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Source: *Philosophical Issues*, Vol. 10, Skepticism (2000), pp. 220-257

Published by: Ridgeview Publishing Company

Stable URL: <http://www.jstor.org/stable/3050579>

Accessed: 26-06-2016 15:51 UTC

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Vagueness and Partial Belief

Stephen Schiffer

To solve the philosophical problem of vagueness is to solve two subproblems: the sorites paradox and the problem of explicating the notion of a borderline case (or the problem of explicating vagueness, since vagueness just is the possibility of borderline cases). In this paper I introduce a new kind of partial belief, *vagueness-related partial belief* (VPB), which I distinguish from the familiar kind of partial belief, *standard partial belief* (SPB), and bring it to bear on the two problems of vagueness.¹ Underlying both applications is the idea that vagueness is neither a semantic nor an epistemic notion but rather a *psychological* notion.

Two Kinds of Partial Belief

Partial belief is qualified assent and has to do with how firmly—the degree to which—one accepts a proposition. I'll begin by stipulatively defining one kind of partial belief. *Standard partial belief*, I'll say, is that kind of partial belief which can under suitable idealization be identified with *subjective probability*. I take this to mean two things:

(1) SPBs are those partial beliefs that under suitable idealization satisfy the standard axioms of probability theory. That is, if

there are SPBs, then we instantiate a partial-belief function b_s such that the following holds under suitable idealization:

$$0 \leq b_s(p) \leq 1$$

If p and q are logically incompatible, then $b_s(p \vee q) = b_s(p) + b_s(q)$

If p is a theorem of classical logic, then $b_s(p) = 1$

I intend to be suitably vague about what I mean by ‘suitable idealization’. I mean whatever writers on subjective probability mean when they take the probability calculus to model rational belief. Evidently, the idealization would involve perfect rationality and logical omniscience. I won’t concern myself with how SPBs should be modeled for actual humans; that won’t be necessary for my purposes.

(2) If there are SPBs, then

$$b_s(q/p) = b_s(p \ \& \ q)/b_s(p)$$

holds (under idealization) when, for the intended notion of partial belief, ‘ $b_s(q/p)$ ’ represents the degree to which one believes q given p . Now, the notion of *conditional belief*—believing q given p —is itself somewhat of a technical notion. The intuitive, or pretheoretic, notion it’s intended to capture is the extent to which one would take p ’s being true to be evidence for or against q ’s being true. In this sense, one takes p and q to be unrelated, or independent, when one’s being certain that p would make no difference to the degree to which one believed q ; that is, when $b_s(q/p) = b_s(q)$. Thus, suppose I regard p as extremely good evidence that q , so that if I were to become certain that p , then I would believe q to degree .9. Then to say that the displayed formula holds for the intuitive notion of conditional belief implies that the values of $b_s(p \ \& \ q)$ and $b_s(p)$ are such that $b_s(p \ \& \ q)/b_s(p) = .9$.

I intend the stipulatively defined notion of a SPB to capture the kind of partial belief that has long been an object of study. Examples of SPBs are your believing to some degree or other—i.e., more or less firmly—that you left your glasses in your office, that it will rain tonight, or that Mexico will win the World Cup. Thus, if you, rational believer that you are, believe to degree .5 that you left your glasses in your office, then you believe to degree 1 that you either did or didn’t leave your glasses in your office. And if you believe to degree .6 that you left your glasses in your office, believe to degree .2 that your nephew will pass his logic course, and take these two partially believed propositions to

be unrelated, then you believe to degree .12 that (you left your glasses in your office and your nephew will pass his logic course).²

So I take it there are SPBs. Here are some substantial things true of them.

(1) SPB is the kind of partial belief we would have even if, *per impossibile*, our language were perfectly precise.

(2) SPB is a measure of *uncertainty*. If one s-believes p to a degree less than 1 and greater than 0, then one takes the truth-value of p to be uncertain. As we'll later see, uncertainty is quite distinct from indeterminacy. Indeed, as I'll suggest later, one can't take the truth-value of a proposition to be uncertain unless one takes that proposition to be determinately true or determinately false.

(3) SPBs generate corresponding likelihood beliefs. Thus, if Sally s-believes to degree .5 that she left her glasses in her office, then she thinks it's just as likely that she left them there as that she didn't; she thinks, as she would say, that there's a fifty-fifty chance that her glasses are in her office. If she s-believes to degree .98 that it will rain tonight, then she believes that it will almost certainly rain tonight. If she s-believes to degree .32 that she'll pass her course in number theory, then she thinks it's somewhat unlikely that she'll pass. (Note that these beliefs aren't about any kind of "objective probability." They're really just *redescriptions* of a particular kind of partial belief. In the relevant sense, to say that Sally thinks there's a fifty-fifty chance that she left her glasses in her office is just another way of saying she s-believes to degree .5 that she left her glasses in her office.)

(4) Typically, if one s-believes p to some degree between 0 and 1, then one doesn't regard oneself as being in the best possible position to pronounce on the truth of p , even if one has no doubts about the integrity of the evidence one has for or against p . Often one thinks there is a better position it's at least possible for one to get into. So, I believe to degree .5 that I left my glasses in my office. Well, I can go there and resolve the matter. Sometimes one supposes there is no better position one can get into oneself, but that there is a better epistemic position someone else might have enjoyed. For example, there's probably nothing I can do to improve my opinion about the color of Thales' eyes, but a contemporary of his could have satisfied herself on that score. Sometimes when one s-believes p , one supposes that no one can presently get into a better epistemic position with respect to p , but one thinks that theoretical advances may change that. This may be our position with respect to our ability to know what happens in

a black hole. Still, there may be cases where no improvement is possible, and this is why I cautiously prefixed this discussion with the ‘typically’ qualifier. Perhaps one such case is our ability to know the position of a particle, where the best theory says we can’t know.³

So much for SPBs. Turning now to the other kind of partial belief, I stipulatively define *vagueness-related partial beliefs* as those partial beliefs that *can’t* under any suitable idealization be identified with subjective probability. Moreover, the substantial things true of SPBs aren’t true of VPBs. Thus:

(1) As we’ll presently see, we couldn’t have VPBs if our language were perfectly precise; VPBs go hand-in-hand with vagueness. One couldn’t have a vague language without VPBs, and having VPBs secures one’s having a vague language.

(2) VPB is *not* a measure of uncertainty. When one is confronted with what one takes to be a paradigm borderline case of a bald man, one doesn’t take oneself to be *uncertain* as to whether or not the man is bald; that’s resolved by one’s taking him to be a borderline case of a bald man. As we’ll see, to take someone to be a borderline case of a bald man is, roughly speaking, just to v-believe that the person is a bald man.

(3) VPBs don’t give rise to corresponding likelihood beliefs. If one v-believes that such-and-such to degree .5, one *won’t* think there’s a fifty-fifty chance that such-and-such, and if one v-believes that such-and-such to degree .7, one *won’t* believe that it’s somewhat likely that such-and-such.

(4) If one v-believes *p* to any degree whatever, and one’s epistemic circumstances are known by one to be ideal (in a way to be explained), then one won’t feel that one, or anyone else, can get into a better epistemic position with respect to *p*.

It will be helpful to introduce what I have in mind with a somewhat artificial example.

Sally is a rational speaker of English, and we’re going to monitor her belief states throughout the following experiment. Tom Cruise, a paradigmatically non-bald person, has consented, for the sake of philosophy, to have his hairs plucked from his scalp one by one until none are left. Sally is to witness this, and will judge Tom’s baldness after each plucking. The conditions for making baldness judgments—lighting conditions, exposure to the hair situation on Tom’s scalp, Sally’s sobriety and perceptual faculties, etc.—are ideal and known by Sally to be such. For simplicity of exposition, I’ll assume both that Sally’s degrees of belief can be measured by real numbers from 1 (unqualified belief) to 0 (un-

qualified disbelief) and that at any given time Sally believes to some determinate degree that Tom is bald. Both assumptions may be artificial, but I intend my provisional use of them to be innocent. Let the plucking begin.

Sally starts out judging with absolute certainty that Tom is not bald; that is, she believes to degree 1 that Tom is not bald and to degree 0 that he is bald. This state of affairs persists through quite a few pluckings. At some point, however, Sally's judgment that Tom isn't bald will have an ever-so-slightly-diminished confidence, reflecting that she believes Tom not to be bald to some degree barely less than 1. The plucking continues and as it does the degree to which she believes Tom not to be bald diminishes while the degree to which she believes him to be bald increases. At some point, we may pretend, the degree to which Sally believes both that Tom is bald and that he isn't bald is .5, and Tom thereby represents for Sally a solid borderline case of baldness. Having reached .5, Sally's degrees of belief that Tom is bald will gradually increase as the plucking continues, until she believes to degree 1 that he is bald.

Although I'll have a little more to say about this later, for now I'm going to assume that the qualified judgments about Tom's baldness that Sally would make throughout the plucking express partial beliefs. After all, the hallmark of partial belief is qualified assertion, and, once she was removed from her ability to make unqualified assertions, Sally would make qualified assertions in response to queries about Tom's baldness. My claim is that Sally's partial beliefs that Tom is bald are VPBs; they are, that is, beliefs that can't under any suitable idealization be identified with subjective probability. Given my earlier stipulation about what it is for partial beliefs to be identified with subjective probability, my claim that Sally's partial beliefs are VPBs means that *either* (1) her partial beliefs (under idealization) don't satisfy the standard axioms of probability theory *or* (2) the formula ' $b_v(q/p) = b_v(p \ \& \ q)/b_v(p)$ ' doesn't hold when, for the intended notion of partial belief, ' $b_v(q/p)$ ' represents the degree to which one believes q given p .

