Be positive! Norm-related implications and beyond

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Abstract. Negative degree questions such as *How short is John*?, and negative equatives such as *John is as short as Mary* imply that *John is short*. Existing theories explain this 'norm-related' implication by means of (i) a competition between unmarked and marked antonyms, and (ii) by introducing a standard-variable in paralel with the standard analysis of the positive form *John is tall*. This paper argues against these principles and in favor of an analysis, whereby the zero on the measurement scales of norm-related adjectives is relative, rather than absolute. This principle captures the fact that norm-related implications arise with many positive adjectives (alongside with their negative antonyms) and are cross-linguistically tied with non-licensing of measure phrases.

1 Introduction: Norm-relatedness

What do we know about norm-relatedness to date? First and foremost, we know that degree questions and equatives with 'negative' adjectives trigger norm-related implications. For example, the question *how short is Bill* and equative *Bill is as short as Mary* imply that *Bill is short*, while the question *how tall is Bill* and equative *Bill is as tall as Mary* do not imply that *Bill is tall*. To explain these facts, linguists often exploit notions such an 'unmarked' vs. 'marked' antonyms; marked expressions have a limited distribution; in certain contexts they are either ungrammatical or infrequent, and their usage is characterized by an interpretation shift, e.g. norm relatedness (Lehrer 1985; Horn 1989). Evidence for the narrower distribution (hence, markedness) of negative adjectives includes in particular their non-licensing with measure phrases and ratio phrases, except in the comparative, as illustrated by the felicity of *twice as tall as* versus infelicity of #*twice as short as*, and by the contrasts in (1).

(1)   a. Bill is 1 meter shorter than John; *Bill is 1.50meters short
      b. Bill is 20 years younger than John; *Bill is 20 years young

A markedness-based analysis within formal semantics is proposed by Rett (2007, 2008), who argues that negative adjectives are banned from linguistic contexts in which their substitution with the positive ('unmarked') antonym preserves truth conditions. For example, the neutral reading of *as short as* is banned, since individuals are equally tall iff they are equally short.

A main drawback of this view is that in many pairs of antonyms, the negative and positive members are both norm-related (Bierwisch 1989), as the following examples illustrate.

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

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

(4) a. How rich is John?   ⇒   John is rich
    b. John is as rich as Bill ⇒   John is rich

(5) a. How poor is John   ⇒   John is poor
    b. John is as poor as Mary⇒   John is poor

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

(7) a. How heavy is the bag?   ⇒   The bag is heavy
    b. The bag is as heavy as the box. ⇒   The bag is heavy

(8) a. How light is the bag?   ⇒   The bag is light
    b. The bag is as light as the box. ⇒   The bag is light

Furthermore, none of the members of these pairs licenses measure phrases, except in the comparative (Schwarzschild, 2005), and many of the positive adjectives resemble their negative antonyms in rarely licensing ratio phrases (Sassoon 2010). Thus, neither the positive nor the negative is 'unmarked'.

(9) a. Bill is 1 kg fatter/ skinnier than John;   vs. *150kgs fat/ skinny
    b. Bill is 200$ richer/ poorer than John;   vs. 1,000$ rich/ poor
    c. It is 2o warmer/ colder than yesterday;   vs. 20o warm/ cold

Such pairs are prevalent in languages as diverse as English, German, Chinese, Hebrew and Esperanto (Bierwisch 1989; Breakstone 2009; Kennedy 2009). A corpora study of Esperanto, which users are native speakers of a variety of

languages, suggests that they are prevalent even in this artificially construed language – most positive adjectives resemble their negative antonyms in rarely licensing ratio phrases (van Cranenburgh et al 2011).

Hebrew speakers' judgments concerning nominalizations exhibit parallel patterns (Breakstone 2009; Sassoon 2010). In many antonym pairs, both negative and positive members are marked, as (10b) and (12b) illustrate.

