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VAGUENESS AND IGNORANCE

Timothy Williamson and Peter Simons

I—Timothy Williamson

No one knows whether I'm thin. I'm not clearly thin; I'm not clearly not thin. The word 'thin' is too vague to enable 'TW is thin' to be recognized as true or as false, however accurately my waist is measured and the result compared with vital statistics for the rest of the population. Is this ignorance? Most work on vagueness has taken for granted the answer 'No'. According to it, there is nothing here to be known. I am just a borderline case of thinness; 'TW is thin' is neither true nor false. Doubt will be cast on the coherence of this view. There are standard objections to the alternative that 'TW is thin' is either unknowably true or unknowably false. Doubt will be cast on them too. For all we know, vagueness is a kind of ignorance.

I

Why doubt the majority view? Well, suppose that 'TW is thin' is neither true nor false. If I were thin, 'TW is thin' would be true; since it isn't, I'm not. But if I'm not thin, 'TW is not thin' is true, and so 'TW is thin' false. The supposition seems to contradict itself. Yet on the majority view it is true.

To generalize the argument, consider a language L with negation (\sim), disjunction (\vee), conjunction ($\&$) and a biconditional (\leftrightarrow). Extend L to a metalanguage for L by adding a truth predicate (T) for sentences of L and quotation marks ('...') for naming them. The falsity of a sentence of L is identified with the truth of its negation. Thus the supposition at issue, the denial of bivalence for a sentence of L , is equivalent to the denial that either it or its negation is true:

$$(1) \sim [T('P') \vee T(\sim P')]$$

Two instances of Tarski's disquotational schema for truth are:

$$(2a) T('P') \leftrightarrow P$$

$$(2b) T(\sim P') \leftrightarrow \sim P$$

The argument uses (2a) and (2b) to substitute their right-hand sides for their left-hand sides in (1):

$$(3) \sim[P \vee \sim P]$$

It then applies one of De Morgan's laws to (3), giving

$$(4) \sim P \ \& \ \sim \sim P$$

This is a contradiction, whether or not the double negation is eliminated. Thus (1) reduces to absurdity. In effect, one uses Tarski's schema to equate bivalence ($T('P') \vee T('\sim P')$) with the law of excluded middle ($P \vee \sim P$), and then argues from the incoherence of denying the latter to the incoherence of denying the former.¹

The argument does not purport to show that bivalence must be asserted, only that it must not be denied. Whether bivalence must be asserted will depend on whether the law of excluded middle must be asserted, an issue which has not been addressed. Even so, the argument may seem to prove too much. Can every denial of bivalence be reduced to absurdity? However, the argument applies not whenever bivalence is denied, but only when it is denied of a particular sentence. It does not touch intuitionism in mathematics, for example. Although intuitionists deny the general principle of bivalence, they are forbidden to give particular counterexamples, just because the inference from (1) to (4) is intuitionistically valid.² They sometimes refrain from asserting the bivalence of a particular sentence, but they never deny it. This does not undermine their denial of the general principle, for 'Not every sentence is bivalent' does not intuitionistically entail 'Some sentence is not bivalent'. Vagueness is a different matter. Vague sentences are supposed to be obviously not bivalent in borderline cases, and the usual way of evoking this sense of obviousness is by vivid descriptions of particular examples. If it is obvious that not all vague sentences are bivalent, it is obvious that 'TW is thin' is not bivalent. So if one

1 Tarski derives bivalence (which he calls 'the principle of excluded middle') from his definition of truth (rather than the disquotational schema) as Theorem 2 of his 1931 'The concept of truth in formalized languages'; see his *Logic, Semantics, Metamathematics*, tr. J. H. Woodger, (2nd ed., Indianapolis: Hackett, 1983): 197. The proof uses the law of excluded middle (in the present sense).

