

ABSTRACT

Title of Document: THE STRUCTURE OF COMPARISON: AN INVESTIGATION OF GRADABLE ADJECTIVES

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This dissertation explores the syntax and semantics of positive and comparative gradable adjectives. A detailed study of intransitive (*tall*) and transitive (*patient with Mary*) adjectives is provided with special emphasis on phrases that express the standard of comparison, such as *tall for a jockey*, *tall compared to Bill*, and *taller than Bill*. It is shown that standard expressions, surprisingly, behave differently both syntactically and semantically. There are four main conclusions. First, a syntactic analysis is provided in which all standard expressions are introduced by unique degree morphemes in the extended projection of the adjective. Each morpheme and the standard expression that it introduces is ordered such that *for-PP*'s are introduced just above the adjective, followed by *compared-to* phrases and then comparatives. Thematic-PP's which denote the object of transitive adjectives are shown to be introduced in the extended projections as well, but interestingly, they are introduced between the *for-PP* and the *compared-to* phrase. Second, a neo-

Davidsonian, event-style analysis is provided that completely separates the internal and external arguments of adjectives. Instead, gradable adjectives are treated as predicates of events (or states), simply. Arguments of the adjective are assigned theta-roles in the syntax and are integrated into the logical form through via conjunction. Third, all other parts of the meanings of positive and comparative adjectives are put into the denotation of the degree morphemes. This includes the comparison relation and the measure function. Thus, gradable adjectives are treated as the same semantic type as other adjectives and other predicates. And fourth, it is shown that positive adjectives are fundamentally different from comparative adjectives in a semantic sense. This is surprising because standard semantic theories of positives treat them as implicit comparatives. The primary difference is that positives are vague in a way that comparatives are not. It is shown that the difference is not a matter of context dependence as suggested in Fara (2000). Instead, it is suggested that the comparative morpheme is responsible for this difference. Therefore, grammatical processes can interact with vagueness in at least one way; they can reduce it.

THE STRUCTURE OF COMPARISON: AN INVESTIGATION OF GRADABLE
ADJECTIVES

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Dedication

For Danielle and Frankie

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Chapter 1: Introduction

1.1 Overview

The general question that is addressed in this dissertation is how truth conditions are assigned to sentences that contain gradable adjectives, like those in (1).

- (1) a. John is tall.
b. John is tall **for a jockey**.
c. John is tall **compared to Bill**.
d. John is taller **than Bill**.

These constructions, and many others that gradable adjectives appear in, have been the object of much attention in linguistics and philosophy. The source of so much interest, I believe, lies in the nature of what gradable adjectives actually mean. They are the quintessential vague predicate, wearing their gradability and vagueness on their grammatical sleeve, so to speak. Degree constructions, for instance, seem to be tailor-made for vague, gradable predicates. It is not known what gives rise to gradability and vagueness. Maybe it is language or thought or the world – or some combination of these. But what I don't think we should doubt is that language and grammar *interact* with gradability and vagueness. It is the main goal of this dissertation to explore this interaction and how it is manifested in the mappings from the lexicon to the syntax to the logical form.

Take the sentences in (1), for example. The predicates in the first three examples are vague. It is difficult to pinpoint exactly where to draw the line between the people who are *tall* and those that are not; between those that are *tall for a jockey* and those that are not; and even between those that *tall compared to Bill* from those that are not. Let's examine this last claim for a moment. If Bill is six feet tall, is John, who is six feet and a quarter inch tall, *tall compared to Bill*? How about if John is six feet and half an inch tall? Six feet and one inch? Where is the line drawn, if it is not drawn at Bill's height? The comparative in (1)d, however, behaves differently. If Bill is six feet tall and John is six feet and a quarter inch tall, then John is taller than Bill. There's no guess work – the cut-off point is Bill's height. Now, what is the locus of this change in behavior? The difference between (1)c and (1)d is clearly grammatical: the introduction of a functional morpheme, somehow, reduces the vagueness that was present in the positive form of the adjective.

Or, take the standard expressions in (1)b,c,d. Standard expressions tell us what we should use as the standard when we assert that some object has a gradable property. In (1)b, the standard expression is *for a jockey*, and in order to say truthfully that John is tall, he must be tall with respect to the typical height of *jockeys*. I will refer to this phrase as a *for-PP*. In (1)c the standard expression is *compared to Bill*. In this case, the standard by which John is judged to be tall or not is *Bill*. I will call this a *compared-to* phrase. In (1)d the standard expression is *than Bill*. They all seem to be doing the same basic thing semantically. But now examine the transitive adjective phrases in (2), which include standard expressions like those in (2)b,c,d.

- (2) a. John is patient with Mary for a boy.
- b. John is patient with Mary compared to the boy.
- c. John is more patient with Mary than a boy.

The sentence in (2)a has an interpretation that is unavailable in (2)b,c. (2)a attributes a property to John, namely that he is patient with Mary to some degree. It also asserts that this degree is larger than the degree that boys exhibit of patience. But patience towards what? It appears that it can be anything, including Mary, but other things as well. For instance, (2)a could assert that John's degree of patience with Mary is greater than boys' typically are with girls. This kind of interpretation is unavailable in (2)b,c. These sentences must mean that John's degree of patience with Mary is greater than the degree of patience that boys typically exhibit *towards Mary*. Why the difference? Contemporary theories of gradable adjectives do not predict this difference because they treat all of these standard expressions as the same type of thing

Thus far, the basic method that has been employed to study gradable adjectives has been to, as von Stechow puts it, "...use Montague's strategy and generalize to the worst case."¹ Thus, most syntactic and semantic theories of gradable adjectives treat them all like clausal comparatives, whether or not they are comparatives or positives. This has proved useful in many ways. It has allowed linguists to see what is common amongst the different uses of gradable adjectives, of which there are many things. But, I believe it has also hidden many differences from

¹ Stechow (1984 p. 53)

view, the vagueness distinction between positives and comparatives and the interpretive difference between standard expressions, to name a couple. It is time to start to address the differences between the uses of gradable adjectives, because this is the key to understanding how gradability and vagueness interact with grammar. In the discussion that follows, I attempt to do just that: begin to address the differences between uses of gradable adjectives. We will find that there is a very rich syntactic and semantic structure inside gradable adjective phrases that has gone largely or entirely unnoticed.

In the next, brief section, I will lay out two different kinds of degree-based analyses of gradable adjectives. The first is a more traditional theory in which gradable adjectives are given relational denotations between individuals and degrees. Under this type of theory, gradable adjectives take the standard expression (which is a degree) as an internal argument. The second, which I will call a *measure function theory*, is a theory in which adjectives project a functional Degree Phrase that introduces the standard expression. The two semantic theories differ enough that they make syntactic predictions. Exploring these predictions will be the topic of chapter two.

Chapter two tests the predictions of the degree-argument analysis and the measure function analysis with respect to where they predict the standard expression to appear. In doing so, a structure of the gradable adjective phrase will emerge that is much more intricate than has previously been assumed. One of the main findings of this section will be that the internal argument of transitive adjectives like *patient with Mary* or *angry at Don* does not sit in the adjectives complement position.

Rather, it is introduced in a functional projection above the adjective. It will also be argued that there is a structural difference between *for-PP's* and *compared-to* phrases. *For-PP's* sit below the thematic PP, close to the adjective head. *Compared-to* phrases sit higher than both the *for-PP* and the thematic PP. Based on these findings, it will be determined that the degree-argument analysis fails to predict this rich structure and cannot be modified to account for it. The measure function analysis also doesn't predict this rich structure, but it is relatively easy to modify such that it can at least describe it accurately.

In chapter three, I provide two semantic analyses of positive and comparative adjectives. The first is a measure function analysis, and the other is a neo-Davidsonian event-style analysis. Both can capture the interpretive differences of *for-PP's* and *compared-to* phrases, but the neo-Davidsonian analysis is more elegant in a certain respect. One conclusion from chapter two is that the internal argument of a transitive adjective is actually not introduced internal to the adjective phrase. Rather, it is introduced non-locally to the adjective head. The neo-Davidsonian approach is especially adept at describing this kind of thematic separation. The neo-Davidsonian analysis will also differ in several other key respects from the traditional analysis. I will provide two arguments in its favor. First, it will allow a straightforward account of non-adjectives that appear in degree constructions. Second, it can be applied to constructions where standard expressions are stacking on top of one another. In both of these cases, the measure function analysis fails. Chapter three ends with a review of a recent proposal in Kennedy (2005a). It will be concluded that the analysis found there is not tenable.

Chapter four is a discussion about the differences between positives and comparatives. Positives are vague, do not allow crisp judgments, and do not allow differential measure phrases. Comparatives, however, are not vague, do allow crisp judgments, and do allow differentials. It is shown that the current analyses of the positives and comparatives cannot describe these differences. Furthermore, an analysis offered in Fara (2000) and Kennedy (2005a, 2005b) is shown to accurately reflect a property of positive adjectives, namely that a context sensitive notion of *similarity* requires that the two objects being compared differ enough to not be considered the same. But their proposal was meant as an explanation for why positives are vague and don't allow crisp judgments. I will reject this explanation on the grounds that comparatives are also sensitive to the exact same context sensitive notion of similarity. Therefore it cannot be the source of differences between positives and comparatives.

But first, let's turn to a review of previous semantic analyses of gradable adjectives.

1.2 Degree-Based Theories of Comparison

1.2.1 Degrees and Scales

In this section, I want to review two types of theories that aim to account for the semantics of gradable adjectives.² The goal here is twofold. First, the review will serve to define what a theory based on degrees is all about, i.e., what it assumes regarding the semantic ontology, the syntactic structure, and the nature of the syntax-

² I will focus solely on positive and comparative adjectives, since these are the constructions that will be the topic of the chapters that follow.

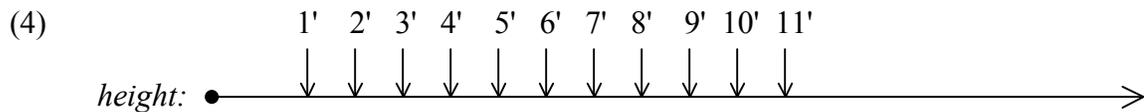
to-semantics mapping, in the hope that it will facilitate the reading of the chapters that follow. The second goal is to categorize degree-based theories into two types based on their predictions about the syntax of gradable adjectives. Exploring these syntactic predications will be the topic of chapter two. I will refer to the two theory types as the *traditional degree-argument theory* and the *measure function theory*.

Degree-based theories add a new semantic type to the typical ontology (Cresswell, 1977 introduced the formal notation of a degree). In addition to individuals, which are of type e , and truth values, which are of type t , we have degrees of type d . Degrees are abstract representations of the amount to which an individual possesses some gradable property. As such, we should think of them as elements of the Real numbers. And, therefore, we can represent the set of degrees as a dense, linearly ordered set of numbers which we can represent as a *scale*. A scale, therefore, is like an infinitely long measuring stick containing all of the dense, linearly ordered degrees. I will use the typical diagram below to represent a scale.³

(3) *scale*: ●—————→

³ There has been some recent work that seems to indicate that there are different types of scales. (Kennedy, 2003, Kennedy, 2005a, Kennedy and McNally, 2005) Scales may differ in whether either or both of their endpoints are closed, as appears to be the case with *empty/full* as in *completely empty* and *completely full*, but not *completely tall*.

Scales can be associated with a particular gradable property, like the gradable adjective *tall*, so that the degrees on that scale represent the different possible amounts that an entity might possess of that gradable property.^{4,5}



So, there is a point on the height scale representing *six feet*. In fact, the measure phrase *six feet* should be thought of as being type *d* and denoting the degree 6'.

1.2.2 Measure Functions, Standards and the Comparison Relation

With these assumptions in place, it becomes possible to treat gradable predicates as comparisons between two degrees.⁶ There are three crucial parts to any degree-based system. First, there must be a way to associate individuals with degrees on a scale. I will refer to this as a *measure function*. (Kennedy, 1999) Measure

⁴ Kennedy (1999) argues that scales must be associated with particular properties so that there are scales that represent linear extensions (for height, length, width, etc.), scales that represent intelligence, scales that represent weight, etc. The discussion in this dissertation is largely orthogonal to whether this is true or not, so I will not adopt or deny it. But I will label scales as the *height scale* or *cost scale* etc. as a rhetorical strategy. Nothing should be drawn from this, however.

⁵ Cresswell's (1977) original intuition was to treat degrees like the Fregean way of treating numbers – as sets of individuals, i.e., the set of things that are six feet long or cost \$7.95.

⁶ There have been many degree-based analyses that treat gradable predicates as relations between two degrees. (cf. Bartsch and Vennemann, 1972, Bierwisch, 1989, Cresswell, 1977, Heim, 1985, Heim, 2000, Hellan, 1981, Hoeksema, 1984, Kennedy, 1999, Kennedy and McNally, 2005, Lerner and Pinkal, 1995, Moltmann, 1992, Schwarzschild and Wilkinson, 2002, Seuren, 1973, Stechow, 1984, among many others.)

functions map individuals onto a degree. So, for instance, the measure function that maps individuals onto degrees of height is the TALL function in (5).⁷

(5) TALL = λx . *the degree to which x is tall*

This function is of type $\langle e,d \rangle$; it takes an individual x and returns x 's height. Measure functions are part of the denotation of the adjective they are associated with. So, TALL is part of the meaning of *tall*. If TALL were to be applied to *John*, it would return John's height; it would not return a truth value. Of course, nothing is simply *tall* by virtue of having some height.

The second part of a degree-based system is the comparison relation. These relations can be represented in many different ways, depending on the exact definition of degrees and scales. I will illustrate the most intuitive relations, which include:

- (6) a. $> = \lambda d \lambda d'$. d' is greater than d
- b. $\geq = \lambda d \lambda d'$. d' is greater than or equal to d
- c. $< = \lambda d \lambda d'$. d' is less than d

These relations are functions of type $\langle d \langle d,t \rangle \rangle$: they take two degrees and return true if the degrees are ordered on the scale in the necessary way. For instance, the

⁷ There are, of course, many variations of this. Some theories do not treat the degree as a definite description, but rather use a variable that can be bound by a quantifier, while others treat the degree as a set of degrees, etc. Nothing about this discussion hinges on any of the options that have been proposed.

greater-than relation returns true if the second argument is greater than the first, or, the second degree is higher on the scale than the first. This means that there needs to be two degrees to compare when interpreting a gradable predicate. I will refer to the first degree as the *standard degree* and the second degree as the *referent degree*. We can get the referent degree quite easily by simply predicating a gradable adjective of the subject. With the addition of the comparison relation we have something like in (7)

$$(7) \#||\text{John is tall}|| = \text{TALL}(\text{john}) \geq$$

This is of course, incomplete.

Thus, the third property of degree-based semantics of gradable predicates is the *standard degree*. The standard is the basis by which we consider something else to satisfy the gradable predicate. So, for instance, if we were to predicate the gradable adjective *tall* of John, as in *John is tall*, we could apply the measure function to *John*, as in (7), and treat this degree as an argument of the $>$ relation. Following standard assumptions, we can assume that the standard degree in a sentence like *John is tall* is supplied by the context.

$$(8) \#||\text{John is tall}|| = \text{TALL}(\text{john}) \geq d_s, \text{ where } d_s \text{ is supplied by the context.}$$

Both the degree-argument theories and the projectionist theories contain these three elements. Notice that since both the degree-argument theories and the projectionist

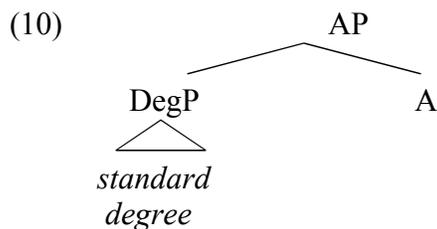
theories adopt these assumptions, they both essentially treat positive adjectives like they are hidden comparatives. I will discuss this at length in chapter four. What differs between them is where these elements come from.

1.2.3 Degree-Argument Theories

In the degree-argument type of theory, the measure function, comparison relation and the standard degree are all introduced into the logical form via the meaning of the adjective itself. (cf. Bierwisch, 1989, Cresswell, 1977, Heim, 1985, Hellan, 1981, Klein, 1991, Seuren, 1973, Stechow, 1984) Thus, the denotation of *tall* would be as in (9).

$$(9) \text{ tall} = \lambda d \lambda x. \text{TALL}(x) \geq d$$

Thus, the adjective *tall* is of type $\langle d, \langle e, t \rangle \rangle$: it takes an *internal degree argument* (the standard degree) and returns a predicate of individuals.



In some cases, the standard can be supplied by the context. Now, this works quite well for cases in which the standard is expressed by a measure phrase as in *John is six feet tall*.

$$(11) \quad \|\text{tall}(6')(\text{john})\| = 1 \text{ iff } \text{TALL}(\text{john}) \geq 6'$$

In this case, *six feet* denotes the degree 6' and serves as the internal argument of the adjective and the standard degree in the comparison relation. The subject, *John*, serves as its external argument. The measure function calculates the referent degree *John's height*. For the sentence to be asserted truthfully, *John's height* must be greater than or equal to 6'.

Now, when the positive form of the adjective includes a *for-PP*, this expression can serve as the standard degree. We simply assume that the standard degree slot can be filled with a complex phrase that includes a function that generates the *standard degree* from a *for-PP*. Following von Stechow (1984), we can call that function POS. Let's also assume that *for-PP's* denote properties of type $\langle e, t \rangle$, which we will informally refer to as *comparison classes*. (Klein, 1980) The property is simply the denotation of the NP part of the *for-PP*. For example *tall for a wrestler* includes the comparison class denoted by *wrestler*.

$$(12) \quad [\text{ppfor a wrestler}] = \lambda x. x \text{ is a wrestler}$$

The POS function, then, takes the comparison class and returns a standard degree, i.e., in our example it would return the standard for wrestlers.⁸

⁸ This is incomplete. I will address this at length in chapter three. For now, I simply want to illustrate roughly how the degree-argument system works.

(13) $\| \text{tall}(\text{POS for a wrestler})(\text{john}) \| = 1$ iff $\text{TALL}(\text{john}) \geq \text{the standard height of a wrestler}$

Now, one of the main advantages of the internal degree-argument theories is the analysis of comparatives that they can provide. Comparative morphemes are treated as quantifiers over degrees; they denote a relation between two sets of degrees. In

(14), I provide a denotation for the comparative morpheme (*-er/more*), that denotes a quantifier function over predicates of degrees. It takes two predicates of degrees (type $\langle d, t \rangle$) and returns a truth value.⁹

(14) $\text{COMP} = \lambda P \in D_{\langle d, t \rangle}. \lambda Q \in D_{\langle d, t \rangle}. \text{MAX}(Q) > \text{MAX}(P)$

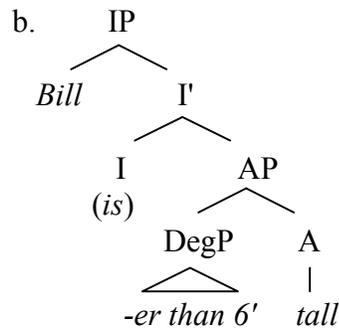
MAX is a function that takes a set of degrees and returns the biggest member of that set. (Rullmann, 1995)

(15) $\text{MAX} = \lambda P \in D_{\langle d, t \rangle}. \text{the unique } d \text{ such that } P(d) = 1 \ \& \ \forall d' [P(d') = 1 \rightarrow d' \leq d]$

⁹ There are many, many variations on this. Some researchers treat comparatives as restricted existential quantification over degrees (cf. Heim, 1985, Hellan, 1981, Lerner and Pinkal, 1995, Rullmann, 1995, Stechow, 1984); some treat them as definite descriptions as in (14) (Schwarzschild and Wilkinson, 2002); some treat them as universal quantification structures (Kennedy, 1999, chapter 4); and still others as generalized quantifiers (cf. Moltmann, 1992)

Let's consider an example like *John is taller than six feet*. In this case, we assume that the *than*-phrase is sisters to the *-er* morpheme and they both sit in the standard degree slot.¹⁰

(16) a. Bill is taller than six feet.



The denotation of the DegP, then, is as in (17), where the COMP function takes the degree *six feet* as its first argument.

(17) $\| \text{-er than 6 feet} \| = \lambda Q \in D_{\langle d, t \rangle}. \text{MAX}(Q) > \text{MAX}(\{d: d = 6'\})$

Putting *-er than 6 feet* in the DegP slot where we would normally find the degree argument of the adjective gives rise to the classic "quantifier in direct object position" problem. That is, there is a type mismatch due to the quantifier *-er than six feet* which is of type $\langle \langle d, t \rangle, t \rangle$ sitting in the internal argument position of the adjective which is of type $\langle d, \langle e, t \rangle \rangle$. Within the degree-argument theory, the typical thing to do is quantifier raise the DegP.

¹⁰ This is an assumption that goes back to Bresnan (1973).

(18) [-er than 6 feet] λd [John is d-tall]
 \uparrow _____

This yields a lambda abstraction over the degree argument slot. This lambda abstraction creates a predicate of degrees (or a set of degrees) out of the matrix clause, which can then serve as the second argument of COMP.

- (19) a. $[[[-er [than 6 feet]]] \lambda d[[John\ is\ d-tall]]] = 1$ iff
 b. $MAX(\lambda d[[John\ is\ d-tall]]) > MAX(\{d: d = 6'\})$
 c. $MAX(\lambda d[TALL(john) \geq d]) > MAX(\{d: d = 6'\})$
 d. $MAX(\{d: TALL(john) \geq d\}) > MAX(\{d: d = 6'\})$
 e. *John's height > 6'*

The first MAX operator in (19) returns the maximal degree from the set of degrees that are shorter to or equal to John's height. In other words, it returns John's height. The second one returns the maximal degree from the set that includes only 6'. And, it is asserted that John's height must be greater than 6'.

This analysis also accounts for clausal comparatives quite readily. *Than*-clauses in typical clausal comparatives look like relative clauses (for instance, they have a required gap.)

(20) John is taller than Bill is ~~d-tall~~

I will assume that the deleted material is interpreted. This is necessary because we need something with a degree variable inside of the *than*-clause to abstract over and make a predicate of degrees out of the *than*-clause. Thus, we'll assume that there is empty operator movement from the standard degree position up to the CP of the *than*-clause.

(21) John is taller λd . Bill is d-tall
 \uparrow _____

This makes the *than*-clause a predicate of degrees. And, as before, we will assume that *-er λd . John is d-tall* starts out in the internal degree-argument slot of the matrix adjective. Thus, the predicate of degrees that is denoted by the *than*-clause serves as the first argument of COMP. This entire phrase raises to the top of the sentence, creating another predicate of degrees out of the matrix clause.

(22) a. John is [-er [λd . Bill is d-tall]]-tall
 \uparrow _____
 b. [-er [λd . Bill is d-tall]] [$\lambda d'$. John is d'-tall]
 \uparrow _____

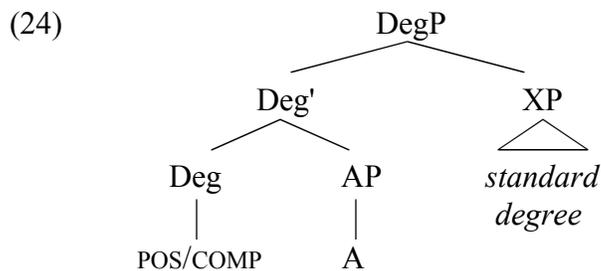
(23) a. $[[-er [\lambda d$. Bill is d-tall]]] $\lambda d'$ [|John is d'-tall|] = 1 iff
 b. $\text{MAX}(\lambda d' [|John is d'-tall|]) > \text{MAX}(\lambda d [|Bill is d-tall|])$
 c. $\text{MAX}(\lambda d' [\text{TALL}(\text{john}) \geq d']) > \text{MAX}(\lambda d [\text{TALL}(\text{john}) \geq d])$
 d. $\text{MAX}(\{d': \text{TALL}(\text{john}) \geq d'\}) > \text{MAX}(\{d: \text{TALL}(\text{john}) \geq d\})$
 e. *John's height > Bill's height*

The COMP morpheme takes two predicates of degrees, maximizes them, and compares the results via a *greater-than* relation.

The essential point about this type of theory that is important for our purposes is that it always places the standard degree in the internal argument slot of the gradable adjective. This has its benefits. It is easy to provide an analysis of measure phrases, and the analysis of clausal comparatives has its parallels in quantifier theory. In the next section, I outline the projectionist theory, which does not assume that the standard is an internal argument.

1.2.4 Measure Function Theories

Kennedy (1999) bases a theory of gradable adjectives on the syntactic structures proposed in Abney (1987) and Grimshaw (1991) in which gradable adjectives project a functional degree phrase category, DegP.



In this system, two of the three ingredients that are necessary for a degree-based theory of comparison are pulled out of the adjective denotation and, instead, placed in the DegP. What is left in the adjective is the measure function. Adjectives, like *tall*, denote the measure function, simply. (Kennedy, 1999)

(25) $tall = \lambda x. TALL(x) = \lambda x. \text{the degree to which } x \text{ is tall}$

Thus, adjectives are of type $\langle e, d \rangle$, taking an individual and return the degree that individual possesses of the gradable property. The head of the DegP houses the positive or comparative morphemes. The positive morpheme is phonetically null, while the comparative morpheme is pronounced *-er/more* (in English). These morphemes denote functions, POS and COMP, that contribute the comparison relation and introduce the standard degree into the denotation.

(26) $POS = \lambda G. \lambda d. \lambda x. G(x) \geq d$

This POS function combines with the gradable property G first, then with the standard degree d . The result is a predicate of individuals as in (27), which can then be applied to the subject as in (28).

(27) a. $||[\text{six feet } [POS [\text{tall}]]]|| =$
 b. $[6' [\lambda G. \lambda d. \lambda x. G(x) \geq d [\lambda x. TALL(x)]]] =$
 c. $\lambda x. TALL(x) \geq 6'$

(28) a. $(\text{john})[\lambda x. TALL(x) \geq 6'] = 1$ iff
 b. $TALL(\text{john}) \geq 6' = 1$

The comparative morpheme is not a quantifier, but rather a function similar to POS.

$$(29) \quad \text{COMP} = \lambda G \lambda y \lambda x. G(x) > G(y)$$

This is the COMP function that works with phrasal comparatives like that in (30).

(Heim, 1985, Kennedy, 1999)

$$(30) \quad \text{John is taller than Bill.}$$

Phrasal comparative differ from clausal comparatives in that there is no clausal material in the *than*-phrase, just a DP. (Hankamer, 1973, Kennedy, 1999)¹¹ Under this assumption, the COMP function first takes a gradable property G and copies it into two positions in the meta-language. The first copy will be applied to x and the second will be applied to y . The individual y is the DP in the *than*-phrase, i.e., we assume that *than* is vacuous. The individual x is the object that the whole DegP is predicated of, i.e., the subject of the clause. G is a measure function, so the referent and standard degrees are calculated by applying the two copies of G to each of these individuals.

$$(31) \quad \begin{array}{ll} \text{a.} & \|\text{John is taller than Bill}\| = 1 \text{ iff} \\ \text{b.} & (\text{john})[\text{COMP}(\|\text{tall}\|)](\text{bill}) = 1 \text{ iff} \\ \text{c.} & (\text{john}) [[\lambda G \lambda y \lambda x. G(x) > G(y)](\lambda x. \text{TALL}(x))](\text{bill}) = 1 \text{ iff} \\ \text{d.} & (\text{john}) [\lambda x. \text{TALL}(x) > \text{TALL}(\text{bill})] = 1 \text{ iff} \end{array}$$

¹¹ But see Bresnan (1973) and Lechner (2001) for arguments that there is clausal material.

- e. $TALL(john) > TALL(bill) = 1$
- f. *John's height is greater than Bill's height*

The important aspect to remember about the projectionist theories is that the standard expression is introduced above the adjective head, in the specifier of the DegP.¹² Also, the adjective denotes only a measure function. The comparative relation is introduced into the logical form by the degree head.

In chapter two, I will examine the syntactic predictions that these two types of theories make concerning where the standard expression is introduced: as sister to the adjective head or above the adjective phrase.

¹² Or, perhaps adjoined to the Deg' or DegP level.

Chapter 2: The Syntax of Comparison: Establishing Boundary Conditions for a Semantic Theory of Gradable Adjectives

2.1 Introduction

This chapter argues for a particular internal constituent structure of gradable adjective phrases. A variety of satellites to the adjective are investigated including the standard expressions that were discussed in chapter one: *for-PP's*, *compared-to* phrases and *than*-phrases.

- (32) a. John is tall **for a jockey**.
b. John is tall **compared to Bill**.
c. John is taller **than Bill**.

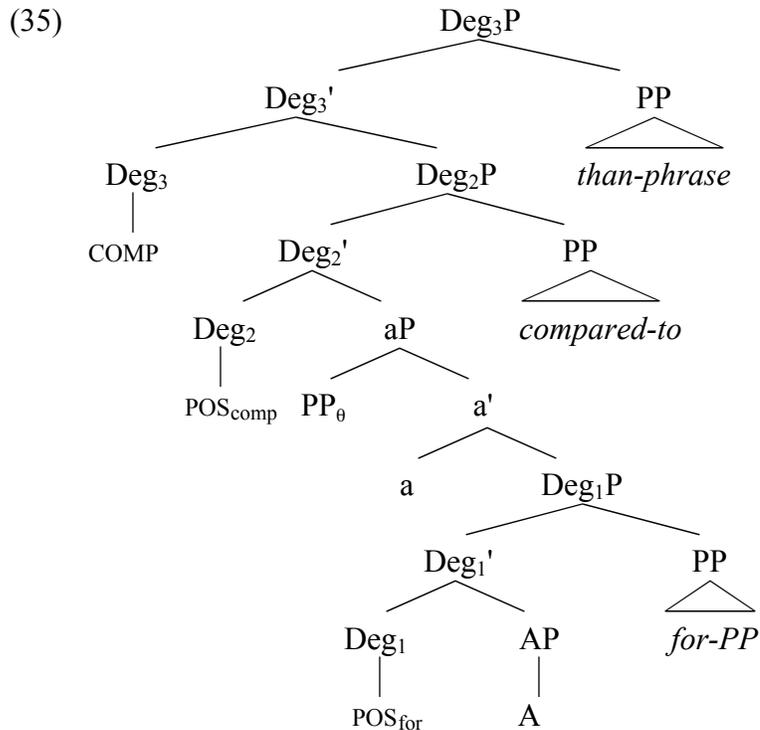
As was discussed in chapter one, these phrases, at least intuitively, seem to be doing the same thing: they provide the standard. And, given that the semantics of gradable adjectives seems to require a standard, one might be inclined to say that each of these phrases are particular instantiations of this semantically required standard. But as we will see, they behave quite differently from each other, both syntactically and semantically. Their distinguishing behavior will become more apparent when we investigate how standard expressions relate syntactically to two other types of PP's that can occur with gradable adjectives: the thematic-PP's of transitive adjectives as in (33) and the *as-PP's* of subsecutive adjectives as in (34).

- (33) a. Al is patient **with Mary** for a boy.
b. Al is patient **with Mary** compared to Tom.
c. Al is more patient **with Mary** than Tom.

(34) Alexander is skillful **as a cook** for a linguist.

I use a variety of syntactic tests to argue for four descriptive conclusions: (a) each type of standard expression (*for-PP's*, *compared-to* phrases, and *than*-phrases) is introduced by a different functional head/morpheme in the extended projection of a gradable adjective, outside of the AP; (b) these functional morphemes are ordered such that the morpheme that introduces the *for-PP* is closest to the adjective, the morpheme that introduces the *compared-to* phrase is above that, and the comparative head which introduces the *than*-phrase is highest; (c) the thematic-PP of transitive adjectives is not a complement of the adjective, but rather is introduced in the extended projection of the adjective; and (d), the thematic-PP sits between the morphemes that introduce the *for-PP* and the *compared-to* phrase. The structure in (35) summarizes these main conclusions. It is meant to capture the relative height of these constituent phrases, not to suggest that they can all appear in the same construction.¹³

¹³ Though, I will have something to say about stacking multiple standard expressions in this and the next chapter.



The constituent structure above places strong boundary conditions on a semantic analysis of gradable adjectives. As such, I will use these syntactic conclusions to draw several semantic conclusions. The first will be the focus of this chapter, namely, that the syntax of standard expressions is incompatible with the traditional degree-argument theories. The type of argumentation that I will provide for this conclusion is obvious from the structure in (35): none of these standard expressions are direct arguments of the adjective head. Only semantic theories that introduce standard expressions outside of the immediate AP, in the extended projection of the A, are compatible with the constituent structure above. The second conclusion will be the focus of chapter three: all thematic and comparative meaning should be completely separated from the lexical denotation of the adjective leaving a simple predicate of events.

The structure of the chapter is this. I first show that *for-PP's* and *compared-to* phrases are not sentence level adjuncts, but rather they are introduced inside the gradable adjective phrase and behave like syntactic arguments. This is done in section 2.2 for *for-PP's* and section 2.3 for *compared-to* phrases. The internal structure of gradable adjective phrases is investigated in section 2.4. It is shown there that the relative height of each standard expression differs from what we would expect given the assumptions of the degree-argument theories. It is also shown that thematic-PP's are not complements of transitive adjective heads, but rather, they are introduced external to the AP and between the positions of *for-PP's* and *compared-to* phrases. The final result of this section is that *for-PP's*, too, are not introduced internal to the AP. Section 2.5 discusses the relative height of comparative *than*-phrases and concludes that these are introduced highest in the structure of gradable adjective phrases. In section 2.6, I provide some concluding remarks and set up the discussion in chapter three.

2.2 The Syntax of *for-PP's*

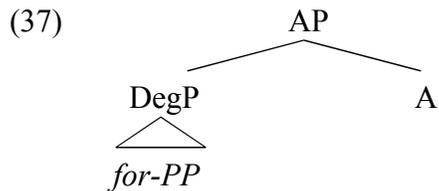
2.2.1 Introduction

This section presents the first step in establishing the phrase structure of gradable adjectives and standard expressions. The first of these standard expressions to be discussed are the *for-PP's* that have been the topic of much debate in the literature on gradable adjectives. (Cresswell, 1977, Kennedy, 1999, Kennedy, 2003, Kennedy, 2005a, Kennedy, 2005b, Klein, 1980, Klein, 1991, Ludlow, 1989, Siegel, 1976a, Wheeler, 1972)

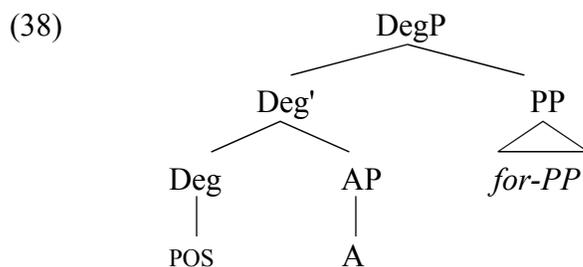
- (36) a. John is tall **for a wrestler**.
- b. These aren't expensive **for a pair of dress shoes**.
- c. My car is very fast **for a 4-cylinder**.
- d. Andy was quite unhappy with his paper **for such an accomplished linguist**.
- e. Peter is really patient with Mary **for a brother**.

Descriptively, these phrases can be said to denote a *comparison class* by which the object that the gradable adjective is predicated of is compared. (Klein, 1980) So, in the first example, John must be compared to the typical height of wrestlers; in the second, the objects referred to by *these* must be compared to the typical cost of dress shoes; etc. Thus, they serve the semantic purpose of supplying the standard that divides the extension and anti-extension of the gradable predicate. This is an important semantic function, and is probably behind an intuition that (most) researchers have, namely, that *for-PP's* bear a tight lexical and syntactic relationship with gradable adjectives. But there are possible alternatives to this view.

In this section, I will provide evidence that *for-PP's* are not sentence level adjuncts. Instead, they are introduced inside the gradable adjective phrase that they are semantically associated with. This might seem like an obvious conclusion, because it is consistent with both of the semantic theories that we are considering. The traditional degree-argument analysis places the *for-PP* (as it does all standard expressions) inside an AP argument slot, presumably with some sort movement that would get the word order right.



Measure phrase theories introduce the *for-PP* in the extended projection of the adjective.



Both of these analyses are compatible with the data that will be discussed in this section. Thus, it might seem like this section makes a moot point. But, I present the arguments below for two reasons. First, I hope to exclude a type of analysis that has been proposed for *compared-to* phrases (Beck et al. (2004) discussed below in section 2.3.1) in which some standard expressions serve as pragmatic context setters that allow speakers to infer the value of the standard degree. That analysis and the arguments used to bolster it could potentially be applied to *for-PP's*. Second, the conclusion that *for-PP's* are introduced in the gradable adjective phrase, combined with the conclusion in 2.3 that *compared-to* phrases are also introduced inside the

gradable adjective phrase, will be used to argue against the degree-argument analysis.¹⁴

The layout of this section is this. First, I show that *for-PP's*, despite a certain ease of mobility, obey island constraints, indicating that they are not sentence level adjuncts. Next, I use constituency diagnostics to show that *for-PP's* form a constituent with the adjective. And, finally, I show that *for-PP's* behave like syntactic arguments.

2.2.2 *for-PP's* are not Sentence Level Adjuncts

It is argued here that *for-PP's* form a tight syntactic relationship with the gradable adjective that they are associated with. This might be unexpected given how they can be pronounced in various sentence positions.

- (39) a. John is quite tall for a wrestler.
b. John is, for a wrestler, quite tall.
c. John, for a wrestler, is quite tall.
d. For a wrestler, John is quite tall.

¹⁴ Another reason is that it is not clear to me whether Klein (1980) can account for this tight relationship between *for-PP's* and the gradable adjective. He explicitly denies that gradable adjectives have a comparison class argument, and incorporates comparison classes into the contextual component of the grammar. In Klein's theory, comparison classes basically modify the context that a gradable adjective is interpreted under. He does not talk about the syntax or semantics of *for-PP's* explicitly (rather, he focuses on implicit comparison classes), but it appears to me that his system would treat them as sentence level adjuncts. It may be that Klein's system could be easily modified to include a contextual variable in the syntax that *for-PP's* could modify. Klein may be opposed to such a modification, however, given his adamant denial of a comparison class variable appearing in the syntax. These two alternatives look a lot like debates over whether world and time variables appear in the syntax or only in the semantics.

In fact, *for-PP's* can be positioned indefinitely far from the gradable adjective clause, provided the distance between the two only spans across bridge verbs.

- (40) a. It was for a ballet dancer that Bill said he believes Mary is heavy.
b. For a ballet dancer, Bill said he believes Mary is heavy.

However, a *for-PP* and the clause that contains the gradable adjective cannot be separated by a syntactic island. Examples of the major types of islands are given in (41) – (45).

(41) *Noun Complement Island*

- a. Bill believes the claim that Mary is heavy for a ballet dancer.
b. *It was for a ballet dancer that Bill believes the claim that Mary is heavy.
c. *For a ballet dancer, Bill believes the claim that Mary is heavy.

(42) *Relative Clause Island*

- a. Bill saw the woman who is heavy for a ballet dancer.
b. *It was for a ballet dancer that Bill saw the woman who is heavy.
c. *For a ballet dancer, Bill saw the woman who is heavy.

(43) *Wh-island*¹⁵

- a. Bill wonders whether Mary is heavy for a ballet dancer.
- b. ?It was for a ballet dancer that Bill wonders whether Mary is heavy.
- c. ?For a ballet dancer, Bill wonders whether Mary is heavy.

(44) *Sentential Subject Island*

- a. That Mary is heavy for a ballet dancer annoyed Bill.
- b. *For a ballet dancer, that Mary is heavy annoyed Bill.

(45) *Adjunct Island*

- a. Mary got fired because she is heavy for a ballet dancer.
- b. *It was for a ballet dancer that Mary got fired because she is heavy.
- c. *For a ballet dancer, Mary got fired because she is heavy.

A natural explanation of these facts can be given if *for-PP's* can optionally move from inside the gradable adjective clause to its fronted position. For example, the examples in (41)b and (41)c are unacceptable because the *for-PP* has moved out of a position inside the relative clause (for instance, where it is pronounced in (41)a), and it is this movement that causes their unacceptability. We can conclude from these facts that the *for-PP* must be base-generated in the immediate clause that contains the

¹⁵ I mark these examples with a "?" because my informants believe that, while they are certainly unacceptable compared to the (a) example, they are not as unacceptable as the other island violations reported in (41) – (45). I will make something of this point in section 2.2.3.

gradable adjective. I now turn to evidence that *for-PP's* are base-generated low, inside the adjective phrase.

2.2.3 *for-PP's* are Part of the Gradable Adjective Phrase

For-PP's and the gradable adjectives they are associated with are mediated by more than just a clause-mate condition. *For-PP's* must start out below the subject of the adjective phrase. Evidence for this comes the fact that pronouns must be c-commanded by quantifiers that bind them. A pronoun in the *for-PP* can be bound by a quantifier in the subject position, even when it has been fronted.

- (46) a. Every boy₁ in my class is smart for a student his₁ age.
b. For a student his₁ age, every boy₁ in my class is smart.
c. It is for a student his₁ age that every boy₁ in my class is smart.
- (47) a. No boy₁ in my class is smart for a student his₁ age.
b. For a student his₁ age, no boy₁ in my class is smart.
c. It is for a student his₁ age that no boy₁ in my class is smart.

For the examples in (46)b,c and (47)b,c to be acceptable under a bound variable interpretation, the *for-PP's* must have been base-generated in position where they are c-commanded by the subject.

Further evidence indicates that *for-PP's* can form a constituent with the gradable adjective. First notice that they can be fronted together.

- (48) a. John is tall for a wrestler, and tall for a wrestler he should be considering wrestlers are usually so short.
- b. Tall for a BASKETBALL player, he is NOT. But he IS tall for a BASEBALL player.
- c. It's surprising how tall for a basketball player he actually is.

Second, we can elide the adjective phrase with the *for-PP*.

- (49) a. John is tall for a wrestler, and Tom is, too.
- b. Mary is happy for a freshman, and Tom is, too.

In these examples, Tom is interpreted as being *tall for a wrestler* or *happy for a freshman*, not just tall or happy in general, nor can he be tall or happy for some other comparison class. We can conclude from this that the *for-PP* is part of the elided adjective phrase. One could argue against this conclusion by saying that the copula raises in (49) and what is being deleted is something slightly larger than the adjective phrase. The following examples test for a smaller constituent than perhaps ellipsis does, by using the pro-form *so* to target a constituent of the previous clause.

- (50) a. John is tall for a wrestler, and Bill is very much so, as well.
- b. That guy was really polite for a bank teller. The woman was much less so.
- c. Ken is very patient for a young boy, but Tom is even more so.

In these examples, the antecedent of *so* must include the adjective and the *for-PP*.

This is shown in the following example by changing the gender of the second conjunct's subject in (50)c.

(51) #Ken is very patient for a young boy, but Mary is even more so.

Hence, the *for-PP* forms a constituent with the gradable adjective.

Thirdly, when a phrase moves, it becomes an island to extraction. (Wexler and Culicover, 1980) Therefore, we can use the "derived position island" diagnostic to test for the *for-PP*'s base-generated location. However, there is a slight complication in applying the diagnostic: extraction from *for-PP*'s does not initially seem possible.

(52) *What is John tall for?

This might be expected though: *for-PP*'s seem to require (or at least prefer) a property-denoting expression as their complement. Only an indefinite understood as non-specific can appear in the complement of *for-PP*'s.

(53) a. *John is tall for the wrestler.
b. John is tall for a wrestler.

The confound can be corrected for by extracting a higher-order *wh*-phrase, rather than *what*, such as a *what kind of* phrase.

- (54) a. What kind of athlete is John tall for?
b. It's surprising what kind of athlete John is tall for.

The derived position island diagnostic predicts that we should only be able to extract from the *for-PP* when it is in its base-position. If this is so, then the position of the *for-PP* in (54) is not derived. Recall that *for-PP*'s can appear in just about any position along the spine of a tree that has a gradable adjective. Trying to extract out of these other positions yields very strong unacceptability.

- (55) a. *What kind of athlete₁ is₂ John t₂ for t₁ tall?
b. *What kind of athlete₁ is₂ John for t₁ t₂ tall?
c. *What kind of athlete₁ for t₁ is₂ John t₂ tall?

We can conclude that extraction is only possible when the *for-PP* appears to the right of the adjective as in (54). This position to the right of the adjective could, however, be a relatively high, adjoined position outside the adjective phrase. An adverb can control for this possibility.

- (56) John has been happy recently for an oncologist.

In (56), the adverb *recently* appears between the adjective and the *for-PP*. If the *for-PP* really does form a constituent with the adjective, then this must be an extraposed position, and we should not be able to extract from it.

- (57) a. *What kind of doctor₁ has John been happy recently for t₁?
b. What kind of doctor₁ has John been happy for t₁ recently?

We cannot extract from it in the extraposed position (57)a, but we can extract when it is immediately to the right of the adjective (57)b.

2.2.4 *for-PP's* are Syntactic Arguments

We have seen evidence that *for-PP's* are base-generated inside the adjective phrase. In this section, I show that they behave like syntactic arguments of the adjective phrase and not like adjuncts.¹⁶

The first bit of evidence for this conclusion comes from the fact that the *wh*-island violation in (43) sounds relatively good compared to the other island violations (41) – (45) (all repeated here).

- (58) ?It was for a ballet dancer that Bill wonders whether Mary is heavy.
(59) a. *It was for a ballet dancer that Bill believes the claim that Mary is heavy.

¹⁶ A short disclaimer, first, though. Some of the tests that I use, unfortunately, do not provide perfectly clear data. However, I do believe that they trend in the same direction, and I hope that the reader allows me a certain bit of leeway on some of the individual tests, and in the end, takes the tests as a whole as evidence for my conclusion.

- b. *It was for a ballet dancer that Bill saw the woman who is heavy.
- c. *For a ballet dancer, that Mary is heavy annoyed Bill.
- d. *It was for a ballet dancer that Mary got fired because she is heavy.

This is a property of syntactic arguments, not of adjuncts. Adjuncts exhibit much harsher *wh*-island violations than arguments do. (Lasnik and Saito, 1992)

Next, it is well known that adjuncts can optionally reconstruct, but arguments must. (Lebeaux, 1991) Because adjuncts have the option of reconstructing, they obviate Condition C violations by fronting (60)a.

- (60) a. Which book that Noam₁ wrote does he₁ think Mary read.
- b. *Which book about Noam₁ does he₁ think Mary read.

