The semantics of *for* phrases and its implications

This paper argues that combinations of gradable adjectives with for *phrases are more interesting than they are normally considered to be. Important ingredients of the semantics of* for *phrases were largely neglected so far. These ingredients point against the popular analyses of* for *phrases. This paper defends an analysis of* for *phrases as modifiers of degree functions. The effect of this modification is shown to be significantly more fundamental than merely restricting function domains (cf. Kennedy 2007). Moreover, the new data and analysis have consequences to a variety of previous analyses that use a null morpheme,* pos*, to derive the interpretation of* for *phrases and the positive form, and/or to achieve a variety of other purposes. Based on new facts, this paper shows that the data does not support such a null morpheme; rather, postulating it creates a line of complications that need to be taken into account. The question, then, is – do we need it at all? We conclude that the answer should eventually be determined as part of a more general controversy regarding the level of representation usually called the logical form. This paper contributes to this controversy by providing two possible accounts of the facts, a degree-based analysis, albeit without a null-morpheme, and an alternative analysis without degrees at all. While these analyses are simpler, they appear to be at least as plausible.*

1. The semantics of *for* phrases

1.1 Data

The interpretation of the preposition *for* is highly polysemous, ambiguous and/or underspecified. This paper is about *for* phrases co-occurring with gradable predicates, as in (1)-(2).

(1) a. John is tall for a three year old.
b. He's a tall boy for his age and thank goodness he is.

(2) a. Mia wants an expensive hat for a three year old (Schwarz 2010)
b. This book is {fun, difficult, sophisticated, violent} for a 3-year old child.
c. The store is crowded for a Tuesday (Solt 2011)
d. John wants me to talk loud for a vocal coach (Schwarz 2010)

What does the *for* phrase in (1) contribute? First, *for* phrases set out a constraint on the comparison class, e.g. in (1a) only three year olds compare. Heights of other age groups are excluded from the discussion.

Second, *for* phrases help fix standards of membership of gradable adjectives. The standard is determined based on the comparison class; e.g., (1a) conveys that John's height exceeds the standard height of three year olds, not that of individuals in general.

Third, *for* phrases trigger a presupposition. In many, but not all cases, they trigger the presupposition that the adjective's subject argument belongs to the comparison class; e.g., (1a) is judged to presuppose that John is a three year old (for a detailed discussion see

Kennedy 2007 and Bale 2008). Thus, the sentences in (3) imply the truth of (1) irrespective of whether John is tall for a three year old or not.

(3) a. It is not the case that John is tall for a three year old.
b. If John is tall for a three year old, then these trousers won't fit him.
c. Is it the case that John is tall for a three year old?

In (2a), however, the gradable adjective *expensive* applies to a hat for three year old children, while the presupposition conveyed by the *for* phrase does not require that the hat be three year old (Schwarz 2010; Solt 2011); rather, it requires Mia, the sentential subject, to be a three year old child, and the hat(s) under discussion to be suitable for such children, or otherwise related to children that age.

Examples (2b,c) illustrate two points. First, the material in the noun phrase functioning as the comparison class argument of a *for* phrase need not be fully specified if it is salient in the context; e.g., the compared entities in (2b) are books associated with three year old children, not the children themselves. The compared entities in (2c) are not Tuesdays generally, but rather, Tuesday events or temporal stages in the life of the given store.

Second, the examples in (2b) show that contribution of a presupposition is not the only reason or main reason for the use of a *for* phrase, as the given examples do not include any argument refereeing to a three year old child, namely a suitable bearer of a presupposition. Similarly, (2a) can be minimally changed to exclude a presupposition bearer, as in *Mrs. Robinson looks for an expensive hat for a two year old child*.

Examples like (2d) illustrate another complication pertaining to the presupposition bearer. Schwarz (2010) convincingly argues that (2d) has two readings; it either presupposes that the sentential subject John is a vocal coach, or that the speaker is.

Notice also that in the examples in (1b) and (2a) the gradable adjective is in attributive position and therefore separated from the *for* phrase. The deviance of (4b) is probably due to the fact that constituents as heavy as *for* phrases tend to be linked at the right edge of the sentence as in (2a), and may also be extraposed as in (4a), but they may not intervene between an adjective in attributive position and the noun it modifies, as the *for* phrase does in (4b). That material in that position is infelicitous is a general phenomenon, illustrated in (4c,d).

(4) a. For an 8-year-old, Mia wants a very expensive hat
b. Mia wants a very expensive (*for an 8-year-old) hat
c. the angry (*at Mary) boy
d. is the most (*of the candidates) beautiful

Fourth, *for* phrases can occur in a variety of degree constructions, including equative and comparative constructions, degree questions, exclamations involving gradable adjectives, excessive constructions (*too, enough*), and constructions involving degree modification (*very, slightly, extremely*, etc.), as illustrated shortly. In these environments, the effects of *for* phrase modification go beyond that of setting a comparison class based standard, restricting an adjective's domain of reference, and conveying a presupposition. They trigger a more radical meaning shift.

For example, in the comparison constructions in (5a), the main entailment of the bare comparative – that John is taller than Sam – is eliminated. The sentence may hold true even if John is a baby and Sam is his father and obviously taller. Similarly (5c) may hold true even if John is shorter than Sam (Bale 2008).

(5) a. John is taller for his age than Sam is for his age
b. John is taller for a man than Mary is for a woman (Bale 2008)
c. John is as tall for a three year old as Sam is ~~tall~~ for a five year old.

Furthermore, *for* phrases are perfectly acceptable in degree questions such as those in (6), and exclamations such as those in (7). However, questions such as (6a) differ from the equivalent bare questions, e.g., *How tall is John?* in their set of possible answers. This difference reflects a meaning shift. The bare question *How tall is John?* is a direct question about John's height, which can be answered by means of precise measure phrases such as *2 meters*, or deictic degree pronouns as in *he is that tall*, accompanied by a hand gesture, pointing at the relevant height – the distance between the floor and the top of John's head. But the question *How tall is John for his age?* is rather about the extent to which John's height deviates from the norm for his age, and cannot be so answered, as illustrated in (8).

(6) a. How tall is John for his age?
b. How expensive for a three year old (child), is the hat Mia wants?
(7) a. How tall her baby is for his age!
b. I was very surprised at how expensive (for so little taste) this place was.
c. I was very surprised at how expensive (for a restaurant at this level) this place was.
d. We know how expensive, for amateur and professional alike, is the total package.
(8) a. A: How tall is John for his age?
B: slightly, very, exteremely, #2m; #that tall.

Relatedly, *for* phrases do not license precise or deictic measure phrases in declarative sentences, as the following felicity contrasts illustrate. This too suggests that something is happening that goes beyond the restriction of the adjectival domain of reference. The functions denoted by a bare adjective and a *for* phrase modified adjective are different.

(9) a. John is 98cm tall.
b.#John is 98cm tall for a three year old.
c. John is that tall.
d.#John is that tall for a three year old.

Notice that *for* phrases are not compatible with phrasal comparisons such as those in (10) (Solt 2011), or within-adjective clausal comparisons such those in (11). A *for* phrase must be attached to the adjective in the main clause, as well as to its possibly elided form in the *than* clause to create a between-adjective comparison, as in (5a-c).

(10) a. #John is taller than Sam for his age
b. #John is as tall as Sam for a five year old.
c. #John and Sam are equally tall for three year olds

(11) a. #John is {taller than, as tall as} Sam is ~~tall~~ for his age.
b. #For a five year old, John is {taller than, as tall as} Sam is ~~tall~~.
c. #John is {taller for his age than, as tall for his age as} Sam is ~~tall~~.

The infelicity of *for* phrases in phrasal comparatives and equatives such as (10b) may stem from the same reasons for which other PP adjuncts are illicit in these structures (cf. *#Dan is as proud as Bill of his son, #Mary is as good as Bill as a violinist*), possibly syntactic reasons. However, in the case of *for* phrases, in addition to syntax, there is also a semantic problem that becomes apparent when considering the improved felicity of clausal comparatives and equatives with PP adjuncts generally (e.g., *Dan is as proud as Bill is of his son, Mary is as good as Bill is as a violinist*), but not with *for* phrases, as the examples in (11a,b) illustrate. Moreover, *Dan is as proud of his son as Mary is* is perfectly okay, while (11c) is not. This suggests that the reasons are semantic. For some reason, *for* phrases are ruled out from within-adjective comparisons.[1]

In addition, the vague adjectives that *for* phrases normally modify are not compatible with degree modifiers like *slightly* that typically denote low degrees ('minimizers'), and most typically occur with minimum-standard adjectives (Kennedy and McNally 2005). However, adjectives modified by *for* phrase are perfectly compatible with minimizers, as the following contrasts illustrate.[2]

(12) a.#John is {slightly, a bit, somewhat} tall
b. John is {slightly, a bit, somewhat} tall for his age

This fact is puzzling given that *for* phrase modification does not eliminate the vagueness characterizing the interpretation of adjectives like *tall* and *expensive* altogether. As Kennedy (2007) shows, predicates such as *tall for a 15 year old boy* are not equivalent to precise predicates such as *taller than the average height of 15 year old boys*; their vagueness is evident from the fact that their extension shifts between contexts, they normally have a gap consisting of borderline cases for which speakers cannot tell whether they fall in the positive or negative extension, and they trigger the Sorites paradox.

Intuitively, if a boy is tall for this age, any boy 1mm shorter is also tall for this age. One millimeter never seems to make any difference. As a result, it seems that a series of inferences based on pairs differing by 1mm yields the conclusion that any 15 year old boy is tall for his age, which is paradoxical, as it is obviously judged false. When small differences add up, that does seem to make a difference. Similarly, if a boy is not tall for this age, so is any boy 1mm taller, although it is very clear intuitively that not all 15 years old boys fail to be tall for their age.

[1]Also the PP *of his son* triggers a between-adjective comparison when right adjoined to *Dan is as proud as Bill (is)*. Hence, semantic factors probably affect the felicity of equatives with this PP at final position, too.

[2]In accordance, for example, the frequency of *slightly short for* – the number of tokens of this type per the total number of tokens of *short for* in the corpus of contemporary American English (Davies 2012) – is 8 times higher than the frequency of *slightly short* per tokens of *short*. Similarly, the frequency of *slightly tall for his age* – the number of tokens of this type per the total number of tokens of *tall for his age* as estimated by a Google search of the internet – is 32 times higher than the frequency of *slightly tall* per tokens of *tall*.

Most lower closed adjectives are not vague to the same extent. For example, if a little stain is added to a clean (not dirty) table it is easily judged to no longer be clean, or equivalently, to be dirty, even if only slightly so (Kennedy 2007). In sum, adjectives modified by *for* phrases are vague, and at the same time, they naturally combine with minimizers, as in *slightly tall for his age*, suggesting that a lower closed scale and a minimum standard is involved; but then – in the absence of an upper closure – we expect the minimum to function as a membership norm, and thereby to eliminate vagueness effects, contra the above mentioned evidence.

This combination of facts has to be explained.

1.2 A new analysis

Throughout this paper, we use a λ-categorial language in the style of Heim and Kratzer (1998), with basic types x for individuals, t for truth values, and r for degrees; basic semantic domains D_x, D_t, and $D_r = \Re$ (sets of individuals, truth values, and degrees, respectively), and a set C of indices c of evaluation.[3] On most current theories, in any index of evaluation gradable predicates like *tall* are associated with degree functions, $f_{tall,c}$: $D_x \rightarrow D_r$, and the interpretation of adjective phrases in the positive construction (as in *John is tall*) is a characteristic function $c_{tall,c}$: $D_x \rightarrow \{0,1\}$, which either derives through a systematic type shift, or through the contribution of a null morpheme *pos* (see, for example, Kennedy 1997, 2007).

On these analyses, *for* phrases together with *pos* provide a standard of membership for the adjective they modify, usually the mean or median in the comparison class (Bartsch & Vennemann 1971; Solt 2011). However, as observed by Kennedy (2007), *for* phrases do not create sharp adjectives, e.g. *tall for a child* is itself a vague relative-adjective. The *for* phrase helps to reduce some of the vagueness of *tall* by eliminating possibilities such as that 2 meters is the standard; but they do not directly specify a standard for *tall*. Taking this point one step further, the new data discussed above suggests that *for* phrases neither function as type-shifters of adjectival interpretations from degree functions into characteristic functions, nor as mere domain restrictors; rather, they contribute deviation functions.

Indeed, a most important fact that usually goes unnoticed is that *for* phrases trigger a deviation interpretation. An utterance such as *john is tall* is often paraphrased as conveying that John's height stands out – it exceeds a norm serving as the contextual cutoff between the positive and negative extensions of *tall*. However, an utterance such as *john is tall for his age* can be paraphrased as conveying that the deviation of John's height from the normal height for his age stands out – it exceeds the normal deviation from the norm in the given age group.

It is particularly easy to see that interpretation relates to deviations from a norm when *for* phrases modify adjectives within degree constructions, as in (5) and (6) above; e.g., utterances such as *John is as tall for a three year old as Mary is for a five year old* convey that the extent to which John deviates from the norm for his age is at least as great as the extent to which Mary deviates from the norm for her age. Importantly, the truth conditions for this sentence are different from those of equatives with unmodified

[3] These indices can be seen as tuples consisting of at least a world and an assignment function.

adjectives, as they are compatible with situations in which John is shorter than Mary is. For example, even if Mary is John's mother and taller than John, she may deviate slightly from the height norm for adults, while baby John may deviate considerably from his age norm, so the sentence *John is taller for his age than Mary is for her age* still holds true.

In addition, questions such as *how short is my baby for her age group?* inquire about the deviation of a given baby from the average height of babies that age, and they implicate a worry concerning whether this deviation is within the norm for such deviations. Similarly, exclamations such as *how expensive (for so little taste) this place is* convey surprise at the high extent to which the prices in a given restaurant deviate from the normative prices in places providing that level of food (so little taste). [4]

Thus, *for* denotes a function from an adjectival degree function f and a comparison class C to a new degree function, $f_{f \text{ for } C}$, from entities x to the relative size of their deviation from the norm in C. Crucially, measures of the relative size of deviations from a norm are not linear distance measures; they cannot be described using conventional metrics such as inches or centimeters. The reason for this is that the size of a deviation depends on the distribution of values (and, in accordance, distribution of deviations from the norm) in the comparison class C (cf. Solt 2011).

