STANDARD FIXING AND CONTEXT MANIPULATION: AN EXPERIMENTAL INVESTIGATION OF DEGREE MODIFICATION*

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1 Introduction

The core meaning of gradable adjectives involves a relation to a scalar concept on the basis of which objects can be ordered (e.g. height, weight, cost). The focus of this study is the meaning and use of gradable adjectives in their positive form, which lacks any overt degree morphology (1), and the semantic input of intensifiers like *very* to the positive form (2).

(1) a. The cord is **short**.
b. This table seems **light**.
c. The **cheap** coffee is surprisingly good.

(2) a. The cord is **very short**.
b. This table seems **very light**.
c. The **very cheap** coffee is surprisingly good.

The meaning of the positive forms of the adjectives in (1) is typically tied to the context: what counts as *short, light*, or *cheap* can vary, so the extension of *short, light*, and *cheap* is correspondingly context dependent. In light of that, gradable adjectives can be characterized either as context-sensitive properties (e.g. Klein 1980) or as relations between individuals and degrees (e.g. Cresswell 1976, von Stechow 1984, Kennedy 1997). The goal of this study is to tease apart the crucial distinctions between the two main views, utilizing an experimental paradigm that examines the effect of context on the use of positive and intensified forms of various gradable adjectives.

The structure of this paper is as follows. In Section 2, the details of the two analyses are discussed, followed by a description of the experimental task in Section 3, as well as the predictions the two main views make for the task. The results of the experiments will be given in Section 4, followed by the implications of the study and future directions (Section 5).

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2 Gradable adjectives and degree modification

2.1 The two competing analyses and relative adjectives

The VAGUE PREDICATE analysis (Klein 1980) treats gradable adjectives as vague properties, which, like other predicates, denote functions from objects to truth values. The difference between gradable adjectives and non-gradable adjectives is that the domain of gradable adjectives is partially ordered with respect to some property that permits gradation, such as *length*, *weight*, or *cost*. The gradable adjective denotes a function that induces a partitioning on a partially ordered set into objects ordered above and below some point. For example, Figure 1 depicts the domain, and the trees in the figure can form the comparison class in (3).

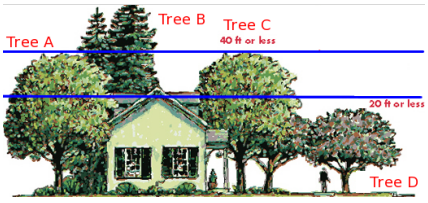


Figure 1: Partitioning of Trees into Tall and non-Tall Trees

(3) K_{tall} = { …, Tree D, Tree A, Tree C, Tree B}

For example, consider Figure 1, and suppose that the 20 feet line is the threshold, and every tree taller than 20 feet is tall. In this context, Trees A, B, and C count as *tall*. Tree B can be described as *very tall*, as it is tall in comparison with other tall trees (Trees A and C, in this case).[1]

(4) pos_c(tall) = {Tree A, Tree B, Tree C}
$[\![\textbf{very}(\text{tall})]\!] = [\![\text{tall}]\!]_{c[X]}$, where $X = pos_c(\text{tall})$

The fundamental difference between the vague predicate view and the SCALAR ANALYSIS view (e.g. Cresswell 1976, Hellan 1981, Hoeksema 1983, Kennedy 1997), is that unlike the vague predicate approach, which assumes that the domain of a gradable adjective has an inherent ordering, most scalar analyses construct an abstract representation of measurement, a SCALE, and define the interpretation of a gradable adjective in terms of this representation. The scale consists of a set of points or intervals ordered by the relation $\leq$, whereby each point represents a measure or degree of *A-ness*. Under this analysis, gradable adjectives are relations between an object in a domain and degrees on a scale. For example, *tall* in (5) denotes a measure function that takes an entity (x) and returns its height, a degree (d) on the scale associated with the adjective.[2]

(5) $[\![\text{tall}]\!] = \lambda d \lambda x.\textbf{tall}(x) = d$

[1] The partitioning of the domain in gradable predicates actually involves three-way partitioning in order to account for borderline cases , in which, for example, some trees are neither tall nor not tall. I abstract away from the extension gap here in order to focus on intensification.

[2] Kennedy (1997) argues that gradable predicates denote measure functions—functions from individuals to degrees (type ⟨e,d⟩), in contrast with the standard view that a gradable predicate is a function from degrees to properties of individuals, type ⟨d,et⟩ (Cresswell 1976, von Stechow 1984, Heim 1985, Bierwisch 1989, Kennedy and McNally 2005b, inter alia). Since both views are scalar in nature, the comment about the derivation from the measure function or relational meaning to a property meaning is valid for both.

