Vagueness and Comparison*

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Vagueness and comparison are linked in different ways. Vague predicates typically support comparison; several influential semantic analyses of comparative constructions are based on prior accounts of vagueness; and a notion of comparison or similarity plays an important role in many accounts of vagueness. However, the subtlety and significance of the places where vagueness and comparison do not line up have not been explored in great detail, either by philosophers or linguists. This paper examines one such case, involving distinctions between objects that differ along a particular dimension by a very small amount, and discusses its significance for theories of vagueness and for the semantics of comparison.

1 Introduction

Vagueness and comparison are linked in a number of different ways. The most obvious is that, at least when they are expressed by adjectives (in English), vague predicates have morphosyntactically comparative forms. These forms are often invoked in formulations of the inductive premise of the Sorites Paradox:

(1) If x is {tall, big, heavy, ...}, and y is just a little bit {short-, small-, light-, ...}**-er than** x, then y is {tall, big, heavy, ...}.

The relation between vagueness and comparison is also explointed in a class of important semantic analyses of morphological comparatives that attempt to explain their truth conditions in terms of prior analyses of the vagueness of the morphologically unmarked forms (Wheeler 1972; Kamp 1975; Klein 1980; van Benthem 1982; van Rooij this volume). Finally, constraints on judgments about pairwise comparisons are often invoked in the development and evaluation of theories of vagueness. In particular, a crucial evaluation criterion for a theory of vagueness is that it should derive the descriptive constraint in (2) (Fara 2000).

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(2) *The Similarity Constraint*
When x and y differ to only a very small degree in the property that a vague predicate g is used to express, we are unable or unwilling to judge the proposition that x is g true and that y is g false.

Theories differ both in whether they derive (2) and in how: some derive (2) as a function of language use (e.g. Soames 1999); some as a by-product of epistemic uncertainty (e.g. Williamson 1994); and some as a feature of the meaning of vague predicates (e.g. Raffman 1994, 1996; Fara 2000).

My goal in this paper is to take a close look at two ways of expressing comparison, which differ in both their morphosyntactic properties and semantic/pragmatic properties, with the goal of showing how they can help us assess theories of vagueness andexplanations of the Similarity Constraint on the one hand, and semantic analyses of the positive and the comparative forms (and the relation between them) on the other. The facts will suggest that the Similarity Constraint (and so features of vagueness more generally) is due to a semantic property of vague predicates, and that this property is a feature of the positive form but not the comparative form. This can be easily accommodated if both forms are derived from a more abstract source, but it is difficult (though perhaps not impossible) to explain if the comparative is derived from the positive.

2 Explicit and implicit comparison

2.1 Modes of comparison

Consider the asymmetric size relation between the planets Uranus and Venus, as determined by diameter, which is shown to scale in Figure 1. (To make differences in diameter easily perceptible, I will represent the sizes of the planets as concentric circles in the figures to follow.)

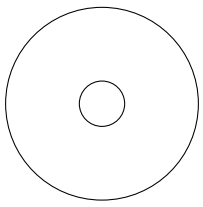


Figure 1: Uranus (51,118 km) vs. Venus (12,100 km)

A speaker might describe this relation by uttering one of the following sentences:

(3) a. Uranus is bigger than Venus.
b. Venus is smaller than Uranus.
c. Uranus is the bigger one/of the two.
d. Venus is the smaller one/of the two.

The main predicates in (3a-b) and the prenominal modifiers in (3c-d) contain morphologically comparative forms of the adjectives *big* and *small*. Like other kinds of degree morphology, the function and conventional meaning of the comparative is to introduce an ordering entailment, which is relativized to the polarity of the adjective. (3a-b) entail that the target of comparison (the subject) is ordered above the standard (marked by *than*) relative to the appropriate size concept (increasing for *big*; decreasing for *small*). (3c-d) each presuppose (thanks to the contribution of the definite article) that there is a unique object that is ordered above another one relative to the relevant size concept, and entail that the subject is that object.

The size relation shown in Figure 1 could also be described using one of the sentences in (4), which differ from those in (3) in that the main predicates and the modifiers do not include overt degree morphology, but instead involve the unmarked, "positive" form of the adjectives.[1]

(4) a. Uranus is big compared to Venus.
b. Venus is small compared to Uranus.
c. Uranus is the big one.
d. Venus is the small one.

The fact that the positive form can be used to express comparison follows from two features of its meaning. First, it is context dependent: what counts as *big* or *small* can vary according to a number of different contextual factors, such as an implicit or explicit comparison class (Wheeler 1972; Klein 1980), the interests/expectations of a designated discourse participant (Bogusławski 1975; Fara 2000; Richard 2004), or other salient contextual information (Kamp and Partee 1995). Second, no matter how the meaning and context sensitivity of the positive form is ultimately cashed out, the two "consistency constraints" in (5a-b) hold.[2]

[1]There are, of course, many other ways to talk about the size relation represented in Figure 1, such as sentences containing other degree moprhemes (e.g., *Venus is not as big as Uranus*), collocations in which the compared dimension is provided by a noun or nominalized adjective and the ordering relation comes from a verb (*Uranus exceeds/surpasses Venus in size*), or constructions using phrases like *relative to, comparatively speaking* and so forth. Some of these constructions have their own unique properties, but for the most part they can be grouped either with the sentences in (3) or with those in (4) with respect to the kinds of judgments I will discuss below. Therefore, in order to keep the discussion in this paper focused, I will limit my discussion to examples parallel to those in (3) and (4).

[2]How exactly these constraints are derived is a point of variation among analyses. See Kennedy

(5) *Consistency Constraints*

a. For any positive form gradable predicate g and objects in its domain x, y and for any context c, if $g(x)(c)$ is true and $g(y)(c)$ is false, then x exceeds y relative to the scalar concept encoded by g.

b. For any positive form gradable predicate g and objects in its domain x, y, if there is a context c such that $g(x)(c)$ is true and $g(y)(c)$ is false, then for any c' such that $g(y)(c')$ is true, $g(x)(c')$ is also true.

These features of positive form meaning interact with other general semantic/pragmatic properties to derive the comparative entailments in the sentences in (4). Given a general "informativity" constraint on predicate valuations which requires both the positive and negative extension of a vague predicate to be non-empty (such predicates are not useful if there are not things that they are true of and things that they are false of; see Klein 1980), we can account for the use of (4a-b) to make comparisons by hypothesizing that the function of *compared to* is to evaluate the main predication of *big/small* relative to a context consisting only of Uranus and Venus (Kennedy 2007a). Asserting that e.g. Uranus is big relative to such a context entails that Venus is not big (in that context); given (5a-b), we may conclude that Uranus is bigger than Venus in all contexts, including the context of utterance.