To see this, consider for example, a context whereby the heights of most 15 year old boys is normally distributed, such that 95% of the boys fall in the range between 10cm above and 10cm below the mean, while the heights of most 14 year old boys is normally distributed between 1cm above and 1cm below the norm. To make sense of this, we may assume that 15 years is normally the age at which a burst of growth occurs rendering some boys more adult like than others at some point on their 15^{th} year of life. On such a scenario, a 15 year old boy deviating by 2cm from the norm for his age is *hardly tall for his age*,[5] but a 14 year old boy deviating by 2cm from the norm for his age is *very tall for his age*. The latter is *taller for his age* than the former is.

Thus, for any individual x, the size of x's deviation, $f_{f \text{ for } C}(x)$, is, roughly, the ratio between x's deviation from the norm in C (f(x) – norm(f,C)) and the normal deviation from the norm in C; we may symbolize the latter as std(f,C).[6,7]

(13) a. $[\![\text{for}]\!]_c = \lambda C \in D_{xt}.\ \lambda f \in D_{xr}.\ \lambda x \in C.\ (f(x) - \text{norm}(f,C)) / \text{std}(f,C)$

b. $[\![\text{tall for a child}]\!]_c = \lambda x \in C.\ \dfrac{f_{\text{tall},c}(x) - \text{norm}_c(f_{\text{tall},c}, [\![\text{child}]\!]_c)}{\text{std}(f_{\text{tall},c}, [\![\text{child}]\!]_c)}$

Importantly, this analysis has two straightforward desired consequences. On the one hand, *for* phrases can be licensed in degree constructions to yield a deviation interpretation, as desired (for an illustration see (14a-b)). On the other hand, they can be

[4] Bylinina (2011) analyses *for* phrases as shifters of basic degree functions into derived degree functions. Hence, her analysis closely resembles the present proposal, except that the derived degree functions on her analysis necessarily reflect context dependent purposes or interests.

[5] If the membership norm of *tall*, considering 15 year old children, exceeds the average height by more than two centimeters, a 15 year old boy deviating by two centimeters from the norm for his age is *not tall* and therefore *not tall for his age*.

[6] The operations called 'norm' and 'std' can correspond to mean and standard deviation; however, as observed by Solt (2011) a median gives a better notion of 'norm' for cases in which the distribution is not normal, and a standard deviation from the median is a better notion of 'std' in these cases.

[7] We are grateful to Adar Weidman for his useful examples and comments for this section.

licensed in the positive form like other adjectives do. The result, illustrated in (14c), is the truth value 1 iff the deviation value of the subject is greater than the norm for the deviation-adjective. Any method for determining the standard of a lexical adjective should also be good for determining a norm for a deviation adjective, e.g., norm(tall for a child,c), as discussed shortly.

(14) a. $[\![$John is as tall for his age as Mary is tall for her age$]\!]_c$= 1 iff
$f_{\text{tall for Dan's age},c}([\![\text{Dan}]\!]_c) \geq f_{\text{tall for Mary's age},c}([\![\text{Mary}]\!]_c)$

b. $[\![$How tall is John for his age? $]\!]_c$ =
$\lambda s \in C.\ f_{\text{tall for a child},s}([\![\text{Dan}]\!]_s) = f_{\text{tall for a child},c}([\![\text{Dan}]\!]_c)$[8]

c. $[\![$Dan is tall for a child$]\!]_c$= 1 iff
$f_{\text{tall for a child},c}([\![\text{Dan}]\!]_c) > \text{norm}(\text{tall for a child},c)$ iff
$\underline{f_{\text{tall},c}([\![\text{Dan}]\!]_c) - \text{norm}_c(f_{\text{tall},c}, [\![\text{child}]\!]_c)}$ $> \text{norm}(\text{tall for a child},c)$ iff
$\text{std}(f_{\text{tall},c}, [\![\text{child}]\!]_c)$
$f_{\text{tall},c}([\![\text{Dan}]\!]_c) - \text{norm}_c(f_{\text{tall},c}, [\![\text{child}]\!]_c) > 0$ iff
$f_{\text{tall},c}([\![\text{Dan}]\!]_c) > \text{norm}_c(f_{\text{tall},c}, [\![\text{child}]\!]_c)$

As (14c) illustrates, we propose that the deviation interpretation does not render the truth conditions of positive forms modified by *for* phrases necessarily different from those of their unmodified counterparts. The reason for this is that, by default, deviations from the norm are only required to be minimal – greater than zero. Indeed, a scale based on non negative deviations is lower closed – zero deviation exists – and it is upper open. Hence, the zero point stands out and functions as a standard of membership. This fact directly follows from Kennedy's (2007) economy principle, whereby scale endpoints function as standards.

The assumption that zero-deviation is the norm (membership standard) of *for* phrase adjectives explains the equivalence of positive constructions with and without *for* phrases (unless the comparison class changes); e.g., a child's height exceeds the height norm for children (the height functioning as the standard of membership of *tall* when children are under discussion) iff it deviates from this norm by a degree that is greater than zero. Thus, a child x is tall iff x is tall for a child.

Moreover, a zero-deviation norm explains the felicity of minimizers (e.g., (12b)).[9] At the same time, as long as, e.g., the height norm (the membership norm of *tall*) is not specified, predicates like *tall for her age* retain their vagueness, since they relate to non-zero deviations from a point which is not fully specified.

[8]These truth conditions suppose a partition analysis of questions (Groenendijk and Stokhof 1989), but nothing hinges on this; the crucial point is only that, given the present analysis of *for* phrases as adjective modifiers (functions from degree functions to degree functions), any interpretation of degree questions that works for, e.g. *tall*, should also work for *tall for an eight year old*.

[9]Sassoon (2012) shows, by means of a survey of acceptability judgments and a study of patterns of usage, that the licensing condition of *slightly* is not merely a lower closed scale, but rather, such a scale together with a minimum standard. Moreover, what we call 'minimum' standard is in effect a non-maximal salient point on a scale, not necessarily the absolute scale minimum (McNally 2011; Bierwisch 1989; Rotstein & Winter 2005). Thus, while negative deviations from a height norm might exist, it is the zero deviation that stands out and functions as the standard, as in, e.g., Bierwische's view of adjectives like *glad-sad*. Notice also that reference to negative degrees is marked (e.g., predicates like *taller for her age* are not normally used to compare short entities), except under negation as in *not tall for her age*.

This analysis has additional advantages. First, it explains why measure phrases are not licensed (cf. (8-9)), as in e.g., **Dan is 2cm tall for his age*.; the reason is that the value distribution within the comparison class affects the interpretation of adjectives modified by *for* phrases in such a way that the values they assign to entities are normalized by the normal deviation in this class. Furthermore, since the norm for a given class is not semantically determined, a considerable range of values may be regarded as normative. Consequently, it is impossible to specify the precise measurement of deviations from the norm. The situation is similar to one whereby one tries to determine how much weight one has lost in a diet with no precise information about one's weight in the onset of the diet. Indeed, when the norm is fully specified the use of measure phrases improves. For example, the felicity of *the baby is 2cm tall(er) for her age* improves in the context of a dialogue between a mother and a doctor taking place in front of a screen presenting the height curve for babies of the relevant percentile.

Second, this analysis explains why adjectives with *for* phrase are licensed in between-predicate comparisons. We can use a *for* phrase meaningfully when the model specifies more or less what the central value and deviation are for the comparison class and adjective. Such information is available when the vast majority of values tend to fall within a certain bound range. For example, in a normal distribution, 99.74% of the entities are located within the range of three standard deviations above and below the average. If 'norm' is the average and 'std' equals 3 standard deviations, then the bounds encompass virtually all the domain, except few abnormal cases (a quarter of a percent of the domain). Importantly, these bounds allow comparison: the relative position of a value on a bound range is meaningfully comparable to the relative position of any other value on any other bound range. In fact, between adjective comparisons easily lend themselves to a deviation interpretation, as in *Mary is as tall as Bill is short*, when accepted, or as in *Mary is as late as Bill is early* (Kennedy 2001).[10]

By contrast, comparative and equative constructions such as those in (10-11) whereby the arguments compare relative to one and the same predicate do not license adjectives modified by *for* phrases (e.g., *#John is as tall for a three year old as Mary (is)*), because the result is completely equivalent to the simpler version without a *for* phrase (e.g., *John is as tall as Mary (is)*). The restriction of the domain to a particular age group, and the deviation interpretation imposed by the *for* phrase serve no purpose in the given construction. Hence, the use of a *for* phrase creates a manner violation – it is a complicated way to say no more than is (or can be) said without a *for* phrase. Boys of the same age are *equally tall for their age* iff they are *equally tall* point, rendering the use of a *for* phrase superfluous.

Importantly, interpretations of bare adjectives in terms of deviation functions exist, but they are marked or secondary in importance, while in *for* phrase modified adjectives they form the dominant interpretation. One reason to think that deviation interpretations got conventionalized in the latter is the following. Synthetic comparative forms such as the one in the between-adjective comparison in (15a) normally convey a **direct** comparison of lengths. By contrast, analytic forms such as the one in (15b) normally convey an

[10]Barner and Snedeker (2008) show that subjects label the tallest one third of objects in a distribution as tall, and the shortest third as short; a cutoff located 0.43 of a standard deviation from the mean derives these results. Moreover, they show that four year olds can use statistical properties – value distributions in comparison classes – to determine standards for *tall* and *short*

indirect comparison of lengths vs. their respective norms, and they may have a metalinguistic flavor, namely they imply that, e.g., *tall* is a more appropriate description than *wide* is for the given table. However, already the synthetic form of between adjective comparisons of *for* phrase modified adjectives such as the one in (16a) relate to a comparison of deviations vs. their respective norms. The reason seems to be that that's what adjectives with *for* phrases measure. Moreover, a metalinguistic flavor accompanies the analytic form in (16b), not the one in (16a).

(15) a. The table is (2cm) **taller** than it's wide.
b. The table is (#2cm) **more tall** than it's wide.
(16) a. John is (#2cm) **taller for his age** than Sam is for her age.
b. John is **more tall for his age** than Sam is tall for her age.

Third, this analysis suggests a possible explanation for why *for* phrases are not licensed with absolute adjectives (Siegel 1977). Heights of boys and girls in different ages are normally distributed, so generalizations about height per age and gender can provide a basis for calculation of values for 'norm' and 'std'. The same holds for the size of different types of spoons, glasses, trees and so on. While people can lose or gain weight, they are usually more or less the same weight, which allows keeping track of weight distributions. The same holds for the weather in different locations and times of the year. Hence, *for* phrases naturally combine with adjectives like *tall/short, long/short, fat/skinny* and *warm/cold.*

In opposition, values of entities on the measures denoted by absolute adjectives such as *dry/ wet, open/ closed* and *full/empty* change quite arbitrarily with time. A glass is not normally full by 300ml or 200ml or any other value; one moment it is full, another moment it is half full and so on. The same holds for the degree to which a floor might be wet, or a door in a house might be open. Perhaps, then, the distribution of *for* phrases is explained merely by *for* phrases not being licensed unless value distributions with a more or less fixed form over time (e.g., bell shaped distributions), including stable central values and deviations, are available for the given adjective and comparison class. Indeed, *for* phrase modification of absolute adjectives improves when such value distributions are available, as in, e.g., *this room is empty for a Hollywood cinema theatre* (Kennedy 2003). We do have, after all, stable information concerning how full Hollywood cinema theatres tend to be (for a discussion of additional factors see Toledo & Sassoon 2011).[11]

Fourth, probably for the same reason, *for* phrases contribute a presupposition of membership in the comparison class (Kenddey 2007; Solt 2011), e.g. if Dan is known to be an adult *Dan is tall for an eight year old* is not an appropriate utterance. The presupposition arises because *for* phrases are all about the relative position of objects in a given distribution. Normally, the relative size of the subject's deviation from the norm is relevant only when information about a distribution is available including the value for

[11] As an anonymous reviewer observed, hearing that one's infant son is *healthy for a baby* would make one wonder if not worry. We agree, but do not think this refutes the thesis that the interpretation is "healthy given norms suitable for babies". The worry arises because *healthy* is an absolute adjective with a default maximum standard (Kennedy & McNally 2005; Kennedy 2007), and therefore *for* phrase modification can only trigger lowering of the standard. Stating that one is healthy relative to a standard lower than the default implies that this is one's highest degree of health, namely one is *not* strictly speaking healthy.

the subject as part of it; e.g., one can tell whether a baby is healthy by testing whether his height and weight are normal at his age group; one can tell whether a child is clever by testing whether her intelligence exceeds the level prevailing at her age, etc.

Thus, we explain why the presupposition arises, while at the same time it is not an inherent part of the analysis. Indeed, in some cases the norms of other groups can also matter, rendering convenient any means to mark whether the norms for the subject's group or for some other group are under discussion. Accordingly, we can find other modifiers like *relative*, whose interpretation tightly resembles the interpretation of *for* phrases, except for not triggering the given presupposition. To see this, compare, for example, (17a) with *for* to (17b) with *relative to*.

(17) a. Dan is tall for a child
b. Dan is tall relative to a child.

If anything, *relative to* triggers the presupposition that the subject is not a member of the comparison class. On the present analysis it is easy to explain the difference. While we will not discuss here the full range of interpretations of *relative*, it is intuitive to analyze its use in the given example as involving central tendencies (norm and std) in a value distribution, hence *tall relative to a child* can be analyzed as denoting the degree function $\boldsymbol{\lambda x \notin [\![child]\!]_c}$. $(f_{tall,c}(x) - norm_c(f_{tall,c}, [\![child]\!]_c))$ /$std(f_{tall,c}, [\![child]\!]_c)$. The only difference with respect to *for* is in the presupposition conveyed.

Fifth, the licensing of degree adverbials such as *very* as in *Dan is very tall for his age* is also explained on this account, since, e.g., if *tall* is a relative adjective for which a stable value distribution is available, so is *very tall* and *extremely tall*, which can therefore be modified by a *for* phrase. In addition, *tall for his age* is a standard gradable adjective on its own right and can therefore combine with degree modifiers (*slightly*, *very*, etc.), as well as with other degree morphemes (*too*, *enough*, *-er*, *how* of degree questions, etc.)

The licensing of *for* phrases in degree constructions depends mainly on whether their use can contribute significantly to the meaning of the construction in the context of utterance; e.g., normally, boys of the same age are equally tall for their age iff they are equally tall point, rendering the use of a *for* phrase with *equally* superfluous (i.e. rare, but not necessarily ungrammatical). Furthermore, considering that *for* phrases constrain the possible norms and deviations under discussion in a context of utterance, it is no wonder that they are more useful means to express exclamation (i.e. surprise concerning an individual's degree in relation to the central tendency in a given group) than to request information about precise measurements (cf. the first point).

