Comments on *Standpoint Semantics: A Framework for Formalising the Variable Meaning of Vague Terms* by Brandon Bennett

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Introduction

Brandon Bennett [1] offers us a fragment of a first-order theory of the precisification of vague predicates, a theory that applies in the case when there is a (measurable) physical magnitude underlying the vague predicate, as height underlies 'tall'. The basic thought is that vague predicates are precisified through the specification of thresholds, e.g., a height above which an individual counts as tall; the vagueness of a term such as 'tall' is reflected in the fact that various thresholds are acceptable to a speaker of English.

1 Degrees and modality

Let's start with a very simple thought: whatever sorites vagueness—to use Bennett's terminology[1]—there may be regarding 'tall', there is none associated with the comparatives 'at least as tall' and 'taller'. With heights in the background, we, of course, have these two equivalences:

$$x \text{ is at least as tall as } y \text{ iff } \mathit{height}(x) \geq \mathit{height}(y)$$

$$x \text{ is taller than } y \text{ iff } \mathit{height}(x) > \mathit{height}(y),$$

but the important point is that these equivalences are not definitional of their left-hand sides. In fact, in the theory of measurement, we arrive at the magnitude *height* and the properties of scales for the measurement of height from comparisons on a sufficiently rich domain [9, 4].

However one chooses to precisify the word 'tall', in any *finite* domain in which something or someone counts as tall, there *has* to be an individual d_{tall_1} such that

$$x \text{ is tall iff } x \text{ is at least as tall as } d_{tall_1}$$

and an individual d_{tall_2} such that

$$x \text{ is tall iff } x \text{ is taller than } d_{tall_2},$$

[1] Bennett writes (p. 264), 'A somewhat different kind of vagueness occurs when the criteria for applicability of a term depend on placing a threshold on the *required magnitude* of one or more variable attributes. For instance, we may agree that the appropriateness of ascribing the predicate 'tall' to an individual depends on the height of that individual, but there is no definite height threshold that determines when the predicate is applicable. We refer to this as *sorites vagueness*, since the essence of the sorites paradox is the indeterminacy in the number of grains required to make a heap.'

for under the precisification there is a (possibly jointly) least tall tall individual and a (possibly jointly) tallest non-tall individual. Of course, neither of these conditions need hold in an infinite domain: there could be an infinite sequence of non-tall individuals, each taller than its predecessor in the sequence, *and* an infinite sequence of tall individuals, each taller than its successors in the sequence, and no individual taller than the ones in the first sequence but not as tall as any of the ones in the second. Nonetheless, even in these circumstances, it's true, given a precisification of 'tall', that *either*

x is tall iff x is taller than each the individuals in the first sequence

or

x is tall iff x is at least as tall as one of the individuals in the second sequence.

Vagueness in the use of the term 'tall' with respect to a fixed domain of individuals is reflected in differing choices for the distinguished individual/set of individuals.

To be sure, what we have here is, for a very good reason, an unnatural way of thinking about our use of a vague predicate. What it does serve to show is that a "pure" theory of precisification of vague predicates in application to a fixed domain can be developed without appeal to an underlying physical magnitude and its values as measured on some scale.[2]

Why is this approach so unnatural? Because of a feature of our use of adjectives such as 'tall'. It is not just that, as it happens, say,

x is tall iff x is at least as tall as d_{tall}

but

x *would be* tall if x *were* at least as tall as d_{tall} *is*.

Notice that this last is an 'if', *not* an 'if, and only if', for it simply does not follow that x would be tall *only if* x *were* at least as tall as d_{tall} is. It might be that, while being at least as tall as d_{tall} is is, as it happens, not just sufficient but also necessary (in the logician's weak, extensional, non-definitional sense of these terms) given the actual heights of the denizens of the domain, our precisified understanding of 'tall' is such that an individual *could be* tall without being as tall as d_{tall} is.

Talk of degrees such as heights comes naturally when we try to say what is going on in such comparisons. Consider Russell's example and, more particularly, his commentary:

> I have heard of a touchy owner of a yacht to whom a guest, on first seeing it, remarked, "I thought your yacht was larger than it is"; and the owner replied, "No, my yacht is not larger than it is". What the guest meant was, "The size that I thought your yacht was is greater than the size your yacht is"; the meaning attributed to him is, "I thought the size of your yacht was greater than the size of your yacht". [8, p. 489]

[2] It is sometimes suggested that 'tall' means taller than average (with respect to some contextually given reference class) e.g., [10, p. 60] or—better, perhaps—taller than most. The notion of an average would seem to presuppose the availability of some suitably structured scale but, in any case, there are sound reasons on which to reject both these analyses—see, e.g., [3, p. 126].