I take disjunct (2) to be straightforwardly true. As regards SPBs, $b_s(p \ \& \ q)/b_s(p)$ *does* (under idealization) give the degree to which one would s -believe q given p . For suppose one s -believes to degree .5 both that Beetlebomb will win the Kentucky Derby and that the Atlantic City Flounders will win the Super Bowl, and suppose one takes these two partially believed propositions to be unrelated in that the degree to which one s -believes either prop-

osition doesn't affect the degree to which one s-believes the other. Then one ought to s-believe the conjunction *that Beetlebomb will win the Kentucky Derby and the Flounders will win the Super Bowl* to degree .25. Intuitively, this is what we would expect of a rational believer. If asked to justify her .25 degree belief in the conjunction, the rational s-believer would say her evidence justifies her in thinking that either proposition could go either way, but it's a much stronger thing to suppose they'll both go the same way. This response relies on there being a gap between the partially believed proposition and her evidence for it, so that she can meaningfully wonder how things will turn out.

As regards VPBs, however, $b_v(p \ \& \ q)/b_v(p)$ does *not* in any way give the degree to which one would v-believe q given p . Suppose that at the point in the plucking when Sally believes to degree .5 that Tom is bald, thereby making him a paradigm borderline case of baldness for her, she also believes to degree .5 that he is thin, making him also for her a paradigm borderline case of thinness (poor Tom has been entirely nude throughout the plucking). Suppose further that these two partially believed propositions are taken by Sally to be unrelated, in that for her the truth of neither proposition has any bearing on the truth of the other. Can we expect eminently rational Sally to believe to degree .25 that Tom is bald and thin? I submit not. I submit that she'll believe the conjunction to degree .5. I regard this as intuitively correct, but that doesn't preclude a rationale. The rational believer who takes the propositions that Beetlebomb will win the Kentucky Derby and that the Atlantic City Flounders will win the Super Bowl to be independent and s-believes each to degree .5 will believe the conjunction of those two propositions to degree .25, for that is the degree supported by the evidence. But for Sally, there is no gap between her partially believed proposition and her evidence for it; she's *ambivalent*, but she's not *uncertain* about anything. For her, all the relevant facts are completely available to her; nothing more of relevance could possibly come to light. Sally can't wonder how, given her situation, the issue of Tom's baldness (or thinness) might turn out, nor will she wonder what the secret fact of the matter to which she can't have access might be. Thus, she v-believes to degree .5 that Tom is bald, that Tom is thin, and that Tom is bald and thin; yet the two propositions are for her independent. If, however, $b_v(p \ \& \ q)/b_v(p)$ adequately represented conditional belief for VPBs, then the two propositions wouldn't be independent for her. Rather, Tom's being thin would be conclusive evidence

for Sally of his being bald, since $b_v(\text{that Tom is bald and thin})/b_v(\text{that Tom is thin})$ [i.e., $.5/.5$] = 1.

I also take disjunct (1) to be straightforwardly true. In the scenario just described, $b_v(\text{Tom is bald}) = .5$, $b_v(\text{Tom is bald and not thin}) = .5$, and $b_v(\text{Tom is bald and thin}) = .5$, and this is inconsistent with the probability calculus (if VPB satisfied the axioms of the probability calculus, $b_v(\text{Tom is bald})$ would be 1 when $b_v(\text{Tom is bald and not thin})$ and $b_v(\text{Tom is bald and thin})$ were both $.5$). Also, if Sally's $.5$ belief that Tom is bald were a SPB, then she would believe to degree 1 that Tom was bald or not bald. But Sally, who v -believes both that Tom is bald and that he's not bald to degree $.5$, is also apt to find it indeterminate whether excluded middle applies to borderline propositions. That is to say, she's also apt rationally to v -believe to degree $.5$ that Tom is bald or not bald. But more on this presently.

Since Sally's partial beliefs about Tom's baldness can't be identified with subjective probability, they are VPBs and not SPBs. It's also easy to see that Sally's VPBs don't satisfy the substantial things true of her SPBs (see above, p. 222): (1) I said that SPBs were the sort of partial beliefs we could have even if, *per impossibile*, our language were perfectly precise; but, as we're about to see, VPBs go hand-in-hand with vagueness. (2) Sally's VPBs about Tom's baldness are no measure of any *uncertainty* she has about Tom's being bald. When her VPBs represent Tom as a borderline case of baldness, Sally is ambivalent as to how to judge Tom, but she doesn't take herself to be *ignorant* of the real state of affairs regarding Tom's baldness. It's because Sally appreciates that her situation isn't one of ignorance that she v -believes to degree $.5$ that Tom is bald and thin, even though she v -believes each conjunct to the same degree and takes the conjuncts to be unrelated.⁴ (3) Sally's VPBs about Tom's baldness aren't accompanied by corresponding likelihood beliefs. If Sally v -believes to degree $.5$ that Tom is bald, she doesn't thereby think there's a fifty-fifty chance that he's bald. Believing that there's a fifty-fifty chance that Tom is bald is not an appropriate epistemic stance when one feels, as does Sally, that one's evidence reveals the full story about Tom's baldness. Likewise, if Sally v -believes to degree $.7$ that Tom isn't bald, she won't thereby believe that it's somewhat unlikely that he's bald. (4) When, as we've already noticed, one s -believes a proposition to a degree midway between 0 and 1, one won't take oneself to be in the best possible epistemic position with respect to that proposition. But in a case such as Sally's, where epistemic conditions for judging Tom's baldness are

known to be ideal, whatever the degree to which she v-believes that Tom is bald, she won't suppose that she, or anyone else, can get into a better epistemic position with respect to that proposition.

I think that, subject to a certain refinement, enough has been said about VPB to apply it to the problems of vagueness. I know there remain plenty of questions about VPB answers to which are needed for a full understanding of the notion, but these questions are best taken up after the main application to vagueness has been laid bare. The refinement to which I just alluded is needed for this application, and it's as follows.

Sally's VPBs are formed under ideal epistemic conditions, but VPBs may be formed under conditions that are less than ideal. For example, it may be that she would v-believe to degree .6 that Tom was bald if she were certain that the hair situation on his scalp was such-and-such, but since she only s-believes to degree .7 that that is the hair situation on Tom's scalp, the degree to which she v-believes that Tom is bald will be less than .6. How that degree is to be determined is a point to be taken up later. For now, let's say that a *VPB** is the kind of VPB Sally has when, during her presence at the plucking, she v-believes that Tom is bald. It's a VPB formed under ideal epistemic conditions as regards the supervenience base for the vague property that enters into the belief, for the sense in which Sally's VPBs about Tom's baldness are formed under epistemically ideal conditions is that she has, and knows herself to have, certain knowledge of the relevant hair situation on Tom's scalp, i.e., of that hair situation which determines the extent to which a person is bald. Later I'll offer a generalization that will allow a more perspicuous characterization of a *VPB**, but what we have so far should do well enough for the applications to which I now turn.

VPB* and the Notion of a Borderline Case

Tom is a borderline case of baldness. What makes him such? It's no help to say that Tom is neither determinately/definitely bald nor determinately/definitely not bald, since the problem of explaining the determinately/definitely operator just is the problem of explaining the notion of a borderline case. Currently, as well as traditionally, two styles of answer predominate, and there are two notionally different but equivalent ways of characterizing the difference between these two styles of answer. We can characterize the difference either as

- a difference between *semantic* theories, which explain vagueness in truth-theoretic terms, and *epistemic* theories, which explain vagueness in terms of our inability to know the truth-values of borderline propositions

or as

- a difference between those who don't and those who do accept bivalence for borderline propositions—the thesis that every borderline proposition is true or false.⁵

We can see the equivalence of these two characterizations in the following way.

The epistemic theorist = the theorist who accepts bivalence for borderline propositions. Suppose a theorist holds that every borderline proposition is true or false. Then for this theorist it will be true, and thus a fact, that borderline Tom is bald, or else true, and thus a fact, that he's not bald. At the same time, the theorist must acknowledge, first, that it's impossible for us to know whether or not Tom is bald, and, second, that propositions like Goldbach's conjecture show that the truth-value of a true or false proposition may be unknowable even though the proposition isn't vague. Thus, the theorist who accepts bivalence must explain why, though the proposition that Tom is bald is true or false, it's impossible for anyone to know which truth-value the proposition has, where the irremediable ignorance somehow results from the vagueness of baldness. If, but only if, this theorist can answer this question can she say what makes Tom a borderline case of baldness, for her answer to that question must take the form:

Tom is a borderline case of baldness just in case it's either true that Tom is bald or else true that he's not bald, although, *for such-and-such reason*, it's impossible for anyone to know which truth obtains.

To define the notion of a borderline case in this way is to be an epistemic theorist of vagueness. Epistemic theories of vagueness may be individuated by the way they explain the ignorance to which they are committed.

The semantic theorist = the theorist who rejects bivalence for borderline propositions. Now suppose a theorist denies that bivalence holds for borderline propositions. According to this theorist, the proposition that borderline Tom is bald is neither true nor false; it's neither a fact that he's bald nor a fact that he's not

bald; there's no fact of the matter either way. Since there's no truth either way, there's nothing of which we're *ignorant*. At the same time, this theorist will acknowledge that if there are any truth-value-less propositions, there are bound to be some—e.g., the proposition that the present King of France summers in New Jersey—which have nothing to do with vagueness. Thus, the theorist who denies bivalence must explain what distinguishes borderline propositions from others that lack truth-values. If, but only if, the theorist can do this can she say:

Tom is a borderline case of baldness just in case, *owing to such-and-such*, it's neither true nor false that Tom is bald.

To explain the notion of a borderline case in this way is to be a semantic theorist of vagueness.⁶

As you might have guessed, I doubt that either style of theory can be made to work. I think there are serious problems with all extant attempts, and I think there are principled reasons for doubting that the future will prove more promising. In other words, I doubt that vagueness is either an *epistemic* or a *semantic* notion. This, however, is not something for which I can hope to argue here.⁷ Instead, I'll simply suggest how I think the notion of a borderline case ought to be explicated, the way in which I think it is a *psychological* notion.