2 The intuitionist is assumed here to equate 'true' with 'provable' rather than with 'proved'.

must not deny the bivalence of 'TW is thin', does vagueness give any reason to deny bivalence in general?³

The core of the argument is its use of Tarski's disquotational schema for truth; everything else is relatively uncontroversial.⁴ At first sight, it looks vulnerable to an obvious objection. If P is neither true nor false, should not $T('P')$ be simply false? But then the left-hand sides of (2a) and (2b) but not their right-hand sides would be false; on a strong reading of the biconditional this would make (2a) and (2b) not true. This is just what one might say in the case of reference failure. Consider, for example, a context where 'this dagger' fails to pick anything out. One might hold that no sentence in which 'this dagger' is used is true in the context. Thus neither 'This dagger is sharp' nor 'This dagger is not sharp' is true, so 'This dagger is sharp' is neither true nor false. By the same principle, the Tarskian biconditional "'This dagger is sharp' is true if and only if this dagger is sharp" would not be true in the context, for it uses as well as mentions 'this dagger'. The argument has no force in the case of reference failure; why should it have any force in the case of vagueness?

On the suggested treatment of reference failure, 'This dagger is sharp' says nothing that could have been true or false, and even counterfactuals such as 'If the servants had been assiduous, this

- 3 The sorites paradox might move some to deny that all sentences of the form ' n grains make a heap' are bivalent, but not to deny bivalence for any particular n (although for some n they would refrain from asserting it). If the argument in the text is sound, the supposedly obvious assumptions which might drive one to this view are false.
- 4 A general setting for the argument is as follows. There is a partial ordering \leq of the semantic values assigned to sentences (e.g. truth values) under which they form a lattice, i.e. each pair of values has a greatest lower bound (glb) and a least upper bound (lub), greater values being thought of as 'truer'. If $|P|$ is the semantic value assigned to P , $|P \& Q| = \text{glb}(|P|, |Q|)$, $|P \vee Q| = \text{lub}(|P|, |Q|)$ and if $P \leq Q$ then $|\sim Q| \leq |\sim P|$. These assumptions are met by standard classical, supervaluational, intuitionist and many-valued treatments and others. Now suppose that $|P| = |T('P')|$ and $|\sim P| = |T(' \sim P')|$. Then $|P| = |T('P')| \leq \text{lub}(|T('P')|, |T(' \sim P')|) = |T('P') \vee T(' \sim P')|$; similarly, $|T(' \sim P')| \leq |T('P') \vee T(' \sim P')|$. Thus $|\sim [T('P') \vee T(' \sim P')]| \leq |\sim P|$ and $|\sim [T('P') \vee T(' \sim P')]| \leq |\sim P|$, so $|\sim P| \leq \text{glb}(|\sim P|, |\sim \sim P|) = |(4)|$. Thus what is needed is a defence of Tarski's schema which assigns the same semantic value to each side of the biconditional; this is supplied in the text. Two further assumptions are that P has a negation whose falsity is equivalent to the truth of P and that a contradiction is indeed absurd. The former is clearly correct for 'TW is thin', which is enough for the argument. As for the latter, if the denial of bivalence for vague sentences is obviously correct, it does not involve a contradiction (someone might answer the question 'Is TW thin?' with 'He is and he isn't', but it would take a bold man to revise logic on the basis of that idiom).

dagger would have been sharp' are neither true nor false (of course, the sentence type 'This dagger is sharp' could have been used in a different context to say something true or false). According to the parallel treatment of a vague sentence in a borderline case, 'TW is thin' says nothing that could have been true or false, and even counterfactuals such as 'If he had dieted, TW would have been thin' are neither true nor false.⁵ Such consequences are unwelcome. Unlike 'This dagger is sharp', 'TW is thin' could have said something true without saying something different. Most simply, 'TW is thin' means that TW is thin; on the suggested treatment, "'This dagger is sharp'" means that this dagger is sharp' is neither true nor false, for 'this dagger' is used, not mentioned, on its second occurrence. But since 'TW is thin' means that TW is thin, what it is for 'TW is thin' to be true is just for TW to be thin. Similarly, since 'TW is not thin' means that TW is not thin, what it is for 'TW is not thin' to be true, and so for 'TW is thin' to be false, is just for TW not to be thin.⁶ The difference between reference failure (as treated above) and vagueness favours the Tarskian biconditionals in the latter case.⁷ In doing so, it undermines the thought that 'TW