In (4c-d), a similar result is achieved thanks to the uniqueness presupposition of the definite article (Syrett, Kennedy, and Lidz 2010). An assertion of e.g. (4c) in a context containing just Uranus and Venus commits the speaker to the proposition that Uranus is big in that context and that Venus is not, since this is the only way to satisfy uniquenes relative to the definite description (in the absence of prior context that could supply anaphoric *one* with a meaning that would do the job). Given (5a-b), it must also be the case that Uranus is bigger than Venus.

Borrowing terminology from Sapir 1944, Kennedy (2007a) refers to constructions like those in (3) as instances of EXPLICIT COMPARISON, and constructions like those in (4) as instances of IMPLICIT COMPARISON, providing the definitions for these terms in (6)-(7).

(6) *Explicit Comparison*

Constructions which establish an ordering between objects x and y with respect to gradable property g by using a morphosyntactic form of g whose conventional meaning has the consequence that the degree to which x is g exceeds the degree to which y is g.

(7) *Implicit Comparison*

1999 for discussion, and see Robert van Rooij's paper in this volume for a detailed formalization of one way of deriving them.

> Constructions which establish an ordering between objects x and y with respect to gradable property g by using the positive form of g and manipulating the context in such a way that the positive form true of x and false of y.

The point of making this distinction in Kennedy 2007a was to explore the possibility that the explicit/implicit distinction is a point of typological variation in the expression of comparison in the world's languages, and in particular, to ask whether some languages have only implicit comparison. This possibility is suggested by the fact that some languages lack overt comparative morphology and instead rely on collocations that appear to involve the positive form in order to express comparison. A particularly striking example is the class of "conjoined comparatives" (Stassen 1985), illustrated by the Samoan example in (8).[3]

(8) Ua tele le Queen Mary, ua la'itiiti le Aquitania.
is big the Queen Mary, is small the Aquitania
'The *Queen Mary* is bigger than the *Aquitania*.'

2.2 Crisp judgments

Although the superficial morphosyntactic facts of languages like Samoan lend some credence to the idea that some languages might lack explicit comparison, given the existence of null morphology, we cannot draw this conclusion simply on the basis of the absence of an overtly marked comparative form. Instead we need to identify tests that differentiate between instances of (6) and instances of (7) on a distributional, semantic or pragmatic basis. Several such tests are provided in Kennedy 2007a (see also Sawada 2009); of interest to us here is one that involves CRISP JUDGMENTS: whether a particular expression can be used to describe differences of a very small degree.

For an illustration, consider Figure 2, which shows the relative size of Uranus and Neptune. As the picture indicates, the two planets differ in size by a relatively small amount. This difference could be felicitously characterized by

[3]Evidence that the this construction is functionally a comparative, and not an arbitrary coordination of independent propositions, comes from the fact that its use need not entail that *Aquitania* is small. As noted by Marsack (1975, p. 66), "Even in the case of giant vessels like the *Queen Mary* and the *Aquitania* this construction would be used. To indicate that the 85,000 ton *Queen Mary* is bigger than the 45,000 ton *Aquitania*, a Samoan of the old school would say [(8)]." (When he says "Samoan of the old school", Marsack alludes to the fact that constructions like (8) are no longer in regular use, and have been replaced in modern colloquial Samoan by what is clearly a type of explicit comparison structure.)

any of the explicit comparison constructions in (9).

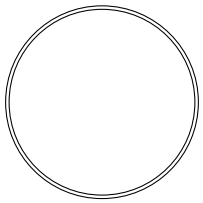


Figure 2: Uranus (51,118 km) vs. Neptune (49,500)

(9) a. Uranus is bigger than Neptune.
b. Neptune is smaller than Uranus.
c. Uranus is the bigger one/of the two.
d. Neptune is the smaller one/of the two.

In contrast, the implicit comparison constructions in (10) are infelicitous: they do not support crisp judgments.[4]

(10) a. #Uranus is big compared to Neptune.
b. #Neptune is small compared to Uranus.
c. #Uranus is the big one.
d. #Neptune is the small one.

At first glance, the infelicity of these sentences as descriptions of the scenario in Figure 2 appears to follow straightforwardly, given that the kinds of judgments involved in evaluating them are exactly the kind of judgments that the Similarity Constraint makes reference to. If this constraint applies to any context of evaluation of a vague predicate, the similarity in size between Uranus and Neptune means that either both planets must be in the positive extension of the predicate or both must be in the negative extension. If the semantic characterization given above for *compared to* sentences is correct, then (10a-b) are infelicitous because they violate the constraint that in every context of evaluation, both the positive and negative extension of the predicate should be non-empty. Similarly, (10c-d) violate the presuppositions of the definite, since it must be the case (according to (2)) either

[4]van Rooij (this volume) claims that implicit comparisons are false in crisp judgment contexts. My own judgment about the truth or falsity of the examples in (10) in the context of Figure 2 is not so clear, in contrast to my judgment of their (un)acceptability. Given that there is a natural pragmatic explanation for the facts, as described in the text, I prefer to characterize the examples in (10) as infelicitous rather than false.

that both planets count as big/small (violating uniqueness) or that both fail to count as big/small (violating existence).

However, as noted above, the Similarity Constraint is a descriptive generalization that should be derived rather than stipulated, and different theories of vagueness derive it in different ways, typically in the context of explaining judgments about the inductive premise of the Sorites. But the inductive premise is a universal claim about objects that are not under active consideration, while the comparisons in (10) involve claims about two objects whose relevant properties are directly observable. It is possible, then, that different theories of vagueness might provide equally adequate accounts of Sorites judgments, but still make different predictions about data like (10). At the same time, we need to ask of particular compositional semantic analyses of positive and comparative adjectives whether they make the right distinction between explicit and implicit comparatives in crisp judgment contexts. These are the questions I take up in the next section.

Before moving to this discussion, though, let me quickly point out that the facts we are considering here really are facts about vague positive form gradable predicates in particular, not facts about the positive-comparative distinction more generally. As discussed in Kennedy 2007b, there exist classes of gradable predicates that have both positive and comparative forms, but which are not vague. Borrowing terminology from Unger 1975 (see also Kennedy and McNally 2005), Kennedy refers to gradable predicates that are vague in the positive form as RELATIVE and those that are not vague as ABSOLUTE. Unlike relative gradable predicates, absolute gradable predicates do not display crisp judgment effects in implicit comparison constructions.[5]

This can be seen by considering the adjective *old*, which has both an absolute and a relative sense. The relative sense behaves in the same way as *big* in crisp judgment contexts. If we are looking at two young boys, Julian and Sterling, who are similar in appearance, but have birthdays that are two years apart, we might distinguish them by saying either of the sentences in (10).

(11) a. Julian is the old one.
b. Julian is the older one.

If their birthdays are two days apart, however, only (11b) is acceptable.