As I've already intimated, this explanation needs to be in terms of the notion of a VPB*, a VPB formed under ideal epistemic conditions, when one has certain knowledge of the relevant supervenience base. Before framing the explanation, we should note two things. First, a thing may be a borderline case of a property even though no one is making judgments about the thing. Second, it's of the nature of vagueness that different people in the same ideal epistemic circumstances can differ, sometimes even radically, in their judgments about a thing's being a borderline case of a property, where no one of them is in any sense irrational, and, from a God's eye perspective, that thing would be a borderline case of the property in question. We may now say that

[B] x is to some extent a borderline case of being F just in case someone could have a VPB* that x is F.

[B] evidently provides a necessary condition for x's being a borderline case of being F. To say that someone could have a VPB* that x is F is to say that there is *some* possible world similar in relevant respects to the actual world in which someone has a VPB*

that x is F . The relevant respects are defined by the supervenience base for being F —e.g., the hair situation on Tom’s scalp. Thus, the ability to form a VPB* that x is F would fail to be a necessary condition for x ’s being a borderline case of being F only if there is a possible world in which x is a borderline case of being F and there is *no* possible world similar to that world in all F -relevant respects in which someone has a VPB* that x is F .

[B] evidently also provides a sufficient condition. The right-hand side of [B] fails to state a sufficient condition if someone can have a VPB* that x is F when x is definitely F or definitely not F . Yet I submit that this isn’t possible. If, for example, Tom is definitely bald and one’s epistemic circumstances with respect to the hair situation on Tom’s scalp is ideal, and known by one to be such, then one won’t v^* -believe that Tom is bald; one will *know*, and hence s -believe, that Tom is bald.

The Essence of Vagueness and Pleonastic Properties

One’s apt to feel that [B] fails to capture the *essence* of vagueness, fails to capture what *constitutes* it, even if it provides a necessary and sufficient condition for being a borderline case. The idea would be that a thing’s being a borderline case of a property was a metaphysical status whose explication owed nothing to anyone’s actual or potential propositional attitudes. The propositional attitude we have towards a borderline case can’t be *constitutive* of a thing’s being a borderline case of a property; it must merely be a *reflection of*, or *response to*, the thing’s status as a borderline case. While it’s perhaps true that VPB*’s track borderline cases, this is simply because a VPB* is the appropriate attitude to have when confronted with a borderline case.

The feeling one is apt to have is problematic. It’s difficult to see how a VPB could be the appropriate response to a borderline case if VPBs were trackers but not constituters. Being a borderline case of a property Φ is itself a property a thing might determinately have, and one may of course judge a thing to have that property. At the same time, a person who has no explicit concept of a borderline case (no determinately or definitely operator in her language) nevertheless reacts appropriately to a borderline case of Φ by v^* -believing that the thing has Φ , and, we’re assuming, a VPB is the appropriate attitude for anyone who takes something to be a borderline case (an ordinary person’s typical reaction to a borderline case of Φ isn’t to s -believe

that the thing in question is a borderline case of Φ but rather to v-believe that the thing has Φ). We find in this observation a confirmation of an objection Crispin Wright has raised against what he calls *third-possibility views of indeterminacy*—views holding “that indeterminacy consists/results in some kind of status other than truth and falsity—a *lack* of truth-value, perhaps, or the possession of some other value.”⁸ Wright’s objection to third-possibility views is that

It is unsatisfactory in general to represent vagueness as any *determinate* status—a middle situation, inconsistent with both the poles (truth and falsity)—since one cannot thereby do justice to the absolutely basic intuition that vagueness presents as an indeterminacy about *which polar verdict applies*, not as a status inconsistent with both.

From this Wright correctly infers that

To reject the third possibility view is thus to reject the idea that in viewing the question, whether P, as indeterminate, one takes a view with any direct bearing on the question of the truth-value of P. I know of no way of making that idea intelligible except by construing indeterminacy as some kind of *epistemic* status.

I would conclude “epistemic or *psychological* status,” but I think Wright didn’t mean to exclude the kind of position I am advancing. In any case, if the epistemic theory *as defined above* were correct, then one would have an SPB, not a VPB, when confronted with a borderline case. This very strongly suggests that the essence of being a borderline case is captured by [B].

A question lingers. At least the epistemic theory of vagueness makes a semantic, a logical, and a metaphysical pronouncement: *bivalence* holds for borderline propositions (and thus, presumably, holds generally); hence *excluded middle* holds for borderline propositions (and thus, presumably, holds generally); and hence there’s always a *fact of the matter* as to whether a vague property applies or fails to apply to a thing. My VPB view, however, makes no such pronouncements. It’s evidently neutral with respect to the semantic, the logical, and the metaphysical question. But mustn’t there be some objective fact about what’s going on at the semantic, logical, and metaphysical levels with vague properties, a question that isn’t answered by anything about our cognitive practices with respect to vague propositions? This complaint

reasonably emanates from an entirely natural metaphysical view. This natural view, which owes something to Plato, sees properties as being entities that are in every sense ontologically and conceptually independent from us and from whatever conceptual or linguistic practices we may or may not have. There is no sense in which the nature of any property is determined by the way we use, in thought or talk, the predicate that canonically expresses it. On this view, it is determinate that there is a fact of the matter as regards the semantic, logical, and metaphysical status of each vague proposition, even if that status is, say, that there is no fact of the matter as to whether every such proposition is bivalent. Whatever is going on, it has nothing to do with how we think or talk about vague properties, or whether the semantic, logical, and metaphysical status of these propositions is even knowable by us.

Opposed to this natural view is another view that I would recommend as the correct view. According to this correct view, baldness is mind independent in that a thing might have been bald no matter what our conceptual or linguistic practices had been. Nevertheless, there's a *sense* in which baldness is merely a hypostatization of certain conceptual or linguistic practices.⁹ On this, what I call *pleonastic*, conception of properties the nature of baldness is determined by features of one's concept of baldness, by, if you will, the conceptual role of Mentalese 'bald'. This determination obtains in the sense that there's nothing more to the *nature* of properties than can be read off our property-hypostatizing linguistic and conceptual practices.¹⁰ What we can learn about them is what our linguistic and conceptual practices license us to learn about them. Unlike electrons, trees, rocks and other things that enjoy the highest degree of ontological and conceptual independence from our linguistic and conceptual practices, pleonastic entities like properties have, as Mark Johnston would put it, "no hidden and substantial nature for a theory to uncover. All we know and all we need to know about [them] in general"¹¹ is determined by our hypostatizing linguistic and conceptual practices. Now, it is a *primitive and underived* feature of the conceptual role of each concept of a vague property that under certain conditions we form VPBs involving that concept, and *it's in this that vagueness consists*. To use a metaphor, what makes a property vague is simply the fact that its predicate name has an underived conceptual role that determines the name to go into a person's VPB box under certain conditions. When the sentence 'Tom is bald' goes into Sally's VPB box, it's not as a response to her

perception of the independently explicable fact that he's a borderline case of baldness. His being a borderline case consists in the conceptual fact, and it's *this* that accounts for the familiar "no-fact-of-the-matter" intuition many have about borderline cases. In line with this, there need be no determinate fact of the matter about the further semantic, logical, or metaphysical status of vague propositions. As I'll presently emphasize, it may well be indeterminate whether bivalence or excluded middle holds for borderline propositions, where this means, of course, that one may v*-believe the propositions that those principles hold. Since our conceptual practices exhaust what may be true of all properties and propositions, there can be no further question of what is "really going on" at any non-conceptual level.

VPB* and the Sorites Paradox

Sorites derivations can take a few interestingly different forms, but it won't hinder our investigation if we take the following derivation as our exemplar:

A person with \$50,000,000 is rich.

For any n , if a person with $\$n$ is rich, then so is a person with $\$n - \1 .

Therefore, a person with only \$3 is rich.

This derivation presents a paradox because it is classically valid, yet one is tempted to pronounce each premise true and the conclusion false when considering it on its own.

Familiar attempted solutions to the sorites aim to give it what we might call a *happy-face* solution.¹² A happy-face solution to the displayed sorites derivation would do two things. First, it would identify the assumption that was the odd-guy-out: it would tell us either that the derivation, although valid by classical logic, isn't really valid, or else that either the first premise, the second premise, or the conclusion doesn't have the truth-value we're tempted to ascribe to it. Second, it would explain away the spurious appearance of the odd-guy-out so that we would never again be taken in by it.

I doubt the sorites has a happy-face solution. The problem isn't that we can't identify the odd-guy-out, for we're constrained, *faute de mieux*, to deny the second premise, the *sorites premise*.¹³ After all, it's obvious that the first premise is determinately true and

the conclusion determinately false, and the inference appears to be determinately valid, since its validity depends only on *modus ponens* and universal instantiation, and we can remove the reliance on universal instantiation by replacing the sorites premise with its relevant instances. Since the inference is determinately valid, the first premise is determinately true, and the conclusion is determinately false, we're constrained to hold the sorites premise to be determinately false. The impediment to a happy-face solution comes when we try to *explain away* the sorites premise's appearance of truth. To explain away that appearance of truth is just to explain away the following argument's appearance of soundness, for the sorites premise appears to be true just to the extent that this argument appears to be sound:

- (1) There is no one-dollar cutoff between what suffices to make a person rich and what fails to suffice to make a person rich. That is, there isn't some particular number such that the proposition that *that number* is the cutoff is true.¹⁴
- (2) If there is no such cutoff, then there isn't an n such that having $\$n$ is sufficient for being rich but having $\$n - \1 isn't sufficient for being rich.
- (3) If there isn't an n such that having $\$n$ is sufficient for being rich but having $\$n - \1 isn't, then for any n , if a person with $\$n$ is rich, then so is a person with $\$n - \1 .
- (4) Therefore, for any n , if a person with $\$n$ is rich, then so is a person with $\$n - \1 .