(10) a. Godel/??Katnut ha-bayit; 'The size/??smallness of the house'
     b. Mishkal / ??Koved ha-noca; 'The weight /?'heaviness' of the feather'
(11) a. Orex kaful/ shney meter; 'Double length; 2 meters of length'
     b.*Katnut kfula/ shney meter; *'Double smallness/ smallness of 2ms'
(12) a.Mishkal kaful / 30kg; 'Double weight / weight of 30kg'
     b.*Koved kaful / 2kg; *'Double heaviness / heaviness of 2kg'

Moreover, in languages like Russian, *all* adjectives not morphologically marked for comparison are norm-related and do not license measure phrases (Krasikova 2009). Even *tall* is marked, so to speak.

(13)*Катя низкая, она такая/настолько же высокая, как/насколько и Лариса;
     'Katja is short, she is as tall as Larissa.'
(14)a. Насколько стол широкий?
        'How wide is the desk?'   (very, fairly, little, *20cm)
     b.*Кровать 80 см *широкая/ *узкая/ шириной.
        'The bed is 80 cm wide.'

Only adjectives morphologically marked for comparison (e.g., the Russian equivalents of English 'taller') are 'unmarked' – they are neutral and they license measure- and ratio-phrases. All other degree constructions, whereby the adjective occurs with no morphological marking (the Russian equivalents of 'tall', 'more tall', etc.) are norm-related and ban measure phrases.

(15) a. Катя не высокая, но она выше, чем Сергей.
        Katja is not tall, but she is taller than Sergej.'
     b.*Катя не высокая, но она более высокая,чем Сергей
        Katja is not tall, but she is more tall than Sergej.'

These cross-linguistic generalizations call for a unified account of norm-relatedness in natural language, and its interactions with polarity and measure phrases.

2 Existing theories

This paper utilizes a representation of background contexts c via context-sets W_c (sets of indices w consistent with the information in c; Stalnaker 1978), such that a statement S is true in c iff $\forall w \in W_c$, S is true in w; S is false in c iff $\forall w \in W_c$, S is false in w, and S is undetermined in c, otherwise. Let D_x and D_r be the domain of possible individuals x and degrees r, respectively, and let gradable adjectives denote in indices w measure functions, $f(P,w): D_x \rightarrow D_r$; for example, f(tall,w) is a degree function (also symbolized as $f_{tall,w}$) − a mapping of entities $x \in D_x$ to values $r \in D_r$. The interpretation of a positive construction, *x is P*, is the truth value 'true' in w iff f(P,w)(x) exceeds P's standard in w, s(P,w) (Kennedy 1999).

The degree functions of positive adjectives are monotonic with respect to conventional measures, while those of negative adjectives are reversed with respect to those of their antonyms, e.g., the more height one has (wrt any possible measure), the taller one is, but the less short one is. Thus, the ordering imposed by $f_{short,w}$ is equivalent to the ordering imposed by the reversed height function $\lambda x \in D_x. - f_{tall,w}(x)$. Let us, then, represent this fact by assuming that for any c and $w \in W_c$, $f_{short,w}$ is roughly equivalent to $\cong \lambda x. - f_{tall,w}(x)$. However, the arguments in this paper do not hinge on this analysis of antonymy; they generalize to other contemporary analyses of antonymy (Kennedy 1999, 2001; Heim 2008, etc.)

Theories such as Rett (2008) seek to explain the data with two principles:

(16) a. **Markedness (restricted distribution):** Norm related implications are due to a competition between marked and unmarked forms. Marked (negative; 'reversed') adjectives can be used iff substitution with the 'unmarked' antonym does not preserve truth conditions.
   b. **Null morphemes ('Pos'/'Eval'):** Norm related implications are explained by analogy with the positive construction, which is normally analyzed as containing a null morpheme – POS or EVAL – that introduces a membership-standard variable into the syntax and semantics. For example, 'Dan is tall' is analyzed as conveying that Dan is taller than tall's contextual standard (Kennedy 1999).

Therefore, since the neutral interpretations of, for example, *equally tall* and *equally short* are equivalent, by principle (16a), the latter is not licensed. However, when EVAL enters the derivations, the outcome consists of two non-equivalent norm related interpretation for the positive and negative equatives. Hence, both are licensed. For example, the negative equative *Dan and Bill are equally short* has a derivation of the form Equally(Eval Dan is

short, Bill is Short), which conveys that Dan and Bill are equally short and Dan is shorter than the standard height norm, r_s. Likewise, the norm related interpretations of negative and positive *as* equatives and degree questions are different so both are licensed.