The absolute sense of *old* behaves differently. Imagine a context in which there are two occurrences of the file `foo.txt`, one on my laptop computer and one on my desktop computer, which are identical except that the one on my desktop was

[5]This is not to say that absolute gradable predicates are always acceptable in implicit comparison; in fact, they show a different set of restrictions, which can be traced to the fact that they make use of fixed standards of comparison. See Kennedy 2007a and Sawada 2009 for discussion.

copied from my laptop, immediately modified by changing one character in the text, and then saved. I could then felicitously describe the situation situation by saying either (12a) or (12b).

(12) a. The file on my laptop is the old one.
b. The file on my laptop is the older one.

This sense of *old* is roughly similar to (though not the same as) the meaning of *former*, and so is in some sense inherently comparative. In the terms of Kennedy 2007b, it is probably best classified as a "minimum standard" absolute adjective, since it is true of any object whose age (in the relevant sense) diverges by some positive (but possibly quite small) degree from whatever is "most recent". This is not a vague concept, and so (12a) is correspondingly acceptable in crisp judgment contexts.[6]

[6]Paul Egré asks whether the two uses of *old* discussed might not involve distinct senses after all, but rather a single sense, with the difference in judgments arising from the interaction of the adjective and noun meanings: while a two-day difference in age is unlikely to be significant when considering boys, a very small difference might ery well be significant in the case of computer files. To some extent, I think this is correct: I have argued in Kennedy 2007b that relative and absolulte gradable predicates denote the same kinds of properties (interest relative or otherwise), and that it is their scalar features that determine whether they define sharp or fuzzy boundaries (i.e., whether they are vague or not). But even given that, I believe that there is reason to believe that two uses of *old* discussed here actually measure different (though often related) properties: *old* in (11) measures "absolute age"; *old* in (12) measures (something like) "distance from a salient transition point". Evidence that these senses are distinct comes from the fact that they have different antonyms — *young* for the former, and *new* for the latter — and can be put in opposition without contradiction. For example, I could point at two women of different ages at a faculty reception and felicitously assert (ia) to indicate that the young woman has been serving as a department chair for a longer period of time than the old woman. If we replace *new* with *young*, however, as in (ib), the sentence sounds contradictory.

(i) a. The old woman is a new department chair and the young woman is an old department chair.
b. #The old woman is a young department chair and the young woman is an old department chair.

(ia) is fine because the adjectives that modify the two occurrences of *woman* involve the absolute age sense, while the ones that modify the two occurrences of *department chair* infolve the "distance from a transition point" sense, and so imply nothing about the actual age of the two women. In (ib), however, the preferred parse (because of the parallel syntactic structure) is one in which both sets of adjectives involve the absolute age sense. Given that an old woman is older in absolute age than a young woman, and a young department chair is younger in absolute age than an old department chair, the preferred parse of (ib) is one that entails that the first woman is both older and younger than the second woman, which is a contradiction.

3 Implications for analyses of vagueness and comparison

3.1 Derived vagueness

As a starting point, let us consider analyses of gradable predicates, comparatives and vagueness that work together to make exactly the distinction we need to make in order to explain the crisp judgment facts. Clearly, any analysis in which the positive form contains an element of meaning that has the Similarity Constraint as a consequence, and in which the comparative form lacks this element of meaning, will be one that makes the right predictions. Assuming compositionality, such a theory would necessarily be one in which the comparative is not derived from the positive, but instead both forms must be derived from a more basic meaning which does not itself contain the element of meaning responsible for crisp judgment effects. There are several such theories on the market; the one I will present here is based on the hypothesis that gradable predicates like *big* do not denote properties of individuals, but rather denote functions from individuals to scalar values, traditionally called DEGREES (Bartsch and Vennemann 1973; Kennedy 1999, 2007b). Gradable predicates are converted into properties by DEGREE MORPHOLOGY; different degree morphemes introduce different requirements into the truth conditions.[7]

There are a number of truth-conditionally equivalent ways of stating the denotation of the comparative morphology given these initial assumptions, which differ in their specific claims about the semantic contribution of other parts of the sentence, such as the semantic type of the gradable predicate (see note 7) and the compositional interpretation of the standard phrase (the *than*-constituent). Since these distinctions are not relevant to the main point of this paper, we can assume that the meaning of the comparative morpheme in the kinds of examples we are considering is (13a): MORE combines with a gradable adjective and returns a relation between indivduals which is true in a context of utterance iff the predicate maps the target of comparison (the external argument) to a higher value on the relevant scale than the standard.

(13) a. $[\![\text{MORE}]\!]^c = \lambda g_{\langle e,d\rangle}\lambda y\lambda x.g(x) \succ g(y)$
b. $[\![\text{MORE big}]\!]^c = \lambda y\lambda x.\mathbf{big}(x) \succ \mathbf{big}(y)$

[7] A variant of this kind of analysis is one in which gradable predicates denote relations between degrees and individuals, so that e.g. *big* is true of a pair $\langle d, x\rangle$ just in case x's size equals (or at least equals) d (see e.g. Cresswell 1977; von Stechow 1984; Heim 2000; Schwarzschild 2005). As in the functional analysis I assume here, the relational analysis requires the adjectival root to combine with some sort of degree morphology or undergo some sort of type-shifting rule in order to saturate the degree argument and derive a property of individuals. See Bogal-Allbritten 2008 for arguments based on morphosyntactic data in Navajo that favor a functional analysis.

For example, composition of MORE with the adjective *big*, as in (13b), returns a relation between individuals which is true just in case the size of the target exceeds the size of the standard.

Importantly, in this kind of analysis, the "unmarked" positive form must also include a degree morpheme, albeit a phonologically null one, since direct composition of a gradable predicate with an individual returns a degree, not something that is truth evaluable.[8] Since this morpheme is present in the positive form but not in other forms (and not present in the adjectival root), this kind of analysis provides a straightforward means of accounting for differences between the positive and other forms: we simply assign to the positive form degree morphology whatever semantic features need to be invoked to explain those differences. Since our interest is in saying why the positive but not the comparative form is subject to the Similarity Constraint, let us hypothesize with Fara (2000) that the denotation of the positive morpheme (henceforth POS) is (14a), where $\succ_!$ is the interest relative relation "significantly exceed" and **stnd** is a function that, given an adjective meaning and a context, picks out an appropriate standard of comparison in the context for the kind of measurement encoded by the adjective (cf. Bogusławski 1975; Richard 2004; Kennedy 2007b).

(14) a. $[\![\text{POS}]\!]^c = \lambda g_{\langle e,d\rangle}\lambda x.g(x) \succ_! \textbf{stnd}(g)(c)$
b. $[\![\text{POS big}]\!]^c = \lambda x.\textbf{big}(x) \succ_! \textbf{stnd}(\textbf{big})(c)$

Composition of POS with e.g. *big* returns the interest relative property in (14b), which is true of an object iff its size exceeds a contextual standard in size by a degree that is signficant given some set of interests. According to Fara, such a property is subject to the Similarity Constraint because our interests (in particular our interests in efficiency) are such that a small difference in size can never be significant. That is, it can never be the case that one object exceeds a standard of comparison for size in a way that is significant given my interests, while another object that is nearly the same size does not, and vice versa.