This argument itself constitutes a paradox: it's apparently valid, each premise, considered on its own, appears to be true, and yet we know its conclusion can't be true. The sorites has a happy-face solution only if this sub-paradox has a happy-face solution, and it has a happy-face solution only if we can locate a masquerader among the following assumptions: that the inference is valid, that (1) is true, that (2) is true, that (3) is true, and that (4) is false. The catch, I submit, is that there is no determinate masquerader. The conclusion is determinately false and the inference, depending only on *modus ponens*, is determinately valid. If there's to be a determinate odd-guy-out, it must be that one of the three premises is determinately false, or that while the conjunction of the premises is determinately false, each premise itself is determinately neither true nor false. It's not the latter, for, as we're about to see, it's indeterminate whether bivalence holds, and we can see in the following way that none of the premises is determinately false.

To suppose that premise (1) is false is in effect to suppose that bivalence holds for borderline propositions. Nothing else could motivate holding that there is some numeral α such that 'Having $\$ \alpha$ is sufficient for being rich but having $\$ \alpha - \1 isn't' is true. But it's indeterminate whether bivalence holds for borderline propositions, for one may v^* -believe, for example, *that it's true or false that borderline Tom is bald*. Recall that a proposition is indeterminate if someone may v^* -believe it. Recall, too, that to have a VPB*, as opposed to a mere VPB, one must be in *ideal* epistemic circumstances. What counts as ideal will depend on the nature of the proposition in question. When the proposition involves a certain discipline, expertise in that discipline may be required. The propositions presently at issue may require expertise in semantics and logic. Nevertheless, it would seem that there are such experts who would v^* -believe that borderline vague propositions have truth-values.¹⁵

It's plausible that it's indeterminate whether borderline vague propositions have truth-values whether or not my own account of borderline propositions is correct. There is a disagreement among extremely intelligent and superbly rational experts as to whether borderline vague propositions have truth-values. Are we really to suppose that one side of this disagreement is determinately right, the other determinately wrong? What on earth could possibly explain the failure of those who have it wrong to see the truth? The only sensible way to make sense of this dispute is to suppose that no one is determinately right or wrong, which is to say that it's indeterminate whether borderline propositions have truth-values.

If it's indeterminate whether bivalence holds for borderline propositions, then it's reasonable to suppose that it's also indeterminate whether excluded middle holds for them. Someone ideally placed epistemically may v^* -believe to degree .5 that Tom is bald or not bald. Once again, this seems right quite apart from the explication of vagueness in terms of VPBs. There is here, as with bivalence, an evidently irresolvable dispute between equally adept and expert rational thinkers. It seems preposterous to suppose that one side is simply failing to see what the other knows.

Turning now to premise (2), to suppose it's false is to suppose that bivalence fails for borderline propositions. For (2) is false only if it's the case *both* that there is no $\$1$ cutoff *and* that there is some number n such that having $\$n$ suffices for being rich while having $\$n - \1 doesn't, and requires the position, famously associated with supervaluationism, that an existential generalization can be true without there being a witness that makes it true,

because every proposition involving a potential witness will fail to have a truth-value.

Premise (3) will be denied by the intuitionist,¹⁶ but it can't reasonably be said to be determinately false, and we needn't decide whether it's determinately true or indeterminate.

Thus, we're unable to give a happy-face solution to the sorites because there is no determinately correct complete explanation of why the argument for the sorites premise is unsound.

Unhappy-Face Solutions

One is committed to an *unhappy-face* solution to a paradox if one denies that the paradox has a happy-face solution, but we should expect more of an unhappy-face solution than a demonstration that there can be no happy-face solution. First, we should expect an explanation of what it is about the concept, or concepts, in play which precludes a happy-face solution. Second, we should expect to learn whether the paradox admits of a *weak* or a *strong* unhappy-face solution, a distinction presently to be explained.

To see what I mean as regards the first expectation, consider the problem of free will, a classical philosophical paradox. The problem of free will is a paradox because it's posed by three mutually incompatible propositions each one of which seems plausible when viewed on its own: we sometimes act freely; everything we do was caused by events that preceded our birth; and if everything we do is causally determined by events that happened before we were born, then we never act freely. This paradox, I submit, doesn't admit of a happy-face solution. The reason has to do with a glitch in our concept of free will. Think of that concept as determined by the underived conceptual role of 'free' in one's language of thought (by 'underived' I mean, to a rough approximation, the processing role your brain was programmed to follow as soon as you were plugged in). That conceptual role has two parts that don't cohere. On the one hand, we're disposed to judge an act was done freely when it satisfies certain paradigm conditions, while on the other hand we're disposed to deny that an act was done freely when we learn that the propositional attitudes which led to it were caused by factors over which the agent had no control. Further, there is nothing in the concept to resolve the conflict. The conflicting aspects of conceptual role don't mean that the concept of free will is inconsistent (it isn't like the concept of a round square), for we don't take

the aspects of conceptual role to provide necessary conditions for the concept's application when we learn of their conflict. The extent to which one experiences these conceptual impulses can vary from person to person, and even within a person over time, but for anyone who has our concept of free will, both impulses are inherent in the concept, and it remains there even if one decides to ignore it in applying the concept. This is why the paradox of free will can have no happy-face solution.

So why does the sorites not have a happy-face solution? In the case of our concept of free will, the conceptual glitch is entirely within the single concept of free will (or, better, of free will and its companion concept of moral responsibility). The conceptual-glitch situation generating sorites paradoxes is a bit more complicated:

- There is a glitch within each vague concept for which it and its complement (i.e., the concept of its negation) admit of determinate application, which should not be surprising, since a sorites may be run on each such concept.
- The intraconceptual part of the glitch for each such sorites-prone vague concept is that we are disposed to regard certain cases as paradigm instances of the concept's application and certain other cases as paradigm instances of the application of the concept's complement while, at the same time, we are disposed not to recognize any sharp cutoff between those cases where the concept applies and those cases where its complement applies.
- But the glitch that results in the sorites paradox reaches beyond the vague concepts on which sorites derivations turn:
 - The underived conceptual roles of our concepts of our logical connectives (e.g., disjunction) disposes us to regard them as truth-functional (e.g., the truth-value of a disjunction is a function of the truth-values of its disjuncts) and to regard true existential generalizations as having witnesses (e.g., if it's true that there are dogs, then it's true of some particular thing—say, Fido—that it's a dog). This disposition is so strong that it persists in full light of the sorites, which is why many people find supervaluationist semantics unacceptable as an account of the logical concepts we actually use.
 - The underived conceptual role of our concept of truth disposes us towards bivalence and excluded middle, but these dispositions (= "intuitions") are thrown into disarray by the already-noted conceptual role dispositions of vague concepts.

- Finally, there is no “higher” conceptual authority to give a determinate resolution to these conflicts.

So much for what it is about our concepts which precludes a happy-face solution. I turn now to the distinction between weak and strong unhappy-face solutions. A *weak* unhappy-face solution of any paradox will tell us that while there can be no happy-face solution involving the concept, or concepts, generating the paradox, a suitable conceptual revision is possible that would be paradox-free, where a conceptual revision is “suitable” if it can do the primary work we wanted the “defective” concept to do. Alfred Tarski in effect offered a weak unhappy-face solution to the semantic paradoxes. He suggested that given the “inconsistent” nature of our commonsense concept of truth, there could be no happy-face solution to those paradoxes. But Tarski, and those who have followed him, expected, and sought, a notion of truth on which the paradoxes wouldn’t arise. A *strong* unhappy-face solution denies that any suitable conceptual revision is possible. Will the sorites have a weak or a strong unhappy-face solution?

Giving a weak unhappy-face solution for a paradox requires answering two questions: What is the defective paradox-generating concept/s? What tasks would a replacement need to perform? These questions are easy to answer for the semantic paradoxes: truth is the defective concept, and we need a non-defective version to do such metalogical work as defining validity. But how might we attempt to answer them for the sorites?

The first question was answered when we noted the conceptual glitches that generated sorites paradoxes, a package with elements in each vague concept, in our concept of truth, and in our concepts of logical expressions. Now, we can hardly hope to replace each vague concept with a precise one, and to what end if, *per impossibile*, we could? We can forget about that route to a weak unhappy-face solution; if there’s to be such a solution it will have to proceed via a reform of our concept of truth, perhaps in conjunction with a reform of our logical concepts. Any such reform, it’s reasonable to suppose, will seek a revision of our concept of truth which makes its application to borderline propositions either determinately bivalent or determinately non-bivalent. What sort of reform we should seek depends, of course, on our answer to the second of the two questions raised in the preceding paragraph: For what purpose would we need a reform? It might be thought that it’s needed to have an adequate logic for vague language. Classical logic doesn’t require bivalence, but it does re-

quire excluded middle, and, as we've seen, the reasonableness of pronouncing bivalence indeterminate carries with it the reasonableness of pronouncing excluded middle indeterminate. And if it's indeterminate whether every instance of excluded middle is true, then it's indeterminate whether classical logic is correct. But so what if it's indeterminate whether classical logic is correct? Logic is the theory of the consequence relation. If it's indeterminate whether instances of excluded middle involving borderline propositions are true, then, for example, it's indeterminate whether the proposition that borderline Tom is or isn't bald is a consequence of the empty set of premises. How does *adopting* any logic, classical or non-classical, help this fact? We have many logics at our disposal, and we mustn't confuse the question of which logic is *correct* with the question of which logic might best be used for such-and-such purpose. Besides, it's hard to see what reasoning is seriously affected. Classical logic continues to let us know that any conclusion is determinately true when it is validly derived from premises that are determinately true.