In order to determine whether the property denoted by the gradable adjective is true of an individual, it has to be related to a degree on a scale that exceeds a contextually determined standard of comparison. In the vague predicate analysis, the comparison class introduces the set partitioned by the adjective. Following Cresswell 1977 et seq., I assume a null degree morpheme *pos* (for POSITIVE FORM), whose function is to relate the degree argument of the adjective to the standard of comparison. The relation holds of a degree d just in case it meets a standard of comparison for an adjective G with respect to a comparison class determined by $\mathbf{C}$, a contextual variable over properties of individuals. The composition of *pos* with the adjective *tall* returns the denotation of a gradable predicate, as in (7).

(6) $[\![\text{pos}]\!] = \lambda G \lambda x.\exists d[\textbf{standard}(d)(G)(\mathbf{C} \wedge G(d)(x)]$

(7) $[\![\text{pos}]\!]([\![\text{tall}]\!]) = \lambda x.\exists d[\textbf{standard}(d)([\![\text{tall}]\!])(\mathbf{C}) \wedge [\![\text{tall}]\!](d)(x)]$

Returning to Figure 1, suppose that the contextually-determined standard of *tallness* for trees is 20 feet. Tree D will be mapped onto a degree ($\approx$15 feet) smaller than the standard, and therefore the sentence *Tree D is tall* would be false. On the other hand, Trees A, B, and C will be related to points on the scale of *tallness* that are greater than the standard degree (40 feet for Trees A and C, and 80 feet for Tree B) and therefore count as *tall*.

There are two plausible strategies to derive the intensified form of the gradable adjective under the scalar analysis. The CONTEXT MANIPULATOR strategy is similar to the analysis of degree modification in the vague predicate account, whereby Tree B can be described as *very tall* if its comparison class consists of just the trees whose degree of *tallness* is greater than the contextually-salient standard (e.g. 20 feet). Thus, as in (8) below, *very A* is true of an object if the degree to which it is *A* exceeds a norm on the *A*-scale for a comparison class based on those objects that have the property *A* in the context of utterance (Kennedy and McNally 2005a).

(8) $[\![\text{very}]\!]^c = \lambda G \lambda x.\exists d[\textbf{standard}(d)(G)(\lambda y[\![pos(G)(y)]\!]^c) \wedge G(d)(x)]$

(9) $[\![\text{very}]\!]^c([\![\text{tall}]\!])^c = \lambda x.\exists d[\textbf{standard}(d)([\![\text{tall}]\!])(\lambda y[\![pos([\![\text{tall}]\!])(y)]\!]^c) \wedge [\![\text{tall}]\!](d)(x)]$

In the STANDARD FIXER view, on the other hand, a *very tall tree* would be mapped onto a degree that is considerably greater than the degree of a *tall tree*. Note that the 'considerably greater' interval that sets *very tall* and *tall* apart would depend on a contextually-dependent *very*-standard value, represented in (10) by the LARGE function (Kennedy and McNally 1999, Cresswell 1976).

(10) $[\![\text{very}]\!] = \lambda G \lambda x.\exists d[\textbf{standard}(d)(G)(\mathbf{C} + d \wedge \text{LARGE}(d)) \wedge G(d)(x)]$

(11) $[\![\text{very}]\!]([\![\text{tall}]\!]) = \lambda x.\exists d[\textbf{standard}(d)([\![\text{tall}]\!])(\mathbf{C} + d \wedge \text{LARGE}(d)) \wedge [\![\text{tall}]\!](d)(x)]$

While the vague predicate and the scalar analyses greatly differ in the semantic type they ascribe to gradable adjectives like *tall* how they derive degree modification, they both rely on the comparison class. However, Kennedy and McNally (2005a) show that not all gradable adjectives are like *tall*; some adjectives map individuals onto scales with a fixed minimum or maximum standard value irrespective of the context.[3] In those adjectives, the potential role of the comparison class can be set against a fixed standard and thus help adjudicate between the analyses.

[3] Rotstein and Winter (2004) refer to the two classes of absolute gradable adjectives discusses here (maximum and minimum standard) as total and partial gradable predicates, respectively.

2.2 Absolute adjectives

2.2.1 Minimum standard adjectives

Minimum standard adjectives relate a property to an individual just in case the individual has some non-zero degree of that property. For example, a nail is *bent* only if it possesses some non-zero degree of bend. Figure 2 depicts a possible domain that includes nails in various degree of *bentness*. Nails B through G have some degree of *bend*, while Nail A doesn't.