Whether Fara's analysis is ultimately the right way to derive the Similarity Constraint is to some extent beside the point (see Stanley 2003 for criticisms, and Fara 2008 for a response); I adopt it here because it provides a way of illustrating the more important compositional point: in this kind of analysis of adjective meaning, the positive form, and the comparative form, it is POS that is the locus

[8] An alternative to hypothesizing a null, positive degree morpheme would be to assume a type-shifting rule that achieves the same semantic results (Kennedy 2007b; cf. Chierchia 1998 for similar points in the domain of nominal meaning, and general discussion of the significance of the morphology/type-shifting distinction). Grano (2010) presents arguments based on the morphosyntax of the positive form in Mandarin Chinese that the type-shifting option may in fact be preferable.

of whatever aspect of meaning derives Similarity, not MORE and not the adjectival root. This distinction allows us to explain the difference between explicit and implicit comparison constructions in crisp judgment contexts.

First consider the explicit comparative (15a), in which the predicate denotes the property in (15b).

(15) a. Uranus is bigger than Neptune.
b. $\lambda x.\textbf{big}(x) \succ \textbf{big}(\textbf{neptune})$

This property is true of an object just in case its size exceeds that of Neptune, so an assertion of (15a) just commits the speaker to the claim that there is a size difference between the two planets, which is a perfectly reasonable thing to assert, and also true, given the facts represented in Figure 2.

Now consider the implicit comparative (16a). Let us assume that the semantic function of *compared to* is to modify the contextual parameter relative to which the positive form adjective is evaluated. Specifically, it causes the adjective to be evaluated relative to a context that is just like the actual one, except that its domain includes just the two planets Uranus and Neptune (Kennedy 2007a,b; cf. Wheeler 1972). Representing such a context as $c[\textbf{uranus}, \textbf{neptune}]$, the predicate in (16a) denotes the property in (16b).

(16) a. #Uranus is big compared to Neptune.
b. $\lambda x.\textbf{big}(x) \succ_! \textbf{stnd}(\textbf{big})(c[\textbf{uranus}, \textbf{neptune}])$

Given the informativity constraint on predicate valuations, which requires both the positive and negative extension of a vague predicate to be non-empty, an assertion of (16a) commits a speaker to the position that Uranus has a degree of size that significantly exceeds the standard in the {Uranus, Neptune} context, but Neptune does not. This entails that Uranus is bigger than Neptune, and would therefore seem to predict that (16a) is true as a description of the state of affairs in Figure 2. However, if Fara's claims about how the interest relative semantics of the positive form derives the Similarity Constraint are correct, then it cannot be the case that *big* can be true of Uranus and false of Neptune in any context. We thus have a conflict between the meaning of the predicate in (16a) and the informativity constraint on predicate valuations; this conflict is source of the unacceptability of the example. (The examples with definite descriptions work the same way, except that in these cases the conflict arises from the clash between the interest relative meaning of the adjective and the uniqueness/existence presuppositions of the definite article.)

It is important to recognize that the analysis of explicit and implicit comparatives in crisp judgment contexts that I just sketched has two parts, which are logically distinct: the interest-relative analysis of vagueness and the compositional

analysis of positive and comparative adjectives. The interest-relative analysis of vagueness provides an account of the Similarity Constraint, and could be replaced with a different theory of the semantic source of vagueness that achieves the same result.[9] The compositional analysis of positive and comparative adjectives provides a way of ensuring that this constraint applies only to the positive form, not to the comparative form, by locating the source of the Similarity Constraint in the meaning of the POS morpheme and not in the adjective. We may now ask whether different assumptions about vagueness and different assumptions about the compositional analysis of positive and comparative adjectives would equally well account for the crisp judgment data, or whether they make incorrect predictions. There is insufficient space to consider all alternative accounts of vagueness here, so I will instead discuss just a couple of the most central analyses, in an effort to illustrate how the explicit/implicit comparison data can be used to test different hypotheses.

3.2 Epistemicism

Let us begin by considering an alternative account of vagueness that maintains the assumptions about the composition of positive and comparative adjectival predicates that we made in the previous section: a gradable adjedtive denotes a measure function, and must combine with degree morphology to derive a property. At first glance, it appears that these compositional assumptions ensure that any account of vagueness that provides *some* way of deriving the Similarity Constraint will achieve the same results that we achieved with the interest-relative account, because the morphological difference between positives and comparatives (composition of the adjective with POS vs. MORE) will always allow us to make the necessary distinction between the two forms. This is not the case, however: this result is ensured only if the analysis of vagueness is linked to a particular semantic feature of the positive form (i.e., to a feature of the meaning of POS). If, instead, the explanation of Similarity depends on some extra-linguistic property that interacts with the meaning of the positive form but is not itself part of its meaning, then an explanation of crisp judgment effects in comparison is not guaranteed.

One approach to vagueness that works this way is the Williamson's (1992; 1994) epistemic analysis. Williamson starts from the assumption that vague predicates (and in fact all predicates in natural language) sharply define a positive and negative extension. This is also true of the interest relative account discussed above; the difference between the two analyses is that in Williamson's account, our judg-

[9] In fact, I advocate a slightly different approach in Kennedy 2007b, in which the positive form denotes a property that is true of an object just in case it "stands out" relative to the kind of measurement that the adjective encodes.

ments about how a vague predicate applies to objects that are very similar with respect to the relevant property (true of both or false of both) are not due to a semantic feature of the predicate (like interest relativity), but rather to a more general principles of epistemic uncertainty.

Specifically, Williamson observes that unlike many predicates, whose extensions may be stabilizied by natural divisions (cf. Putnam 1975), the extensions of vague predicates cannot be so stabilized: a slight shift in our disposition to say that Venus is big, for example, would slightly shift the extension of *big*. The boundary is sharp, but not fixed. But this in turn means that an object whose size puts it just below (or above) the threshold for counting as *big* could easily have been (or not been) counted as *big* had the facts (in particular, the linguistic facts) been slightly different — different in ways that are too complex for us to even fully catalogue, let alone compute. Given this instability, there will always be objects whose position on the relevant continuum make it such that we can never really know whether or not they are *big*. This last point leads to the "margin for error" principle in (17) (Williamson 1992, p. 161).

(17) For a given way of measuring differences in measurements relevant to the application of property P, there will be a small but non-zero constant c such that if x and y differ in those measurements by less than c and x is known to be P, then y is P.

The upshot of this reasoning is that it is impossible to know whether, for example, *big* applies differently to objects x and y that differ in size by less than c; this is the source of the Similarity Constraint on the epistemic analysis of vagueness.