I confess that I can think of no compelling reason for which a conceptual reform is required. But if there were to be such a reform, it would require a reform of *truth* which made it determinately bivalent or determinately non-bivalent, so let's look at each of these possibilities.

How is a determinately bivalent notion of truth—let's call it *truth**—to be introduced? Presumably by the stipulation that every instance of the following schemas is to count as determinately true:

- The proposition that S is true* iff S
- The proposition that S is false* iff not-S
- Every proposition of the form *S or not-S* is true*.

This is problematic; it appears to require us to stipulate what can't be stipulated. The stipulations entail that the proposition *that borderline Tom is bald or not bald* is determinately true, and this is not something that can be stipulated. The problem is that we've introduced *truth** in terms of *truth*. We need to envision a revision that isn't introduced in terms of any concepts we're trying to replace. We could pretend that, without our knowing it, God does the following brain operation on each of us as we sleep. She extracts 'true' from our *lingua mentis*, and thereby from our public language, and replaces it with 'true*', giving it a conceptual role that entails the following:

'Every proposition is true* or false*' resides permanently in one's implicit-belief box.

S is in one's belief box iff 'It's true* that S' is also in one's belief box.

'Not-S' is in one's belief box iff 'It's false* that S' is also in one's belief box.

Still, at least one serious problem remains: this conceptual revision would prove as puzzling as the puzzle it was meant to eliminate. Truth* would give rise to a notion of vagueness whose coherence with either VPB or SPB was problematic. I'll try to explain.

If our innate notion of truth were truth*, vagueness as we know it might not obtain, but something like it would, and it would require an epistemic theory. The proposition that borderline Tom was bald would have a truth*-value, but, of course, it would be impossible for anyone to know what it is. It may seem that no deep account of this irremediable ignorance would be needed. The proposition that borderline Tom is bald would be determinately true* or false*, although it would be neither determinately true* nor determinately false*. At the same time, it would be a conceptual truth* that one knows p only if p is determinately true*. Suppose it's true* that Tom is bald. The fact that it's not also determinately true* entails that no one knows it. End of story. But this short story is too short. The fact that a proposition isn't determinately true* doesn't *per se explain* why no one can know it; whether it does explain it depends on one's account of the determinately operator. If, for example, 'indeterminate' simply means *unknowable*, then one's inability to know that Tom is bald isn't *explained* by citing the fact that, while the proposition that Tom is bald is true*, it isn't determinately true*.

It may, however, seem that the VPB theorist has an answer to give, one that would make her welcome the conceptual revision that replaces truth with truth*. For her, p is solidly indeterminate just in case someone can v*-believe p to some degree near .5, but no one can *know* that which may be so v*-believed. No one can know that which can be v*-believed to degree .5, because when someone v*-believes a proposition, he's in, and knows himself to be in, conditions that are epistemically ideal for knowing that proposition, and he therefore knows that even though he doesn't know the proposition, no one can ever get into a better epistemic position for knowing it. Seeing why this response won't do will show us how paradox looms again.

When truth* replaces truth, v-believing that Tom is bald may not be the appropriate response. Either the proposition that Tom is bald is true* or the proposition that he's not bald is true*. If the best available evidence fails to privilege one of those propositions, then we're evidently committed to unknowable hidden facts. But then shouldn't the appropriate belief for Sally mid-way through the plucking of Tom (but after the neural transplant that replaced her Mentalese 'true' and 'false' with 'true*' and 'false*')—the point when she actually v*-believes to degree .5 that he's bald—be a SPB? Shouldn't it be her view that her evidence simply fails to reveal the full story about Tom's baldness and that all she can do is suspend judgment, there being a fifty-fifty chance that he's really bald, and a fifty-fifty chance that he's really not bald? After all, wouldn't *God* s-believe to degree 1 either that Tom was bald or that he wasn't bald? The problem is that it's doubtful that anyone could coherently s-believe that Tom was bald. Imagine you're confronted with Tom and take it to be either a fact that he's bald or else a fact that he's not bald. At that time you would be *uncertain* whether he was bald and would thus s-believe to, say, degree .5 that he was bald. However, you would soon realize that this makes no sense: there can't *really* be a fact of the matter about Tom's baldness. The contours of the property expressed by a predicate are determined by features of the predicate's *use*, and there's nothing in the use of 'bald' that would allow one to say that Tom satisfies a sufficient condition either for being bald or for not being bald. The idea that there could nevertheless be a commitment to bivalence would undo itself, for your temptation, if you had that commitment, would be to say "Our commitment to its being true* or false* that Tom is bald is merely an artifice of our commitment to bivalence with respect to truth*.¹⁷ There isn't *really* a fact that he's bald or a fact that he's not bald; it's just that our commitment to bivalence requires us to say there is." As I said, a determinately bivalent notion of truth seems to cohere dubiously with either VPB or SPB.

Perhaps we'll have better luck with a determinately *non*-bivalent notion of truth. Intuitively, a semantic regimentation of vagueness would do better with such a notion; and the best non-bivalent notion would be one that allowed for fine-grained *degrees* of truth. A degree-theoretic notion of truth would presumably allow us to dispense with VPBs. To v-believe p is to v-believe that p is true. If our notion of truth were degree-theoretic, then (to oversimplify momentarily) when Tom was a borderline case of baldness it would be at least partly by virtue of the fact that the

proposition that he was bald was true to such-and-such degree, and thus the appropriate belief for Sally to have would be the *SPB that the proposition that Tom was bald was true to such-and-such degree*. There is, however, more than one way of developing a degree-theoretic notion of truth. For our purposes, such developments may be subsumed under two general approaches, one of which comports with classical logic, the other of which departs from it.

The degree-theoretic notion of truth that departs from classical logic is the way most common among degree-of-truth theorists; it's a degree-functional account of the connectives due to Łukasiewicz,¹⁸ which, following Dorothy Edgington,¹⁹ we may restate as follows for negation, conjunction, disjunction, and implication (*if...*, *then...*):

$$[\sim] T(\sim p) = 1 - T(p)$$

$$[\&] T(p \& q) = \text{Min}[T(p), T(q)]$$

$$[\vee] T(p \vee q) = \text{Max}[T(p), T(q)]$$

$$[\supset] T(p \supset q) = 1 \text{ if } T(p) \leq T(q), 1 - [T(p) - T(q)] \text{ otherwise.}$$

This requires a departure from classical logic in that, for example, excluded middle and non-contradiction fail: if $T(p)$ and $T(\sim p)$ are both .5, then both $T(p \vee \sim p)$ and $T(p \& \sim p)$ are also .5. These results, however, are not without intuitive appeal. It's patently not unreasonable to wonder whether borderline propositions are neither true nor false and therefore not unreasonable to wonder whether disjunctions of them are also neither true nor false. And, as regards non-contradiction, if God were to assure you that it was a *fact* that *both* the proposition that Tom was bald *and* the proposition that he wasn't bald were true to degree .5, how could you rationally think that the conjunction of those two propositions was itself true to a degree other than .5?

How will this theorist respond to the two problems of vagueness, the problem of explicating the notion of a borderline case and the sorites paradox? As regards the first, she'll at least want to say that

p is to some extent a borderline proposition *only if* $0 < T(p) < 1$.

Whether she'll want to add an 'if' to the 'only if' will depend on whether she thinks that non-borderline propositions—e.g., the proposition that the King of New Jersey drools—can be other than

completely true or completely false. As regards our exemplar of the sorites—the inference

A person with \$50,000,000 is rich.

For any n , if a person with $\$n$ is rich, then so is a person with $\$n - \1 .

Therefore, a person with only \$3 is rich.

—what the theorist says will depend on how she defines validity, but we may take it as given that for her the first premise is true to degree 1, the conclusion is true to degree 0, and the second premise, being equivalent to a long conjunction none of whose conjuncts is true to a degree much below 1, is itself true to a degree just a little below 1. A natural, but not inevitable, way for the theorist to define validity is to say that valid arguments preserve *degree of truth*, so that the conclusion of a valid argument will be at least as true as the least true premise. So defined, the displayed sorites argument is invalid. It may seem that the Łukasiewiczian degree-of-truth theorist could have the argument come out valid if she took degree 1 as the designated value and held that an argument is valid just in case it's impossible for the premises to be completely true while the conclusion isn't. For then she could say that the conclusion *would* be completely true if the premises *were* completely true. We can, however, see that this won't work by contraposing the sorites premise and the conclusion: the derivation

A person with \$50,000,000 is rich.

A person with only \$3 is not rich.

Therefore, it's not the case that for any n , if a person with $\$n$ is rich, then so is a person with $\$n - \1 .

has completely true premises and a conclusion, the theorist must hold, that is nearly completely false (for the conclusion is equivalent to a long disjunction of negations of conditionals of the form *not*(if a person with $\$x$ is rich, then so is a person with $\$x - \1), and each such negation will be either completely false or else very nearly completely false).

There are several problems with this non-classical way of trying for a weak unhappy-face solution (some of which will be mentioned in the discussion of the next proposal), but the following problem appears to render the theory straight-out unacceptable. However the theorist defines validity, the theorist must hold that some determinately true propositions classically entail proposi-

tions that are determinately false to a degree close to 1, and this is unacceptable.

A degree-theoretic account of truth which comports with classical logic can be defined in terms of a supervaluational account of propositional truth, for, on such an account, a proposition's degree of truth can be defined in terms of the proportion of admissible precisifications on which it's true.²⁰ And Dorothy Edgington achieves the same effect by directly introducing a degree-theoretic construal of truth wherein T mimics the behavior of prob in classical probability theory.²¹ Whereas the Łukasiewiczian account is degree-functional (the degree of truth of a compound is a function of the degrees of truth of its components), the classical logician's T , like prob , isn't. Pursuing the analogy with prob , Edgington accepts the degree-functional's $[\sim]$, but rejects the other three generalizations, and it will be convenient to take her account as representative of an account of degrees of truth which comports with classical logic (although readers familiar with the supervaluationalist literature will have no trouble superimposing that view).