(a) Nail A (b) Nail B (c) Nail C (d) Nail D (e) Nail E (f) Nail F (g) Nail G

Figure 2: The Ordered Domain of *Bent*

The vague predicate analysis would treat minimum standard adjectives as it does relative adjectives. The comparison class in Figure 2 is Nails A-G, and the partitioning can be intuitively drawn somewhere between Nail A and Nail B. Since Nail A is below the cut-off point, the sentence *Nail A is bent* is false, and because Nails B-G are above the threshold, they count as *bent*.

(12) pos_c(bent) = {Nail B, Nail C, Nail D, Nail E, Nail F, Nail G}
neg_c(bent) = {Nail A}

However, under the vague predicate analysis, the domain could theoretically be partitioned in a different way such that the threshold could be between, e.g., Nail B and Nail C (for example, if one recycles used nails and looks for the nails that are too bent to be used again).

Since all types of gradable adjectives are assume to behave similarly under the vague predicate analysis, then intensified minimum standard adjectives would be derived by context manipulation. And so, in order for a nail in the domain to count as *very bent*, the comparison class is manipulated so as to include only the nails that already count as *bent*, as expressed in the partitioning in (13). And in comparison with the class of *bent nails*, a nail such as Nail E will have what it takes to be *very bent*. Note, however, that there is no reference to the threshold between *bent nails* and *very bent nails*, and a naive interpretation of this analysis would predict that Nails C and E could both count as *very bent*. Thus, context manipulation in minimum standard adjectives seems semantically vacuous.

(13) $[\![\textbf{very}(\text{bent})]\!] = [\![\text{bent}]\!]_{c[X]}$, where $X = pos_c$(bent)
pos_c(bent) = {Nail B, Nail C, Nail D, Nail E, Nail F, Nail G}

Under the scalar analysis, the nails are mapped onto a scale of degrees of bentness, and each nail is associated with a degree on that scale. The property *bent* will be true of a nail (or any other object) if it is related to a degree on the scale that exceeds the minimal point (14). Unlike the standard in relative adjectives, the standard of minimum standard adjectives is context-independent. Kennedy & McNally (2005) analyze minimum standard adjectives as in (15), in which S_A stands for the scale associated with the adjective, and $\mathbf{m}_A$ is the measure function

introduced by the adjective. In the AP denotation given in (16), *bent* combines with *pos*, and the degree d satisfies the standard relation just in case it is greater than the minimum value of the scale associated with the adjective, as shown in (16).

(14) $[\![\text{bent}]\!] = \lambda x.\exists d[d \succ \mathbf{min}(S_{\text{bent}}) \wedge \mathbf{bent}(x) = d]$

(15) $[\![\text{AP}_{\text{min}}]\!] = \lambda x.\exists d[d \succ \mathbf{min}(S_{\text{A}}) \wedge \mathbf{m}_{\text{A}}(x) = d]$

(16) $[\![\text{pos}]\!]([\![\text{bent}]\!]) = \lambda x.\exists d[\mathbf{standard}(d)([\![\text{bent}]\!])(\mathbf{C}) \wedge [\![\text{bent}]\!](d)(x)]$

Under the context manipulator strategy for *very*, the computation of the *very* standard is a function of the computation of the *pos* standard (17). Note, however, that the standard for minimum standard adjectives is context-independent, and so the comparison class (as well as the *very* standard) seems to yield the same semantics for *bent* and *very bent*.

(17) $[\![\text{very}]\!]^{c}([\![\text{bent}]\!])^{c} = \lambda x.\exists d[\mathbf{standard}(d)([\![\text{bent}]\!])(\lambda y[\![pos([\![\text{bent}]\!])(y)]\!]^{c}) \wedge [\![\text{bent}]\!](d)(x)]$

The context manipulator strategy under the scalar analysis, therefore, encounters the same problem of semantic vacuousness as the vague predicate analysis does, and Kennedy & McNally (2005) see it as the source of anomaly of some cases of minimum standard adjectives modified by *very*. However, the many felicitous cases of minimum standard adjectives modified by *very* (e.g. *very bent nails*) suggest that minimum standard adjectives (and, in fact, many absolute adjectives) are ambiguous between an absolute and a relative reading. Under this view, *very* only modifies minimum standard adjectives when used in their relative interpretation.

Under the standard fixer strategy, the intensifier meaning of minimum standard adjectives is derived by fixing the standard associated with *very bent* in a similar way to how the standard for *bent* is fixed. For example, a nail that is *bent* relates to a degree greater than 0 on the scale of bentness, and a nail that is *very bent* relates to a degree on the scale of bentness that is 'considerably greater' than 0. Under this view, the calculation of the *positive*-standard and the *very* standard depends on different factors, as the minimum standard is context-insensitive.