For the use of a variety of degree morphemes with *for* phrases and the role of distributions, consider the following naturally occurring examples. Notice that true requests of information are possible, as in (18e), although *for* phrases appear to be used mainly in exclamatives, as in (18f-h). Also, (18c-d) illustrate the common use of excessive morphology (*too*, *enough*) with *for* phrases. The job of excessive morphemes is to set up a functional standard for the adjective they modify, a cutoff between the degrees that are compatible with the requirements, goals or desires of the situation and those which are not (Heim 2000). Standard setting is naturally welcomed in the case of *for* phrase modified adjectives that denote measurements of deviation from a standard.

(18) a. My daughter is **extremely** tall for her age… now 5 1/2 years old and 52" tall … (attached is a pic of her at 3 1/2 with her classmates, to give you an idea of her height). (http://moms4mom.com/questions/2935/my-daughter-is-extremely-tall -for-her-age-whats-the-right-way-to-handle-insensi).

b. My niece is **very** small for her age--she's 13 years old but looks more like 10 (http://www. mamapedia.com/article/20-month-old-is-small-for-her-age).

c. Then, of course, there's that one question that nearly every parent asks the paediatrician – "Doctor, tell me, is my child **tall enough for his age**?" (magtheweekly.com/16apr-22apr2011/mommynomics.asp).

d. I took my son to the dr. in May and she said he is **too tall for his age** (www.dfwareamoms.com/forums/showthread.php?t=31806).

e. Q: **How** good or bad is 118 IQ for an 11 year old girl? …
A: It's ok. About normal. The highest I ever heard of was 200… (http://uk.answers.yahoo.com/question/index?qid=20090110185755AAxZaiN)

f. Meg gets tired of hearing **how** "tall" she is for her age but loves to ride rides that other kids her age aren't tall **enough** for. (www.danacarrington.com/ megan-shay/?paged=3).

g. I'm told regularly **how** amazing her language is for her age (www.bubhub.com.au/community/forums/archive/.../t-26960. html).

h. I love how she is **soo** clever for an eight year old girl *(*asianfanatics.net/ forum/topic/200278.../page__st__450)

To summarize, an analysis of *for* phrases as relating to degree functions representing relative size of deviations from norms captures a wide variety of the facts discussed in part 1 of this paper. The next section shows that some of the facts this analysis captures are problematic for previous accounts.

2. Consequences for contemporary analyses of *for* phrases and *pos*

We now move on to show that the new data this paper presents is challenging for contemporary analyses of *for* phrases. They fail to account for the whole range of facts discussed above.

Moreover, since modification of adjectives by *for* phrases in positive constructions is optional, most accounts tie the use of adjectives in general, and modification by *for* phrases in particular, with the use of a special null morpheme, known under the name *pos. For* phrases are assumed to delineate a comparison class, or restrict the domain of comparison, while it is *pos* that introduces the norm for that class/domain into the derivation and truth conditions of the positive construction. Moreover, in two recent accounts, it is *pos* that is assumed to convey the presupposition of membership in the comparison class. These accounts of *for* phrases have exploited *pos* to account for the non-local presuppositions of the sentences in (2) in particular the ambiguous (2d) (cf. Schwarz 2010) in terms of raising of *pos* to positions in which it takes scope over predicates larger than the lexical gradable adjectives in the given sentences. Another account exploited a standard-introducing null modifier *eval*, similar in its effects to a *for* phrase, in order to capture norm-related interpretations in degree constructions with

negative adjectives, e.g. the fact that examples such as *How short is Bill?* and *Bill is as short as Mary* imply that Bill and Mary are short (Rett 2007, 2008).

Hence, different analyses take slightly different stands on the semantics of *for* phrases, but neither subsumes a full fledged deviation semantics, and they diverge quite remarkably with regard to the analysis of the *pos* morpheme, depending on the roles and distribution they assign to it. This divergence in itself, we think, is a reason to worry. We will explore the main tasks for which a null morpheme is exploited in the degree literature, and show that an account without such a morpheme is possible, which is at least as adequate and compelling. In addition, we will review a variety of issues that arise in null-morpheme accounts, which reduce their attractiveness. Briefly summarizing our arguments, the interpretation of positive and degree constructions is different with and without *for* phrases. This observation speaks against the postulation of a null morpheme that mimics the workings of *for* phrases in their absence.

We show that an analysis without a null morpheme – assuming a freely available type shift from degree functions to characteristic functions – is simpler and it creates fewer problems to explain. As a second step, part 3 provides an alternative analysis that eliminates the need of a type shift (that might possibly be marked with *pos*) altogether by eliminating the use of degrees.

2.1 *For* phrases as arguments of a null-morpheme *pos*

On most current theories, in any index of evaluation gradable predicates like *tall* are associated with degree functions, $f_{tall,c}$: $D_x \rightarrow D_r$. Based on combinations of adjectives with measure phrases, as in *Dan is 5 feet tall*, the interpretation of adjectives is often assumed to be relational (Cresswell 1977; von Stechow 1984); e.g., in any index c, *tall* is assumed to denote a relation between individuals x and degrees r, such that x's height in c, $f_{tall,c}(x)$ exceeds r.

(19) a. $[\![\text{tall}]\!]_c = \lambda x \in D_x.\ \lambda r \in D_r.\ f_{tall,c}(x) \geq r$

b. $[\![\text{Dan is 5ft tall}]\!]_c = 1$ iff $\lambda x \in D_x.\ \lambda r \in D_r.\ f_{tall,c}(x) \geq r([\![\text{Dan}]\!]_c)([\![\text{5ft}]\!]_c)$
iff $f_{tall,c}([\![\text{Dan}]\!]_c) \geq [\![\text{5ft}]\!]_c$

While a relational analysis works well for sentences with measure phrases such as (19b), the interpretation it yields for sentences in the positive form such as *Dan is tall* leaves the degree argument of *tall* unbound.

(20) $[\![\text{Dan is tall}]\!]_c = 1$ iff $\lambda x \in D_x.\ \lambda r \in D_r.\ f_{tall,c}(x) \geq r([\![\text{Dan}]\!]_c)$
iff $\lambda r \in D_r.\ f_{tall,c}([\![\text{Dan}]\!]_c) \geq r$ **????**

The degree variable cannot get bound at the level of discourse closure, for this yields a too weak interpretation, according to which Dan is tall iff Dan's height is bigger than some degree. While this condition is satisfied for just any height, the actual truth conditions of *Dan is tall* require that Dan's height be greater than some stricter norm, *tall*'s cutoff in the context of evaluation c.

On other analyses, gradable adjectives denote the degree functions they are associated with, $f_{<x,r>}$ (Bartsch & Vennemann 1971; Kennedy 1997-2007; Landman 2009). The

problem persists, since the combination of an adjective with an argument yields a degree (type r) rather than a truth value (type t).

(21) $[\![\text{Dan is tall}]\!]_c = 1$ iff $f_{\text{tall},c}(x)$ **????**

In sum, degree analyses do not straightforwardly derive the interpretation of adjectives in the positive form. A dominant solution to this problem takes norm-related ("above cutoff") implications to involve a null morpheme *pos*[12] or *eval*[13]. On these analyses, the positive construction contains a covert degree projection, DegP, occupying *pos.* This null morpheme adds to the derivation of the positive form an implicit variable whose value stands for a context dependent standard of membership. On an early analysis (Bartsch & Vennemann 1971; see also von Stechow 1984a: 60), *pos* takes a comparison class argument $C_{<x,t>}$ and an adjectival function $f_{<x,r>}$, returning a characteristic function from an object x to 1 iff x's degree exceeds the average degree in C, norm(f,C):

(22) a. $[\![\text{pos}]\!]_c = \lambda C \in D_{<x,t>}.\lambda f \in D_{<x,r>}.\lambda x \in D_x.f(x) \geq \text{norm}_c(f,C)$
b. $[\![\text{pos tall (for a) child}]\!]_c = \lambda x \in D_x.f_{\text{tall},c}(x) \geq \text{norm}_c(f_{\text{tall},c}, [\![\text{child}]\!]_c)$

Kennedy (2007) argues against this analysis, based on the non-equivalence of sentences such as *Dan is a tall child* and *Dan is above the average child height*. While the former is vague, the latter is not. This suggests that the method for determining the cutoff point based on f and C is not unequivocally identified with averaging; rather, as assumed in, for instance, Klein (1980), the method for selecting a standard given an adjective and a comparison class, 'norm(f,C)', is undetermined semantically.

Moreover, this analysis was criticized by Kennedy (2007) and Bale (2008) for not capturing the presuppositional nature of *for* phrase modification. These authors provide new analyses whereby the main role of *for* phrases is to restrict the domain of interpretation of the adjectives they modify. We consider in the next section several problems with these revised analyses. However, we agree that the traditional analysis in (22) is problematic, for the following reasons.

If *for* phrases are arguments of *pos* and *pos* shifts the interpretation of its adjectival argument from a measure function into a characteristic-function, then the fact that *for* phrases are licensed in degree constructions may suggest that degree morphemes such as *–er* in between predicate comparisons, *how* of degree questions, *slightly*, *very*, *enough*, *too* and so forth, make use of characteristic functions, not degree functions. But adopting this line rips off the ground of the null-morpheme analysis. Obviously, in a grammar with no degree functions, *pos* is left entirely out of job, and if degree functions or relations are not even necessary for the analysis of the most dominant degree morpheme *-er*, why have them at all?

This argument applies also to attempts to draw an analogy between *for* phrases and *pos* given the semantics in (22) (Solt 2009, 2011; Bylinina 2011). While such an analogy might make an intuitive sense, it can be cashed out in the spirit of Lewis (1979), by stating merely that *for* phrase interpretations can be accommodated when contexts

[12]See Bartsch and Vennemann (1972), Cresswell (1977), von Stechow (1984, 2007), Kennedy (1999, 2007); and Heim (2006).
[13] See Rett (2007, 2008).

support this move. We have no objection to the idea that many sorts of constituent interpretations may be accommodated in the appropriate circumstances; *for* phrases make no exception; yet, an analysis of *for* phrases along this line – e.g., $\lambda C \in D_{<x,t>}.\lambda f \in D_{<x,r>}.\lambda x \in D_x.f(x) \geq \text{norm}(f,C)$, should be supplemented with a coherent account of cases in which *for* phrases do appear in constructions other than the positive form. If *for* phrases are realizations of *pos*, their application shifts the interpretation of their adjectival argument from a degree function or a relational interpretation into a characteristic-function; thus, the fact that *for* phrases do appear in constructions other than the positive form suggests that the comparative morpheme and other degree morphemes make use of characteristic functions, not degree functions; a grammar with no degree functions is a grammar without *pos*.

2.2 *For* phrases as restrictors of domains of adjectival interpretations

2.2.1 For *phrases as restrictors of degree functions*

On more recent theories, the null morpheme directly relates to a membership standard, with no mediating comparison class parameter at all (Kennedy 2007; Heim 2006; von Stechow 2009); e.g., generally, *Dan is tall* is analyzed as equivalent to tall(Dan,r_s), where r_s is *tall*'s membership standard in the context of evaluation. The interpretations in (23a,b)-(24) represent three main proposals along this line, abstracting away from details that are irrelevant for the present purpose. On (23a), a popular proposal due to Cresswell (1977), *pos* takes an adjectival relational interpretation G and an individual x and returns truth value 1 iff the relation G applies to x and some degree r greater than the norm r_s.

(23) a. $[\![\text{pos}_{<xrt,xt>}]\!]_c = \lambda G \in D_{<x,rt>}\, \lambda x \in D_x.\, \exists\, r \in D_r,\, r > r_s\colon G(x,r)$ (Cresswell 1977)
b. $[\![\text{pos}_{<xr,,xt>}]\!]_c = \lambda f \in D_{<x,r>}.\lambda x \in D_x.f(x) \geq r_s$ (Kennedy 1997)

On (23b), due to Kennedy (1997-2007), *pos* takes an adjectival degree-function interpretation, $f \in D_{<x,r>}$, and an individual x and returns 1 iff f(x) is greater than the norm r_s. Importantly, the value of r_s is context dependent, but is not necessarily determined indexically. Kennedy (1997), for example, suggests that *pos* introduces a degree argument (as in $\lambda f \in D_{<x,r>}.\lambda r \in D_r.\lambda x \in D_x.f(x) \geq r$), which is afterwards saturated by a contextually given value r_s, computed based on a salient class C; thus, r_s = norm(f,C). On Kennedy's (2007) analysis, this value is computed based on the adjectival degree function f alone, r_s = norm(f), since the domain of this function is already represented as contextually restricted to some salient class C. On this analysis, r_s is identified with an endpoint on the scale of an absolute adjective, and a degree that stands out on the scale of a relative adjective. For example, norm(f_{full}), norm(f_{open}) and norm(f_{tall}) are the maximum degree assigned to an entity in the domain of f_{full}, the minimum degree assigned to an entity in the domain of f_{open}, and a midpoint degree that only very few things in f_{tall}'s domain reach, respectively.

A slightly different analysis of *pos* is presented in (24) (von Stechow 2009), the main renovation of which is that the standard of membership in each context of evaluation c is not considered to be a single degree; rather, it is an interval, R_s, on the adjectival scale, called the 'neutral range' or 'indifference zone'. Derivation proceeds by applying an

adjectival relational interpretation G to an individual argument x; the result is a degree predicate, $\lambda r \in D_r.G(x,r)$ (cf. (20)), with which *pos* combines. *Pos*, on this analysis, is a determiner referencing the subset relation between G's indifference zone, R_s and this degree predicate, i.e. pos(G(x)) = 1 iff $R_s \subseteq \lambda r \in D_r.\ G(x,r)$.

(24) $[[pos_{<rt,t>}]]_c = \lambda P \in D_{<r,t>}.\forall r \in Rs.P(r)$ (von Stechow 2009)

Hence, *pos* takes a degree predicate interpretation $P_{<r,t>}$ built from the relational interpretations of an adjective G and an argument x (e.g. $\lambda r \in D_r.G(x,r)$) and returns truth value 1 iff G's contextually determined neutral range is a subset of this degree predicate. This is the case iff x's maximal degree in G exceeds every degree r in the neutral range of G, which is the case iff x is in the positive extension of G.