This theory is appealing because it is economic and highly intuitive. Can we, then, use a modified version of it to explain the facts concerning antonym pairs whereby the negative and positive are both marked? The answer is no. Norm-related readings with positive adjectives cannot be based on comparisons with an 'unmarked' form, because their negative antonyms are also marked – they do not license ratio- and measure-phrases.

The moral is twofold. First, non-licensing of ratio and measure phrases cannot be explained merely as a result of the reversal characterizing negative antonymy, for otherwise the fact that many positive adjectives do not license ratio- and measure-phrases will remain unexplained. Second, norm-relatedness cannot be explained by relying on a notion as general as markedness. What we need to explain is why 'marked' adjectives have a constrained distribution in the first place, and the reasons explaining this would probably reveal why they tend to also be norm-related.

A theory that seeks to explain norm-relatedness in terms of reasons for non-licensing of measure phrases will be more explanatory. First, it will explain the cross linguistic patterns. Krasikova (2008), for example, adopts principles (16a,b) to account for the English data; this forces her to propose a different account for Russian, to capture the apparent role of degree morphology in this language. So she is forced to use separate accounts for an apparent cross-linguistic feature – norm relatedness always goes with non-licensing of measure phrases. Second, an account of norm-relatedness which is based on non-licensing of measure- and ratio-phrases has the potential advantage of explaining data pertaining to norm-relatedness in measure- and ratio-phrases. In particular, why is it that when people do use ratio-phrases, as in *This paper is twice as short as that one*, the result is neutral? After all, other modified equatives (e.g. *at least as short as*) are norm related.

Additional problems with existing analyses pertain to principle (16b) – the assumption that the derivation and semantics of equatives and degree questions is mediated by a standard variable. One problem pertains to the use of *for* phrases in equatives (Sassoon and van Rooij 2011). *For* phrases are adjective modifiers indicating what the implicit standard is, as illustrated with the positive construction in (17a). These modifiers cannot modify equatives (17b). When accepted, the *for* phrase is an adjective modifier, which produces a shift in the adjective interpretation (17c). Due to this shift, (17c) does not at all entail that the two arguments are equally short.

(17) a. Dan is tall for his age
       (= Dan is taller than tall's standard, namely his age's norm)
     b.*Dan is as short as Bill for their age(s)
       (≠ Dan is shorter than short's standard, namely his age's norm and
       Dan and Bill are equally short)
     c. Dan is as short for his age as Mary is for her age
       (≅ Dan is short for his age to the same degree as Mary is short for her
       age)

Why?? A *for* phrase can only modify the adjective occurring in an equative, thereby creating a between-adjective equative; Thus it produces a shift in interpretation, not necessarily towards a norm-related interpretation, but towards a deviation interpretation – the adjectival function is replaced with a function assigning to entities the distance between their value and the norm in their respective categories. The *for* phrase does not and cannot modify the equative itself, which is straightforwardly explained if and only if no standard parameter is added by virtue of the use of an equative without *for*.

     Similar problems arise with the use of standard boosters like *very* (compare, for example, the felicity of *Dan is very tall* to the utterly odd sentences #*Bill is as very short as Dan* and ?? *How very short is Bill?*). Why? Again, *very* cannot modify an equative or degree question by boosting the value of the norm variable, probably because there is no such value in their semantics. In conclusion, equatives and degree questions are inherently different from positive forms. Their derivations are mediated by neither a null morpheme, nor a standard variable (Sassoon and van Rooij 2011).

     In sum, an account of norm related implications in these constructions cannot be based on principles (16a,b). Norm-related implications must derive from something else, which characterizes the interpretation of marked adjectives, including positive ones. The rest of this paper will provide an implementation of the idea put forward in this section, namely an account of norm-relatedness that bind it, rather than to a general notion of markedness, to a more specific, pervasive feature of norm-related adjectives crosslinguistically: non-licensing of measure phrases and rarity of licensing of ratio phrases.