While this analysis presents a plausible account of our reaction to the inductive premise of the Sorites Paradox (though see Fara 2000 for criticism), it runs into problems when we consider crisp judgment effects in implicit comparison. To be precise, it runs into problems given the assumption that the semantic content of the positive form is itself consistent with crisp judgments, unlike what we saw in the previous section.[10] The simplest way to implement this assumption is to say that POS has the denotation in (18a), which is just like (14a) except that the interest relative relation $\succ_!$ is replaced with a regular asymmetric ordering relation.

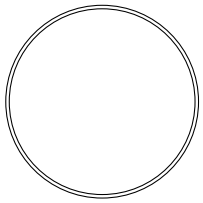
[10]This is not a necessary assumption: the claim that we cannot know the precise location of the boundary between the positive and negative extension of a vague predicate is consistent with an interest-relative semantics, as Fara (2000) points out. However, if the explanatory force of the epistemic analysis of vagueness lies in its ability to maintain a "sharp" semantics for vague predicates and explain our judgments about particular uses of them based on general principles of epistemic uncertainity, then we should evaluate it relative to a semantics for the positive form that is consistent with crisp judgments.

(18) a. $[\![\text{POS}]\!]^c = \lambda g_{\langle e,d\rangle}\lambda x.g(x) \succ \textbf{stnd}(g)(c)$
b. $[\![\text{POS big}]\!]^c = \lambda x.\textbf{big}(x) \succ \textbf{stnd}(\textbf{big})(c)$

The **stnd** function returns a standard degree for the adjective in the context of utterance, so that the positive form of e.g. *big* denotes the property in (18b), which is true of an object as long as its size exceeds the standard (by any amount). More generally, as long as **stnd** is defined in the context for the adjective that POS composes with, the result will be a property that gives back true or false for any object in its domain strictly based on how that object gets projected onto the scale: whether it is mapped to a degree that is ordered above or below the standard.

Let us now see how this analysis fares in crisp judgment cases, focusing on examples with definite descriptions. As shown by the example in (19), even when it is made clear both through preceding context and visual stimulus that there is a difference in size between two objects, if that difference is very slight, it is infelicitous to use a definite description based on an implicit comparison to refer to the larger of two objects, but it is felicitous to use the corresponding definite description based on an explicit comparison.

(19) The planets Uranus and Neptune differ in size. This difference is represented schematically in the diagram on the right, where the circles represent the sizes of the two planets, drawn to scale. Uranus is the {#big, bigger} one.



The problem for the epistemic analysis of vagueness is that this is a situation in which the linguistic and non-linguistic contextual factors are such that there should be enough certainty about the cutoff point between the big and the non-big things to justify the use of *the big one* to uniquely describe Uranus. The argument runs as follows.

First, we know based on both prior discourse and observation of the graphical representations, that the planets under consideration have different sizes. Second, we know based on our knowledge of the meaning of the positive form, that the standard of comparison for *big* can vary in different contexts of utterance. (In fact, children as young as three years of age know this, as shown experimentally in Syrett et al. 2010.) Given our semantic assumptions, this means that **stnd** can return different values in different contexts. Finally, we know, based on our knowledge of the presuppositions introduced by the use of the definite article, that one and only one of the two objects under discussion should have a size that exceeds the standard for *big* in the context. We should therefore accommodate these presuppositions in

the discourse in (19) by assuming that we are in a context in which the degree returned by the **stnd** function is one that is ordered below the size of Uranus, making *big one* true of it. and above the size of Neptune, making *big one* false of it. But if this is the case, then it should be perfectly acceptable to refer to Uranus as *the big one* in this context, contrary to fact.

The epistemicist might respond to this argument by saying that the implicit comparison form in (19) is infelicitous because the difference in size between Uranus and Neptune is less than the margin for error constant c. If this is the case, then accommodating a standard of comparison which will allow us to know that *big one* is true of Uranus in the context of utterance will, in virtue of (17), make the description true of Neptune, thereby violating the presuppositions of the definite article. Indeed, Williamson's explanation of the Sorites Paradox — and our judgments about it — relies on exactly this sort of reasoning; see Williamson 1992, p.161.

This response cannot be correct, however. The reason that judgments about predications involving vague predicates are typically sensitive to a margin for error is because their extensions are, in general, unstable. As noted above, changes in our dispositions can result in changes in the extension of a vague predicate in ways that are too complicated to calculate, necessitating (or giving rise to) a principle like (17). However, thanks to the semantic/pragmatic contribution of the definite article, this instability disappears — or is at least significantly reduced — when a vague predicate is used to distinguish between two objects that differ, in an observable way, solely along the dimension of measurement that the predicate encodes, as is the case in (19). The definite article imposes uniqueness and existence requirements as a matter of meaning; the meaning of the positive form of *big* allows for a context-dependent standard of comparison which can (by hypothesis) make fine-grained distinctions in size; therefore the only kind of disposition that could lead to a degree of instability in the extension of *big* in contexts like (19) which would justify a margin for error larger than the size difference between the two planets would be a disposition to behave in a way that is inconsistent with the semantic/pragmatic requirements of the expressions of our language. Assuming that this sort of pathological disposition is not normally at play, the result is that the margin for error in contexts like (19) should be so small as to be irrelevant, leading to the incorrect prediction that implicit comparison should be acceptable.

We could salvage the epistemicist's response, however, by returning to our earlier assumption that the positive form (and in particlar, the POS morpheme) has a richer meaning than the simple ordering relation in (18). In particular, if we assume that POS introduces whatever element of meaning is responsible for the kind of instability that gives rise to a margin for error in the first place, and that this instability persists even in the presence of the semantic/pragmatic contributions of

the definite article, then the epistemicist's response goes through. For example, it could be that instability in the extension of the positive form of *big* arises from interest relativity in the meaning of POS, as in the analysis we considered in the previous section: since our interests are constantly shifting, the extension of the positive form are also shifting. If it can be shown that this instability persists even in the presence of the uniqueness and existence presuppositions of the definite article, then the epistemicist's response can be maintained.[11] It is important to observe, though, that this version of the response crucially imparts an aspect of meaning to the positive form that is not present in the comparative. This means that crisp judgment effects — and by extension, the Similarity Constraint — are ultimately rooted in a semantic property of this class of vague predicates.

3.3 Underlying vagueness

Let us now consider supervaluationist accounts of vagueness. There is a way of implementing this sort of analysis that can in principle account for the implicit vs. explicit comparison in crisp judgment contexts: we could maintain the compositional assumptions about gradable adjective meaning and explicit comparative morphology that we adopted in section 3.1, but take no stand on whether the semantics of POS is interest relative, and instead just make the general assumption that regardless of its specific contributions to the meaning of the positive form, the result is a vague property that should be given a standard supervaluationist analysis. To the extent that such an analysis can be made to derive the Similiarity Constraint, e.g. by stipulating a global constraint that disallows the sort of "fine-grained" precisifications that are necessary to make the positive form usable in crisp judgment contexts (see van Rooij (this volume); but see also Kamp (1975, p.145), who explicitly resists this move, and Fara (2000), who rejects supervaluationism on other grounds), it will account for the facts.