In sum, on the analyses in (23-24), *pos* gives us the required type for the positive form, thereby solving the problem illustrated in (20)-(21). In addition, these analyses predict that *pos* would never occur and trigger the specification of a context-dependent standard value, r_s, in the presence of an overt measure phrase like, e.g., *5 feet*, because both reside in the same position in the degree projection and both saturate/bind the free degree argument (for a detailed discussion see, for instance, Kennedy 1997: 126-130). Finally, these analyses elegantly assign the positive form the syntactic structure characterizing other degree constructions; thus, by stipulating a null morpheme they gain structural uniformity.

What semantic contribution might *for* phrases have on such analyses? Not much. Kennedy (2007) proposes that *for* phrases simply restrict the adjectival domain, e.g., [[tall for a child]]$_c$ = $\lambda x \in D_x \cap [[child]]_c.\ f_{tall,c}(x)$. Hence, on this analysis *pos* takes an adjectival measure function f and returns a characteristic function from objects x to 1 iff x's degree stands out in f's domain, i.e. reaches a degree, norm(f), that only very few things in the domain reach, as illustrated in (25a,b). In addition, *for* phrases directly restrict the adjectival domain, not the selection of norm, as in (25c). For this reason, *pos* is needed to resolve type mismatch even in sentences with *for* phrases, as illustrated in (25d).

(25) a. $[[pos_{<xr,,xt>}]]_c = \lambda f \in D_{<x,r>}.\lambda x \in D_x.f(x) \geq r_s$ (Kennedy 1997)
b. $[[pos\ tall]]_c = \lambda x \in D_x.f_{tall}(x) \geq norm_c(f_{tall,c})$
c. $[[tall\ for\ a\ child]]_c = \lambda x \in D_x \cap [[child]]_c.\ f_{tall,c}(x)$
d. $[[pos\ tall\ for\ a\ child]]_c = \lambda x \in D_x \cap [[child]]_c.\ f_{tall,c}(x) \geq norm_c(\lambda x \in [[child]]_c.f_{tall,c}(x))$

However, if *for* phrases are merely domain restrictors and do not in themselves relate to norm-related implications, why aren't *for* phrases naturally used in order to restrict the domain in true degree structures? The examples are repeated below; e.g., on the one hand, (26a-b) are odd and need not convey 'equally tall'; if they convey anything at all, it is that Bill and Mary's possibly different heights count the same for their respective ages (say, both are very tall for their age). (26c) is again utterly odd.

(26) a. #Bill is as tall for his age/ their ages as Mary
b. #Bill and Mary are equally tall for their age
c. #For his age, Bill is taller than Mary (is for her age)

This is not expected given a domain restriction proposal, for nothing in this proposal prevents these derivations from having the following interpretations.

(27) a. $[\![\#\text{as tall for an eight year old boy as Mary}]\!]_c =$
$\lambda x \in D_x \cap [\![\text{an eight year old boy}]\!]_c.\ f_{tall,c}(x) \geq f_{tall,c}([\![\text{Mary}]\!]_c)$
b. $[\![\#\text{taller than Mary for an eight year old boy}]\!]_c =$
$[\![\#\text{taller for an eight year old boy than Mary}]\!]_c =$
$\lambda x \in D_x \cap [\![\text{an eight year old boy}]\!]_c.\ f_{tall,c}(x) > f_{tall,c}([\![\text{Mary}]\!]_c)$

On the other hand, the sentences in (28) are felicitous, as they can be interpreted as between-adjective comparisons. Moreover, their interpretation is based on special measure functions comparing the extents to which the heights of the individuals in question diverge from the norm in their respective ages. These interpretations are clearly not motivated by Kennedy's proposal (cf. (25)).

(28) a. Bill is as tall for his age, as Mary is for her age
b. Bill is taller for a three year old than Mary is for a five year old

The function-domain restriction proposal correctly predicts that, e.g., (28b) conveys the presuppositions that Bill is a three year old child and Mary a five year old child, but in addition, it wrongly predicts that (28b) entails that Bill is taller than Mary.

These data point against a division of labor whereby *for* phrases are used to restrict functional domains, whereas the use of *pos* directly references a standard variable (rather than a mediating comparison class).

Since this objection is based on the infelicity of *for* phrases with equatives and comparatives, one could still counter it on the basis that equatives and comparatives have the same properties as absolute adjectives in terms of crisp judgments and insensitivity to comparison class. Kennedy (2007) presents an analysis of absolute adjectives that takes into account the unacceptability of *for* phrases with these adjectives while still arguing for *pos.* Notice, however, that Kennedy by no means argues that all degree-constructions are absolute. In particular *compared to* comparisons are examples in point. For Kennedy (2007), a minimal (non-zero) height difference is *not* sufficient for the sentence *Dan is tall compared to Mary* to be true, which shows that *tall compared to Mary* is not an absolute comparative adjective construction. The possibility of modifying it with *very*, as in, e.g., *very tall compared to Mary*, supports its classification as a relative construction too. Still, the infelicity of *for* phrases persists as illustrated in (29).

(29) a. *For his age, Bill is tall compared to Mary
b. ??Bill is tall for his age compared to Mary

The infelicity of *for* phrases here cannot be due to an absolute-standard. In fact, even (29b) is odd (compared to, e.g., *Dan is taller for his age than Mary is*), probably because not being a clausal comparative, it cannot possibly be interpreted as a between-predicate comparison.

The infelicity of (29a) is puzzling given Kennedy's (2007) assumption that *compared to* phrases restrict the domain to the two compared entities, e.g., Bill and Mary.

Why not restrict the domain to children at Bill's age, for instance, three year olds, and then further restrict it to Bill and Mary? Is it because (27a) is redundant in that it is equivalent to *Dan is tall compared to Mary*? but these sentences are not quite equivalent, since only in (29a) the standard-identification-function that *pos* introduces ('norm') receives as an argument a function whose domain is restricted to individuals of Bill's age. In accordance, only in (29a) the standard of *tall compared to Mary* should be determined using this restricted domain. Furthermore, many entirely grammatical examples are equally redundant, such as, for example, (30a), whose roughly equivalent shorter version is *Bill studies in this class*, and (30b), whose roughly equivalent shorter version is *Bill was here yesterday at two o'clock*; yet, the sentences in (30a,b) are perfectly grammatical, while the sentences in (29) are not.

(30) a. Bill studies in this school at that class.
b. Bill was here yesterday afternoon at two o'clock…

The interpretation of (31a,b) is, again, not predicted by the domain restriction theory.

(31) a. How tall is Bill for his age?
b. How tall is Bill?

Given this theory, (30a) should be a question about a more restricted domain than (30b). We naturally expect questions about restricted domains to trigger finer grained answers than questions about non restricted domains such as (30b). After all, the former, unlike the latter, direct our attention to a small subset of all possible heights, namely, $\{f_{tall,c}(x): x \in D_x \cap [\![\text{Bill's age}]\!]_t\}$ versus $\{f_{tall,c}(x): x \in D_x\}$, respectively. Judgments, however, go in the opposite direction, e.g., *1.87cm* is an acceptable answer only to (30b), as the following dialogues illustrate.[14]

(32) a. A: How tall is Bill?
B: 1.87cm
b. A: How tall is Bill for his age?
B: #1.87cm
c. A: How tall is Bill for his age?
B: very tall; much taller than normal.

Recall also that a deviation analysis of *for* phrases easily extends to an analysis of equivalent examples such as (33b). If anything, *relative to* triggers the presupposition that the subject is not a member of the comparison class. Hence *tall relative to a child* can be analyzed as denoting the function $\boldsymbol{\lambda x \notin [\![child]\!]_c}$. $(f_{tall,c}(x) - norm_c(f_{tall,c}, [\![child]\!]_c))$ $/std(f_{tall,c}, [\![child]\!]_c)$. The only difference with respect to *for* is in the presupposition conveyed.

(33) a. Dan is tall for a child

[14]For the very same reasons, we would expect *very* to be licensed in degree structures, e.g. supposing Bill is very tall, *how very tall is Bill?* should have been a normal question about Bill's precise height among all possible very tall heights $\{f_{tall,c}(x): x \in D_x \ \& \ f_{tall,c}(x) > r_s + \delta\}$.

b. Dan is tall relative to a child.

Notice, however, that a mere domain restriction analysis of *for* phrases, whereby *tall for a child* denotes the function $\lambda x \in [\![\text{child}]\!]_c$. $f_{\text{tall},c}(x)$, does not trivially extend to capture the example with *relative*. Assuming that *tall relative to a child* denotes the function $\lambda x \notin [\![\text{child}]\!]_c$. $f_{\text{tall},c}(x)$ yields the wrong results for the positive construction. On such an extension, *John is tall relative to a child* is wrongly predicted to be true iff John's height exceeds the height norm for non-children. To capture the fact that it should exceed the height norm for children, we have to separate between the domain restriction and the standard setting. These two functions are separated in the present analysis, in which *for* phrases and their *relative* cousins in examples like (33a,b) trigger a shift to a function from entities to their deviation from a norm in a given class (the standard of *tall* considering children heights), irrespective of whether they trigger a presupposition of membership or non-membership in that class (e.g., children), or no presupposition at all. In addition, on the proposed analysis, the standard of membership for this function is simply zero, irrespective of the presupposition (the way the function domain is restricted).

We therefore contend that *for* phrases do not pattern as mere function-domain restrictors (presupposition triggers), and should retain their status as markers of comparison classes, i.e. as playing the special role of restricting the set of plausible standards in the interpretation of the positive form of relative adjectives, and as triggering comparison class based deviation interpretations.

2.2.2 For *phrases as restrictors of ordering relations*

Similar problems pertain to Bale's (2011) account of *for* phrases as restrictors of ordering relations.

Bale (2011) associates adjectives with preorders (reflexive and transitive relations), e.g. *tall* is associated with $\{\langle x,y\rangle: x \geq_{\text{tall}} y\}$, and comparison classes which restrict the domain of the relation: $\geq_{\text{tall},C} = \{\langle x,y\rangle: x \geq_{\text{tall}} y \,\&\, x \in C \,\&\, y \in C\}$. *For*-phrases, on this analysis, restrict the domain of adjectival relations, e.g., *tall for a 3-year old* refers to $\{\langle x,y\rangle: 3(x) \,\&\, 3(y) \,\&\, x \geq_{\text{tall}} y\}$. Adjectives are associated with measure functions mapping entities to their equivalence classes under the equality relation based on ≥, yielding, possibly by means of a null morpheme, that, e.g., *John is tall* is true iff $f(\geq_{\text{tall},C})(J) > \text{norm}(\geq_{\text{tall},C})$. Thus, *for* phrases on this analysis affect the membership norm, but at the same time also restrict the domain of application of the degree function, thereby contributing a presupposition.

On Bale's (2008) account, between adjective comparisons such as *a is (2 cms) taller than b is wide* convey that $f(\geq_{\text{tall}})(a) >_{\text{tall}} f(\geq_{\text{wide}})(b)$, i.e. the equivalence class containing a is ranked higher on the scale of *tall* than the one containing b is ranked on the scale of *wide*. The equivalence classes on these scales may represent, e.g., entities n cm tall and n cm wide, respectively, for any natural number n. The equivalence classes of *tall* and *wide* are therefore comparable by means of one and the same ordering relation. By contrast, between adjective comparisons such as *John is more handsome than Bill is talented*, cannot be interpreted directly, as in $f(\geq_{\text{handsome}})(j) >_{\text{handsome}} f(\geq_{\text{talented}})(b)$, because the equivalence classes of the *handsome* relation do not compare with those of the *talented*

relation. Since such comparisons cannot be interpreted directly, they get an indirect "relative-position interpretation", i.e. the given example conveys that John's position on the scale of *handsome* is higher than Bill's position on the scale of *talented*.

On this analysis, indirect interpretations in between adjective comparisons are the hallmark of adjectives that do not license numerical unit-based measure phrases. Thus, it is correctly predicted that comparisons with *for* phrases, such as *John is taller for a four year old than Bill is for a 15 year old*, cannot be interpreted directly. Rather, they get an indirect interpretation whereby John's position on the scale of *tall for a four year old* is higher than Bill's position on the scale of *tall for a 15 year old*.

While the interpretation just given may stand for the interpretation we related to in terms of comparisons of deviations from central tendencies, the problem is as follows. This theory does not explain why an adjective like *tall for a three year old* does not license measure phrases in the first place, if all that the *for* phrase does is to merely restrict the domain and affect the standard accordingly. Since this fact remains unexplained, so does the fact that in *How tall is Bill for his age* we cannot answer by means of precise measure phrases such as *1.2 meters*. Rather than asking for a precise degree, such questions are understood as asking for the extent of deviation from the norm in a given domain. They are directly answered by means of modifiers like *slightly* and *very*.

We believe that these facts, as well as the facts pertaining to between adjective comparisons with *for* phrases, stem from one origin: *for* phrases are adjective modifiers, that built from the degree function of their adjectival argument a new function from entities to the relative degree to which they deviate from the central tendency in the comparison class. It is due to the vagueness in the determination of the central tendency that measure phrases are not licensed, and it is therefore due to their association with measurements of deviation that *for* phrases trigger a deviation interpretation in between adjective comparisons and degree questions.

2.3 The null morpheme as a modifier of degree constructions

On yet another analysis (Rett 2007, 2008), the null morpheme is a modifier of degree predicates, called *eval*. As a modifier, it does not change the type of its argument, leaving it for discourse closure to bind the degree variable. As shown in (34a), the one and only role of this null morpheme is to constrain the set of degrees it combines with to be above a contextually determined standard. Rett (2008) uses a relational analysis of adjectives. As illustrated in (34b), before existential closure, the interpretation of the positive form amounts to the set of degrees r such that Dan is r tall and r exceeds r_s.

(34) a. $[\![\text{eval}_{<rt,rt>}]\!]_c = \lambda P_{<r,t>} \lambda r.\ P(r)\ \&\ r > r_s$ (Rett 2007, 2008)

b. $[\![\text{eval Dan is tall}]\!]_c = \lambda r \in D_r.\ f_{tall,c}([\![\text{Dan}]\!]_c) \geq r\ \&\ r > r_s$

Moreover, as a modifier, *eval* can freely co-occur also in degree constructions. Hence, for Rett (2008), the constituent structure of an equative such as *Dan is as short as Bill* may contain one or two occurrences of *eval*, as in "As(eval Dan is short, eval Bill is short)", "As(eval Dan is short, Bill is short)" and "As(Dan is short, eval Bill is short)".