3 Accounts based on licensing of measure phrases

I will make use of measurement theory's explanation of the distribution of measure phrases (Krantz et al 1971), whose relevance to linguistics has already been noted (Klein 1991; Krifka 1989; van Rooij 2010; Sassoon 2010). I will discuss specifically the difference between ratio- and difference-

scales, which pertains to the status of the zero on a measurement scale and its effects. On this proposal, the so-called 'norm related implications' are actually 'zero related implications', and the so called 'Unmarked-' versus 'Marked-adjectives' are adjectives with absolute- versus relative-zeros. Section 3.1 explains these notions in more detail.

3.1 Zero the hero

Let the domain of degrees, D_r, include a special element, $0 \in D_r$. Let adjectival interpretations in indices w include, besides a cutoff point, also a zero point – the set of entities whose P value in w is 0: $\text{zero}(P,w) = \{x \in D_x: f(P,w)(x) = 0\}$. Like the cutoff point, also the zero can be either semantically determined or context relative. P's zero is ***absolute*** in c iff it is index invariant (i.e. the same extent of the given property is regarded as zero in every accessible index; (18a)) <u>and</u> it marks absence of P-hood by comprising P's absolute lower bound (18b). Otherwise, P's zero is ***relative***.

(18) Absolute zeros are index invariant lower bounds:
    a. $\forall w_1, w_2 \in W_c, \text{zero}(P,w_1) = \text{zero}(P,w_2)$
    b. $\forall w \in W_c, \forall x \notin \text{zero}(P,w), f(P,w)(x) > 0)$.

What, then, distinguishes neutral adjectives (like English *tall* and *old*) from norm-related ones (*fat, rich, warm* and negative antonyms in general)? In the former, the zero is absolute. It marks complete absence of height, width, age, etc. Conversely, in the latter, the zero is relative. The 'out of the blue' context fails to determine precisely which entities cease to have any amount of the measured properties. Which entities are minimally fat? Rich? Short? At which point on the warm-cold scale are entities not even somewhat cold? Warm? Our linguistic capacity is as indeterminate with regard to the zero (or minimum) of these adjectives as it is with regard to the cutoff point of *tall*. If I do not want to be fat at all – not even minimally fat – what weight should I aspire for? If I want to warm up a soup so that it is not at all cold, what temperature should I aspire for?

Some of the adjectives lacking an absolute zero, e.g., *short*, have no minimum at all, because there is no maximal height. Others, e.g., *fat*, could have had an absolute zero – 0 weight – but in actuality, *fat* doesn't appear to measure mere weight, but rather – overweight. The point at which entities begin to have a noticeable amount of overweight ('minimum fatness') is context relative. So is the point at which entities begin to have noticeable deficits compared to the average height ('shortness'), etc.

Significantly, relative zeros do not have to equal the membership norms. For example, while *somewhat open* entails *open* and *slightly wet* entails *wet*,

one can be *somewhat fat, but not fat*, meaning that the reference point relative to which we begin to measure overweight (*fat's* zero) may be different from *fat's* norm. Likewise, one can be *somewhat short, but not short*, meaning that the reference point relative to which we begin to measure height-deficit (the zero) may be different from *short*'s norm. Notice that according to the economy principle (Kennedy 2007), if there is a point that stands out on a scale (usually either a minimum or a maximum on the scale), the adjective's norm will be identified with it, rather than be context-relative. This is the case in *open/closed*; *dry/wet*, but not in *fat/skinny* and *tall/short*. They seem to reference midpoint standards, despite the fact that speakers easily recognize an absolute zero on the height and weight scales, and despite the role that this zero plays in the interpretation of adjectives like, e.g., *tall* – explaining their licensing of ratio- and measure-phrases (as illustrated shortly).