These are not the compositional assumptions usually made in supervaluationist analyses that actually address the relation between positive and comparative

[11] On the other hand, it is not clear that we need to invoke a margin for error at all, if we adopt an interest relative semantics. The interst relative account of the infelicity of the definite description in (19) goes as follows. We have a standing interest in behaving in a way consistent with the conventional meanings of the expressions of our language. This interest should lead us to fix the extension of *big* in a way that makes it true of Uranus and false of Neptune, in order to accommodate the presuppositions of the definite article. However, this very same interest also requires us to accept the entailments of the positive form of *big*, which inlcude the strong position that Uranus but not Neptune has a size that significantly exceeds the contextual standard of comparison, rather than the weaker position that Uranus but not Neptune has a size that (merely) exceeds the standard. If our overall interests are in general incompatible with this entailment, as claimed by Fara, we have an irresolvable conflict, leading to anomaly.

gradable predicates, however. This brings us back to the second question about the implicit/explicit comparison distinction: what does it tell us about the compositional relation between these forms? To understand the significance of this question, we need to step back a bit and take note of a robust typological generalization about the world's languages: if the positive and comparative forms of a gradable predicate stand in a morphological markedness relation to each other, it is always the comparative that is the marked form. While there are many languages that do not make a morphological distinction between positive and comparative predicates (as noted in section 2), there are no known languages in which the comparative form is morphologically simple and the positive is morphologically complex.[12]

The typological facs can certainly be accommodated in a degree-based theory of the sort we started this section with (e.g., by hypothesizing that the move from a one-place measure function to a one-place property is achieved by a type-shifting rule while the move to a two-place comparative relation requires extra morphology; see note 8). A major selling point of most supervaluationist analyses, along with their close cousins, the comparison-class based analyses of Wheeler 1972; Klein 1980; van Benthem 1982 and van Rooij (this volume), is that they actually predict the typological facts. This is because such analyses provide a way of compositioanlly deriving the meaning of comparative predicates from the (vague) meaning of the positive, and as an "added bonus," they can achieve this result withough introducing abstract objects like degrees into the semantic ontology.

For example, Kamp (1975) defines the comparative morpheme roughly as an operator that ranges over different ways of precisifying a vague predicate, and says that there are ways of doing so that make it true of the target of comparison

[12]It has sometimes been claimed that Mandarin Chinese has the opposite markedness relation, given contrasts like the one in (i) (see e.g., Sybesma 1999, p. 27).

(i) a. Zhangsan gao.
Zhangsan tall
'Zhangsan is taller than some contextually salient individual.'
'*Zhangsan is tall.'

b. Zhangsan hen gao.
Zhangsan HEN tall
'Zhangsan is tall.'

However, as shown in recent work by Liu (2009) and Grano (2010), the contrast in (i) is really a fact about non-negated, matrix assertions, and in other syntactic contexts, unmarked gradable predicates can have positive form meanings. More convincing evidence evidence for morphological marking of the positive form comes from Elizabeth Bogal-Allbritten's (2008) work on Navajo, though in this language *both* the positive and comparative forms are derived by combining a root (which cannot appear by itself) with degree morphology. This is exactly the kind of pattern that the degree-based theory outlined at the beginning of this section predicts to be a possibility.

and false of the standard, but not vice versa. For example, on this view, (20) is true relative to a model M just in case there is a model M', which may differ from M in how it populates the positive and negative extension of *big* (and in whether it does so in a total or partial way) such that M' assigns Uranus to the positive extension of *big* and *Neptune* to its negative extension.

(20) Uranus is bigger than Neptune.

The Consistency Constraints (however they are derived) will ensure that this meaning gives the right truth conditions, i.e. that the size of Uranus exceeds the size of Neptune. But crucially, in order to account for the fact that (20) can be felicitously used in crisp judgment contexts, as we have seen, it must be the case that the range of models with respect to which the positive root can be evaluated includes ones that make very fine-grained distinctions (see Kamp 1975, p. 145).

Given this, it is difficult to see what rules out implicit comparison constructions in the same contexts. That is, if there is a way to precisify *big* in just the way that (20) requires, then surely if the linguistic and discourse context tells us that we are restricting our attention to just Uranus and Neptune, as is the case in implicit comparison, it is precisely this precisification that we will need to invoke. We could avoid this result by stipulating that the positive root is restricted to be evaluated only with respect to coarse models — i.e., by putting a limit on precisification — but then we would incorrectly predict that explicit comparatives should also show crisp judgment effects, since they are compositionally derived from the positive. Alternatively, we could hypothesize that the positive contains an element of meaning that adds the restriction to coarse-grained models, but this would effectively amount to giving up on the hypothesis that the comparative is compositionally derived from the positive.

Turning to comparison class based analyses of positive and comparative adjectives, it appears at first glance that they run into the same sorts of problems as supervaluation analyses. In this kind of approach, the positive form denotes a property whose extension is determined relative to a comparison class c, which may be either explicit or implicit. The resulting function from individuals to truth values may be partial — distinguishing between those elements in the comparison class that definitely have the property, those that do not, and those that fall in an "extension gap" — leading to a treatment of vagueness that is much the same as in a supervaluationist analysis.

Once we add in the Consistency Constraints, there are a couple of different options for deriving the comparative from the positive. Wheeler (1972) proposes that the function of the comparative is to stipulate that the adjective is evaluated relative to a comparison class consisting of the target and standard of comparison,

and to assert that, relative to this comparison class, it is true of the target and false of the standard. This is shown in (21), where c is the comparison class parameter.

(21) $[\![\text{MORE } A \textit{ than } y]\!]^c = \lambda x.[\![A]\!]^{\{x,y\}}(x) = 1 \wedge [\![A]\!]^{\{x,y\}}(y) = 0$

But if this is the right meaning, it is difficult to see how implicit and explicit comparatives can be distinguished in crisp judgment contexts. According to (21), the explicit comparative *Uranus is bigger than Neptune* is true just in case Uranus counts as big relative to the comparison class {Uranus, Neptune}, and Neptune does not. But then it is not at all clear how we can rule out the corresponding implicit comparative, which seems to be saying exactly the same thing. Klein (1980) proposes a different semantics for comparatives, given in (22).

(22) $[\![\text{MORE } A \textit{ than } y]\!]^c = \lambda x.\exists c'[[\![A]\!]^{c'}(x) = 1 \wedge [\![A]\!]^{c'}(y) = 0]$

This analysis shares with Wheeler's the idea that the basic function of a comparative is to relativize the extension of the adjective to a comparison class that makes it true of the target and false of the standard. The difference is that it doesn't stipulate what this comparison class is; it merely asserts that there is one.

