Tall – tall and not tall – neither tall nor not tall

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Introduction
Vague, relative gradable, adjectives such as tall, and fast admit of borderline cases and studies have found that, in these borderline regions, speakers tend to utter BORDERLINE CONTRADICTIONS (BCs) such as this one is tall and not tall or this one is neither tall nor not tall (Ripley, 2011; Alxatib and Pelletier, 2011; Serchuk et al., 2011; Egré et al., 2013). Given the evidence of the naturalness of such assertions, theories of vagueness ought not to require that all speakers who utter BCs are irrational. Indeed, such utterances are often, pre-theoretically, clear and informative as opposed to absurd. Nonetheless, even in borderline cases, one can still understand BCs in another sense, as actual contradictions. The challenge, then, is to satisfy our intuitions that, in borderline cases, statements of the form φ and not-φ and neither φ nor not-φ can be perfectly felicitous in some sense, but contradictory in another. The probabilistic frame-based analysis presented in this paper takes on this challenge.

Background
Classical logic-based theories of vagueness can easily capture the absurdity of contradictions, but struggle to model non-absurd uses of BCs. Some non-classical theories such as intensional fuzzy logic (Alxatib et al. 2013), can capture the non-absurd uses (borderline contradictions can be completely true), but then struggle to capture the absurd uses. Supervaluationism (which has truth value gaps) and subvaluationism (which has truth value gluts) can both model the classical interpretation since classical theorems are true on all super- or sub-valuations. When a proposition φ is neither true on all precisifications, nor false on all precisifications, due to truth value gaps, supervaluationism can also make sense of statements like φ is neither true nor false, but subvaluationism cannot. However, in the same situation, due to truth value gluts, subvaluationism can make sense of statements like φ is both true and false, but supervaluationism cannot. Indeed, no current theory can entirely satisfy our intuitions that all BCs with relative gradable adjectives can be both in some sense felicitous and in some other sense absurd.

Analysis with probabilistic frames
Frames are recursive attribute-value structures (the value-space of an attribute can be the range for a further attribute) (amo, Petersen 2015; Löbner 2014). Probabilistic frames lift value spaces to probability distributions over possible values.

Probabilistic frames offer two means of combining information from connectives (and, or) and negation. For tall, for instance, one means of combination, which yields the classical, absurd reading, combines inconsistent assignments for the TALL attribute. The second mode of combination, which yields the non-absurd reading, combines information about the value for the HEIGHT attribute. For example, if expected heights of individuals are represented as probability distributions over heights, then tall and not tall can also be interpreted as an instruction to combine the distributions over heights for tall and for not tall which results in a mean value centred around those heights considered to be borderline for tall.
A schematic partial probabilistic frame is given in Figure 1. It has a central node (double ringed), and somewhere in the frame, a height attribute the value of which is a probability density function over heights. The interpretation of tall requires a frame, like the one in Figure 2, with a path \((\text{HEIGHT}, V)\) where \(V\) is probability density function over heights. \([[\text{tall}]\)] then modifies this function (by shifting the mean upwards and decreasing the standard deviation), and also adds a TALL attribute, a function from and individual and a height to a Boolean value (the possibility of including Boolean values in frames is raised in Löbner 2017). This is shown in Figure 2 (grey). (The Boolean value may also be sensitive to an uncertain threshold defined in terms of the cumulative probability for the height distribution, not represented here). In contrast, not tall (Figure 2 (black)) shifts expectations for heights downwards.

Figure 1: Partial frame for a common noun concept: something with a height

Figure 2: Modification of the frame in Figure 1 with tall (grey), not tall (black) and tall and not tall (on the non-absurd reading, dashed)

Utterances such as tall and not tall or neither tall nor not tall can then be interpreted in one of two ways. (i) As an actual contradiction where the value for TALL is an inconsistent Boolean assignment. This gives the absurd reading. Or (ii) As an instruction to combine the distributions for heights, yielding a height expectation centred around values which are borderline for tall and borderline for not tall (Figure 2 (dashed)). Something which can be evaluated as true if the individual is close to the borderline. This gives the non-absurd reading.
Sketching an extension to absolute gradable adjectives

In contrast to the open scales of relative gradable adjectives such as tall, absolute gradable adjectives (e.g., full, dirty, and pure) reflect a scale structure that is either upper closed (pure), lower closed (dirty) or fully closed (full) (Kennedy & McNally 1999). Furthermore, BCs are degraded for absolute gradable adjectives:

1. Neither full nor not full/dirty nor not dirty/pure nor not pure.
2. Both full and not full/dirty and not dirty/pure and not pure.

This data is captured by applying the above model wherein frame nodes record probability distributions over degrees of, e.g., purity, cleanliness etc. As an example, pure will be a constant function from any distribution over degrees of purity to a distribution that assigns the absolute degree of purity a probability of 1. If the graph for not pure assigns the same point a probability of 0, then I will show how the same means of combining tall and not tall above can yield the right results for, e.g., pure and not pure. However, this leaves a complication in delivering a uniform interpretation of negation for relative and absolute gradable adjectives insofar as it must be sensitive to whether the input distribution is over a single discrete point on a scale or over the whole scale.

Summary

Probabilistic frames give us the means to see BCs from two perspectives, either as a contradictory combination of statements with incompatible Boolean values, or as an update on expectations for, e.g., heights such that the referred to individual is predicates to be a borderline case. This approach, I argue, has advantages over purely logical approaches such as fuzzy logic, subvaluationism and supervaluationism, and it can be extended to cover absolute adjectives and explain why they resist BCs.

References