(18) $[\![\text{very}]\!]([\![\text{bent}]\!]) = \lambda x.\exists d[\mathbf{standard}(d)([\![\text{bent}]\!])(\mathbf{C} + d \wedge \text{LARGE}(d)) \wedge [\![\text{bent}]\!](d)(x)]$

2.2.2 Maximum standard adjectives

Maximum standard adjectives denote properties that are true of an individual if the individual possesses a maximal degree of the relevant property. Figure 3 depicts a possible domain that includes doors in various degree of *closedness*. Doors A-F don't have the maximal degree of *closedness*, while Door G does.

(a) Door A (b) Door B (c) Door C (d) DoorD (e) Door E (f) Door F (g) Door G

Figure 3: The Ordered Domain of *Closed*

Under the vague predicate view, the domain depicted in 3 is partitioned to doors that possess the property *closed* and to doors that lack it. The comparison class is Doors A-G, and a strict partitioning can be drawn between Door F and Door G.

(19) pos_c(closed) = {Door G}
neg_c(closed) = {Door A, Door B, Door C, Door D, Door E, Door F}

As is the case with relative and absolute minimum standard adjectives, the partitioning of the domain under the vague predicate analysis can be done differently. In a context in which the cupboard door is *closed* just in case it's closed enough as to conceal its contents, the domain can be partitioned as in (20).

(20) pos_c(closed) = {Door E, Door F, Door G}
neg_c(closed) = {Door A, Door B, Door C, Door D}

The meaning of intensified maximum standard adjectives would be achieved by manipulating the comparison class, similarly to relative and minimum standard adjectives. A *very closed door* would be compared to other closed doors, as illustrated in the denotation in (21). However, the composition in (21) below predicts that a maximum standard adjective like *closed* could be felicitously modified by *very* and thus would predict that (22) isn't anomalous.

(21) $[\![\textbf{very}(\text{closed})]\!] = [\![\text{closed}]\!]_{c[X]}$, where $X = pos_c(\text{closed})$
pos_c(closed) = {Door E, Door F, Door G}

(22) #Door G is very closed

But while *closed* cannot be felicitously modified by *very*, other maximum standard adjectives can be modified without producing semantically anomalous sentences. For example, consider the a domain that includes glasses in various degrees of fullness. If the comparison class includes only glasses that are 3/4 full and fuller, then compared to these glasses, a 9/10 full glass would count as *very full*. In sum, even though the vague predicate analysis seems plausible for the meaning and vagueness of maximum standard adjectives, it doesn't account for the lexical distinction between maximum standard adjectives that can be felicitously modified with *very*, such as *full*, and ones that are not, such as *closed*.

Under the scalar analysis, the doors are mapped onto a scale of degrees of *closedness*, and each door is associated with a degree on that scale. In the case of the maximum standard adjective *closed*, the standard for *closed* is, on the face of it, context-independent and set at the maximum point of the scale (23).

(23) $[\![\text{AP}_{\text{max}}]\!] = \lambda x.\exists d[d \succ \textbf{max}(S_A) = \textbf{m}_A(x) = d]$

As mentioned in the discussion of the vague predicate analysis of maximum standard adjectives, there can be some room for tolerance of imprecision (an intuition that is experimentally supported in Barner and Snedeker 2008, Syrett et al. 2009, Foppolo and Panzeri 2009). While the vague predicate view accounts for imprecision by a context-sensitive partitioning of the domain, the scalar analysis would include rigid semantics for maximum standard adjectives and then have pragmatic principles to allow for imprecision (e.g. Lasersohn (1999)'s theory of PRAGMATIC HALOS).

Under the context manipulation view, if only the objects that are 100% full count as *full*, no manipulation of the comparison class to include just the full objects is possible. The standard fixer view likewise rules out the modification of maximum standard adjectives by *very*. And so, *very full*, under the scalar analysis and both intensification strategies, is infelicitous.

However, it is quite easy to find occurrences of *very* modifying a maximum standard adjective, which challenge the strict scalar view, as illustrated in (24).

(24) a. Why does my bladder hurt when it's **very full**?[4]

b. San Gabriel River runs **very full** this week.[5]

Kennedy and McNally (2005a) take this apparent contradiction as evidence that some maximum standard adjectives have both relative and absolute uses. In the case of the glasses, the proposition *the glasses are very full* implies the proposition *the glasses are full*, "indicating that whatever standard is being raised, it is not the absolute one (Kennedy and McNally 2005a, 371)."