Re $[\&]$. In probability theory, $\text{prob}(p \ \& \ q) = \text{prob}(p) \times \text{prob}(q/p)$ (unless $\text{prob}(q) = 0$, in which case $\text{prob}(p \ \& \ q) = 0$). $\text{Prob}(q/p)$ —the conditional probability of q given p —is, we know, $\text{prob}(p \ \& \ q)/\text{prob}(p)$. Edgington's version of $[\&]$ requires a truth-theoretic analogue of conditional probability. $T(q/p)$ —the conditional truth of q given p —is what $T(q)$ would be if $T(p)$ were 1. She is then able to say that $T(p \ \& \ q) = T(p) \times T(q/p)$ (unless $q = 0$, in which case $T(p \ \& \ q) = 0$).

Re $[\vee]$. In probability theory, $\text{prob}(p \ \vee \ q) = \text{prob}(p) + \text{prob}(q) - \text{prob}(p \ \& \ q)$. Accordingly, Edgington holds that $T(p \ \vee \ q) = T(p) + T(q) - T(p \ \& \ q)$.

As regards $[\supset]$, Edgington sets aside “the correct treatment of vague conditionals (tempting as it is to identify $T(\text{If } p, q)$ with $T(q/p)$.”²² Classical logic holds for Edgington, even though bivalence fails: $T(p \ \& \ \sim p) = 0$ and $T(p \ \vee \ \sim p) = 1$ whatever the value of $T(p)$ (compare: for the supervaluationalist, $p \ \& \ \sim p$ is always false and $p \ \vee \ \sim p$ always true, even when p and $\sim p$ are neither true nor false).

The Edgingtonian/supervaluationalist degree-of-truth theorist offers a more acceptable treatment of the sorites than the Łukasiewiczian degree-of-truth theorist. For her, an argument is valid when, and only when, it has what she calls the *verity-constraining property*. An argument has this property when the “unverity” of its conclusion can't exceed the sum of the unverities of its premises, where

the unverity of a proposition is $1 -$ its degree of truth. Thus, our exemplar of the sorites is valid, because while its conclusion has unverity 1, so does the sorites premise (as the supervaluationist would put it, the negation of the sorites premise will be completely true, since it will be true in every admissible precisification).

This theorist also has a response to the argument for the sorites premise. That argument, you'll recall, is:

- (1) There is no sharp one-dollar cutoff between what suffices to make a person rich and what fails to suffice to make a person rich. That is, there isn't some particular number such that the proposition that *that number* is the cutoff is true.
- (2) If there is no such sharp one-dollar cutoff, then there isn't an n such that having $\$n$ is sufficient for being rich but having $\$n - \1 isn't sufficient for being rich.
- (3) If there isn't an n such that having $\$n$ is sufficient for being rich but having $\$n - \1 isn't, then for any n , if a person with $\$n$ is rich, then so is a person with $\$n - \1 .
- (4) Therefore, for any n , if a person with $\$n$ is rich, then so is a person with $\$n - \1 .

According to the Edgingtonian/supervaluationist degree-of-truth theorist, premises (1) and (3) are completely true and premise (2) is completely false. This is readily appreciated if one recalls that this way of going degree theoretic comports with a supervaluationist semantics, and in such a semantics the existential generalization 'There is an n such that having $\$n$ is sufficient for being rich but having $\$n - \1 isn't' is true (i.e., true in every admissible precisification) even though no substitution instance of its quantified open sentence, 'Having $\$n$ is sufficient for being rich but having $\$n - \1 isn't', is true. If this were being offered as a happy-face solution, the theorist would need to explain why we naively suppose premise (2) is true when it's really false, why, that is, we suppose a true existential generalization must have a witness that makes it true. But since we're considering the position as a conceptual revision, no such debt is incurred.

Nevertheless, there are problems:

- (a) I'll start with something I'm not sure is a problem, as opposed to a feature worth remarking on: the degree-theoretic revision would introduce properties that nothing could have determinately. Can there be a property Φ such that (i) it's metaphysically possible for something to have Φ but (ii) metaphysically impossible for anything *determinately* to have Φ ? One might be

tempted to answer no, arguing that we couldn't have a concept of a property without knowing what would count as a determinate instance of it, unless our concept was of a property that couldn't be instantiated. If this argument is correct, then there is a problem for the degree-of-truth revision. The problem is that for any p and n such that $0 < n < 1$, it will never be a determinate fact that $T(p) = n$; in other words, the proposition that p is true to degree n will itself never be true to degree 1. The argument for this is straightforward. There is no p and n ($0 < n < 1$) such that n is the *only* degree to which it would be correct to v^* -believe p . Suppose Sally and Harry are both present at Tom's plucking and that at the point when Sally v^* -believes to degree .473 that Tom is bald, Harry v^* -believes it to degree .51. In the event, both will be equally correct, equally justified. I take this to be obvious. But then it can make no sense to suppose that the proposition that Tom is bald is true to degree .473 or to degree .51, for if the proposition were true to one of those degrees, then Harry and Sally's VPBs wouldn't be equally correct. The upshot is that every proposition of the form $T(p) = n$ will give rise to unending higher-order vagueness, when $0 < n < 1$. One might well wonder what's to be gained by a conceptual revision that introduces degrees of truth that can never be determinately applied.

(b) This theorist would still owe an account of indeterminacy, or of what it is for a proposition to be borderline. With the Lukasiewiczian degree-of-truth theorist she can say

p is to some extent a borderline proposition *only if* $0 < T(p) < 1$

but in order to go beyond this we must first know this theorist's treatment of propositions, such as the proposition that the King of New Jersey drools, which she may well not want to regard as true or false to degree 1. It's not clear what completion this theorist can give.

(c) The Edgingtonian/supervaluationist revision gives unacceptable results in a significant range of cases. Suppose that while out for a walk in her hometown, Betty gestures in a certain direction and says to her companion, 'A statue of Richard Nixon once stood there'. Almost certainly, the reference of 'there' will be vague, or indeterminate; there will be a large number of precise regions of space that are admissible candidates for being the reference of 'there'. According to the fuller elaboration of the view under con-

sideration, and ignoring higher-order vagueness, the degree of truth of Betty's utterance is computed in the following way. First, one computes the degree to which the utterance of 'there' refers to each of the candidate references, the sum of these equaling 1. For each of the n candidate reference places, we have to consider n distinct propositions: that a statue of Nixon once stood at P_1, \dots , that a statue of Nixon once stood at P_n . The degree of truth of the utterance would then be the arithmetic mean of the products of the degree of truth of each proposition and the degree to which the place involved in the proposition was the reference of 'there'. Thus, Betty's utterance is determinately true—i.e., true to degree 1—if, but only if, each of the n propositions is true to degree 1. So far there is no problem.

Now suppose that the next day, Al, who was party to Betty's utterance, gestures in the same direction and says to his companion [♦] Betty said that a statue of Richard Nixon once stood there. It's here that a problem arises. The problem is that, on the one hand, we want intuitively to say that [♦] is determinately true, while, on the other hand, the revision under consideration must pronounce it determinately false. I take it that we would deem [♦] to be true; it's exactly how we would report Betty's utterance when we were in a position to duplicate her reference. If we deny that [♦] is true, we'll be constrained to deny the truth of an enormous number of indirect speech reports we regard as true. For, as we're about to see, if [♦] fails to be true, then so will any other indirect speech report that involves indeterminate, or vague, reference—for example, reports of the forms:

- A said that it's [now] snowing [here].
- A said that she already ate.
- A said that he'll leave soon.
- A said that Truman lived nearby.
- A said that she'll be with you shortly.

The reason the theory under consideration must pronounce [♦] determinately false is as follows. In order for [♦] to be true to degree 1, it must come out true to degree 1 when 'there' is taken to refer to any of its admissible candidate references. In other words, for every proposition referred to by 'the proposition that a statue of Richard Nixon once stood there', when 'there' is taken to refer to a relevant precisely delimited place, it must be true to degree 1 that Betty said that proposition. But it's not only not determinately true that Betty said each of those n propositions;

even allowing for the vagueness of ‘say’, it’s determinately false that she said any of those propositions. Betty said nothing about some absolutely precisely delimited region of space. Likewise for the other examples just displayed. It’s determinately true that Maurice, in uttering ‘It’s snowing’, said that it was snowing. But the determinately true report, ‘Maurice said that it was snowing’, involves an implicit, and indeterminate, reference to a period of time (‘now’) and to a region of space (‘here’), and however we precisify those implicit references so that they refer to absolutely precisely bounded spans and regions, it will be determinately false that Maurice said any proposition involving those precisely delimited spans or regions. Now, it’s true that the Edgingtonian/supervaluationist position being considered is being considered merely as a conceptual *revision*, so it may seem beside the point that we would have to deem certain things determinately false that are, with respect to our actual concept of truth, determinately true. But I submit that a revision that precludes us from ever correctly reporting that someone said that it’s raining is not a revision worth taking very seriously.

I conclude that the sorites admits only a strong unhappy-face solution.

Further Questions

Vagueness-related partial belief has been introduced, partially explained and motivated, and applied to the two issues of vagueness. I wanted the applications to come quickly on the heels of an intuitive introduction so that the point of the notion didn’t get lost in a discussion of its details. At the same time, such a discussion is needed both for the further elucidation of what’s been done and, no small thing, to allay reasonable doubts about there even being any such things as VPBs. I won’t here attempt to answer all the questions worth asking (and not merely because I haven’t thought of them all!), but I will say something about some of the more salient ones.