Finally, notice that sentences such as *The surface of the floor is zero (cms) tall* are funny or infelicitous, but they are easily interpretable, whereas corresponding examples, e.g., *The surface of the floor is zero (cms) short* are both funny and senseless (Sassoon 2010). This is because the degrees assigned by *short* – including those of entities whose height measures zero – are shifted by an unspecified value, which results in a relative zero. In typical contexts of use c, we do not know which entities belong in zero(short) in c (formally, for many w_1, w_2 in W_c, zero(short,w_1) $\neq$ zero(short,w_2)). No absolute 'zero' is available, only local zeros. So we have found a common denominator: All norm related adjectives have relative zeros. We can describe their degree functions as shifted by an index-dependent value, symbolized below as 'Tran', from 'transformation value'. For example, the zero on the Kelvin scale is absolute. Nothing can get any colder. But the zero on the Celcius scale is arbitrary – frozen water exemplifies this degree. The Celsius scale can be defined in terms of Kelvin degrees plus a transformation by exactly 273 degrees. The scales of natural language adjectives can also be described as transformed, but by an undetermined (index relative) value.

(19) a. $\forall w \in W_c$, $\exists Tran \in D_r$: $f_{warm,w} = \lambda x. f_{Kelvin}(x,w) - Tran$
       b. $\forall w \in W_c$, $\exists Tran \in D_r$: $f_{short,w} = \lambda x. Tran - f_{tall}(x,w)$

This is not to say that speakers always need to possess a representation of an additive temperature scale a kin to Kelvin; rather, the result of transforming Kelvin by different arbitrarily given values constitutes a correct description of the representations speakers do possess for temperature adjectives.

Measurement theory tells us that measure phrases are only licensed with ratio ('additive') scales, namely ones with absolute non-shifted zeros (Krantz et al 1971). To illustrate measurement with an absolute zero, consider for

example, an index w whereby *tall* maps entities whose height is 1 centimeter to 1, and assume that Sam and Dan's heights are 50 and 100 centimeters, respectively, and in accordance, they are mapped to the degrees 50 and 100, respectively. Since ratio-based scales have an absolute zero, they assign no negative values, and the values they assign adequately represent differences and ratios between entities' manifestations of the given property (e.g. height). For examples, we can say that *Dan is twice as tall as Sam* since the ratios on *tall's* scale are meaningful and indeed $100 = 2 \times 50$. We can also use units and measure phrases as in *Dan is 100 cms tall*, because the ratios on tall's scale are meaningful and Dan is in fact 100 times as tall as a centimeter.

By contrast, consider an index w whereby 'tall' is linked to a transformed function (which is, arguably, the case in Russian), for instance, one that maps entities whose height is 1 centimeter to 0 ($\lambda x.$ height$(x,w) - 1$; so Sam and Dan are assigned 49 and 99, respectively). Since such transformed ('difference') scales have an arbitrary zero, they typically assign negative values, and the ratios between their values are not meaningful; so in Russian, we cannot felicitously say that Dan is twice as tall as Sam because indeed, e.g., $99 \neq 2 \times 49$. Likewise, we cannot felicitously say that Dan is 100 cms tall because 99 is not 100 times 0. For similar reasons, English speakers tend to avoid statements such as *Sam is twice as short as Dan*; reversed and transformed degrees do not capture ratios. Still, measure phrases are okay in morphologically-comparative adjectives in these two languages (e.g., we can say that *Dan is 50 cms taller than Sam*), because when calculating degree differences, the transformation values cancel out – the difference between Dan and Sam's *tall* degrees is 50, and so is the difference between their *short* degrees $((1 - 100) - (1 - 50) = 50)$; this value is precisely 50 times the value of a centimeter, as stated by the measure phrase (Sassoon 2010).

Absolute zeros are a relatively recent invention, and conceptually, difference scales are still more prominent than additive ratio-scales (Smith et al 2005). For instance, according to judgments of 7 year old children, dividing an object repeatedly will eventually make it disappear, or reduce its weight to zero. Why? Because children use difference-scales and substraction, instead of ratio-scales with division. Correct reasoning typically occurs at age 8-12 or latter, and latter for weight than for matter and space.

These findings are consistent with the linguistic data – most adjectives do not license measure phrases and rarely license ratio phrases (and they do so mainly with round numbers). Data from Esperanto suggest that there is no statistically significant difference between negative and positive adjectives in the frequency of ratio modifiers (as well as nominalizations; van Cranenburgh et al 2010), except for distance predicates like *tall*. This

suggests that all negative adjectives are non-additive, but so are also many positive adjectives. In addition, adjectives and their comparative and superlative forms (which do not require calculation of ratios) are acquired earlier than measure phrases (Tall > Taller, tallest > 2m tall; Beck at el 2010). Finally, nominalization morphology is consistent with this view. After all, *height, weight, width* and *length* are all non-generative forms, while most other (non-additive) adjectives tend to combine with other, more generative morphemes, such as '-ness' and '-ity' (e.g., *highness*, *obesity*, etc.)