But arguments must reconstruct and hence cannot avoid Condition C violations in examples like (60)b. *For-PP*'s do not obviate Principle C when they are fronted.

- (61) a. John₁ is tall for a boy in his₁ class.
- b. *How tall for a boy in John₁'s class is he₁?
- c. ??For a boy in John₁'s class, he₁ is tall.

Reconstruction of the *for-PP* appears to be necessary. Again, this is a property of syntactic arguments, not of adjuncts.

Lastly, it's well known that extraction out of arguments of NPs and APs is licit

(62) but extraction out of adjuncts of NPs and APs is disallowed (63).

- (62) a. Who₁ did John read [a book by t₁]?
b. Which subject₁ did John read [a book about t₁]?
c. Who₁ is John [proud of t₁]?
d. Which student's work₁ is John [happy with t₁]?

(63) a. *How many chapters₁ did John read [a book with t₁]?
b. *Which library₁ did John read [a book in t₁]?
c. *What₁ is John [proud within t₁]? (*proud within limits*)
d. *What₁ is John [happy with t₁]? (*happy with some trepidation*)

We have already seen that extraction from *for-PP*'s is possible, but only when we extract a higher order *wh*-phrase.

- (64) What kind of athlete₁ is John tall for t₁?

Using a higher order *wh*-phrase does not have an effect on adjunct extraction from NPs or APs. Extraction from adjuncts is unacceptable regardless of the form of the *wh*-phrase.

- (65) a. *What₁ did John read [a book in t₁]?

- b. *What kind of library₁ did John read [a book in t₁]?
 (66) a. *What₁ is John [proud within t₁]?
 b. *What kind of limits₁ is John [proud within t₁]?

Therefore, we can conclude that extraction out of the *for-PP* as in (64) is allowed because the *for-PP* is an argument of the adjective.

2.2.5 Summary

The diagnostics applied in this section included movement of the *for-PP* out of islands, binding pronouns inside the *for-PP*, fronting of the adjective and the *for-PP*, interpretation of adjectival pro-forms, and extraction from derived position islands. They all point to a structure in which *for-PP's* are base-generated inside the gradable adjective phrase, and when they appear elsewhere, it is because they have moved to these positions. It was also shown that *for-PP's* behave syntactically like arguments of the adjective. This verifies a central intuition that (most) researchers have maintained through past studies of gradable adjectives, namely that comparison classes bear a tight lexical (and hence syntactic) relationship with gradable adjectives. In degree-argument theories, gradable adjectives select a degree argument that can be instantiated by a *for-PP* (though, embedded inside of a complex phrase). Measure function theories introduce the standard degree in the extended projection of the gradable adjective.

In the next section, we turn to kind of standard expression that has not been much discussed in the literature: *compared-to* phrases. The same diagnostics will show that it, too, appears to be introduced inside the gradable adjective phrase.

2.3 The Syntax of compared-to Phrases

2.3.1 Introduction

The second standard expression that will be discussed has received much less attention in the literature. (but see Beck et al., 2004, Fults, 2005, Kennedy, 2005a, Kennedy, 2005b) There are several different forms these types of phrases can take, but I will follow Beck et al. (2004) and treat them all as variations of the same type of phrase. I will refer to them as *compared-to* phrases.¹⁷

- (67) a. **Compared to Sam**, Bill is quite angry at their mom.
 b. **In comparison to Jeff**, Alex isn't very happy with Mary.
 c. **With respect to those shoes**, these shoes are really expensive.
 d. **With regards to Sue**, Mary is really tall.
 e. **Relative to Eric**, Frank is so calm.

These phrases, too, intuitively supply the standard by which the gradable expression is predicated of must be compared. So, in (67)a, Sam is compared to Bill, and in (67)b, Jeff is compared to Alex. The degree-argument analysis could approach *compared-to* phrases in this intuitive manner by base-generating them inside the

¹⁷ I will only use examples of the form *compared to DP*, but all of the judgments and the arguments that follow from them carry over to the other versions.

standard degree argument slot. But, in some ways they do not look like typical standard expressions. Perhaps the reason for the lack of interest in these constructions is their surface similarity to more pragmatic items like parentheticals or context-setters. For instance, in addition to the variation in their form, they are very mobile, appearing just about anywhere in a simple clause.

- (68)
- a. Compared to John, Bill is tall.
 - b. Bill, compared to John, is tall.
 - c. Bill is, compared to John, tall.
 - d. Bill is tall compared to John.

Beck et al. (2004) give just such an analysis in which these phrases set the context such that the value of the standard can be inferred. According to this analysis, they are sentence level adjuncts that set the value of the standard degree through pragmatic computations. Notice that this type of analysis does not violate any of the main assumptions of the traditional analysis: the standard degree can still be treated as an internal argument (although, it would be a hidden variable) whose value is set pragmatically. The analysis that Beck et al. (2004) propose, then, can be seen as trying to maintain the traditional analysis in the face of a standard expression that does not readily fit into this framework.

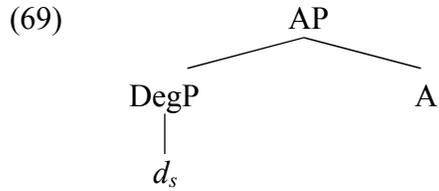
I argue that Beck et al.'s analysis is incorrect. I do so by showing that *compared-to* phrases do not behave syntactically like sentence level adjuncts. I apply the same diagnostics that were applied to the *for-PP* in the previous section and

conclude the same thing: *compared-to* phrases are base-generated inside the gradable adjective phrase. Despite being able to move quite freely, they cannot cross over islands, they form a constituent with the adjective, and they behave like syntactic arguments. The section is organized as follows. First, I introduce Beck et al. (2004). Then, I discuss and reject an analysis of *compared-to* phrases as hidden conditionals. Next, I apply the diagnostics from section 2.2 to *compared-to* phrases.

2.3.2 Beck et al. (2004)

Beck et al. (2004) points out a few problems with treating *compared-to* phrases as the standard degree argument of the adjective. While I don't think their arguments are very compelling, the analysis that they propose has certain intuitive benefits, and it is worth arguing explicitly against it. One benefit of the analysis is that it actually ends up maintaining the traditional degree-argument analysis. It does so not by overcoming the problems that they point out, but rather by banishing it from the gradable adjective phrase altogether. Under their analysis, *compared-to* phrases are sentence level adjuncts that serve the role of pragmatic "context setters". Speakers infer the value of the standard degree from a *compared-to* phrase.

One of their main argument concerns the compositional semantics of *compared-to* phrases. In the traditional degree argument analysis, a gradable adjective is a function from degrees to functions from individuals to truth values (i.e., they are of type $\langle d, \langle e, t \rangle \rangle$). They adopt the common view that when the standard degree is not expressed explicitly, its value is supplied by the context.



- (70) a. Bill is tall.
 b. *the degree to which Bill is tall* $\geq d_s$

d_s = the size standard made salient by the utterance context

Beck et al. rightly point out that if *compared-to* phrases are supposed to sit in the degree argument slot and compositionally supply the value of the standard degree d_s , then we need somehow to compositionally derive a degree term from a *compared-to* phrase. But there is nothing inside of *compare-to* phrases that degrees can be abstracted over since they don't contain a gradable predicate. But in a phrase of the form *compared to DP*, there is no gradable adjective phrase, and hence, no degree variable to abstract over.¹⁸

- (71) a. Compared to John, Bill is tall.
 b. #*the degree to which Bill is tall* \geq **John**

¹⁸ Beck et al. (2004) seem to assume that the *compared to* part of *compared-to* phrases is completely vacuous semantically. As a result, there is nothing in a *compared-to* phrase except the DP. See Fults (2005) for a semantic analysis that does derive a degree term out of a *compared-to* phrase using the verb *compare* to introduce a gradable property and, hence, a degree.

Their point is well taken – (71)b is nonsense because degrees cannot be compared to individuals. But instead of offering a way to derive a degree out of *compared-to* phrases, Beck et al. propose that comparison phrases can serve as an input to the pragmatics and be used to infer the value of the standard degree d_s .

- (72) a. Compared to John, Bill is tall.
b. *the degree to which Bill is tall* $\geq d_s$
c. d_s = the size standard made salient by the utterance context
d. d_s := John's height

The important step is between (72)c and (72)d. The *compared-to* phrase provides enough information to understand that the utterance is "about John" in some way. This, combined with the fact that the gradable predicate involved is *tall*, allows speakers to infer that the size standard must be John's height.

Notice that the analysis is capable of maintaining the degree argument analysis. The gradable adjective still takes an internal degree argument, it is just not actually supplied by the *compared-to* phrase. Hence, there is no need to incorporate *compared-to* phrases into the traditional degree-argument analysis as a standard denoting expression. The analysis could also be straight-forwardly applied to the measure function theories. These theories have to account for implicit standard degrees as well, and however it is done, the *compared-to* phrase can be used to pragmatically infer its value. But I think there are good reasons to believe that *compared-to* phrases are not pragmatic context setters, and I will go over them in the

following sections. If these reasons are convincing, then we need to provide an analysis that can incorporate *compared-to* phrases into the semantics in compositional fashion that does not involve a inference mechanism. For now, note that the argument put forth in Beck et al. has far reaching consequences. They do not discuss the fact that *for-PP's* and phrasal comparatives pose the same problem for a compositional degree-based system.¹⁹

- (73) a. Adam is big [for an ant].
 b. #*the degree to which Adam is big* \geq **ants**
- (74) a. Fred is fatter [than Barney].
 b. #*the degree to which Fred is fat* $>$ **Barney**

There is not a gradable property of the ants or of Barney to abstract degrees over. According to the logic of Beck et al., this means that *for-PP's* and phrasal comparatives should be handled in the pragmatics as well. One could imagine an analysis in which *for-PP's* pragmatically set the value of the standard degree (this is more difficult to imagine with phrasal comparatives). The syntactic properties of *for-PP's* presented in section 2.2 argue against this conclusion. Having determined that *for-PP's* are introduced inside the gradable adjective phrase, and that they arrive at

¹⁹ That is, under the assumption that phrasal-*than* does not contain any elided clausal material. (Hankamer, 1973, Kennedy, 1999) If there is clausal material, then it might contain a gradable predicate that introduces a degree variable. This is the standard analysis of clausal comparatives, which plausibly do contain an elided gradable predicate. (Bresnan, 1973) But see Lechner (2001) which offers evidence that phrasal-*than* does contain clausal material.

sentence initial positions only through movement, we might hope that they simply denote the standard degree, or at least, enter into the compositional semantics at that point using traditional function application or predicate modification rules. In the sections that follow, I will apply the same diagnostics to *compared-to* phrases that were applied to *for-PP's*. The same conclusion will be drawn: they are introduced as part of the gradable adjective phrase. We will be able to conclude from this that *compared-to* phrases should be incorporated into the semantic form via compositional rules, not pragmatic inferences. Before I do that, however, let's now turn to ruling out one other possible analysis of *compared-to* phrases.

2.3.3 Against a Hidden Conditional Analysis

This section argues against an obvious possible analysis of *compared-to* phrases: that they are actually the reduced form of a conditional antecedent clause. A hidden conditional analysis would account for *compared-to* in the following way. They start out like either of the acceptable sentences in (75).

- (75) a. If he₁ is compared to John, (then) Bill₁ is happy.
b. When she₁ is compared to Sarah, (then) Sue₁ is tall.

These conditionals look a lot like *compared-to* constructions. There is a comparative reading of these sentences in which the comparison expressed in the antecedent clause allows an assignment of the standard degree in the consequent that is relational. This reading does not entail that Bill is happy. Bill can be quite depressed, as long as John is depressed more than that. That is, in (75)a, Bill need

only be happy relative to John's happiness. (75)b does not assert that Sue is tall in general, in fact she can be quite short. She only has to be tall relative to Sarah. This is exactly what we expect if these constructions underlie the *compared-to* phrases.

The analysis then posits an optional ellipsis process which deletes part of the antecedent clause such that only the *compared to DP* part is pronounced.

- (76) a. ~~If he_i is~~ compared to John, Bill_i is happy.
b. ~~When she_i is~~ compared to Sarah, Sue_i is tall.

This analysis has a simplicity to it that is appealing. Notice that it sits well with Beck et al.'s (2004) proposal. If *compared-to* is a context setter that allows one to infer the value of the standard degree, then a hidden conditional analysis might allow us to give a more explicit formal account of how this might happen. It seems natural to suggest that the meanings of (75) might be something like: in the contexts where Bill and John are explicitly compared, those are the ones where Bill should be judged as happy; and, in the contexts where Sue is explicitly compared to Sarah, those are the contexts where Sue is considered to be tall. Under the analysis of Beck et al, it should be easy to infer from these contexts what the standard degree is.

I have four arguments against the hidden conditional analysis. First, notice that the *then* must be deleted along with the antecedent material. This might be unexpected under a simple PF deletion process that targets the antecedent. Second, the other *compared-to* phrases cannot be (easily) explained under this analysis since it is not obvious what the antecedent clause would have to look like prior to deletion.

- (77) a. ??If he₁ is in comparison to John, (then) Bill₁ is tall.
 b. *When he₁ is with regards to John, (then) Bill₁ is tall.
 c. *If he₁ is relative to John, (then) Bill₁ is tall.
 d. *If he₁ is with respect to John, (then) Bill₁ is tall.

Under the assumption that we want an analysis that covers each type of *compared-to* phrase, then the hidden conditional analysis falls short.

Third, an overt conditional has another possible reading besides the one that correlates with the *compared-to* phrase: an event-conditional reading.

- (78) a. If he₁ is compared to Bill, John₁ will be sad.
 b. When he₁ is compared to Bill, John will be sad.

In (78) there is a possible reading in which John will be saddened by the event of him being compared Bill. Notice that under this reading there is an entailment that, in the situation where John is compared to Bill, John is sad: not sad *compared to Bill*, but sad simply. This is not the meaning of *compared-to* phrases: if the underlying form of *compared-to* was a conditional, then we would expect to get both of these readings in (79).

- (79) Compared to Bill, John will be sad.

However, we only get the comparative reading. In (79), John must be sad in comparison to Bill, and could in fact be relatively happy.

Lastly, a conditional does not require there to be a sortal in the consequent clause, but the *compared-to* phrase does.

- (80) a. Compared to Bill, John is tall.
b. #Compared to Bill, John will vomit.

Intended Interpretation:

When he is compared to Bill, John will vomit.

(80)b cannot have the intended reading. It is good only with a very strained reading in which the predicate *will vomit* is ranked, somehow, on a scale. For instance, we could rank events of *vomiting* on a scale according to the volume of stomach contents that are ejected out of one's mouth. Under most people's use of the word *vomit*, what John will spew forth would not constitute a *vomiting*. Then, this strained, gradable reading of (80)b says that, compared to what Bill spewed, which wasn't very much, whatever John will spew, even if it is very little, should be considered to be a *vomiting*. The point is that *compared-to* requires an expression in the clause it appears with to be gradable, and if one doesn't exist, then the non-gradable predicate will be coerced into gradability. Full conditionals do not require a gradable predicate, and of course, appear quite often without them. Another way of stating this difference between *compared-to* and full conditionals is that conditionals do not allow ellipsis of the sort proposed to derive *compared-to* phrases.

- (81) a. If he left the baby alone, she cried.
b. *left the baby alone, she cried.

Therefore, I think we can safely conclude that *compared-to* phrases are not hidden conditionals. So, what are they? The Beck et al. (2004) analysis says they are sentence level adjuncts that set the context such that it is easy to infer what the standard degree argument is. In the next section, I argue that they are base-generated inside the gradable adjective phrase, and therefore could not be context setters in this sense.

2.3.4 *compared-to* Phrases are not Sentence Level Adjuncts

This section has two goals. The first is simply to show that *compared-to* phrases are introduced inside the clause that contains the gradable adjective they are associated with. The section following this one will expand on this point and show that they are introduced inside the gradable adjective phrase. The second goal of this section is to argue explicitly against the Beck et al. (2004) analysis in which *compared-to* phrases are treated like pragmatic "context setters" that allow speakers to set the value of the implicit degree argument. The argument will be that *compared-to* phrases behave syntactically like the sorts of things we want to be integrated into the logical form directly, not through a pragmatic inferences.

To tackle the first goal, I will apply the same island diagnostics that were used to show that *for-PP's* must begin the derivation inside the clause that contains the

gradable adjective. *Compared-to* phrases can be positioned indefinitely far from the gradable adjective clause, as long as they only cross over bridge verbs.

- (82) a. It was compared to John that Bill said he believes Mary is heavy.
b. Compared to John, Bill said he believes Mary is heavy.

It is not licit, however, to separate the two with an island.

(83) *Noun Complement Island*

- a. Bill believes the claim that Mary is heavy compared to John.
b. *It was compared to John that Bill believes the claim that Mary is heavy.
c. *Compared to John, Bill believes the claim that Mary is heavy.

(84) *Relative Clause Island*

- a. Bill saw the woman who is heavy compared to John.
b. *It was compared to John that Bill saw the woman who is heavy.
c. *Compared to John, Bill saw the woman who is heavy.

(85) *Wh-island*

- a. Bill wonders whether Mary is heavy compared to John.
b. ?It was compared to John that Bill wonders whether Mary is heavy.
c. ?Compared to John, Bill wonders whether Mary is heavy.

(86) *Sentential Subject Island*

- a. That Mary is heavy compared to John annoyed Bill.
- b. *Compared to John, that Mary is heavy annoyed Bill.

(87) *Adjunct Island*

- a. Mary got fired because she is heavy compared to John.
- b. *It was compared to John that Mary got fired because she is heavy.
- c. *Compared to John, Mary got fired because she is heavy.

Again, a natural explanation for these facts is to assume that *compared-to* phrases start out in the clause that contains the gradable adjective and optionally move to sentence initial positions.

The second goal of this section can be addressed by comparing *compared-to* phrases to actual context-setting phrases. Take a phrase of the form *speaking of...* Phrases like this can be used to introduce a sentence and explicitly state what that sentence will be "about". Importantly, they can be used to set the value of a variable in the subsequent discourse.

- (88)
- a. Speaking of Mary, she went to Hawaii last year.
 - b. Speaking of Honolulu, Joan said that they think they will visit there next year.

In (88), the *speaking-of* phrases introduce referents that can be used to assign the values of the deictic pronouns in the following clause. This is what Beck et al. say is going on with *compared-to* phrases. So, in (72), repeated here, it is the standard degree variable introduced by the adjective that has its value set by the *compared-to* phrase.

- (89) a. Compared to John, Bill is tall.
b. *the degree to which Bill is tall* $\geq d_s$
c. d_s = the size standard made salient by the utterance context
d. d_s := John's height

If Beck et al. is correct, then *compared-to* phrases should show similar properties in terms of how they set the value of variables in subsequent utterances. The prediction is not borne out, though. *Speaking-of* phrases can set variables across islands, as is attested in (90).

- (90) a. Speaking of Mary, Bill believes the claim that she is tall.
b. Speaking of Honolulu, the fact that Bill visited there last year annoyed Mary.
c. Speaking of Sue, Bill got fired because he stalked her at work.

In the above examples, the context setting *speaking-of* phrase is able to supply the reference to a pronoun over islands. Therefore, since context-setters do not obey

island constraints, we should conclude that they do not move from within the clause that contains the pronoun they supply the reference for. In other words, they are real sentence level adjuncts.

The argument can be made stronger. It is not just that *compared-to* phrases require a kind of locality absent with *speaking-of* phrases, but that the standard degree variable itself must be set locally. Thus, *speaking-of* phrases cannot supply the standard degree, even if the standard is explicitly stated and speakers need not infer anything.

- (91) a. ??Speaking of John, Bill is tall.
b. ??Speaking of two-hundred and one centimeters, Scott is tall.
c. ??Speaking of John's height, Bill is tall.

These sentences sound odd at best, but even to the extent that they are acceptable, they definitely don't mean what a *compared-to* sentence means. (91)a, for instance, does not mean that Bill is taller than John's height. It would have to mean that Bill is tall in general. What we can conclude from these examples is that standard degree variables (if they exist) cannot be set by explicitly introducing a degree into the discourse prior to introducing them.

It appears that *compared-to* phrases are not sentence level adjuncts, and they do not set the context such that the value of the standard degree is inferred from them. Rather, they start out inside the clause that contains the gradable adjective and

optionally move to other sentence level positions.²⁰ This reminds us of *for-PP's*, and we must ask if there are any other syntactic properties that the two standard expressions share. In the next section, I show that *compared-to* phrases are also introduced as arguments inside the gradable adjective phrase, just like *for-PP's*.

²⁰ Beck et al. (2004) was actually concerned mainly with Japanese *yor*i-clauses as in (i), which have traditionally been translated into English as comparatives. (*Yori* might be translatable into English *than*.)

- (i) Mary-wa John-yori (motto) takusan-no ronbun-o kaita.
 Mary-Top John-YORI (more) many-Gen paper-Acc wrote.
 "Mary wrote more papers than John."

Their conclusion was that *yor*i-clauses are not actually analogous to English comparatives, but rather they are much closer to *compared-to* constructions. They say that (i) should be translated as roughly something like (ii).

- (ii) Mary wrote a lot of papers compared to John.

Their position is that since (they assume) English *compared-to* phrases are pragmatic context setters, Japanese *yor*i-clauses are also pragmatic context setters, unlike English comparatives. The arguments in this section showed that English *compared-to* phrases are not pragmatic context setters because they behave like phrases introduced by the adjective. The same arguments can be applied to *yor*i-clauses. *Yori*-clauses can scramble indefinitely far from the adjective, provided they only cross over bridge verbs:

- (iii) John-yori₁ Mary-wa [Bill-ga t₁ takusan hon-o katta-to] omotta
 John-than Mary-Top B-Nom many book-Acc bought-COMP thought

But they cannot scramble over complex noun phrase islands:

- (iv) *John-yori₁ Mary-wa [Bill-ga t₁ takusan hon-o katta-toiu]
 John-than Mary-Top Bill-Nom Many book-Acc bought-Comp
 syutyoo-o sinziteiru
 claim-Acc believes
- (v) *John-yori₇ Mary-wa [t₇ takusan hon-o katta] hito-o mita
 John-than Mary-Top many book-acc bought person Acc saw.

Even if Beck et al.'s claim that *yor*i-clauses are really like *compared-to* constructions is correct, neither appear to be context setters in the sense they are proposing. Thanks to Tomohiro Fujii and Masaya Yoshida for help constructing these examples.

2.3.5 *compared-to* Phrases are Part of the Gradable Adjective Phrase

In the previous section, it was shown that there is a locality constraint on *compared-to* phrases: they must at least originate inside the clause that contains the gradable adjective that it is associated with. In this section, we apply the same diagnostics that were applied to *for-PP*'s in section 2.2.3 and come to a similar conclusion: *compared-to* phrases are base-generated inside the gradable adjective phrase.

First, using the binding diagnostic, we see that a pronoun in the *compared-to* phrase can be bound by a quantifier in the subject position.

- (92) a. Every boy₁ in my class is smart compared to his₁ father.
b. Compared to his₁ father, every boy₁ in my class is smart.
c. It is compared to his₁ father that every boy₁ in my class is smart.
- (93) a. No boy₁ is tall compared to his₁ father.
b. Compared to his₁ father, no boy₁ is tall.
c. It is compared to his₁ father that I consider no boy₁ in my class tall.

Since pronouns must be c-commanded by quantifiers that bind them, *compared-to* phrases must start out below the subject of the adjective phrase.

Second, *compared-to* phrases can form a constituent with the gradable adjective. They can be fronted together.

- (94) a. John is tall compared to Bill, and tall compared to Bill he should be considering
Bill is so short.
- b. Tall compared to BILL, he is NOT. But he IS tall compared to DAVE.
- c. It's surprising how tall compared to Dave he actually is.

And, they can elide along with the adjective.

- (95) a. John is tall compared to Bill, and Tom is, too.
- b. Harriet is happy compared to Sally, and you are, too.

Notice that if the *compared-to* phrase was simply a context setter, then we might expect the possibility that the deletion site be resolved only with *tall*. This would mean that the standard degree used in (95) to interpret *Tom is tall* could be set by the context as something other than *Bill's height*. But neither example has such a meaning; we can only conclude that Tom is tall *compared to Bill* or you are happy *compared to Sally*. We come to the same conclusion using the pro-form *so*. It is dependent on the adjective phrase of the previous clause, and must include the *compared-to* phrase.

- (96) a. John is tall compared to his dad, and Bill is very much so, too.

- b. That guy was really polite compared to his boss. The woman was much less so.
- c. Ken is very patient compared to Judy, but Tom is even more so.

Hence, *compared-to* phrases can form a constituent with the adjective, to the exclusion of the higher material such as the copula.

Finally, we can extract out of *compared-to* phrases, but only when the comparison phrase is immediately to the right of the adjective.

- (97) a. Who₂ is₁ John t₁ tall compared to t₂?
 - b. *Who₂ is₁ John compared to t₂ t₁ tall?
 - c. *Who₂ is₁ John t₁ compared to t₂ tall?
 - d. *Who₂ is₁ compared to t₂ John t₁ tall?
- (98) a. Who₂ has₁ John t₁ been depressed compared to t₂ recently?
 - b. *Who₂ has₁ John t₁ been depressed recently compared to t₂?

When the *compared-to* phrase is immediately to the right of the adjective, extraction is still possible. But when the adverb position clearly indicates that *compared-to* has been extraposed, extraction becomes unacceptable.

2.3.6 *compared-to* Phrases are Syntactic Arguments

Three diagnostics provide evidence that *compared-to* phrases, despite being optional and relatively mobile, do not otherwise behave like adjuncts. Instead, they

seem to behave, in the syntactic sense, as argument categories. First, extracting the *compared-to* out of a *wh*-island results in a relatively good example compared to the other island violations.

- (99) a. ?It was compared to John that Bill wonders whether Mary is heavy.
b. ?Compared to John, Bill wonders whether Mary is heavy.
- (100) a. *Compared to John, Bill believes the claim that Mary is heavy.
b. *Compared to John, Bill saw the woman who is heavy.
c. *Compared to John, that Mary is heavy annoyed Bill.
d. *Compared to John, Mary got fired because she is heavy.

Compare (99) to the sentences below, where the *compared-to* is in an unambiguous adjunct.

- (101) a. *When compared to John, Mary wonders whether Bill is tall.
b. *It was when compared to John that Mary wonders whether Bill is tall.

The *wh*-island violation is relatively good compared to the other island violations and the adjunct violations in (99).

Second, as we saw above when diagnosing the *for-PP*, adjuncts can obviate Principle C violations by moving, but arguments cannot. (Lebeaux, 1991)
Compared-to phrases do not obviate Principle C when they are fronted.

- (102) a. John can't be tall compared to himself.
b. *He₁ can't be tall compared to John₁.
c. *Compared to John₁, he₁ can't be tall.

Finally, as we have already seen, extraction out of *compared-to* phrases is acceptable

(103). Compare this to an adjunct comparison clause (104).

(103) Who₁ is John tall compared to t₁?

(104) *Who₁ is John tall when compared to t₁?

Extraction from a phrase inside of an adjective phrase should only be allowed if that phrase is an argument. This conclusion combined with the others cannot be accounted for in the system that Beck et al. propose.

2.3.7 Summary

The arguments presented in this section indicate that the proposal by Beck et al. cannot be correct. *Compared-to* phrases are introduced inside the gradable adjective phrase. This fact can be reasonably integrated into the previous theories of gradable adjectives that assume that they are relational predicates and require some kind of standard expression (which may be supplied by the context if it is not pronounced). Both the traditional degree-argument and the measure function theories would expect the standard expression to be base-generated close to the gradable adjective, and putting *compared-to* phrases into this argument slot would not be

difficult. Or so it would seem. Section 2.2 concluded the same thing for *for-PP's*. It is the combination of these two conclusions that raises problems for degree argument theories and, to a lesser extent, projectionist version of measure function theories, as proposed by Kennedy (1999). If gradable adjectives take an internal argument that supplies the standard expression, and *for-PP's* and *compared-to* phrases are actually standard expressions, then one should be puzzled by the fact that they can both appear along with the same gradable adjective.

(105) These are expensive for a pair of shoes compared to those.

If there is one argument slot for the standard expression, then how do these two different standards fit into it? It is this problem that we now turn to.

2.4 The Internal Syntax of Gradable Adjective Phrases

2.4.1 Introduction

This section begins our investigation of the internal organization of gradable adjective phrases. I will be concerned with three types of phrases that occur inside gradable adjective phrases: *for-PP's*, *compared-to* phrases and thematic-PP's, such as in *patient with Mary* or *angry at Don*. In the previous two sections, we learned that *for-PP's* and *compared-to* phrases behave quite similarly: they are both base-generated inside the adjective phrase and display properties of syntactic argument categories. We also intuitively know that they supply the semantically required standard of the gradable adjective. Therefore, it would be natural to conclude that they are different instantiations of the same thing, i.e., the standard expression by

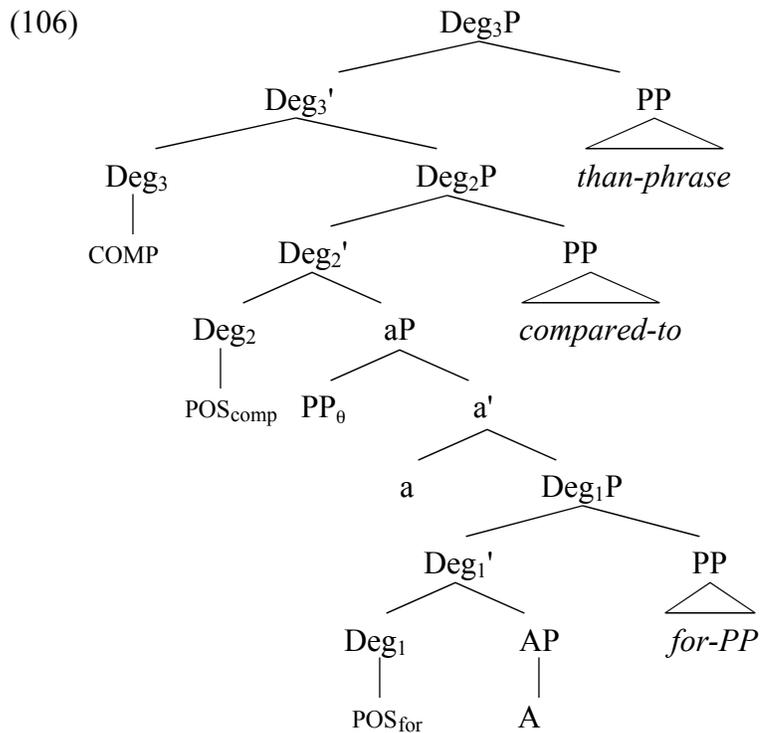
which the standard degree is computed. But, it is the goal of this section to convince the reader that they are not syntactically the same thing. Instead, they are each introduced by different functional heads in the extended projection of the gradable adjective.

Thematic-PP's will help provide much of the evidence for this conclusion. I will use them as a kind of anchor from which to test the relative height of the *for-PP's* and *compared-to* phrases. These tests will prove useful precisely because thematic-PP's are introduced between *for-PP's* and *compared-to* phrases. That is, thematic-PP's are not complements of the adjective, but rather are part of the extended projection of the adjective, outside of the AP. *For-PP's* are introduced below this position, near the adjective (but still outside the AP), while *compared-to* phrases are introduced above it.

This conclusion creates a problem for the traditional degree-argument theories. If standard expressions directly supply the standard degree argument of gradable adjectives, then they are predicted to appear in the adjective's internal argument position. But the evidence below indicates that they do not appear in an internal argument position. Rather, they are introduced above the AP, in the adjectives extended projection.

Measure function theories, on the other hand, can be easily adapted to the syntax that will argued for below. The theory in Kennedy (1999), for instance, only needs to add additional functional heads into the extended projection of gradable adjectives: one to introduce *for-PP's* and one to introduce *compared-to* phrases. The

picture that will emerge is captured by the structure from the beginning of this chapter, repeated here:²¹



The layout of this section is as follows. In the next section, I return to the puzzle pointed out previously: gradable adjective phrases can contain multiple standard expressions. This is, of course, only a puzzle if it is assumed that *for-PP's* and *compared-to* phrases are the same thing. But, if they are not the same thing, then the fact that standard expressions can stack on top of one another is not so surprising. In section 2.4.3, I show that *for-PP's* and thematic-PP's are close enough to the adjective head that when the adjective is nominalized, these phrases can appear inside

²¹ Although I will not discuss comparatives in this section. Another functional head, COMP for comparatives, will be added in section 2.5. I include here only to inform the reader where I am headed.

the derived nominal unchanged. *Compared-to* phrases, on the other hand, cannot. In section 2.4.4, I examine transitive adjective phrases and show that interpretive properties of the *for-PP* differ from that of *compared-to* phrases. This interpretive difference follows from a syntactic structure in which *for-PP's* are below thematic-PP's but *compared-to* phrases are above them. In section 2.4.5, I use anti-c-command diagnostics to show that thematic-PP's c-command into *for-PP's*, but not into *compared-to* phrases. And, in section 2.4.6, I apply diagnostics that indicate *for-PP's* form a constituent with the adjective to the exclusion of the thematic-PP, but *compared-to* phrases do not. Finally, in section 2.4.7, I discuss facts concerning *as-PP's*, like in *skillful as a cook for a linguist*, and show that these phrases are closer to the adjective head than *for-PP's*, indicating that *for-PP's* must also be introduced outside of the AP. In section 2.4.8, I provide some concluding remarks.

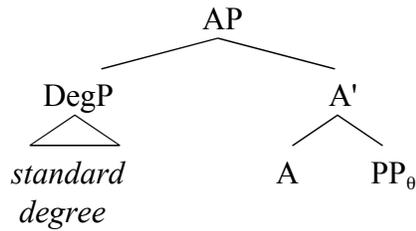
2.4.2 The Puzzle of Stacking Standard Expressions

Section 2.3 ended with a puzzle: standard expressions like *for-PP's* and *compared-to* phrases can appear in the same gradable adjective phrase.

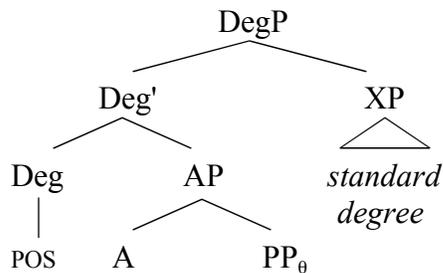
(107) These are expensive for a pair of shoes compared to those.

Recall that the traditional degree-argument analysis and the measure function analysis both posit a single slot for the standard expression. The structures that they assume are repeated below.

(108) Degree-Argument Theories

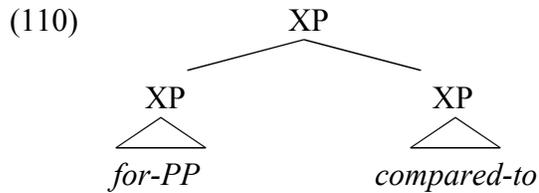


(109) Measure Function Theories



The puzzle for these theories that is presented by (107) is obvious: how do two different standard expressions fit into the single standard degree slot? The purpose of this section is to show that the traditional degree-argument analysis is inadequate and cannot be modified such that its primary assumption, that adjectives take an internal degree argument, is maintained. Measure function theories, however, can be modified such that they can allow stacking of multiple standard expressions. But, before we modify this analysis, let's consider one alternative.

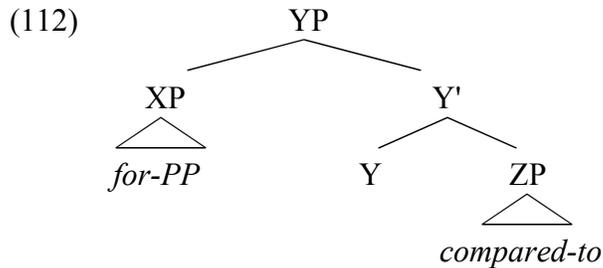
One possibility is that *for-PP's* and *compared-to* do not individually supply a standard degree. Rather, they can combine to supply a degree. So, suppose that *for-PP's* and *compared-to* phrases can constitute a complex phrase as in (110) that sits in the standard degree slot of (108) and (109).



The compositional semantics would have to be such that it could produce a standard degree out of this structure. I'm going to ignore how this might be done, since I believe that the syntax of gradable adjectives is not compatible with this alternative. Something so simple cannot be correct. There are ordering restrictions on stacking multiple standard expressions.

- (111) a. These are expensive for a pair of shoes compared to those.
 b. ??These are expensive compared to those for a pair of shoes.

The second example sounds odd (when the *for-PP* is not set off with comma intonation, which would indicate that the *for-PP* has been extraposed). If the standard expressions were simply conjoined as in (110), this fact would be left unexplained, since it would be expected that either standard could be pronounced first. This problem could be corrected by positing a more hierarchal structure to the complex standard expression, as in (112).



This structure could fit into the standard degree slots of (108) and (109). It would also get the word order correct provided that we assume some type of obligatory extraposition.^{22,23} This line of thought starts to become much less manageable when we consider the fact that phrasal comparatives can also stack on top of *for-PP*'s and *compared-to* phrases, with ordering restrictions, as well.

- (113) a. John is more tall for wrestler than Bill.
 b. *John is more tall than Bill for a wrestler.

- (114) a. John is more tall compared to Tom than Fred.
 b. *John is more tall than Fred compared to Tom.

- (115) a. ?John is more tall for a wrestler compared to Tom than Fred.

²² Obligatory extraposition of standard phrases is not very appealing, I admit. But it has been standard in traditional analyses since Bresnan (1973) to assume such a mechanism for comparative *than*-phrases. I won't focus on challenging this assumption, however, for two reasons. First, I will supply other arguments for discarding this option, and second, the projectionist theories (and the analysis I will propose) have to make a similarly ad hoc assumption that places standard expressions in a right adjoining specifier.

²³ The other possibility is one in which the *compared-to* phrase c-commands the *for-PP*. But then this would not get the word order correct: the *compared-to* phrase would have to appear first where ever the complex phrase were pronounced.

- b. *John is more tall than Fred for a wrestler compared to Tom.

The example in (115)a is admittedly difficult to comprehend, but there is definitely a distinction between it and (115)b.²⁴ In order to maintain the idea that *for-PP's* and *compared-to* can stack inside of the positions for the standard degree in (108) or (109), one would also have to allow comparative phrases to stack as well. Maybe this is a tenable solution for the semantic component, but it certainly wouldn't be easy and I won't pursue it here. On the syntactic side, however, this proposal makes predictions. Specifically, it predicts that *for-PP's* and *compared-to* phrases²⁵ form a constituent to the exclusion of other adjectival material. I will show in the follow subsections that this is not the case. *For-PP's* can form a constituent with the adjective, to the exclusion of *compared-to* phrases, but not vice versa, indicating that the *for-PP* is closer to the adjective head than the *compared-to* phrase. Other evidence will be presented that indicates that thematic-PP's such as in *patient with Mary* and *angry at Tom* sit between the *for-PP* and the *compared-to* phrase. These thematic-PP's are introduced above the adjective in a functional projection. Given this structural asymmetry between *for-PP's* and *compared-to* phrases, it can be concluded that they do not form a constituent.

A second, more promising alternative arises if we do not assume that both *for-PP's* and *compared-to* phrases must be in the same argument slot. The necessary modification is the addition of several new positions in the extended projection of the

²⁴ I will discuss why it is preferable to pronounce the comparative morpheme as *more* in stacked examples in chapter three.

²⁵ ...and comparative *than*-phrases.

adjective, each of which introduce their own specific standard expression. These projections can be ordered such that *compared-to* phrases sit higher than *for-PP*'s. This proposal, combined with the idea that thematic-PP's are introduced in the extended projection of adjectives as well, points to an analysis in which adjectives enter the derivation as simple lexical heads and receive the functional aspect of their meaning, including their relations to arguments and standard expressions, through their interaction with functional material.²⁶ I will provide a more detailed analysis of what these functional heads do semantically in the next chapter. For now, I will refer to them as Deg morphemes, and it is sufficient to know that Deg morphemes are functions that take standard expressions as one of their semantic arguments.

To summarize, it was shown that standard expressions can stack. Degree-argument theories have trouble accounting for this fact since they would posit every standard expression into the same syntactic slot, that of an internal argument of the adjective. Measure function theories, however, can be modified such that each standard expression is introduced by its own Deg head in the extended projection of the adjective. In the next section, I provide evidence that *compared-to* phrases are structurally higher than thematic-PP's and *for-PP*'s.

2.4.3 Nominalization Facts

The first bit of evidence for *compared-to* phrases' structural superiority over thematic-PP's and *for-PP*'s comes from nominalization facts. Gradable adjectives can typically be nominalized as in (116).

²⁶ This proposal is consistent with Baker (2003), where adjectives are treated as zero place predicates.

- (116) patient → patience
happy → happiness
sad → sadness
polite → politeness
jealous → jealousy
etc.

In an adjective's nominalized form, some of its low-hanging syntactic arguments can be presented inside the derived NP. In (117) and (118), it is shown that thematic-PPs and *for-PP's* can easily appear within the derived NP unchanged.

- (117) a. John's patience with Mary should be held up as an example for all teachers.
b. Bill's happiness with his job was a key factor in deciding not to move.
c. Our jealousy of Mary astonished her.
- (118) a. At the meeting, we discussed John's patience for a doctor.
b. Bill's politeness for a bank teller was evident in the way he treated me.
c. I was astonished at Mary's jealousy for a twenty-year old.

But *compared-to* phrases cannot appear inside the NP as shown by the oddness of

- (119)a.

- (119) a. *At the meeting, we will discuss John's patience compared to Bill.
b. At the meeting, we discussed John's patience compared to Bill's.

The oddness goes away (119)b when the complement of the *compared-to* phrase is an elided derived NP like the one being modified (120).

- (120) ...John's patience compared to Bill's ~~patience~~.

The point is that *compared-to* phrases cannot be included inside the derived NP in the same form that they appear in when they are inside the gradable adjective phrase like thematic-PP's and *for-PP's* can. To my knowledge, there is not a theory of AP nominalization. But I will briefly speculate as to how this might be done in a way that explains the difference between *compared-to* phrases on the one hand, and thematic-PP's and *for-PP's* on the other.

Let's say that the nominalization of an AP targets a specific level of structure. Everything below that target level is (or can be) included inside the nominal as arguments. Everything above that target level cannot appear inside the nominal. Given this type of nominalization analysis, an argument that *compared-to* phrases are structurally higher than thematic-PP's and *for-PP's* presents itself. That is, *for-PP's* and thematic-PP's are included in the nominalization level because they are closer to the adjective head, but *compared-to* phrases are not because they are further away. This predicts that when a gerund is created out of a gradable adjective, the *compared-*

to phrase should be allowed inside the nominal unchanged, and that is exactly what we find as in (121)a. Compare this to the non-gerund in (121)b.

- (121) a. At the meeting, we will discuss John's being patient compared to Bill.
b. *At the meeting, we will discuss John's patience compared to Bill.

Now, we can say that the example in (119)b is acceptable because the *compared-to* phrase is attached outside the NP. One reason to think that the *compared-to* phrase in derived nominals is outside the NP concerns the elliptical structure of (119)b. The ellipsis must be resolved, and if the *compared-to* phrase were included inside the NP, then we run into the classic infinite regression problem. Consider the structure in (122) where the *compared-to* phrase is part of the NP.

- (122) a. John's patience compared to Mary's
b. [DP John's [NP patience [compared to Mary's [Ø]]]]

If the ellipsis is resolved with the NP, then this NP includes the ellipsis site.

- (123) [DP John's [NP patience [compared to Mary's [NP patience [compared to Mary's [Ø]]]]]]

But if the *compared-to* phrase is outside the NP, it can be resolved without infinite regress.

- (124) a. [DP John's [NP patience] [compared to Mary's [\emptyset]]]
 b. [DP John's [NP patience] [compared to Mary's [NP patience]]]

There is another possible way out of infinite regress problem. Yoshida (2005) suggests that phrases inside NP's can extrapose. If this is so, then the *compared-to* phrase could start out inside the NP and extrapose to a higher position. But if this is possible, then we wouldn't expect the asymmetry that we find with *for-PP's*. The reason that nominalization is interesting here is because *compared-to* phrases take a different form than their adjectival counterparts while *for-PP's* don't. If *compared-to* phrases and *for-PP's* were both generated inside the derived nominal, we would expect the *for-PP* to express its complement in the same way (or at least, optionally allow it). It is possible for a *for-PP* to have a complement of this form, including allowing ellipsis, as in (125).

- (125) John's patience is quite extraordinary for a boy's (patience).

If *compared-to* phrases of the type in (119)b were generated inside the NP, we would expect sentences like (126) to be acceptable.

- (126) *Today, we will discuss Bill's patience for a boy's.

The infinite regress generated by phrasal structure like in (126) this would be solved by extraposition of the type under consideration here for *compared-to*. Since it is apparently not available for *for-PP's*, I will conclude that it is not available for *compared-to* phrases either, and *compared-to* phrases must be outside the NP to begin with. So, while *compared-to* phrases cannot occur inside derived nominals, thematic-PP's and *for-PP's* can (in fact, they must). This indicates that *compared-to* phrases are higher than thematic-PP's and *for-PP's*.

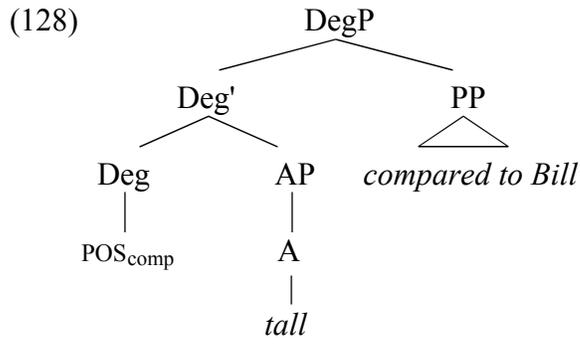
2.4.4 Scope Facts

The scopal properties of the functions that introduce *for-PP's* and *compared-to* phrases offer a way to see the internal structure of gradable adjective phrases. To test for the scope of these functions, I will assume that the point at which *compared-to* phrases or *for-PP's* attach marks the gradable predicate that the subject and the standard will be compared with respect to. This assumption will be discussed in more detail in the following chapter, but for now, let's use some examples to see how the test works. The sentence in (127) requires that John and Bill be compared with respect to how *tall* they are.

(127) John is tall compared to Bill.