- 5 A standard analysis of 'If he had dieted, TW would have been thin' is assumed, on which it results from feeding 'He [or TW] dieted' and 'TW is thin' into a counterfactual conditional.
- 6 A homophonic truth theory is thus not essential to the argument; the translatability of P and $\sim P$ into the metalanguage is enough, as Tarski noted. Incidentally, it is not claimed that a Tarskian theory tells the whole truth about truth, just that it tells an essential part of the truth. Without a disquotational schema, it is doubtful that one has a truth predicate at all.
- 7 The supervaluational treatment of vagueness, most systematically expounded by Kit Fine in 'Vagueness, truth and logic', *Synthese* 30 (1975): 265–300, may seem an obvious counterexample to the argument in the text from failure of bivalence to failure of excluded middle. However, Fine allows a Tarskian truth predicate 'true_T'; he argues that it is conceptually prior to the ordinary truth predicate 'true', because 'x is true' is to be defined by 'Definitely (x is true_T)'; 'true' is not subject to the Tarskian schema (296–7; compare S. Kripke, 'Outline of a theory of truth', *Journal of Philosophy* 72 (1975): 690–716, at 715). Since Fine's account validates the law of excluded middle, it validates bivalence for the primary notions of truth and falsity. Where the present approach differs is in its claim that the ordinary notion of truth is subject to the Tarskian schema and is therefore not to be defined in Fine's way. The 'definitely' operator is discussed in section II. In *The Logical Basis of Metaphysics* (London: Duckworth, 1991) Michael Dummett argues that the ordinary notion of truth for a vague language is the non-Tarskian one because only it is 'objective' in the sense that 'every sentence determinately either does or does not possess it' (74). This condition is not self-evident, not least because it is inconsistent with second-order vagueness. The disquotational schema is endorsed for a vague language by K. Machina, 'Truth, belief and vagueness', *Journal of Philosophical Logic* 5 (1976): 47–78, at 75; C.A.B. Peacocke, 'Are vague predicates incoherent?', *Synthese* 46 (1981): 121–41, at 136–7 (both within theories of degrees of truth); R.M. Sainsbury, 'Concepts

is thin' is neither true nor false, i.e. (1), by vindicating the argument from it to (4).

We can consistently deny bivalence of a sentence with reference failure precisely because in doing so we abjure the use, embedded or unembedded, of that sentence in that context. If we are not willing to abjure the use, embedded or unembedded, of a vague sentence in the context of borderline cases, we cannot consistently deny its bivalence. According to a sceptical view, rigour demands that we should abjure such uses because vagueness is itself a kind of reference failure. Adjectives refer, if at all, to sharply defined properties, but a vague one like 'thin' fails to single out such a property and so fails to refer; sentences of the form '*a* is thin' say, strictly, nothing, whether or not *a* is a borderline case. Since almost all our utterances involve vague terms, this view makes almost all of them mere noise. They are not even failed attempts to express thoughts, since parallel considerations would suggest that almost all our concepts are equally contentless.⁸ The only consistent expression of such a view is in silence.⁹

Once we are permitted to use 'thin', we can argue that 'TW is thin' says something that would have been true in various circumstances, because I would have been thin. Then "'TW is thin'" is true if and only if TW is thin' says something too. But if it says anything, it is true. For, given that 'TW is thin' means that TW is thin, what more could it take for 'TW is thin' to be true than for TW to be thin?

To deny bivalence for vague sentences while continuing to use them is to adopt an unstable position. The denial of bivalence amounts to a rejection of the practice of using them. One is rejecting the practice while continuing to engage in it. Rapid alternation between perspectives inside and outside the practice can disguise, but not avoid, this hypocrisy.

without boundaries' (inaugural lecture at King's College London, 1990).

8 Even the intention to express some thought or other harbours vagueness.

9 The classic expression of a sceptical view is section 56 of Frege's *Grundgesetze der Arithmetik*, vol. II. The more limited sceptical view that observational predicates are vague in such a way as to be incoherent is discussed in my *Identity and Discrimination* (Oxford: Blackwell, 1990): 88–103; in effect section VI below explains how the incoherent principle 'If *x* and *y* are indiscriminable by the naked eye, *x* is thin if and only if *y* is thin' could look true while being false.