1. *How do VPBs interact with SPBs?—Part one.* Owing to the technicalities it would require, a fully general answer to this question is beyond the scope of the present paper. But the general idea can be conveyed. There are really two issues. One concerns the formation of complex beliefs involving one proposition that is v-believed and another that is s-believed. This will be discussed after I say something about how the degrees of logically complex

VPBs are determined. The other issue concerns the role of SPBs in the formation of non-logically-complex VPBs, and I hope the following highly idealized generalizations will indicate the gist of the full story.

For virtually all judgments about the application of vague properties, it's useful to think of the judging agent proceeding in the following sort of way. Suppose that A is judging whether X has the vague property V (e.g., judging whether Tom is bald). Suppose, too, that X's situation with respect to V supervenes on X's situation with respect to a family of properties S, which we might call X's *S situation*. The model here is the way in which the extent to which a person is bald supervenes on the hair situation on his scalp—on the number, size, distribution, etc. of the hairs on his scalp. The idealized version of the underlying truth I'm attempting to approach might go as follows. Let's say that two S situations are *relevantly different for A as regards X's having V* just in case the degree to which A would v-believe that X is V given that A was certain that the one S situation obtained is different than the degree to which A would v-believe that X is V given that A was certain that the other S situation obtained. Then we obtain the degree to which A v-believes that X is V in the following way. First, for each relevant S situation S', we determine the degree to which A would v-believe that X is V given that A was certain that S' obtained. Second, we determine the product of that number and the degree to which A s-believes that S' obtains. Third, we add all those products, and that is the degree to which A v-believes that X is V. For example, suppose (i) that Louise s-believes to degree .7 that hair situation H obtains on Tom's scalp, (ii) that she would v-believe to degree .4 that Tom is bald if she were certain that H obtained, (iii) that she s-believes to degree 1 that hair situation H' obtains on Tom's scalp if H doesn't obtain (i.e., she s-believes to degree .3 that H' obtains), and (iv) she would v-believe to degree .6 that Tom is bald if she were certain that H' obtained. Then the degree to which Louise in fact v-believes that Tom is bald = $(.7 \times .4) + (.3 \times .6) = .46$.

The foregoing affords a more perspicuous way of explaining VPB*s, those VPBs formed under "epistemically ideal" conditions. To a first approximation, VPB*s are those VPBs where one s-believes to degree 1 that a certain S situation obtains; that is, they are those VPBs formed when one is certain about the underlying supervenience base for the vague property being ascribed. This is what characterizes the VPBs Sally forms about

Tom's baldness throughout the plucking: by stipulation, she never has any doubt about the relevant hair situation on Tom's scalp. Her VPBs about Tom's baldness are formed in epistemically ideal situations in that each of her VPBs that Tom is bald is accompanied by an SPB of degree 1 that a certain supervenience-base hair situation obtains for Tom.

The recharacterization of VPB* is a first approximation in at least two respects. First, given the role of VPB* in defining borderline cases, we should require that the degree 1 SPB be certain *knowledge*, rather than mere subjective certainty. Second, not all judgments about vague properties are based on judgments about other properties on which the vague properties supervene. For example, I might regard a certain sensation as a borderline case of pain, but no other judgment seems to stand to that judgment in the way a judgment about the hair situation on a person's scalp sustains a judgment about the person's baldness. I propose that we treat these cases as VPB*s for which there need be no underlying SPB, and thus as being on all fours with VPBs where one *s*-believes to degree 1 that a certain *S* situation obtains.

I introduced the foregoing account of the interaction of VPBs and SPBs as "the idealized version of the underlying truth I'm attempting to approach." I might more accurately have called it the egregiously oversimplified version. For one thing, I neglected to take into account *the way in which* the subvening facts are presented to the believer. When, for example, we judge a person to be bald, we do so on the basis of how his scalp *looks to us* under optimal perceptual conditions. Facts about the number, size, distribution, etc. of the hairs on a person's scalp are relevant only in so far as they determine the kind of VPB* we would form about his baldness under such ideal conditions. I trust that only care about details is needed to correct my overly-simplified characterization of the gist of the complete account. For another thing, my idealization pretends that there is such a thing as *the* degree to which *A* would *v*-believe that *X* is *V* given that *A* was certain that *S'* obtained. In fact, there is no uniquely correct such degree, and what degree a person might manifest at a given time can be determined by various contextually relevant factors, including ones so intangible as transient mood.

2. *How are degrees of logically complex VPBs determined?* Actually, there are two questions: How are complex VPBs *in fact* determined? How would they be determined *for an ideally rational agent*? The same two questions arise for SPBs, for it's clear that the actual degrees of belief of ordinary people don't satisfy

the probability calculus. Our question has to be about the rational formation of VPBs, and on this I would like to suggest that, while the Łukasiewiczian might not have given an adequate degree-theoretic account of *truth*, what she says may aptly characterize VPBs. Like Edgington, I'll ignore conditionals because of the unique problems they present. The proposal then is that:

$$[\sim] \text{VPB}(\sim p) = 1 - \text{VPB}(p)$$

$$[\&] \text{VPB}(p \& q) = \text{Min}[\text{VPB}(p), \text{VPB}(q)]$$

$$[\vee] \text{VPB}(p \vee q) = \text{Max}[\text{VPB}(p), \text{VPB}(q)]$$

Two things to be said for $[\sim]$ are, first, that it seems intuitively right (when Sally v-believes to degree .5 that Tom is bald she seems, *ipso facto*, to v-believe to degree .5 that he's not bald) and, second, it seems to capture the fact that our reaction to a borderline case is ambivalence, not our recognition of (to use Wright's apt phrase) "a third possibility."

Perhaps the most salient feature of VPB is the intuitiveness of the claim that Sally would v-believe to degree .5 that Tom is bald and thin when she v-believes each conjunct to degree .5, even though she regards the conjoined propositions as being unrelated. This is captured by $[\&]$. What will give one pause is that it follows that our eminently rational Sally will also v-believe to degree .5 that Tom is bald and not bald when she v-believes each conjunct to degree .5. But is this really unacceptable? First, v-believing a proposition to degree .5 is consistent with knowing that it can't be determinately true. Second, a not unnatural reaction to the question "Is Tom bald?", when Tom is a borderline case of baldness, is to say, albeit with appropriate ambivalence, "Well, he sort of is and sort of isn't" (I once had a clever undergraduate offer the fact that it was drizzling as a counterexample to the law of non-contradiction, since when it was drizzling it was neither raining nor not raining). Third, as already noted, the truth-theoretic Łukasiewiczian version of $[\&]$ is motivated, and there is something degree-of-truthish about v-believing a proposition, for if one v-believes that Harry is bald to a greater degree than one v-believes that Tom is bald, then one s-believes that Harry is balder than Tom (I'll have more to say on this score presently). Fourth, I've already argued that it's rational to v-believe instances of excluded middle. Suppose, then, one v-believes to degree .5 that Tom is bald or not bald. Then, by $[\sim]$, one also v-believes to degree .5 that Tom is not (bald or not bald); but to v-believe that Tom is not (bald or not bald) is to v-believe that

he's neither bald nor not not bald, which in turn is evidently to v-believe that he's not bald and bald.

Finally, [v] is arguably the most plausible rule, since it has a transparent motivation when the disjuncts are compatible, and I've already tried to argue the plausibility of this rule for instances of excluded middle. One might object that this would preclude one from rationally accepting excluded middle, but it doesn't. My position is that one who fully accepts excluded middle, one who s-believes that every proposition of the form *p or not-p* is true, should also accept bivalence, and therefore shouldn't have our concept of vagueness. Faced with borderline Tom, one should be *uncertain* whether he's bald, and should therefore s-believe to an appropriate intermediate degree that he's bald.

3. *How do VPBs interact with SPBs?—Part two.* This brings us to complex beliefs involving one proposition that is v-believed and another that is s-believed. An example would be Sally's belief that (Tom is bald and her nephew will fail his logic course), where she v-believes the first conjunct to degree .6 and s-believes the second to degree .3. I propose that, even though rational Sally takes the two conjuncts to be unrelated, she'll nevertheless believe the conjunction to degree .3 (rather than to degree .18). In fact, I submit that all such beliefs, when rationally held, will satisfy the Łukasiewiczian rules just displayed, and are therefore all VPBs. It's possible, however, that this will require qualification when conditionals are accommodated.

4. *Since virtually all concepts are vague, how can there be any SPBs? Why aren't all partial beliefs VPBs?* This has a short answer. One's partial belief of a vague proposition is a SPB when one takes the partially-believed proposition to be determinately true or determinately false, notwithstanding its vagueness.²³ Thus, typically, one regards oneself as having inconclusive evidence for a proposition whose truth or falsity can in principle be settled decisively, which is why uncertainty characterizes SPBs but not VPBs.

5. *What about higher-order vagueness?* I said that x is to some extent a borderline case of being F just in case someone could have a VPB* that x is F. This isn't intended to imply that the extent to which a thing is a borderline case of a property = the degree to which someone could v*-believe that the thing has the property, for there is no unique such degree. More needs to be said on this, but the intuitive idea meant to be captured is that one thing can be more of a borderline case of a property than another thing, and this should be explained, somehow, in

terms of the degrees to which rational agents would v^* -believe those things to have the property. If an exact correlation of some sort were to hold, this would alleviate problems of higher-order vagueness, but it would certainly not eliminate the phenomenon. The reason is simple: the notion of a VPB, like every other notion, is vague, and higher-order vagueness will be generated just from the fact that propositions about something's being a VPB may themselves be v -believed.