The Deg morpheme that introduces *compared to Bill* in (127), represented as POS_{comp} in (128), relates the degree to which the object of the *compared-to* phrase possesses the gradable property to a degree to which the subject possesses that property.

POS_{comp} does this by first combining with the gradable predicate that the two entities will be compared with respect to, in this case, *tall*.



Anything outside of the Deg function's first argument will not be used to compare the two entities. I will describe this by saying that *compared-to* has scope over the AP.

Under this assumption, the gradable predicate is determined very locally. So, in (129), the scope of *compared to Bill* is the same as in (127): it only has scope over the AP, not over the negation as well. *John* and *Bill* are compared with respect to how *tall* they are, not in terms of how much they are *not tall*. Therefore, *not* is outside the scope of *compared to Bill*.

- (129) a. John is not tall compared to Bill.
 b. John is [not [tall compared to Bill]]

This test can be used to explore the scope of *for-PP*'s and *compared-to* phrases.

As noted above, a *for-PP* and a *compared-to* phrase can co-occur in the same gradable predicate, but only when the *for-PP* comes before *compared-to*.

- (130) a. This is expensive for a car compared to that one.
 b. ??This is expensive compared to that one for a car.

But, by applying the scope test, we will see that, despite appearing after the *for-PP*, the *compared-to* phrase has semantic scope over it. First, in (131)a, both a *for-PP* and a *compared-to* phrase appear within the gradable adjective phrase headed by *cheap*. I give the paraphrase of (131)a in (131)b so that it is obvious what the gradable property that both objects are being compared with respect to is. And, according to the logic of the test, this paraphrase should allow us to see what *compared-to* has potential scope over.

- (131) a. My bike is cheap for a mode of transportation compared to your car.
 b. *Paraphrase:*
 My bike is cheaper for a mode of transportation than your car is *cheap for a mode of transportation*.

In (131)b, the paraphrase indicates that the gradable property under question is not just the adjective *cheap*, but actually the larger phrase *cheap for a mode of transportation*. This means that *compared-to* at least optionally has scope over the *for-PP*. To show that this is necessarily so, I will make use of the fact that when *x is A for a NP*, it is required that *x* be a member of the set denoted by NP. That is, if

John is tall for a wrestler is true, it must also be true that John is a wrestler. Now, consider the following example and paraphrase:

- (132) a. #My bike is cheap for a two-wheeled mode of transportation compared to your car.
- b. *Paraphrase:*
My bike is cheaper for a two-wheeled mode of transportation than your car is *cheap for a two-wheeled mode of transportation*.

(132)a sounds odd because it seems to be claiming that your car is a two-wheeled mode of transportation, as indicated in the paraphrase. This is because the *compared-to* phrase necessarily has scope over the entire phrase *cheap for a two-wheeled mode of transportation*. That is, *compared-to* phrases are introduced above both the adjective and the *for-PP*.

For-PP's appear linearly before *compared-to* phrases, but *compared-to* has scope over the *for-PP*. This is reminiscent of the scope facts of adverbs discussed in Cinque (1999) and Andrews (1983):

- (133) a. John knocked on the door intentionally twice.
- b. John knocked on the door twice intentionally.

In each case, the adverb to the right takes scope over the adverb is on the left. This can be represented structurally such that the scopally dominant adverb sits higher in the tree, but both are right adjoined to the structure:

- (134) a. John [[[knocked on the door] intentionally] twice]
b. John [[[knocked on the door] twice] intentionally]

I will adopt a similar representation: *for-PP's* and *compared-to* phrases appear on the right side of the tree with *compared-to* phrases sitting in a position that is structurally higher than the position of *for-PP*.

- (135) This is [[expensive for a car] compared to that one]

For-PP's and *compared-to* phrases can also occur with gradable adjectives that take a thematic-PP such as:

- (136) a. John is patient with Mary for a boy.
b. Tom was angry at Pat for a Buddhist.
c. Bill is happy with the class compared to Sarah.
d. Sam was proud of Gary compared to their friends.

- (137) John is patient with Mary for a boy compared to Bill.

Previous analyses of transitive adjectives have treated these thematic-PP's as complements of the adjective head. (Abney, 1987, Bowers, 1975, Corver, 1990) However, by applying the scope test, we will see that the *for-PP* is closer to the adjective than the thematic-PP.

First, let us use the scope test to show that *compared-to* phrases can take scope over both the adjective and the thematic-PP.

- (138) a. John is patient with Mary compared to Sarah.
b. *Possible paraphrase:*
John's patience with Mary is greater than the patience Sarah exhibits towards Mary.

The sentence in (138)a can be paraphrased as in (138)b, indicating that the *compared-to* phrase can have the thematic-PP within its scope. Interestingly, *for-PP's* allow this reading as in (139)b, but also allow another reading as paraphrased in (139)c.

- (139) a. John is patient with Mary for a boy.
b. *Possible paraphrase:*
John's patience with Mary is greater than the patience boys typically exhibit towards Mary..
c. *Possible paraphrase:*
John's patience with Mary is greater than the patience boys typically exhibit.

The reading paraphrased in (139)c is a general reading: the boys' patience is measured, simply, not their patience towards anything. I will refer to this general reading as the *narrow* reading because it seems to exclude the thematic-PP from calculation of the standard degree. The reading paraphrased in (139)b is more specific: the boys' patience *with Mary* seems to be measured. This is what we found with *compared-to* phrases. I will refer to this as the *wide* reading. What I want to claim is this: the *only* reading that is available for *for-PP's* is the narrow reading, and the sentence in (139)a is not ambiguous. Rather, it is general in a specific sense. The patience of the boys is indeterminate in the same way that *teacher* is indeterminate as to what subject is being taught. The interests of the conversation determine how we estimate the boys' patience. In some cases, we might be interested in how patient boys are with people, animals, machines, etc. Or, we might be interested in being more specific, and estimate how patient boys are with girls, classmates, or even Mary. Hence, the wide reading is really just a more specified version of narrow reading.

Perhaps the reading can see where I am going with this: if the *for-PP* is required to only receive a narrow reading, then it must be lower than the thematic-PP. This is different than what we find with the *compared-to* phrase examples. *Compared-to* phrase must take scope over the thematic-PP, and hence the only reading they receive is the wide, specific reading.

(140) a. John is patient with Mary compared to Sarah.

b. *Possible paraphrase:*

John's patience with Mary is greater than the patience Sarah exhibits towards Mary.

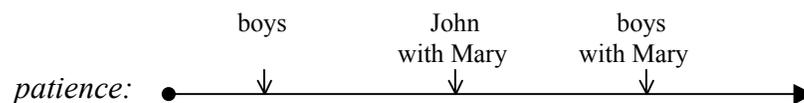
c. *Not a possible paraphrase:*

#John's patience with Mary is greater than the patience Sarah exhibits.

When the standard expression is a *compared-to* phrase, both the referent and the standard degrees are computed relative to the gradable adjective and the thematic-PP, i.e., *patience with Mary*. Thus, the *compared-to* phrase must be higher than the thematic-PP, while the *for-PP* must be lower. In order to convince the reader of this conclusion, let me first argue that the narrow reading for *for-PP*'s actually exists. Then, I will provide two possible accounts. The syntactic facts presented in the rest of section 2.4 will argue in favor of one of these accounts.

The first question is whether the narrow reading really exists or not. To see that it does, let's set up a situation that would differentiate the two readings. The scale below represent amounts of patience, starting with a zero-degree of patience and increasing to the right.

(141)



The diagram describes a situation in which boys typically don't have much patience, but they do with Mary because she is exceptional for some reason. John has a lot of

patience with Mary as well, but not as much as the other boys do. In this situation, the wide reading of (142) should be false, and the narrow reading should be true.

(142) John is patient with Mary for a boy.

(143) a. *Wide Reading (predicted to be false in (141)):*

John's patience with Mary is greater than the patience boys typically exhibit towards Mary.

b. *Narrow Reading (predicted to be true under (141)):*

John's patience with Mary is greater than the patience boys typically exhibit.

The wide reading shouldn't be controversial: if John is less patient with Mary than the other boys typically are, then (142) can certainly be read as false. The relevant reading is the narrow one, and I believe that in the situation in (141), (142) is true.

Under this reading, we simply aren't interested in the boys' patience with Mary. It is irrelevant. But I admit that presenting the situation as I do in (141) makes the boys' patience with Mary very salient, and hence the wide reading is difficult to ignore.

This shouldn't dissuade us from seeing that the narrow reading is possible: to show that this reading exists, it is not a logical necessity that the other boys be less patient with Mary than John is. All that is required is that the boys have a general level of patience with girls that is less than John's patience with Mary. In other words, the narrow reading of *John is patient with Mary for a boy* does not entail that the boys are

less patient with Mary than John is. (But this is entailed under the wide reading).

Consider the following sentence continuations.

- (144) a. John is really patient with Mary for a boy. I wonder how the other boys treat her.
- b. It's amazing how patient for a boy John is with Mary. I bet that when the other boys meet her, they will be patient with her, too.
- c. John is so patient with Mary for a boy. The other boys are, too.

These examples show us that it is possible for a speaker to utter the first sentence even when the speaker doesn't know whether or not the other boys are patient with Mary, or if the speaker knows that the other boys haven't met Mary. The last example is quite informative. Consider the following similar sentence.

- (145) Every single one of the boys is patient with Mary for a boy.

In order for every single one of the boys to be patient with Mary for a boy, then each of the boys must be compared to the patience boys typically exhibit. If it were boys' patience with Mary, then the sentence would be a contradiction as in (146)b, and it is clearly not that. Only the narrow reading is possible as paraphrased in (146)a.

(146) a. *Narrow Reading of (145):*

The degree to which every single one of the boys is typically patient with Mary is greater than the degree to which the boys in general are typically patient.

c. *Wide Reading of (145) (a contradiction):*

The degree to which every single one of the boys is typically patient with Mary is greater than the degree to which the boys in general are typically patient with Mary.

The importance of (146)a for our purposes cannot be overstated: the sentence is acceptable only under the narrow reading. Therefore, the narrow reading must be possible.

I see three possible ways of accounting for the two readings of *for-PP's*. The first possibility is that the two readings arise from the vagueness of the adjective. *For-PP's* don't remove vagueness from the adjectives they appear with, but they do limit it in some sense. The predicate *big for an athlete* leaves open a wide range of size standards, but the predicate *big for a wrestler* narrows down the possible standards considerably. Maybe what is going on with the wide/narrow readings is something similar. If the *for-PP* allows one to calculate a standard degree, then the interpretation of the *for-PP* is dependent on the gradable predicate over which the object of the *for-PP* is measured. The gradable predicate restricts the standard degree. The vagueness would arise in the identification of the relevant gradable

predicate which can be more or less restrictive. In the case we are looking at in (142), the standard could be restricted by *patient with girls* or *patient with Mary*.

The second and third possibilities stem from our previous assumption that the gradable property over which the comparison class will be evaluated is based on the attachment site of the standard expression. One possibility is that *for-PP's* can attach in two different positions: one in which it has scope over the thematic-PP and one in which it doesn't. This possibility requires that the thematic-PP not be a complement of the adjective – there must be a position in which the *for-PP* can attach that includes the A but not the thematic-PP. Therefore, if this possibility is correct, the thematic-PP must be separated from the A head. I will assume that instead of being a complement, it is introduced in the specifier position of a functional projection of the AP. *For-PP's* could attach to a DegP that is projected from either the AP or the aP.

(147) [_{DegP} (*for a boy*) [_{aP} *with Mary* [_{DegP} (*for a boy*) [_{AP} *patient*]]]]

In the high position, *for a boy* would be interpreted such that the gradable predicate measured of the boys is *patient with Mary*. In the low position, the gradable predicate would be *patient*, simply. Any further specificity would be supplied by the context. I will refer to this analysis as the structural ambiguity hypothesis.

The third possibility is that *for-PP's* always attach low (below the thematic-PP), yielding the less specific reading only.

(148) [_{aP} *with Mary* [_{DegP} (*for a boy*) [_{AP} *patient*]]]]

Then this reading could be pragmatically strengthened to the more specific readings (*patient with girls, patient with girls their age, patient with Mary*). Notice that this second possibility also requires that the thematic-PP not sit in the complement position of A. Rather it must be further away from the AP than the *for-PP*. I will refer to this analysis as the generality hypothesis.

The vagueness story can be ruled out, but the structural ambiguity and generality hypotheses will have to remain viable options for now.²⁷ This can be shown by applying ambiguity tests to the sentences under question. Ambiguity can be differentiated from vagueness and generality in ellipsis configurations. Let's use a lexically ambiguous word like *cool* to illustrate how the test is run. *Cool* can mean several things including *excellent* and *cold*. To test for ambiguity using ellipsis, first imagine a situation in which one person is cool in the first sense, but not in the other, and another person is cool in the second sense, but not in the first. Then conjoin two uses of the ambiguous word in which the second usage is elided. Take (149) and (150), for example.

(149) *cool*₁ (excellent) = {al}

*cool*₂ (cold) = {bob}

(150) Al is cool, and Bob is too.

²⁷ I will offer structural arguments below that *for-PP's* are always lower than the thematic-PP, even under the wide reading, and therefore the generality hypothesis must be correct.

The sentence in (150) cannot describe the situation in (149). If the first use of the word *cool* is meant in the sense of excellent, then the first conjunct is true under situation (149). But this requires that the elided part of the second conjunct be interpreted in the same way as its antecedent in the first clause. That is, the ellipsis is interpreted as *cool*, but it must be cool in the same sense as was used in the antecedent. *Bob is too* must mean that Bob is excellent, not that he is cold. And, this makes the second conjunct false under (149). To force an interpretation of the second clause using *cool* in the sense of cold means forcing the same use in the first clause, and that makes the first clause false. Generality and vagueness do not work the same way in ellipsis configurations.

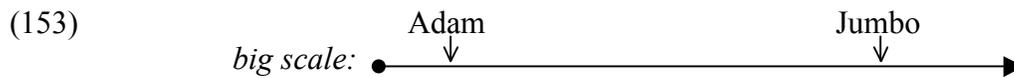
Teacher is a general term that covers teachers of math, physics, linguistics, etc. It could be that *teacher* is ambiguous between several different uses. One lexical entry might mean *teacher of math* and another *teacher of linguistics*, etc. To see that generality cannot be explained away as a case of ambiguity, we need only to apply the ellipsis test. Imagine the situation in (151). In this situation, the sentence in (152) is true.

(151) *teacher of math* = {al}

teacher of linguistics = {bob}

(152) Al is a teacher, and Bob is too.

So, *teacher* is not ambiguous. Vague terms like *big* are also not ambiguous. Imagine the situation in (153), in which an ant named Adam and an elephant named Jumbo have been placed very far apart on the bigness scale.



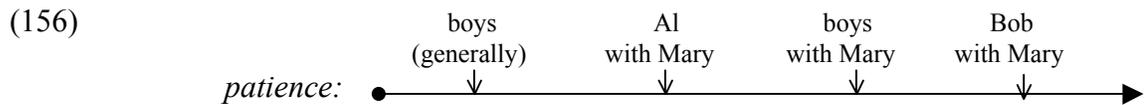
(154) Adam is big, and Jumbo is too.

The sentence in (153) could be true under the situation in (153) (when we also know that Adam is an ant, and Jumbo is an elephant), because Adam might be big for an ant and Jumbo big for an elephant.

So, it looks like there is a test that we can use to differentiate ambiguity on the one hand and vagueness and generality on the other. But, unfortunately, the test in this form is not applicable to the *for-PP* sentences we are concerned with. To see why this is so, we must try to concoct a situation in which one conjunct is definitely true on one reading and false on the other, and vice versa for the other conjunct. Now, we are interested in testing whether the *for a boy* phrase is interpreted as the degree to which the boys are typically patient (the narrow reading) or typically patient with Mary (the wide reading). We'll be testing the sentence in (155).

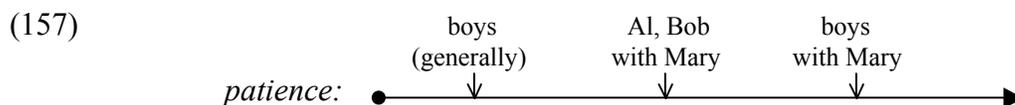
(155) Al is patient with Mary for a boy, and Bob is too.

In order to make the first conjunct true on the narrow reading, but false on the wide reading, we need to put Al's patience with Mary between the boys' general patience and their patience with Mary as in (156). But then to make the second conjunct false on the narrow reading, we must make Bob's patience with Mary higher than the boys' patience with Mary.



Herein lies the problem: once Bob's patience with Mary is higher than the boys' patience with Mary, it is necessarily so that his patience with Mary is higher than the boys' general patience. In other words, it is impossible to make the situation such that the first conjunct is true under the narrow reading but false under the wide, *and* the second conjunct be true under the wide reading, but false under the narrow. The second conjunct will be true under both readings. The test requires that we set up the situation in the right way, and since we cannot, the test cannot be applied. The same problem arises if we try to make the first conjunct true under the wide reading, but false under the narrow reading.

However, a variation on the ellipsis test can be used. When we negate the second conjunct, then the scale representation in (157) is what we need to test the sentence in (158) under.



(158) Al is patient with Mary for a boy, but Bob is not.

This is a situation in which the first conjunct of (158) is true on the narrow reading and false on the wide reading, and the second conjunct is false on the narrow reading and true on the wide reading. Then, we ask whether (158) can be true under this situation, and the answer is clearly no.

Before we conclude that the narrow/wide distinction is a matter of ambiguity, we need to make sure this negative ellipsis test behaves the same as the positive ellipsis test when it is applied to cases of ambiguity, generality and vagueness. To make the test equivalent to the one we just used, the situations will be set up such that the individuals under question possess the same property. First, let's look at ambiguity.

(159) $cool_1$ (excellent) = {al, bob}

$cool_2$ (cold) = (Bowers)

(160) Al is cool, but Bob is not.

Under the situation in (159), (160) is necessarily false. So, the sentence we are interested in, (158), behaves like ambiguity. Next, let's look at generality. The sentence in (162) is necessarily false in (161).

both the structural ambiguity story and the generality story require that the thematic-PP not be introduced in the complement position of the adjective. Rather, the adjective and the *for-PP* must be able to combine to the exclusion of the thematic-PP. Therefore, the thematic-PP must be introduced above the adjective head, and the *for-PP* can (maybe must) be introduced below thematic-PP. In the next section I will provide further evidence of this conclusion. Some of that evidence is incompatible with the structural ambiguity hypothesis.

2.4.5 C-command Facts

In the previous two sections, we saw evidence that *compared-to* phrases sit higher than thematic-PP's and *for-PP*'s. The previous section also argued that thematic-PP's do not sit in the complement position of adjectives, but rather are introduced above the adjective. We will see further evidence of both these conclusions in this and the following subsections. One thing the previous section was inconclusive about was whether the *for-PP* is always below the thematic-PP (the generality hypothesis), or whether it optionally attaches above or below the thematic-PP (the structural ambiguity hypothesis). In this and the following subsections, I will provide evidence that the *for-PP* is below the thematic-PP and, thus, closer to the adjective head than the thematic-PP is. I apply c-command diagnostics that are able to make a distinction between the thematic-PP and the *for-PP*. I use the thematic-PP as a reference point and show that while it doesn't c-command into the *compared-to* phrase, it does c-command into the *for-PP*. In order to show that this is indeed the case, I will first determine the position of the thematic-PP.

To help determine the position of the thematic-PP, I will use an adjunct of the adjective phrase as a reference point. The adjunct in the examples in (165) *before he defended* must be part of the adjective phrase since it can be fronted along with the adjective.

- (165) a. Mary was happy with John before he defended.
b. How happy with John before he defended was Mary?
c. Happy with John BEFORE he defended, Mary was NOT. But she WAS very happy with him AFTER.

First, notice that a quantifier can bind out of the thematic-PP and into the adjunct phrase, indicating that the PP c-commands the adjunct.

- (166) a. Mary is happy with every student_i before he_i defends.
b. Mary is happy with no student_i before he_i defends.
- (167) a. How happy with every student_i before he_i defends is Mary?
b. Happy with every student_i BEFORE he_i defends, Mary is NOT. But she IS very happy with them AFTER.

Second, NPI's inside the adjunct can be licensed by the thematic-PP, again indicating that the PP c-commands the adjunct.

- (168) a. Mary is happy with no jury members before any trial.
b. *Mary is happy with all jury members before any trial.

This could, however, be an effect of quantifier raising of the PP or A-movement into some type of Agr position by the PP (like the A-movement of direct objects proposed in Lasnik, 1995). From either of these high positions, the PP would be expected to c-command the adjunct, and perhaps also, the *compared-to* phrases and *for-PP's*. If it is true that this is a raised position, then we need to use the base-position of the PP for testing the height of *for-PP's* and *compared-to* phrases.

If the high position is due to QR, then this should be optional or at least only needed when the object of the PP is a quantifier. If it is due A-movement analogous to that proposed by Lasnik (1995), then it should be able to be postponed until LF. In either of these cases, we should be able to force it to remain low by setting up an example where the high position would violate a grammatical constraint. It is possible to do this by using anti-c-command diagnostics. For instance, the PP can be prevented from raising above the adjunct, if such movement would trigger a Condition C violation. In the following examples, there is no Condition C violation, so the PP must not have moved to its higher position.

- (169) a. Mary was happy with him_i before John_i defended.
b. How happy with him_i before John_i defended was Mary?
c. Happy with him_i BEFORE John_i defended, Mary was NOT. But she was very happy with him after.

A related diagnostic also shows that the PP can remain in a low position. Epithets are only allowed when they are not c-commanded by their antecedent.

- (170) a. Mary was happy with John_i before the bastard_i defended.
b. How happy with John_i before the bastard_i defended was Mary?
c. Happy with John_i before the bastard_i defended, Mary was NOT. But she was very happy with him after.

Again, we would only expect the examples in (170) to be acceptable if the thematic-PP did not raise to its high position.

Lastly, parasitic gaps can be licensed by extraction from the thematic-PP.

- (171) Who_i was Mary happy with t_i before offending <pg_i>?

Assuming an anti-c-command requirement between the real gap and the parasitic gap, the PP must *not* c-command into the adjunct.

To summarize, the c-command diagnostics indicate that the thematic-PP is higher than the adjunct, but the anti-c-command diagnostics indicate that it can also sit lower than the adjunct. I take this to mean that the thematic-PP can *optionally* raise higher than the adjunct. Therefore, the anti-c-command diagnostics must be used in order to test the relative height of *compared-to* phrases and *for-PP's* in order to insure that the thematic-PP is in its low position.

First, when the thematic-PP (in its low position) contains a pronoun that is co-indexed with an R-expression in the *compared-to* phrase, we do not see a Condition C violation, indicating that the *compared-to* phrase is higher than the low position of the thematic-PP.

- (172) a. Mary is quite happy with Norbert_i compared to the Japanese girl in his_i class.
b. ?Mary is quite happy with him_i compared to the Japanese girl in Norbert_i's class.

But there is a Condition C violation when the co-indexed R-expression is included in the *for-PP*. The important contrast here is between (172) and (173); that is, compare the difference in acceptability between the two examples in (172) to the difference between the examples in (173).

- (173) a. Mary is quite happy with Norbert_i for a Japanese girl in his_i class.
b. *Mary is quite happy with him_i for a Japanese girl in Norbert_i's class.

The contrast between the examples in (173) is much greater than in (172). This indicates that regardless of whether the thematic-PP raises or not, it c-commands into the *for-PP*. Notice that both the narrow and the wide readings (discussed in section 2.4.3) of (173)b are unavailable. On the structural ambiguity story, the wide reading was caused by attaching the *for-PP* above the thematic-PP. If it were the case that the

two readings of *for-PP's* was caused by structural ambiguity, we would expect the wide reading to be available here, but it is not. Therefore, we can also see this data as arguing for the generality story of *for-PP's*: they always attach lower than the thematic-PP, and only the narrow reading is actually available (though it is subject to contextual specificity).

Second, epithets must not be co-indexed with an item that c-commands them. *Compared-to* phrases can contain an epithet co-indexed with an R-expression in the thematic-PP, but *for-PP's* cannot.

- (174) a. Mary is quite happy with John_i compared to the bastard_i's other girlfriends.
- b. ??Mary is quite happy with John_i for a girlfriend of the bastard_i.

Again, this indicates that the thematic-PP does not c-command into the *compared-to* phrase, even in its low position, but it does c-command into the *for-PP*. Also, this again argues in favor of the generality story, since we would expect on the structural ambiguity story that the wide reading would be possible in (174)b.

Lastly, it is possible to get a parasitic gap in a *compared-to* phrase that is licensed by a real gap in the thematic-PP.

- (175) a. You are proud of Bill compared to the father of Bill.
- b. ?Who_i are you proud of t_i compared to the father of <pg>?

- (176) a. You would be unhappy with the real painting compared to a print of
it.
- b. ?Which painting_i would you be unhappy with t_i compared to a print of
<pg_i>?

But this is not possible with *for-PP*'s.

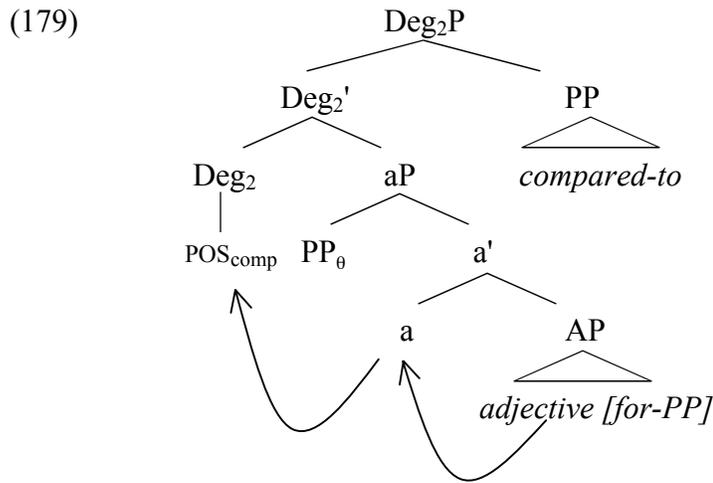
- (177) a. You are proud of science teachers for a science teacher.
- b. *What kind of teacher_i are you proud of t_i for <pg_i>?

If parasitic gaps may not be c-commanded by the real gap that licenses them, then we can conclude that thematic-PP's c-command into the *for-PP* but not into the *compared-to* phrase.

This leads us to a structure of gradable adjective phrases in which *compared-to* phrases are high, followed by thematic-PP's, followed by the adjective head and the *for-PP*. But notice that there are linear order restrictions on these phrases.

- (178) a. John is patient with Mary for a boy compared to Bill.
- b. ??John is patient for a boy with Mary compared to Bill.
- c. ??John is patient compared to Bill with Mary for a boy.
- d. ??John is patient for a boy compared to Bill with Mary.

Only the order in (178)a seems natural. While the *compared-to* phrase is highest in the structure, followed by the thematic-PP, and then the *for-PP*, the thematic-PP must be linearly closest to the adjective, followed by the *for-PP* and then the *compared-to* phrase. Therefore, I will assume that the standard expressions right adjoin to the tree, and the thematic-PP adjoins on the left. I will use a little *aP* as the functional head that introduces the thematic-PP (referred to below as PP_{θ}). Head movement of the adjective, as indicated in the tree diagram below, results in the correct word order.



The head movement is from the A head into the little *a* head and then into the Deg_2 head position. This results in the order *adjective* PP_{θ} *for-PP* *compared-to*. I have left the structure of the *adjective-for-PP* undetailed because we have not yet seen evidence that the *for-PP* is separated from the AP. I will provide this evidence in section 2.4.7 below. Next, however, I want to provide further evidence for the structure in (179).

2.4.6 Fronting, *So*, and Pseudogapping Facts

The data that has been presented so far indicates that *for-PP*'s should form a constituent with the adjective head to the exclusion of the thematic-PP, and *compared-to* phrases should not. The constituency diagnostics presented in this section also point to this conclusion.

First, let us look at *wh*-fronting. First notice that each of the phrases under question can be fronted in questions.

- (180) a. Exactly how patient compared to Tom is he?
b. Exactly how patient with Tom is he?
c. Exactly how patient for a doctor is he?

But while the *compared-to* phrase and the thematic-PP can be stranded, stranding the *for-PP* is somewhat less acceptable.

- (181) a. Exactly how patient was he compared to Tom yesterday?
b. Exactly how patient was he with Tom yesterday?
c. ?Exactly how patient was he for a doctor yesterday?

This would be explained if the *how*-phrase targeted a constituent that was below the thematic-PP but included the *for-PP*. The more relevant test is whether the thematic-PP can be fronted and the *compared-to* or *for-PP* stranded, and vice versa.

- (182) a. ?How patient for a nurse is she with the doctor today?
b. ??How patient with the doctor is she for a nurse today?

Stranding the *for-PP* is worse than stranding the thematic-PP, indicating that the *for-PP* is closer to the adjective than the thematic-PP. We get the opposite judgments with *compared-to* phrases.

- (183) a. ??How patient compared to Sue is she with the doctor today?
b. ?How patient with the doctor is she compared to Sue today?

This data can be explained if *compared-to* phrases are above thematic-PP's which are above the *for-PP*.

Another constituency test yields the same results. The adjectival pro-form *so* can target an adjectival constituent that includes any of the phrases we are testing.

- (184) a. Although John isn't very patient compared to Sam, Brett is very much so.
b. Although John isn't very patient with Mary, Brett is very much so.
c. Although John isn't very patient for a doctor, Brett is very much so.

And, *so* can target a constituent that excludes each of these phrases. (Perhaps the case of excluding the *for-PP* is a bit degraded, which if true, would indicate that the *for-PP* is close to the adjective head.)

- (185) a. Although John isn't very tall compared to Sam, he is very much so compared to Bill.
- b. Although John isn't very happy with Mary, he is very much so with Sam.
- c. ?Although John isn't very tall for a basketball player, he is very much so for a wrestler.

Most relevant here is whether the pro-form *so* can target a constituent that includes the thematic-PP, but excludes the *compared-to* or *for-PP* phrases. It appears to be able to do so with *compared-to* (186), but not with a *for-PP* (187). (The second conjunct of the example in (186)b must be read with the interpretation ...*he is very happy with Tom compared to Sam.*)

- (186) a. Although John isn't very happy with Mary compared to Sam, he is very much so compared to Tom.
- b. ??Although John isn't very happy with Mary compared to Sam, he is very much so with Tom.
- (187) a. ??Although John isn't very happy with the doctor for a patient, Sue is very much so for a nurse.
- b. Although John isn't very happy with the doctor for a patient, he is very much so with the nurse.

Again, we come to the conclusion that *for-PP's* can form a constituent with the adjective head to the exclusion of the thematic-PP, but not the other way around. *Compared-to* phrases, on the other hand, can not form a constituent with the adjective to the exclusion of the thematic-PP.

Pseudogapping facts provide further evidence for the constituency structure being argued for here. Pseudogapping is the result of deleting a constituent that can be recovered under identity with an antecedent in the previous clause. (Lasnik, 1995) In the case of adjectival clauses, the deletion can target an adjective to the exclusion of a *compared-to* phrase (188) and a thematic-PP (189).

(188) Although John wasn't very patient compared to Sam yesterday, he was compared to Bill today.

(189) Although John wasn't very patient with Sam yesterday, he was with Bill today.

But, pseudogapping cannot strand the *for-PP* (at least not very easily).

(190) ??Although John wasn't very patient for a doctor yesterday, Mary was for a doctor today.

In addition, it is impossible to strand the thematic-PP and not the *compared-to* phrase.

(The second conjunct in example (191)b must be interpreted such that Mary's happiness with Tom is being compared to Sam.)

- (191) a. Although Mary isn't very patient with John compared to Sam, she was compared to Bill.
- b. ??Although Mary isn't very patient with John compared to Sam, she was with Tom.

The opposite is true for *for-PP's*. It is easier to strand the *for-PP* than to strand only the thematic-PP.

- (192) a. ??Although Mary wasn't very patient with Sam for a doctor yesterday, Sue was for a nurse today.
- b. Although Mary wasn't very patient with Sam for a doctor yesterday, she was with Bill today.

Thus the pseudogapping facts coincide with the results from each of the other tests: *for-PP's* can form a constituent with the adjective head to the exclusion of thematic-PP's. *Compared-to* phrases are again shown to be higher in the gradable adjective phrase than either of the other two phrases.

Each of the constituency tests applied in this section might not individually provide decisive evidence for these conclusions. But because the results of each test

are consistent with the others, we should take them together as offering the strongest kind of evidence: evidence that is repeatable across a number of different domains.

2.4.7 *for-PP's* are not in the AP either

So far, we have been able to ascertain the relative height of these phrases: *compared-to* phrases dominate thematic-PP's, and they dominate *for-PP's*. *For-PP's* are closest to the adjective because they together form a constituent to the exclusion of thematic-PP's. This suggests a structure like the following:

(193) [_{DegP} *compared to Bill* [_{AP} *with Mary* [_{AP} [*for a boy*] *patient*]]]

But, we still don't have a way to definitely describe the syntactic relationship between the adjective head and the *for-PP*. Is the *for-PP* introduced inside the AP? Perhaps in an argument position? Notice that without any evidence to the contrary, the degree-argument theory could be maintained by refusing *compared-to* phrases the status of the degree-argument, they are just something else. These expressions occur too high to be the internal standard degree argument. Then, if one wanted to push the degree-argument analysis, he could say that only *for-PP's* sit in the internal argument position of the adjective. So far, the only evidence we have seen indicates that *for-PP's* are closer to the adjective head than *compared-to* and thematic-PP's. But is this close enough to be the internal argument of the adjective? What we need to do is see if there are any other expressions that must occur between the adjective and the *for-PP*. Luckily, one such phrase exists: the *as-PP's* that occur with adjectives like *skillful*.

- (194) a. Alexander is skillful as a cook.
b. Olga is beautiful as a dancer.
c. Sylvia is fierce as a debater.

In this section, I want to use *as-PP's* to show that *for-PP's* are also introduced in the extended projection of the adjective. The argumentation will be simple: *as-PP's* occur between *for-PP's* and the adjective head. And, given the assumption that adjuncts shouldn't appear between a head and its internal argument, *for-PP's* should not be internal arguments of the adjective.²⁸

Larson (1998) analyzes adjectives like those in (194) as modifying an event variable introduced by the noun in the *as-PP*. These adjectives are, however, also gradable. One can be skillful or beautiful or fierce to different degrees when one does certain activities like surgery, dancing or debating.

- (195) a. Alexander is very skillful as a cook.
b. Olga is more beautiful as a dancer than I am.
c. Sylvia is fierce enough as a debater to maybe even take on Noam.

²⁸ This is a potentially worrisome assumption, since there are semantic theories that allow the first argument of a function to be saturated later in the derivation (cf. Steedman, 1997). However, options like this are cumbersome, particularly in the Heim and Kratzer (1998), and so I will assume that they should be avoided if at all possible. It is better to have internal arguments saturated in immediately, in internal positions.

When these adjectives occur with both an *as-PP* and a *for-PP* there is a clear ordering restriction.

- (196) a. Alexander is very skillful as a cook for a linguist.
b. ?? Alexander is very skillful for a linguist as a cook.

This means that *for-PP*'s must hang off the adjective phrase above the *as-PP* which must be closer to the adjective head. In addition, the *for-PP* obligatorily takes scope over the *as-PP*. The sentence in (196)a can only be paraphrased as in (197)b, not as in (197) c.

- (197) a. *Possible paraphrase of (196):*
The degree to which Alexander is skillful as a cook is greater than the degree to which linguists are typically skillful as cooks.
b. *Not a possible paraphrase of (196):*
The degree to which Alexander is skillful as a cook is greater than the degree to which linguists are typically skillful.

That is, the standard degree must be measured with respect to the linguists' skill as cooks, not skill, simply.

Other diagnostics also argue for this conclusion. The pro-form *so* can have *skillful as a cook* as its antecedent as in (198)a. But, it is difficult for it to be interpreted as *skillful for a linguist* in (198)b.

(198) *Pro-form so*:

- a. Although Alexander isn't very skillful as a cook for a linguist, he is very much so for a linguist with no hands.
- b. ??Although Alexander isn't very skillful as a cook for a linguist, he is as a violinist.

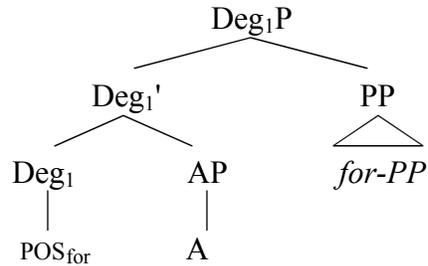
The same for pseudogapping. The elided part of (199)a can have the interpretation *skillful as a cook*, but in (199)b, the elided part cannot be interpreted as *skillful for a linguist*.

(199) *Pseudogapping*:

- a. Although Alexander is very skillful as a cook for a linguist, he isn't for a linguist who studies Chinese.
- b. ??Although Alexander is very skillful as a cook for a linguist, he isn't as a violinist.

If these data are convincing, then the *for-PP* must be higher in the structure than *as-PP's*, and *as-PP's* must be closer to the adjective. This makes it unlikely that *for-PP's* could be internal arguments of the adjective, under the standard assumption that no phrase can intervene between a function and its first argument. The structure below summarizes this conclusion.

(200)



Thus, we should conclude that not only are *compared-to* phrases incompatible as internal degree-arguments of the adjective, but so are *for-PP's*. The degree-argument theories begin to look far less appealing as the number of constructions they aim to account for dwindles. Theories that introduce standard expressions in the extended projection of the adjective (such as the measure function theories), however, can easily account for these facts by simply positing a degree head specifically for *for-PP's*.

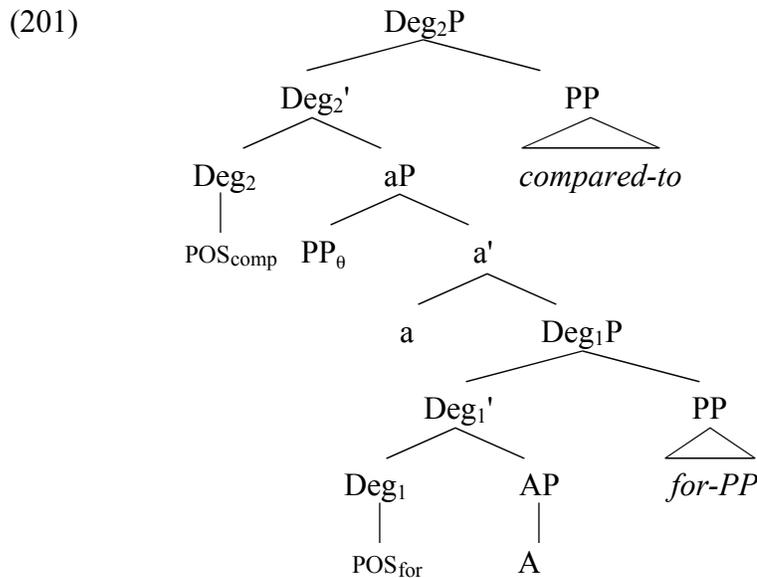
2.4.8 Conclusion

The purpose of this section was to show that *for-PP's* and *compared-to* phrases are not syntactically equivalent and are introduced outside of the immediate projection of the adjective head. Instead, they are introduced at different points in the extended projection of the gradable adjective. *Compared-to* phrases are introduced high in the gradable adjective phrase, above thematic-PP's and *for-PP's*. *For-PP's* are structurally low in the adjective phrase, appearing very close to the adjective, but still outside of the immediate maximal projection of the A head. The evidence for these conclusions came from several sources. First, *compared-to* phrases cannot be part of a nominalized gradable adjective phrase, but *for-PP's* and thematic-PP's can. Therefore, *compared-to* phrases are outside of the target of the nominalization, above

the *for-PP* and the thematic-PP. Scope facts also indicate that *compared-to* phrases are structurally higher than both the *for-PP* and the thematic-PP. Scope facts also indicate that *for-PP*'s are structurally lower in the gradable adjective phrase than thematic-PP's. This is because the general reading of transitive adjectives with *for-PP*'s requires that they combine with the adjective to the exclusion of the thematic-PP. C-command facts also indicate that this three-way dichotomy is correct:

thematic-PP's c-command into *for-PP*'s but not into *compared-to* phrases.

Constituency tests such as pseudogapping, fronting and *so*-pro-form replacement also indicate that the *for-PP* is closer to the adjective than either the thematic-PP or the *compared-to* phrase. And, finally, *as-PP*'s are structurally closer to the adjective than *for-PP*'s are, indicating that *for-PP*'s are also external to the AP, and instead are introduced outside the A head's immediate projection. The following structure sums up the syntactic results from this section:



This syntax does not coincide well with degree-argument theories which predict that standard expressions should appear in the internal argument position of gradable adjectives.

Theories of the measure function type, however, require that standard expressions be introduced outside of the AP, since the AP is simply a measure function and nothing more. Degree heads supply the comparative meaning of gradable adjectives and they introduce standard expressions. Modifying standard measure function theories is easy enough to do to handle the syntactic facts outlined above, we only need to add different types of degree heads and state explicitly where in the extended projection they occur. This is what we have done for *for-PP's* and *compared-to* phrases: they are each introduced by their own designated degree morpheme with the *compared-to* phrase's morpheme above the *for-PP's* morpheme.

I will discuss the semantic details of these structures, including how the standard expressions and the thematic-PP's are interpreted, in chapter three. Now, I would like to add the comparative morpheme to the structure in (201), and show that it must be added at the top.

2.5 Phrasal Comparatives

This will be a brief section since I believe the proposal that I am making is rather easy to accept given the assumption that standard expressions are introduced in the extended projection of the adjective phrase. The proposal is this: phrasal comparative morphemes and the *than*-phrases they introduce are structurally superior to all of the phrases we have discussed so far. That is, *than*-phrases are introduced

above *compared-to* phrases, thematic-PP's and *for-PP's*. I will offer to arguments in favor of this conclusion.

First, when we apply the scope test, the gradable property that is used to calculate the standard degree must include not only the adjective but also any of the other phrases that also appear within the adjective phrase. For instance, the sentence in (202)a has only a wide reading, and not a narrow one.²⁹

- (202) a. John is more patient with Mary than Bill.
- b. *Possible paraphrase:*
John's patience with Mary is greater than Bill's patience with Mary.
- c. *Not a possible paraphrase:*
John's patience with Mary is greater than Bill's patience.

Therefore, comparative *than*-phrases must have scope over the thematic-PP. We can show the same for *for-PP's* and *compared-to* phrases. Because we have much evidence that *compared-to* phrases are higher than *for-PP's* I will just focus on the example in (203) which tests a *than*-phrase relative to a *compared-to* phrase.³⁰

²⁹ I am ignoring "subcomparative" readings of phrasal comparatives. Under this reading, (202) would be paraphrased as *John's patience with Mary is greater than his patience with Bill*. These are of course interesting in their own right, but I don't think they bear directly on the argument at hand.

³⁰ The interpretations of stacking examples are, I admit, not initially obvious. But I believe the paraphrase that I have used is accurate. However, I will discuss stacking in great detail in chapter 3, and offer arguments there that these *differential type* interpretations are the correct and only readings available for stacking examples.

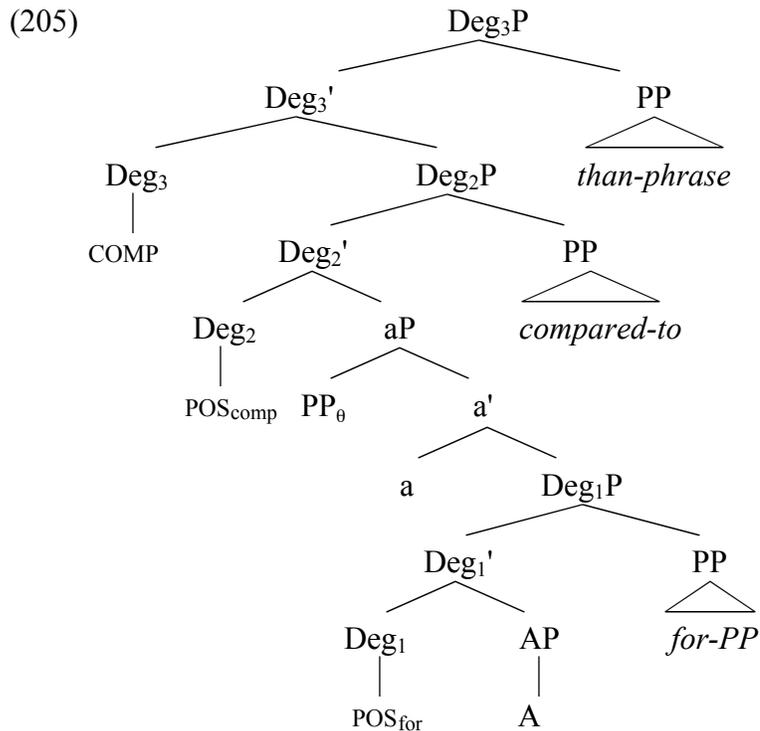
- (203) a. John is more tall compared to Tom than Bill.
- b. *Possible paraphrase:*
 The difference between John's height and Tom's height is greater than the difference between Bill's height and Tom's height.
- c. *Not a possible paraphrase:*
 The difference between John's height and Tom's height is greater than Bill's height.

The paraphrase in (203)b is what we would expect if *than*-phrases had scope over the *compared-to* phrase. The paraphrase in (203)c is what we would expect if a narrow reading were possible, and only the adjective were used to calculate the standard degree based on Bill. This paraphrase is clearly not possible. Therefore, it is safe to conclude that *than*-phrases have scope over *compared-to* phrases.

The second argument is the linear order restrictions on *compared-to* phrases and *than*-phrases. Notice that the *than*-phrase must appear to the right of the *compared-to* phrase.

- (204) a. John is more tall compared to Tom than Bill.
- b. ??John is more tall than Bill compared to John.

Just as before, we should conclude from this that *than*-phrases are right adjoining. And, they adjoin high in the structure, above *compared-to* phrases, as in the structure below.



Thus, we are left with a rather surprising syntactic structure of gradable adjective phrases. Standard expressions, which intuitively seem to play the same semantic role, behave quite differently syntactically.