II

If one cannot deny bivalence for vague sentences, can one deny something like it? There is a standard move at this point. Instead of saying that 'TW is thin' is neither true nor false, one says that it is neither *definitely* true nor *definitely* false. Definite truth does not itself obey the disquotational schema, otherwise nothing would have been gained. It takes less for 'TW is thin' not to be definitely true than for TW not to be thin. Since it does not take less for 'TW is thin' not to be true than for TW not to be thin, truth is not the same thing as definite truth. On pain of the argument in section I, this new position does not involve a denial of bivalence. Indeed, the principle of bivalence does not mention definiteness; it merely says that a sentence is either true or false. On the face of it, the claim that a sentence is neither definitely true nor definitely false has no more to do with bivalence than the claim that it is neither necessarily true nor necessarily false, or that it is neither obviously true nor obviously false.¹⁰ To pursue indirect connections would be premature.

Before one can assess the claim that vague sentences are neither definitely true nor definitely false in borderline cases, one needs to know what it means. That the adverb 'definitely' has been given a clear relevant sense is less than obvious. If 'definitely true' were just a circumlocution for 'true', no problem would arise, but the view under consideration requires the two expressions to have quite different senses. Can 'definitely' be explained in other terms, or are we supposed to grasp it as primitive? No doubt 'TW is thin' is definitely true if and only if TW is definitely thin, but what is the difference between being thin and being definitely thin? Is it like the difference between being thin and being very thin? Again, 'TW is thin' is presumably not definitely true if and only if TW is not definitely thin; what is the difference between not being thin and not being definitely thin?¹¹

Let it be obvious that 'TW is thin' is neither definitely true nor definitely false. In reporting this obvious truth, the philosopher has

10 For a contrary view see Dummett (op. cit.): 74–82.

11 There are views on which 'definitely' makes a difference only in the scope of negation and in similar contexts. I also assume that the reference of 'TW' is unproblematic.

no right to stipulate a theoretical sense for 'definitely'. Rather, it must be used in a sense expressive of what is obvious. Yet what is *obvious* is just that vague sentences are sometimes neither knowably true nor knowably false. The simplest hypothesis is that this is the *only* sense in which the vague sentences are neither definitely true nor definitely false. Bivalence and classical logic hold. Either I'm thin and 'TW is thin' is true or I'm not thin and 'TW is thin' is false; we have no way of knowing which. Although this is not at all the standard view of what 'definitely' means, the obscurity of the standard view gives us reason to explore alternatives. The epistemic view is usually held to be inconsistent with obvious facts, but the leading candidate for such a fact—the failure of bivalence—has already disappeared. The rest of the paper explores the epistemic view.¹²

III

Many descriptions of vagueness rule out the epistemic view from the start. A term is said to be vague only if it can have a borderline case, and a case is said to be borderline only if our inability to decide it does not depend on ignorance. But to assume that the cases ordinarily called 'borderline' are borderline in this technical sense is just to beg the question against the epistemic view. For example, 'TW is thin' would ordinarily be called a 'borderline' case, but one should not assume without argument that our inability to decide the matter does not depend on ignorance. Of what fact could we be

12 The epistemic view probably goes back to the Stoic logician Chrysippus, a man with some claim to have discovered the classical propositional calculus; see J. Barnes, 'Medicine, experience and logic', in J. Barnes, J. Brunschwig, M. F. Burnyeat and M. Schofield, eds., *Science and Speculation* (Cambridge: Cambridge University Press, 1982) and M. F. Burnyeat, 'Gods and heaps', in M. Schofield and M. C. Nussbaum, eds., *Language and Logos* (Cambridge: Cambridge University Press, 1982). More recently, it has been defended in J. Cargile, 'The sorites paradox', *British Journal for the Philosophy of Science* 20 (1969): 193–202; R. Campbell, 'The sorites paradox', *Philosophical Studies* 26 (1974): 175–91; R. A. Sorensen, *Blindspots*, (Oxford: Clarendon Press, 1988): 217–52; P. Horwich, *Truth* (Oxford: Blackwell, 1990): 81–7; T. Williamson (op. cit.): 103–8. It is critically discussed in M. Heller, *The Ontology of Physical Objects* (Cambridge: Cambridge University Press, 1990): 89–106. D. Sperber and D. Wilson, 'Loose talk', *Proceedings of the Aristotelian Society* 86 (1985/6): 153–71, retain classical logic and semantics while explaining vague utterances in pragmatic terms, 'He is bald', said of a man with just one hair on his head, being false but relevantly informative; a generalization of this view from 'bald' to 'heap' might need to postulate ignorance.

ignorant? There is an obvious answer: we are ignorant either of the fact that TW is thin or of the fact that TW is not thin (our ignorance prevents us from knowing which). If that is a bad answer, it has yet to be explained why. That it uses the word 'thin' is just what one would expect in the light of section I. There is no general requirement that vague words be definable in other terms.