The three derivations have the same truth conditions, illustrated in (36).[15] Rett (2008) makes use of the null morpheme to explain an impressive amount of data, including, in particular, the fact that degree questions and equatives with negative adjectives trigger norm-related implications, e.g., (37b,c) imply (37a), but (36b,c) do not imply (36a).

(35) $[\![\text{eval Dan is as short as Bill}]\!]_c = 1$ iff $\exists r \in D_r.\ f_{tall,c}([\![\text{Dan}]\!]_c) = f_{tall,c}([\![\text{Bill}]\!]_c) = r < r_s$

(36) a. Bill is tall
b. How tall is Bill?
c. Bill is as tall as Mary

(37) a. Bill is short
b. How short is Bill?
c. Bill is as short as Mary

Rett (2008) argues that marked-, i.e. negative adjectives are banned from linguistic contexts in which their substitution with the unmarked positive antonym preserves the truth conditions. On Rett's (2008) account, a derivation without the null morpheme is available for (36c), as this sentence may be true in contexts in which Dan is **not** tall; this option is not available in the case of the positive form in (36a), since the result would not be informative enough without the norm related implication triggered by *eval.* In addition, the neutral (not norm-related) reading of, for example, (37c), is banned because individuals are equally tall iff they are equally short; i.e., only a derivation with *eval* is grammatical, for the one without it is equivalent to the derivation of (36c) wthout *eval.*

In this way, Rett (2008) elegantly accounts for norm-related implications in many more constructions than just the positive form, thereby supporting the stipulation of the null morpheme *eval*. Despite these advantages, considerations of the semantic analysis of *for* phrases will eventually lead us to argue against this analysis.

If one adopts any of the previous analyses of *for* phrases, one immediately encounters the problems discussed in the previous sections. Abstracting away from details that are irrelevant for the present discussion (see Rett 2008: 93-96), we have seen that the equative in (35) ends up equivalent to the conjunction of "Dan and Bill are equally tall and Dan and Bill's height is shorter than the height functioning as short's standard". If so, then standard-restrictors and boosters – e.g., *for* phrases (as they are traditionally analyzed) and modifiers like *very* – should be licensed in these constructions to restrict or boost the standard.

Alternatively, one could maintain an analysis with *eval*, but adopt the new approach to *for* phrase modified adjectives as denoting deviation functions. But this does not work either. The problem persists with other modifiers of the positive form. For instance, in *Dan is very tall*, the modifier *very* seems to boost the standard of *tall* to a height that fewer entities have. If a morpheme like *eval* is part of the derivation of degree constructions, the licensing of boosters in degree constructions should be equally useful;

[15] Where $f_{tall,c}([\![\text{Dan}]\!]_c)$ being Dan's maximal degree of height. This proposal is based on an 'exactly' semantics for the equative *as*; for a discussion see Rett (2008). Moreover, Rett (2007: 217) uses a different technique to derive the same results, whereby *Dan is as tall as Mary* is true iff the set of degrees r such that Dan is r tall is identical to the set of degrees r such that Mary is r tall; Together with *eval*, this equative is true iff the set of degrees r such that Dan is r tall and r exceeds r_s is identical to the set of degrees r such that Mary is r tall and r exceeds r_s. Our arguments in this section apply to this analysis as well.

they should be able to combine with equatives whenever *eval* enters the derivation, so as to boost the value of r_s by some constant, δ, as illustrated in (38b) and (39b); however, in actual fact, boosters are licensed in the positive form, but not in equatives, as the infelicity of (38a) and (39a) illustrates. Similarly, boosters are banned from degree-questions as illustrated in (40a,b), and comparatives as in (40c).

(38) a. *Dan is as very short as Bill is
b. $\exists r \in D_r.\ f_{tall,c}([\![Dan]\!]_c) = f_{tall,c}([\![Bill]\!]_c) = r\ \&\ r < (r_s + \delta)$
(= Dan and Bill's heights are equal & much shorter than the norm)

(39) a. *Football is as very expensive as theatre
b. $\exists r \in D_r.\ r = f_{expensive,c}([\![Football]\!]_c) = f_{expensive,c}([\![theatre]\!]_c)\ \&\ r > (r_s + \delta)$
(= Tickets for football and theatre are equally expensive and are very expensive)

(40) a. *How very-expensive is football?
b. *How very-short is Dan?
c. *Bill went to sleep less very-early than Mary

These facts remain unexplained if the derivations of these constructions may include a standard-variable, or even *must* include one in case a marked adjective like *short* or a marked degree morpheme like *less* is involved. A null morpheme analysis needs to exploit a syntactic story here. Resort to syntax is, of course, always possible, but it complicates the theory and therefore reduces its appeal. In opposition, these facts are straightforwardly captured by an analysis whereby *eval* cannot be licensed in degree constructions and so it cannot add a standard variable to their derivation. For this reason, no degree modifier whose job is to restrict or shift the values of membership standards (*very, extremely, slightly, completely,* etc.) is licensed in equatives and degree questions.

Yet another alternative is to argue for an analogy between *for* phrases and *eval*. After all both are modifiers with a semantic interpretation involving reference to membership norms. The problem persists also with this approach. The point is that, e.g., equatives and degree questions with *for* phrases have systematically different interpretations than their equivalents without *for* phrases; e.g. the interpretation of (41a) does not entail that Dan and Bill are equally tall; (41a), unlike (41b,c), can be truthfully uttered in a situation whereby Dan and Bill deviate from the norm for their age to the same extent, regardless of whether they are equally short or not. Thus, we do not want a null morpheme to do the job of *for* phrases in their absence.

(41) a. Dan is as short for a ten year old as Bill is for a four year old <≠>
b. Dan is as short as Bill is
c. Dan and Bill are equally tall.

Finally, the reasoning behind the licensing of *eval* fails to capture norm-relatedness in adjectives modified by *for* phrases, as the latter are norm-related in the negative and the positive alike, e.g., the within-adjective equative *as tall for an eight year old as* (to the extent that it means anything) and the degree question *how tall is Bill for his age?* trigger norm related implications just as much as *as short for his age as* and *how short is Bill for his age?* do. This problem reoccurs with lexical adjectives too such as *fat-skinny* and *rich-poor*. Positive adjectives such as *fat* and *rich* are norm related in equatives and

degree questions, as the examples below illustrate (Bierwisch 1989; Sassoon 2011). Such adjectives are prevalent in languages as diverse as English, German, Chinese, and Hebrew. Hence, norm related implications in degree constructions derive from a feature in the interpretation of certain adjectives, either positive or negative, not from an obligatory presence of *eval* in equatives and questions with negative adjectives.[16]

(42) [Bill and Mary are skinny]
a. #Bill is as fat as Mary;
b. #How fat is Bill?

(43) [Bill and Mary are fat]
a. #Bill is as skinny as Mary.
b. #How skinny is Bill?

(44) a. How rich is John? ⇒ John is rich
b. John is as rich as Bill ⇒ John is rich
c. How poor is John ⇒ John is poor
d. John is as poor as Sue ⇒ John is poor

(45) a.?This ice-cream is as warm as that one.
b.?How warm is the ice-cream?
c. ?How cold is the fire?

To recap, when the necessary conditions for a *for* phrase to be grammatical are met, this results in a compulsory shift away from the default interpretation; rather than a statement about equal heights, we get a between-predicate comparison of deviations from standards. In addition, comparison tends to be based on coarse grained degrees (very, pretty, little, etc.) rather than on precise measurements (1cm, 2cm, 3cm…) This is unexpected if the derivation includes an implicit standard variable and the *for* phrase merely restricts the set of possible value assignments for this variable, and it is unexpected assuming that *for* phrases are realizations of *eval*. Finally, assuming a deviation analysis of *for* phrases together with *eval* is still problematic, because other modifiers of positive forms, such as boosters, minimizers and maximizers, are ungrammatical in degree constructions such as equatives and degree questions, a fact that is unexpected if the derivation includes an implicit standard variable. Postulating a null

[16]Additional issues with a markedness analysis and alternative accounts of norm relatedness in degree constructions cannot be reported here for space reasons, but are discussed in Sassoon (2010a: 172; 2011) and Bierwisch (1989). Moreover, notice that recent proposals analyze degree questions as asking for a degree predicate (or interval), rather than a single degree, e.g. *how tall is John* is a request for information about the degree predicate M that in c creates the most informative true proposition of the form "John is M tall" (Abrusaan and Spector 2010 and references therein); on a partition-approach, we then get, roughly, $\lambda s \in C.\ [\lambda M \in D_{<r,t>}.\ M(f_{\text{tall for a child},s}([\![\text{Dan}]\!]_s))] = [\lambda M \in D_{<r,t>}.\ M(f_{\text{tall for a child},c}([\![\text{Dan}]\!]_c))]$. Klein (1980), Doetjes (2010), and van Rooij (2011a,b), as well sections as later on in this paper, make similar points regarding comparatives and equatives. Norm-related implications of negative equatives and degree questions such as *how short is x* and *x is as short as y* may derive from the fact that they (but crucially, not comparatives such as *taller/shorter*) involve a projection of the form *x is M short*. The crux is that negative adjectives do not license fine grained neutral adjective modifiers M (cf. *two meters tall* vs.#*two meters short*), leaving as alternatives only evaluative modifiers like *very, fairly* and *for his age*. Crucially, even negative answers such as *little short* or *not short* allow for (and perhaps even defeasibly suggest) *not tall*. Such an analysis, unlike that in, for example, Rett (2007), captures norm relatedness in positive adjectives that do not license measure phrases, like *fat, warm* and *rich* in English.

morpheme, then, involves explaining these facts on syntactic grounds, while a theory without a null morpheme directly predicts the facts. Finally, norm-relatedness in predicates denoting deviation functions works in a different way than expected by the theory. To the best of our understanding, the theory does not predict the facts we discuss.

We terminate this section with one last observation. The analysis of *pos* in (24) by von Stechow (2009) is superior to all the others in that the standard is an interval (see von Stechow 2009 for a detailed comparison of theories). However, we must keep in mind that for (24) to escape the wrong results discussed in the present section, the licensing of *pos* in degree constructions must be strictly banned through an auxiliary assumption that degree morphemes are always interpreted in such a way that they take an adjective and an argument and return a truth value. They cannot possibly return a set of degrees to be bound at the level of existential discourse closure, for otherwise this would lend them easy to combine with *pos*, which paves the way to wrong predictions concerning the licensing of *for* phrases and boosters. Unless this auxiliary assumption receives empirical support in future studies, it complicates the theory and makes it less appealing.

2.4 The split between presupposition and standard setting & scope interactions

Recall that the comparison class is not always fully specified explicitly, and the presupposition *for* phrases trigger is dependent on this, as well as on the linguistic context; e.g., the comparison class in (46a) consists of three year old children, but in (46b) and (47) it consists of hats for three year old children. In addition, (47) presupposes that the sentential subject, not the adjective's argument, is a three year old (Solt 2011), and (48) either presupposes that the subject of the matrix clause, John, is a vocal coach, or that the speaker is (Schwarz 2010).

(46) a. John is tall for a three year old
b. This hat is expensive for a three year old boy
(47) Mia wants an expensive hat for a three year old
(48) John wants me to talk loud for a vocal coach

Both Solt (2011) and Schwartz (2010) focus on this split between presupposition and standard setting, and they give the same principled solution. They postulate a null morpheme *pos* that combines with *for* phrases in the same way as the superlative morpheme *-est* combines with *of* phrases as in *the tallest of the mountains*. Heim (1999, 2000) analyzes the superlative morpheme as taking a covert comparison class argument C, a gradable predicate $P_{r,xt}$, and an individual x which is, by presupposition, an element of C. Heim characterizes superlatives in terms of *semantic ellipsis* – a construction in which there aren't two parallel pieces of syntactic structure which stand in an anaphor-antecedent relation, but rather there is a single piece P which, however, is used twice in the semantic calculation:

(49) $[\![\text{–est}]\!]_c = \lambda C_{\subseteq D_{xt}} \lambda P_{\in D_{r,xt}} \lambda x_{\in C}.\ \exists r_{\in D_r},\ P(x,r)\ \&\ \forall y_{\in C},\ y \neq x\colon \neg P(y,r)$

In analogy, Solt and Schwartz postulate that a *for* phrase only contributes a domain restriction, either as an argument of *pos* (Solt 2011 following Bartsch & Vennemann

1972), or as a modifier of adjectives (Schwartz 2010 following Kennedy 2007), as in (50a). It is *pos* that contributes the presupposition that the subject is a member of the nominal argument of *for*. For example, in Schwartz (2010), *pos* takes a degree relation – a *for* phrase modified gradable predicate $P_{r,xt}$, and an individual x. Providing that x is P to some degree, namely the presupposition is satisfied, *pos* returns truth value *true* iff x is P to a degree higher than the standard of membership, as shown in (50b).

(50) a. $[\![\text{P for C}]\!]_c = \lambda r.\ \lambda x\text{: } [\![\text{ C}]\!]_c(x).\ [\![\text{ P}]\!]_c(r)(x)$ (following Kennedy 2007)
b. $[\![\text{pos}]\!]_c = \lambda P \lambda x\text{: } \mathbf{\exists r.P(r)(x)}.\ \exists r > r_{s,p}\text{: } P(r)(x)$ (Schwartz 2010).

P may be a complex predicate containing as a constituent a lexical gradable adjective. Hence, the presupposition is defined on the type x argument of *pos,* and not necessarily on the argument of the lexical gradable adjective. For example, to deal with the ambiguity in (48), Schwartz assumes that *pos* can lend in two positions as in (51a,b).

(51) a. $[\![$ John wants me_i PRO_i **pos** $[\lambda r \lambda x.$ x talk r loud] [for a vocal coach] $]\!]_{w0,g} = 1$ iff
$\forall w \in [\![\text{John wants}]\!]_{w0,g}$, s.t. $[\![\text{I am a vocal coach}]\!]_{w,g}$ & $\exists r\ [\![\text{I talk r loud}]\!]_{w,g(r/r)}$.
$\exists r > r_{s,\lambda r \lambda x.\text{ x talks r loud for a vocal coach}}\text{: } [\![\text{I talk r loud}]\!]_{w,g(r/r)}$.
b. $[\![$ John **pos** $[\lambda r \lambda x.$ x wants me to talk r loud] [for a vocal coach] $]\!]_{w0,g} = 1$ iff
$[\![\text{John is a vocal coach}]\!]_{w0,g}$ & $\exists r\ [\![\text{John wants me to talk r loud}]\!]_{w0,g(r/r)}$.
$\exists r > r_{s,\lambda r \lambda x.\text{x wants me to talk r loud for a v.coach}}\text{: } \forall w \in [\![\text{John wants}]\!]_{w0,g}\text{: } [\![\text{I talk r loud}]\!]_{w,g(r/r)}$.