2.6 Conclusion

This chapter investigated the syntactic structure of gradable adjective phrases in order to determine boundary conditions on semantic theories of positives and comparatives. The conclusions from this investigation included the following: (a) standard expressions including *for-PP's*, *compared-to* phrases and *than-phrases* are introduced in the extended projection of the gradable adjective, not in its internal argument positions; (b) thematic-PP's are introduced in the extended projection of the gradable adjective, not in its complement position; (c) each of these phrases is

introduced by a different functional morpheme; and (d) the relative height of these phrases indicates that *for-PP's* are closest to the adjective (though still outside of the immediate AP), thematic-PP's are next, followed by *compared-to* phrases, and finally comparative *than*-phrases are the highest and furthest from the adjective head.

When I say that these syntactic conclusions provide boundary conditions for a semantic theory of positive and comparative adjectives, I mean first that we can rule out degree-argument theories. These theories treat standard expressions as denoting the standard degree and thus require that they appear in an internal argument slot of the gradable adjective. But, as we have seen, standard expressions can stack, they behave differently in terms of their interpretations (the wide vs. narrow readings of transitive gradable adjectives), they are hierarchically related to each other, thematic-PP's appear between *for-PP's* which are low and *compared-to* and *than*-phrases which are high, and *as-PP's* appear between *for-PP's* and the adjective head. None of them can appear inside the gradable adjective's internal argument position.

There are other semantic conclusions that I want to draw from the structure argued for here and represented in (205). It was one result of this chapter that measure function theories, i.e., theories that remove part of the comparative meaning from the adjective denotation and insert it into functional morphemes that take the adjective as arguments, correspond well with the syntactic properties of gradable adjective phrases. In the next chapter, I will explore a more radical version of this idea: I will extract the measure function meaning from the adjective and place it, too, inside the degree morpheme denotation. What will be left is a simple predict of events. That is, gradable adjectives are like every other adjective and indeed every

other predicate, in that they simply describe events (or states). This will allow an account of stacking and the general reading of transitive adjectives, something that the measure function analysis cannot provide. It will also have several theoretical benefits that are worth striving for.

Chapter 3: On the Semantics of Comparison

3.1 Introduction

In this chapter I address several issues in the semantics of positive gradable adjectives that can occur with *for-PP's* and *compared-to* phrases. One such issue is how to extend current analyses of intransitive positive adjectives such that we can also account for transitive gradable adjectives like *patient with Mary for a boy* and *angry at Don compared to Bill*. The main problem that transitive adjectives give rise to is how to analyze a certain openness in the interpretation of sentences like those in (206), where a *for-PP* occurs with a thematic-PP.

- (206) a. John is patient with Mary for a boy.
b. Paul was really angry at Pat for a Buddhist.
c. Bill is happy with the class for a freshman.
d. Sam was really proud of Gary for a complete stranger.

Recall from the previous chapter that there is a surprising question sentences like (206) raise: which gradable property is the comparison class measured over?

Consider (206)a. It attributes to John a degree of patience with Mary. The degree is determined in comparison to the typical degree that boys have some property. But which property? Is it patience with Mary in particular? Or, is it patience simply? It seems that either choice is possible, leading to two truth-conditionally distinct

interpretations. For example, (206)a gives rise to at least the interpretations in (207) and (208).

(207) John's patience with Mary is greater than the patience boys typically exhibit towards Mary.

(208) John's patience with Mary is greater than the patience boys typically exhibit.

Suppose that boys are generally very impatient, but are exceptionally indulgent with Mary. Then the interpretation of (206)a in (207) requires a much higher patience of John towards Mary than what is required in (208).³¹

In chapter two, we referred to the interpretation exemplified in (207) as the *wide reading* because the gradable property over which the comparison class, expressed in the *for-PP*, is evaluated includes both the adjective and the thematic-PP. The wide reading is unsurprising, in a sense, because the surface order (and, perhaps, long held prejudices) suggests that the thematic-PP is closest to the adjective. This makes it seem quite natural to assume that the *for-PP* has scope over both the adjective and the thematic-PP. What is surprising here is that, contrary to the surface linear order of these adjective phrases, the *for-PP* has a *narrow reading* that corresponds to the interpretation in (208). The narrow reading is defined by the exclusion of the thematic-PP in the gradable predicate that the comparison class is measured over. What adds to our surprise is the fact that *compared-to* phrases, which

³¹ See 2.4.4 for a more detailed discussion.

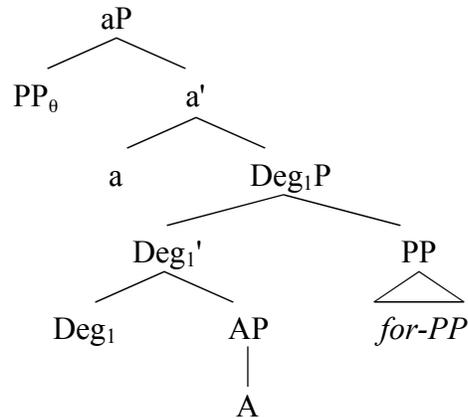
we might think are semantically equivalent to *for-PP*'s since they both express the standard, only get a wide reading as the sentences in (209) exemplify.

- (209) a. John is patient with Mary compared to the boy.
b. Paul was really angry at Pat compared to any Buddhist.
c. Bill is happy with the class compared to the freshman.
d. Sam was really proud of Gary compared to Bill.

When the standard expression is a *compared-to* phrase, both the referent and the standard degrees are determined with respect to the gradable adjective *and* the thematic-PP. There is no narrow reading of *compared-to* phrases, so (209)a, unlike (206)a, must receive a wide interpretation, something like (207).

The narrow reading of *for-PP* expressions becomes less surprising given the conclusions from the previous chapter (section 2.4.3) in which it was shown that the *for-PP* combines with the adjective head to the exclusion of the thematic-PP. The thematic-PP must be introduced above the *for-PP* as in the structure below.

(210)



I assumed that a comparison class denoted by a *for-PP* is measured with respect to the gradable property denoted by its sister constituent.³² Given that the structure in (210) is the only structure available, then a *for-PP* will always measure just the property of the adjective alone, not that of the adjective plus the thematic-PP. For this reason, I concluded that the semantics of a sentence like (206)a is actually as in (208), repeated here as (211).

(211) John's patience with Mary is greater than the patience boys typically exhibit.

The point is that the syntactic facts spelled out in chapter two had a very important implication for the semantics. Namely, they indicate that gradable adjective phrases like *patient with Mary for a boy* are not actually ambiguous: only the narrow reading is available. This is as it should be, though. The reading in (211) is general in a certain sense. The patience of boys is indeterminate in the same way that the

³² This isn't exactly right, as we will see below. The Deg' level does not denote the needed gradable property, but rather the AP does. The point is still the same though: the AP alone, to the exclusion of the thematic-PP, is the gradable property that the comparison class is measured with respect to.

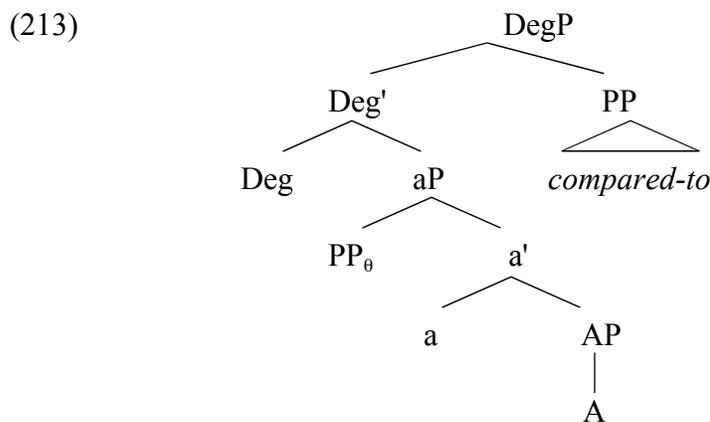
predicate *teacher* is indifferent to what exactly its subject teaches. For (211), the patience of boys could be with anything at all. For instance, when we estimate the typical patience of boys, our estimate will be shaped by the interests of the conversation. In some cases, we may be interested in how patient boys are with people, animals, machines, sisters, the weather, etc. In other cases, we may have more particular concerns, and hence, we may only be interested in how patient boys are with girls, classmates, or even specifically with Mary.

What I am claiming is that the semantic content of *patient with Mary for a boy*, like the paraphrase in (211), is indifferent to these further choices. The object of the boys' patience, the type of information that would be supplied by the thematic-PP, is indeterminate. The *for-PP* combines only with an AP denotation, such as *patient* (simply), and in a certain context might actually be understood as more specific, such as *patient [with a contextually relevant class of things]*. The wide reading of (206)a is actually just a contextual sharpening of what the narrow reading supplies semantically. So, the sentence in (206)a could have any of the interpretations illustrated in (212), and more.

- (212) a. John's patience with Mary is greater than the patience boys typically exhibit.
- b. John's patience with Mary is greater than the patience boys typically exhibit towards girls.
- c. John's patience with Mary is greater than the patience boys typically exhibit towards girls in their class.

- d. John's patience with Mary is greater than the patience boys typically exhibit towards Mary.
- e. etc.

The conclusions of the previous chapter also make it unsurprising that *compared-to* phrases do not have the indeterminate, general reading. Recall that it was concluded that *compared-to* phrases combine with the gradable adjective phrase at a position that is above the thematic-PP.



Thus, the *compared-to* phrase cannot combine with the adjective, simply, but must combine with the adjective and the thematic-PP.

In section 3.4, I will supply two analyses of positive and comparative adjectives, one in the traditional semantic framework and one in a neo-Davidsonian event-style framework. Both frameworks can capture the crucial point of the analyses: that the *for-PP* combines with the adjective head to the exclusion of the thematic-PP, while *compared-to* phrases and comparatives combine with the AP and

its thematic-PP. But the neo-Davidsonian analysis is more elegant in a certain respect. The previous chapter concluded that the thematic-PP was introduced so far above the adjective head that other semantic material, such as *for-PP's* and *as-PP's*, can occur between the two. This leads one to expect that the adjective is not lexically specified for an internal thematic-PP, because we would then have to assume that a head can specify for a non-local internal argument. It would be odd, at best, to allow adjunct-like phrases to intervene between what we typically assume is a very local relationship, that of a head and its internal argument.

The neo-Davidsonian framework is especially adept at thematic separation, such as what appears to be happening with the intransitive/transitive alternating adjectives like *patient*, and hence, I will argue that it provides a better way to capture the empirical facts. This analysis will require that we discard our earlier assumption that adjectives denote measure phrases. Instead, the system that I will propose pulls the measure function property out of the adjective head and inserts it into the degree operator. This will not simply be a modification that we are forced into by assumptions of a neo-Davidsonian framework. Removing the measure function from the adjective and placing it in the degree operator will provide an explanation as to why there are gradable verbs, nouns, prepositions, and adverbs, which is surprising under the measure function account of gradable adjectives. It will also offer an explanation of why it is easy to coerce typically non-gradable words into gradable ones. In both cases, the degree operator essentially makes a non-gradable predicate gradable. Furthermore, this analysis will provide a straightforward analysis of stacking, which the traditional frameworks are unable to do.

The chapter is organized as follows. First, I will first discuss the previous work on the semantics of *for-PP's* in section 3.2. This discussion will serve two purposes. The first is simply to give a synopsis of the current state of the art and provide a context for the ensuing discussion in the following sections and chapter four. The second purpose is that the basic analysis that has developed over the years can be used to account for the general reading of sentences like (206), provided we adopt the syntax from chapter two. This is followed by section 3.3, where I propose an analysis of *compared-to* phrases based on phrasal comparatives. In section 3.4, I will discuss deriving the narrow reading of *patient with Mary for a boy*, in both the traditional framework and the neo-Davidsonian framework. In the final section 3.5, I will argue against a proposal in Kennedy (2005a). One of the goals of Kennedy (2005a) is to eliminate the status of comparison class denotations as semantic arguments of the degree operator. He argues that *for-PP's* (and implicit comparison classes) are not arguments of the degree operator POS_{for} , but rather indirectly affect the computation of the standard degree. I will argue that this is not possible. Any system that assumes adjectives are measure functions must also assume that *for-PP's* combine with their own degree operator which then uses their denotation as a comparison class to compute the standard degree. The analyses developed for *for-PP's* and *compared-to* phrases will be discussed in section 3.6. There are some concluding remarks in section 3.7.

3.2 Computing the Standard Degree from a for-PP

In a degree-based, projectionist theory like that of Kennedy (1999, 2005a), a degree is introduced into the logical form via a measure function (see section 1.2.4). Gradable adjectives denote measure functions (and nothing else), as in (214). They are of type $\langle e,d \rangle$, taking an individual and returning a degree.

(214) [gradable AP] = λx . *the degree to which x is A'*

Notice that this requires that there be some other semantic material for a sentence like (215) to produce a truth value.

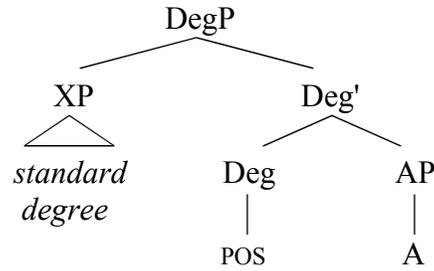
(215) John is tall.

Simply predicating a gradable adjective of an individual-denoting (type $\langle e \rangle$) expression would only yield a degree, not a truth value. To produce an expression with a truth value, something further is needed.

Kennedy (1999) provides the function in (216) and the structure in (217).

(216) POS = $\lambda G_{\langle e,d \rangle} . \lambda d . \lambda x . G(x) \geq d$

(217)



The POS morpheme maps three arguments – an adjective meaning, a degree, and an individual – onto a truth value. In doing so, it sets up the relational aspect of gradability. Degree theories are based on the idea that gradable expressions are relational, but the relation is not directly between individuals. The relation is a comparison between two degrees. Hence, a degree-based theory must posit two degrees in the logical form of any gradable expression, which I will call the referent degree and the standard degree. The former is the degree to which the subject of predication has the property in question; the latter is the degree to which this is compared. Thus, the null POS morpheme takes the denotation of the gradable adjective, here represented as G , and applies it to the individual x , whose value is eventually fixed by the subject noun phrase. G is a measure function, so the semantic result, $G(x)$, is the referent degree. This referent degree, according to Kennedy, is asserted to be greater than or equal to the standard degree d .

The POS function is based on traditional degree-argument analyses. Here is the traditional meaning of a gradable adjective (see section 1.2.3).

(218) $[\text{gradable } A] = \lambda d \lambda x. \text{ the degree to which } x \text{ is } A \text{ is greater than } d$

The difference between the degree-argument theories and the projectionist theories is that in (218), the POS function is incorporated into the meaning of the adjective itself, along with the measure function. Kennedy essentially extracts the part of the meaning in (218) that contributes the comparison relation and the standard degree and places it in a functional head which takes the adjective as an argument. The adjective retains the measure function part of the traditional meaning.

Kennedy's formulation of POS works well if the standard degree is supplied by a measure phrase. Let's assume that a measure phrase denotes a degree. So, for instance, *six feet* denotes the degree 6'

- (219) a. Mary is six feet tall.
 b. $\| \text{Mary (is) [six feet [POS [tall]]] } \| = 1$ iff
 c. $(\text{mary}) [(\text{6}')[[\lambda G.\lambda d.\lambda x. G(x) \geq d] \lambda x.\text{TALL}(x)]] = 1$ iff
 d. $(\text{mary}) [(\text{6}')[\lambda d.\lambda x. \text{TALL}(x) \geq d]] = 1$ iff
 e. $(\text{mary}) [\lambda x. \text{TALL}(x) \geq \text{6}'] = 1$ iff
 f. $\text{TALL}(\text{mary}) \geq \text{6}' = 1$ iff
 g. *the degree to which Mary is tall* $\geq \text{6}'$

Now let us consider *for-PP's*. How can they be incorporated into a semantics like the projectionist type of theory that Kennedy has proposed? A first idea is to analyze *for-PP's* as describing the standard degree, similar to measure phrases. This seems initially plausible, since the two sorts of phrases are in complementary distribution. (Kennedy, 1999)

- (220) a. Mary is six feet tall.
b. Mary is tall for a gymnast.
c. *Mary is six feet tall for gymnast.

This fact can be explained if *for-PP's* and measure phrases are both the standard degree argument: they cannot co-occur because there is only room for one standard in the logical form.³³

But this first idea cannot be correct: it cannot be that *for-PP's* actually denote a degree. The reason is simple. Inside the *for-PP*, there is no expression denoting a gradable property. So it is implausible to treat the *for-PP* itself as a description of a degree. This is the same problem noticed by Beck, Oda and Sugisaki (2004) in calculating a standard degree from a *compared-to* phrase. There is nothing inside the *compared-to* phrase that introduces a degree term, i.e., inside *compared to John*, there is no expression denoting a gradable property. This is a problem for degree based theories, which require that the comparison relation be a relation between two degrees.

³³ While it is true that *for-PP's* cannot appear with any measure phrases, the explanation for this fact presented here only accounts for part of the facts. We should differentiate between two semantic roles that measure phrases can perform when they modify gradable predicates. The first is the type we find with simple positive adjectives, such as in *John is six feet tall*. It is this type that the explanation presented here is able to account for. The second type appears in the comparative form and is typically called a *differential* phrase (Stechow, 1984), such as in *John is three inches taller than Bill*. Differentials are predicated of the difference between two descriptions of degrees, i.e., the difference between John and Bill's heights is three inches. I will discuss differentials below in section 3.2.4 and at length in chapter four. For now, it is only relevant that *for-PP's* do not appear with measure phrases in the former sense.

However, even if *for-PP's* do not themselves denote the standard degree, they evidently do affect the determination of the standard degree in some way. This effect is what saves (221) from being a contradiction.

(221) Dumbo is small for an elephant, but he is not small.

If the standard degree for smallness were the same in both the conjunct clauses, (221) could not possibly be true. But it can be true, because *small for an elephant* implies a different standard of smallness than *small* alone. And so the *for-PP* somehow affects the determination of the standard degree. As Klein (1980) put it, *for-PP's* denote a "comparison class" used in the calculation of the standard.

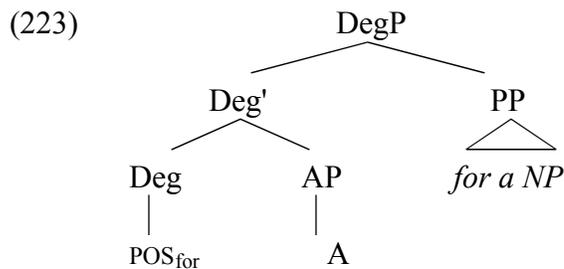
Thus let us assume that *for-PP's* do not denote descriptions of degrees, but rather specify an parameter of an implicit measure function, call it \mathcal{M} . \mathcal{M} takes the content of the *for-PP*, along with the gradable property in question, and returns a degree. This degree serves as the standard degree in the meaning of the larger adjective phrase.

(222) $\|\text{small for an elephant}\| = \lambda x. \text{SMALL}(x) \geq \mathcal{M}(\lambda y. \text{SMALL}(y))(\|\text{for an elephant}\|)$

This is basically the analysis that a number of researchers have proposed (although, with changes to reflect several assumptions about the lexical denotation of adjectives). I will turn to how this might be derived, and what \mathcal{M} might mean, momentarily.

But before I do that, let me point out that any degree based analysis that uses the *for-PP* to calculate the standard degree immediately provides an explanation for why *for-PP*'s are in complementary distribution with measure phrases as shown in (220). According to analyses of this type, the greater than relation is a relation between two degrees, the referent and the standard. The standard degree can only be specified once. It can be explicitly stated by a measure phrase like *six feet*, or it can be determined by the implicit measure function \mathcal{M} , but not both. An explicit measure phrase therefore excludes the possibility of a *for-PP*, because *for-PP*'s, as arguments, are contingent on the presence of \mathcal{M} . I now turn to a discussion of how a logical form like in (222) is derived and what the meaning of \mathcal{M} is.

The task now is to derive the logical form in (222) from the syntactic structure we are assuming from chapter two.



Furthermore, we are prevented from treating the *for-PP* as denoting a description of a degree, because there is not a gradable property inside of it to introduce that degree. Notice that in (222) there are two copies of the gradable property, one that computes the referent degree when it is predicated of x , and one that serves as an argument of \mathcal{M} . \mathcal{M} takes this gradable property, along with the comparison class, and returns the

standard degree. Well, it does so not only by taking the comparison class as an argument, but also by taking the gradable property as an argument. The question is just how to get the second copy of the gradable property into the logical form such that it can serve as the argument of \mathcal{M} .

One possibility we should rule out right away is that there is a variable over gradable properties, whose value is set by the context, hidden in the meaning of a *for-PP*. But if this were the case, then we would expect that the standard degree could be based on any gradable property. We would expect that sentences like (224)a be ambiguous and have meanings that are analogous to subcomparative meanings, like that in (224)b.

- (224) a. John is tall for a wrestler.
 b. John is taller than the average width of a wrestler.

But this is obviously not an acceptable reading of positive adjectives with *for-PP*'s. The standard degree must always be based on the comparison class and the same gradable property that the subject is measured with respect to.

Instead, I will assume that the second gradable property is provided by a semantic copying operation. We can achieve this by positing a meaning for the POS operator such as that in (225).

$$(225) \text{ POS}_{\text{for}} = \lambda G_{\langle e, d \rangle}. \lambda P_{\langle e, t \rangle}. \lambda x. G(x) \geq \mathcal{M}(G)(P)$$

Here, POS_{for} is defined such that it copies its first argument, the gradable property G , into two positions of the logical form. One copy is predicated of x and, when the complex predicate is combined with the subject, ends up generating the referent degree. The second copy serves as an argument of the \mathcal{M} function. After combining with G , the resulting function then combines with a comparison class P of type $\langle e, t \rangle$. The comparison class can be supplied explicitly by a *for-PP*, assuming that the *for*-part of the *for-PP* is vacuous, and only the property denoting NP enters the logical form.

The copying mechanism that is part of the POS_{for} morpheme's meaning has been employed by Heim (1985) to do essentially the same thing for phrasal comparative predicates, like *taller than John*. Phrasal comparatives, too, lack a gradable property in the *than*-phrase (assuming that there is not any clausal material hidden inside the *than*-phrase). Hence in order to derive the necessary standard degree, the gradable property must appear twice in the logical form of phrasal comparatives. Heim posits a meaning of the comparative morpheme, to be used only with phrasal comparatives, that takes the gradable property as an argument and copies it into two positions such that it can be used to compute both the referent and standard degrees.

Now, let's turn to the content of the \mathcal{M} function, the function that outputs the standard degree based on the gradable property and the comparison class. The intuition that most theories of comparison classes incorporate into the meaning of \mathcal{M} is that the standard degree must be something like the average or median degree that the members of the comparison class possess of the gradable property. Hence,

theories typically define the \mathcal{M} function as an averaging operator, signified by NORM in (226) and defined in (227). These are taken from Kennedy (1999, 2003, 2005a), but they are essentially the same as other proposals. (cf. Bartsch and Vennemann, 1972)

$$(226) \quad \text{POS}_{\text{for}} = \lambda G. \lambda P. \lambda x. G(x) \geq \text{NORM}(G)(P)$$

$$(227) \quad \text{NORM} = \lambda G_{\langle e, d \rangle} \lambda P_{\langle e, t \rangle}. \text{the average degree to which the objects in the set defined by } P \text{ possess the gradable property denoted by } G$$

With the assumption that comparison class properties are really sets of individuals, NORM computes the standard degree over those individuals with respect to the gradable property. Alternatively, NORM could return the median value, in order to capture the intuition that to be *Adjective for a NP* requires one to have the gradable property to a degree that is more than *most* of the individuals denoted by the NP. However, it has long been known that defining NORM in terms of an average or median operator does not work.

There is an obvious reason why we cannot treat the NORM function as an averaging or median operator. The problem lies in the fact that these mathematical operations are operations over *extensions* of comparison classes. For instance, if the NORM function applies to the extension of a comparison class, i.e., the set of individuals denoted by the NP in a *for-PP*, and calculates the average value of the degrees to which those individuals possess the gradable property, then the occasional

freak would throw the average off. Boguslawski (1975) and Kennedy (2005a) point out that an analysis based on averages predicts that the following sentence should be a contradiction.

(228) Michael's height is greater than the average height of a member of his basketball team, but he is still not tall for a member of his team.

But (228) isn't a contradiction, and it seems obvious that we don't want the referent degree to be compared to a potentially skewed average degree.

Perhaps another mathematical definition of *NORM* that computed a standard degree based on the extension of the comparison class with something other than an average operation, for instance the median value, could work. A median operator would rank the individuals in the comparison class and pick out the one in the middle (if there are an even number of individuals, it could pick out the one on the high side of the middle). It would then return the degree to which that individual possesses the relevant property. This sense of the *NORM* function would guarantee that the referent were greater than most of the degrees in the comparison class set. But, this won't work either. Imagine Michael's basketball team consisted of four players that are 5', 5'1", 5'2" and 5'3" tall respectively, and one that is seven feet tall. The median degree would be 5'2". Let's say Michael is the 5'3" tall player. We wouldn't want to say that Michael is tall for his team. It appears that no matter which mathematical operation we use to define *NORM*, we can always come up with a situation that throws it off.

The problem with both the average operator and the median operator, and perhaps any mathematical operation, is that they rely on the extension of the comparison class. But, comparison classes do not affect the determination of the standard degree in an extensional way. (Fara, 2000, Kamp, 1975, Klein, 1980)

Imagine a situation in which all of the basketball players of the world except the shortest one were to die. We wouldn't then categorize the last remain player as *tall for a basketball player*. Rather, we are inclined not to accept such a description as true because he is not tall relative to the expected, typical height of basketball players, whether or not any other basketball players really exist. NORM cannot, therefore, be defined as an operator over the extension of the comparison class, since it apparently supplies a standard degree even when there is nothing in the extension of the comparison class to operate on.

Rather, our world knowledge about the comparison class *property* seems to determine the standard degree. We are able to infer from what we know about a comparison class property what a typical instance of that comparison class is, and from this, we calculate the standard by which a thing can be compared. That is, comparison class properties must be intensional notions. And, what counts as *tall* or *expensive* or *patient* is based on the intension of a comparison class property. Fara (2000) points out that the comparison class might even be restricted to *kinds*. She points out that it is strange to say that my computer is tall for a thing on my desk, because things on my desk don't form a kind (although *things on my desk* is a property). Because the things on my desk do not form a kind, there is no way of

knowing what a typical instance of a thing on my desk is, and therefore, there is no way of determining the standard degree based on that property.

So, the basic conclusion is that the function that determines the standard degree is an intensional function over gradable properties and comparison class properties (or kinds). It contains within it some notion of *typicality* that allows it to return the degree to which a typical entity in the comparison class possesses that gradable property.³⁴ (Fara, 2000, Kennedy, 1999, Stechow, 1984, and many others)

(229) $\text{NORM} = \lambda G_{\langle e, d \rangle} \lambda P_{\langle e, t \rangle}$. the degree to which a typical instance of the kind denoted by P possesses the gradable property denoted by G

What actually ends up counting as a "typical" instance of a kind and how the is beyond the scope of this thesis. What is important for our purposes is that, while the *for-PP* does not denote a degree, the result of the NORM function is a degree – the standard degree.

Let's look at a sample derivation to see how this all works.

(230) a. $\| \text{John (is)} [\text{DegP POS}_{\text{for}} \text{tall for a wrestler}] \| = 1$ iff

³⁴ There are several interesting intensional properties of the NORM function that are beyond the scope of this thesis. One is the way the function interacts with stage-level adjectives like *patient* and *happy* in which it appears that the standard degree is not only dependent on a typical individual in the comparison class, but also on a typical instance in which that individual possesses the gradable property. So, after finding the typical individual we still have to determine what its typical state of *patience* or *happiness* is, because these properties change over time. Individual-level predicates like *tall* and *expensive* are different in this respect. For these, we simply calculate the typical individual and ask how tall or how expensive it is. These issues do not play a part in any of the discussions that follow, so I will leave them for future research.

- b. (john) $[[\lambda G.\lambda P.\lambda x. G(x) \geq \text{NORM}(G)(P)] (\lambda x.\text{TALL}(x)) (\lambda x.\text{wrestler}(x))] = 1$ iff
- c. (john) $[\lambda x. \text{TALL}(x) \geq \text{NORM}(\lambda x.\text{TALL}(x))(\lambda x.\text{wrestler}(x))] = 1$ iff
- d. $\text{TALL}(\text{john}) \geq \text{NORM}(\lambda x.\text{TALL}(x))(\lambda x.\text{wrestler}(x)) = 1$ iff
- e. *John's height is greater than or equal to the height of a typical wrestler*

The POS_{for} morpheme introduces both the comparative relationship and the function that will return the standard degree based on the gradable adjective and the comparison class. It copies the gradable property into two positions, so that both the referent and standard degrees are based on that gradable property. This rendition of the semantics of positive adjective with *for-PP's* is able to account for the generality properties of predicates like *patient with Mary for a boy*. In section 3.4, I will go into detail about how this is done, as well as provides an account of transitive gradable adjectives. But, first, a brief section on computing the standard from a *compared-to* phrase.

3.3 Computing the Standard from a compared-to Phrase

There have only been a few semantic proposals for how to analyze *compared-to* phrases. We have already discussed the proposal of Beck, Oda and Sugisaki (2004) in section 2.4.1. The proposal in Kennedy (2005b) will be discussed briefly in chapter four. Here, I will lay out the details of a proposal that treats *compared-to* phrases very much like phrasal comparatives. The analysis raises some serious problems which I will discuss in the chapter four.

The problem that must be dealt with is the one that Beck, Oda and Sugisaki (2004) pointed out, namely that there is no gradable property in the *compared-to* phrase that can generate the standard degree. However, as we have seen previously, this problem can be overcome by using a copying mechanism in the degree operator. Thus, we can use a definition of POS that looks very much like the degree operator used for phrasal comparatives. Recall that the phrasal comparative operator COMP was given the denotation in (231). (Hankamer, 1973, Heim, 1985, Hoeksema, 1984, Kennedy, 1999, Kennedy, 2005a)

$$(231) \text{ COMP} = \lambda G \lambda y \lambda x. G(x) > G(y)$$

This operator takes a gradable property as its first argument and copies it into two positions in order to determine the referent and standard degrees. Let's assume that the *compared-to* phrase combines with a POS operator that is identical to the COMP operator.

$$(232) \text{ POS}_{\text{comp}} = \lambda G \lambda y \lambda x. G(x) > G(y)$$

I will call this POS_{comp} because it must be differentiated from the POS_{for} operator used with *for-PP's*. Then, we assume that the *compared-to* phrase simply denotes an entity of type $\langle e \rangle$. That is, we will assume that the *compared to* part of the phrase is vacuous.

(233) $\| \text{compared to DP} \| = \| \text{DP} \|$

A derivation of the truth conditions of a sentence like *John is tall compared to Bill* is then straightforward.

- (234) a. $\| \text{John (is) } [[\text{POS}_2 \text{ [tall]}] \text{ compared to Bill}] \| = 1 \text{ iff}$
b. $(\text{john}) [[\lambda G \lambda y \lambda x. G(x) > G(y)] (\lambda x. \text{TALL}(x)) (\text{bill})] = 1 \text{ iff}$
c. $(\text{john}) [\lambda x. \text{TALL}(x) > \text{TALL}(\text{bill})] = 1 \text{ iff}$
d. $\text{TALL}(\text{john}) > \text{TALL}(\text{bill}) = 1$

Thus, *compared-to* phrases can be given an identical analysis to the one given to phrasal comparatives.

3.4 Integrating Thematic-PP's into the Semantics

3.4.1 Introduction

The conclusion from chapter two, that the thematic-PP is introduced above the adjective head, leads to a question as to how we should integrate thematic-PP's into the logical form of a transitive adjective phrase. The question is a matter of how to define the lexical requirements of transitive adjectives: is the thematic-PP lexically specified in the denotation of a transitive adjective or not? The question is interesting because of the general reading of transitive gradable adjective phrases like *patient with Mary for a boy*. Take (235) for example:

(235) John is patient with Mary for a boy.

The standard degree in sentences like this, I claimed, is *the degree to which the typical boy is patient*. The semantic content of the sentence includes the assertion that John's patience is directed towards Mary, but it leaves the object of the boys' patience indeterminate. However the thematic-PP is integrated into the logical form, it must allow this indeterminacy in the calculation of the standard degree.

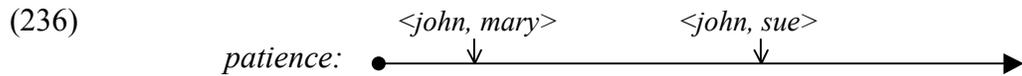
In this section I will first describe a traditional system³⁵ that lexically specifies the transitive adjective as having an internal argument. I will show how, given a few assumptions, the generality reading can be derived. Then, I will discuss a neo-Davidsonian analysis that separates the thematic requirements of the adjective from its lexical denotation. During the discussion, I will highlight that fact that removing the thematic requirements of an adjective from its lexical denotation works well with the syntactic facts uncovered in chapter two, and allows a more parsimonious derivation of the narrow reading than we are able to give using the traditional system.

3.4.2 A Traditional Semantic Analysis of Transitive Gradable Adjectives

Let's start by imagining what the meaning of a transitive gradable adjective would look like, given our assumptions that gradable adjectives are measure functions. (Kennedy, 1999) If an intransitive measure functions map their single arguments onto a scale associated with the right gradable property, then a transitive gradable adjective maps its two arguments, as an asymmetric ordered pair, onto the

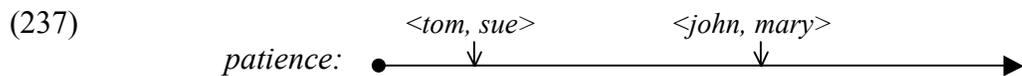
³⁵ By "traditional" I just mean a system that includes function application, conjunction and lambda-abstraction as compositional rules. I will use the basic system outlined in Heim and Kratzer (1998).

necessary scale. For instance, the ordered pairs $\langle john, mary \rangle$ and $\langle john, sue \rangle$ can be mapped onto the patience scale.



The degree that these ordered pairs are mapped to represents the amount that the first member of the pair has of the gradable property when that gradable property is directed towards the second member of the ordered pair. In (236), John is patient with Mary to a degree that is less than the degree of his patience with Sue.

One might think that the internal argument of adjectives like *patient* should modify the scale itself, creating different scales, i.e., a scale of *patience with Mary* and a scale of *patience with Sue*, etc. But, since we can compare the degrees to which one or more individuals possess of patience directed towards different objects, we need to have one general scale of patience. For example, the sentence *John is more patient with Mary than Tom is with Sue* would be true in a situation as in (237).



So, transitive measure functions are relations between ordered pairs of individuals and a degree. In (238) I give the meaning of the transitive measure function PATIENT. It takes an ordered pair of individuals as its argument and returns

the degree to which the first member of the pair is patient with the second member of the pair.

(238) $\|\text{PATIENT}_{\text{TRAN}}(\langle x, y \rangle)\| = \text{the degree to which } x \text{ is patient with } y$

This measure function is part of the meaning of the transitive adjective *patient* as in

(239)

(239) $\text{patient}_{\text{Trans}} = \lambda y. \lambda x. \text{PATIENT}_{\text{TRAN}}(\langle x, y \rangle)$

The transitive gradable adjective *patient* is a function whose arguments make up the ordered pair that is mapped to the *patient* scale, returning a degree. Let's now return to some of the conclusions drawn in chapter two about the syntax of transitive gradable adjectives.

First, we discovered that thematic-PP's are introduced above the adjective head, and therefore, the first argument of *patient*, expressed by the thematic-PP, does not appear in its complement position. The adjective's lexical argument-taking requirements must allow that the first argument appear above the adjective. This is not in and of itself a difficult problem to deal with in our theory, since the lexical representation in (239) does not discern between complements and specifiers. But, we also know that semantic material can occur between the adjective and the thematic-PP (i.e., *for-PP's* and *as-PP's*). This makes things a bit more difficult, but the meaning of POS_{for} can be altered such that the first argument of the adjective can be saturated

later in the derivation.³⁶ For instance, the following definition of POS_{for} can be used for transitive adjectives.

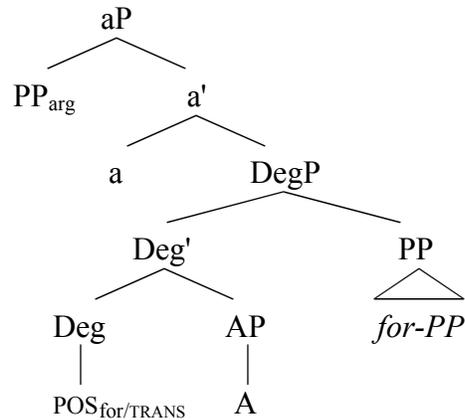
$$(240) \text{ POS}_{\text{for/TRANS}} = \lambda G. \lambda P. \lambda y. \lambda x. G(y)(x) \geq \text{NORM}(G)(P)$$

Here, the POS_{for} morpheme has been modified such that it expects two arguments for the gradable property, y and x . The two new lexical entries, *patient_{Trans}* and POS_{for/TRANS}, occur in the lexicon along with their intransitive counterparts.

Now, notice that the transitive POS_{for/TRANS} morpheme includes the semantic copying mechanism that allows a degree term to be calculated by NORM. POS_{for/TRANS} takes the gradable property G and places it in two different positions of the logical form. The first is to be predicated of the subject returning the referent degree. The second copy serves as an argument of NORM, ultimately determining the standard degree based on a typical instance of the comparison class P . It is this copying mechanism that underlies chapter two's assumption that the gradable property, by which the standard expression is measured, is determined by the position that the *for-PP* attaches. Using the structure that we concluded with in chapter two, the gradable property that is the first argument of POS_{for/TRANS} includes the AP but excludes the thematic-PP.

³⁶ Alternatively, POS and the transitive gradable adjective could combine by function composition. (Steedman 1997)

(241)



The result is that only the AP denotation ends up being an argument of the NORM function, and therefore, only the AP is used to calculate the standard degree.

It is this copying mechanism, combined with the syntactic structure in (241), that is meant to account for the generality readings of sentences like:

(242) John is patient with Mary for a boy.

Recall that the claim made in chapter two that sentences like (242) actually mean something like (243).

(243) John's patience with Mary is greater than the patience boys typically exhibit.

The object of the boys' patience is indeterminate, but can be made understood as more specific depending on the context. We can explain this now: because the POS_{for/TRANS} morpheme combines only with the AP denotation as in (241), NORM only uses the AP denotation in calculating the standard degree – the thematic-PP is not specified in

the scope of NORM. And hence, the object of the boys' patience is indeterminate.

Let's look at an example of how this works. The following is the derivation of the meaning of the predicate *patient with Mary for a boy*. In (244)a, we use the structure in (241).

- (244) a. $||[\text{with Mary } [\text{POS}_{\text{for/TRANS}} [\text{patient}] [\text{for a boy}]]]|| =$
 b. $[(\text{mary})[[\lambda G \lambda P \lambda y \lambda x. G(y)(x) \geq$
 $\text{NORM}(G)(P)](\lambda y \lambda x. \text{PATIENT}(\langle x, y \rangle))(\lambda x. \text{boy}(x))]] =$
 c. $[(\text{mary})[\lambda y \lambda x. \text{PATIENT}(\langle x, y \rangle) \geq \text{NORM}(\lambda y \lambda x. \text{PATIENT}(\langle x, y \rangle))(\lambda x.$
 $\text{boy}(x))]] =$
 d. $\lambda x. \text{PATIENT}(\langle x, \text{mary} \rangle) \geq \text{NORM}(\lambda y \lambda x. \text{PATIENT}(\langle x, y \rangle))(\lambda x. \text{boy}(x))]$

The result is a function from individuals to truth values. The NORM function calculates a degree based on the transitive meaning of *patient* and the comparison class *boy*. When applied to an individual, the subject, we get the following truth conditions.

- (245) a. $(\text{john}) [\lambda x. \text{PATIENT}(\langle x, \text{mary} \rangle) \geq \text{NORM}(\lambda y \lambda x. \text{PATIENT}(\langle x, y \rangle))$
 $(\lambda x. \text{boy}(x))] = 1$ iff
 b. $\text{PATIENT}(\langle \text{john}, \text{mary} \rangle) \geq \text{NORM}(\lambda y \lambda x. \text{PATIENT}(\langle x, y \rangle))(\lambda x. \text{boy}(x)) = 1$
 iff
 c. *the degree to which John is patient with Mary is greater than or equal to the degree of patience that the typical boy has with x*

Notice the variable in (245)c: this variable has to be given a pronominal reading. The indeterminate nature of the object of the boys' patience must be a consequence of the assignment this pronominal receives. In some contexts it could be girls, in others it could be Mary, etc.

(246) $\text{NORM}_{\text{TRANS}} = \lambda G_{\langle e, \langle e, d \rangle \rangle} \lambda P_{\langle e, t \rangle}$. the degree to which a typical instance of the kind denoted by P possesses the gradable property denoted by G when it is directed towards x , where x is supplied by the context

This pronominalization of the internal argument is perhaps a bit troubling. In order to get the facts right, we can stipulate that the NORM function always pronominalizes the internal argument position of transitive adjectives, and, crucially never pronominalizes the external argument position. But why doesn't NORM use a typical instance of the comparison class as the internal argument of the transitive adjective and pronominalize the external argument? Or, why doesn't it simply use the comparison class to satisfy both of the adjectives argument slots? These logically possible alternatives are simply not available. A more explanatory analysis would feed the NORM function a gradable predicate that was not lexically specified for an internal argument. The neo-Davidsonian framework allows us a way of doing this.

3.4.3 A Neo-Davidsonian Analysis of Transitive Gradable Adjectives

In this section, I lay out an analysis of transitive adjectives in the neo-Davidsonian framework. First, I assume that adjectives are predicates of events. This requires that we allow events to include not just events that take place over time, but also states. (References xxxx) I will use the standard e variable to represent states like the state of being patient as in (247).

$$(247) \textit{patient} = \lambda e. \textit{patience}(e)$$

Furthermore, I will assume, in accord with the neo-Davidsonian program, that there is a small inventory of basic and very general thematic relations. I will not get involved in a discussion of what this inventory is, or how exactly to define any of its members. But, for the purposes of the current discussion, I will follow Pietroski (2003, 2005) and assume only two relations, EXTERNAL and INTERNAL. Thus, I will assume that the EXTERNAL and INTERNAL relations, when applied to states, are to be interpreted as the *experiencer* and the *target* of the state, respectively. For instance, the EXTERNAL argument of a state of *patience* is the experiencer of that patience, and the INTERNAL argument of a state of *patience* is the target of that patience.

Now, notice that (247) is not a measure function, as we have been assuming thus far. Instead, it is a simple predicate of events (or states). The measure function will instead be part of the Deg head denotation as it is defined in (248).

$$(248) \text{POS}_{\text{for}} = \lambda G \lambda P \lambda e. \exists d [G(e) \ \& \ \text{DEG}(e) = d \ \& \ d > \text{NORM}(G)(P)]$$

Here, POS_{for} looks very much like what we have been using: the gradable property G is copied into two positions, the comparison relation is introduced between the referent degree and the standard degree, and the standard is computed via the NORM function which ranges over the gradable property G and the comparison class P . But, POS_{for} also includes a measure function, represented as "DEG(e) = d ". This should simply be read as *e is to degree d*. When the G variable is valued, for example with the *patient* predicate of events, then we would say that *there is an e, e is a patience and e is to degree d*. This rests on the assumption that an event, or state in this case, can be measured just like the degree analysis in the traditional semantic framework measures individuals. While this sounds like an odd concept initially, I don't think it is that far-fetched. It doesn't sound unreasonable to say that there can be states of *tallness to degree d* or *patience to degree d*. If anything is odd, it would be to say that there exists state of *tallness* or *patience*, simply. I will assume that this make some sense and move on with the discussion.

So far, we have a denotation of gradable adjectives as predicates of events, and a denotation of the POS_{for} operator that includes within it a measure function that returns the referent degree as well as a NORM function that returns the standard degree. Because these degrees are measurements of an event, I will refer to the *referent event* and the *standard event*. When the POS_{for} morpheme combines with the gradable adjective and the *for-PP* we get a predicate of events as in (249).

$$(249) \quad ||[\text{POS}_{\text{for}} [\textit{patient}] \textit{for a boy}]] = \lambda e. \exists d[\textit{patience}(e) \ \& \ \text{DEG}(e) = d \ \& \\ d > \text{NORM}(\lambda e.\textit{patience}(e))(||\textit{boy}||)]$$

Because we have divorced the argument requirements of the adjective from its lexical denotation, the copy that becomes an argument of *NORM* does not include any information about the internal participant of the event. *NORM* simply functions over an event of *patience* and a comparison class *boy*. In a typical neo-Davidsonian way, we can add the internal (and external) participants of the referent event higher up in the tree. But, in order to do this, I assume that the input to the compositional semantics makes asymmetric reference to these participants. That is, the input tells the compositional semantics what the internal and external arguments are.

So, in order to combine (249) with the thematic-PP, we can assume that the prepositional head marks its complement as the internal participant of an event. Alternatively, we could assume that the prepositional head is vacuous and the functional head *little a* marks the internal participant of the event. Thus, the thematic-PP gets a denotation like that in (250).

$$(250) \quad ||[\textit{with Mary}]] = \lambda e. \text{INTERNAL}(e) = \textit{mary}$$

(250) is a predicate of events, and thus can be conjoined with the predicate of events in (249), resulting in a new predicate of events, (251).

$$(251) \quad ||[\textit{with Mary} [\text{POS}_{\text{for}} [\textit{patient}] \textit{for a boy}]]] =$$

$$\lambda e. \text{INTERNAL}(e) = \text{mary} \ \& \ \exists d[\text{patience}(e) \ \& \ \text{DEG}(e) = d \ \& \\ d > \text{NORM}(\lambda e. \text{patience}(e))(\|\text{boy}\|)]$$

Finally, let's also assume that the external participant of the event can be marked in the syntax (say by a functional projection like little ν). And, the event is existentially closed at the top of the structure.

$$(252) \ \|\text{John} \ [\text{with Mary} \ [\text{POS}_{\text{for}} \ [\text{patient}] \ \text{for a boy}]]\| = \\ \exists e \ [\text{EXTERNAL}(e) = \text{john} \ \& \ \text{INTERNAL}(e) = \text{mary} \ \& \ \exists d[\text{patience}(e) \ \& \\ \text{DEG}(e) = d \ \& \ d > \text{NORM}(\lambda e. \text{patience}(e))(\|\text{boy}\|)]]$$

This final logical form should be read as *there is an event e such that john is the external participant of e and mary is the internal participant of e and there is a d such that e is a patience and e is to degree d and d is greater than the typical degree that a typical boy has of patience.*

An analysis of transitive adjectives with *compared-to* phrases along these lines is rather straightforward. Recall the denotation of POS_{comp} provided in section 3.3.

$$(253) \ \text{POS}_{\text{comp}} = \lambda G \lambda y \lambda x. G(x) > G(y)$$

We can replace it with the denotation in (254).

$$(254) \text{ POS}_{\text{comp}} = \lambda G \lambda x. \lambda e. \exists d [G(e) \ \& \ \text{DEG}(e) = d \ \& \ \exists e' \exists d' [\text{EXTERNAL}(e') = x \ \& \ G(e') \\ \& \ \text{DEG}(e') = d' \ \& \ d > d']]$$

In this denotation, POS_{comp} is basically does exactly what it did before, with a few differences. As before, the property G , which is a predicate of events, has been copied into two positions. But, in order to measure these two copies of G , there are two measure functions, DEG . There are also two existential closures: one over the standard event, and another over the standard degree.