Those wholly predictable opening moves against the epistemic view mismanage a deeper objection. It can be made using the idea that vague facts *supervene* on precise ones. If two possible situations are identical in all precise respects, they are identical in all vague respects too. For example, if x and y have exactly the same physical measurements, x is thin if and only if y is thin. More generally:

- (*) If x has exactly the same physical measurements in a possible situation s as y has in a possible situation t , x is thin in s if and only if y is thin in t .¹³

The objection to the epistemic view can now be formulated. Let my exact physical measurements be m . According to the epistemic view, I am either thin or not thin. By (*), if I am thin, necessarily anyone with physical measurements m is thin. Similarly, if I am not thin, necessarily no one with physical measurements m is thin. Thus either being thin is a necessary consequence of having physical measurements m , or not being thin is. Suppose that I find out, as I can, what my physical measurements are. I would then seem to be in a position either to deduce that I am thin or to deduce that I am not thin. But it has already been conceded that no amount of measuring will enable me to decide whether I am thin.¹⁴

The basis of this objection to the epistemic view is not that one can know all the relevant facts in a case ordinarily classified as 'borderline' but that one can know a set of facts on which all the relevant facts *supervene*, without being able to decide the case. Unlike the first claim, the second does not beg the question against the epistemic view. The epistemic theorist has as much reason as

13 More accurately, one's thinness may depend on the physical measurements of one's comparison class as well as on one's own. This does not affect the point about to be made.

14 Exercise: how does this argument fare against the supervaluational approach?

anyone else to accept supervenience claims like (*). However, the objection commits a subtler fallacy.

The kind of possibility and necessity at issue in supervenience claims like (*) is metaphysical. There *could not be* two situations differing vaguely but not precisely. Suppose that I am in fact thin. By (*), it is metaphysically necessary that anyone with physical measurements *m* is thin. If I know that I have physical measurements *m*, in order to deduce that I am thin I must *know* that anyone with physical measurements *m* is thin. The plausibility of the objection to the epistemic view thus depends on something like the inference that since the supervenience generalizations are metaphysically necessary, they can be known *a priori*. The inference from metaphysical necessity to *a priori* knowability may be a tempting one: but, as Kripke has emphasized, it is fallacious. Indeed, metaphysical necessities cannot be assumed to be knowable in any way at all, otherwise all mathematical truths could be assumed knowable. It is integral to the epistemic view that metaphysically necessary claims like 'Anyone with physical measurements *m* is thin' can be as unknowable as physically contingent ones like 'TW is thin'.

One should not be surprised that the known supervenience of *A*-facts on *B*-facts does not provide a route from knowledge of *B*-facts to knowledge of *A*-facts. A more familiar case is the supervenience of mental facts on physical facts. Suppose, for the sake of illustration, that bravery is known to supervene on the state of the brain. Then if *s* is a maximally specific brain state (described in physical terms) of brave Jones, it is metaphysically necessary that anyone in brain state *s* is brave. Clearly, however, there is no presumption that one could have found out that Jones was brave simply by measuring his brain state and invoking supervenience. 'Anyone in brain state *s* is brave' cannot be known *a priori*. Perhaps one can know it *a posteriori*, because one can find out that someone is brave by observing his behaviour, then combine this knowledge with knowledge of his brain state and of the supervenience of mental states on brain states. 'Anyone with physical measurements *m* is thin' cannot be known *a posteriori* in a parallel way, for no route to independent knowledge of someone with physical measurements *m* that he is thin corresponds to the observation of brave behaviour.

The epistemic view of vagueness is consistent with the supervenience of vague facts on precise ones. The next section considers a different objection to the epistemic view, and makes another application of the concept of supervenience.