On the reading in (51a), *for* is applied to the degree relation *to talk loud* ($\lambda r \lambda x.$ x talk r loud), restricting its domain to vocal coaches. Then, *pos* is applied, contributing the presupposition that in John's desire worlds the speakers is a vocal coach talking r loud, for some degree r, and the entailment that in these worlds the speaker talks louder than an average vocal coach. On the reading in (51b), *for* is applied to the degree relation *wants me to talk loud* ($\lambda r \lambda x.$ x wants me to talk r loud) restricting it to vocal coaches. Then *pos* is applied, presupposing that John is a vocal coach that wants me to talk r loud, for some degree r, and entailing that in John's desire worlds the speaker talks louder than an average vocal coach wants him to.[17]

A main problem for these analyses, as Solt (2011) admits, is that in the absence of a *for* phrase, the comparison class of attributive adjectives is often identified with the denotation of the modified noun. However, they do not exhibit the same presuppositional behavior as *for* phrases. For example, (52a) is a presupposition failure, while (52b) is not.

(52) a.#Mickey is not large for a mouse. Mickey is a rat.
b. Mickey is not a large mouse. Mickey is a rat.
c. $[\![\text{is a large mouse}]\!]_c = [\![\text{ is large for mouse}]\!]_c = \lambda r \lambda x.[\![\text{mouse}(x)]\!]_c$ & $f_{\text{large},c}([\![x]\!]_c) \geq r$

[17] On Solt's (2010) proposal, a parallel entry for the null morpheme *pos* takes a comparison class as an argument, and following von Stechow (2007), introduces an interval, $R_{\text{Std-C}}$, as a standard. The interval is defined based on the value distribution in the comparison class:
a. $[\![\textit{pos}\ ]\!]_c = \lambda C \subseteq D_{xt} \lambda P \in D_{r,xt} \lambda x \in C.\ \forall r \in R_{\text{Std-C}}\text{: } P(x,r)$.
b. $R_{\text{Std:C}} = \text{median}(\{\max(\lambda r.P(y,r))\text{: } y \in C\}) \pm n * \text{MAD}(\{\max(\lambda r.P(y,r))\text{: } y \in C\}$.
c. MAD, *Median Absolute Deviation*, is a measure of dispersion around the median of a set of values.

d. [[Mickey **pos** [is a large mouse]]]$_c$ = 1 iff
$\exists$r, [[**mouse(Mickey)**]]$_c$ **&** $\mathbf{f_{large,c}}$**(**[[**Mickey**]]$_c$**) ≥ r.**
$\exists r > r_{s,\lambda r \lambda x.\ mouse(x)\ \&\ flarge(x) \geq r}$: [[mouse(Mickey)]]$_c$ & $f_{large,c}$([[Mickey]]$_c$) ≥ r.

This fact is puzzling if *pos* is part of the derivation and contributes a presupposition; e.g., on Schwarz's analysis, *pos* will take *Mickey* and the degree relation λrλx. mouse(x) & $f_{large}(x) \geq r$ as arguments, and incorrectly impose the condition that the latter is applicable of Mickey, i.e. that there is a degree such that Mickey is a mouse and large to that degree. Similarly, on Solt's analysis *pos* will take *mouse* as its comparison class argument and incorrectly impose the condition that Mickey is a mouse. Again, we see that letting a null morpheme do the job of *for* phrases in their absence has undesirable consequences.

By contrast, the facts are directly predicted if *for* phrases contribute the presupposition themselves, without mediation by a null morpheme *pos.* The success of an account of scope possibilities with degree morphemes of the type of *for* phrases does not depend on the stipulation of a null morpheme; rather, it depends on:

(i) a possibility of successfully composing a complex gradable predicate for the *for* phrase to take as an argument, from lexical gradable adjectives and additional material. We know how to do that (e.g., Heim 1999-2000). If the degree argument of a gradable adjective remains unsaturated, we can abstract over it from a distance, as in λrλx. x wants me to talk r loud.

(ii) a mechanism that allows *for* phrases to take scope. Following Heim's analysis of degree morphemes of this type (*too* and *–est*), we assume that no auxiliary null morpheme is needed for that. Syntactically speaking, *for* phrases can either be base generated at different positions (an assumption that is perfectly compatible with an adjunct analysis adjoined at a sentence final position), or alternatively they can move on their own right. Semantically speaking, *for* phrases should merely be able to modify complex gradable predicates.[18]

(iii) *for* phrases analyzed as modifiers – functions from a gradable predicate interpretation to the same type of a thing – a measurement of the extent to which entities in the comparison class deviate from the standard for that class; the proposed analysis is repeated in (53a).

(iv) A free type shift between degree functions and degree relations. We can switch freely between relations and functions (as we do with characteristic functions and sets), because given a fixed domain of entities and a fixed domain of degrees, there is a one-one function T between degree relations and degree functions, as (53c.d) show.

(v) a 'norm' function from a set of degrees (the value distribution of a degree function in a certain domain) to a degree that stands out within that set (e.g., the maximum, minimum or a central tendency in that set, cf. Kennedy 2007). 'Norm' can provide a standard of membership to simple and complex gradable predicates alike, as long as a point that stands out can be identified in their value distribution. Therefore, 'norm' provides us with the means to freely type shift degree function interpretations f into characteristic function interpretations C(f), as stated in (53b).

[18]Schwarz notices the felicity contrast between *Mia has an expensive hat for a 3-year old* and #*Mia has a hat that is expensive for a 3-year old*, and explains it in terms of a relative clause island for movement that prevents POS from scoping outside it. Alternatively, this island may affect the *for* phrase directly. *For* phrases can only take as arguments complex gradable predicates included in their movement scope.

(53) a. $[\![\text{for}]\!]_c = \lambda C \in D_{xt} \lambda P \in D_{r,xt} \lambda x \in C.\ f_P(x) - \text{Norm}(\{f_P(y) \mid y \in C\})$.

b. For any $[\![P_{r,xt}]\!]_c = \lambda r \in D_r \lambda x \in D_x.P(r)(x)$: $T([\![P]\!]_c) = f_P = \lambda x.\ \text{MAX}(\lambda r.P(x,r))$.

c. For any $[\![A_{xr}]\!]_c = \lambda x \in D_x.f(x)$: $[\![A]\!]_c = T(\lambda r \in D_r \lambda x \in D_x.f(x) \geq r)$.

d. If $[\![A_{xr}]\!]_c = \lambda x \in D_x.f(x)$, $C([\![A]\!]_c) = \lambda x.f(x) > \text{norm}(\{f(x)$: x is in f's domain$\})$.

With this we can provide an interpretation for *for* phrases that suffices to solve the problems under discussion. This analysis of *for* phrases is superior to the previous analyses in that it makes the right predictions for attributive adjectives in the absence of *for* phrases.

(54) a. $[\![\text{John is a tall man}]\!]_w = 1$ iff
$[\![\text{John}]\!]_w \in [\![\text{man}]\!]_w \,\&\, f_{\text{tall},w}([\![\text{John}]\!]_w) \geq \text{norm}(\{f_{\text{tall},w}(y)$: $y \in [\![\text{man}]\!]_w\})$.

b. $[\![\text{John is tall for a man}]\!]_w = 1$ iff **ps**. $[\![\text{John}]\!]_w \in [\![\text{man}]\!]_w$.
$f_{\text{tall},w}([\![\text{John}]\!]_w) - \text{norm}(\{f_{\text{tall},w}(y)$: $y \in [\![\text{man}]\!]_w\}) >$
$\text{norm}(\{f_{\text{tall for a man}}(y)$: $y \in [\![\text{man}]\!]_w\}) = 0$
(which reduces to $f_{\text{tall},w}([\![\text{John}]\!]_w) > \text{norm}(\{f_{\text{tall},w}(y)$: $y \in [\![\text{man}]\!]_w\})$)

Moreover, it captures the two interpretations of (48). On the reading in (55a), *for* takes a comparison class argument (*a vocal coach*) and a gradable predicate (*talk loud*), and returns a degree relation as in (55b), that shifts into a degree function in (55c) (a function from vocal coaches to the extent to which the loudness of their talk deviates from the norm for vocal coaches), and into a characteristic function in (55d) (a function from vocal coaches to those of them that talk louder than an average vocal coach). The resulting reading, shown in (55e), includes the presupposition that the speaker is a vocal coach in the worlds of John's desire, and the entailment that in these worlds, the degree to which the speaker deviates from the norm for how loud vocal coaches talk exceeds the normal deviation – zero; i.e., in John's desire worlds, the speaker talks louder than an average vocal coach.

(55) a. John wants me [**to talk loud**] [for a vocal coach]

b. $[\![\,[\text{talk loud}]\ \textbf{for}\ [\text{a vocal coach}]\,]\!]_{w,g} = \lambda r \in D_r \lambda x \in D_x.\ \lambda x \in [\![\text{vocal coach}]\!]_w.$
$f_{\text{talk loud},w}(x) - \text{Norm}(\{f_{\text{talk loud},w}(y)$: $y \in [\![\text{vocal coach}]\!]_w\}) > r$.

c. $T([\![\,[\text{talk loud}]\ \textbf{for}\ [\text{a vocal coach}]\,]\!]_{w,g}) =$
$\lambda x \in [\![\text{vocal coach}]\!]_w.\ f_{\text{talk loud},w}(x) - \text{Norm}(\{f_{\text{talk loud},w}(y)$: $y \in [\![\text{vocal coach}]\!]_w\})$.

d. $C(T([\![\text{talk loud}\ \textbf{for}\ \text{a vocal coach}]\!]_{w,g})) =$
$\lambda x \in [\![\text{vocal coach}]\!]_w.\ f_{\text{talk loud},w}(x) - \text{Norm}(\{f_{\text{talk loud},w}(y)$: $y \in [\![\text{vocal coach}]\!]_w\})$.
$> \text{Norm}(\{f_{\text{talk loud for a vocal coach},w}(y)$: $y \in [\![\text{vocal coach}]\!]_w\})$.

e. $[\![\text{John wants me to talk loud for a vocal coach}]\!]_{w0,g} = 1$ iff.
$\forall w \in [\![\text{John wants}]\!]_{w0,g}$, s.t. $[\![\text{I am a vocal coach}]\!]_{w,g}$.
$f_{\text{talk loud},w}([\![\text{me}]\!]_{w,g}) > \text{Norm}(\{f_{\text{talk loud},w}(y)$: $y \in [\![\text{vocal coach}]\!]_w\})$

On the second reading in (56a), *for* takes a comparison class argument (*a vocal coach*) and a gradable predicate (want me to talk loud), and returns a degree relation that shifts into a degree function from vocal coaches to the extent to which the loudness at

which they want the speaker to talk deviates from the norm for vocal coaches – the degree to which an averaged vocal coach wants the speaker to talk loud. With zero as the norm for this function, the corresponding characteristic function in (56b) is a function from vocal coaches to those of them that want the speaker to talk louder than an average vocal coach wants. The resulting reading, shown in (56c), includes the presupposition that John is a vocal coach, and the entailment that John wants me to speak louder than the standard loudness desired by vocal coaches in w_0.

(56) a. John [**λdλx. x wants me to talk d loud**] [for a vocal coach]

b. $C(T([[\lambda x.[x \text{ wants me to talk loud}] \textbf{ for } \text{a vocal coach}]]_{w,g})) = \lambda x \in [[\text{vocal coach}]]_w$. $f_{\text{want me to talk loud}}(x) > \text{Norm}(\{f_{\text{want me to talk loud}}(y): y \in [[\text{vocal coach}]]_w\})$.

c. $[[\text{John } [\lambda x. \text{ x wants me to talk loud}] \text{ [for a vocal coach]}]]_{w,g} = 1$ iff $[[\text{John is a vocal coach}]]_{w,g}$. $f_{\text{want me to talk loud}}([[\text{John}]]_{w,g}) > \text{Norm}(f_{\text{want me to talk loud}}(y): y \in [[\text{ vocal coach}]]_w\})$.

Hence, this analysis captures non local interpretations of *for* phrases and it is superior to the corresponding null morpheme analyses that wrongly predict attributive adjectives to convey a presupposition in the absence of a *for* phrase.

We therefore conclude that all gradable predicates, lexical adjectives or complex ones based on them, are ambiguous. Depending on their linguistic context, they denote either a characteristic- or a measure-function (Sassoon 2007; Krasikova 2009; Cohen 2012). For any $c \in C$ and any gradable adjective P of any complexity, $f_{P,c} \in \Re^{D_x}$ is *the degree function of P in c* (a function from entities x in the domain D_x to degrees r in D_r), and $c_{P,c} \in \{0,1\}^D$ is *the characteristic function of P in c* (where 1 and 0 stand for truth values), such that $\forall x \in D_x$: $c_{p,c}(x) = 1$ iff $f_{P,c}(x) > \text{norm}(\{f_{P,c}(x) | x \in C\})$. P is interpreted either as an expression of type <x,r> denoting $f_{P,c}$ (or the corresponding degree relation), or as an expression of type <x,t> denoting $c_{P,c}$, depending on the linguistic context.

For example, in statements like *Dan is taller than Sam*, the adjective *tall* denotes $f_{tall,c}$, while in statements like *Dan is tall*, *tall* (or its projection) denotes $c_{tall,c}$. This analysis differs from standard null morpheme analyses of the positive form in that neither the characteristic function nor the degree function is claimed to be more basic or primitive. They simply constrain one another by virtue of the general principle or meaning postulate defining 'norm'. On this analysis, the interpretation of adjectives P includes in each context of evaluation c a cutoff point, norm(P,c), although neither the syntactic, nor the semantic derivation of the positive form needs to be mediated by a free variable explicitly relating to this value.

Why should all the gradable adjectives in all the known languages be ambiguous? The proposed ambiguity is not just a case of a widespread accidental homophony. Rather, it is a type ambiguity which is well motivated psychologically. Rather than learning by heart the set of instances of a predicate, a degree function straightforwardly provides an algorithm for calculating a characteristic function. By simply selecting a value representing the cutoff point, all instances can be classified as either members or non-members. In turn, information regarding denotation membership constrains the degree function, by providing evidence for the dimension of measurement and by constraining the possible values entities might have (Sassoon 2007).