This time, because the *compared-to* phrase combines above the thematic-PP, the event property *patient with Mary* is used to compute the standard degree.

$$(255) \ ||[\text{POS}_{\text{comp}} [[\textit{with Mary}]\ \textit{patient}]\ \textit{compared to Bill}]]\ || = \\ \lambda e. \text{INTERNAL}(e) = \textit{mary} \ \& \ \exists d [\textit{patience}(e) \ \& \ \text{DEG}(e) = d \ \& \\ \exists e' \exists d' [\text{EXTERNAL}(e') = \textit{bill} \ \& \ \textit{patience}(e') \ \& \ \text{INTERNAL}(e') = \textit{mary} \ \& \\ \text{DEG}(e') = d' \ \& \ d > d']]$$

And this predicate of events conjoins to the subject, followed by existential closure of the event.

$$(256) \ ||\textit{John} [\text{POS}_{\text{comp}} [[\textit{with Mary}]\ \textit{patient}]\ \textit{compared to Bill}]]\ || = \\ \exists e [\text{EXTERNAL}(e) = \textit{john} \ \& \ \text{INTERNAL}(e) = \textit{mary} \ \& \ \exists d [\textit{patience}(e) \ \& \ \text{DEG}(e) = \\ d \ \& \ \exists e' \exists d' [\text{EXTERNAL}(e') = \textit{bill} \ \& \ \textit{patience}(e') \ \& \ \text{INTERNAL}(e') = \textit{mary} \ \& \\ \text{DEG}(e') = d' \ \& \ d > d']]]]$$

Phrasal comparatives can be given an analysis that is identical to the *compare-to* phrase. (Recall that our analysis in 3.2 of *compared-to* was also identical to phrasal comparatives.)

$$(257) \text{ COMP} = \lambda G \lambda x. \lambda e. \exists d [G(e) \ \& \ \text{DEG}(e) = d \ \& \ \exists e' \exists d' [\text{EXTERNAL}(e') = x \ \& \\ G(e') \ \& \ \text{DEG}(e') = d' \ \& \ d > d']]$$

Thus, the event analysis can be extended to both *compared-to* and phrasal comparatives in a straightforward way.

The point of digression into the neo-Davidsonian analysis was to show that it meshes well with the syntactic requirements outlined in chapter two, because the thematic-PP can be introduced above the *for-PP*, and the lexical denotation of the adjective does not have to specify that it takes any arguments. This allows a natural explanation for the indeterminacy of the transitive adjective's object in calculating the standard degree. There are two other benefits to this analysis that I will discuss in the next two sections.

3.4.4 Benefits of the Neo-Davidsonian Analysis: Coercion

The neo-Davidsonian analysis described in the previous subsection extracts the measure function out of the adjective and places it in the degree operator, treating the adjective as a predicate of events. In this section, I'll discuss data concerning the myriad of predicates that can occur in degree constructions and the coercion of non-gradable predicates that this neo-Davidsonian analysis is able to capture.

The event-style analysis removes the measure function from the adjective denotation and places it in the degree operator. This is possible because the thing being measured is an event, rather than an individual.³⁷ Thus, the gradable predicate can retain a standard denotation, that of a predicate of events, and yet we can still compare it to another event via "measuring it" through one of the degree operators, POS_{for}, POS_{comp} or COMP. This has an advantage. When we treat gradable adjectives as measure functions, we relegate them to a special lexical status.³⁸ As they are treated in the traditional degree theories, they are measure functions of type $\langle e, d \rangle$, and hence they are different lexically than other non-gradable adjectives which are of type $\langle e, t \rangle$. Why then are they syntactically classified as "adjectives" if their denotation is so different from non-gradable adjectives? In fact, they are also different from all other simple predicates of type $\langle e, t \rangle$. Treating gradable adjectives as type $\langle e, d \rangle$ explains well why gradable adjectives appear in degree constructions, but it also predicts that other predicates, which we normally wouldn't think of as gradable, shouldn't appear in degree constructions. But this just isn't so: many verbs, nouns, adverbs and prepositional phrases can all appear in degree constructions.

³⁷ The measure function could be removed from the denotation of a gradable adjective without an event analysis. This would make gradable adjectives type $\langle e, t \rangle$. The degree operator would have to include the measure function:

(i) POS = $\lambda G \lambda P \lambda x. \text{DEG}(x)(G) > \text{NORM}(P)(G)$

(ii) DEG = $\lambda x \lambda G. \textit{the degree to which } x \textit{ is } G$

The DEG operator in this case would return the degree to which the subject of the whole complex predicate, x , has the gradable property G . So, the real benefit of the neo-Davidsonian account is the removal of the measure phrase from the adjective. But, I might point out that the DEG function, since it applies to the pair x and G , really looks like it is measuring $G(x)$. That is, $\text{DEG}(\text{john})(\lambda x. x \text{ is tall})$ looks like $\text{DEG}(\text{john is tall})$. In other words, it at least looks like it is measuring an event of *john being tall*.

³⁸ This has been one of the most fought over problems in the literature on adjectives. (cf. Kamp, 1975, Parsons, 1972, Partee, 1995, Siegel, 1976a, Siegel, 1976b)

- (258) a. John loves Mary more than Bill.
b. John is more of a man than a boy.
c. John drives more carefully than Bill does.
d. John dove more below the surface than Bill did.

And, in fact, many adjectives that we would call non-gradable can also appear in degree constructions if they are sufficiently coerced into doing so.

- (259) a. George Washington is more dead than Ronald Reagan is.
b. I am more American than George Bush.

If the only way for a lexical item to appear in a degree construction is if it is a measure function, then in order to account for sentences like these, we would have to assume that there is a measure function entry in the lexicon for (just about) all verbs, adverbs, nouns, etc, in addition to their typical predicate of type $\langle e,t \rangle$ entry, an outcome that should be avoided if possible.

But, if we introduce the measure function in the degree operator, all of these lexical items can remain predicates of the same type. In other words, each predicate has only one lexical entry, and a degree operator can be added to it in order to measure it. In (258) a degree operator turns *loves*, *careful*, *man*, *below* into *loves to degree d*, *careful to degree d*, *man to degree d*, *below to degree d*. The problem that the sentences in (259) pose, then, can be thought of as a conceptual problem, rather

than a type-theoretical one: they are weird because the concepts *dead to degree d* and *American to degree d* are odd. It is difficult to measure a degree of *deadness*. That is, sentences like (259) are weird because the concept behind these predicates aren't easily thought of as gradable, not because they don't denote measure functions. The neo-Davidsonian analysis allows this, while the traditional degree analysis does not.³⁹

3.4.5 Benefits of the Neo-Davidsonian Analysis: Stacking

The second benefit is that we can provide a straight-forward semantic account of stacking. The degree analyses (both Kennedy's version and the traditional degree-argument version) cannot readily handle these cases because they include the measure function inside the adjective meaning (see section 3.2 and the adjective denotations in (214) and (218)). This discussion will require a brief digression into what is called a *comparison of deviation* reading of comparatives.

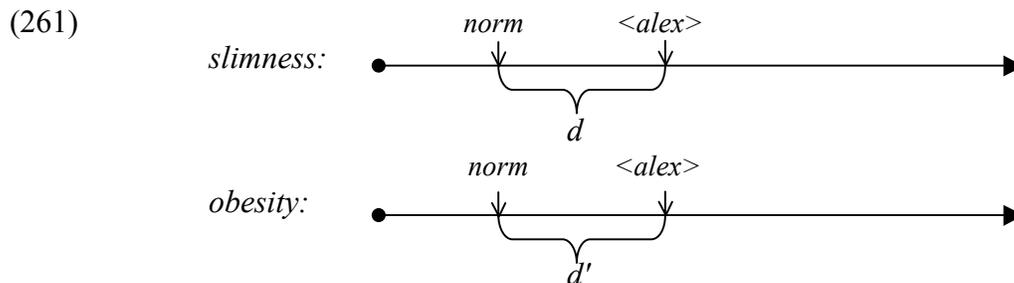
Comparison of deviation readings are the comparison of the amount one entity differs from some norm with the amount another entity differs from some norm. (Kennedy, 1999) So, in (260)a taken from Kennedy (1999), we compare the extent to which Alex currently exceeds a standard of slimness to the extent to which he previously exceeded some standard of obesity. In (260)b, we compare the extent to which the difficulty of surfing Maverick's exceeds a standard to the extent to which the ease of surfing Steamer Lane exceeds a standard of easiness.

(260) a. Alex is as slim now as he was obese before.

³⁹ But see footnote 37.

- b. It is more difficult to surf Maverick's than it is easy to surf Steamer Lane.

The comparison relation, whether it is a greater-than, less-than, or equal-to relation, takes the extents of deviation from the norm as its arguments. So the referent degree in (260)a is the deviation of Alex's current slimness from the norm of slimness. This referent degree is equal to the standard degree, which is the deviation of Alex's previous obesity from the norm of obesity. We can represent the referent and standard degrees of (260)a as in (261), where d is the referent degree and d' is the standard.



(260)a requires that the referent degree equal the standard, $d = d'$.

One defining property of comparison of deviation readings is that, unlike the normal reading of a comparative, they entail that objects being compared have the gradable property in the positive sense of that gradable property. Thus, (260)a entails that Alex is currently slim and was previously obese; (260)b entails that it is difficult to surf Maverick's and easy to surf Steamer Lane. As Kennedy (1999) points out, evidence for this comes from the fact that the following sentences are contradictory:

- (262) a. #Alex is as slim now as he was obese before, though he isn't slim now.
 b. #It is more difficult to surf Maverick's than it is easy to surf Steamer Lane, though surfing Maverick's is pretty easy, too.

Comparison of deviation readings seem to require (or at least, prefer) the comparative morpheme to be pronounced as *more* rather than *-er*. The following contrast supports this conclusion. (Kennedy, 1999)

- (263) a. San Francisco Bay is more shallow than Monterey Bay is deep.
 b. #San Francisco Bay is shallower than Monterey Bay is deep.

Now, a comparative can be stacked on top of an AP with a *for-PP* or a *compared-to* phrase producing sentences like these in (264) and (265).⁴⁰

- (264) a. ??John is taller for a basketball player than Bill.
 b. John is more tall for a basketball player than Bill.

- (265) a. ??John is taller compared to Tom than Bill
 b. John is more tall compared to Tom than Bill.

A *compared-to* phrase can be added to the AP-*for-PP* phrase as well as in (266).

⁴⁰ I use phrasal comparatives for convenience, but the argument I will make with them can be made with clausal comparatives as well.

(266) John is tall for a basketball player compared to Bill.

It appears that the sentences in (264), (265) and (266) require *comparison of deviation* readings. If this is the case, then the meanings of (264), (265) and (266) would be paraphrased as in (267), (268) and (269), respectively.⁴¹

(267) *the amount that John's height differs from that of a typical basketball player's height is greater than the amount that Bill's height differs from that of a typical basketball player's height*

(268) *the amount that John's height differs from Tom's height is greater than the amount that Bill's height differs from Tom's height*

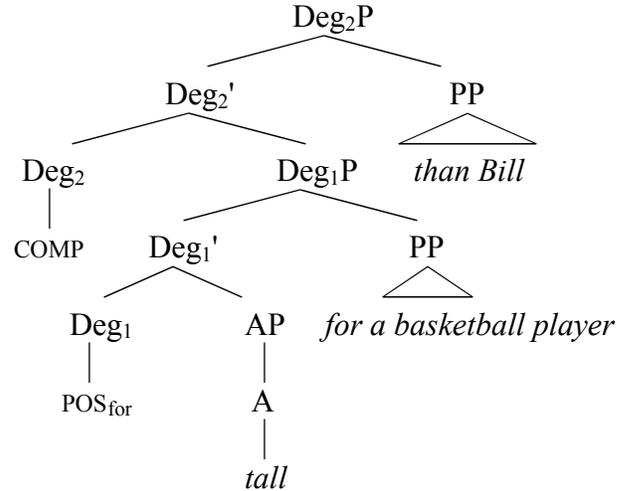
(269) *the amount that John's height differs from that of a typical basketball player's height is greater than the amount that Bill's height differs from that of a typical basketball player's height*

⁴¹ There is actually another meaning of (265) besides that paraphrased in (268), in which the *than*-phrase is interpreted as *than John is d-tall compared to Bill*. This reading is fine (and would not garner a "??" status). This is similar to a subcomparative in that the gradable property *tall compared to Tom* has not been entirely deleted like it would be in a normal clausal comparative. The same point can be made with clausal comparatives, but just to make the discussion simpler I am only focusing on phrasal comparatives. Therefore, I am going to ignore this reading.

Now, recall that with comparison of deviation readings, unlike the normal readings of comparatives, the objects compared must have the gradable property in a positive sense (see examples (260) and (262)). My intuitions and those of my informants indicate that John and Bill in (264) and (266) must both be *tall for a basketball player*, and in (265) they must both be *tall compared to Tom*. In other words, they must have the gradable property in the positive sense, just like we would expect if these were comparison of deviation readings. Furthermore, if (264)a and (265)a require a comparison of deviation reading, then the fact that they sound odd is expected, since these types of comparatives normally do not allow incorporation of the *-er* into the adjective.

What is important to notice about these comparison of deviation readings is that there are actually three comparisons involved in their meanings. Take (264) its paraphrase in (267) as an example. First, we have a positive comparison where John's height is compared to the height of the typical basketball player. Then, we have another positive comparison in which Bill's height is compared to the height of the typical basketball player. And lastly, on top of these two comparisons, is the comparative that compares these first two comparisons. That is, what is compared on top is the difference derived from the first two comparisons. This is apparent in the structure that I will assume the predicate *more tall for a basketball player than Bill* has.

(270)



There are two degree terms, which results in three comparisons. The first Deg head compares a referent degree (calculated by predicated the subject of *tall*) and a standard degree (calculated by copying *tall* into the logical form so that it serves as one of the arguments of NORM along with the comparison class denoted by *for a basketball player*). The second Deg head should compare the extent to which the subject has this first comparison and the extent to which the object in the *than*-phrase, i.e., *Bill*, has this first comparison.

Now, before I get to the neo-Davidsonian analysis, let me point out what goes wrong in the traditional analysis that places the measure phrase inside the adjective. I will use the comparative in (264)b to illustrate my point. First, POS_{for} is defined as it was before:

$$(271) \text{ POS}_{\text{for}} = \lambda G. \lambda P. \lambda x. G(x) \geq \text{NORM}(G)(P)$$

And, the meaning of the phrasal comparative morpheme COMP is as in (272).

$$(272) \text{ COMP} = \lambda G \lambda y \lambda x. G(x) > G(y)$$

This denotation for phrasal COMP also employs the semantic copying mechanism: it takes the gradable property G as its first argument and copies into two positions so that it can be used to compute both the standard and the referent degree. It then takes the individual denoted in the *than*-phrase, y , which it predicates of the G measure function on the right hand side of the comparison relation, followed by the subject x which it predicate of the other copy of G .

So, first, the Deg₁P is the predicate *tall for a basketball player*. It has the denotation in (273) (see section 3.2 for how this denotation is computed).

$$(273) \text{ } \|\|_{\text{Deg}_1\text{P}} \text{ POS}_{\text{for}} [\text{AP } \textit{tall}] [\text{PP } \textit{for a basketball player}]\|\| = \\ \lambda x. \text{TALL}(x) \geq \text{NORM}(\lambda x. \text{TALL}(x))(\lambda x. \text{bb-player}(x))$$

Now, this must serve as the argument of COMP. But, COMP takes gradable properties, i.e., things of type $\langle e, d \rangle$ as its first argument, not predicates of type $\langle e, t \rangle$. This is the problem that these traditional analyses have with stacking: when the measure function is part of the adjective denotation, there is nothing that can supply the degrees for the top comparison. COMP simply doesn't measure things. The same problem arises in the other examples of stacking in (265) and (266). The neo-Davidsonian analysis, however, in which the measure function is part of the degree operator, does provide a way to compute the top degrees.

I will provide an event-style neo-Davidsonian analysis of the comparative in (264). Let's use the structure in (270) again, where there are two degree heads, a comparative head and a POS_{for} head. Let's assume that the meaning of the POS and COMP morphemes are as in (274) and (275), repeated from (248) and (257) above.

$$(274) \text{ POS}_{\text{for}} = \lambda G \lambda P \lambda e. \exists d [G(e) \ \& \ \text{DEG}(e) = d \ \& \ d > \text{NORM}(G)(P)]$$

$$(275) \text{ COMP} = \lambda G \lambda x. \lambda e. \exists d [G(e) \ \& \ \text{DEG}(e) = d \ \& \ \exists e' \exists d' [\text{EXTERNAL}(e') = x \ \& \ G(e') \ \& \ \text{DEG}(e') = d' \ \& \ d > d']]$$

The first DegP has the denotation in (276).

$$(276) \ |||_{[\text{Deg1P POS}_{\text{for}} [\text{AP } \textit{tall}] [\text{PP } \textit{for a basketball player}]]}] = \lambda e. \exists d [\text{tallness}(e) \ \& \ \text{DEG}(e) = d \ \& \ d > \text{NORM}(\lambda e'. \text{tallness}(e'))(\lambda x. \text{bb-player}(x))]$$

This is an event of being *tall to degree d and d is greater than the typical height of a basketball player*. In order to make the denotation easier to read, I will replace the NORM function and its arguments with d_{Tbb} , for *the typical height of a basketball player*. Now, this predicate is a predicate of events, and it can be measured again. Thus, we can have the degree to which someone is tall for a basketball player. It can then serve as the first argument of COMP, which copies it into two positions, resulting in the following denotation.

(277) $\|[\text{Deg2P COMP } [\text{Deg1P POS}_{\text{for}} \textit{tall for a basketball player}] \textit{than Bill}]\| =$
 $\lambda e'' . \exists d'' [\exists d [\text{tallness}(e'') \ \& \ \text{DEG}(e'') = d \ \& \ d > d_{\text{Tbb}}] \ \& \ \text{DEG}(e'') = d'' \ \&$
 $\exists e''' \exists d''' [\text{EXTERNAL}(e''') = \textit{bill} \ \& \ \exists d [\text{tallness}(e''') \ \& \ \text{DEG}(e''') = d \ \& \ d > d_{\text{Tbb}}] \ \&$
 $\text{DEG}(e''') = d''' \ \& \ d'' > d''']]$

This is then conjoined with the external argument.

(278) $\|[\text{John (is)} \ [\text{Deg2P COMP } [\text{Deg1P POS}_{\text{for}} \textit{tall for a basketball player}] \textit{than Bill}]]\| =$
 $\exists e'' \exists d'' [\exists d [\text{EXTERNAL}(e'') = \textit{john} \ \& \ \text{tallness}(e'') \ \& \ \text{DEG}(e'') = d \ \& \ d > d_{\text{Tbb}}] \ \&$
 $\text{DEG}(e'') = d'' \ \& \ \exists e''' \exists d''' [\text{EXTERNAL}(e''') = \textit{bill} \ \& \ \exists d [\text{tallness}(e''') \ \& \ \text{DEG}(e''') = d$
 $\ \& \ d > d_{\text{Tbb}}] \ \& \ \text{DEG}(e''') = d''' \ \& \ d'' > d''']]$

Essentially, in (278), two events are measured: the event of John being tall for a basketball player and the event of Bill being tall for a basketball player. And, it is asserted that the first measurement is greater than the second measurement.

The sentences in (265) and (266) are computed in a similar way. I will spare you the details. The point of this discussion, though, was to show that, in a degree type semantics, the measure function cannot be part of the adjective denotation in order to account for stacking.

3.4.6 Summary

In summary, I have offered two ways to integrate the thematic-PP into the semantics of gradable adjective phrases. Both were capable of producing the correct truth conditions of sentences like *John is patient with Mary for a boy*. The first way,

based on the Traditional semantic framework, treated the gradable adjective as a two place measure function. It mapped an ordered pair of individuals onto a degree that represented the amount of the gradable property that the first individual exerted towards the second. In this approach, the standard degree was calculated by pronominalizing the internal argument of the transitive adjective denotation. The second approach was proposed within a neo-Davidsonian framework that treated gradable adjectives as predicates of events. This approach relied on the idea that an event (or a state) could be measured. That is, events of *patience* or *tallness* can be thought of as events of *patience to degree d* or *tallness to degree d*. This analysis allowed a perhaps more elegant way of capturing the syntactic properties from chapter two. The neo-Davidsonian analysis allowed us to separate the thematic properties of the adjective from its lexical denotation, making the syntactic structure in which the thematic-PP was non-local to the adjective head more acceptable. This approach had two further benefits that derived from the fact that the measure function, which in the traditional systems is part of the adjective denotation, was put into the meaning of the degree operator. First, it provided an explanation for why there are so many kinds of predicates that can appear in degree constructions without positing multiple lexical meanings for them. Second, it provided a straightforward semantic account of stacking. In the final section of this chapter, I reply to a recent proposal in Kennedy (2005a) that treats *for-PP* as modifiers of the AP, rather than an argument of the POS_{for} morpheme.

3.5 Reaffirming the Status of Comparison Classes

3.5.1 Introduction

Kennedy (2005a) proposes that comparison classes, both implicit and explicit *for-PP*'s, do not have any representational status in the semantic (or syntactic) form of positive gradable adjectives. Instead, the term 'comparison class' should be thought of as a descriptive term for whatever property plays a part in determining the standard degree. This property can correspond to highly salient properties, in the case of bare positives (without a *for-PP*) and attributive positives, or it can correspond to an explicit *for-PP*. In the case of an explicit *for-PP*, the comparison class does *not* serve as an argument of POS_{for}, but rather restricts the domain of the gradable adjective in an interesting and unique way: it modifies the presuppositional structure of the adjective. Then, the NORM function is applied to this modified adjective, returning the standard degree. Thus the *for-PP* ends up only indirectly affecting the calculation of the standard, and the status of comparison classes as arguments is eliminated.

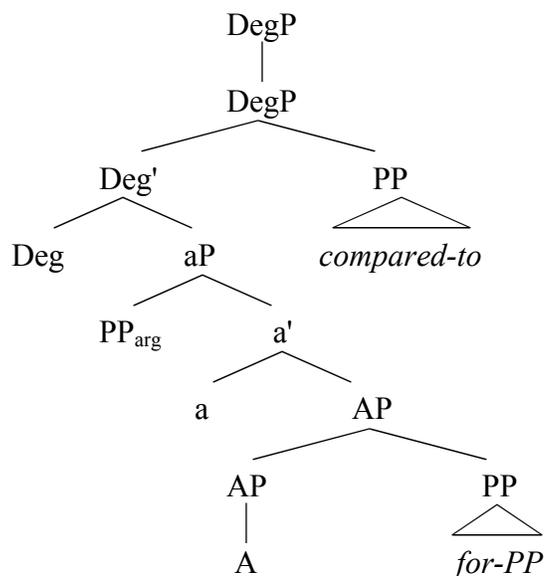
In this section, I will briefly describe the analysis proposed in Kennedy (2005a), and then I will show how it is incapable of accounting for the generality reading of *patient with Mary for a boy*. I will also provide several other arguments against this analysis in an effort to reaffirm the status of the comparison class.

3.5.2 Eliminating Comparison Classes (Kennedy, 2005a)

Kennedy (2005a) proposes that *for-PP*'s are modifiers of gradable adjective phrases and *compared-to* phrases are modifiers of DegP's. The important thing to notice about this proposal is that there is only one DegP, headed by a POS operator – the *for-PP* is not related directly to the DegP at all. The structure that proposes, given

this notion of *for-PP*'s and *compared-to* phrases is in (279). I have modified it in order to include our previous conclusion that the thematic-PP is introduced above the *for-PP*.

(279)



For now, let's focus on the *for-PP* and just consider a structure that does not include modification of the DegP by a *compared-to* phrase. These assumptions require a change to the semantics of both the *for-PP* and the POS operator.

First, the *for-PP* is a modifier of gradable adjectives phrases, i.e., a modifier of measure functions. In essence, the *for-PP* restricts the domain of the gradable adjective phrase. But Kennedy has it do so in a unique way. Since the gradable adjective is a measure phrase, we cannot simply conjoin the AP and the *for-PP* without saying that the *for-PP* is a measure phrase as well (an assumption that seems impossible). Instead, Kennedy bases his analysis on the following sentences (from Kennedy (2005a)).

- (280) a. Kyle's car is expensive for a Honda.
 b. Kyle's car is not expensive for a Honda.
 c. Is Kyle's car expensive for a Honda?
- (281) a. #Kyle's BMW is expensive for a Honda.
 b. #Kyle's BMW is not expensive for a Honda.
 c. #Is Kyle's BMW expensive for a Honda?

Kennedy says that the reason the sentences in (281) sound odd in comparison to those in (280) is because there is a requirement on positive adjectives with *for-PP*'s, first pointed out in Wheeler (1972). In sentences of the form *x is A for a NP*, we have a strong inclination to suppose that *x is an NP*. So, for example, in (280)a, Kyle's car is not only expensive compared to the typical Honda, it is also a Honda. Now, if this generalization is correct, then in (281)a, Kyle's BMW must be a Honda. And since BMW's cannot be Hondas, the sentence sounds odd. Therefore, we can conclude that there is some sort of a relationship between the object predicated of the gradable adjective phrase and the NP part of the *for-PP*.

One might think that this relationship can be represented by predicating the subject of the NP part of the *for-PP*. This could be accomplished by integrating the adjective and the *for-PP* together in a way that *x is A for a NP* means *x is A for a NP and x is a NP*. (Platts, 1979, Siegel, 1976a, Siegel, 1976b, Wheeler, 1972) This type of analysis, however, would predicate that there is an assertion of *x is an NP*.

Kennedy points out that this is not the case. The relationship between the subject and the *for-PP* persists even in negated sentences and questions, as evidenced by the oddness of (281)b and (281)c. Kennedy concludes from this that the requirement is not an assertion, but rather a presupposition. Hence, it cannot be that the adjective and the *for-PP* are simply conjoined, i.e., *x is A for a NP and x is NP*, because that would be an asserted predication relationship.⁴²

Kennedy suggests that the presupposition arises from a modification of the domain of the AP by the *for-PP*. In this analysis, the *for-PP* does not combine as an argument of the DegP. Instead, it is a function of type $\langle\langle e,d\rangle, \langle e,d\rangle\rangle$, and thus, combines with a gradable adjective returning another gradable adjective phrase. The new gradable adjective phrase presupposes that everything in its domain has the property denoted by the NP.

$$(282) \quad \llbracket[_{PP} \text{ for a NP}]\rrbracket = \lambda G \lambda x: \llbracket[_{NP}]\rrbracket(x). G(x)$$

One interesting benefit of this analysis is that the *for*-part of the *for-PP* is not treated as a vacuous element. It turns the NP into a function that modifies the presuppositional structure of measure phrases. For example, (283)a is the denotation of an unmodified gradable adjective, *expensive*. It is a measure function, and it takes an individual and returns the cost of that individual. (283)b is a gradable adjective modified by the phrase *for a Honda*. It is a function that takes an individual which is presupposed to be a Honda, and returns its cost.

⁴² I will refute the conclusion that this is a presupposition below in section 3.5.5. For now, though, let's accept this conclusion in order to see the logic of the analysis.

- (283) a. $[[[_{AP} \text{expensive}]]] = \lambda x. \text{EXPENSIVE}(x)$
 b. $[[[_{AP} \text{expensive for a Honda}]]] = \lambda x: \text{Honda}(x). \text{EXPENSIVE}(x)$

This means that POS must be slightly changed so that it does not expect a comparison class as its second argument.⁴³

(284) $\text{POS} = \lambda G \lambda x. G(x) \geq \text{NORM}(G)$

This new POS operator contains a NORM function that works only on adjective denotations. This does not create a problem, however, because the comparison class information (the property denoted by the NP) is contained inside the adjective denotation. So, for instance, if (284) were applied to (283)b, we would get a predicate of individuals such as in (285).

- (285) a. $[[[_{\text{DegP}} \text{POS} [_{AP} \text{expensive for a Honda}]]]] =$
 b. $[\lambda G \lambda x. G(x) \geq \text{NORM}(G)](\lambda x: \text{Honda}(x). \text{EXPENSIVE}(x)) =$
 c. $\lambda x: \text{Honda}(x). \text{EXPENSIVE}(x) \geq \text{NORM}(\lambda x: \text{Honda}(x). \text{EXPENSIVE}(x))$

This predicate presupposes that its single argument x is a Honda, and it says that x 's cost is greater than or equal to the typical cost of things that are presupposed to be

⁴³ Kennedy (2005a) actually proposes another change to the denotation of POS concerning the status of the NORM function, which is not relevant here so I will ignore it for now. I will, however, discuss this briefly in chapter four.

Hondas. So, the comparison class is used to determine the standard degree, but it does not have any special status in the syntax or semantics: it is simply one more thing that the NORM function takes into account when it determines the standard.

3.5.3 The Presupposition-Modifier Analysis and the Narrow Reading

The assumption that *for-PP's* do not combine directly with the DegP leads to several problems, the first of which is that it cannot predict the narrow readings of sentences like *John is patient with Mary for a girl*. Recall that these sentences allow readings in which the standard degree is based only on the simple adjective, not the adjective and the thematic-PP. In section 3.3, I argued that the narrow reading was in fact the *only reading*; contextual considerations allowed more and more specified valuations of the adjective's object when calculating the standard degree. The analysis proposed that the adjective did not contain a lexical specification of its object, so that when it was copied into the argument position of the NORM function, it lacked not only the thematic-PP itself, but also any mention of an internal argument. Hence, it was a crucial aspect of the analysis that the POS_{for} morpheme combine with the adjective and copy its denotation into the argument position of NORM. The presupposition-modification analysis is not capable of accounting for these facts, and in fact, predicts only the wide reading to be available. It is important, therefore, to remember an example from chapter two. The sentence in (286)a is a contradiction on the wide reading. It therefore must be the case that the narrow reading is possible, since the sentence is obviously not a contradiction.

(286) a. Every single one of the boys is patient with Mary for a boy.

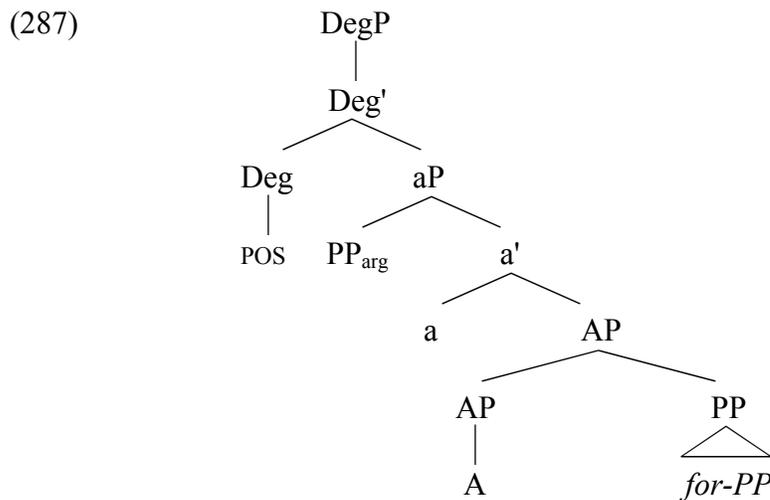
b. *Narrow Reading:*

The degree to which every single one of the boys is typically patient with Mary is greater than the degree to which the boys in general are typically patient with girls.

b. *Wide Reading: (a contradiction)*

The degree to which every single one of the boys is typically patient with Mary is greater than the degree to which the boys in general are typically patient with Mary.

Notice that in the structure in (287), the DegP is sisters to the aP, not the AP, and hence, the POS operator copies the entire adjective, thematic-PP, and *for-PP* into the argument slot of NORM.

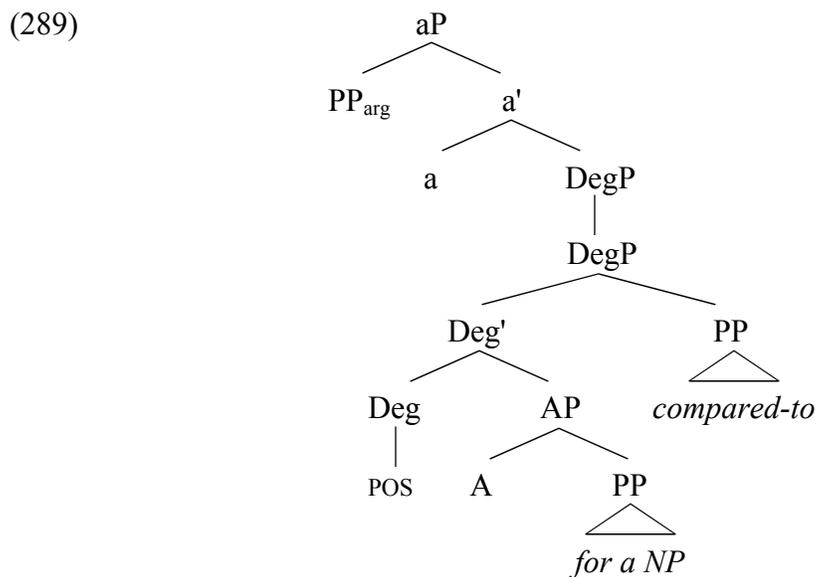


As a result, the thematic-PP must always be included in the calculation of the standard degree.

- (288) a. $\| \text{POS} [\textit{with Mary} [\textit{patient for a boy}]] \| =$
 b. $\lambda x: \text{boy}(x). \text{PATIENT} (\langle x, \text{mary} \rangle) \geq \text{NORM} (\lambda x: \text{boy}(x). \text{PATIENT} (\langle x, \text{mary} \rangle))$

(288)b is a predicate of individuals. It says the object that it is predicated of, x , is patient with Mary to a degree that is greater than the typical degree to which the typical boy is patient with Mary. By not providing a Deg operator for the *for-PP*, it is impossible for the standard degree to be calculated relative to only the adjective.

Moving the DegP so that it selects the AP simply presents another problem. If *compared-to* phrases modify DegP, then moving the DegP below the aP would put the *compared-to* phrase below the thematic-PP.



But, as discussed in chapter two, the standard degree derived from a *compared-to* phrase always has scope over the thematic-PP: there is no narrow reading for a standard degree calculated over a *compared-to* phrase, the thematic-PP does not c-command into the *compared-to* phrase, and nominalizations of gradable adjectives cannot include a *compared-to* phrase but can include a thematic-PP. Therefore, it appears that both the *compared-to* phrase and the *for-PP* must each have their own degree operator, like POS_{for} and POS_{comp}, to integrate them into the semantics of the adjective phrase.

3.5.4 The Presupposition-Modifier Analysis and Stacking

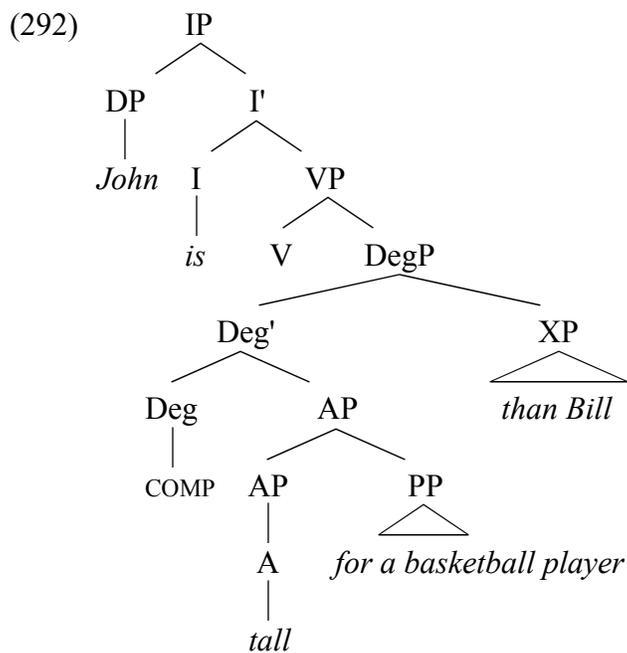
The second problem with assuming that the *for-PP* doesn't combine with a DegP is that it cannot account for the *comparison of deviation* readings of stacked positive and comparative adjectives. This is an additional problem to the one discussed in section 3.4.5 that arose from putting the measure function inside of the adjective. According to the analysis under question, *for-PP's* modify the presuppositional structure of the adjective. To this modified AP structure, one of two different Deg heads can be stacked on top: the POS_{comp} morpheme or the COMP morpheme (*-er/more*).

- (290) a. John is more tall for a basketball player than Bill.
b. John is tall for a basketball player compared to Bill..

Under the modifier analysis of *for-PP*'s, their meanings should be the same as the sentence in (291), with the added caveat that both John and Bill are presupposed to be basketball players.

(291) John is taller than Bill.

To see that these are the predictions of the presupposition-modifier analysis, consider the structure below for the comparative in (290).



In this structure, the Deg head is a comparative morpheme, and the *for-PP* combines with the AP to produce another AP that has its presuppositional structure modified. Let's assume that the meaning of the phrasal comparative morpheme COMP is as in (293).

(293) $\text{COMP} = \lambda G \lambda y \lambda x. G(x) > G(y)$

Now, if the *for-PP* simply modifies the AP denotation (i.e., it modifies a measure phrase of type $\langle e, d \rangle$, producing another measure phrase of type $\langle e, d \rangle$), we would derive the following truth conditions. I will assume that the copula and *than* are vacuous.

- (294) a. $\| \text{John (is) taller for a basketball player (than) Bill} \| = 1$ iff
- b. $(\text{john})[[[\text{COMP}]] ([\| \text{tall} \|] [\| \text{for a basketball player} \|]) (\text{bill})] = 1$ iff
- c. $(\text{john})[[[\text{COMP}]] ((\lambda x. \text{TALL}(x)) [\lambda G \lambda x: \text{basketball player}(x). G(x)]) (\text{bill})] = 1$ iff
- d. $(\text{john})[[\text{COMP}]] (\lambda x: \text{basketball player}(x). \text{TALL}(x)) (\text{bill})] = 1$ iff
- e. $(\text{john})[[\lambda G \lambda y \lambda x. G(x) > G(y)] (\lambda x: \text{basketball player}(x). \text{TALL}(x)) (\text{bill})] = 1$ iff
- f. $(\text{john})[\lambda y \lambda x: \text{basketball player}(x) \ \& \ \text{basketball player}(y). \text{TALL}(x) > \text{TALL}(y) (y)] (\text{bill})] = 1$ iff
- g. $\text{TALL}(\text{john}) > \text{TALL}(\text{bill}) = 1$

The resulting truth conditions are the same truth conditions of the sentences in (291) with the added presupposition that John and Bill are basketball players. But, as discussed in section 3.4.5, this is not what the sentences in (290) mean.

The sentences in (290) should receive comparison of deviation readings. Recall that comparison of deviation readings entail that the things being compared must have the property in its positive sense. So, in (290), both John and Bill must be *tall for a basketball players*. But, if they are to be understood as in (294), i.e., as *John is taller than Bill*, then they should be true even if John and Bill are not very tall in general.

The point of this discussion is that in order to compare the extents to which John and Bill are tall for a basketball players, there must be a measurement between the normal height of wrestlers and John and Bill's heights. That is, there must be a standard degree computed from the *for-PP* from which we can measure the deviation of John's height and Bill's height. Under the assumption that adjectives are simply measure functions, this can only happen if there is a Deg head. And, the presuppositional modification analysis does not supply a Deg head for the *for-PP*. This isn't, however, a fatal flaw: we could maintain the analysis if there were a POS Deg head introduced above the AP, in addition to the COMP morpheme. However, the sentence in (295), indicates that this isn't enough.

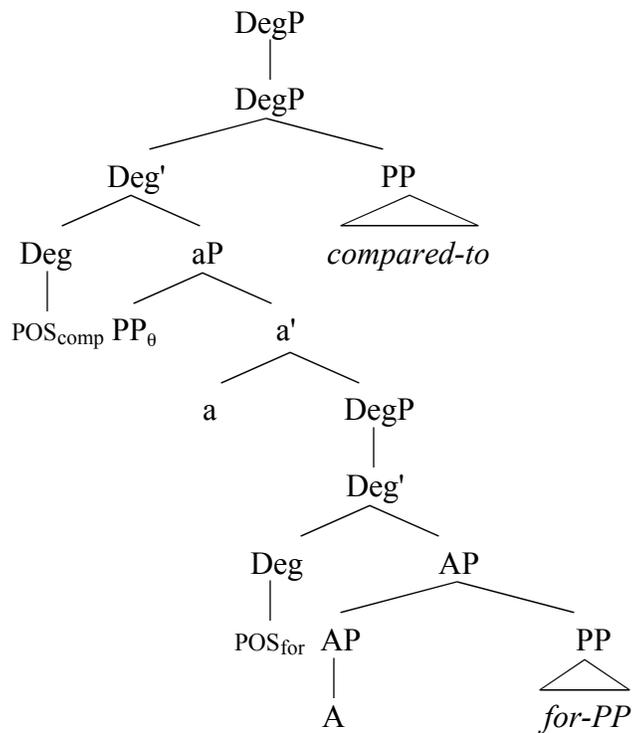
(295) John is tall for a basketball player compared to Bill.

This sentence, too, seems to require (or at least allow) a comparison of deviation reading. That is, both John and Bill need to be tall for basketball players. If this is correct, then it would also seem to require that there be a standard degree computed over the *for-PP* that can provide a comparison between the John's deviation from the

standard and Bill's deviation from the standard. This requires that there be a POS operator between the *for-PP* and the *compared-to* phrase in addition to the operator that introduces the *compared-to* phrase and compares the deviations.

Hence, we are again forced into having two different DegP's, one on top of aP for *compared-to* and the other on top of AP for *for-PP*'s. It should be pointed out that the presuppositional modifier analysis of *for-PP*'s proposed by Kennedy could be maintained. All we would have to do is posit a POS_{for} morpheme that selects the AP-*for-PP* combination that does not take a comparison class as one of its arguments.

(296)



However, it is not necessary to go to these lengths to maintain the presupposition-modifier analysis. I will now offer evidence that the presupposition analysis is too strong. Rather, the fact that in sentences of the form *x is A for an NP* we have a

strong inclination to think that *x is an NP* looks more like an implicature than a presupposition.

3.5.5 Implicature, not Presupposition

Recall the sentences that lead Kennedy (2005a) to the conclusion that there is a presuppositional relation between the comparison class and the argument of the predicate.

- (297) a. #Kyle's BMW is expensive for a Honda.
b. #Kyle's BMW is not expensive for a Honda.
c. #Is Kyle's BMW expensive for a Honda?

It was claimed that there is a presupposition that the object predicated of the adjective phrase must be of the same kind as denoted by the NP part of the *for-PP*. Then these sentences sound odd because there is a presupposition failure in the mismatch: subject cannot be both *Kyle's BMW* and *a Honda*. In this section, I will argue against this conclusion, and instead argue that the reason the sentences in (297) sound odd is because the relationship between the subject and the comparison class is the result of an implicature, not a presupposition.

First notice that other sentences where there is a mismatch between the subject and the comparison class actually sound pretty good, as long as a context is set up such that it makes sense to make the comparison.

- (298) a. Tomo's car is really expensive for an American car. It's even

expensive for a Japanese car.

- b. On some issues, Bill is so conservative for a liberal, that he's even conservative for a conservative.
- c. Scott is quite tall for a high school basketball player, but he isn't tall for a college basketball player, and definitely not for a professional basketball player.

In fact, the sentences in (297) sound a lot better when the subject and object of the *for-PP* are switched.

(299) Kyle's Honda is even expensive for a BMW. Now that is an expensive Honda!

This may be because, in a situation in which you want to express an astonishingly expensive cost for a car, it is more felicitous to compare it to something that is typically more expensive than things like it typically are. Expensive Hondas should be compared to cars that are more expensive than Hondas, like BMW's. In order to express the surprising cost of a BMW, you shouldn't compare it to a Honda. These sentences show that the requirement that the subject be of the same kind as the comparison class can be cancelled, unlike presuppositions.

In addition, if the relationship between the subject and the comparison class were a presuppositional relationship, then we would expect it to behave like standard

presuppositions. For instance, *because* clauses presuppose the truth of their complements.

(300) Tomo's car is expensive because it is a Japanese car.

In (300), the truth of *it is a Japanese car* is presupposed, not asserted, as the following examples attest.

- (301) a. #Tomo's American car is expensive because it is an Japanese car.
b. #Tomo's American car is not expensive because it is an Japanese car.
c. #Is Tomo's American car expensive because it is an Japanese car?

If these sentences asserted the truth of the *because* clause, then we should be able to negate and question them without any degradation, but they are clearly quite odd.

Now, in a footnote, Kennedy (2005a) notes that the following type of sentence in (302) is acceptable.

(302) Tomo's Japanese car would be expensive for a American car.

Here, the alleged presupposition seems to be cancelled under the modal. We don't get the same type of cancellation with a *because* clause.

(303) #Tomo's American car would be expensive because it is a Japanese car.

Kennedy suggests that (303) be analyzed as having a hidden conditional, as in (304).

(304) If it were true that Tomo's American car were a Japanese car, then it would be expensive for an Japanese car.

However, if this were a possible analysis, it should be possible to analyze (303) in the same way. But, (303) is clearly a presupposition failure, and therefore, cannot be analyzed along the lines of (304).

