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NOTAS E DISCUSSÕES
NOTES AND DISCUSSIONS

REPRESENTING VAGUE OPINION

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Abstract. Current supervaluation models of opinion, notably van Fraassen's (1984; 1989; 1990; 1998; 2005; 2006) use of intervals to characterize vague opinion, capture nuances of ordinary reflection which are overlooked by classic measure theoretic models of subjective probability. However, after briefly explaining van Fraassen's approach, we present two limitations in his current framework which provide clear empirical reasons for seeking a refinement. Any empirically adequate account of our actual judgments must reckon with the fact that these are typically neither uniform through the range of outcomes we take to be serious possibilities nor abrupt at the edges.

Keywords: Belief; models of opinion; subjective probability; supervaluation; uncertainty; van Fraassen; vagueness.

Current supervaluation models of opinion, notably van Fraassen's (1984; 1989; 1990; 1998; 2005; 2006) use of intervals to characterize vague opinion, capture nuances of ordinary reflection which are overlooked by classic measure theoretic models of subjective probability. However, after briefly explaining van Fraassen's approach, we present two limitations in his current framework which provide clear empirical reasons for seeking a refinement. Any empirically adequate account of our actual judgments must reckon with the fact that these are typically neither uniform through the range of outcomes we take to be serious possibilities nor abrupt at the edges.

Van Fraassen models opinion in terms of subjective probability. A sharp opinion about some proposition A would be represented as a single probability function P, where $P(A)$ equals some real number z between 0 and 1. If I am about to roll three fair six-sided die, my personal probability for rolling three ones may be one out of 216. Yet, van Fraassen recognizes that typically our opinions are not adequately represented by the assignment of a precise numerical value. Our opinion about some proposition A is often more adequately represented as a set of probability functions

— typically an interval. Drawing on Levi, Jeffrey, and Suppes, van Fraassen proposes that a person's opinion about A can be characterized as an assertion that her subjective probability for A is no less than x and no greater than y just in case for every member P of her representor $x \leq P(A) \leq y$ (van Fraassen 1984: 252). The idea is that the subjective probability one assigns to A is an interval $[x, y]$ such that $[x, y]$ is the smallest closed interval which contains the probabilities assigned to A by members of that set (Monton 1998: 207). Thus, van Fraassen further observes, for instance, that for a judgment such as *It seems to me more likely than not* 'we may equally say *either* that my probability for A is *vague*, with lower and upper bounds 0.5 and 1.0, *or* that I am *ambivalent* between the probability functions $[P]$ such that $0.5 \leq P(A) \leq 1$' (van Fraassen 1990: 347).

So far this seems right: ordinary folks and philosophers alike form judgments about what *seems likely* to them and they assert these opinions with various degrees of confidence. Judgments about "high", "low", "very high", or "fairly low" probability are a commonplace. While mending the salmon nets after a hard day, two rugged Alaskan fishermen — Larry and Pierre — speculate about the chances that they catch more than a hundred reds tomorrow. Suppose Pierre optimistically announces proposition (K): *It seems to me about three times as likely as not that we catch a king salmon over 80 lbs. tomorrow.* On van Fraassen's account we can *translate* attitudes expressed by *It seems to me that* and its modes into terms of personal probability (*My personal probability* and its modes) without supposing that people typically assign sharp numerical probabilities to propositions (1989: 154–55). A naïve translation of Pierre's statement K would represent it as a subjective probability of 0.75. Now it may be that Pierre does have sharp opinions about this matter — when he says three times he really means it! But typically a more adequate representation of our opinions will use probability intervals rather than sharp numerical probabilities. Alternatively, we could take the qualifier 'about' to indicate that Pierre intends to commit to some interval in the neighborhood around 0.75, say, [0.6, 0.9].

Notice, however, two limitations of van Fraassen's current supervaluation model. While Pierre could simply specify that he wants to make precisely the sort of commitments described by the interval [0.6, 0.9], there are several reasons for thinking that van Fraassen's current way of representing vague probabilities will be deficient as a model of a great many, if not most, vague opinions.

First, it suggests a *uniform preference* for probability functions within the interval. The sort of commitment it attributes to Pierre is one in which 0.65 and 0.75 are held with equal conviction. It seems more plausible to suppose that in such cases Pierre will prefer some values in the interval more than others and that this differential preference could be described by some function over the interval $x = [0, 1]$. We have no stake in denying that Pierre could assign uniform preferences for every valuation in the interval if he likes. Our claim is instead that current supervaluation

models fail to capture nuances in the attitudes folks like Pierre quite effortlessly finds themselves taking. Pierre might well attach the most weight to the value 0.75, and more weight to probabilities at 0.74 and 0.76 than to values such as at either extreme (e.g. 0.6 or 0.9).

A second shortcoming of van Fraassen's current account is that it suggests precision at the end points of the interval. Call this the *end-point precision* objection. Not all end-point precision is problematic, of course. Intervals which include either 0 or 1 will necessarily cut off sharply and phrases such as 'more likely than not' do seem appropriately glossed as suggesting sharp discontinuity at 0.5. What is undesirable is that van Fraassen's employment of intervals to model opinion introduces end-point precision artificially — simply as an artifact of this way of representing opinion — even in cases where none is implied by the attitude we want to model. To take our example above, since van Fraassen's idea seems to be that the subjective probability Pierre assigns to statement K is an interval such that [0.6, 0.9] is the smallest closed interval which contains the probabilities Pierre assigns to members of that set, this would imply that the agent sees some kind of radical break between 0.6 and 0.59 (indeed, between 0.6 and $0.5\overline{9}$, where the difference is infinitesimal). But surely the cut-off will not be so sharp in typical cases. It is preferable, it seems, to allow that opinions can shade off gradually. The problem of appealing to precise values at the endpoints of the interval is particularly acute for the supervaluation model, since one of the primary motivations for introducing intervals is that so often it seems psychologically unrealistic to attribute precise probabilities to our ordinary opinions.

The uniform preference objection and the end-point precision objection are related. The problem is that if we take the upper and lower bound of the interval to be so high and so low as to ensure that Pierre's opinion falls within either extreme, it seems plausible that Pierre or others like him would often want to give far less weight to the probability functions that 'run through' values at the extremes than to those, say, located comfortably toward the center of the interval.

So, while van Fraassen's account of vague probabilities does improve on the naïve attribution of sharp single numerical probability functions for our opinions generally, neither of these approaches adequately represents many of the actual opinions one might want to hold and both introduce false precision artificially in a wide range of cases. Ordinarily our vague opinions are neither precise at the endpoints nor uniform over the values within the intervals used to represent that vagueness. A more nuanced model would allow for cases in which folks like Pierre are more willing to affirm certain probabilities at points around which their opinion is clustered (e.g. 0.75, then 0.74 and 0.76 and so on) while increasingly hesitant to affirm values that diverge from there. What is desirable is to have a way of taking about or modeling the "confidence shape" in the sorts of vague judgments people

quite naturally and spontaneously take toward various propositions. We have some ideas about how such models could be refined to account for these difficulties and to represent contours in such judgments with a greater degree of empirical adequacy using fuzzy set theory (McKaughan 2007), but presentation of our specific proposal must await another occasion.

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