IV

A common complaint against the epistemic view of vagueness is that it severs a necessary connection between meaning and use. Words mean what they do because we use them as we do; to postulate a fact of the matter in borderline cases is to suppose, incoherently, that the meanings of our words draw lines where our use of them does not. The point is perhaps better put at the level of complete speech acts, in terms of sentences rather than single words. The meaning of a declarative sentence may provisionally be identified with its truth conditions, and its use with our dispositions to assent to and dissent from it. The complaint is that the epistemic view of vagueness sets truth conditions floating unacceptably free of our dispositions to assent and dissent.

So far, the complaint is too general to be convincing. If our dispositions to assent to or to dissent from the sentence 'That is water' do not discriminate between H_2O and XYZ, it does not follow that the truth conditions of the sentence are equally indiscriminating. What needs to be emphasized is that there is no sharp natural division for the truth conditions of 'He is thin' to follow corresponding to the sharp natural division between H_2O and XYZ followed by the truth conditions of 'That is water'. The idea is that if nature does not draw a line for us, a line is drawn only if we draw it ourselves, by our use. So there is no line, for our use leaves not a line but a smear.

Before we allow the revised complaint to persuade us, we should probe its conception of drawing a line. On the face of it, 'drawing' is just a metaphor for 'determining'. To say that use determines meaning is just to say that meaning *supervenes* on use. That is: same use entails same meaning, so no difference in meaning without a difference in use. More formally:

- (#) If an expression e is used in a possible situation s in the same way as an expression f is used in a possible situation t , e has the same meaning in s as f has in t .

There are various problems with (#), such as its neglect of the environment as a constitutive factor in meaning and its crude notion of 'used in the same way'. However, some refinement of (#) will be assumed for the sake of argument to be correct. For the epistemic view of vagueness is quite consistent with (#) and its refinements. Although the view does not permit simple-minded reductions of meaning to use, it in no way entails the possibility of a difference in meaning without any corresponding difference in use. Had 'TW is thin' had different truth conditions, our dispositions to assent to and dissent from it would have been different too.

Our use determines many lines. Of these one of the least interesting is the line at which assent becomes more probable than dissent. It is no more plausible a candidate for the line between truth and falsity than is the line at which assent becomes unanimous. The study of vagueness has regrettably served as the last refuge of the consensus theory of truth; the theory is no more tenable for vague sentences than it is for precise ones. We can be wrong even about whether someone is thin, for we can be wrong both about that person's shape and size and about normal shapes and sizes in the relevant comparison class. These errors may be systematic; some people may characteristically look thinner or less thin than they actually are, and there may be characteristic misconceptions about the prevalence of various shapes and sizes. To invoke perfect information or epistemically ideal situations at this point is merely to swamp normal speakers of English with more measurements and statistics than they can handle. Perhaps an epistemically ideal speaker of English would be an infallible guide to thinness, but then such a speaker might know the truth value of 'TW is thin'. If one sticks to actual speakers of English, there is no prospect of reducing the truth conditions of vague sentences to the statistics of assent and dissent, whether or not one accepts the epistemic view of vagueness.

The failure of simple-minded reductions is quite consistent with supervenience. There may be a subtler connection, perhaps of a causal kind, between the property of thinness and our use of 'thin'. Even if everything has or lacks the property, the reliability of our mechanism for recognizing it may depend on its giving neither a positive nor a negative response in marginal cases. The cost of having the mechanism answer in such cases would be many wrong

answers. It is safer to have a mechanism that often gives no answer than one that often gives the wrong answer. From such a mechanism, one might be able to work back to the property, through the question ‘Which property does this mechanism best register?’.¹⁵

It might be objected that if a mechanism sometimes gives no response, there will be distinct properties *p* and *q* such that both are present when it responds positively, both are absent when it responds negatively, but sometimes one is present and the other absent when it does not respond, and that since it is equally good at registering *p* and *q*, and no better at registering any other property, the question ‘Which property does this mechanism best register?’ has no unique answer. This objection ignores the statistical nature of reliability. The mechanism cannot be expected to register any distal property infallibly; since its functioning depends on the state of the subject as well as on the state of the environment, no distal property will be present whenever there is a positive response and absent whenever there is a negative one.¹⁶ Reliability is a matter of minimizing a non-zero probability of error; for all that has been shown, just one property may do that.¹⁷

A subject whose primary access to a property is through a recognitional mechanism may not be helped to detect it by extra information of a kind which cannot be processed by that mechanism, even if the new information is in fact a reliable indicator of the presence of the property—for the subject may not know that. My exact measurements may in fact be a sufficient condition for thinness, and knowledge of the former still not enable us to derive knowledge of the latter; for all that, thinness may be the property best registered by our perceptual recognitional capacity for thinness.