3.5.6 Summary

The conclusion that we should draw from this discussion is that the use of a *for-PP* to express a comparison class does not assert or presuppose that the object predicated of the adjective phrase is also of the kind denoted by the comparison class. The relationship must be much weaker than that. Given the ease at which it is cancelable (see examples (298)), let's call it an implicature. This means that there is no need for the *for-PP* to modify the AP.

We have also seen reasons to believe that there must be a degree operator immediately above the AP to compute a standard degree based on the comparison class. When we stack a comparative or a *compared-to* phrase on top of a *for-PP*, the result is a *comparison of deviation* which requires that a standard degree be calculated over the comparison class. Therefore, we might as well resort back to the structure that we ended the section 3.3. That is, *for-PP's* should be analyzed as arguments of

the Deg head POS_{for}. It appears that the status of *for-PP's* as supplying a semantically important comparison class is unavoidable.

3.6 Summary

In this chapter, I first reviewed the history of semantic analyses of *for-PP's*. We saw that an analysis that posits a NORM function that returns a standard degree based on the typical instance of a comparison class was best at capturing the semantic properties of positive adjectives with *for-PP's*. (Bartsch and Vennemann, 1972, Kennedy, 1999) I then proposed an analysis of *compared-to* phrases that treats them identically to phrasal comparatives. Next, I provided two analyses, a Traditional semantic analysis and a neo-Davidsonian analysis, of transitive adjectives such as *patient with Mary*. In the Traditional semantic analysis, transitive adjectives were treated as measure functions that take an ordered pair of individuals and returns a degree. In the neo-Davidsonian analysis, intransitive and transitive adjectives were treated alike: they were predicates of events. In fact, this meant that gradable adjectives were treated like all other event predicates such as verbs, adverbs, non-gradable adjectives, etc. The POS_{for}, POS_{comp} and COMP morphemes were modified such that it included a measure function that measured events and returned a degree. Hence, we could measure an event of patience or tallness. This meant that the internal and external arguments of the event could be added to the logical form after the event had been measured. Both of these proposals could account for the generality readings of predicates like *patient with Mary for a boy*, since both copied the gradable property without its internal argument into an argument slot of the NORM function. However, it was claimed that the traditional semantic analysis required a

pronominalization of the internal argument, a process that the neo-Davidsonian analysis did not need to resort to. Furthermore, the neo-Davidsonian analysis was able to be applied to cases of stacked standard expressions. The traditional analysis was unable to handle these.

I also entertained the proposal in Kennedy (2005a) which treats *for-PP's* as modifiers of the presuppositional structure of gradable adjectives, in an effort to eliminate any special status of comparison classes from the semantic representation. It was concluded that this analysis falls short of accounting for the generality readings of adjective phrases like *patient with Mary for a boy* and the comparison of deviation reading of a comparative stacked on top of a *for-PP*. Furthermore, it was pointed out that *for-PP's* do not affect the presuppositional structure of APs. Rather, the use of a *for-PP* creates an implicature that the object predicated of the adjective phrase also have the property denoted by the comparison class. We concluded that if gradable adjectives denote measure functions, then *for-PP's* must be introduced by a Deg head that immediately dominates the measure function. The semantic material in the Deg head (i.e., the NORM function and the greater-than relation) are needed to account for the comparison of deviation readings, and the copying mechanism is needed for the general reading of *patient with Mary for a boy*.

However, in the next chapter, I will show that the semantic analyses for positive adjectives, whether bare or with a standard expression, are too much like the degree analysis of comparatives. The problems that arise due to this similarity will be discussed in the next chapter.

Chapter 4: Grammar and Vagueness

4.1 Introduction

This chapter is about the fact that positive adjectival forms are different from comparative forms. This might seem like a rather obvious point. But as yet, these differences have gone either unnoticed or unexplained. And if I am right, they are crucial to our understanding of gradable adjectives and, more importantly, how grammar interacts with vagueness. While the differences that I will focus on are obvious from a naïve perspective, they surprise our theoretic prejudices, precisely because we have become accustomed to analyzing positive forms as implicitly comparative.

In order to see what I mean by this claim, let's examine the denotations of the POS_{for} , POS_{comp} and $COMP$ morphemes that were proposed in the previous chapter.

$$(305) \quad POS_{for} = \lambda G \lambda P \lambda e. \exists d [G(e) \ \& \ DEG(e) = d \ \& \ d > NORM(G)(P)]$$

$$(306) \quad POS_{comp} = \lambda G \lambda x. \lambda e. \exists d [G(e) \ \& \ DEG(e) = d \ \& \ \exists e' \exists d' [EXTERNAL(e') = x \ \& \ G(e') \\ \& \ DEG(e') = d' \ \& \ d > d']]$$

$$(307) \quad COMP = \lambda G \lambda x. \lambda e. \exists d [G(e) \ \& \ DEG(e) = d \ \& \ \exists e' \exists d' [EXTERNAL(e') = x \ \& \ G(e') \\ \& \ DEG(e') = d' \ \& \ d > d']]$$

First, notice that the POS_{comp} morpheme used for the *compared-to* phrases in (306) and the phrasal comparative morpheme COMP in (307) are semantically identical. And, because we assumed that the *compared to* part of the *compared-to* phrase and the *than* in the *than*-phrase were semantically vacuous, the truth conditions and the way these truth conditions are generated are identical for the sentences *John is taller than Bill* and *John is tall compared to Bill*.

- (308) a. John is taller than Bill.
 b. $\|[\text{John} [\text{COMP}[\text{tall}][\text{Bill}]]]\| = 1$ iff
 c. $\exists e \exists d [\text{EXTERNAL}(e) = \text{john} \ \& \ \text{tallness}(e) \ \& \ \text{DEG}(e) = d \ \& \ \exists e' \exists d' [\text{EXTERNAL}(e') = \text{bill} \ \& \ \text{tallness}(e') \ \& \ \text{DEG}(e') = d' \ \& \ d > d']]$

- (309) a. John is tall compared to Bill.
 b. $[\text{John} [\text{POS}_{\text{comp}} [\text{tall}][\text{Bill}]]] = 1$ iff
 c. $\exists e \exists d [\text{EXTERNAL}(e) = \text{john} \ \& \ \text{tallness}(e) \ \& \ \text{DEG}(e) = d \ \& \ \exists e' \exists d' [\text{EXTERNAL}(e') = \text{bill} \ \& \ \text{tallness}(e') \ \& \ \text{DEG}(e') = d' \ \& \ d > d']]$

The only difference is that the COMP morpheme is pronounced but the POS_{comp} morpheme is null. The POS_{for} morpheme used for *for-PP's* in (305) is also identical, though this is hidden a bit by the NORM function that is used to calculate the typical instance of the comparison class expressed by the *for-PP*. The NORM function is

essentially a measure function that calculates the standard degree based on the gradable property that the POS_{for} morpheme copies into its argument position.⁴⁴

But, the important thing to notice about these denotations is that they all contain measure functions that generate two definite, precise degrees, i.e., the standard and referent degrees. They also include a comparison relation between these degrees, which I should note is only defined over precise, definite degrees. Since comparison relations are typically defined as *greater-than*, *less-than*, etc., they are mathematical functions over numbers. Degrees are numbers ordered by the precedence relation. In fact, *greater-than*, etc., should be defined in terms of the precedence relation. And, the precedence relation is precise and crisp, i.e., it is not vague. Therefore, our assumption that positive adjectives are implicit comparatives results in an expectation that positive and comparative adjectives behave the same with regards to any properties that are based on the description of these two degrees and the comparison relation between them.⁴⁵ But they do not. I will show below that the semantic differences between positives and comparatives strike at the root of this assumption, and we can only conclude that the premise on which we have built our semantics of positive adjectives, that they are implicit comparatives, is false.

⁴⁴ The POS_{comp} and COMP morphemes also assign the external argument role to the entity referred to in the *compared-to* phrase or *than*-phrase. I think we can view the NORM function as essentially doing the same thing. The "typical instance of the comparison class" is, in a sense, assigned the external theta role as well.

⁴⁵ I should point out that the point I am trying to make does not depend whether we adopt this neo-Davidsonian account or, instead, adopt the measure function analysis. The measure function analysis also treats positive and comparative adjectives as virtually identical in the same ways as the neo-Davidsonian account, i.e., they all include a comparison relation and a measure function that generates definite, precise degrees to serve as the referent and standard.

The first property that illustrates the fundamental difference between what positive and comparative adjectives mean is exemplified in (310) – (313).⁴⁶

(310) a. John is **three inches** taller than Bill.

(311) a. *John is **three inches** tall.

b. *Intended meaning:*

John is three inches taller than the contextually supplied standard degree.

(312) a. *John is **three inches** tall compared to Bill.

b. *Intended meaning:*

John is three inches taller than Bill.

(313) a. *John is **three inches** tall for a wrestler.

b. *Intended meaning:*

John is three inches taller than the typical height of a wrestler.

These sentences demonstrate that there is no positive adjectival analog to comparative differentials. Differential measure phrases describe the difference between the standard and referent degrees. The differential in (310), for instance, means that John is taller than Bill *and* that the difference between their heights is three inches. But we

⁴⁶ This data was independently discovered by Kennedy (2005b).

can't express that type of meaning with (311), which on the standard view should be acceptable. The positive form is supposed to be a comparison of two degrees, and when the positive is bare, the standard degree is supplied by the context. Why can't we then describe the difference between these two degrees with a measure phrase? (312) is simply incoherent and cannot express the meaning that (310) does. Again, this is surprising because our semantics of *compared-to* constructions is identical to phrasal comparative constructions. (see section 3.3) (313) is surprising as well, since the NORM function is supposed to supply a standard degree based on the comparison class expressed by the *for-PP*, and the positive morpheme simply compares it to the referent degree in exactly the same way as in a comparative construction. As our semantics stands now, we have no explanation for this apparently semantic difference between positives and comparatives. I will claim below that the problem lies in our inclusion of precise degrees in the truth conditions of positive adjectival constructions. Differentials are defined over precise degrees, i.e., they measure the difference between the standard and the referent. Because our semantics of positive adjectives includes precise values of the standard and the referent, we should predict that they allow differential measure phrases.

The second fact that distinguishes the semantic properties positives and comparatives was pointed out first in Kennedy (2005a). In a context in which two items differ only in a minor way, the comparative form can be used to licitly describe the difference, but a positive form with a *compared-to* phrase cannot.

(314) Context: A 100 page novel and a 99 page novel.

- a. This novel is longer than that one.
- b. #This novel is long compared to that one.

Comparatives, but not *compared-to* phrases, can be used to make *crisp judgments*. These are judgments made in contexts where the difference between two objects is saliently small. The lack of crisp judgments actually turns out to be a property of positive adjective constructions in general, not just positives that occur with *compared-to* phrases. In (314), we see that expressing the standard with a *for-PP* also does not allow crisp judgments.

(315) Context: John is 5' 1/4", and everyone else in his family is exactly 5 feet tall.

- a. #John is tall for a member of his family.
- b. #John is tall for a member of a family where everyone else is exactly five feet tall.

There are one important feature of positive adjectival constructions that the lack of crisp judgments brings into view is that the standard predicted by the semantics we have been assuming is, in a sense, too low. It appears that the referent must be greater than what we would predict the standard to be plus something more. For instance, in the comparative construction in (315)a, the standard is *99 pages*, and the referent need only be longer than this. But in the *compared-to* construction in (315)b, the referent must be more than just greater than *99 pages* – it must be greater than *99*

pages plus some amount. I will adopt the terminology of Fara (2000) and Kennedy (2005a, 2005b) and refer to this as a requirement that the referent degree be *significantly* greater than the standard degree in positive adjectival constructions. I will define what *significantly* means below.

So, we have second property of positive adjective constructions that differentiates them from comparatives. Just as with differentials, this property is also completely mysterious if positives are treated as implicit comparatives. And, it should be noted that the problem doesn't seem to lie in our semantics of comparatives. Our semantics of comparatives relates a referent degree to a standard degree via the relation "*greater-than*". This relation is defined *crisply*, i.e., we expect crisp judgments in comparatives. Rather, the problem seems to lie in our treatment of positive adjectives as implicit comparatives.

Kennedy (2005a, 2005b) has an intuition (which I believe is correct) that this *crisp judgment* distinction is derivable from another property that distinguishes positive adjectives from comparatives: *vagueness*. The vagueness distinction is illustrated in (316) – (318). The first two sentences contain positive adjectives, one with a *for-PP* and the other with a *compared-to* phrase. This means that they both have an overt expression of the standard, and according to our semantics, should behave quite similarly to comparatives. But, while the first two sentences containing positive forms of *tall* seem acceptable, i.e., we tend to believe that they could be true, the third sentence, which contains a comparative form of *tall*, is rejected on the grounds that it could not ever be true.

(316) Anyone who is one millimeter shorter than someone who is tall for a jockey is also tall for a jockey.

(317) Anyone who is one millimeter shorter than someone who is tall compared to Bill is also tall compared to Bill.

(318) #Anyone who is one millimeter shorter than someone who is taller than Bill is also taller than Bill.

As will be discussed in section 4.4 below, these are sentences that have the same form as a premise in a Sorites argument. We'll use these Sorites sentences as a test for *vagueness*: any predicate that can be inserted into a structure of this form to produce a sentence that is possibly true is vague. Therefore, what we will conclude from these sentences is that positive adjective phrases, whether they contain an explicit standard expression or not, differ in terms of their vagueness from comparatives. We know that the sentence in (318) is false because someone who is one millimeter shorter than someone who is one millimeter taller than Bill is exactly as tall as Bill, not taller than Bill. That is, we know that the point at which someone becomes *taller than Bill* is just above Bill's height. Anyone who is even a small amount taller than this standard is taller than the standard. But, what is the point at which someone becomes *tall compared to Bill* or *tall for a wrestler*? We can't seem to pinpoint it, *even though the standard is explicit!* It is not Bill's height or the typical height of a wrestler (as the crispness distinction tells us), but some significant amount more than that. But where

exactly the standard is defined remains elusive. If Bill is six feet tall, is six feet and one inch tall enough to be *tall compared to Bill*? How about six feet and two inches, or six feet and three inches, etc.? These positive forms that include explicit standard expressions are vague just as much as the plain positive form, but comparative forms are not. When we assume that positives are really comparatives, this vagueness distinction is mysterious. The problem seems to lie, once again, in the use of precise degrees to describe the truth conditions of positive adjectives. For comparative predicates, the use of a precise standard degree is enough for us to realize that the sentence in (318) is false. Therefore, if a precise standard degree is used in the truth conditions of positive adjectives, we should reject the sentences in (316) and (317), too.

So, we have three properties that distinguish positive adjectives from comparative adjectives: differentials, crispness and vagueness. I will discuss four options that aim to account for these differences. The first two continue to treat positives as implicit comparatives. The first of these was proposed in Fara (2000) and adopted by Kennedy (2005a, 2005b). This discussion will lead me to claim that natural language actually displays two types of vagueness. I will argue that the reasoning Fara and Kennedy use to justify their proposal, and the mechanism they use to implement it, is needed for one type of vagueness that I will call *observational vagueness*. However, observational vagueness is found in comparatives as well as positives, and therefore, while we do need the mechanisms proposed by Fara and Kennedy, they are needed for comparatives and positives. Thus, Option 1 does not make the necessary distinctions between the two types of adjective. Positive

adjectives possess an additional kind of vagueness, on top of observational vagueness, that is responsible for the distinguishing characteristics. Option 2 is a variation of Option 1 that simply encodes the additional type of vagueness.

Options 3 and 4 are not actual proposals, but instead are suggestions for future research. They do not treat positives as implicit comparatives. Instead, they suggest that positives involve a completely different type of comparison than comparatives. Option 3 says that while comparatives are comparisons between precise degrees, positives are comparisons between *blurry* degrees. It is left open what exactly this means in mathematical terms.

Option 4 takes a more obvious approach: a grammatical process, namely the introduction of the comparative morpheme *-er/more* into the structure of a gradable adjective phrase, is suggested to cause the distinctions between positive and comparative adjectives.⁴⁷ Under this approach, positives are treated as whole semantic units that denote comparisons between objects. The addition of a comparative morpheme creates a predicate that compares degrees. Thus, the three distinguishing characteristics are explained by the degree system only being applicable for comparatives, not positives.

In section 4.2, I will discuss the differential data outlined above. In section 4.3, I will discuss the crispness distinction between positive and comparative adjectives. In section 4.4, I will discuss the vagueness properties of positive adjectives and comparative adjectives. In section 4.5, I will review several ways of describing vagueness. Then, I will begin discussing the four options. In section 4.6,

⁴⁷ I mean to include all comparative morphology in this category, not simply *-er/more*.

the first two options are discussed. I will review the proposal in Fara (2000) and Kennedy (2005a, 2005b) that aims to account for vagueness as a matter of context dependence. I also introduce the notion of observational vagueness in this section. In section 4.7, I will discuss Options 3 and 4 which treat positives as not involving comparisons between degrees.

4.2 The First Difference: Differentials

In this section, I show that comparatives and positives differ in terms of whether they allow measure phrases to express the difference between the referent and standard degrees. Comparatives allow this, but positives do not. I will explain that differentials are compatible with a semantics of comparatives that includes degrees, but that because our semantics of positives also includes degrees, we predict that they, too, should allow differential measure phrases.

Comparatives allow differential measure phrases, as in (319).

- (319) a. John is **three inches** taller than Bill.
b. John is taller than Bill **by three inches**.

Differential measure phrases specify the difference between the referent and standard degrees. (Stechow, 1984) Thus, the comparatives in (319) require not only that John be taller than Bill, but that the difference between their heights be three inches. Notice that the measure phrase can be expressed in an explicitly adjunctive *by*-phrase. Thus, it appears that differential measure phrases simply modify the comparative relation (Schwarzschild and Wilkinson, 2002). Standard ways of describing

differentials use either a concatenation operation or a subtraction operation on degrees. (Kennedy, 1999, Schwarzschild and Wilkinson, 2002, Stechow, 1984) I will use a subtraction operation simply because it provides a straightforward notation.

- (320) a. $\| \text{John is three inches taller than Bill} \| = 1$ iff
- b. $\exists e \exists d [\text{EXTERNAL}(e') = \text{john tallness}(e) \ \& \ \text{DEG}(e) = d \ \& \ \exists e' \exists d' [\text{EXTERNAL}(e') = \text{bill} \ \& \ \text{tallness}(e') \ \& \ \text{DEG}(e') = d' \ \& \ d > d' \ \& \ d - d' = 3'']]$

"-" is the subtraction operation on the degrees d and d' . It returns a degree that is the difference between d and d' . Therefore, $d - d' = 3''$ is true iff the difference between d and d' is three inches.

So, the expression of a differential relies on this subtraction operation, which presumably has as its only requirement that it apply to two degrees. Because our semantics of positive adjectives includes the same descriptions of degrees that are used in comparatives, we expect that differential measure phrases could be used to describe the difference between these degrees. But, they cannot be used in this way, as evidenced by (321) – (323).

- (321) a. *John is **three inches** tall.
- b. *John is tall **by three inches**.
- c. *Intended meaning:*
John is three inches taller than the contextually supplied standard degree.

- (322) a. *John is **three inches** tall compared to Bill.
b. *John is tall compared to Bill **by three inches**.

c. *Intended meaning:*

John is three inches taller than Bill.

- (323) a. *John is **three inches** tall for a wrestler.
b. *John is tall for a wrestler **by three inches**.

c. *Intended meaning:*

John is three inches taller than the typical height of a wrestler.

I want to stress the fact that these sentences are semantically incoherent. There simply is no positive adjectival analog to comparative differentials. This is completely unexpected if positive adjectives are semantically identical to comparatives. Take the bare positive in (321), for example. The bare positive form of *tall* is supposed to be a comparison between a referent and a contextually supplied standard degree. But, if this is so, we should be able to modify the comparison relation by a measure phrase to describe the difference between the referent degree and the contextually supplied standard. Also, recall that we predict the *compared-to* construction in (322) to be semantically identical to the phrasal comparative in (319). Therefore, given our assumptions about differential measure phrases, the fact that (322) is so incoherent should be a complete surprise.

The unacceptable *for-PP* example in (323) should be surprising as well. According to the standard degree semantics that we have been assuming, positive adjectives with *for-PP's* as in (324) should have the same meaning as (325).

(324) John is tall for a wrestler.

(325) John is taller than the typical height of a wrestler.

But while the differential form of (324) in (323) is unacceptable, the differential form of (325) in (326) is fine.

(326) John is three inches taller than the typical height of a wrestler.

One might think that the reason (323) is unacceptable but (326) is fine is because of the indeterminate nature of the *for-PP* as opposed to the nominalized degree in (326). But the sentences in (327) indicate that indeterminacy is not the deciding factor.

- (327) a. John is three inches taller than the typical wrestler.
b. John is three inches taller than the typical height of a wrestler,
whatever that is.

(327)a compares John to the typical wrestler, just like the *for-PP* construction, and yet a differential measure phrase can be used. (327)b explicitly states that the typical height of a wrestler is unknown to the speaker, and yet again, the differential form is

acceptable. Furthermore, as we saw in (322), a *compared-to* construction that bases the standard on a definite individual, i.e., *Bill*, behaves like the *for-PP*, not like the phrasal comparative. This means that the prohibition of a differential is a property of positive adjective forms, not an effect of the way the standard is expressed.

- (328) a. *John is three inches tall compared to the typical wrestler.
b. *John is three inches tall compared to the typical height of a wrestler, whatever that is.

To summarize, comparatives allow differential measure phrases that describe the difference between the standard and referent degrees, but positives do not, even when the standard is explicitly stated with a *for-PP* or a *compared-to* phrase. This is not an effect of the way the standard is expressed, i.e., a kind-denoting NP in the *for-PP* is not at fault, because it arises when we use a *compared-to* phrase with a name. Rather, it is the use of the positive form of the adjective as opposed to the comparative form that disallows differential measure phrases. Furthermore, this is a semantic effect, not a syntactic one. Differential measure phrases are adjuncts that apparently can be added to any comparative structure to modify the comparison relation. These facts are surprising given that the semantics of the positive relies on what appear to be the crucial factors in allowing a differential measure phrase, namely a comparison relation between two precise degrees.

4.3 The Second Difference: Crispness

In this section, I discuss a distinction between positives and comparatives pointed out in Kennedy (2005a, 2005b): comparatives allow crisp judgments, but positives do not. Again, the semantics that we have developed for positive adjectives cannot predict this difference.

The crispness distinction is illustrated in (329), from Kennedy (2005a, 2005b), and I have added the example in (330).

(329) Context: A 100 page novel and a 99 page novel.

- a. This novel is longer than that one.
- b. #This novel is long compared to that one.

(330) Context: John is 5' 1/4", and everyone else in his family is exactly 5 feet tall.

- a. #John is tall for a member of his family.
- b. #John is tall for a member of a family where everyone else is exactly five feet tall.

The judgment of the comparative in (329)a is easy to make, even in a context where the two objects being compared differ minimally. Let's call these *crisp* judgments.

The judgments of the positives in (329)b and (330) are difficult to make in this same kind of context. I will call these *soggy* judgments. So, comparatives allow crisp judgments but positives only allow soggy judgments.

I want to make two points about this data. The first is that our semantics, once again, correctly predicts the behavior of comparatives, but fails to distinguish them from positives which behave differently. Both the positive and the comparative forms employ the *greater-than* relation in our representations of their semantics. And, the *greater-than* relation is, by definition, a crisp relation. It is a mathematical function that takes two arguments ranging over numbers (or degrees). Because it is defined over numbers, it cannot be soggy: numbers are by their very nature crisp since they are defined with the precedence relation which is itself, by definition, a crisp relation. The *greater-than* relation, therefore, is really just defined in terms of the precedence relation, i.e., the number 24 is greater than all of the numbers that precede it. (cf. Pietroski, to appear) Thus we can explain why we can make crisp judgments with comparatives, since our semantics treats them as a *greater-than* relation between two numbers. But, because we treat positives as a *greater-than* relation between two numbers, our semantics predicts that we should be able to make crisp judgments with positives as well.

The second point I want to make about this crispness distinction concerns what it tells us about the meaning of positive comparisons. The data indicates that, when a positive adjective is used, the actual standard is greater than the standard that we predict when we treat the positive as an implicit comparative. That is, we predict in a phrase like *long compared to that book* that the standard degree is the length of *that book*, and that for the referent to be *long compared to that book* it only need be longer than that book. But, the lack of a crisp judgment shows us that the referent must be some amount greater than the standard. (Kennedy, 2005a, 2005b)

Henceforth, I will say that, in positive comparisons, the referent must be *significantly-greater-than* the standard, and, for now, I will leave open how to define *significantly*, but I will return to this topic below.

To summarize, we now have two semantic distinctions between positive and comparative adjectives. First, comparatives allow differential measure phrases that describe the difference between the referent and standard degrees, but positive adjectives do not, even when the positive adjective appears with a standard expression like *compared to Bill*. Second, comparatives allow crisp judgments, meaning the referent and standard degrees can be very, very close to each other, i.e., they can be saliently similar. In the same contexts, however, positive adjectives cannot be used. We resist making crisp judgments with positives, even when the positive appears with an explicit standard expression. While our semantics predicts that comparatives should allow differential measure phrases and that they should allow crisp judgments, it also predicts that positive adjectives should behave the same, because we have treated them as implicit comparatives. The problems that differentials and crispness raise for positive adjectives seem to be related. In order to express a differential measure phrase, there must be two degrees, i.e., two numbers associated with the referent and standard, that can be subtracted. Crisp judgments, too, are a property that we would expect if comparisons are between two numbers defined by the precedence relation. In the next section, I describe a third distinction between positives and comparatives – vagueness.

4.4 The Third Difference: Vagueness

4.4.1 Introduction

In this section I will discuss data concerning the third property that distinguishes positive adjectives from comparative adjectives: positive adjectives are vague in a way that comparatives are not. Keefe and Smith (1996) list three, interrelated, defining characteristics of vague predicates. Vague predicates have *borderline cases*, lack *sharp boundaries* and give rise to *Sorites paradoxes*. Roughly speaking, borderline cases are those entities in which we can not say with any certainty whether the predicate applies truthfully to them or not. They seem to hover around the border between those entities which are definitely in the positive extension of the vague predicate and those which we definitely know are in the negative extension. For instance, is a person who is five feet and six inches short or not short? Non-vague predicates have sharp boundaries between their positive and negative extensions, while vague predicates lack sharp boundaries, and instead, have *blurry* or *fuzzy* boundaries, where these borderline cases seem to lie. The third defining characteristic of vague predicates is their ability to give rise to a Sorites paradox (the paradox of the heap). The Sorites paradox illustrates what Wright (1976) refers to as a vague predicate's *tolerance* for small changes. Vague predicates are tolerant to degrees of change that make no difference in terms of the applicability: a short person is still short even if they gain $1/100^{\text{th}}$ of an inch in height. I will describe each of these characteristics in more detail below, and I will use them as tests to show that positive adjectives are vague in a way that is lacking in comparative adjectives.

We will come to this conclusion by noticing that positive adjective phrases, even those with explicit standard expressions, have borderline cases, blurry boundaries, and easily give rise to Sorites paradoxes. Comparative adjective phrases, on the other hand, behave differently when we apply these tests.⁴⁸ Now, when I say that they behave differently, I do not mean that comparative predicates are not vague, because they are, i.e., they have borderline cases, blurry boundaries and give rise to Sorites paradoxes. But as we apply the tests, it will become obvious that positive adjectives are vague in a way that is lacking in comparatives. Therefore, I am going to have to ask the reader to allow me a certain amount of latitude when I describe these differences in this section. I want to, for now, ignore the vagueness of comparatives, and I will return to it in section 4.6 where I will claim that the source of vagueness in comparatives is different from the source of the vagueness that gives rise to the behavior of positives when we apply these tests.

It will, again, be the case that our semantic representations of comparative predicates predict their behavior when we apply the vagueness tests. When the standard is represented as a precise degree, it represents the boundary between the positive and negative extensions of the comparative predicate. Hence, we expect comparatives to lack vagueness. But, because our semantics of positive adjectives

⁴⁸ Much of the data that I present in this section is not new. That positive adjectives are vague has been known for centuries. What I think is interesting is that positives with explicit standard expressions are also vague. Fara (2000) notes that positives with *for-PP's* are still vague, and Kennedy (2005b) notes that positives with *compared-to* phrases are vague. In this section, I simply fill in some of the empirical data about positives and, in what I think is my contribution, compare them to comparatives. While Kennedy indicates that comparatives are not vague in the same way that positives are, I will argue against his analysis, in section 4.6, by pointing out that it does not make the right distinctions between positives and comparatives.

also includes a precise standard degree, we expect them to behave just like comparatives. This ties the vagueness distinction to the differential and crispness distinctions: all three appear to be a product of whether or not precise degrees are used to represent the extent to which the standard and referent possess the gradable property.

In section 4.4.2 and 4.4.3 I show that positive adjectival predicates have borderline cases and lack sharp boundaries. Comparatives, on the other hand, at least initially appear to lack borderline cases and have sharp boundaries. Then I investigate the behavior of positive and comparative predicates with respect to the Sorites paradox. In section 4.4.4, I review the Sorites paradox, and in 4.4.5 I explore whether these predictions are true. In 4.4.6, I provide a summary of the vagueness tests.

4.4.2 Borderline Cases

The point of this brief section is simply to point out that positive adjectives have borderline cases, while comparatives, at least upon initial inspection, do not. This is surprising given that our semantics assigns truth conditions to positive adjectives that are identical to what it assigns comparative adjectives. And, crucially, this semantics assigns to both comparatives and positives logical representations that contain reference to precise standard and referent degrees which are related via the *greater-than* relation. Thus, it should be obvious where the boundary is between the positive and negative extensions, i.e., at the standard degree.

Positive adjectives that contain explicit standard expressions should be surprising in this regard. The standard expression should tell us exactly where the

standard is, but apparently, it does not. For instance, at what point does someone become *tall for a member of a family where everyone else is exactly five feet tall*? The crispness distinction (see section 4.3) indicates that it is not at five feet in height, but rather some point above that on the height scale. But even this actual standard point is not precise because we still have borderline cases. Do we consider someone who is five feet and one inch to be tall for that family? How about five feet and two inches? Five feet and three inches? These are borderline cases.

Positives with *compared-to* phrases behave similarly. Let's say that Bill is five feet tall. How tall does John need to be in order to be considered *tall compared to Bill*? Is five feet and one inch enough? Five feet and two inches? Or, five feet and three inches? Again, we see that positive adjectives give rise to borderline cases, even when the standard is explicitly expressed.

Comparatives, however, behave differently. Consider the same situation: Bill is five feet tall. How tall does John need to be in order for us to say truthfully that he is *taller than Bill*? Is five feet and one inch enough? Certainly. How about five feet and 1/100th inches? Yes, we easily consider that height to constitute being *taller than Bill*.^{49,50} Hence, there is a clear difference in terms of borderline cases between positive adjectives and comparative adjectives.

⁴⁹ This is where I need the reader to allow me some leeway in describing comparative predicates as non-vague. There are, in fact, borderline cases in this situation. For instance, what if John is five-feet tall and 1/1000000th of an inch? Sure, John is still taller than Bill, but in cases where we don't care about such slight differences or have no possible way of measuring such a difference, then we might say that John is not taller than Bill. This is vagueness, but in a very different sense than what we see here with positive adjectives. I will discuss this sense of vagueness, which I will refer to as *observational* vagueness, in section 4.6. For now, I believe the distinction in clear,

Our semantics correctly predicts this behavior for comparatives because it assigns a logical representation to them that includes reference to precise degrees. A precise standard degree should not give rise to borderline cases. Positives, on the other hand, cause problems for our semantics because they too are assigned the logical forms that predict no borderline cases.

4.4.3 Sharp and Blurry Boundaries

Let's return now to the data presented in section 4.3 concerning the crispness distinction. Recall that the crispness distinction indicated that the actual boundary was some significant amount greater than the standard that is predicted when we treat positives as implicit comparatives. In this section, I want to explore the nature of the boundary in positive adjectival constructions and show that it is not only significantly greater than what we predict, but it is also *blurry* or *fuzzy*. The eventual goal will be to tie the crispness distinction to the vagueness distinction, but notice that this is not a

and I will continue to refer to comparatives as lacking vagueness, when what I mean is that they lack the kind of vagueness that positives so readily display.

⁵⁰ I am also going to be ignoring vagueness that is inherited from the complement of *than*, *compared-to* and the *for-PP*. For instance, the predicate *child* is vague, i.e., we aren't sure at what age a person slips out of the extension of *child*. . . is it age 14, 15, 16? Well, *taller than a child* is vague in the sense that we can't tell when someone belongs in the extension of this predicate because we aren't sure how to calculate the standard given that we aren't sure who is in the extension of *child*. In order to avoid this type of vagueness, I will continue to use names as the complement of *than* and *compared-to* (even though names might themselves be vague in some tediously pedantic way, see Russell (1923)). I think it is possible to ignore this inherited vagueness in the *for-PP* as well: just assume that when I talk about *tall for a jockey* that the extension of *jockey* is well defined. I believe it is possible to do this and keep the sources of vagueness distinct. Besides, it is possible to use a name in a *for-PP*:

(i) Do you mean she is crazy for Lucy or for everybody else?

Even in these cases, it is obvious that there is vagueness emanating from the adjective itself, not the *for-PP*.

logical necessity.⁵¹ It could be that the boundary degree in positive constructions is simply significantly greater than what we predict, but that this boundary is precise. Here, I want to show that the boundary is blurry in positive adjectival constructions, but not in comparatives.

I repeat the examples from 4.3 here.

(331) Context: A 100 page novel and a 99 page novel.

- a. #This novel is long compared to that one.
- b. This novel is longer than that one.

(332) Context: John is 5' 1/4", and everyone else in his family is exactly 5 feet tall.

- a. #John is tall for a member of his family.
- b. #John is tall for a member of a family where everyone else is exactly five feet tall.

In section 4.3, we concluded that comparatives allow crisp judgments but positives only allow soggy judgments. In order to illustrate the nature of the standard, it is helpful to think about these facts in terms of a sequence of items arranged on a scale.

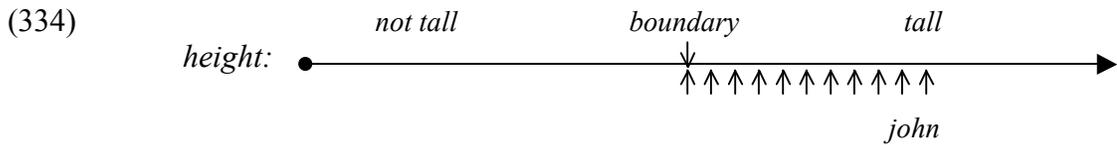
Imagine a scale in which jockeys have been ordered in terms of their heights. Each jockey in the ordering is related to the jockey above it by the relation *is-one-millimeter-shorter-than*, i.e., we have an ordering of jockeys on a scale of height in

⁵¹ Kennedy (2005a, 2005b) proposes a system that ties the vagueness and crispness distinctions together. I will discuss his proposal in the next section.

which all of the heights of the jockeys are separated by one millimeter. What we want to investigate here is the nature of the boundary.



In order to illustrate the nature of the boundary, let's imagine that John is a clear case, i.e., he is clearly tall for a jockey. Then, we go down the scale to the next person, who is one millimeter shorter than John. He, too, is tall for a jockey. Do this again and again, and at some point our semantics predicts that we will bump into the boundary.



Now, let's test each of our predicates, i.e., *tall for a jockey*, *tall compared to Bill*, and *taller than Bill*, by progressively bringing the referent down the scale and getting closer and closer to the boundary. What this test will do, in essence, mimics the kinds of experiments psychologists have done with color terms. These experiments test where speakers place the boundary between two closely related color terms, like *orange* and *red*, by presenting participants with a color that ranges on a spectrum of colors between orange and red, and asking them to identify that color as *orange* or *red*. The results of these experiments indicate that speakers agree on colors that are prototypical examples of orange and red. But participants have an increasingly

difficult time labeling colors that are in between the prototypical examples. And, as colors get closer to the boundary between orange and red, participants are essentially at chance in choosing a label. In other words, the boundary between color terms like *orange* and *red* is blurry.

Imagine that we were to do something similar with the predicate *tall for a jockey*. We can conduct the same type of experiment here by considering situations in which we keep the standard constant and vary the referent such that it is closer or further from the standard. What is interesting about this example is that the standard expression *for a jockey*, according to the semantics we have adopted, indicates where the boundary should be. In each sentence of (335), for example, the referent degree is brought down progressively closer to the standard.

- (335) a. Someone who is a hundred millimeters taller than the typical jockey is tall for a jockey.
- b. #?Someone who is fifty millimeters taller than the typical jockey is tall for a jockey.
- c. #??Someone who is twenty millimeters taller than the typical jockey is tall for a jockey.
- d. #Someone who is ten millimeters taller than the typical jockey is tall for a jockey.
- e. #Someone who is five millimeter taller than the typical jockey is tall for a jockey.

- f. #Someone who is one millimeter taller than the typical jockey is tall for a jockey.

What the examples in (335) show us is that the boundary is blurry. That is, our judgments are easy when the distance between the referent and the standard is high, i.e., (335)a is clearly true. Our judgments get progressively more difficult to make as the referent gets closer to the standard, (335)b and (335)c. But then, as the referent gets even closer to the predicted boundary, (335)d, (335) e, and (335)f, our judgments get progressively easier again, i.e., it is easy to judge the sentences as false. The point is that the boundary between objects that are *tall for a jockey* and those that are *not tall for a jockey* is blurry, just like the boundary between the color terms *orange* and *red*. The semantics of POS_{for} predicts the boundary to be at the typical instance of the comparison class. But the actual boundary appears to be above the predicted boundary...somewhere. We just can't nail it's value down precisely.

The same is true for positives with *compared-to* phrases, which is surprising because we might expect that our inability to precisely know the value of the standard when it is expressed by a *for-PP* is due to the nature of how the comparison class is expressed or our world knowledge about the comparison class. In (336), the *compared-to* phrases contain a name, *Bill*, and therefore, since we get the same effect, it appears to be a property of positive adjectives that the standard is blurry, regardless of how the standard is expressed.

- (336) a. Someone who is a hundred millimeters taller than Bill is tall compared to Bill.
- b. Someone who is fifty millimeters taller than Bill is tall compared to Bill.
- c. Someone who is twenty millimeters taller than Bill is tall compared to Bill.
- d. Someone who is ten millimeters taller than Bill is tall compared to Bill.
- e. Someone who is five millimeters taller than Bill is tall compared to Bill.
- f. Someone who is one millimeter taller than Bill is tall compared to Bill.
- g. Someone who is the same height as Bill is tall compared to Bill.

We can draw the same conclusion from these facts as we did above for *for-PP's*: the expected boundary, based on the predicted standard degree, is not the real boundary. Rather, the real boundary is somewhere above the predicted standard degree, and it is imprecise or blurry.

Now, let's contrast this behavior of the positive adjective to that of a comparative in (337).

- (337) a. Someone who is twenty millimeters taller than Bill is taller than Bill.
- b. Someone who is five millimeters taller than Bill is taller than Bill.
- c. Someone who is one millimeter taller than Bill is taller than Bill.

- d. Someone who is one micrometer taller than Bill is taller than Bill.
- e. Someone who is one nanometer taller than Bill is taller than Bill.
- f. #Someone who is the same height as Bill is taller than Bill.

With comparative predicates, we have no trouble knowing where the boundary is, and whether or not we have passed it. In this case, the boundary is Bill's height, and it is only when we have reached this exact height do we reject the truth of the sentence (337)f. Comparatives, therefore, behave as predicted. The logical representations of comparatives make reference to precise standard degrees which indicate the boundary point between the positive and negative extensions of a comparative predicate. This boundary seems to be precise, just like we would expect if it were marked by a standard degree. With positives, however, the boundary is blurry, unlike what we would expect if it were marked by a standard degree. Therefore, we have further evidence that positive adjectives, whether or not they are expressed with a standard or not, are vague, while comparatives are not. In the next section, I apply the last test for vagueness, and I show that positives give rise to Sorites paradoxes while comparatives do not.

4.4.4 The Sorites Paradox

Vague predicates like *expensive* give rise to Sorites paradoxes, which are arguments constructed with the form of (338).

- (338) Premise 1: This car is expensive.
- Premise 2: Any car that is one cent less expensive than a car that is expensive is also expensive.
- Conclusion: Therefore, a free car is expensive.

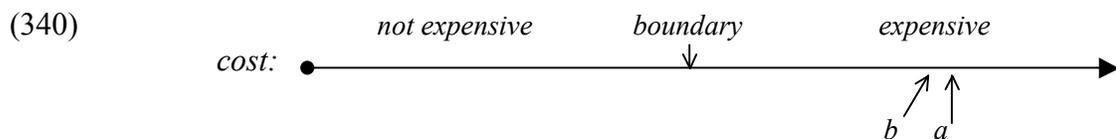
The argument in (338) is paradoxical because while we are inclined to accept the two premises, and the conclusion logically follows from them, the conclusion is clearly false. Let's refer to the first premise as the *clear case* premise. In the clear case premise, the vague predicate is applied to an object that we agree definitely lies in the extension of the vague predicate, i.e., it is *clearly true*. The second premise I will refer to as the *universally quantified* premise. It says that for all x,y if x is true of the vague predicate (i.e., the clear case premise), and we relate x and y via a relation R (i.e. *is one cent less expensive than*), then y is true of the vague predicate. It has the logical form of (339), where F is the vague predicate.

$$(339) \quad \forall x \forall y [Fx \ \& \ Rxy \rightarrow Fy]$$

The relation R , of course, must be a plausible relation in order to set up a *Sorites sequence*. A Sorites sequence is a sequence of true instances of the second premise. So, if we subtract one cent from the cost of the clear case car, we are left with a car that is still expensive. Then, we subtract one cent from the cost of this car, and we are again left with a car that is expensive. We apply the relation R reiteratively until we end up with the false conclusion. It is important to realize that the relation R is a

binary relation, and therefore, when we evaluate specific instances of it, we only look at two entities at a time.

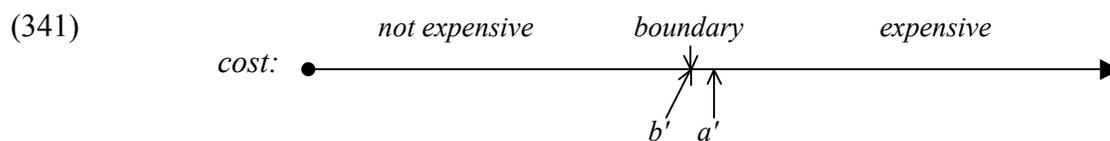
We can use a scale to help represent a Sorites sequence. The scale in (340) is a scale of cost, and the adjective *expensive* is a measure function that maps objects onto the cost scale. Let's restrict our attention to only cars. Thus, we have in effect a ranking of the cost of cars, in iterations of one cent, from the cheapest to the most expensive. The universally quantified premise in (338) looks at any two cars that are exactly one cent apart on the scale and says that if the more expensive car is expensive, then the one-cent-less car is also expensive.



Consider the two cars, a and b , in which a is a clear case of a car that is expensive and b costs one cent less than a . They are therefore joined by the relation in the universally quantified premise of (338), i.e., b is one cent less than a . When we look at the two costs along side of each other we decide that the two do not differ very much and so b must also be expensive. We can imagine doing the same thing, successively, to each pair of cars that satisfy the relation *is-one-cent-less-expensive-than*.

The paradox illustrates the basic nature of vagueness in that the universally quantified premise exemplifies what Wright (1976) calls *tolerance*. Vague predicates are tolerant of small changes to the entities that they apply to. We can make a small

change to an object that is clearly in the positive extension, and we end up with another object that is still in the positive extension. The paradox arises because if we keep making tolerant changes, we end up with a false conclusion. Our intuitions tell us that the Sorites sequence is split up into at least two categories: the positive extension, in which the cars are *expensive*, and the negative extension, in which the cars are *not expensive*. According to the theory we have been assuming so far, there are only these two categories, since the theory says that at some point in the sequence, there is a standard cost which defines the boundary point that divides the cars that are judged to be expensive and those that are judged to be not expensive. But if our theory is correct, then the boundary should be known, or at least known to exist, in adjectival constructions that make explicit reference to the standard. That is, in positive adjectives, using a *for-PP* or *compared-to* phrase should indicate what the boundary is and *should not be tolerant to small changes*.⁵² Why, then, are we initially inclined to accept the universally quantified premise? We should be able to determine that the car that is one cent above the boundary is expensive, but the car that is one cent less than that is not be expensive. For instance, the cars *a'* and *b'* in (340) differ in respect to cost by one cent.



⁵² Our theory actually goes further than that, since it also covers bare positives by positing a contextually supplied standard, i.e., *X is tall* means *X is taller than Y*, where *Y is supplied by the context*.

But the boundary is between them, so a' is expensive and b' is not. Why don't we notice this when we interpret the universally quantified premise? This is not only a perplexing philosophical question. It possibly undermines everything that we have thus far assumed about the semantics of gradable adjectives. But, as we will see below, our semantics makes the right predictions for comparatives. Comparative predicates do not behave the same way as positive adjectives, even those positives with explicit standard expressions, when it comes to the Sorites paradox. Positive adjectives are much more tolerant than comparatives are. We will conclude that comparatives lack a kind of vagueness that is easily apparent in positives. And, again, we will conclude that the difference has to do with comparatives making reference to a precise standard degree, whereas positives do not.

4.4.5 Comparatives, Positives and the Sorites Paradox

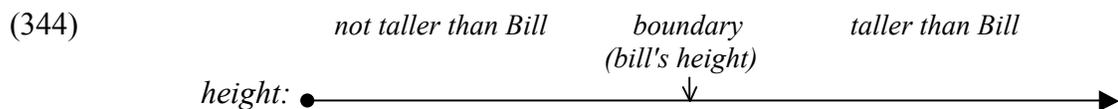
The purpose of this section is to show that comparative predicates resist Sorites paradoxes, but positive adjectives do not. That is, when we use a Sorites argument to test a comparative predicate for tolerance (and, hence, vagueness), we resist accepting the universally quantified premise, but when we do the same for positive adjectives, the universally quantified premise is easily acceptable. Once again we will see that the existence of a standard degree in the logical form of a gradable adjective causes us to reject the universally quantified premise with comparatives, but not with positives. Thus, we will be faced with a question regarding what to do with the semantics for positive adjectives because they include a definite standard degree in the logical form that we have postulated.