The goal of this study is to tease apart the crucial distinctions between the two main views using an experimental paradigm that examines the effect of context on the use of positive and intensified forms of various gradable adjectives. Both views predict an effect of context on the use of both the positive and intensified forms for relative adjectives. In minimum and maximum standard adjectives, however, the potential role of the comparison class can be set against a fixed standard to illustrate the difference between the two views with respect to the effect of context on the use of positive and intensified forms.

3 Methods

The goal of the experiment is to determine whether context, namely the composition of the comparison class, affects the use of gradable adjectives in their positive and intensified forms, taking *very* as a representative. An additional research question is whether distinct types of gradable adjectives would be affected by the context differently.

3.1 Materials

Four types of adjectives were used in the experiment: (i) 8 relative adjectives, (ii) 7 absolute minimum standard adjectives, (iii) 7 absolute maximum standard adjectives, and (iv) 8 colour adjectives[6], to a total of 30 adjectives.

The relative adjectives used in this study were: *tall, big, long, wide, thin, thick, short*, and *small*. For each adjective, seven picture stimuli depicting an object were created. The pictures differed in the degree to which the depicted object had the property denoted by the adjective. For relative adjectives, it was the degree of, for example, *shortness*, as illustrated in Figure 4.

The minimum standard adjectives used in this study were: *curved, dirty, bent, bumpy, open, fast*, and *slow*.[7] For minimum standard adjectives, the first stimulus depicted an object that lacks

[4]Source:: http://answers.yahoo.com/question/index?qid=20110226235828AAlCtOl

[5]Source: http://blogging.la/2010/12/20/san-gabriel-river-runs-very-full-this-week/

[6]Unfortunately, there's not enough space to discuss the colour stimuli results.

[7]The adjectives *fast* and *slow* are classified as minimum standard because they pattern with other adjectives of this type in their ability to be modified by *slightly*, e.g. *slightly fast/slow*. Relative and maximum standard adjectives cannot combine with *slightly* (e.g. **slightly thin* or **slightly clean*), unless an expected maximum standard is contextually devised (e.g. maximum of *thinness* or of *cleanliness*).

Figure 4: The Shortness Continuum Used in the Experiment

the property, for example, a straight nail for *bent*, and the rest of the stimuli depicted nails in increasing degrees of *bentness*, as illustrated in Figure 2 in Section 2.2.1. The target stimuli for *bent*—as well as for the other adjectives—was always the fourth picture in that continuum; that is, it always had some degree of the relevant property.

The maximum standard adjectives used in this study were: *full, closed, clean, empty, straight, flat*, and *smooth*. In the absolute maximum adjectives, because the fourth largest degree in the continuum of stimuli of, e.g., the adjective *closed* or *clean* was not the maximal degree, the target item then never counted as closed or clean, as illustrated in Figure 3 in Section 2.2.2.

3.2 Design

In every stimulus, the target item was presented together with three other objects that differed from the target object and from each other in their degree with respect to the relevant property. For example, for the property *tall*, four ladders in varying degrees of tallness were shown, with one ladder circled, as shown in the pictures in Figure 5.

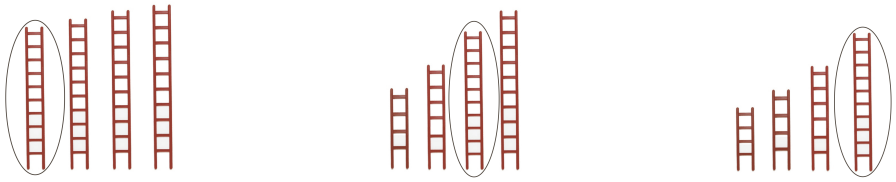
Participants were then asked to describe the circled ladder, choosing only one sentence from a list of four sentences. The instructions for the *tall* stimuli are given in (25). All of the stimuli had the same sentences in the same order, with the object in the stimulus and the property in question (*tall*, *empty*, etc.) varying depending on the stimulus.[8]

(25) Choose the sentence that best describes the circled ladder in the picture above.

- ☐ The circled ladder is tall.
- ☐ The circled ladder is very tall.
- ☐ The circled ladder is not tall.
- ☐ The circled ladder is neither tall nor not tall.

In order to determine whether the context affects the use of gradable adjectives and degree modification, the comparison class was manipulated with respect to a the circled target item, which remained constant across context conditions. In the first context condition (Condition S, for 'small'), the target item has the smallest degree of the target property out of the four objects in the stimulus (Figure 5a). In the second context condition (Condition M, for 'middle'), the target item had the third largest degree of the target property out of four objects (Figure 5b). In the third context condition (Condition G, for 'greatest'), the target object had the greatest degree of the target property (e.g. the tallest) among four objects (Figure 5c).