Significantly, despite their often being sloppy on this regard, all null morpheme accounts must postulate a restriction on the assignment of values for the standard variable introduced by *pos*, $r_{s,P}$. The restriction should state that the value must be set to the cutoff point of the adjectival argument of *pos*, rather than to any other value in the lexicon or context. To this end, a cutoff point value has to be assigned for each adjective P, along with, or based on a degree function, f_P. But then, these theories are no more economic (or less dual) than the present theory without *pos*.[19]

2.5 Additional issues

2.5.1 Realizations of the null morpheme across languages

Although *pos* is with us for quite a while now, but few degree expressions have been proposed to be possible realizations of *pos* in the languages of the world. In this section, we argue that perhaps the only candidate, Chinese *Hen* ('very'; cf. Kennedy 1999; Grano 2012 and references therein) is unlikely to be *eval* or *pos.*

First, note that *hen* is obligatory in declarative sentence (at least for some speakers and adjectives).

(57) Zhangsan *(hen) {gao/ai/pang}.
Zhangsan HEN tall/short/fat
'Zhangsan is 'POS' {tall/short/fat}.'

Second, note that *hen* is incompatible with degree questions, as illustrated in (58), and it necessarily conveys '*very'* (rather than *eval*) in equatives, as illustrated in (59).

(58) Zhangsan duome (*hen) {gao/ai/pang}?
Zhangsan how-much tall/short/fat
`How {tall/short/fat} is Zhangsan?'

(59) Zhangsan gen lisi yiyang (*hen) {gao/ai/pang}.
Zhangsan with Lisi same tall/short/fat
`Zhangsan is as {tall/short/fat} as Lisi.'

[19]Notice that *for* phrases can head a clause as in *The book is fun for John to read*. We can give the arguments of *for* phrases a sentential semantics to accommodate *for* complementizers, following Heim's (1999: 21) second analysis of *–est*, which depends more heavily on context and information structure to resolve semantic ellipsis. The semantics for *for* phrases is given in (a). The interpretation of the second reading of (48) is illustrated in (b,c). The presupposition is again that John is a vocal coach, and the entailment is that John's value deviates from the norm – the standard degree of loudness desired by vocal coaches in w_0 – to an extent that exceeds zero (i.e., John wants the speaker to speak louder than the standard loudness desired by vocal coaches in w_0.)

a. $[\![\textbf{For}]\!]_{wg} = \textbf{λC∈D}_{\textbf{rt}}\ \textbf{λS∈D}_{\textbf{rt}}\textbf{. Max(S) – norm(C) > 0}$

b. John [wants me to talk loud] [for a vocal coach] ⇔ For**(**{Max(λr. x wants me to talk r loud)| $x \in Alt_{John} \subseteq$ [vocal coach]}**,** λr. John wants me to talk r loud**)**.

c. True iff Max(λr. John wants me to talk r loud) – norm({Max(λr. x wants me to talk r loud)| x is in Alt_{John} which consists of vocal coaches}) > 0, i.e. iff ps. John is a vocal coach. $f_{\text{want me to talk loud}}$(John) > Norm({$f_{\text{want me to talk loud}}$(y): y is a vocal coach}).

This, again, speaks against an analysis of *eval* as a modifier; either *hen* is not a realization of *eval* or *eval* cannot modify adjectives in degree constructions.

Third, while the ungrammaticality of (58)-(59) is compatible with *hen* being a realization of the null morpheme *pos*, the facts are by far too weak to support such a null-morpheme-realization analysis (Grano 2012). It is not the case that gradable adjectives in Mandarin Chinese are of the wrong semantic type to combine directly with a subject; rather, overt degree morphology (the use of *hen*) is obligatory only when the adjective is the entire predicate of a matrix-level, declarative clause. When the adjective contains extra material, when the relevant clause is embedded, or when it is not declarative, no overt degree expression is required; yet, the adjective still has a positive (i.e., non-comparative) meaning, as Grano (2012) illustrates with a wide variety of examples. Here are but a few.

(60) a. Zhangsan gao-gao-de.
Zhangsan tall-tall-DE
'Zhangsan is really tall.'
b. Zhangsan bu gao.
Zhangsan NEG tall
'Zhangsan is not tall.'
c. Zhangsan you gao you zhuang
Zhangsan again tall again strong
'Zhangsan is both tall and strong.'
d. dajia dou renwei zhangsan gao, buguo wo juede ta bing bu gao.
Everyone all think Zhangsan tall however 1SG believe 3SG actually NEG tall
'Everyone thinks Zhangsan is tall, but I think he's actually not.'

To recap, even in the one and only language whereby *pos* is supposed to be realized, it can hardly ever be realized. We find these circumstances mysterious. More than supporting *pos,* they add the burden of explaining why *pos* cannot appear overtly in so many circumstances and languages. Again, rather than establishing an elegant theory, stipulating *pos* causes theoretical complications that can be easily avoided by simply not doing so.

2.5.2 The null morpheme does not add structural uniformity

It has been suggested that the use of *pos* helps achieving structural uniformity (Kennedy 2007). It is as yet impossible to judge the structural uniformity argument, given the diverse syntactic and semantic analyses of sentences with *pos* and other degree morphemes. At any rate, there are good reasons to think that if *pos* is a constituent of the positive form at all, it has different structural properties than any equivalent explicit expression has, such as *er than the norm* in, for instance, *Dan is taller than the norm* (Cohen 2012) or *very* in *Dan is very tall*.

First, if rather than a set of degrees, *pos* returns a truth value, it can only be licensed once in a sentence. This goes against an analogy between degree-modifiers like *very* and *pos,* because, as admitted by von Stechow, *very*, unlike *pos,* can be applied again and

again, as in *very very very tall*. In addition, section 2.3 has challenged an analysis of the null morpheme *eval* as a modifier that resembles *very* or *for* phrases semantically, and has shown that the distribution of those modifiers differ from the distribution that the null modifier is argued to have.

Second, von Stechow's analysis of *pos* as a determiner invites an analogy with *–er*. The basis against such an analogy is that *er* can take wide scope, wider than that of a a finite clause, while *pos* cannot, as Cohen (2012) convincingly illustrates with the following contrast. Intuitively, (61a), with the explicit degree morpheme *er*, can be interpreted as stating that the yacht's size in Dan's belief worlds is larger than its actual size (its size in the actual world w_0; Russell 1905). However, (61b) cannot be interpreted as conveying that the yacht's size in Dan's belief worlds is larger than its size in w_0. To see this, suppose that Dan thinks the yacht is 30ft, which is small for Dan, but large in w_0 (for the speaker, addressee, etc.) On this scenario, (61b) is intuitively false. The only interpretation available here is local – the yacht size in Dan's belief worlds should be larger than the size standard in these worlds.

(61) a. Dan believes the yacht is larger than it is
b. Dan believes the yacht is tall(er than r_s)

Based on its scope interactions, *er* is often analyzed as a determiner (Heim 2001). Assuming this analysis is correct, as von Stechow (2009) does, the different scope interactions of *pos* and *er* are challenging for the view that *pos* is a determiner too (von Stechow 2009).

In conclusion, null morpheme analyses need to be supplemented with a special story according to which *pos* has special structural properties, explaining the facts in (61). These properties must impose constraints against the extraction of *pos* outside its local domain, constraints which, considering other degree morphemes, are unique to *pos*. This additional complication speaks against the analysis.

2.6 Intermediate summary

On null-morpheme analyses, characteristic functions are only associated with adjectival projections combined from adjectives and an empty morpheme *pos* that introduces into the derivation a standard variable; however, summarizing briefly:

- *Pos* cannot merely shift the interpretation of adjectives from a measure function into a characteristic-function (Bartsch & Vennemann 1971; Cresswell 1977; Kennedy 1997), for then the fact that *pos* + a *for* phrase *can* in certain cases appear in degree constructions would suggest that degree morphemes (*-er*, *more*, *as*, *slightly*, *very*, *how*, etc.) make use of characteristic functions, not degree functions. A grammar with no degree functions is a grammar without *pos*.
- *for* phrases do not seem to function as merely domain restrictors (contra Kennedy 2007) or standard restrictors (contra Rett 2007-8) as *for* phrases, like boosters (e.g., *very*) either cannot combine with degree constructions, or trigger an unexpected shift from the default interpretation, supporting the view that by default, the derivation of degree constructions without them includes no implicit standard variable (i.e. no null morpheme).

- The null morpheme can probably be neither a modifier (type <rt,rt> a la` Rett), nor a degree determiner (type <rt, <rt,t>>, as in von Stechow 2009), for otherwise, what would block unwarranted free licensing in degree constructions?
- These theories appeal is reduced given an absence of direct evidence, such as an overt realization of *pos/eval* in natural languages, and given that we cannot postulate uniform structural properties to *pos* and other degree morphemes.

In conclusion, the facts do not support a stipulation of a null morpheme in the positive form, nor in degree constructions. Future research should as yet establish whether this additional structure is indeed required (Kennedy, 2008). If it is, the empirical and theoretical complications related to its postulation should be considered and coped with.

In the meantime, this paper proposed a new degree-based analysis of the data, which does not postulate a null morpheme, and that regards the semantic contribution of *for* phrases as pretty different from that traditionally associated with *pos.* The analysis appears both simpler, and more adequate.

We now turn to provide an alternative, Kleinean analysis, which does away with degrees and standard variables altogether, leaving room only to entity sets and orderings which are based on them. Then we compare the two general approaches introduced.

3. A Kleinean analysis of the positive form and *for* phrases

3.1 The positive form

The facts this paper considers support a Kleinean comparison-class based analysis of the positive form and *for* phrases. Assuming a characteristic function as the basic interpretation of adjectives, phrases like *for a child* restrict the comparison class to children, thereby restricting the set of possible characteristic functions (Klein 1980-91).

More precisely, let adjectives like *tall* denote functions (hence force, 'Tall') of type <xt,xt> from comparison classes $C_{<x,t>}$ to characteristic functions of individuals (62a). If the value of the comparison class variable is not explicitly specified, the context should provide a value for it, C_c, as in (62b,c).

(62) a. $[\![\text{tall}]\!]_c = \lambda C \in D_{<x,t>}. \lambda x \in D_x. \text{Tall}_c(C)(x)$.
b. $[\![\text{tall}]\!]_{c,Cc} = \lambda x \in D_x. \text{Tall}_c(C_c)(x)$.
c. $[\![\text{Dan is tall}]\!]_{c,Cc} = \text{Tall}_c(C_c)([\![\text{Dan}]\!]_c)$.

On this analysis, bare adjectives like *tall* select as a denotation in a context c, a proper subset of a salient domain of entities, C_c. No method for selecting a proper subset is compulsory, but any selection constrains and is constrained by the interpretation of the adjective in other contexts, as well as by the interpretation of the derived comparative. The main constraint this theory postulates is highly intuitive; roughly, any entity must be considered *tall*, if some other entity which is *equally or less tall* than it is considered *tall*. In addition, any entity must be considered as *not tall*, if some other entity which is *equally or more tall* than it is considered *not tall* (for more details see Klein 1980; van Rooij 2011a).

Notice however, that the Kleinian semantics does not presuppose an order. It derives it, instead. Cross linguistically, the morphological form of comparative predicates like *taller* is more complex than that of the positive form *tall* (see Klein 1991, for a detailed cross linguistic review). The Kleinean approach aims at explaining this phenomenon by taking the meaning of the positive form to be more basic; it is given by our natural ability to classify entities into sets (e.g., *tall* and *non-tall*). The definitions in (62) are implementations of this view. On such an analysis, the basic facts we are concerned with in this paper are derived straightforwardly: *pos* is not needed because the positive form is analyzed as the basic one.[20] The meaning of the comparative, or of any other so-called degree morpheme, depends on the meaning of the positive form (the extensions of *tall* in different indices).

3.2 Degree constructions

Klein (1980) accounts for modifiers of adjectives (*very*, *fairly* and so on) in terms of comparison classes. For example, *very* is analyzed as affecting adjectival interpretations by setting the value of the comparison class argument to be the contextual denotation of the given adjective, cf. (63). On this analysis, modified adjectives like *very tall* select as a denotation in a context c, a proper subset of the adjectival denotation, e.g. of the set of tall entities, in c.

(63) a. $[\![\text{very}]\!]_c = \lambda G_{<xt,xt>}.\lambda C \in D_{<x,t>}.\ \lambda x \in D_x.\ G(G(C))(x)$.
b. $[\![\text{very tall}]\!]_c = \lambda C \in D_{<x,t>}.\ \lambda x \in D_x.\ \text{Tall}(\lambda x \in D_x.\ \text{Tall}_c(C)(x))(x)$
c. $[\![\text{very tall}]\!]_{c,Cc} = \lambda x \in D_x.\ \text{Tall}_c(\text{Tall}(C_c))(x)$.[21]

This account easily captures *for* phrases. As stated and illustrated in (64), on such an account, *for* phrases merely denote adjectival modifiers; thus, like all other modifiers they denote at type <<xt,xt>,<xt,xt>>. *For* phrases can be seen as a special case of a modifier, since they too affect the interpretation of adjectives by restricting the value of their comparison class argument.[22]

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[20]It is, of course, possible to argue that a null morpheme takes part in the syntactic derivation of (62b,c) that references a comparison class; the facts discussed in this paper are compatible with (although they do not necessitate) such a view. At any rate, unlike *pos*, this null parameter relates to entity sets, rather than to membership standards.

[21]The interpretation of fine grained measure phrases such as, e.g. *two meters*, may be similarly modeled (with the same type), such that, e.g.:. $[\![\text{two meters}]\!]_c = \lambda G_{<xt,xt>}.\lambda C \in D_{<x,t>}.\ \lambda x \in D_x\ 2m(G)(C)(x)$, and so $[\![\text{two meters tall}]\!]_c = \lambda x \in D_x.\ \lambda C \in D_{<x,t>}.\ 2m(\text{Tall})(C)(x)$. Alternatively, they may be modeled via quantification over comparison classes; to illustrate shortly, for any set $X \subseteq D_x$, let $\oplus X \in D_x$ stand for the concatenation of X's members, and let *two* denote a function from sets X to 1 iff X has two-members. Assuming $[\![\text{two meters}]\!]_c = \lambda G_{<xt,xt>}.\lambda x \in D_x\ \exists X \subseteq D_x\ [\![\text{meters}]\!]_c(X)\ \&\ [\![\text{two}]\!]_c(X)\ \&\ \forall C_{xt},\ G(C)(\oplus X)\colon G(C)(x)$, we get, e.g., $[\![\text{two meters tall}]\!]_c = \lambda x \in D_x.\ \exists X,\ [\![\text{two meters}]\!]_c(X)\ \&\ \forall C_{xt},\ \text{Tall}(C)(\oplus X)\colon \text{Tall}(C)(x)$ (cf. Klein 1991); notice that we cannot do away with the last bit (quantification over comparison classes), for otherwise *two meters tall* will wrongly apply of entities which are, say, two meters wide, but not two meters tall. At any rate, we can keep the type of, e.g., *2 meters* and *very* uniform, while postulating that for any G, C and x, $2m(G)(C)(x)$ iff $\exists X,\ [\![\text{two meters}]\!]_c(X)\ \&\ \forall C,\ G(C)(\oplus X)\colon G(C)(x)$.