To summarize, 'markedness' in adjectives does amount not to negative antonymy, but to the notion of difference scales, meaning – scales with relative zeros, either by virtue of a transformation of an additive base (*tall-short*), or due to absence of an additive base in the first place (*glad-sad*). Transformed adjectives do not license measure phrases, but their comparatives do; they license *twice* only if context biases towards a non-dominant non-transformed interpretation; we are uncertain about their zero point, and -- they are norm-related in equatives and 'how' questions. This last feature must be related to the previous features. An account based on this insight is presented in the next section.

3.2 Be positive!

Norm related implications arise if the adjective's function is transformed. Why? One possibility is that denotation members always have to have positive degrees ($\forall w \in W_c$, $s(P,w) \geq 0$), but non-members may have negative degrees. In each context, entities' value fails to exceed 0 iff they fail to have a contextually noticeable or significant amount of the measured property. Thus, adjectives cannot be used to rank these entities:

(20) Be positive! Use adjectives P to rank entities whose value in P exceeds zero.

Formally, then, *x is P* is felicitous in c iff $\forall w \in W_c$, $f(P,w)(x) > 0$. This idea has been out there for a pretty long time; as Winter (2005) writes: "a possible explanation, discussed by Seuren and Kennedy, is that the scales of adjectives such as *fast* and *expensive* do not exhaust all the physically legitimate values" (Winter 2005: 39). Likewise, Heim and Kratzer (1998) and Kennedy (2007) have argued for various sorts of adjectival domain restrictions, covering among other things, also the role of zeros. But, to the best of my knowledge, the relations have never been worked out in detail, between zeros and norm-relatedness in positive and negative adjectives across languages (see Winter 2005 and Breakstone 2010 for previous discussions). This section includes a preliminary account of these relations and many questions for future research.

First, notice that the maxim in (20) can only be violated when, in denying P, its application turns P's negation unusable; i.e., it makes sense to apply *not P* of entities whose P value fails to exceed 0 in c iff *all* non Ps fail to do so ($\forall w \in C_c$, s(P,w) ≤ 0), namely in minimum standard adjectives (cf. *the door isn't open* vs. *#the surface isn't tall*).[1] Furthermore, on the basis of (20) we can claim that transformation in negative adjectives has a purpose, namely to avoid negative values. By virtue of transformation, positive and negative antonyms may apply to slightly different domains. Thus, transformation is bad for ratio- and measure-phrase licensing, but it is good to tell apart negative- from positive-antonyms (Rett 2007; Tribushinina 2009). Besides these observations, this proposal has the following outcomes.

First, by (20), *tall* (whose zero is absolute, i.e. marks complete absence of height) can be used to rank entities iff they have some height, but not necessarily much height. Hence, *tall* is neutral. Conversely, almost only fat entities are surely 'somewhat fat' (have a noticeable overweight and so a positive degree). So we can only use *fat* 'safely' to rank denotation members, or at least 'somewhat fat' entities.
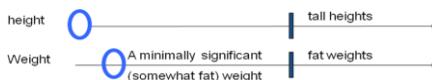
Second, the strength of an evaluative implication (e.g. *fat* vs. *somewhat fat*) varies with the location of the zero. For example, soon after switching on a slow oven to warm up some **cold** bread, one can ask *how warm is the bread?* (I am grateful to Ewan Klein for this observation). In this context, soon after the oven is switched on, some heat is added to the bread, rendering it at least 'somewhat warm', i.e. more than 'zero' warm. This is all that is required for an appropriate use of *warm* by (20). Similarly, after cutting some part of a **very long** rope to shorten it, we can ask *how short is the rope?* Even if the rope is still clearly not short. Also*, how brown* only implies *somewhat brown,* even out of the blue (Heim 2009). Stronger constraints, directly relating to cutoff points, cannot capture these judgments (Rett 2007, 2008).