[8]Francesca Panzeri (p.c.) pointed out that the equation of four objects in the stimulus and four responses may cause participants to map each object to a unique response. For example, the leftmost ladder could be mapped onto *not tall*, the second from the left to *neither tall nor not tall*, the target, circled ladder to *tall*, and the rightmost ladder to *very tall*. The response patterns presented in Section 4 show that this worry is not borne out.



(a) Cond. S (b) Cond. M (c) Cond. G

Figure 5: The Three Conditions for Relative Adjectives

Participants saw all stimuli in all conditions. The stimuli were organized in three blocks, each of the three conditions for the same target adjective was placed in a different block, and the blocks as well as the stimuli were randomized.

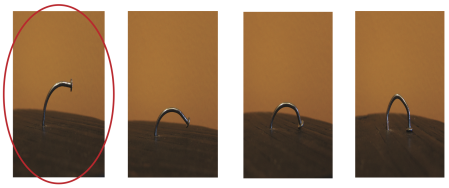
3.3 Predictions

Both analyses predict an important role of context (here, the comparison class) in the use of relative adjectives and degree modification. If participants calculate the standard according to the context given to them in each stimulus, the ladder in Condition M will likely be described as 'tall', as it is above the contextual standard or above the partition point for the objects that count as *tall* and those that do not. Whether the same object is likely described as 'very tall' in Condition M depends on what participants decide the standard is and whether the target ladder is tall in comparison with the other tall ladders. In Condition G, the ladder is the tallest of the four, so as long as participants fixed the standard or drew the partition between *tall* and *not tall* ladders below the target ladder, it would be described as 'tall' or 'very tall'.

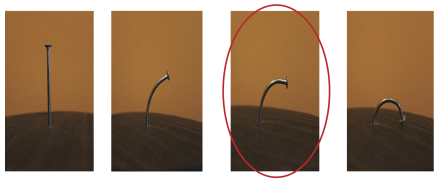
The vague predicate analysis predicts that context would affect the use of minimum standard adjectives and degree modification. Since the target object for minimum standard adjectives has some degree of the relevant property (e.g. *bentness*), the two possible responses for minimum standard adjectives are either the sentence 'bent' or 'very bent'. But as discussed in Section 2.2.1, the vague predicate analysis would also allow for an effect of context such that when the target object is the least bent (Condition S), participants would be less likely to describe the nail as *bent*. Likewise, under the context manipulation analysis, participants are more likely to use the intensified form of adjectives in Conditions G and M than in Condition S, as degree modification relies on the same contextual parameters that are involved in fixing the truth conditions for the gradable adjectives.

Under the scalar analysis, however, there would be no effect of context on the use of the positive forms of gradable adjectives. The two strategies of degree modification, on the other hand, make slightly different predictions. Under this analysis, *very*'s semantic contribution is no different than the contribution of *pos*, which provides the standard. Following Kennedy & McNally's proposal that cases in which *very* can modify a minimum standard adjective are in fact cases in which they are interpreted as relative adjectives, an effect of context on the response rate of *very A* entails an effect of context on the positive form as in relative adjectives.

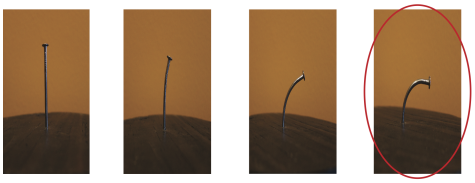
If degree modifiers like *very* are standard fixers, the difference between a *bent* nail and a *very bent* nail is the degree to which it is bent; any nails with some degree of bend would be described as *bent*, but nails whose degree of bend is greater that a minimum standard for *very bent*, e.g. more than 90 degrees bent, would be described as *very bent*, regardless of context.



(a) Condition S



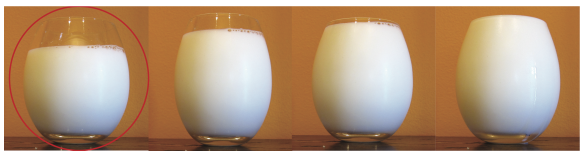
(b) Condition M



(c) Condition G

Figure 6: The Three Conditions for Minimum Standard Adjectives

As for maximum standard adjectives, under the vague predicate analysis, the comparison class can partition the domain such that those objects that count as possessing the relevant property, e.g. *full*, are not completely full, allowing for an effect of context. Recall that the target object never had the maximum degree of the relevant property, e.g. the glass of milk is never completely full. Participants are then more likely to describe the target glass of milk as *full* in Condition G, when it's the most full in the comparison class than in Conditions M and S, in which the fullest glass in the comparison class, which is not the target object, is also completely full. Participants are likewise more likely to use the intensified form in Condition G rather than in Conditions M and S.