6. *Are VPBs really beliefs?* There can be little doubt that in making one of her qualified assertions that Tom is bald midway through the plucking of Tom, Sally is expressing *some* relation to the proposition that Tom is bald. Let's dub this relation, whatever its nature, 'V'. Given the way Ving is related to making a qualified assertion that such-and-such, and given that one can't make a qualified assertion that such-and-such without being prepared to make the same qualified assertion that it's true that such-and-such, we know that to V a proposition is to V that it's true. So, Ving is a propositional attitude, and it's a propositional attitude that comes in degrees. But are V states *partial beliefs*? The reason for doubting that they are is that being an SPB—i.e., being the sort of partial belief which under idealization satisfies the axioms of probability theory—is apt to seem definitive of the contribution beliefs make in the production of behavior, and something that can't be used to explain behavior in the way beliefs standardly do has no business being called a belief. 'VPB', of course, is just another name for V states, whether or not they are partial beliefs, and we can see the dilemma for them in the following way.

You have one concern: to find your heart medicine as soon as possible. You s -believe to degree .67 that it's at place P and you s -believe to degree .33 that it's at place P'. Both places are equidistant from you, and you have easy access to both. There are no competing desires. Clearly, you will first look for your medicine at place P. But now suppose that instead of s -believing to those degrees, you V to those degrees, where your Ving is based on your taking the stuff at the two locations to be a borderline case of your heart medicine. It's no longer clear what you would do. What good, you may wonder, would a borderline case of your medicine do?

My initial intuitive basis for claiming that VPBs are a species of partial belief was the way they are implicated in the production of qualified assertions, evidently a hallmark of partial belief. Still, VPBs would be a very Pickwickian species of partial belief

if the only behavior they explained were qualified assertions of borderline propositions. But so what? Then I've explained vagueness in terms of a notion of Pickwickian partial belief, or, if even that sounds tendentious, then I've explained vagueness in terms of a new kind propositional attitude, one that comes in degrees and that precludes standard partial beliefs. Yet, while I can find nothing wrong with that (admittedly aesthetically unsatisfying) response, I do think VPBs are a species of partial belief that explains behavior. For VPBs behave *as if* they were beliefs about the degree to which their propositional contents were true. The "as if" is crucial: there is no reducing *x v-believes p to degree n* to *x believes that p is true to degree n*. First, the believer need have no concept of degrees of truth. Second, we've already noticed that two people may be equally correct in v-believing a proposition to different degrees, but this wouldn't be possible if one of them had a true belief and the other a false belief. Third, if there were a reduction, the applicable degree-theoretic notion of truth would be Łukasiewiczian, and we know that can't handle the sorites and probably can't define the notion of a borderline case. What recommends the "as if" gloss are considerations like the following.

Pretend that we had a coherent, Łukasiewiczian degree-theoretic notion of truth and that Sally believes that the proposition that Tom is bald is true to degree .5. This is a straightforward belief of Sally's and can explain her behavior if it interacts in appropriate ways with desires whose propositional contents themselves concern degrees of truth. For example, it may be that she is attracted only to men who are either completely bald or else have luxurious heads of hair. Then we can explain her refusing to go out with Tom by citing that fact about her together with the fact that she believes that the proposition that he's bald is true to degree .5. My point—on which something more might be said—is that we can achieve what is in effect the same explanation by citing the fact that she v-believes to degree .5 that Tom is bald.

Anyway, this paper proposes a theory of vagueness. A lot more remains to be said in clarification and elaboration of it, but I hope it's at least worthy of further consideration.²⁴

NOTES

1. There is a partial overlap between the present paper and Schiffer 1998. The present paper is both a substantial revision of and sequel to the earlier paper.

2. It's a theorem of the probability calculus that if p and q are independent, then $\text{prob}(p \ \& \ q) = \text{prob}(p) \times \text{prob}(q)$ (otherwise, $\text{prob}(p \ \& \ q) = \text{prob}(p) \times \text{prob}(q/p)$, unless $\text{prob}(p) = 0$, in which case $\text{prob}(p \ \& \ q) = 0$).
3. I owe this example to Hartry Field.
4. After writing Schiffer 1998, in which I first presented the distinction between SPBs and VPBs, I became aware of Sainsbury 1986. There Sainsbury distinguishes between what he calls *epistemic* and *non-epistemic* degrees of belief. He holds that "borderline cases for a vague predicate will give rise, in fully informed and rational beings, to degrees of belief. These resemble epistemic degrees of belief in that they are related to strength of tendency to act. But they are unlike epistemic degrees in that they represent no ignorance. Rather, they reflect the fact there is no definite right or wrong: it would be as wrong to believe with total confidence that a borderline case is a positive case as to believe, with total confidence, the negation of this" (99). He adds that "epistemic degrees of belief reflect some lack in *us* (lack of information). They need give rise to no temptation to suppose that they answer to some feature of the world independent of ourselves. By contrast, the necessity for vagueness-induced non-epistemic degrees of belief, if we are to have as accurate and complete a picture of the world as possible, shows that these degrees *do* answer to some feature of the world. Omniscience, if it allows vague concepts at all, as we mortals do, could do no better than have an intermediate degree of belief about a borderline case" (104). But Sainsbury's distinction isn't mine. Not only does he think that non-epistemic degrees of belief satisfy the same laws as epistemic degrees (they're both species of SPBs), but, even more significantly, he uses his non-epistemic degrees of belief to motivate a notion of degrees of truth, and it's in terms of this degree-theoretic notion of truth that he hopes to deal with vagueness. I discuss degrees of truth later in this paper, and show there why they can neither be identified with degrees of belief nor used to solve the problems of vagueness.
5. Of course, anyone who accepts bivalence for borderline propositions will do so because she thinks that the principle of bivalence holds for all propositions, perhaps with a qualification for the semantic paradoxes.
6. One might complain that I have, at best, implicitly exaggerated the distinction between the two kinds of theories of vagueness, since in some cases there will be a virtual equivalence between epistemic and semantic theories as I've characterized them. Suppose that A is a conventional supervaluationist (except, we'll suppose, her theory is developed for propositions rather than sentences—which I take to be merely an expository convenience in the present context). According to A , a proposition is true just in case it's true under every admissible precisification, false just in case it's false under every admissible precisification, and neither true nor false just in case it's true under some admissible precisification and false under another. A holds that the proposition that borderline Tom is bald is neither true nor false. A counts, on my characterization, as a semantic theorist of vagueness, i.e., a theorist who rejects bivalence for borderline propositions. Opposed to A is B . B accepts bivalence for borderline propositions but gives a supervalua-

tionist account of *definitely true/false*. That is, a proposition is definitely true just in case it's true under every admissible precisification, definitely false just in case it's false under every admissible precisification, and neither definitely true nor definitely false if it's true under some admissible precisification and false under another. But now suppose that, with no alteration of her theory, A introduces the predicates 'true*' and 'false*' via the stipulation that every instance of the schemas *The proposition that S is true* iff S* and *The proposition that S is false* iff not-S* is to be true. Since A's theory already entails excluded middle, propositions are for her bivalent with respect to their truth*-values. Yet now A and B hold equivalent theories, for B's truth = A's truth* and A's truth = B's definite truth.

I don't see that this shows anything interesting. Any theorist who accepts classical logic can cast her theory in a supervaluationist guise, and this because the notion of an admissible precisification must itself be explicated in terms of vagueness: a precisification of Φ is admissible just in case everything that *determinately/definitely* has Φ is assigned to the extension of Φ and everything that *determinately/definitely* doesn't have Φ is assigned to the anti-extension of Φ . No account of vagueness is given until a non-question-begging account of the determinately/definitely operator has been given. If the account is to be semantic in the sense explained, it will have to fit the schema displayed in the text, and then the account will have its weight borne by a pre-theoretic, non-bivalent notion of truth. The theorist can then go on harmlessly to introduce his bivalent truth*, but it will do no work and show nothing.

7. I argue against epistemic theories of vagueness in Schiffer 1999. Two objections against semantic theories, one Crispin Wright's, one mine, are mentioned below in the texts, on pp. 231 and 246–248, respectively.
8. Wright 1999.
9. See Schiffer 1996 and Schiffer forthcoming.
10. One way of putting this point is to say that we know the nature of Φ by way of knowing *a priori* that Φ is necessarily such-and-such just in case our concept of Φ **actually** has such-and-such conceptual role.
11. Johnston 1988.
12. See Schiffer 1995/6.
13. This is what Vann McGee and Brian McLaughlin call it in McGee and McLaughlin 1994.
14. This is equivalent to saying that there isn't some numeral α such that the proposition expressed by 'Having \$ α is sufficient for being rich but having \$ α – \$1 isn't' is true.
15. What about paraconsistent logicians who hold that some contradictions are true? This is a delicate question that I hope to treat at length elsewhere. For now, my short answer is that the paraconsistent logician is best construed as introducing a new notion of truth.
16. Hilary Putnam denies it on intuitionistic grounds in Putnam 1983.
17. Cf. my discussion of Horwich in Schiffer 1999.
18. Łukasiewicz and Tarski 1956 (translation of article published in 1930).
19. Edgington 1996.

20. See Lewis 1970; Kamp 1975; McGee and McLaughlin 1994, pp. 236–9.
21. Edgington 1996. I've changed Edgington's technical use of 'verity' to 'T'. Her reluctance to speak of degrees of truth (she speaks of degrees of verity) is that she's reluctant to identify the all-or-nothing term 'true' with "degree of truth 1." Her reason, tellingly (see Crispin Wright's objection to third-possibility theories discussed above in the text, p. 231), is that if a proposition is definitely borderline, then it wouldn't be definitely wrong to call it true, but it would be definitely wrong to give it degree of truth 1.
22. Edgington 1996, p. 307. I've changed Edgington's notation for partial truth and conditional truth.
23. What's in play here is one's pretheoretic concept of determinate truth, not my explication of what it is to be indeterminate. It's not my claim that the two sides of *p* is indeterminate iff it's possible for someone to *v**-believe *p* express the same concept, since it's not my claim that they are synonymous.
24. I am indebted to comments by David Barnett, Hartry Field, Kit Fine, Paul Horwich, Christopher Peacocke, Roy Sorensen, and Timothy Williamson.

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