Transformed adjectives may be partial in disguise, if their relative standard is taken to equal their relative zero – this is the case in contexts in which, for instance, *x is somewhat fat* is taken to imply *fat*. In such cases, we only use the adjectives (even in the comparative) in order to rank members. Thus, the present account converges with the account of norm-relatedness in

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[1]Still, with negation, we find evidence for a weaker version, something like "be able to be positive!" For example, *The door isn't open* is okay because the door *might* be open. However, *#The surface isn't tall* is odd because a surface cannot possibly ever exceed zero height. Then again, consider a line X on a screen whose length varies with time and is now zero; reporting the ongoing changes X undergoes one may say that *right now, X isn't long* (because it *might* be long.)

comparatives of partial (minimum-standard) adjectives (Kennedy and McNally 2005); in contexts in which the relative zero and norm of *fat* are equated, *fatter* is norm related for the same reasons *sicker* or *more open* usually are – to count as Per one has to have some non-zero degree of P; when this suffices for P-hood, 'x is Per' entails 'x is P'. The standard is context relative, but entities below it are below 0 so they can't be ranked.

Third, languages like Russian provide additional evidence for relative zeros (even for adjectives like, e.g., *tall*). Combinations like '*entirely short*', whereby a maximizer modifies a relative adjective, are just fine in Russian. Yet they do not refer to *tall*'s absolute zero, but to some context dependent minimum height (Tribushinina 2009, 2010), namely *tall*'s relative zero. Again, this zero is clearly not the standard of *tall* and *short*. Similar evidence is provided by certain English negative, relative- or partial-adjectives, as in the felicitous and frequent combinations *completely different* and *entirely sick*.[2] We find similar Hebrew data (e.g., 'legamrey kar' 'entirely cold' is perfectly grammatical). Such maximizers occur not only with maximum-scale adjectives (*clean; closed; full; empty*), but also with relative adjectives, and they refer to the (possibly local) zero of those adjectives' antonyms.

Fourth, (20) is a restriction on the use of adjectives P, but not of other lexical items, including ones decomposed of P, like *unP* or *Per*. In fact, although the interpretation of the latter is mediated by P's degree function, they can be used without implying P-hood. Thus, (20) captures the role of morphology, including the fact that, for instance, *unhappy* doesn't imply *happy,* and *shorter* doesn't imply being *short*. Conversely, *less short*, *as short* and *how short* are correctly predicted to imply *short*. So (20) captures the role of comparative morphology in Russian, namely the fact that morphologically marked comparatives are neutral and they license ratio- and measure-phrases. Also, for Bierwisch (1989), Krasikova (2009) and Kennedy (2001), *more P* differs from *Per* in being norm-related, as (200 predicts.[3,4]

Notice, however, that *er*-comparatives, being lexical entries in their own right, may have either an absolute or a relative zero. If *Per* has a relative zero, then only entity pairs whose values in P differ to a contextually noticeable or

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[2]Syrett (2007) shows that maximizers are a cue for the acquisition of standard type – invented labels are regarded as total (maximum-standard) adjectives if modified by maximizers like *completely*. But Syrett cites relative- or partial- (mininum standard) adjectives like *different* among the most frequent adjectives licensing maximizers like *entirely*.

[3]Why aren't measure-phrases licensed here, as in *#2m/twice more wide than long*? After all, the transformation values cancel out, so relative zeros cannot be the reason. Probably, this construction employs a richer semantics than a mere difference calculation. Independent evidence for this is the fact that noun phrases are freely licensed in this constructions across languages, as in *more a car than a truck* and *more a bird than a horse* (versus *#more bird* or *#birder*).

[4]This proposal predicts a difference in implications between *little fat, slightly fat* or *barely fat* and *rather skinney*, and between *slightly ful* and *rather empty*. Empirical research should ultimately determine whether this prediction is on the right track.

significant extent, count as somewhat *Per*. This explains why sometimes *Per* implies (somewhat) P; e.g ??*this feather is heavier than that one* is odd, because differences in weight between feathers (unlike, say, bags) are too fine grained for *heavier* to capture, rendering *heavier* semi norm-related. The sentence improves if, say, a wet feather is compared to a dry one, since their weights differ more notably (Ewan Klein, p.c.) On a similar vein, we can say that *The winter in Antarctica is warmer this year*, either if it feels noticeably warmer, or if we report about fine-grained scientific measures that render the two winters discernable.