The foregoing speculations should not mislead one into supposing that a causal theory of reference is essential to an

15 A more teleological question would be ‘Which property did this mechanism evolve to register?’. Considerations like those in the text would still apply.

16 Why consider distal properties rather than proximal ones? This is a general but not unanswerable question for causal theories of reference; it is not a special problem for the epistemic view of vagueness.

17 If several properties tie for first place, the obvious candidate is their conjunction (even if it is not itself one of them).

epistemic view of vagueness. They illustrate only one way in which our use of a vague expression might determine a sharp property. A comprehensive account of the connection between meaning and use would no doubt be very different. Since no one knows what such an account would be like, the epistemic view of vagueness should not be singled out for its failure to provide one. No reason has emerged to think that it makes such an account harder to provide. At the worst, there may be no account to be had, beyond a few vague salutary remarks. Meaning may supervene on use in an unsurveyably chaotic way.

V

The charge against the epistemic view of vagueness might be revised. If the view does not force what we mean to transcend what we *do*, perhaps it forces what we mean to transcend what we *know*. The new charge is as obscure as the old one, but may be worth exploring.

A cautious answer is that the epistemic view of vagueness allows us to know what we mean. No gap need open between what we mean and what we think we mean, for both are determined in the same way, perhaps that described in section IV. We know that 'TW is tall' as we use it means that, and is true if and only if, TW is tall. If we cannot know whether TW is tall, who but the verificationist thought that actual knowledge of truth conditions requires possible knowledge of truth value?

It may be replied that the epistemic view makes us ignorant of the sense of a vague term, not just of its reference. Of course we do not know where all the thin things are in physical space; the point is that we should not even know where they all are in conceptual space. We should be using a term that does in fact determine a line in conceptual space without being able to locate that line. We should understand it partially, as one partially understands a word one has heard used once or twice. But in the latter case the word's meaning is backed by other speakers' full understanding, whereas no one is allowed full understanding of the vague term. The objection to the epistemic view is that it attributes partial understanding to the speech community as a whole. It is not entitled to say that we know what we mean. It attributes to the community incomplete

knowledge of a complete meaning; would it not be more reasonable to attribute complete knowledge of an incomplete meaning?

The objection is based on the Fregean model of the sense of a term as a region in conceptual space: to grasp a sense is to know where its boundary runs. Individual points in this space are located by means of precise descriptions such as 'having exact physical measurements *m*'. Thus the demand that one know which points are in the region marked off by a vague term such as 'thin' is simply the demand that one know truths such as 'Anyone having exact physical measurements *m* is thin' or 'No one having exact physical measurements *m* is thin'. The unreasonableness of that demand was already noted in section III; the metaphysical necessity of such truths does not justify the demand to know them. The metaphor of conceptual space adds no force to the demand. Rather, its function is illicitly to collapse distinctions between concepts whose equivalence is metaphysically necessary but not *a priori*. If a proposition is identified with a region in a space of possible worlds, cognitively significant distinctions are lost in a familiar way; exactly the same happens when the objection identifies a sense with a region in conceptual space.

On the epistemic view, our understanding of vague terms is not partial. The measure of full understanding is not possession of a complete set of metaphysically necessary truths but complete induction into a practice. When I have heard a word used only once or twice, my understanding is partial because there is more to the community's use of it than I yet know. I have not got fully inside the practice; I am to some extent still an outsider. It does not follow that if we had all understood the term in the vague way I do, all our understandings would have been partial, though they would still have determined complete intensions.¹⁸ In that counterfactual situation, we should all have been insiders. To know what a word means is to be completely inducted into a practice that does in fact determine a complete intension.