So, first let's look at a typical comparative such as in (342). This should have the logical form in (343).

(342) John is taller than Bill.

(343) a. $\| \text{John is taller than Bill} \| = 1$ iff
 b. $\exists e \exists d [\text{EXTERNAL}(e) = \text{john} \ \& \ \text{tallness}(e) \ \& \ \text{DEG}(e) = d \ \& \ \exists e' \exists d' [\text{EXTERNAL}(e') = \text{bill} \ \& \ \text{tallness}(e') \ \& \ \text{DEG}(e') = d' \ \& \ d > d']]$

As noted above, the logical form of comparatives that we have been assuming includes a measure function, DEG, that measures an event's extent; in (343), it is the event (or state) of tallness that Bill is the external participant of. Therefore, a Sorites sequence based on the predicate *is taller than Bill*, should have the degree returned by DEG as its boundary point, i.e., *Bill's height*.



We can think of (344) as an abstract representation of a Sorites sequence that successively compares pairs of individuals that differ in some small amount. We start with a clear case, someone who is definitely *taller than Bill*, and then move down the scale. The Sorites argument that we are interested in, then, is in (345).

(345) Premise 1: John is taller than Bill.

Premise 2: # Anyone who is one millimeter shorter than someone who is taller than Bill is also taller than Bill.

Conclusion: Therefore, someone who is one centimeter tall is taller than Bill.

What is interesting here is the second premise. It is clearly not a sentence that we can accept as true. If John is a clear case, and we start by comparing him to the individual that is immediately below him, then this would be a fine instance of the universally quantified premise. And so would the next few instances. But we still don't want to accept the premise when it is universally quantified. Recall that the premise has the logical form in (346).

(346) $\forall x \forall y [Fx \ \& \ Rxy \rightarrow Fy]$

Translating the second premise of (345) into the form of (346) yields:

(347) $\forall x \forall y [x \text{ is-taller-than-Bill} \ \& \ x \text{ is-1mm-shorter-than } y \rightarrow y \text{ is-taller-than-Bill}]$

The only situations in which the logical form in (347) could be true are those where Bill is the shortest person in the universe of discourse. But in this situation, (347) is vacuously true; everyone is taller than Bill, so of course, anyone who satisfies the R relation is taller than Bill. In situations in which Bill is not the shortest person, the logical form must be false. It is easy to imagine someone who is only one millimeter

taller than Bill, and therefore, someone who is one millimeter shorter than that person is *not taller than Bill*.

The point here is that Bill's height is the boundary for the predicate *taller than Bill*, and knowing that this boundary exists causes us to reject the universally quantified premise. Comparatives are not (very) tolerant to small changes because small changes can cause a crossing of the boundary. Now, because our semantics for *compared-to* and *for-PP's* is essentially the same as the comparative, that is they contain a precise standard degree that should define the boundary point, they should behave in the same way with respect to the universally quantified premise.

However, gradable adjective phrases of the form *A for a NP* are tolerant and vague. (Fara, 2000) This is surprising since the *for-PP* (combined with the NORM function) should supply the standard by which the object predicated of the adjective phrase is measured. In other words, there should be a boundary: those above the boundary are *A for a NP* and those below the boundary are *not A for a NP*. For example, the predicate *tall for a jockey*, when it is applied to an individual, produces the following logical representation:

- (348) a. $\| \text{Willie is tall for a jockey} \| = 1$ iff
 b. $\exists e \exists d [\text{EXTERNAL}(e) = \text{willie} \ \& \ \text{tallness}(e) \ \& \ \text{DEG}(e) = d \ \& \ d > \text{NORM}(\lambda e. \text{tallness}(e))(\lambda x. \text{jockey}(x))]$

The standard degree is returned by the NORM function (based on the properties *tall* and *jockey*). Thus, *the typical height of a jockey* should be the boundary point. But,

for-PP's do not make gradable adjectives any less vague than they are without this standard expression. (Fara, 2000) I will also show that the source of this vagueness is not the NP that is the complement of the *for-PP*.

First, in (349), we see that a predicate of the form *A for a NP* gives rise to a Sorites paradox just like the bare form of the adjective does.

(349) Premise 1: Willie is tall for a jockey.

Premise 2: Anyone who is one millimeter shorter than someone who is tall for a jockey is also tall for a jockey.

Conclusion: Therefore, someone who is ten centimeters tall is tall for a jockey.

Again, the important sentence is the universally quantified premise. Compared to the comparative predicate, this one seems acceptable. But how could it be accepted as true? The boundary should be *the typical height of a jockey*, and as we saw with comparatives, a precise boundary should cause us to reject this premise. According to the semantics that treats positives as implicit comparatives, positive adjectives should not be tolerant.

One possible response might be to say that while the standard is a precise degree, we don't actually know which degree it is. And therefore, we accept the universally quantified premise because as we look at two very similar individuals, we

don't know if the boundary is between them or not.⁵³ I will refer to this as the *epistemic solution* to vagueness. So, while the semantics determines from *tall for a jockey* that the standard degree is the typical height of a jockey, we don't know what that height is and have no way of realistically determining it. I have two arguments against this view.

The first argument is that when we construct comparatives with the same epistemic failings that are claimed to cause the vagueness of positives, the comparative is not vague in the same way that positives are. Take the example in (350).

(350) Willie is taller than the typical height of a jockey.

This is a comparative where the standard expression is an explicit degree term that is identical to what we have predicated to be the standard for the predicate *tall for a jockey*, i.e., *the typical height of a jockey* (348). Therefore, the epistemic solution predicts that (350) should be just as unknowable as the standard in (349) and be just as tolerant to small changes. But, comparatives like (350) resist Sorites paradoxes.

(351) Premise 1: Willie is taller than the typical height of a jockey.

⁵³ This response would be similar to Williamson (1994) which suggests that there are things we just can't possibly know about the world, like the exact extension of a predicate and the boundaries of vague predicates. But, I should also point out that Williamson's theory makes no predictions about natural language semantics. He directs his attention to the relationship between the mind and the world.

Premise 2: # Anyone who is one millimeter shorter than someone who is taller than the typical height of a jockey is also taller than the typical height of a jockey.

Conclusion: Someone who is ten centimeters tall is taller than the typical height of a jockey.

As with other comparatives, the second premise is not easy to accept as true. Not knowing what the typical height of a jockey is – and having no way of ever learning what it is – does not effect our ability to reject the universally quantified premise. Apparently, simply accepting that it exists and that it is precise is enough. Thus we can conclude that not knowing what degree the typical instance of a comparison class has of the necessary gradable property does not cause the vagueness of a positive with a *for-PP*. The second argument against the epistemic solution is based on the vagueness of positives with *compared-to* phrases.

Positive adjectives that occur with a *compared-to* phrase, just like those with *for-PP*'s, are tolerant and vague in a way that contrasts with comparative adjectives. Again, it is important to note that the semantics of *compared-to* phrases proposed in the previous chapter treats them exactly like phrasal comparatives.

- (352) a. John is tall compared to Bill.
b. $\exists e \exists d [\text{EXTERNAL}(e) = \text{john} \ \& \ \text{tallness}(e) \ \& \ \text{DEG}(e) = d \ \& \ \exists e' \exists d' [\text{EXTERNAL}(e') = \text{bill} \ \& \ \text{tallness}(e') \ \& \ \text{DEG}(e') = d' \ \& \ d > d']]$

We would therefore expect them to behave identically in terms of their vagueness and whether or not we accept a universally quantified premise. But they don't behave the same, and therefore, the semantics that we have attributed to positives is too similar to the semantics of comparatives.

The universally quantified premise of a Sorites argument is initially accepted when it is a positives with *compared-to* phrases that is being tested.

(353) Premise 1: John is tall compared to Bill.

Premise 2: Anyone who is one millimeter shorter than someone who is tall compared to Bill is also tall compared to Bill.

Conclusion: Therefore, someone who is one centimeter tall is tall compared to Bill.

In this respect, they behave just like adjectives with *for-PP's*, and they do so even though the complement of a *compared-to* phrase is an individual, not a kind denoting NP. This argues against the epistemic solution to vagueness, i.e., the vagueness of predicates of the form *A for a NP* is a matter of not knowing what the typical instance of the comparison class looks like. Rather, it has something to do with the semantics of positives as opposed to comparatives.

4.4.6 Summary

This section explored a vagueness distinction between positive adjectives and comparative adjectives. We saw that positive adjectives, even when they occur with an explicit standard expression, have boundary cases, have blurry boundaries and are

tolerant in the sense that they give rise to Sorites paradoxes. Comparatives on the other hand behave differently. For instance, we resist accepting sentences of the following form when F is a comparative predicate and R relates x and y by requiring that they differ by a small amount.

$$(354) \quad \forall x \forall y [Fx \ \& \ Rxy \rightarrow Fy]$$

Therefore, I take this to mean that positives are a source of a certain kind of vagueness that comparatives are not. We cannot pin this difference on the kind of nominal in the standard, since the difference persists even when the same kind of nominal is used in a comparative or a positive, i.e., *taller than Bill* is not vague in the same way as *tall compared to Bill*.

The facts discussed in this section and the previous two sections point to a problem with the semantics that we have thus far assumed. That semantics predicts that positive adjectives and comparatives should behave the same with respect to differentials, crispness and vagueness tests because it assigns to both constructions logical representations that contain precise degrees representing the referent and standard. Precise degrees should allow us to modify comparison relations with differential measure phrases, make crisp judgments, and reject the universally quantified Sorites premise. In fact, they do in the case of comparative predicates. But, however, positive adjectival predicates, even those with explicit standard expressions, do not allow differential measure phrase, do not allow crisp judgments, and do not resist Sorites type reasoning.

These conclusions raise several interesting questions. First, are degrees at the root of the properties that we find with comparatives, i.e., differentials, crispness and a lack of vagueness, as I have claimed? If they are, then do we have to expunge degrees from the logical representation of positives? Or more generally, how must our semantics of the positive adjective be modified if we are to understand why behaves so differently from comparatives? This question is especially interesting given our intuitions that positive adjectives have extremely similar semantics to comparatives.

In the next section, I review, very briefly, some ways of describing vagueness. One way, in particular, seems very adept at accounting for the properties that distinguish positives from comparatives. That is to say that because positives are vague in a certain way that comparatives are not, the other two properties, differential measure phrases and crispness, follow. This has, in fact, been suggested (to some extent) by Kennedy (2005a, 2005b) and Fara (2000). However, Kennedy's proposal maintains the idea that positives are implicit comparatives. I will review their proposal in the section 4.6.

4.5 Describing Vagueness

4.5.1 Introduction

The previous section left us with the puzzle of how to differentiate positive adjectives from comparative adjectives. Positive adjectives do not allow differential measure phrases, do not allow crisp judgments, and give rise to Sorites paradoxes. Comparatives, on the other hand, do allow differential measure phrases, do allow crisp judgments and resist Sorites paradoxes. Therefore, our semantics of positives

must change to account for these differences because as it stands now, positive adjectives look virtually identical to comparatives. Also, the way I have described the distinguishing properties puts the blame on our assumptions that assign positives logical representations that include reference to precise degrees. Thus, we need a way to describe positives that differentiates them from comparatives in this way: they cannot include reference to precise degrees. That is, positives are vague in a way that comparatives are not.

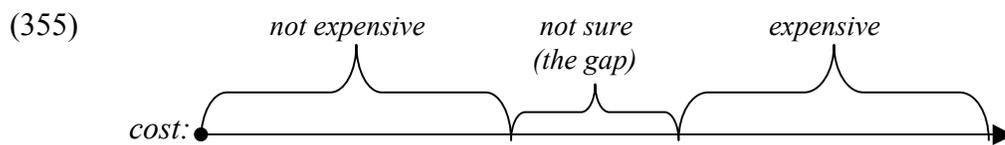
In this section, I will review two different ways of describing what vagueness is. I will refer to the first way as the *borderline cases* description, which I will discuss in section 4.5.2. In this type of story, vague predicates split the universe of discourse up into three groups: those that definitely satisfy the predicate, those that definitely do not, and those that we aren't sure about, i.e., the *borderline cases*. The second way of describing vagueness, discussed in section 4.5.3, defines the standard, or the *borderline*, as a fuzzy or blurry line that has no real borders itself, and hence I will refer to it as the *blurry boundary* description. I will also discuss how this conception of vagueness might provide a way to unify the three properties that distinguish positives from comparatives.

4.5.2 Describing Vagueness as the Inclusion of Borderline Cases

It is typical to say that vague predicates are those that give rise to *borderline cases*. (Fine, 1975, Kamp, 1975, Keefe and Smith, 1996, and sources cited therein) This means that a predicate splits the universe of entities up into three parts: a definite positive extension that includes those entities that definitely possess the property denoted by the vague predicate, a definite negative extension that includes those

entities that definitely do not possess the property, and, between them, a *gap* that includes those entities for which we are not sure if they possess the property or not. To help illustrate this, let's employ the degree/scale terminology and use the vague predicate *expensive* as an example.

Let's say we are concerned with the cost of sneakers, and we have ordered the sneakers on a scale of cost. There are cases of definitely expensive sneakers, and cases of definitely not expensive sneakers. Between these groups lies the gap, in which the sneakers that we aren't sure about are ordered.



This demonstrates a critical problem with thinking about vague predicates as predicates that have borderline cases. Defining vagueness in this way requires that we assume that there are *definite cases*, but the notion of definite cases requires that there be definite borders around the gap. Now, imagine starting at the bottom of the scale in (355), where the sneakers are definitely not expensive, and working our way up the scale. At some point, the sneakers cease being *not expensive* and start being *borderline cases*. But where is this point? Also, where is the point at which sneakers stop being borderline cases and start being expensive? Is it precisely where the gap is defined in (355)? The borderline story, that places the objects we aren't sure about in the gap, predicts that there should be *precise* borderlines around the extension and anti-extension. But it seems impossible for us to judge the borderline of the

borderline cases. That is, it appears that the borderlines between the gap and the definite cases are themselves vague. (cf. Keefe and Smith, 1996, p 14, and sources cited therein) Thus, if the puzzle was simply to find out what is going on with borderline cases, we run into the problem of defining the borderline cases because the borderlines are vague.

Furthermore, as Fara (2000) points out, this description of vagueness doesn't explain why we are so willing to accept the universally quantified premise. Knowing that there are precise boundaries surrounding the gap should result in us knowing that there are transition points in the Sorites sequence between *true*, the gap and *false*. In other words, these precise transition points predict that positives should behave like comparatives in terms of accepting the universally quantified premise.

4.5.3 Blurry Degrees

A second way of describing vagueness seems to capture our intuitions a bit more accurately. Instead of saying that there is a gap (with clear boundaries) in our judgments, we can say that the boundary is itself *fuzzy*, or, as I will call it, *blurry*. (Fara, 2000, Sainsbury, 1991) Fara warns of taking this metaphor *blurry* too seriously, because one might worry that to say that the boundary is blurry is really to say that there is a gap defined by the edges of the blurry boundary. But, she says, we shouldn't think of *blurry* in this way: to say that a boundary is blurry is to say that it has *no boundaries at all*. I take this to mean that there is no point at which the blurry boundary starts and ends.⁵⁴ She uses a quotation from Frege, volume II of the

⁵⁴ I hesitate to say that this *is* what Fara means because, in the end, she claims that a sharp, precise boundary does exist – it just shifts around easily. I discuss this more in section 4.6.

Grundgesetze (1903), to illustrate her point which I will paraphrase.⁵⁵ Imagine using a Venn diagram to describe the extension of a concept. We draw a circle on a plane of paper and say "inside this circle are all and only the objects for which the concept is true." Now, imagine that the lines of the circle were, in some places, not sharp, but rather, faded into the background. The faded line doesn't start or end anywhere, and yet it manages to, as Sainsbury (1991) says, "classify without setting boundaries".

I will describe this using the scale terminology as in the following diagram.



We can think of the boundary between the expensive things and the inexpensive things as being a blurry line, without edges, fading in both directions.

This diagram in (356) does a better job of capturing our intuitions about the boundary than the diagram in (355). Recall from 4.4.3 when we start with an individual that we clearly judge as truthfully in the extension of the vague predicate, and then work our way down the scale by small increments, we never seem to cross a clear boundary into the gap as (355) would predict. Rather, as we get lower and lower on the scale our judgments seem to get less and less clear, and then at some point, they get clear again, only then we are judging the individuals as part of the negative extension. That is, we can clearly judge individuals as part of the positive extension or part of the negative extension, and those in the middle are not clear. But the clearness of our judgments is *gradual*, like the blurry degree diagram is. We

⁵⁵ See also, Wright (1976).

accept the universally quantified premise of a Sorites paradox because vague predicates do not draw a boundary between things that are similar to each other. Pick two points on the scale in (356) that are sufficiently close to each other in terms of the relation R used in the Sorites sentence (like *one cent less than*), and it is impossible to see the boundary between them. That is, vague predicates are tolerant because there never is a boundary between two objects that differ minimally. I don't want this to sound like an explanation of vagueness, because it isn't. It is simply a metaphor that tries to capture some intuitions about it, but I think it is a helpful one in that it allows us to describe things in a way that differentiates positive adjectives from comparative adjectives.

This notion of a blurry standard also lends some credence to the claim that the differences between positive and comparative adjectives can be traced to the fact that positives are vague in a way that comparatives are not. Take differential measure phrases, for instance. Differentials describe the difference between two precise degrees, i.e., they include a subtraction operation that requires two numbers. If the standard in a positive adjective phrase is actually blurry, how could a differential be used? But, if comparatives are not vague and have precise standards, the use of a differential should be easy. Recall also that the crispness distinction seemed to indicate that comparatives involve precise degrees, but positives required the referent to be some significant amount greater than the standard. Well, if the standard were actually blurry, then the referent might not be able to get very close to it, since we couldn't say with any certainty where the standard starts and where it ends.

In the next three sections, I will entertain four different options for incorporating this notion of a blurry degree into the semantics. The first two, discussed in the following section, continue to treat positives as implicit comparatives. Options 3 and 4, however, aim to treat positives as fundamentally different from comparatives. The following chart outlines the basic nature of the options.

(357) *Alternatives Approaches to Distinguishing Positives from Comparatives:*

	Positives:	Comparatives:
Option 1:	$\mathbf{d} \!> \mathbf{d}'$ where $\!>$ is <i>significantly-greater-than</i> and what counts as <i>significant</i> is supplied by the context	$\mathbf{d} > \mathbf{d}'$
Option 2:	$\mathbf{d} >^{n^*m} \mathbf{d}'$ where $>^{n^*m}$ is <i>measurably-greater-than</i> , m is supplied by the context, and n is something else	$\mathbf{d} >^m \mathbf{d}'$
Option 3:	$\Delta \succ \Delta'$ where Δ is a blurry number and \succ is a comparison over blurry numbers	$\mathbf{d} >^m \mathbf{d}'$
Option 4:	No grammatical measurement or comparison	$\mathbf{d} >^m \mathbf{d}'$

The first option is from Fara (2000) and Kennedy (2005a, 2005b). They claim that positives actually are implicit comparatives, and that positives have sharp boundaries, but that these sharp boundaries are context dependent in a way that causes them to shift quickly and easily giving the impression of blurriness. I will show that the reasoning they use to justify this context dependence and the mechanisms they use to encode it into the semantics apply to not only positives, but comparatives as well.

Thus, their proposal, while interesting, correct and necessary, does not in the end differentiate positives from comparatives. I will modify their proposal (Option 2) such that the comparison relation is a context dependent *measurably-greater-than* relation between two degrees in positives and comparatives. In order to account for the distinguishing characteristics, the comparison relation in positives must be modified by an additional variable *n*.

Options 3 and 4 are based on the idea that we cannot treat positives as implicit comparatives. Rather, positives involve a different kind of measurement, if they involve measurement at all. Our logical representations for positive adjectives cannot refer to degrees or comparison relations like *greater-than*. Instead, as Option 3 proposes, we must use different mechanisms entirely. I will discuss the idea that the degrees referenced in positives are actually blurry in the sense described above. That is, they are not precise numbers. Therefore, a new relation will have to be defined over blurry degrees, which I will call \succ . Finally, Option 4 suggests that positives do not involve measurement at all, at least not in the grammar.

Only Option 1 has been worked out in any detail (by Fara (2000) and Kennedy (2005a, 2005b)). Options 2, 3 and 4 are simply suggestions for where we might want to look in the future. I am particularly interested in promoting Options 3 and 4, precisely because they appear to account for the distinguishing semantic characteristics between positives and comparatives in the most straightforward way. That is, the properties we have been discussing, i.e., differential measure phrases, crispness and vagueness, suggest that positives involve a completely different type of

measurement. I turn now to discussing Options 1 and 2, which try to fix up the comparative semantics for positives.

4.6 Options 1 & 2: Positives as Implicit Comparatives

4.6.1 Introduction

We have thus far discussed three characteristics that distinguish positive adjectives from comparatives.

(358) *Distinguishing Characteristics:*

	Positives:	Comparatives:
Tolerance/vagueness	YES	NO
Crisp judgments	NO	YES
Differential measure phrases	NO	YES

These characteristics appear to be semantic in nature, and thus they need to be accounted for under our semantic theory. But, as we have discussed, our semantics does not differentiate between positives and comparatives. Furthermore, I have suggested that the problem seems to lie in our treatment of positives as comparative relationships between precise degrees. But, the first option in (357), proposed in Fara (2000) and adopted in Kennedy (2005a, 2005b), does not change the underlying assumption of the standard degree theory that positives are implicit comparatives. I will discuss their theory below and argue that it in fact cannot distinguish between

positives and comparatives. Once the problems with this theory are made clear, I will discuss an alternative, option 2, based on the original proposal.

Fara (2000) and Kennedy (2005a, 2005b) discuss two of distinguishing characteristics in terms of the theory presented in this section. The first is that positives are vague in a way that comparatives are not. They are tolerant, i.e., we tend to accept the universally quantified premise of a Sorites argument when it is based on a positive adjective phrase, but tend to reject it when it is based on a comparative adjective phrase. That is, we notice that the standard degree of a comparative can be crossed in a Sorites sequence, but we don't notice that the standard degree of a positive can be crossed. The second is the crispness of comparatives versus the lack of crispness with positives. The boundary of a comparative is defined by the actual standard degree, but the boundary of a positive is some imprecise location above the standard. It would be desirable to show that these two phenomena had the same source, i.e., there is something about the semantics of positive adjectives that distinguishes between positives and comparatives, and this distinguishing characteristic is at the root of the data we have seen thus far. At this point, the semantics that we have been assuming does not adequately distinguish them.

Fara (2000) proposes a modification to the semantics of positive adjectives that is meant to account for their vagueness, which Kennedy (2005a, 2005b) adopts and extends to account for crispness. The goal of the account is to explain why we tend to accept the universally quantified premise of a Sorites argument and to lend substance to the *blurry-boundary* metaphor. The account is based on the idea that

vagueness is a matter of context dependence. Contrary to what we might think a theory based on the blurry-boundary metaphor would look like, Fara says that the boundary of a positive adjective is precise. But, it moves around, so easily in fact that it gives the impression of being blurry and imprecise. The idea is that when we try to evaluate any given instance of the universally quantified premise, the boundary is not where we are looking. It shifts out of view.

I will argue in this section that while Fara's proposed mechanism is necessary, it actually doesn't account for the distinguishing features of positive adjectives. I will argue for this conclusion by showing that the reasoning behind Fara's proposal is sound and appropriate, but that it also applies to comparatives as well as positives. Comparatives need this notion of a context dependent comparison relation as well. It is this property of comparatives that I asked the reader to ignore when discussing the vague characteristics of positives as opposed to comparatives. Recall that I said that comparatives were in fact vague, but that positives had an additional level of vagueness absent in comparatives. In this and the next few sections, I will give substance to that claim. I will flesh out exactly how I understand Fara's proposal and how I think it is needed for the context dependence of comparatives. The result will be that the distinguishing characteristics of positives and comparatives remains a mystery. It predicts that comparatives and positives should behave the same way because both compare degrees in terms of the context dependent comparative relation. I will therefore conclude that there must be an additional source of vagueness in positive adjectives above-and-beyond that caused by context dependence. Option 2 will be used to describe this additional level of vagueness.

But, let me stress again that Option 2 is not a fully developed proposal; it is simply a suggested avenue of research. Now, let's turn to Fara's analysis, which Kennedy (2005a, 2005b) adopts and extends to cover the crispness distinction.

4.6.2 Shifting Standards

Fara (2000) proposes a *similarity constraint* on the use of vague predicates. The similarity constraint simply states that whatever standard is in use for the vague predicate, anything that is *saliently* similar to something that is in the predicate's positive extension must also be in the positive extension, and anything that is *saliently* similar to something that is in the negative extension must also be in the negative extension. If two objects are saliently different from each other, then it *may* be that they are in different extensions, i.e., if one thing has more of some gradable property than another, then there is the chance that a boundary could be placed between the two.

The key characteristic of the similarity constraint is this notion of *salience*. What makes objects saliently similar is a matter of context, i.e. the interests and purposes of the participants in a conversation. These interests and purposes can be different depending on all sorts of things: what is being measured, how accurately the measurements need to be, what purpose the measurements will serve, etc. I believe that we can think of this as a kind of rounding off of measurements. If, for instance, we are interested in discovering who is taller, Bill or John, then we can use a meter stick to measure them. If the measuring stick only measures to the nearest millimeter, and we agree that this is good enough, then Bill and John might be considered to be the same height. We would think this to be true even if we know that a much finer

grained measuring device would reveal their differences. This, she claims, helps us understand why we accept the Sorites premise.

When we try to evaluate the truth of the universally quantified premise, we imagine a particular instance of it.

(359) Anyone who is one micrometer shorter than someone who is tall is also tall.

The universally quantified premise basically says "don't worry about this small difference – for our purposes, the two objects should be considered to be the same." So, due to the similarity constraint, the two individuals in any particular instance of (359) should both be in the positive extension of *tall*. In essence, the reason that we are so ready to accept a sentence like that in (359) is because when we focus on a small subsection of the Sorites sequence and we accept the similarity of the two items under consideration, the boundary moves from out of our view. At the point when we interpret the universally quantified premise, the context *requires* that we accept the similarity of the two objects and place them in the same extension. This is how the interests and purposes of a discourse manipulate our ability to find the boundary. Crucially, the interests and purposes of discourse participants can vary quite easily and quickly, even during the same discourse, causing different similarities and differences to become more or less salient. Hence, the boundary shifts constantly, and we are never really able to pinpoint it.

Fara encodes the similarity constraint into a context sensitive notion of *significance*. She suggests that for a gradable adjective to be truthfully predicated of

an object, that object must possess the gradable property to a degree that is *significantly-greater-than* the standard degree. The key component of this analysis is the *significantly* modification of the *greater-than* relation. Significance is a context dependent notion, and by modifying the *greater-than* relation, it makes that relation a context dependent one. Significance does the work of the similarity constraint, i.e., it ensures that whatever two objects are being compared, they have to be significantly different from each other where what counts as significantly different is defined by the context. Understand that this account still assumes that positive adjectives are relations between a referent and standard degree. The standard degree is definite just like it is with comparatives, it just shifts easily. Here are the semantic details of her account.

Under Fara's account, a sentence like (360)a is to be interpreted as (360)b, which in turn is to be interpreted like (360)c.

- (360) a. John is tall.
b. John has a lot of height.
c. John has significantly more height than is typical.

The *a lot* in (360)b is important: it is to be interpreted as *significantly more than what is typical*. There must be a difference between John's height and the typical height of the comparison class, but also this difference must be *significant*. The context

dependent *significance* is incorporated into the *greater-than* relation, so that POS_{for} is given the meaning below⁵⁶:

$$(361) \text{ POS}_{\text{for}} = \lambda G_{\langle e, d \rangle} . \lambda P_{\langle e, t \rangle} . \lambda x . G(x) !> \text{NORM}(G)(P)$$

The difference in (361) from what we have been assuming is the *!>* function. This is a context dependent function and is given the following meaning.

$$(362) \text{ !>} = \lambda d \lambda d' . d \text{ is significantly greater than } d', \text{ where what counts as a}$$

significant difference is defined by the context

Whether an amount counts as significant or not depends on how the context defines the similarity constraint. That is, if a sentence like *John is tall for a basketball player* must be true, then we are saying that the significant amount between John's height and the typical height of basketball players must be great enough such that we would not say those two heights are the same. The derivation in (363) illustrates this:

$$(363) \text{ a. } \|\text{John (is) } [_{\text{DegP}} \text{ POS tall for a wrestler}]\| = 1 \text{ iff}$$

$$\text{ b. } \text{TALL(john) !> NORM}(\lambda x . \text{TALL}(x))(\lambda x . \text{wrestler}(x)) = 1 \text{ iff}$$

⁵⁶ Fara (2000) and Kennedy (2005a, 2005b) use the standard measure function analysis of gradable adjectives that I argued against in chapter three. I will use the measure function analysis when reporting their proposals.

- c. *John's height is significantly greater than the height of a typical wrestler, where what counts as significantly greater is defined by the context*

Although Fara doesn't discuss *compared-to* phrases, the semantics for *compared-to* that we have been assuming is easy to modify. We simply replace the $>$ relation with $!>$.

$$(364) \text{ POS}_{\text{comp}} = \lambda G \lambda y \lambda x. G(x) !> G(y)$$

- (365) a. $\|\text{John (is) } [[\text{POS}_2 [\text{tall}]] \text{ compared to Bill}]\| = 1$ iff
 b. $\text{TALL}(\text{john}) !> \text{TALL}(\text{bill}) = 1$ iff
 c. *John's height is significantly greater than Bill's height, where what counts as significantly greater is defined by the context*

Notice that this analysis manages to account for two of the properties of positives that we are interested in: tolerance (vagueness) and a lack of crispness.

Kennedy (2005a, 2005b) adopts Fara's analysis and shows that it provides an account of the crispness distinction.⁵⁷ Specifically, the *significantly-greater-than*

⁵⁷ The difference between Kennedy (2005a, 2005b) and Fara's (2000) analysis is that for Kennedy there is no $!>$ relation. Instead, he modifies the NORM function such that it is dependent on the context. This new function s returns, in the case of *for-PP's*, the degree that is significantly greater than the typical degree of a typical member of the comparison class. In the case of *compared-to* phrases, s returns the degree that is significantly greater than the degree of the individual denoted by the complement of *compared-to*. As far as I can tell, Kennedy's analysis suffers from the same problem

relation requires that the referent be some contextually supplied distance above the standard. Hence, the fact that the boundary line that divides the positive and negative extension of a gradable adjective is above the standard degree is reduced to the same source of the predicates tolerance to small changes: the similarity constraint.

Under this analysis, comparatives are not a *significantly-greater-than* relation between the referent and standard degrees. Thus, comparatives are predicted to be crisp and, at least in the way we are interested in, not vague.⁵⁸ To summarize then, we have the following distinction between positives and comparatives:

(366) Fara (2000) and Kennedy (2005a, 2005b):

Positives: $d \text{ !> } d'$

Comparatives: $d > d'$

Both positives and comparatives involve explicit reference to precise degrees, and hence have sharp boundaries, but they are different in that comparatives only involve the *greater-than* relation while positives involve the *significantly-greater-than* relation. However, there is a problem with using the similarity constraint as the source of these two characteristics of positives. That problem is the fact that comparatives are subject to it as well. Therefore, it could not be the cause of any

that Fara's does, a problem that I will discuss in the next section. Therefore, I will not spell out the details of his proposal.

⁵⁸ Although they are vague in another sense, which I will describe below in the next section.

distinctions between positives and comparatives. This will be the topic of the next few sections.

4.6.3 The Similarity Constraint, Discriminability and Comparatives

In this section, I point out that, while Fara's insights are correct and the mechanisms she proposes are needed, they actually do not distinguish between positives and comparatives. Comparatives are vague in a certain sense that I will describe below, and the context dependent *significantly-greater-than* relation accounts rather nicely for this vagueness. Thus, I will propose that they, too, are a *significantly-greater-than* relation between two degrees. This context dependent notion allows speakers to define the granularity of their measurements, i.e., to define which objects will be discriminated from each other in terms of the gradable property under question. While positives are sensitive to this context dependent notion, we will conclude that positives have another source of vagueness above and beyond discriminability.

The similarity constraint states that if any two objects are saliently similar with respect to the gradable property under question, then they must both either fall in the positive extension of the predicate or the negative extension. The similarity constraint follows from the semantics of the *significantly-greater-than* relation proposed for positive gradable adjectives. This relation is context dependent in the sense that what counts as *significantly-greater-than* depends on what the interests and purposes of the discourse are. If a minor difference between two objects with respect to the gradable property is not salient, then they must be treated as the same. That is, one is not *significantly-greater-than* the other.

The similarity constraint looks an awful lot like the notion of *discriminability* defined in Wright (1976). Wright, based on insights from Russell (1923), claims that when a gradable predicate is applicable to one object that is indiscriminable from another object, then the predicate must also be applicable to that second object. Objects that are discriminable can be differentiated in terms of that gradable predicate. These terms are defined in (367) and (368). (367) says that for two objects x and y to be discriminable then there must be a context in which either x or y is in the positive extension of G but the other is not. (368) says that for two objects to be indiscriminable, then in all contexts, if x is G , then y is G , and if y is G , then x is G .

(367) Discriminable = $\exists x,y \exists C [G(x) \neq G(y)]$

(368) Indiscriminable = $\exists x,y \forall C [G(x) \leftrightarrow G(y)]$

Part of Wright's point was to highlight an insight of Russell that when unaided observation cannot discriminate between two objects in terms of some property, then the two objects are indiscriminate in terms of that property. For instance, if we cannot discriminate between the brightness of two stars because our eyesight is not sensitive enough to do so, then we would refer to those two stars as equally bright. And, if we deem one to be bright then the other is as well, or if we consider one to not be bright, then the other is not bright. The point should be extended to *aided* observation as well: if, by whatever aid we use, two objects are indiscriminable in terms of some gradable property, then they must fall into the same extension of that

property. So, if we are looking through a pair of binoculars and the brightness of two stars is indiscriminable, then both must be in the same extension of *bright*. This, of course, does not preclude us from knowing that one star is brighter than another even though we cannot see the difference and describing that difference using language. The point of (367) is that there must be a context, perhaps one with an observational aid, that discriminates between two objects. In this way, Russell and Wright define *observational predicates* as those that are vague because we cannot use (or refuse to use) our observational skills to decide if an object belongs in the extension of that predicate. We must simply do our best at observing and measuring the gradable property.

Fara's insight is that the definitions in (367) and (368) are too strong. She makes them intensional: it is not that two objects are indiscriminable with respect to a gradable property *G* iff in *all contexts* both objects are in the same extension; rather, for two objects to be indiscriminable with respect to *G* they must be in the same extension in *all of the contexts that conform to our interests and purposes*. That is, if for our purposes we don't need to discriminate beyond a certain level of granularity, then in all of those contexts, the two objects are indiscriminable. It is this notion of *observable* discrimination that I want to focus on here.

A predicate might be vague simply because we cannot (or don't care to) observe distinctions. For instance, the predicate *is two-meters tall* is vague in this sense. If we pull out a meter stick that measures down to the nearest millimeter, then we might observe that John is two-meters tall. We can even "truthfully" say *John is two-meters tall*, even though we know that if we were to use a much more fine-

grained measuring device, we would probably find out that he was a micrometer or so taller or shorter than that.⁵⁹ The point being that the measure phrase *two-meters* is in some sense vague in the way that Fara and Wright and Russell are talking about. What counts as *two meters* is dependent on our interests and purposes. It is not dependent on what the legal definition of *two meters* is, but rather what we can observe or what we choose to observe.⁶⁰ Therefore, I want to refer to this type of vagueness, the purposeful ignorance of a legal definition, as *observational vagueness*.

Another example might help to see what I mean by *observational vagueness*. Consider the vague predicate *is a child*. We cannot pinpoint exactly at what age a person needs to be under to be considered *a child*. Maybe it is fourteen, fifteen, sixteen, or maybe it has something to do with a person's personality. But in some legal systems, a child is defined as anyone under the age of eighteen. Now, is someone who is one second under the age of eighteen legally a child? How about a microsecond or a nanosecond? Maybe, but maybe not. It is this ability to choose how fine-grained we are going to be about measuring a property, despite a legally binding definition of who lies in the extension, that I believe is at the heart of the proposal Fara makes. That is, we discriminate up to the point where we don't want to

⁵⁹ This is different from the observation that *John is two-meters tall* means that he is at least two-meters tall, because the vagueness of *is two-meters tall* allows John to be a very small bit less than two meters in height.

⁶⁰ The international standard for one meter is the distance traveled by light in an absolute vacuum in 1/299,792,458 of a second. Obviously, most people, with the exception of some scientists, adhere to this standard when they use language.

⁶¹ Russell (1923) points out that measure terms, "...which science has tried hardest to make precise...", such as *meter*, are vague, though "...to a lesser degree" than what we find in words like *tall* or *red*.

(or can't) discriminate anymore because for our interests and purposes, we don't have to. This is observational vagueness.⁶²

In sections 4.2, 4.3 and 4.4, I claimed that comparatives were, in fact, vague, but I asked the reader to ignore that for the purpose of showing the distinguishing characteristics of positives. The difference in how positives and comparatives behaved when the vagueness tests were applied to them were so obvious that I felt discussing the way in which comparatives were also vague would just complicate the description of the facts. But now, I want to show that comparatives actually have borderline cases, fuzzy boundaries and are tolerant, and we must therefore conclude that they are vague. This is *not* to say that they are vague in the same way as positives, because they are not. It was clear when we applied those tests that positives behave differently from comparatives. Rather, I want to claim now that the way in which comparatives are vague is a matter of *observational vagueness*. This means that when we apply the vagueness tests to comparative predicates the results will be dependent on how fine-grained our measurements are and whether they discriminate the objects involved. Hence, the results won't be as clear cut as when we applied the tests to positive predicates. Instead, we will have to find *observational vagueness* equivalents to the data that we reviewed concerning positive adjectives.

⁶² Although the examples that I will give are only predicates for which we have some real-world device that can measure extents of that predicate, i.e., a meter stick to measure height or a scale to measure weight, I do not mean *observational vagueness* to only apply to them. I also want to describe gradable predicates like *happy* and *patient* for which there are no measuring devices. The same logic applies to these predicates as well, in fact, they make the point quite dramatically: we can observe states of happiness or patience and we can measure them. It is just that our measurements are necessarily very coarse-grained precisely because we do not have any recognized way to observe them.

First, comparative predicates would be vague if they had borderline cases. Imagine measuring the distance to far away stars. We are capable of only measuring to the nearest light year. If we measure two stars, *A* and *B*, to be about fifty light years away from earth, and our measurements cannot be made any more accurate than that, then we have a borderline case in the following sense: we don't know whether star *B* should be considered to be *farther from earth than star A* or *closer to earth than star A*. One of them is probably true since it is unlikely that they are exactly the same distance from earth. But, star *B* is in this sense a borderline case for either comparative predicate: we simply can't tell whether the predicate applies or not, and the fact that we can't tell is directly related to our observational abilities.

Second, comparative predicates would be vague if they had fuzzy boundaries. Let's use the same situation in which we are measuring the distance to stars *A* and *B*. If *A* is measured to be about fifty light years from earth, at what point does *B* become *closer to earth than A*? Because we can only measure to the nearest light year, the boundary must be somewhere less than fifty light years, but where exactly is this point? At some point our measurements are rounded off to forty-nine light years, but do not mistake this point to be 49.49999 light years: our measurements are not fine-grained enough to measure that precisely. Rather, we make measurements and at some point we feel confident enough to say that a star is *closer to earth than A*, but this point where we are "confident enough" is not precise. At some distance between forty-nine and fifty light years from earth, *B* would be *closer to earth than A*. This is the observational vague correlate to the fuzzy boundary test.

Third, if comparative predicates are vague, then they should be tolerant in that they give rise to Sorites paradoxes. Let's use *taller than Bill* to demonstrate that comparatives are tolerant in the observationally vague sense. Imagine that we are measuring John's height because we want to know if Bill's suit will fit him. If we are constrained to make measurements only within the nearest millimeter, and conclude that John is taller than Bill. Then, a small difference, like a nanometer, will not effect the applicability of the predicate *taller than Bill* because one nanometer is not going to make a difference in terms of whether someone can fit into Bill's suit.

(369) Premise 1: John is taller than Bill.

Premise 2: Anyone who is one nanometer shorter than someone who is taller than Bill is still taller than Bill.

Conclusion: #Someone who is the same height as Bill is taller than Bill.

This universally quantified Sorites sentence is, I admit, hard to accept, as we saw in section 4.4. But, I think that in the situation in which we *don't care about nanometer differences*, it becomes easier to accept. I think that the difficulty in accepting it lies in the fact that by using the differential form of the comparative and stating the nanometer difference, we make it seem as if we can make nanometer measurements. But in a situation in which we can't make that fine-grained of measurements, or simply don't care to, the premise is acceptable. That is, by stating the nanometer difference, we make the differences between the two objects very salient and therefore discriminate between them. The sentence is only acceptable to the extent

that we can keep their similarity salient in such a way that it trumps their differences. Thus, we have the observational vagueness equivalent to tolerance.

All of this was simply to show that comparative predicates are also subject to considerations of similarity, or (in)discriminability, just like positive adjectives. Hence, they are vague in precisely the way that Fara (2000) and Kennedy (2005a, 2005b) say that positives are. When objects are saliently similar they must be either in either the positive or negative extension of *taller than Bill*, where what counts as saliently similar depends on whether we want to discriminate between them. If this is all correct, then the comparative relation is a *significantly-greater-than* relation, just like Fara and Kennedy propose for positives, where what counts as *significantly-greater-than* is dependent on what the discourse says the granularity of the measurements are. To make the *significantly-greater-than* relation and its context dependence more apparent, I will define it as in (370).

(370) $>^m = \lambda d \lambda d'$. d' is at least m greater than d ,

where m is a degree supplied by the context

This is a function from two degrees to a truth value, i.e. it is of type $\langle d, \langle d, t \rangle \rangle$. But it is dependent on the context to indicate what m is, where m is a degree. In essence, it m plays the part of a differential measure phrase. In the case where we measure John and Bill to the nearest millimeter, then to say that John is taller than Bill is to say that John is at least a millimeter taller than Bill. I also want to call the function in (370) something other than *significantly-greater-than* in order to better capture the intuition

behind it (at least, the intuition that I have been using to describe it). Thus, I will refer to it as *measurably-greater-than*.

The conclusion, therefore, must be that the description of vagueness proposed in Fara (2000) and Kennedy (2005a, 2005b) cannot actually differentiate positives from comparatives. But, as we have seen, positives differ from comparatives in terms of their susceptibility to the universally quantified Sorites premise, their lack of crispness and their inability to take differential measure phrases, i.e., positives are vague in a way that comparatives are not. While both are subject to the context dependence of the *measurably-greater-than* relation, positives are also subject to some kind of extra vagueness not apparent in comparatives. In the next section, I spell this claim out a bit more clearly.

4.6.4 Types of Vagueness: Distinguishing Positives from Comparatives

In the previous section, I claimed that the essential claim in Fara (2000) and Kennedy (2005a, 2005b) concerning the *measurably-greater-than* relation (their *significantly-greater-than* relation) is responsible for what I am calling *observational vagueness*, that it is the contextually defined granularity of measurements inherent in the *measurably-greater-than* relation that is the source this type of vagueness, and that both positives and comparatives are contain the *measurably-greater-than* relation in their logical forms. These claims constitute what I am referring to as *option 1*. This option 1 is an attempt at explaining the distinguishing characteristics of positive and comparative predicates based on the assumption that positives are implicit comparatives but that a contextually defined variable found only in positives is responsible for the distinction. But, as has been shown, option 1 is incapable of

distinguishing them, because this contextually supplied variable is at play in both. That is, both positives and comparatives are observationally vague. In this section, I want to explore the data that distinguishes positives and comparatives in light of the conclusion that both positives and comparatives are observationally vague, and then try to define exactly what a theory of positives and comparatives would have to look like if in fact contextually defined variables were what causes their distinguishing properties. The conclusion will be that positive adjectival predicates involve vagueness that is above-and-beyond the observational vagueness that we find in comparatives, and that this other vagueness exists outside of context. that is, this other vagueness found in positives is not a matter of the context.

Notice that observational vagueness, where ever we find it, has a unifying property: it is always, at least in theory, possible to make our observations more precise such that the vagueness lessens. Now, I am not saying that instruments exist such that we can make these observations, i.e, between nanometer differences in height or differences in happiness, etc. Rather, I am saying that one could imagine instruments existing that could discriminate between two objects based on some gradable property. In other words, observational vagueness is, as Russell (1923) puts it, a matter of our inability to be precise in our perceptions of the world, not in the world itself. If our perceptions could be precisified, then observational vagueness would or could, in theory, go away. And, as we have seen, observational vagueness can in fact be reduced, i.e., our measurements can be made more and more precise (within, of course, the limitations of our observations). But, it does not matter how precise one is with positives, their vagueness does not retreat.

For instance, imagine the situation in which we are measuring John and Bill, but this time we use a much finer grained measuring device, say one that measures to the nearest micrometer. Let's say John is 1.5 meters tall, and Bill is 1.500001 meters tall. In this case, *John is taller than Bill* is true. But at what point does John become *tall compared to Bill*? Is it 1.6 meters? 1.7 meters? 1.700001 meters? It doesn't matter how fine-grained our measurements are, we can't pinpoint the precise point. There are borderline cases with *tall compared to Bill* that just are not resolved by using fine grained observational tools; the borderline is blurry regardless of whether we measure to the micrometer or not; and the predicate is tolerant to small changes.

Observational vagueness also exists in positive adjectival predicates, but there is some other type of vagueness at work there, and it is not possible to remove this second type of vagueness by making more precise observations. We can also see the crisp/soggy distinction at play even when we make measurements with greater precision. Recall from the previous section that the *measurably-greater-than* relation, $>^m$, requires that there be a gap between the referent and standard degrees that is at least as big as m , where m is the contextually supplied granularity of measurements. This works well to describe comparatives where the gap doesn't have to be any greater than m . But, what I want to claim now is that in positive adjectives, the magnitude of this gap is *proportionally* dependent on the value of m , but it must be larger than m . But the fact that it must be larger than m is what characterizes positives as different from comparatives. So, what it is about Fara's and Kennedy's analyses that I disagree with is the claim that the context somehow requires a gap between the standard expression's degree and the referent's degree that is larger than

what we find in comparatives, i.e., the context doesn't require the gap to be larger than m . The fact that there *is* a gap is not context dependent, but is somehow simply part of the nature of positive adjectives. Furthermore, if my assertion that the crisp/soggy distinction is a product of vagueness is correct (as is also proposed by Kennedy (2005a, 2005b)), then the nature of positive adjectives that I am referring to is their vagueness (but not their observational vagueness.)