It is hard to see how we can explain such locutions without recourse to lengths/sizes/ heights/ *etc.*, in a word *degrees*. Counterpart theory may offer a way to avoid them—'x could be taller than it is' translates into 'x has a counterpart in some world which is taller than x'—but within anything like Kripkean semantics for modal logic, in which the same individual may inhabit different worlds and to which Bennett is committed when he makes his worlds share a common domain, it seems that we need degrees—see [6]. (There are strong modal principles associated with our use of degrees; we "export" scales from this world to others. When we say 'x could be 5 cm taller than y', on its most obvious reading we treat '5 cm' as rigidly designating the same amount as in this world, just as much as we do when we say 'x could be 5 cm taller than it is', albeit that we know the unit of measurement could have been fixed differently.)

These considerations go a long way to ground Bennett's project. They indicate why the account of precisification is best carried out in terms of degrees. Whether the degrees associated with a comparative are susceptible of numerical representation and, if so, what structure they have varies. On the face of it, what was said above regarding comparisons applies as much to 'funnier' and 'funny' as to 'taller' and 'tall' despite the fact that there is no SI unit of funniness, funniness is not a physical magnitude/Lockean primary quality, and, much more obviously than 'tall', 'funny' exhibits both conceptual and sorites vagueness. Nonetheless, following Russell's lead, analysing the two meanings of 'I thought you were funnier than you are' will lead us to degrees (or extents) of funniness. — And whatever the exact structure of degrees of funniness, we can envisage precisifications of the vague predicate 'funny' being made using them.

If what I have just said is on the right track, we are left with a conceptual conundrum: we happily make "cross-world" modal comparisons of the 'x could be taller than it is' form, which we understand in terms of heights, but, according to the theory of measurement, we arrive at heights, and the properties of scales of measurement for height, from a foundation of comparisons—non-modal comparisons, to be sure, but only so thanks to the fiction that we have a well-enough stocked domain. We flesh out the fiction by supposing that there *could be* individuals whose heights fall between those of extant individuals, *i.e.* individuals taller than some who exist, shorter than others, and not the same height as any existing individuals.

2 The basic idea and its representation

In the simplest case, whether a vague one-place predicate ϕ under a precisification holds of an object is taken to be determined by whether a relevant, measurable, physical quantity f, possessed by the object, exceeds some threshold value t. Measured values of physical quantities are taken to be rational numbers; for convenience, threshold values are taken to to be non-rational reals.[3] Thus whether x is ϕ is determined by whether $f(x) > t$. This is *one* precisification of the vague predicate ϕ.

[3] While there are good reasons for taking *measured* values of physical quantities to be rational, there is nothing in physical theory that precludes possessed values being non-rational real numbers. Why Bennett is concerned only with measured values, 'the results of observations applied to the entities of some domain' (p. 266), and not possessed values is left unexplained, and is all the odder since a possible world in the sense of his theory is 'an arbitrary valuation of the function symbols over the domain', consequently 'the valuation need not respect physical laws with regard to possible combinations of measurable values, so, in so far as the observable functions are intended to correspond to actual kinds of measurements, such worlds could be

2.1 Measurement functions and measurement frames

Bennett says (p. 266),

> At the base of the semantics is a structure that represents the state of a *possible world* in terms of a valuation of *measurement functions*, which specify the results of observations applied to the entities of some domain.

A *measurement structure* is a quadruple $\langle D, M, \nu_M, w\rangle$ where

- D is a domain of entities,
- $M = \{f_1, f_2, \ldots, f_i, \ldots\}$ is a set of measurement function symbols,
- $\nu_M \colon M \to \mathbb{N}$ is a mapping from the symbols in M to the natural numbers, giving the arity of each function,
- $w \colon M \to \bigcup_{n\in\mathbb{N}^+} \mathbb{Q}^{D^n}$ is a function mapping each n-ary function symbol to a measurement function from D^n to $\mathbb{Q}$, *i.e.* $w(f_i) \in \mathbb{Q}^{D^{\nu_M(f_i)}}$.

From the perspective of orthodox model theory, this is unusual in that measurement functions are functions from D^n to $\mathbb{Q}$, for appropriate n, not into the domain D, but this is merely unusual, not something to balk at. What is much, much odder is that "measurement structures" are a mashup of syntax, interpretation, and signature. M is certainly syntax; w interprets the members of M; depending on the text one follows, M [2, p. 4], ν_M [5, p. 6], or the pair $\langle M, \nu_M\rangle$ [7, p. 3] is the signature of the structure $\langle D, w(f_1), w(f_2), \ldots, w(f_i), \ldots\rangle$.