This difference is crucial, and is exploited by Robert van Rooij in the comparison class-based analysis of explicit and implicit comparatives that he develops in his paper in this volume. In essence, van Rooij proposes that explicit comparatives be given a Klein-style analysis, and implicit comparatives be given a Wheeler-style analysis, so that *compared to* structures have the meaning in (23) (definite descriptions involving implicit comparison will be the same in the relevant respects).

(23) $[\![A \textit{ compared to } y]\!]^c = \lambda x.[\![A]\!]^{\{x,y\}}(x) = 1 \wedge [\![A]\!]^{\{x,y\}}(y) = 0$

In van Rooij's analysis, the implicit comparative *Uranus is big compared to Neptune* has the truth conditions in (24a), and the explicit comparative *Uranus is bigger than Neptune* has the truth conditions in (24b).

(24) a. $[\![big]\!]^{\{\textbf{uranus, neptune}\}}(\textbf{uranus}) = 1 \wedge [\![big]\!]^{\{\textbf{uranus, neptune}\}}(\textbf{neptune}) = 0$
b. $\exists c'[[\![big]\!]^{c'}(\textbf{uranus}) = 1 \wedge [\![big]\!]^{c'}(\textbf{neptune}) = 0]$

The truth conditions in (24a) lead to unacceptability in crisp judgment contexts, according to van Rooij, because of whatever principles are ultimately determined to provide the best way to derive the Similarity Constraint and explain judgments about the inductive premise of the Sorites. Van Rooij discusses a couple of options in his paper, which I will not evaluate here; the upshot is that comparison classes that consist only of two objects that deviate by a very small degree along the compared dimension are ruled out, so the infelicity of implicit comparison in crisp

judgment contexts can be viewed as a kind of presupposition failure.

The reason that (24b) does not run into the same problem is because it introduces existential quantification over comparison classes. (24a) is unacceptable because it necessarily involves the inadmissible comparison class {Uranus, Neptune}; (24b) is acceptable because it is not restricted to this comparison class, and it is true as long as there is some other, admissible comparison class relative to which *big* is true of Uranus and false of Neptune. If there is such a class, then given the Consistency Constraints, (24b) entails that the size of Uranus exceeds the size of Neptune, which is what we want.

An important feature of van Rooij's analysis is that the constraints that explain the infelicity of implicit comparison in crisp judgment contexts (whatever they turn out to be) are general constraints on comparison classes and the meaning of the positive form, and so do in fact carry over fully to explicit comparatives. The reason explicit comparatives don't run into the same problems is because of the "extra" meaning they introduce: existential quantification over comparison classes. Van Rooij thus avoids weakening the hypothesis that the comparative is fully derived from the positive, as we saw above was the case for the supervaluationist analysis, and so provides what looks like the best candidate for a semantic analysis of the comparative in which it is fully compositionally derived from the positive.

Van Rooij's analysis is not without its own potentially problematic features, however. In particular, the analysis necessitates assumptions about the domains of vague predicates that call into question the foundational hypothesis that the semantics of vague predicates can be captured strictly on the basis of orderings on individuals, rather than in terms of more abstract objects like degrees. Specifically, as van Rooij observes, his analysis predicts that an assertion of an explicit comparative in a crisp judgment context should entail (or maybe pragmatically presuppose) the existence of "witness" objects that, together with the compared objects, can be used to construct an appropriate comparison class. Van Rooij formalizes this condition as a constraint on models which requires that for any two objects x, y that differ by a small degree along a compared dimension δ, there should be objects w, z such that z is significantly different from y relative to δ but indistinguishable from x, and w is significantly different from y and indistinguishable from x.[13]

The problem is that it does not appear that assertions of explicit comparatives actually entail (or presuppose) the existence of such witnesses. Consider, for example, an assertion of *Uranus is bigger than Neptune*, evaluated against a common ground in which we know that the sizes of the eight planets in the solar system (plus Pluto, for nostalgia's sake) are as shown in (25).

[13]There are two exceptions: objects that are maximal and minimal with respect to δ, if they exist.

(25)

Jupiter	142,984 km	Earth	12,756 km	(Pluto	2274 km)
Saturn	120,536 km	Venus	12,104 km		
Uranus	51,118 km	Mars	6,794 km		
Neptune	49,532 km	Mercury	4880 km		

This sentence is clearly true, but does not appear to entail (or presuppose) the existence of objects (planets or otherwise) with sizes just a bit bigger than Uranus or smaller than Neptune, in this solar system or any other. Even if we explicitly hypothesize the absence of such objects, the sentence is both felicitous and true:

(26) Let's consider a universe that consists of just the nine planets listed in the table in (25). As the table shows, in this universe, *Uranus is bigger than Neptune*, just as it is in our universe.

One response might be to claim that Saturn and Earth count as the relevant witnesses in this example. But this would mean that Saturn is indistinguishable from Uranus relative to size but significantly different from Neptune, and that Earth is indistinguishable from Neptune but significantly different from Uranus. This is clearly wrong, as illustrated by figure 3, which provides a graphical representation of the relative sizes of these four planets (minus Saturn's rings) in descending order.

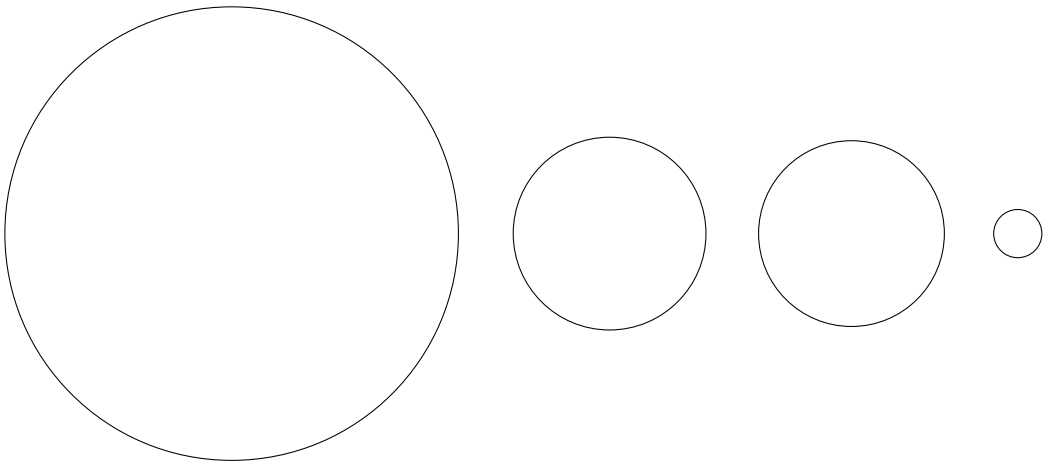


Figure 3: Saturn, Uranus, Neptune and Earth

Evidently the "witnesses" that are required in order to explain the implicit/explicit distinction, and that are required to explain our judgments about the truth and felicity of the comparatives in (25) and (26), are rather abstract, and need not correspond to actual objects in the world that the sentence is about (or the model that represents it). In fact, as van Rooij points out, the structure of the model that

results from the addition of a witness constraint is one that bears a distinct similarity to the abstract structures assumed in many degree-based theories. While this might provide a technical solution to the implicit/explicit distinction that allows us to maintain a semantics in which the comparative is derived from the positive, it clearly undermines one of the main selling points of the comparison class approach, which is that it can base a semantics of gradability and comparison entirely on how the (actual) objects in the domain of a gradable predicate relate to each other, without reference to more abstract objects like degrees. Whether it more seriously undermines the analysis is a question that deserves further consideration.