Fifth, *it weighs* conveys *It weighs a lot,* rather than *It weighs something* (Bierwisch 1989) perhaps due to the triviality of the latter, which, by (20), holds true of all *weigh*'s domain. A question for the future is whether the meaning of adjectival positive forms (e.g. *x is tall*) can also derive from triviality (Fox and Hackl 2006; Heim 2009; Rett 2007).

Finally, this account is more explanatory than an account in terms of a mere competition between marked and unmarked forms, in that it generates predictions about cases we previously could not understand. In particular, it explains why ratio phrases are not norm-related (Rett 2007), e.g., a tall person can be *twice as short as* a house. Why? The licensing of ratio phrases requires an accommodation of a ratio-scale – an absolute zero must be accommodated, which means that the norm relatedness is eliminated.

Also, this account has implications even for mere exceptions to the cross linguistic generalization. Consider, for example, the pair *late-early*. It is obviously norm related – both *How late/ early is the train?* and *This train is as late/ early as that one* imply that *The train is late/ early*; still, it also licenses measure phrases – both *2 minutes late* and *two minutes early* are felicitous across many languages. These adjectives are also particularly amenable to deviation interpretations (Kennedy 2001). Other examples of deviation readings include, for instance, *2 month short of her birthday, 2 minutes short of time* (Schwarzschild 2005), and *Dan is (2cms) taller than Mary is short* which is a direct comparison of deviations (Kennedy 2001).

What explains the norm related implications? Importantly, time is a difference measurement. It has an unspecified or contextually chosen zero (recall that, for instance, year 1 is different in the Christian and Jewish calendars). However, *early* and *late* often select contextually determined zeros in an anaphoric or indexical way. For example, the zero may be defined by the time school's bell rings (the time of an event e_{bell}). In such contexts, $\text{Tran}_{late/early} = f_{Time}(e_{bell})$. These adjectives, then, are linked with a measure of deviation from the bell time, $f(late,w) = \lambda e.\ f_{Time}(e,w) - f_{Time}(e_{bell},w)$ and $f(early,w) = \lambda e.\ f_{Time}(e_{bell},w) - f_{time}(e,w)$ (where 'e' is a variable over events).

These functions compare 'transformed' time values of two given entities; the transformation-values cancel out, and so measure phrases are licensed.

Too is a marker of deviation readings, e.g. in *You arrived late, but not too late*, the first occurrence of *late* has a relative zero and norm, while the second is interpreted relative to, e.g., the bell-ringing time, which functions as both the zero and the standard. In Dutch, the use of *te* ('too') is compulsory in these contexts, as in *Jullie moeten hier zijn voor de bel; Jullie zien *(te) laat* ('You must arrive before the bell rings; you arrived *(too) late'); *te* is obligatory for the meaning "after the bell" (cf. Syrett's 2007 treatment of *too* as a marker of minimum standard adjectives).

To conclude, directly connecting between non-licensing of measure phrases and norm-relatedness is fruitful. Empirical research is required to determine the precise implications from degree constructions – facts pertaining to sub-deletion comparatives with *more*; the connection between granularity and norm-relatedness, etc. Finally, maybe derivations with equatives and degree-questions (but crucially not *er* comparatives) involve a measure phrase variable M, e.g., a projection of the form *x is M Adj.* (cf. Doetjes 2009; Fox and Hackl 2006). Since negative adjectives like *short* do not license fine-grained neutral measure phrases like *two meters*, M can only be saturated by an evaluative entry like *very, fairly* and *for his age*. Crucially, even negative modifiers ('answers') such as *little short* or *not short* allow for, and perhaps even defeasibly suggest, *not tall* (for empirical findings see Paradis and Willners 2006 and references therein). This idea, too, captures norm relatedness in positive adjectives that fail to license measure phrases (such as *fat, warm* and *rich*, in English).

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