On Bennett's formulation, the syntax that is to be interpreted in the measurement structure $\langle D, M, \nu_M, w\rangle$ is itself specified by that structure, *i.e.*, by the structure that interprets it. So one and the same measurement structure cannot interpret two distinct sets of measurement function symbols. This is a perverse and unmotivated restriction, for it rules out by fiat the possibility that sentences of different languages have the same interpretation.

The *measurement frame* associated with the triple of domain D, set of measurement symbols M, and arity assignment ν_M is the quadruple $\langle D, M, \nu_M, W\rangle$ where $W = \{w : \langle D, M, \nu_M, w\rangle \text{ is a measurement structure}\}$. I'm not sure what the point of taking it to be a quadruple is. Nothing is lost, as far as I can see, if, instead, we think of it as—as I'd like to put it—the set of all structures with domain D and signature ν_M (it being understood that the range of the functions is $\mathbb{Q}$, not D).

2.2 Parameterised precisification models

As Bennett defines it, a *parameterised*[4] *precisification model* $\mathfrak{M}$ is, in effect, a 13-tuple comprising

- a domain D,
- a collection M of measurement function symbols,

physically impossible' (p. 267). The restriction is not essential to the development of his theory: simply replace all occurrences of $\mathbb{Q}$ with $\mathbb{R}$.

[4] I'd prefer 'parametrised', in analogy with 'parametric'.

- an assignment ν_M of arities to the measurement function symbols,
- the set, W, of all assignments to the measurement function symbols in M of functions from n-tuples (n as specified by ν_M) of D to rational numbers,
- a set R of predicate symbols (to be thought of as vague predicates of natural language),
- an assignment ν_R of arities to these predicate symbols,
- a set N of constants (thought of as referring to members of the domain D),
- a set V of variables (thought of as ranging over elements of the domain D),
- a second set T of constants (*threshold parameter symbols*, thought of as referring to non-rational real numbers that serve as thresholds),
- a set Θ of predicate grounding theories,
- a function κ mapping members of the set N of constants to members of the domain, D,
- an assignment ξ mapping the variables in V to members of the domain, D,
- the set, P, of *all* mappings of the set T of constants to non-rational real numbers.

Even without saying what a predicate grounding theory is, we see, again, the same ghastly mélange of syntax, interpretation, and signature. What's worse, this is an incomplete specification since it leaves out of account the symbols '$<$' and '$\leq$' which are to be given their standard interpretation in the structure $\langle \mathbb{R}, \leq \rangle$ of the real numbers.

Let us try to impose some model-theoretic order. First, syntax: we have a language with vocabulary $N \cup T \cup R \cup \{<, \leq\} \cup M \cup V$. We are told that every atomic formula built up from the vocabulary $T \cup \{<, \leq\} \cup M \cup V$ takes one of the forms

- $f_i(x_1, x_2, \ldots, x_{\nu_M(f_i)}) \leq f_j(y_1, y_2, \ldots, y_{\nu_M(f_j)})$
- $\mathrm{t}_i \leq \mathrm{t}_j$
- $\mathrm{t}_j < f_i(x_1, x_2, \ldots, x_{\nu_M(f_i)})$
- $f_i(x_1, x_2, \ldots, x_{\nu_M(f_i)}) < \mathrm{t}_j$.

In company with ξ, each pair of functions $\langle w, p \rangle$ with $w \in W$ and $p \in P$, furnishes these formulas with interpretations in the structure $\langle \mathbb{R}, \leq \rangle$.

A *predicate grounding theory* θ associates with each predicate ϕ in R a sentence of the form

$$\forall x_1 \forall x_2 \ldots \forall x_{\nu_R(\phi)} \left[\phi(x_1, x_2, \ldots, x_{\nu_R(\phi)}) \leftrightarrow \Phi(\mathrm{t}_1, \mathrm{t}_2, \ldots, \mathrm{t}_m, x_1, x_2, \ldots, x_{\nu_R(\phi)}) \right]$$

where $\mathrm{t}_1, \mathrm{t}_2, \ldots, \mathrm{t}_m \in T$ and $\Phi(\mathrm{t}_1, \mathrm{t}_2, \ldots, \mathrm{t}_m, x_1, x_2, \ldots, x_{\nu_R(\phi)})$ is *any* formula in the language with vocabulary $T \cup \{<, \leq\} \cup M \cup V$ in which $x_1, x_2, \ldots, x_{\nu_R(\phi)}$ occur free.