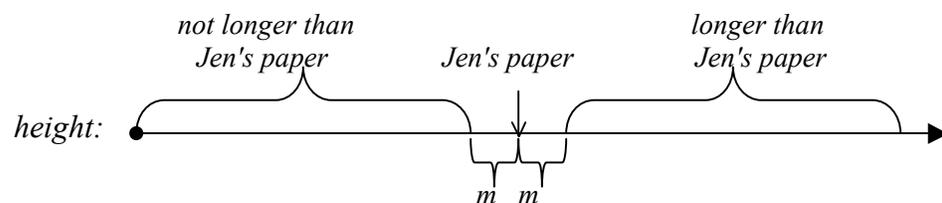
In order to see this, we need to show that the gap can scale up or down, depending on m , but also that in both of these situations, comparatives behave different than positives. Let's look first at a case in which we make m big, and hence scale the gap up, by comparing the lengths of linguistics dissertations. Imagine that Masaya writes a 400 page dissertation and Scott writes a 270 page dissertation. In this case, we appear to be measuring in terms of pages, but we also seem to be rounding off a bit, say to the nears ten pages or so. So, m seems to be something like *ten pages*, maybe a little more or less. Then Masaya's dissertation is *longer than Scott's dissertation* and it is *long compared to Scott's dissertation*. But, if Rob's dissertation is 280 pages, then while Rob's is *longer than Scott's* it is unclear whether it is *long compared to Scott's*. That is, if m is about ten pages, then only being 10 pages longer than Scott's might not count as being *long compared to Scott's*, because the boundary for this predicate is set somewhere higher than Scott's dissertation length plus 10 pages.

When m is scaled down in a situation where 10 pages is too coarse grained, say, because we are comparing undergraduate papers, then what counts as *long compared to X* correspondingly decreases. So, imagine that Jen writes an 8 page

paper and Jeff writes a 15 page paper. Then, Jeff's paper is *longer than Jen's*, and it is *long compared to Jen's*. But if Sue writes a 9 page paper, then it is *longer than Jen's* but maybe not *long compared to Jen's*. In this case, m is about a page, maybe even a little less than that (maybe a half-page or a paragraph). To satisfy the comparative predicate, a paper only needs to be at least a page longer. (Or, if m is smaller, then a half-page longer...we can imagine that for our purposes we don't care about differences smaller than that.) But to satisfy the *compared-to* positive predicate, the length has to be some multiple of m longer, i.e., it needs to be a few pages longer. Thus, in this case, where m is scaled down, in order to satisfy a positive predicate, the gap doesn't need to be as large as it does in the previous situation where we were comparing dissertation lengths.

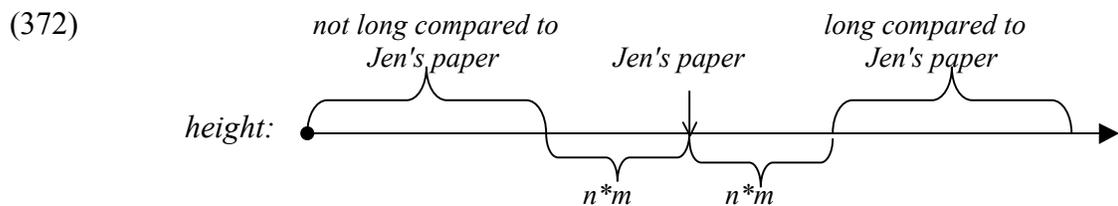
It is this ability to scale up or down that I think Fara was aiming to capture with the *measurably-greater-than* relation. But, it appears that what the *measurably-greater-than* relation does, since it is supposed to capture the similarity constraint, is allow the context to determine the granularity of the measurements. This *does* force a gap between the standard degree and the referent degree, i.e., a gap that is at least as big as m . So for instance, when m is set to one page, then Jeff's paper can only be *longer than Jen's paper* if it is at least one page longer than Jen's.

(371)



Thus there is a gap between the standard degree, *the length of Jen's paper*, and the referent degree, *the length of Jeff's paper*, that is determined by m . Of course, it is very easy to narrow down the value of m , in which case the gap decreases. For instance, we could reduce the magnitude of the gap by worrying about the number of lines, or even the number of words. In these cases, the two papers would be the same length if they had the same length down to the nearest line or word, rather than page. For Jeff's paper to be *longer than Jen's paper*, it would just have to be larger than the m gap.

But this does not capture the fact that the gap has to be larger than m when a positive adjective is used. In the same situations as above, the m can change from a single page to some number of lines or even words, and the gap reduces, but it is always larger than m . For Jeff's paper to be *long compared to Jen's paper* it must be larger than some multiple of m .



So, the fact that there is a gap is common to both positive and comparative adjectives. This is accounted for by the $>^m$ relation: the referent must be at least m greater than the standard where m is defined by the context. But, the fact that the gap is larger in a positive is not dependent on the context. In order for Option 1 to remain viable, both comparatives and positives must be related via a context dependent *measurably-*

greater-than relation, but positives need something more. I'll use the terminology above and describe it as $>^{n*m}$, but this is simply to say that the gap between the referent and the standard must be something bigger and proportional to m .

(373) *Option2'*:

Positives: $d >^{n*m} d'$

Comparatives: $d >^m d'$

If we want to define positives as comparative relationships between precise degrees, then something has to modify the *measurably-greater-than* relation in positives that is not present in comparatives. What this n variable is and how it is valued is unclear. Perhaps it too should be valued by the context somehow. However, I cannot offer any hypothesis in this regard, and I will conclude this discussion by suggesting that it is a weakness of Options 1 and 2 that they cannot explain the additional vagueness of positive adjectival predicates.

Thus, I will conclude that there is a source of vagueness in positive adjectives that is missing in comparatives. Comparatives are observationally vague, just like positives are, but positives have some other type of vagueness that is not context dependent. In section 4.6.6, I will discuss what this conclusion says about the viability of Options 1 and 2 which continue to treat positives like implicit comparatives. But, first, I want to discuss the differential measure phrase distinction a bit, since it too, must be accounted for. I will determine that neither Option 1 or Option 2 can account for it.

4.6.5 Differentials

There is a question about the way that I have defined the *measurably-greater-than* relation for comparatives, repeated here.

(374) $>^m = \lambda d \lambda d'$. d' is at least m greater than d ,

where m is a degree supplied by the context

The question has to do with whether we want the context dependence *measurably-greater-than* relation to be a matter of the logical form of a sentence or not. There are at least three options. First, it could be that the *measurably-greater-than* relation is not actually part of the grammar. Instead, we simply have the normal *greater-than* relation in the logical form of these sentences. When we verify people's statements or make our own statements concerning comparisons, we simply "round-off" and then use a *greater-than* relation, knowing that in the world it is difficult or impossible to make more precise measurements. The second possibility is that the *measurably-greater-than* relation in (374) is correct, and the m variable is pragmatically determined. It plays a role in the logical form, and is therefore linguistic, but is not more than a component of the pragmatics. A third possibility, that I want to explore below, is a bit more bold. Let's say that the m variable is sometimes expressed overtly. We see it expressed overtly in differentials, such as:

(375) John is three inches taller than Bill.

In this way of thinking of the *measurably-greater-than* relation, the definition in (374) would be replaced by a standard way of describing differentials as in (376). (cf. Kennedy, 1999, Stechow, 1984)

(376) $>^m = \lambda d \lambda d'. d' > d \ \& \ d' - d \geq m$, where m is a degree supplied by the context

$\|d - d'\|$ can be thought of as a *subtraction* operation on the degrees d and d' . It returns a degree that is the difference between d and d' . By saying that m is essentially a differential, I mean that it measures the difference between two degrees.

Before I discuss this last option, let me offer one argument that the first option can not be correct. Recall from chapter three, section 3.4.5, that stacking one degree operator on top of another creates a kind of comparison of deviation reading.

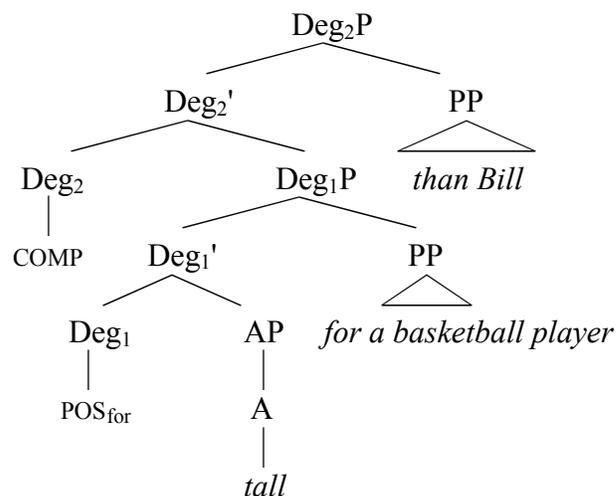
- (377) a. John is more tall for a basketball player than Bill.
b. John is more tall compared to Tom than Bill.
c. John is tall for a basketball player compared to Bill.

These sentences compare the amount that two objects differ from the norm. So for instance, (377)a can be paraphrased as:

(378) *the amount that John's height differs from that of a typical basketball player's height is greater than the amount that Bill's height differs from that of a typical basketball player's height*

Stacking was given an analysis in which there were two degree operators, in this case POS₁ and COMP, stacked on top of each other as in the following diagram.

(379)



Now, the analysis that was proposed was based on the idea that the degree operator contained the measure function, that part of the meaning that measures something, in this case an event, and returns a degree. Then, when the POS_{for} morpheme combines with the AP, which denotes a predicate of events, it measures that event, producing another event. Thus, the Deg₁P denotes an event, and can therefore serve as the argument of COMP which can measure this event. The COMP operator, therefore, measures an event that has already been measured. It measures an event to degree *d*, returning *an event to degree d to degree d'*. Saying it this way makes it sound as if it is measuring the same thing twice. But it is not. The Deg₁P event has been restricted by the comparison relation and the standard degree, as in (380).

(380) $\lambda e. \exists d[\text{tallness}(e) \ \& \ \text{DEG}(e) = d \ \& \ d > \text{NORM}(\lambda e'. \text{tallness}(e'))(\lambda x. \text{bb-player}(x))]$

Thus there must be something inside this logical form that it is possible to measure. Our intuitions about the meaning of a stacked comparative are that it measures the difference. Now, we can say that the difference comes from the comparison relation in (380). This is the relation between the referent event of tallness (which the subject of the clause is the external participant in) and the standard event calculated from the *for-PP*. If it implicitly carries a differential, then the event can be measured in terms of this difference. Therefore, we can conclude that the comparison relation must be measurable, and measurable in a way that language can access. I now return to the other two options for the *measurably-greater-than* relation.

If the preceding argument against the first option is convincing, then we are left with two other options. Option two said that there was only a pragmatic valuation of what it means to be *measurably-greater-than*. Option three said that the *m* variable could be expressed overtly as a differential measure phrase. I want to explore this last option for a bit. I repeat the definition of *measurably-greater-than* that treats it like a differential here:

(381) $>^m = \lambda d \lambda d'. d' > d \ \& \ d' - d \geq m$, where *m* is a degree supplied by the context

There have been proposals to this effect in the literature. Schwarzschild and Wilkinson (2002) base their semantics of comparatives on the structure of a differential. I won't go into the details of their system because of space, but I will

point out that their differential operator looks a lot like $>^m$. Their differential operator appears in the logical form of every comparative. In fact, it includes not only a subtraction operation that measures the difference between two degrees, but also a way to ensure that one degree is higher on the scale than the other. Thus, it serves the same functions as $>^m$. This function returns a degree, i.e., the difference between the referent and standard degrees, which can then be modified by a measure phrase. When it is modified by an overt measure phrase, such as *three inches*, the difference between the two degrees must be at least as great as three inches.

(382) $\text{THREE INCHES}(d - d') = 1$ iff the size of $(d - d')$ equals or exceeds 3"

When it is not modified by an overt measure phrase, a null measure phrase *SOME* restricts it.

(383) $\text{SOME}(d - d') = 1$ iff the size of $(d - d')$ equals or exceeds m , where m is determined by the context

SOME is context dependent in the way I have described above: it requires the context to supply the minimal difference between two degrees for them to be described as different. They mention that *SOME* is based on the mass-quantifier *some* which is similarly context dependent.

(384) a. There is some wood in my eye.

- b. There is some wood in my truck.

What is interesting about their proposal is that the differential can be either overt or covert. That is, in the terms of the function in (376), m is a differential measure phrase variable that can be set by the context or appear overtly. Implicit in Schwarzschild and Wilkinson's account is that differential measure phrases not only define the difference between two objects, but they also define the granularity of the measurements. When the measure phrase is not stated explicitly, this is exactly what the SOME differential does. When it is stated explicitly, it simply requires that the two objects be different with respect to the gradable property by at least the amount denoted by the measure phrase.

If we are to adopt this notion of conflating differentials and *measurably-greater-than*, and if the reasoning from the previous section is correct, i.e., the POS_{for}, POS_{comp} and COMP operators are all *measurably-greater-than* relations, then we have no way of accounting for the differential distinction. Why do comparatives allow differential measure phrases, but positives do not? Or, if we adopt the strategy above, why do comparatives allow overt realizations of m but positives do not? Notice that Fara's and Kennedy's account has nothing to say about this property either. In their account, the standard shifts around when a positive is used, but there is a precise standard. One would think that by adding a differential measure phrase, it would actually pin down the standard and prevent it from shifting with the context. It appears that Options 1 and 2 predict that differential measure phrases should be possible with positive adjective phrases.

4.6.6 Conclusion

This section considered a solution (Option 1) to the problem of differentiating positive adjectival predicates from comparative adjectival predicates. There are three distinguishing characteristics that must be accounted for. I repeat them here:

(385) *Distinguishing Characteristics:*

	Positives:	Comparatives:
Tolerance/vagueness	YES	NO
Crisp judgments	NO	YES
Differential measure phrases	NO	YES

Now, I have suggested that the main problem with our representations of the meanings of positive adjectives lies in their reference to precise degrees and the comparison relation between them. Fara (2000) and Kennedy (2005a, 2005b), on the other hand, propose that positives are essentially like comparatives – they reference precise degrees and hence have sharp boundaries. They propose instead that there is a context dependent modification of the comparison relation in positives that is absent in comparatives. This context dependent relation, *significantly-greater-than*, was supposed to account for why the standard degree in positive predicates appears to be blurry, even though it is precise. It appears to be blurry because it can shift around easily and quickly depending on the interests and purposes inherent in the context. This was supposed to account for the tolerance of positive predicates: they are tolerant because the boundary shifts out of view when we consider small changes,

giving rise to Sorites paradoxes. This was also supposed to account for their lack of crispness: the *significantly-greater-than* relation required that the referent be some significant amount greater than the standard. Comparatives, because they are only a *greater-than* relation between two degrees, are not tolerant and are crisp.

I claimed that the reasoning behind the *significantly-greater-than* relation was essentially what accounts for *observable vagueness*, i.e. a type of vagueness that arises when we are not able or willing to measure differences between objects and thus discriminate between them in terms of some gradable property. I then showed that comparatives are in fact vague and soggy, but only in the observable vagueness sense. Positives, on the other hand, while subject to observable vagueness, are vague in some other way as well. This second kind of vagueness is responsible for the properties that differentiate them from comparatives. And, this second kind of vagueness does not appear to be based on the context. Furthermore, the notion of *measurably-greater-than* was unable to capture the differential distinction, since if positives had precise standard and referent degrees, we would expect to be able to describe the difference between the two with a measure phrase as we can with comparatives. Therefore, I concluded that Option 1 and its variant, Option 2, were wrong.

The problem with Options 1 and 2 appear to be their assumption that positives are logically dependent on precise degrees, just like comparatives. Therefore, we should entertain hypotheses that reject this assumption, and instead treat positives as something wholly different. In the next section I will present two alternatives, Options 3 and 4. At this time, I will have to leave details aside and only offer

descriptions of what these options look like. But, I will argue that they are interesting avenues to pursue precisely because they do not treat positives as implicit comparatives.

4.7 Options 3 and 4: Positives are not Implicit Comparatives

4.7.1 Introduction

I repeat the distinguishing characteristics of positives and comparatives here:

(386) *Distinguishing Characteristics:*

	Positives:	Comparatives:
Tolerance/vagueness	YES	NO
Crisp judgments	NO	YES
Differential measure phrases	NO	YES

In presenting these distinguishing characteristics, I pointed out that the degree semantics makes the right predictions concerning the behavior of comparatives. While comparatives are observationally vague, this vagueness can be lessened by more precise measurements, i.e., by valuing the degree variables in the logical representations of comparatives through precise observations. I also claimed that the degree semantics makes all of the wrong predictions concerning the nature of positives, and that positives should not be assigned logical representations that include reference to comparison relations between precise degrees. That was the approach for Options 1 and 2:

(387) *Alternatives Approaches to Distinguishing Positives from Comparatives:*

	Positives:	Comparatives:
Option 1:	$\mathbf{d} \!> \mathbf{d}'$ where $\!>$ is <i>significantly-greater-than</i> and what counts as <i>significant</i> is supplied by the context	$\mathbf{d} > \mathbf{d}'$
Option 2:	$\mathbf{d} >^{n*m} \mathbf{d}'$ where $>^{n*m}$ is <i>measurably-greater-than</i> , m is supplied by the context, and n is something else	$\mathbf{d} >^m \mathbf{d}'$
Option 3:	$\Delta \succ \Delta'$ where Δ is a blurry number and \succ is a comparison over blurry numbers	$\mathbf{d} >^m \mathbf{d}'$
Option 4:	No grammatical measurement or comparison	$\mathbf{d} >^m \mathbf{d}'$

In this section, I want to briefly suggest two alternatives to treating positives as implicit comparatives, namely, Options 3 and 4. While they are not well developed, I believe they are both interesting enough to warrant some attention precisely because they do not treat positives as implicit comparatives.

4.7.2 Option 3: Blurry Degrees

Option 3 is based on the idea that the scales that positive and comparative adjectives are associated with are structured differently. Recall that the scales are simply number lines, i.e., numbers defined by the precedence relation. By definition, they are precise objects that are ordered crisply. We can define comparison relations over numbers easily by using the precedence relation. Logical representations that refer to scales and degrees of this sort are ideal for comparatives because they allow

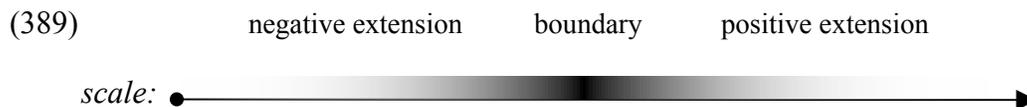
definite (or indefinite) reference to degrees that can be counted, subtracted, perhaps quantified over, etc. But scales and degrees of this sort are not, apparently, capable of describing positives. To capture the intuitions about positives, we must use scales that do not have degrees of the same sort. Instead, these degrees are not sharp or precise, but rather *boundaryless* and *blurry*, as in the metaphor used in section 4.5.3. These "degrees" cannot be referred to definitely or indefinitely, they can't be counted, they can't participate in a subtraction operation or be quantified over.

(388) *Option 3:*

Positives: $\Delta \succ \Delta'$, where Δ is a blurry number and \succ is a comparison over
 blurry numbers

Comparatives: $d \succ^m d'$

Blurry was used as a metaphor to describe the boundary that separates the positive and negative extensions of a vague predicate. By *blurry* we meant that it had *no boundaries*, i.e., it faded away into the background. I repeat the diagram that I used here:



In other words, this is a rejection of the *sharp boundaries* claim, the claim that vague adjectives actually have a definite boundary. How exactly a scale with blurry degrees

is defined in mathematical terms is beyond the scope of what I want to do here. For now, I will have to settle for describing, basically, what Option 3 would look like and save the important details for later. However, I do hope that the reader finds Option 3 (and Option 4) interesting enough to see that it is worth pursuing.

Notice that Fara's explanation of why this metaphor seems to capture our intuitions was not to reject the sharp boundaries claim. Rather, she accepted that there are sharp boundaries, it was just that the boundaries moved around very easily, constantly shifting out of our sight. Perhaps, however, what we should do is actually reject the sharp boundaries claim and use this as a way of explaining our distinction between positives and comparatives: positives have blurry boundaries and comparatives have sharp boundaries.

The way that this could possibly explain the differences under question is to assume that the boundaries are blurry for positives, but sharp for comparative adjectives. In fact, we could go even further: the standard and referent degrees for positives are all blurry, and in comparatives they are sharp and precise. In other words, the scale/degree structure that positives measure functions map their arguments to is different from the degrees that comparative adjectives map their arguments to. Then, we could view the comparative morpheme as changing the scale structure of the measure function. It makes the degrees countable and precise such that we can refer to them definitely, approach them closely, measure them and subtract them.

Therefore, let's assume that comparatives behave exactly like we have said they do. Positives, though, measure entities such that they are mapped to boundaryless degrees.



These blurry degrees could be represented as an expression of probability. The actual degrees exist most probably in the center of the shaded area, with less and less probability as the shaded area gets further away and fainter from the center. The explanation for the distinguishing characteristics of positives can then proceed as follows.

The lack of crisp judgments in positives is a result of not allowing the blurry referent to get too close to the blurry standard. It is a safety mechanism: because there is no precision to these degrees, i.e., there is no boundary, we need to be sure that there is a buffer ground between the two. Again, it is helpful to think of blurry degrees as a probability distribution. It is most probable that the actual degree is in the center of the blur, but we aren't sure, so we hedge our bets and keep the two at some distance. So, if some referent is *A compared to the standard*, (390) would be situation that is allowable because the degrees are not too close. But in (391), the standard and referent degrees overlap too much and therefore the referent is not "greater" than the standard to the degree that it needs to be.

(391) *scale:* ●  standard referent

Comparatives on the other hand, because they employ precise degrees, can compare to degrees in close proximity to each other.

Positive adjectives do not allow differential measure phrases because blurry degrees cannot enter into the subtraction operation. The subtraction operation must work only on degrees that can be counted. Blurry, or boundaryless, degrees simply cannot be subtracted (or added, etc.), because there is no place on a boundaryless degree to start or stop counting. Again, it is useful to think of these degrees as a probability distribution. On this distribution, there is no point at which we are sure the actual degree rests, and hence no way to start or stop counting.

Finally, positives are tolerant because small differences do not cross boundaryless degrees on the positive scale. It is only by standing back, and seeing blurry degrees in their whole are we able to judge whether the referent is above the standard or not.

I realize that Option 3 is not detailed enough to make any real predications. But, I believe that, as a description of the facts, it is interesting enough to pursue. Its main setback, however, is the lack of a mathematical definition of blurry degrees and the ordering relations that they are able to participate in. Consider what we would have to define if blurry degrees were part of the grammar. First, we would have to define a new type of entity. Not only would we need degrees of type d so that we can describe comparatives, but we would also need a new type, Δ , to range over blurry degrees. Furthermore, we would have to define several new comparative

relationships like \succ . And, our measure functions in the POS_{for} and POS_{comp} morphemes would have to be defined differently so that they mapped objects to blurry degrees rather than precise degrees. While the facts might warrant such a theory, we shouldn't confuse this complication of the grammar as an explanation since it is entirely construction specific (even more so than the construction specific syntax and semantics that has been proposed just for gradable adjectives.) Option 4 is built on the idea that none of this should not be part of the grammar proper.

4.7.3 Option 4: Measurement is not Grammatical

Option 4 takes it as a given that the goal of semantic theory is to account for the grammatical association of form and meaning. Any part of meaning that lies outside of grammar is not part of the linguistic pursuit. This might sound like an obvious point, but notice that the conclusions from chapter two and chapter three posit grammatical form in order to account for what we have assumed positive and comparative adjectives mean. For instance, the POS_{for} and POS_{comp} morphemes were used to supply comparison relations and measure functions for both positives and comparatives. These degree heads, coupled with an intricate syntactic structure, were then used to maintain a degree semantics of gradable adjectives.

One conclusion from chapter three was that it is beneficial to radically extract the comparative type meaning from the denotation of gradable adjectives. Recall that the degree type theories came in two flavors: the degree-argument theories, which placed all of the comparative meaning inside of adjectives, and the measure function theories, which extracted much of the comparative meaning out of gradable adjective denotations, leaving only the measure function. I proposed that we also extract the

measure function part of the comparative meaning, and make gradable adjectives simply predicates of events. The comparative meaning was then posited inside of the degree morphemes that head the DegP extended projections. Option 4 is an even more radical extension of this trend.

Comparatives are comparison relations between degrees. This requires that there not only be a comparison relation, but also *degrees*. Now, the idea for positives is that they represent concepts that are essentially comparisons, but they don't compare two numbers or degrees. Instead, they compare objects.⁶³ We can compare John to Bill or to wrestlers, but we do not measure any of these participants in the comparison relation. Rather, we simply compare them. A referent can be greater in terms of some gradable property than the standard without mapping either the referent or the standard to a scale. This means that part of the denotation of gradable predicates must be some kind of comparison relation, but it is not restricted to comparing degrees. Thus, Option 4 treats positives as a whole unit, i.e., they are not part of a larger DegP with a null positive degree morpheme. Rather, they simply denote a comparison relation. Perhaps we can think of this comparison relation as simply an ordering between objects. By this I don't mean an ordering on a scale, but instead a simple ordering, i.e. <john,bill>.⁶⁴ If it can be shown that orderings of

⁶³ This is, I think, similar to an idea that Kennedy (2005b) discusses, which he refers to as *indirect comparison*. Although, it might be more appropriate to refer to comparisons between objects as *direct comparison* and comparisons between degrees, since they are what objects are mapped to, as *indirect comparison*.

⁶⁴ See Pietroski (to appear). But it should be noted that Pietroski argues that simple orderings are all that is needed for comparatives, as well as positives. If he is right, then a simple ordering of objects is too powerful for what I am trying to do here because it wouldn't differentiate between positives and comparatives.

objects must be vague, cannot be crisp and cannot be described by differential measure phrases, then they might be the way to go.

Now, notice that the distinguishing properties of positives and comparatives have a certain coherence to them: they seem to indicate that comparatives are more *determiner-like* than positives. Roughly speaking, comparatives seem to range over degrees, and degrees are precise, countable objects that can be quantified over.⁶⁵ In a sense, comparative predicates seem to contain more structure to their meaning. Positive adjectives, on the other hand, do *not* range over degrees, at least not degrees that are precise, countable objects that can be quantified over, i.e., they have less structure. Therefore, it seems reasonable to conclude that the addition of a comparative morpheme turns a gradable predicate, that is typically an ordering between objects, into an ordering between degrees. In other words, the comparative morpheme is, in some sense, the measure function that maps objects onto scales. Once degrees are part of the logical representation, then the fact that they allow differential measure phrases, crisp judgments and are intolerant of small changes, follows. Of course, as we have seen, comparatives are observationally vague. But, this type of vagueness is part of the measuring process. The mapping from objects to degrees is vague in the sense that we might not map precisely given our purposes and interests. The vagueness of positives is reduced when a comparative morpheme is

⁶⁵ I have used definite descriptions of degrees in the meaning of comparatives, but I believe that I can remain agnostic as to what the right way to quantify over degrees is. As noted in chapter one, some theories treat comparatives as indefinite descriptions of degrees, some as definite descriptions, and some as universally quantified descriptions. If any of these is basically correct, I can still make my point: degrees in comparative constructions are quantifiable.

added to the structure, because, instead of ordering individuals, it orders degrees which can be ordered precisely.

So, what Option 4 says is that positive adjectives are basic and, in some sense, represent an unstructured concept. Comparatives are simply the addition of a comparative morpheme, that in some determiner-like sense, structures the concept that gradable adjectives represent. Comparatives introduce scales into the logical representation, mappings from objects to degrees, and thus allowing differential measure phrases, crisp judgments and non-tolerance. What, exactly, the logical representations consist of or how they are mapped from the syntactic structure, is unfortunately, beyond the scope of this chapter. But I hope the following few remarks on some of the benefits of Option 4 indicate that it is an option worth pursuing.

One potential benefit concerns the nature of vagueness. If we assume that the type of vagueness that we find with positives is not a product of the context, then something like the blurry degree metaphor is correct. But Option 3, which includes a grammatical process that measures objects onto blurry degrees, i.e., the POS morpheme, means that grammar *introduces vagueness* into the logical form. That is to say that grammar causes vagueness. But, Option 4 says that there is no POS morpheme, and instead, the concept behind gradable predicates is vague. In other words, positive adjectival predicates are grammatical constructions that preserve the vagueness inherent in the conceptual meaning of the adjectival head. Comparative predicates, on the other hand, are grammatical constructions that reduce vagueness by the introduction of the comparative morpheme. Thus, we can say that grammar

doesn't cause vagueness, although it interacts with it. But the only interaction it has with vagueness is to reduce it. Now, it is true that comparatives are observationally vague. But, this is not because of the language, per se. Rather, it involves our relationship with the world, and how we measure items in it.

Another reason Option 4 is attractive is because a semantics of comparatives which is based on the semantics of positive forms is desirable. It has been pointed out that the morphosyntactic facts of natural languages do not support the claim that positive adjectives are implicit comparatives. (Klein, 1980, McConnell-Ginet, 1973) Rather, it appears to be the case that, in languages that have both positive and comparative forms, the comparative is morphologically more complex than the positive. (McConnell-Ginet, 1973) Therefore, as Kamp (1975) argues, we want a theory of gradable adjectives that treats the positive form as basic and builds the comparative meaning out of the positive meaning. However, this goal has remained elusive. In the more traditional degree theories, the comparative and positive forms are built upon the same root meaning, i.e., a gradable adjective is a predicate of events and the meaning of either a positive or a comparative morpheme can be added on top of it. This predicts that both the comparative and positive morphemes should potentially be morphosyntactically complex. However, I am aware of no languages in which the hypothesized positive morpheme is ever pronounced.⁶⁶ Thus, it would

⁶⁶ Kennedy (2005a) argues, based on Sybesma (1999), that Mandarin Chinese has a positive morpheme which is pronounced as *hen*. But, *hen* is usually glossed as English *very*, and it has the semantics of an intensifier like *very*, i.e., it modifies the difference between the referent and the standard, just like in English. (Ming Xiang, p.c.) While positive adjectives in Mandarin Chinese must appear with an intensifier like *hen*, other intensifiers are also allowed. Therefore, it seems premature to

be desirable to have a basic meaning for positive adjectives which is changed by the addition of a comparative morpheme.

Two benefits that Option 4 can potentially provide are based on the determiner like properties of the comparative morpheme. By treating the comparative morpheme as something analogous to a determiner, it will perhaps become easier to find commonalities between degree constructions and other constructions where grammatical processes and functional morphemes have been argued to "provide structure". Degree constructions make it seem as if a subpart of the grammar was designed specifically to deal with vague concepts. Maybe that is true. But it would be interesting to see if instead grammar was designed to provide structure, of a certain sort, to unstructured concepts. One of the unstructured concepts that interacts well with grammar just happens to be vagueness, but it also seems to include events structure, time structure, and mass/count structure. By treating the comparative morpheme like a determiner, we might be able to find what is common amongst all of the ways grammar deals with these types of concepts.⁶⁷

A second potential benefit of treating the comparative morpheme as some sort of determiner was suggested in Beck, Oda and Sugisaki (2004). The main goal of their paper was to explain why Japanese lacks constructions like subcomparatives. The answer they give is that Japanese does not include degree abstraction in the syntax. This is very similar to what is suggested by Option 4. So, it would appear that English, too, lacks degree abstraction in the syntax of positive constructions. At

conclude that Mandarin Chinese has a phonologically realized positive degree morpheme.

⁶⁷ Insert references for previous cross category work.

the end of their paper, they suggest that there is a connection between the classifier system of Japanese (Korean and Chinese, as well) and the lack of degree abstraction in the syntax. Option 4, thus, might provide a way to pursue this idea further. If a determiner-like element such as the comparative morpheme were responsible for the differences between positives and comparatives, then we might be able to see how the construction could be related, cross-categorially, to classifiers in the NP system of Japanese. If it is possible to find correlations across categories, it might also be possible to understand how children could possibly learn the adjectival systems of English or Japanese. Perhaps there are parameters that cut across categories and cover the classifier/determiner system and the adjectival system.

While I realize that I have not provided enough information to truly judge Option 4, I hope that I have convinced the reader that it is a worth-while pursuit. It would offer a way to explain the differences between positives and comparatives in a way that does not introduce new mechanisms into the grammar (specifically, vagueness inducing mechanisms), to build comparative meanings out of positive meanings, and to investigate cross-category commonalities.

4.8 Conclusion

There were not many answers in this chapter, but there were, I think, a lot of interesting questions. The main question that this chapter tried to address was how grammar interacts with the vagueness of natural language predicates. We looked at two grammatical mechanisms in particular: the mechanism that turns an adjective root into a comparative and the one that turns an adjective root into a positive. The

positive adjective seems to interact with vagueness at a minimal or non-existent level. That is, by adding a POS morpheme to a vague adjective, the result is a predicate that is just as vague as a bare adjective. This is true even when the POS morpheme introduces a standard expression such as a *for-PP* or a *compared-to* phrase. But when a comparative morpheme is added to a vague adjective, the vagueness seems to be reduced or possibly eliminated. This became apparent as we discussed three differences between positives and comparatives. First, positives do not allow differential measure phrases, but comparatives do. Second, positives lack crisp judgments, but comparatives allow them. And, third, positive adjectival predicates are tolerant and easily give rise to Sorites paradoxes, but comparatives resist them.

I entertained four options for accounting for these distinguishing characteristics. The first two options treat positives as implicit comparatives in that their logical representations are made up of comparison relations between precise degrees. Option 1 was been proposed by Fara (2000) and Kennedy (2005a, 2005b). They claim that positive adjectives involve a context dependent *significantly-greater-than* relation between two precise degrees. This, it was claimed, differentiated them from comparatives which only involve a non-context dependent *greater-than* relation between two precise degrees. It was shown that reasoning behind the *significantly-greater-than* relation was applicable to comparatives, as well as positives. The reasoning that Fara (2000) used to justify the context dependence of positive adjectives was based-on a notion of *similarity*. When two objects are saliently similar with respect to some gradable property, then they cannot be differentiated in terms of that property and must both be in its extension or anti-extension. When their non-

similarity is made salient, however, then one can be in the extension and the other in the anti-extension. Fara claimed that salient similarity caused an appearance of a blurry standard degree, but in actuality, it was precise. It appears blurry because the context can cause it to shift such that it is never where we are looking. This gives rise to tolerance, and as Kennedy points out, a lack of crispness.

I showed that this reasoning is applicable to comparatives as well. My claim was based on ideas of Russell (1923) and Wright (1976), who pointed out that many predicates are vague simply because we cannot observe distinctions between some objects that lie near the borders of their extensions. Thus, I concluded that comparatives were *observationally vague*, in that in situations where we cannot or will not make precise measurements, comparatives can give rise to borderline cases, blurry boundaries and Sorites type reasoning. This notion of observational vagueness looks very much like Fara's notion of salient similarity: we discriminate two objects when we measure precise enough to tell them apart. When we don't measure with enough precision, though, they may be indiscriminable. Therefore, I concluded that comparatives were vague in precisely the way that Fara and Kennedy proposed that positives were vague. Hence, the context dependent comparative relation that they proposed for comparatives was needed in the for the logical form of comparatives as well. I changed it to the *measurably-greater-than* relation and proposed that it account for observational vagueness only. The vagueness that positives show, which distinguishes them from comparatives, was therefore left unexplained by Fara and Kennedy's proposal.

I suggested a revision of their proposal which simply encoded the requirement that there be an additional distance between the referent and the standard than that required by the *measurably-greater-than* relation. This however was unable to account for the lack of differential measure phrases in positives, since it, too, was based on the idea that there is a precise standard degree.

I then entertained two options based on the idea that positives and comparatives simply involve two different kinds of comparison. These two options were only briefly explored, and did not constitute real proposals. Instead, I wanted to show that they were worthwhile options that should be pursued in the future. Option 3 suggested that the POS morphemes associated with positive adjectives mapped objects onto blurry degrees. What exactly a blurry degree is was left undefined. But it was shown that the metaphor of a blurry degree did capture the differential measure phrase, crispness and tolerance distinctions between positive and comparative adjectives.

Option 4 also adopted this idea of a blurry degree, but did not make it part of the grammar. Instead, it was suggested that positive adjectives were comparison relations between objects while comparative predicates were comparisons between degrees. Comparative morphemes were suggested to be determiner-like in that they took a vague predicate and gave it structure. In a sense, the comparative morpheme allows objects to be mapped to a scale/degree structure that can then be compared. Thus, comparative morphemes were responsible for making a vague predicate: intolerant to small changes, crisp and measurable. It was suggested that Option 4 had several appealing properties including: the treatment of positive

adjectives as basic and comparatives as being built out of positive adjective denotations, the elimination of vagueness from the (narrow) grammar, the possibility of cross-category commonalities that can be exploited to provide a theory of acquisition of comparatives.

Bibliography

- Abney, Steven. 1987. *The English noun phrase in its sentential aspect*, MIT.
- Andrews, Avery. 1983. A note on the constituent structure of modifiers. *Linguistic Inquiry* 14:695-697.
- Baker, Mark C. 2003. *Lexical categories: Verbs, nouns, and adjectives*. Cambridge: Cambridge University Press.
- Bartsch, Renate, and Vennemann, Theo. 1972. *Semantic structures: A study in the relation between syntax and semantics*. Frankfurt: Athenaum Verlag.
- Beck, Sigrid, Oda, Toshiko, and Sugisaki, Koji. 2004. Parametric variation in the semantics of comparison: Japanese vs. English. *Journal of East Asian Linguistics* 13:289-343.
- Bierwisch, Manfred. 1989. The semantics of gradation. In *Dimensional adjectives*, eds. Manfred Bierwisch and Ewald Lang. Berlin: Springer-Verlag.
- Boguslawski, Andrzej. 1975. Measures are measures: In defense of the diversity of comparatives and positives. *Linguistische Berichte* 36:1-9.
- Bowers, John. 1975. Adjectives and adverbs in English. *Foundations of Language* 13:529-562.
- Bresnan, Joan. 1973. Syntax of the comparative clause construction in English. *Linguistic Inquiry* 4:275-343.
- Cinque, Guglielmo. 1999. *Adverbs and functional heads: A cross-linguistic perspective*. New York: Oxford University Press.
- Corver, Norbert. 1990. *The Syntax of left branch constructions*, Tilburg University.

- Cresswell, M. J. 1977. The semantics of degree. In *Montague Grammar*, ed. Barbara Partee, 261-292. New York: Academic Press.
- Fara, Delia Graff. 2000. Shifting sands: An interest-relative theory of vagueness. *Philosophical Topics* 28:45-81. Originally published under the name "Delia Graff".
- Fine, Kit. 1975. Vagueness, truth and logic. *Synthese* 30:265-300.
- Frege, Gottlob. 1903. *Grundgesetze der arithmetik, begriffsschriftlich abgeleitet*. vol. II. Jena: Pohle.
- Fults, Scott. 2005. Comparison and compositionality. In *Proceedings of the 24th West Coast Conference on Formal Linguistics*, eds. John Alderete, Chung-hye Han and Alexei Kochetov. Soverville, MA: Cascadilla Proceedings Project.
- Grimshaw, Jane. 1991. Extended projection. Ms. Brandeis University, Waltham, MA.
- Hankamer, Jorge. 1973. Why there are two 'than's in English. Paper presented at *9th Annual Meeting of the Chicago Linguistics Society*, Chicago, IL.
- Heim, Irena. 1985. Notes on comparatives and related matters. Ms. University of Texas, Austin, TX.
- Heim, Irena, and Kratzer, Angelica. 1998. *Semantics in generative grammar*. Oxford: Blackwell.
- Heim, Irena. 2000. Degree operators and scope. *Semantics and Linguistic Theory* 10:40-64.
- Hellan, Lars. 1981. *Towards an integrated analysis of comparatives*. Tübingen: Narr.
- Hoeksema, Jack. 1984. Negative polarity and the comparative. *Natural Language and Linguistic Theory* 1:403-434.

- Kamp, J. A. W. 1975. Two theories of adjectives. In *Formal Semantics of Natural Language*, ed. Edward Keenan, 123-155. Cambridge: Cambridge University Press.
- Keefe, Rosanna, and Smith, Peter. 1996. Introduction: Theories of vagueness. In *Vagueness, a Reader*, ed. Peter Smith Rosanna Keefe, 1-57. Cambridge, MA: MIT Press.
- Kennedy, Christopher. 1999. *Projecting the adjective: The syntax and semantics of gradability and comparison*. New York: Garland.
- Kennedy, Christopher. 2003. Towards a grammar of vagueness. Ms. Northwestern University, Evanston, IL.
- Kennedy, Christopher. 2005a. Vagueness and grammar. Ms. University of Chicago, Chicago, IL.
- Kennedy, Christopher. 2005b. Parameters of comparison. Handout for talk given at the Cornell University Linguistics Department Fall 2005 Colloquium Series.
- Kennedy, Christopher, and McNally, Louise. 2005. Scale structure and the semantic typology of gradable predicates. *Language* 81:345-381.
- Klein, Ewan. 1980. A semantics for positive and comparative adjectives. *Linguistics and Philosophy* 4:1-45.
- Klein, Ewan. 1991. Comparatives. In *Semantik: Ein internationales handbuch der zeitgenossischen forschung*, eds. Arnim von Stechow and Dieter Wunderlich, 673-691. Berlin: Walter de Gruyter.

- Larson, Richard K. 1998. Events and modification in nominals. In *Proceedings from semantics and linguistic theory VIII*, eds. D. Strolovitch and A. Lawson. Ithaca: Cornell University.
- Lasnik, Howard, and Saito, Mamoru. 1992. *Move ALPHA*. Cambridge, Mass.: MIT Press.
- Lasnik, Howard. 1995. Notes on pseudogapping. In *Papers on minimalism. MIT Working Papers in Linguistics 27*, eds. Robert Pensalfini and Hiroyuki Ura, 143-163. Cambridge, Mass.: MITWPL.
- Lebeaux, David. 1991. Relative clauses, licensing, and the nature of the derivation. In *Perspectives on phrase structure: heads and licensing*, ed. Susan D. Rothstein, 209-239. San Diego: Academic Press.
- Lechner, Winfried. 2001. Reduced and phrasal comparatives. *Natural Language and Linguistic Theory* 19:683-735.
- Lerner, Jan, and Pinkal, Manfred. 1995. Comparative ellipsis and variable binding. In *Proceedings of SALT V*, eds. Mandy Simons and Teresa Galloway. Ithaca: CLC Publications.
- Ludlow, Peter. 1989. Implicit comparison classes. *Linguistics and Philosophy* 12:519-533.
- McConnell-Ginet, Sally. 1973. Comparative constructions in English: A syntactic and semantic analysis, University of Rochester.
- Moltmann, Friederike. 1992. Coordination and comparatives, MIT.

- Parsons, Terence. 1972. Some problems concerning the logic of grammatical modifiers. In *Semantics of natural language*, eds. Donald Davidson and Gilbert Harman. Dordrecht, Netherlands: Reidel.
- Partee, Barbara. 1995. Lexical semantics and compositionality. In *An Invitation to Cognitive Science - 2nd Edition: Vol. 1*, eds. Lila R. Gleitman and Mark Liberman, 311-360. Cambridge, MA: MIT Press.
- Pietroski, Paul. 2003. Quantification and second-order monadicity. *Philosophical Perspectives* 17:259-298.
- Pietroski, Paul. 2005. *Events and semantic architecture*. Oxford: Oxford University Press.
- Pietroski, Paul. to appear. Induction and Comparison. In *University of Maryland Working Papers in Linguistics*. College Park: University of Maryland Linguistics Department.
- Platts, Mark. 1979. *Ways of meaning*. London: Routledge.
- Rullmann, Hotze. 1995. Maximality in the semantics of wh-constructions, University of Massachusetts, Amherst.
- Russell, Bertrand. 1923. Vagueness. *Australasian Journal of Philosophy and Psychology* 1:84-92. Reprinted in *Vagueness, a Reader*, ed. by Rosanna Keefe and Peter Smith, 61-68. MIT Press: Cambridge, MA.
- Sainsbury, Mark. 1991. Concepts without boundaries. Inaugural Lecture, Department of Philosophy, King's College, London. Reprinted in *Vagueness, a Reader*, ed. by Rosanna Keefe and Peter Smith, 251-264. MIT Press: Cambridge, MA.

- Schwarzschild, Roger, and Wilkinson, Karina. 2002. Quantifiers in comparatives: A semantics of degree based on intervals. *Natural Language Semantics* 10.
- Seuren, Pieter A. M. 1973. The comparative. In *Generative grammar in Europe*, eds. Ferenc Kiefer and Nicolas Ruwet, 528-564. Dordrecht: Riedel.
- Siegel, E. A. 1976a. Capturing the adjective, University of Massachusetts, Amherst.
- Siegel, E. A. 1976b. Capturing the Russian adjective. In *Montague grammar*, ed. Barbara H. Partee, 293-309. New York: Academic Press.
- Stechow, Arnim von. 1984. Comparing semantic theories of comparison. *Journal of Semantics* 3:1-77.
- Steedman, Mark. 1997. *Surface structure and interpretation*. Cambridge, MA: MIT Press.
- Sybesma, Rynt. 1999. *The Mandarin VP*. Boston: Kluwer.
- Wexler, Kenneth, and Culicover, Peter W. 1980. *Formal principles of language acquisition*. Cambridge, Mass.: MIT Press.
- Wheeler, Samuel. 1972. Attributives and their modifiers. *Nous* 6:310-334.
- Williamson, Timothy. 1994. *Vagueness*. London: Routledge.
- Wright, Crispin. 1976. Language-mastery and the sorites paradox. In *Truth and Meaning*, eds. Gareth Evans and John McDowell, 223-247. Oxford: Clarendon Press.
- Yoshida, Masaya. 2005. The rightward movement analysis of gapping in NP and its structural implications. In *Proceedings of the 24th West Coast Conference on Formal Linguistics*, eds. John Alderete, Chung-hye Han and Alexei Kochetov. Somerville, MA: Cascadilla Proceedings Project.