(a) Condition S

(b) Condition M

(c) Condition G

Figure 7: The Three Conditions for Maximum Standard Adjectives

Under the scalar analysis, however, the target object never, strictly speaking, possesses the relevant property. The prediction is therefore that, in aggregate, the use of the positive form of maximum gradable adjectives is not likely. In addition, degree modifiers are incompatible with maximum standard adjectives. If degree modifiers are context manipulators, since the maximum standard is not strictly speaking context-sensitive, the adjective wouldn't be modified, as the degree to which the target object has the relevant property is mapped onto a maximum standard and therefore cannot be further boosted. However, as discussed before, purported maximum standard adjectives that are interpreted as relative adjectives could be modified by *very*, but then the response

rate for the positive forms of those adjectives should match that of relative adjectives. If degree modifiers are standard fixers they are likewise incompatible with maximum standard adjectives, as the standard for the positive form is already at a maximum point, precluding a further boosting of the maximum point on the associated scale.

3.4 Participants and procedure

30 native speakers of English from the University of Chicago community participated in this experiment (mean age: 25.59; 20 females, 9 males, 1 unknown). The task was given in the form of an online survey. Participants were remunerated for their participation.

4 Results

4.1 Relative adjectives

Recall that in the relative adjectives stimuli, the depicted objects didn't include a reference for the size of, e.g. the ladder (in the *tall* stimuli) or the sofa (in the *wide* stimuli). I hypothesize that participants had to use the comparison class (i.e. the three other objects) in order to decide which response most accurately describes the target object. Therefore, all four responses were possible.

The bar plots in Figure 8 show that in Condition G, in which the target project has the greatest degree of the relevant property, most participants described the object as having the property, judging from the total responses that entail *A* (i.e. *A* and *very A*): 82.08%. Among these responses, 48.33% participants described the target as *very A* and 33.75% described it as *A*. In Condition M, still most participants described the object as having the property (60% total of *A* and *very A* responses), and among those responses, more participants thought that the target object was *A* (50.42%) than it was *very A* (9.58%). In Condition S, in which the degree of relevant property was the smallest, most participants didn't describe the target object as *A* or *very A*. Rather, almost half of the participants described it as *not A* (44.58%) and some described it as *neither A nor not A* (28.75%).

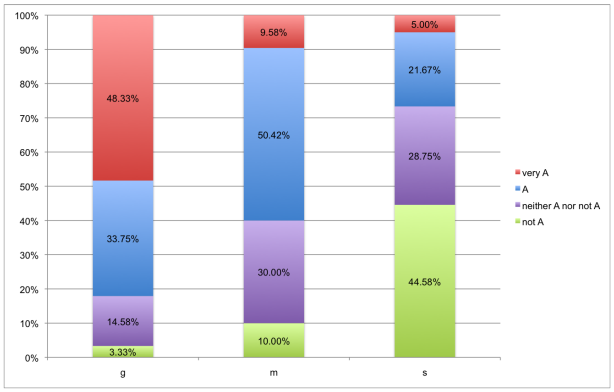


Figure 8: Responses for Relative Adjectives

In sum, the context condition had an effect on the choice of response ($\chi^2(6, N = 30) = 374.18$, $p < 0.001$), such that participants were more likely to judge the target object as possessing the property if it had the largest or the third largest degree rather when it was the smallest, in which

participants were not likely to judge the object as possessing the target property. In addition, participants were more likely to use *very* when the target object had the largest degree (Condition G).

4.2 Minimum standard adjectives

In the stimuli for minimum standard adjectives, the target object always had some degree of the relevant property. Therefore, the two possible choices should be *A* and *very A*.

The bar plots in Figure 9 show the indeed the great majority of participant judge the target object to possess the relevant property, as the response rates for *A* and *very A*, both entailing *A*, with a combined mean of above 98% in all conditions. However, participants were significantly more likely to describe the object as *very A* (rather than just *A*) when the object had the greatest or the third greatest degree, i.e. in Conditions G and M, respectively ($R^2 = 0.77$, $F(8, 12) = 9.52$, $p < 0.001$).