Predicates in R are not assigned extensions. Rather, atomic formulas in the language with vocabulary $N \cup R \cup V$ are determined as satisfied or not by means of κ, ξ, p, *w and* a predicate grounding theory. The quadruple $\langle \xi, \kappa, p, w\rangle$ determines which substitution instances, possibly involving constants in N, of $\Phi(\mathrm{t}_1, \mathrm{t}_2, \ldots, \mathrm{t}_m, x_1, x_2, \ldots, x_{v_R(\phi)})$ are satisfied in $\langle \mathbb{R}, \leq\rangle$. The cognate substitution instances of $\phi(x_1, x_2, \ldots, x_{v_R(\phi)})$, atomic formulas in the language with vocabulary $N \cup R \cup V$, are then determined as satisfied, the rest not.

2.3 Interpretation

There are three dimensions of variability, parametrised by w, p and θ. Bennett says (p. 270), 'The θ index models semantic indeterminacy arising from conceptual vagueness, whereas the p index models indeterminacy due to sorites vagueness.' If this were true, varying θ while keeping p and w constant should make no odds to sorites vagueness, the vagueness due to indeterminacy of threshold values. Bennett's first example of a predicate-grounding clause is

$$\forall x\,[\mathrm{tall}(x) \leftrightarrow (\mathrm{t}_{\mathrm{tall}} < \mathit{height}(x))].$$

Don't let the occurrence of the subscript 'tall' on 't' fool you. Nothing in what he says about predicate grounding theories requires a fixed association between threshold parameters and predicates. So sorites vagueness is not merely confined to the choice of threshold values determined by p; predicate grounding theories can affect it and, depending on just what they say, might be solely concerned with it.

The three parameters are not treated equally in a model $\mathfrak{M}$. On the modal and sorites dimensions of variability, we are, apparently, required to allow *all* logically possible worlds (W) and assignments of threshold values (P), whereas Θ can be any (non-empty) set of predicate grounding theories.

3 Standpoints

Bennett recognizes that not all assignments of values to threshold parameter symbols are on a par but makes this a feature of the possibly idiosyncratic attitudes of an agent, not the semantics of the language. In a model $\mathfrak{M}$ an agent's *standpoint* is a triple comprising (i) a subset of the set of worlds, (ii) a subset of the set of assignments of values to threshold parameter symbols, and (iii) a subset of the set of predicate grounding theories. It's common enough practice to take an agent's beliefs about the way things are to be modelled by a set of worlds, intuitively the worlds that, for all the agent believes, may be actual. Borrowing a term from supervaluationist semantics, Bennett says (p. 274) of the second element that it

> is the agent's *admissibility* set—i.e. the set of precisifications that the agent considers to make reasonable assignments to all threshold parameters, and hence to be *admissible*,

and, similarly, the third element in the standpoint comprises

> a set of predicate grounding theories that characterises all possible definitions of ambiguous predicates that the agent regards as acceptable.

As Bennett says,

> a standpoint [...] characterises the range of possible worlds and linguistic interpretations that are plausible/acceptable to the agent,

which, in a way, is just fine and dandy, but unless he is committed to the primacy of idiolects and the authoritativeness of agents regarding their own idiolects, the agent's beliefs regarding precisifications of the vague predicates of her language have no part to play in providing a semantics of vague terms, not that Bennett suggests otherwise, despite calling his paper 'Standpoint semantics'. Speakers of a language can have all sorts of beliefs, *including mistaken beliefs*, about the meanings of expressions in their (native and other) languages. In one sense, these beliefs are distinct from how they take the world to be—represented by some subset of W. But for most, if not all, of what we have beliefs about, there are standards of correctness, albeit perhaps transcending all possibility of verification. When Bennett offers us a predicate grounding theory for the colour terms *red, orange, pink, peach* and *purple*, he presents it for all the world as though he were making *approximately correct* observations about English usage. He does *not* report it *merely* as part of his idiosyncratic standpoint (and, frankly, if he had, I doubt I'd have been interested in it).

In addition to the set of precisifications an agent considers to make reasonable assignments to all threshold parameters and the set of predicate grounding theories that characterises all possible definitions of ambiguous predicates that the agent regards as acceptable, there are the set of precisifications of vague predicates in English that make assignments to all threshold parameters and the set of predicate grounding theories that characterises definitions of ambiguous predicates in English *compatible with English usage*. It is these that determine whether the agent's idiosyncratic beliefs about the reasonableness of precisifications and the acceptability of predicate grounding theories are right or wrong. It is these that, conceivably, play a role in the semantics of the vague predicates of English. And, of course, there is undoubtedly an element of vagueness in the determination of which are compatible with English usage.

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