4 Conclusion

Stassen (1985, p. 24) states that "a construction in natural language counts as a comparative construction if that construction has the semantic function of assigning a graded (i.e. non-identical) position on a predicative scale to two (possibly complex) objects." Both implicit and explicit comparisons count as comparative constructions by this definition, yet as we have seen in this paper, they differ in acceptability when used to charaterize orderings between objects that differ by a small but observable amount along the relevant parameter, indicating that the two constructions have slightly different meanings. This point is significant for typological work on the grammar of comparison, but, as I have argued in this paper, it is also relevant to questions about vagueness. I have shown that the contrast between implicit and explicit comparison follows directly from an analysis in which positive and comparative forms of gradable predicates are both derived from a more abstract source, and in which vagueness arises from a semantic feature of the positive, though the facts do not necessarily tell us exactly what the nature of this feature is (i.e., whether it comes from interest relativity or from something else). The facts are not so easily explained in a theory in which vagueness is a purely epistemic or model-theoretic phenomenon, or one in which the comparative is compositionally derived from the positive.

References

Bartsch, Renate, and Theo Vennemann. 1973. *Semantic structures: A study in the relation between syntax and semantics*. Frankfurt: Athäenum Verlag.

van Benthem, Johann. 1982. Later than late: On the logical origin of the temporal order. *Pacific Philosophical Quarterly* 63:193–203.

Bogal-Allbritten, Elizabeth. 2008. Gradability and degree constructions in Navajo. BA Honors Thesis, Swarthmore College.

Bogusławski, Andrzej. 1975. Measures are measures: In defence of the diversity of comparatives and positives. *Linguistiche Berichte* 36:1–9.

Chierchia, Gennaro. 1998. Reference to kinds across languages. *Natural Language Semantics* 6:339–405.

Cresswell, M. J. 1977. The semantics of degree. In *Montague grammar*, ed. Barbara Partee, 261–292. New York: Academic Press.

Fara, Delia Graff. 2000. Shifting sands: An interest-relative theory of vagueness. *Philosophical Topics* 20:45–81.

Fara, Delia Graff. 2008. Profiling interest relativity. *Analysis* 68:326–335.

Grano, Thomas. 2010. Mandarin *hen*, universal markedness, and tense. Unpublished ms., University of Chicago.

Heim, Irene. 2000. Degree operators and scope. In *Semantics and Linguistic Theory 10*, ed. Brendan Jackson and Tanya Matthews, 40–64. Ithaca, NY: CLC Publications.

Kamp, Hans. 1975. Two theories of adjectives. In *Formal semantics of natural language*, ed. Edward Keenan, 123–155. Cambridge: Cambridge University Press. Reprinted in 1984.

Kamp, Hans, and Barbara Partee. 1995. Prototype theory and compositionality. *Cognition* 57:129–191.

Kennedy, Christopher. 1999. *Projecting the adjective: The syntax and semantics of gradability and comparison*. New York: Garland. (1997 UCSC Ph.D Dissertation).

Kennedy, Christopher. 2007a. Modes of comparison. In *Papers from the 43rd Annual Meeting of the Chicago Linguistic Society Volume 1: The Main Session*, ed. Malcolm Elliott, James Kirby, Osamu Sawada, Eleni Staraki, and Suwon Yoon, 139–163. Chicago, IL: Chicago Linguistic Society.

Kennedy, Christopher. 2007b. Vagueness and grammar: The semantics of relative and absolute gradable predicates. *Linguistics and Philosophy* 30:1–45.

Kennedy, Christopher, and Louise McNally. 2005. Scale structure and the semantic typology of gradable predicates. *Language* 81:345–381.

Klein, Ewan. 1980. A semantics for positive and comparative adjectives. *Linguistics and Philosophy* 4:1–45.

Liu, Chen-Sheng Luther. 2009. The positive morpheme in chinese and the adjectival structure. *Lingua* DOI: 10.1016/j.lingua.2009.06.001.

Marsack, C. C. 1975. *Samoan*. New York: English Universities Press.

Putnam, Hilary. 1975. The meaning of 'meaning'. In *Language, mind, and knowledge*, ed. Keith Gunderson, 131–193. University of Minnesota Press.

Raffman, Diana. 1994. Vagueness without paradox. *The Philosophical Review* 103:41–74.

Raffman, Diana. 1996. Vagueness and context relativity. *Philosophical Studies* 81:175–192.

Richard, Mark. 2004. Contextualism and relativism. *Philosophical Studies* 119:215–242.

van Rooij, Robert. this volume. Implicit versus explicit comparatives. In *Vagueness and language use*, ed. Paul Egré and Nathan Klinedinst. Palgrave MacMillan.

Sapir, Edward. 1944. Grading: A study in semantics. *Philosophy of Science* 11:93–116.

Sawada, Osamu. 2009. Pragmatic aspects of implicit comparison: An economy based approach. *Journal of Pragmatics* 41:1079–1103.

Schwarzschild, Roger. 2005. Measure phrases as modifiers of adjectives. *Recherches Linguistiques de Vincennes* 35:207–228.

Soames, Scott. 1999. *Understanding truth*. Oxford: Oxford University Press.

Stanley, Jason. 2003. Context, interest relativity, and the sorities. *Analysis* 63.4:269–280.

Stassen, Leon. 1985. *Comparison and universal grammar*. Oxford: Basil Blackwell.

von Stechow, Arnim. 1984. Comparing semantic theories of comparison. *Journal of Semantics* 3:1–77.

Sybesma, Rynt. 1999. *The Mandarin VP*. Boston: Kluwer.

Syrett, Kristen, Christopher Kennedy, and Jeffrey Lidz. 2010. Meaning and context in children's understanding of gradable adjectives. *Journal of Semantics* 27:1–35.

Unger, Peter. 1975. *Ignorance*. Oxford: Clarendon Press.

Wheeler, Samuel. 1972. Attributives and their modifiers. *Noûs* 6:310–334.

Williamson, Timothy. 1992. Vagueness and ignorance. *Proceedings of the Aristotelian Society* 66:145–162.

Williamson, Timothy. 1994. *Vagueness*. London: Routledge.

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