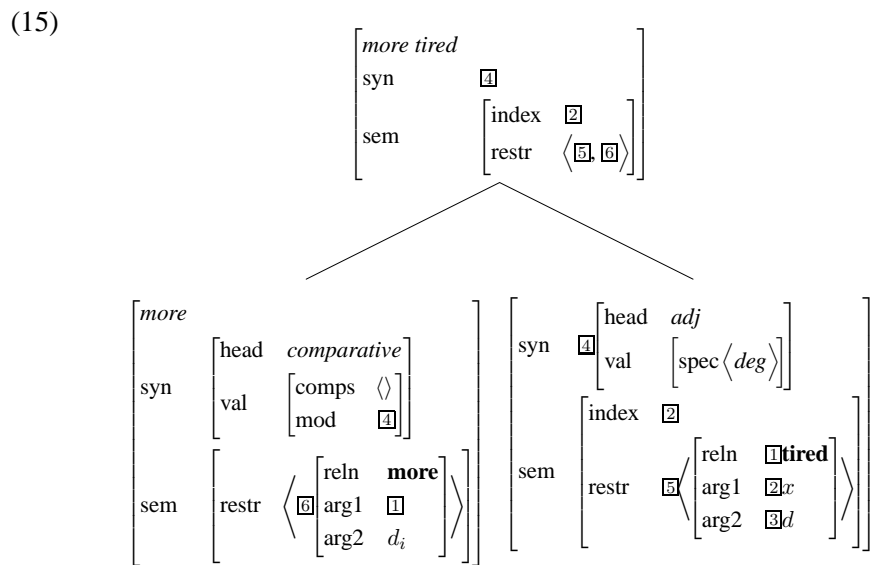
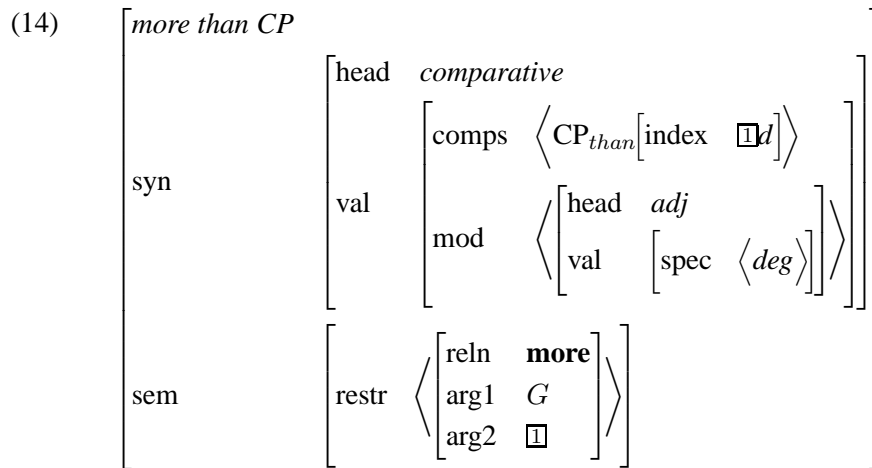
### 3.4 Scale adjusters

Finally, we consider the case of comparatives and related morphology (perhaps *too/enough*, after they have been saturated by their internal (clausal) arguments, though we have not yet explored these constructions), our ‘scale adjusters’. As outlined above, we claim that these expressions are also a type of modifier, but they are not traditional  $\langle \langle e, t \rangle, \langle e, t \rangle \rangle$  predicate modifiers. Instead, they are modifiers of ‘bare’ gradable adjectives (adjectives that have not undergone the positive form type-shifting rule) — expressions of type  $\langle \langle d, \langle e, t \rangle \rangle, \langle d, \langle e, t \rangle \rangle \rangle$ . Specifically, we claim that these expressions modify the adjective they take as input by resetting the maximal or minimal value (depending on the morpheme) of the scale onto which the adjective maps its argument to the degree introduced by the comparative clause.

To see how this works, we must first step back a bit and look at the semantics of gradable adjectives. Following a long tradition of work on this topic, we have assumed that an adjective like *tall* expresses a relation between a degree  $d$  and an individual  $x$  such that  $x$ ’s height is at least as great as  $d$  (see e.g. Cresswell, 1977; Heim, 1985; von Stechow, 1984; Klein, 1991; Kennedy, 1999; Kennedy and McNally, 2005, for representative discussion). This presumes that every gradable adjective includes as part of its meaning a measure function: a function from individuals to degrees on a scale. Our proposal is that it is this part of the meaning of an adjective that is manipulated by scale adjusting morphology.