[22]Bare adjectives may pick up a deviation interpretation. While this is not the most dominant option for bare adjectives, it becomes the preferred interpretation given the use of a *for* phrase that advances the comparison class argument right to the front stage.

(64) a. $[\![\text{for}]\!]_c = \lambda G_{<xt,xt>}.\lambda C \in D_{<x,t>}.\ \lambda x \in D_x.\ G(C)(x)$.
b. $[\![\text{tall for a child}]\!]_c = \lambda x \in D_x.\ \text{Tall}_c([\![\text{child}]\!]_c)(x)$.

Again, we see that the basic data is derived straightforwardly; *pos* is not needed.

Finally, this analysis can also capture the non-default use of *for* phrases in degree constructions. Although Klein (1980) is best known for his analysis of comparatives as quantifying over comparison classes, he has also proposed a somewhat richer analysis to capture between-adjective ('subdeletion') comparatives. This analysis involves existential quantification over the meanings of modifiers of adjectives, like *very* and *fairly* (see discussion in van Rooij 2011a-c); One motivation for quantifying over such modifiers is to be able to account for the fact that subdeletion comparatives like (65a) are interpreted roughly as stated in (65b) (McConnell-Ginet, 1973).

(65) a. John is more happy than Mary is sad.
b. $\exists M \in \{\text{very, fairly, quite, ...}\}$, $M(\text{Happy})(C_{\text{Happy}})(j) \ \&\ \neg M(\text{Sad})(C_{\text{Sad}})(m)$.
c. $[\![\text{John is at least as tall for a man as Mary is tall for a woman}]\!]_{c,Cc} =$
$\forall M,\ M(\lambda x \in D_x.\ \text{Tall}_c([\![\text{woman}]\!]_c))(m):\ M(\lambda x \in D_x.\ \text{Tall}_c([\![\text{man}]\!]_c))(j)$

More recently, Doetjes (2010) argued in favor of such an analysis to account for comparisons in general. Klein (1980) shows that quantifying over comparison classes is only a special case of quantifying over adjectival modifiers. To illustrate this, suppose we have a set of 4 individuals: X = {w; x; y; z}. One comparison-class, call it c_0, is X. Suppose now that $P(c_0)$ = {w; x}, and thus $\sim P(c_0)$ = {y; z}, with ~Y as the complement of Y with respect to the relevant comparison class. We can now think of $P(c_0)$ and $\sim P(c_0)$ as new comparison classes, i.e., $P(c_0) = c_1$, and $\sim P(c_0) = c_2$. Let us now assume that $P(c_1)$ = {w} and $P(c_2)$ = {y}. If so, this generates the following ordering via Klein's definition of the comparative as quantifying over comparison classes: w is P-er than x which is P-er than y which is P-er than z. Let us now assume that M is a modifier of adjectives. On a Kleinean modifier-analysis (66a), comparatives of the form `x is P-er than y' are represented as in (66b):

(66) a. $[\![\text{er}]\!]_c = \lambda G_{2<xt,xt>}.\lambda C_2 \in D_{<x,t>}.\lambda x_2 \in D_x.\ \lambda G_{1<xt,xt>}.\lambda C_1 \in D_{<x,t>}.\ \lambda x_1 \in D_x.$
$\exists M_{<<xt,xt>,<xt,xt>>},\ M(G_1)(C_1)(x_1) \ \&\ \neg M(G_2)(C_2)(x_2)$.
b. $[\![\text{John is taller than Mary}]\!]_{cCc} = \exists M,\ M(G_1)(C_c)(j) \ \&\ \neg M(G_2)(C_c)(m)$.
c. $[\![\text{John is as tall for a man as Mary is tall for a woman}]\!]_c =$
$\forall M,\ M(\lambda x \in D_x.\ \text{Tall}_c([\![\text{woman}]\!]_c))(m):\ M(\lambda x \in D_x.\ \text{Tall}_c([\![\text{man}]\!]_c))(j)$

To continue our illustration, we can define the following set of modifier-functions on domain X in terms of the behavior of P with respect to different comparison classes: $M1(P)(c_0) = P(c_0)$, $M2(P)(c_0) = P(P(c_0))$, $M3(P)(c_0) = P(c_0) \cup P(\sim P(c_0))$, and $M4(P)(c_0) = c_0$. Thus, $M1(P)(c_0)$ = {w; x}, $M2(P)(c_0)$ = {w}, $M3(P)(c_0)$ = {w; x; y}, and $M4(P)(c_0)$ = {w; x; y; z}. Similarly, one can define that $M1(Q)(c_0) = Q(c_0)$, $M2(Q)(c_0) = Q(Q(c_0))$, $M3(Q)(c_0) = Q(c_0) \cup Q(\sim Q(c_0))$, and $M4(Q)(c_0) = c_0$ for adjective Q. Take M_f to be {M1; M2; M3; M4}. For a single adjective P, this new analysis of the comparative gives rise to the same order an analysis with comparison-classes yields: w is P-er than x which is P-er

than y which is P-er than z. Moreover, any of those comparatives can only be true according to the new analysis, if it is true according to the old analysis: The statement `w is P-er than x' is true, for instance, because of function M2. But $M2(P)(c_0)(w)$ & $\neg M2(P)(c_0)(x)$ holds iff $P(c_1)(w)$ & $\neg(P)(c_1)(x)$, which demonstrates that the old analysis is indeed a special case of the new analysis. The latter is immediately an analysis of between-adjective comparisons, based on the meaning of adjectives in different comparison classes. This allows for a straightforward derivation of an interpretation for *for* phrases in degree constructions (as, for instance, in (66c)).

Notice also that one can order the modifiers in terms of what these modifiers do ($M2 \geq M1 \geq M3 \geq M4$), because for all entities $x \in D_x$ and adjectives P, $M4(P)(c_0)(x)$ follows from $M3(P)(c_0)(x)$ which follows from $M1(P)(c_0)(x)$ which follows from $M2(P)(c_0)(x)$.[23]

We have assumed above that M is a modifier of adjectives. So, it is a function from an adjective to a function that takes as argument a comparison class and gives a new set. The function is dependent, of course, on the adjective it takes: the identity of M(P) depends on P. However, M(P) by itself is again a function, taking a comparison class as its argument. This function might itself be either a constant function or not. We assume that the role of the *for*-phrase is to fill in this comparison class. It is clear that in case the function M(P) is a constant function, there is no role to play for the comparison class. As a result, we would expect the *for*-phrase to be inappropriate.

As explained above, M might be something vague like *very*, *quite*, and *slightly*, but also something precise like an explicit measure phrase, like *98 cm*. There is a crucial difference between a resulting function like the one denoted by *very tall* and the one denoted by *98 cm tall*: whereas the former denotes a function whose value depends on the comparison class it takes as input, the latter does not.

Combining these ideas, we can immediately explain why measure phrases do not join well with for-phrases: it is inappropriate to say something like *John is 98cm tall for a 3-year old*, whereas it is appropriate to say *John is very tall for a 3-year old*. We can explain why in contrast to *slightly, 98 cm* is not a good answer to *How tall is John for his age?* in a very similar way. The reason is that on a Kleinean semantics, a degree question would denote (as its extension) a set of modifier functions. We assume that the use of the for-phrase was not redundant and thus that *How tall is John for his age?* means something different from *How tall is John?*. It follows that the functions resulting from the modifiers in the extension of the question applied to *tall* must vary with the *for*-phrases. But this would not be the case if these modifiers would be measure phrases, from which it follows that these are not in the extension of the question.

Moreover, contemporary implementations of the vagueness based approach can arguably deal with a variety of issues pertaining to the semantics of adjectives that go beyond the limited scope of this paper, including restrictions on measure-phrase licensing, negative antonymy, different types of comparison, differences between absolute and relative adjectives and their modifiers, and between different comparison

[23]This account can then be extended to cover additional examples by adding to the comparative morpheme interpretation a measure phrase argument M', such that $[\![er]\!]_c = \lambda G_{2<xt,xt>}.\lambda C_2 \in D_{<x,t>}.\lambda x_2 \in D_x.\ \lambda M' \in D_{<<xt,xt>,<xt,xt>>},\ \lambda G_{1<xt,xt>}.\lambda C_1 \in D_{<x,t>}.\ \lambda x_1 \in D_x.\ \exists x_3 \in D_x,\ M'(G_1)(C_1)(x_3)$ & $\forall M,\ M(G_2)(C_2)(\oplus\{x_2,x_3\})$: $M(G_1)(C_1)(x_1)$. This results in $[\![\text{John is 2cm taller than Mary}]\!]_{Cc} = \exists x_3 \in D_x,\ 2cms(Tall)(C_c)(x_3)$ & $\forall M,\ M(Tall)(C_c)(\oplus\{m,x_3\})$: $M(Tall)(C_c)(j)$.

types (for a detailed discussion of these and related topic see Doetjes, Constantinescu, C. & Soucková 2010, van Rooij 2011a-c, Toledo & Sassoon 2011, and references therein).

3.3 Degree functions vs. characteristic functions – What is more basic?

We have provided two analyses; one has degree functions as a primitive, the other characteristic functions. Are there good reasons to view the former, or alternatively the latter, as more basic?

Many adjectives like, for instance *good* and *happy*, do not license measure phrases; they license other degree morphemes such as, for instance, *er* and *very*, but these facts can be captured with no reference to degree functions (Kamp 1975; Fine 1975; Klein 1980-1991; van Rooij 211a-c). Any analyses whereby the primitive is the degree function (including, in particular, all the null-morpheme analyses) have the disadvantage that a degree function has to be stipulated for these adjectives too. Thus, these analyses generalize to the worst case.

As Partee (1987) has already convincingly argued, a more elegant approach takes the simplest interpretation to be the basic one, using a highly constrained system of type shift operations to derive more complicated interpretations. This reasoning is applicable to our problem as well. Using the means provided by measurement theory, characteristic functions can constitute the primitive adjectival semantics and a basis from which to derive entity orderings, when these are needed for the derivation to proceed. In turn, ordering relations together with context dependent concatenation relations can form a basis to derive degree functions, when these are needed for derivation to proceed (Kamp 1975; Fine 1975; Klein 1980-1991).

In line with this view, recent research shows that the positive form is acquired earlier than degree constructions. In addition, among the latter, comparison constructions, whose interpretation is based on ordering relations, are acquired earlier than measure phrases, whose interpretation is based on degree functions (Ravid et al 2010; Beck et al 2010). Cross linguistic research points to the same direction. Some languages posses no measure phrases, but do possess comparisons or at least positive forms (Beck et al 2010). These facts suggest that indeed, the characteristic function (the interpretation of the positive form) is the primitive, from which entity orderings can be construed systematically.

But these facts do not unequivocally establish that characteristic functions are necessarily the primitive, for basic, primitive interpretations may also be more abstract and for this reason more difficult to acquire than non-primitive (derived or composed) interpretations. Here is one example illustrating this point. While a causal component is part of the interpretation of verbs like *kill* or *break*, the interpretation of abstract verbs like *cause* is acquired after the interpretation of more concrete verbs like *kill* or *break* is already mastered. The same phenomenon might prevail in the domain of adjectives. Degree functions may form an important component of the interpretation of the positive form, but being more abstract or complex to grasp, their acquisition might lag behind, in comparison with the acquisition of the final interpretation of the positive form (despite their being semantic building blocks of this interpretation). On this view, derived comparatives like *taller* are more complex than the basic adjective (e.g., *tall*) only because the interpretation of the former is built compositionally from components of the lexical interpretation of the latter (see discussion in Landman 2005 on this point).

Furthermore, degree-function analyses can explain why measure phrases are so much rarer than positive forms across languages (Schwarzschild 2005). Importantly, measure phrase interpretations can be created only if a convention regarding unit objects can be established, which is not always the case even if a degree function exists for an adjective. In particular, no objects can be considered by a convention to be the unit objects of adjectives denoting emotional or perceptual degrees such as *happy*. This is true independently of whether these adjectives are associated with mappings to degrees or not (for a more detailed discussion see Sassoon 2010b).

All considered, degree function might still be a basic component of interpretation, as the null morpheme analyses have it. Thus, we could still ask whether a null morpheme is part of the syntactic derivation of the positive form directly expressing the ways the characteristic function and degree function constrain one another. But as is already made clear along this paper, we do not see any evidence bearing on this issue. Remember that children have to learn which null morpheme may occur when and adults have to learn to identify when they actually occur. Naturally, null morphemes can be identified as occurring whenever otherwise there will be a type mismatch; but then, one can simply assume an explanation based on type-shift (cf. 3.1 below). Importantly, positing a null morpheme is not in itself more explanatory than supposing that type shift occurs.

4 Conclusions

How can we decide, then, whether *pos* is part of the derivation of the positive form or not? A more general issue is looming behind this question; the issue is whether the theory of grammar needs or does not need to be supplemented with a logical form – a syntactic level of representation of sentences that is fully isomorphic to their semantic, truth conditional interpretation. Careful discussion of this point from different perspectives is found in Gamut (1991: 214-20), Fox (2003), Stokhof (2007) and references therein. The controversy over the logical form goes far beyond our scope in this paper. Focusing on the case of the positive form, we hope to have contributed to this discussion in two ways; first, by examining the consequence of the postulation of *pos* in the positive form and/or degree constructions – a burden of explaining a variety of problems comes with it (cf. section 2); second, by providing two plausible accounts of the facts without a null morpheme (therefore – simpler), one for each of the two dominant approaches to the semantic analysis of adjectives in linguistics today; we leave it for the future to determine which one is superior, a degree-based approach, albeit – without a null morpheme (cf. 1.2 and 2.3) or a Kleinean approach, that minimizes the role of degrees, thereby eliminating the need for *pos* altogether (cf. 3.1 and 3.2).

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