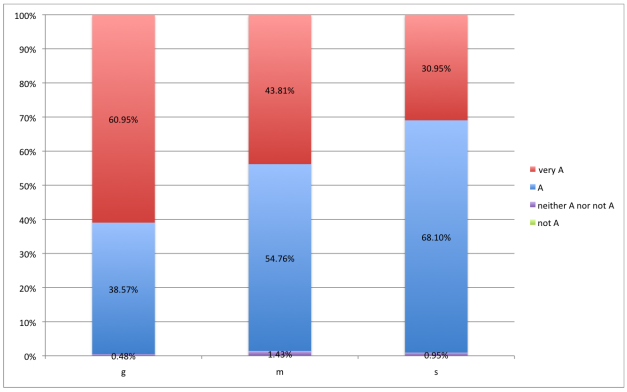


Figure 9: Bar Plots of Responses for Absolute Minimum Adjectives

In conclusion, context had an effect on the choice between *A* and *very A*, but not on the other responses (*not A* and *neither A nor not A*). That is, the vast majority of participants judged the target object as possessing the relevant property, regardless of context condition. Participants' choice of the intensified form (*very A*), on the other hand, was affected by context, as they were more likely to do so in Conditions G and M, in which the target object had the greatest or third greatest degree of the relevant property, than in Condition S.

4.3 Maximum standard adjectives

The target object in the maximum standard adjective stimuli never had the maximum degree of the relevant property and therefore would likely be judged as *not A*. Figure 10 shows that indeed more participants described the target object as *not A* across conditions (61.43% in Condition G, 66.19% in Condition M, and 75.24% in Condition S). There was some effect of context ($\chi^2(6, N = 30) = 13.06$, $p = 0.04$), which will be addressed when the responses for the individual adjectives are discussed.

In conclusion, the effect of the comparison class is marginal in aggregate. While participants in Condition S described the target object as *not A* than in other conditions, very few participants (18.57% for *A* and 4.76% for *very A*) described the target as *A* even when it was the closest to having the property (in Condition G).

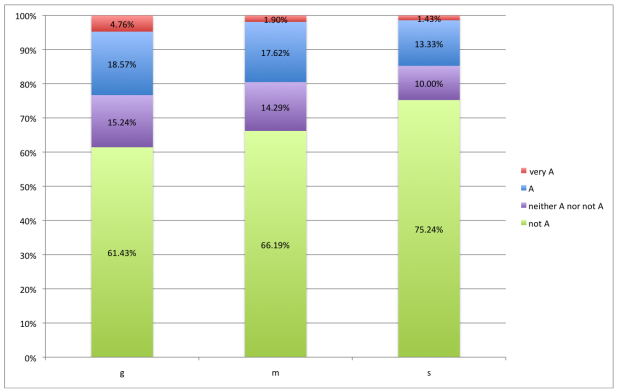


Figure 10: Bar plots of Responses for Absolute Maximum Adjectives

5 Discussion and conclusion

The goal of this study was to distinguish between the the vague predicate and scalar analyses by examining the effect of the comparison class on participants' use of positive and intensified forms of gradable adjectives. Four types of adjectives were used: relative adjectives, minimum standard adjectives, maximum standard adjectives, and colour adjectives.

For relative adjectives, there was an effect of context on the use of positive and intensified adjectives. Thus, both analyses correctly predict that context would have an effect on the use of positive and intensified gradable adjectives, as expected. For minimum standard adjectives, there was no effect of context on the use of the positive form, but there was an effect of context on the use of the intensified form. The surprising results for degree modification suggest that *very* is context-sensitive—and more specifically, sensitive to the internal ordering of objects within the comparison class—even when modifying context-*in*sensitive adjectives. For maximum standard adjectives, there was some effect of context on the use of positive and intensified adjectives but this effect was stronger for some adjectives and their arguments, suggesting that the maximum point on the scale depends on the argument the predicate combines with (e.g. *straight* for a road vs. a rod)

In conclusion, the results of this study suggest that participants employ different strategies for fixing the standard denoted by the gradable adjective and for using intensifiers, depending on the different role of context in fixing the standard in various types of adjectives. The results as a whole lend support to the scalar analysis, because it predicts that adjectives differ in the way the standard of comparison denoted by the gradable predicate is calculated, whereas the vague predicate analysis does not. When degree modification is concerned, *very* seems to behave like a context manipulator, but the contextual parameters it calculates seem to differ depending on whether it's modifying relative or absolute adjectives. In relative adjectives, degree modification relies on the calculation of the standard for the adjective, lending support to the context manipulator analysis. In minimum standard adjectives, for which the standard is context-independent, degree modification seems to be affected by the ordering of the members in the comparison class; not only by the facts that they all possess the relevant property.

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