Consider the case of a comparative of superiority *more than CP* (where CP is the comparative clause). We propose that this expression takes a gradable adjective and assigns to it a new scale whose minimal value is the degree denoted by CP (cf. Rotstein and Winter, 2004). Thus if *tall* is a relation between objects and degrees on the height scale that originate at zero and range towards infinity, *taller than the Empire State Building* is a relation between objects and degrees on that subpart of the height scale whose minimal value is the maximum height of the Empire State Building. The measure function component of *taller-than-the-Empire-State-Building* must be further constrained to return an object’s actual height for all objects whose height is greater than that of the Empire State Building, and ‘zero’ for objects whose height is equal to or less than the Empire State Building (where ‘zero’ is relative to the derived scale; the height of the Empire State Building itself).

Our syntactic and semantic analysis is illustrated in (14) (where we treat *more than CP* as a constituent for convenience; in principle the degree term could combine first with the adjective and second with the *than* constituent) and (15).



The result of this analysis is that expressions consisting of an adjective plus comparative morphology are of the same semantic and syntactic type as ‘bare’ gradable adjectives. It follows that they may be further modified by another comparative (assuming the result is a coherent meaning), allowing for the possibility of multiple comparatives such as (16), which were discussed by Kennedy (1997) (see also Pollard and Sag, 1994; Bhatt and Pancheva, 2004).

- (16) a. Dole isn’t as much more conservative than Clinton as Buchanan is.  
 b. Maverick’s is more too dangerous to surf today than it was yesterday.

It also follows that comparative adjective constructions must ultimately either

undergo the positive form rule in (9) or combine with a true degree morpheme (e.g. a measure phrase) in order to derive a property of individuals. Assuming **stnd** is defined in such a way that the positive form of an adjective that uses a scale with a minimal element is true of an object as long as it has a non-minimal degree of the relevant property (see Kennedy and McNally, 2005), the result is that *taller than CP* is true of an object if its height exceeds the zero value of the derived scale, which corresponds to the degree denoted by the CP. Thus *taller than the Empire State Building*, after undergoing the positive form rule, will denote a property that is true of an object just in case its height exceeds the height of the Empire State Building, which is exactly what we want.

### 3.5 Relation to previous work

As noted at the beginning, the most important previous work on degree expressions in HPSG comes from two sources. The first is Pollard and Sag (1994), who assume a Specifier analysis for the full range of degree expressions; as a result, multiple degree modification is treated in a left-branching fashion. This work does not include full semantic analysis, therefore it is difficult to define specific predictions about the restrictions on various combinations of multiple degree modifiers (such as the impossibility of layering intensifiers on top of true degree morphemes, as in our analysis). The second is Abeillé and Godard (2003), who develop a syntactic and semantic analysis of French degree adverbs using Head-Adjunct structures. This work does not address the full range of degree expressions or multiple degree modification, however, and so does not have the coverage of the current proposal.

Our analysis builds on this work, and in fact preserves aspects of both of these analyses (see also Doetjes (1997)). First, it adopts the Adjunct analysis for certain degree expressions, but refines it by providing (at least in English) for two types of degree Adjuncts: those that operate on bare adjectives (as measure relations), and those that operate on the output of the positive form lexical rule. Second, it adopts Specifier analysis for “true” degree modifiers, but significantly reduces the class of expressions that have this specifying function.

A prediction of our analysis is that iterations both of comparatives and of intensifiers must be interpreted in a right-branching fashion, rather than in the left branching fashion predicted on the Specifier analysis. The fact that (17) has the interpretation in (17a), rather than (17b), supports this conclusion.

- (17) a. Becca was rather very slightly drunk last night.  
       ([www.elvislovers.fanspace.com/fsguestbook.html](http://www.elvislovers.fanspace.com/fsguestbook.html))  
       b. (rather (very (slightly)))  
       c. ((rather (very))(slightly))

## 4 Concluding remarks

The general empirical claim in this paper has been that degree modification is syntactically and semantically diverse: the class of degree expressions is subdivided both according to the semantic effects of its members and according to the extent to which they permit, and participate in, multiple layers of modification. These two factors are linked, and result in (at least) the three-way distinction we have drawn in this paper between true degree morphemes, intensifiers, and scale modifiers.

Our HPSG implementation of the syntax and semantics of degree modification accounts for the diversity of the class by analyzing intensifiers and scale adjusters as expressions that combine with their semantic arguments in Head-Adjunct structures, while true degree morphemes combine with their arguments in a Head-Specifier structure. Our analysis thus resembles Abeillé and Godard's insofar as they argue for a Head-Adjunct analysis of French degree adverbs. It refines their proposal in allowing (at least in English) for two types of degree Adjuncts: those that operate on 'bare adjectives' (measure functions), and those that operate on gradable APs (i.e., on the **stnd** function introduced by the positive form). Kennedy and McNally's (2005) comments concerning the semantics of the degree modifier *well* indicate that these two types are clearly justified.

Nonetheless, the analysis also preserves the essence of the insight behind Polard and Sag's proposal, on which degree expressions are treated as specifiers of adjectives, adverbs or other gradable predicates in a Head-Specifier configuration. It simply reduces the class of expressions that have this specifying function, as a result of having refined the semantics of degree modification.

A question of broader theoretical interest is why the set of degree expressions should be divided up in the way we have proposed here. We claim that this is a natural result of our initial assumptions that gradable adjectives have basic meanings as relations between degrees and individuals (type  $\langle d, \langle e, t \rangle \rangle$ ) and 'derived' meanings (in the positive form) as context-dependent properties of individuals (type  $\langle e, t \rangle$ , where context dependence comes from the **stnd** function). If the basic semantic type of a gradable adjective is  $\langle d, \langle e, t \rangle \rangle$ , then there should exist overt morphology (in addition to our positive form lexical rule) that converts a gradable adjective to a property of individuals: this is our class of true degree morphemes. Furthermore, if natural language quite generally allows expressions of type  $\langle \tau, \tau \rangle$ , there should also exist a class of modifiers of 'bare' gradable adjectives: these are our scale adjusters. By the same token, we also expect to find modifiers of the type  $\langle e, t \rangle$  variant of a gradable adjective (the positive form): this is our class of intensifiers.

## References

- Abeillé, Anne and Godard, Danièle. 2003. The Syntactic Flexibility of French Degree Adverbs. In Stefan Müller (ed.), *Proceedings of the 10th International Con-*

- ference on Head-Driven Phrase Structure Grammar*, pages 26–46, Stanford, CA: CSLI Publications.
- Barker, Chris. 2002. The Dynamics of Vagueness. *Linguistics and Philosophy* 25(1), 1–36.
- Bartsch, Renate and Vennemann, Theo. 1972. The Grammar of Relative Adjectives and Comparison. *Linguistische Berichte* 20, 19–32.
- Bhatt, Rajesh and Pancheva, Roumyana. 2004. Late Merger of Degree Clauses. *Linguistic Inquiry* 35, 1–46.
- Bogusławski, Andrzej. 1975. Measures are Measures: In Defence of the Diversity of Comparatives and Positives. *Linguistische Berichte* 36, 1–9.
- Corver, Norbert. 1997. Much-Support as a Last Resort. *Linguistic Inquiry* 28, 119–164.
- Cresswell, M. J. 1977. The Semantics of Degree. In Barbara Partee (ed.), *Montague Grammar*, pages 261–292, New York: Academic Press.
- Doetjes, Jenny. 1997. *Quantifiers and Selection*. Ph. D.thesis, Rijksuniversiteit Leiden, Leiden.
- Graff, Delia. 2000. Shifting Sands: An Interest-Relative Theory of Vagueness. *Philosophical Topics* 20, 45–81.
- Heim, Irene. 1985. Notes on Comparatives and Related Matters, ms., University of Texas.
- Kasper, Robert T. 1997. The Semantics of Recursive Modification, ms., Ohio State University.
- Kennedy, Christopher. 1997. Comparison and Polar Opposition. In Aaron Lawson (ed.), *Semantics and Linguistic Theory* 7, Ithaca, NY: CLC Publications.
- Kennedy, Christopher. 1999. *Projecting the Adjective: The Syntax and Semantics of Gradability and Comparison*. New York: Garland, (1997 UCSC Ph.D thesis).
- Kennedy, Christopher. 2002. Comparative Deletion and Optimality in Syntax. *Natural Language & Linguistic Theory* 20.3, 553–621.
- Kennedy, Christopher. 2005. Vagueness and Grammar: The Semantics of Relative and Absolute Gradable Predicates, ms., University of Chicago.
- Kennedy, Christopher and McNally, Louise. 2005. Scale Structure and the Semantic Typology of Gradable Predicates. *Language* 81(2), 345–381.
- Klein, Ewan. 1980. A Semantics for Positive and Comparative Adjectives. *Linguistics and Philosophy* 4, 1–45.

- Klein, Ewan. 1991. Comparatives. Chapter 32, pages 673–691, Berlin: de Gruyter.
- Lewis, David K. 1970. General Semantics. *Synthese* 22, 18–67.
- Pollard, Carl and Sag, Ivan. 1994. *Head-Driven Phrase Structure Grammar*. Chicago: University of Chicago Press.
- Rotstein, Carmen and Winter, Yoad. 2004. Total Adjectives vs. Partial Adjectives: Scale Structure and Higher-Order Modifiers. *Natural Language Semantics* 12, 259–288.
- von Stechow, Arnim. 1984. Comparing Semantic Theories of Comparison. *Journal of Semantics* 3, 1–77.
- Wheeler, Samuel. 1972. Attributives and Their Modifiers. *Noûs* 6(4), 310–334.