That rather minimalist answer to the objection is enough. However, a more speculative line of thought may be mentioned. If

¹⁸ My deference to speakers with fuller understanding may be excluded from the counterfactual situation. Think of an intension as a function from possible worlds to extensions.

meaning supervenes on use, might it also supervene on knowledge? The idea can be developed. Let the *verification conditions* of a sentence be those in which its truth conditions knowably obtain, and its *falsification conditions* be those in which its truth conditions knowably fail to obtain. A kind of supervenience claim quite consistent with the epistemic view of vagueness is:

(@) If two sentences have the same verification conditions and the same falsification conditions, they have the same truth conditions.

(@) claims a supervenience of truth conditions on verification and falsification conditions. It no more identifies truth conditions with verification conditions than it identifies them with falsification conditions. In general, (@) is probably too strong. For example, there may be a sentence whose truth conditions cannot be known to obtain and cannot be known not to obtain; it would have the same verification conditions and falsification conditions as its negation, but not the same truth conditions. However, ordinary vague sentences are not like that. (@) might hold for them. In fact a formal version of (@) can be proved for a simple modal logic in which 'necessity' is interpreted as knowability, truth does not entail knowability, and the underlying propositional logic is classical.¹⁹

(@) will not satisfy reductionist aspirations, for the truth conditions are used in characterizing the verification and falsification conditions. But that is a problem for the reductionist aspirations, not for the epistemic view of vagueness. What the consistency of (@) with the epistemic view shows is that the latter does not force what we mean to transcend what we know, if the purport of the charge is that the epistemic view would not allow truth conditions to supervene on the conditions in which they can be known to obtain or not to obtain.

VI

Little has been said to explain our ignorance in borderline cases. Of course, ignorance might be taken as the normal state: perhaps we

¹⁹ See my 'Verification, falsification and cancellation in KT', *Notre Dame Journal of Formal Logic* 31 (1990): 286–90. The result is consistent with the doubt expressed about (@), since it cannot automatically be lifted to extensions of the language.

should think of knowledge as impossible unless special circumstances make it possible, rather than as possible unless special circumstances make it impossible. However, we may be able to do better than that in the case at hand.

Consider again the supervenience of meaning on use, at least for a fixed contribution from the environment. For any difference in meaning, there is a difference in use. The converse does not always hold. The meaning of a word may be stabilized by natural divisions, so that a small difference in use would make no difference in meaning. A slightly increased propensity to call fool's gold 'gold' would not change the meaning of the word 'gold'. But the meaning of a vague word is not stabilized by natural divisions in this way. A slight shift in our dispositions to call things 'thin' would slightly shift the meaning of 'thin'. On the epistemic view, the boundary of 'thin' is sharp but unstable. Suppose that I am on the 'thin' side of the boundary, but only just. If our use of 'thin' had been very slightly different, as it easily could have been, I would have been on the 'not thin' side. The sentence 'TW is thin' is true, but could easily have been false.²⁰ Moreover, someone who utters it assertively could easily have done so falsely, for the decision to utter it was not sensitive to all the slight shifts in the use of 'thin' that would make the utterance false.

The point is not confined to public language. Even idiolects are vague. You may have no settled disposition to assent to or dissent from 'TW is thin'. If you were forced to go one way or the other, which way you went would depend on your circumstances and mood. If you assented, that would not automatically make the sentence true in your idiolect; if you dissented, that would not automatically make it false. What you mean by 'thin' does not change with every change in your circumstances and mood. The extension of a term in your idiolect depends on the whole pattern of your use in a variety of circumstances and moods; you have no way of making each part of your use perfectly sensitive to the whole, for you have no way of surveying the whole. To imagine

20 The point is not that I might easily not have been thin. In the relevant counterfactual situations, my physical measurements are just what they actually are, but 'thin' means something slightly different from what it actually means.

away this sprawling quality of your use is to imagine away its vagueness.²¹

An utterance of 'TW is thin' is not the outcome of a disposition to be reliably right; it is right by luck. It can therefore hardly be an expression of knowledge. Contrapositively, an utterance of 'TW is thin' is an expression of knowledge only if I am some way from the boundary of 'thin', that is, only if anyone with physical measurements very close to mine is also thin. More generally, for a given way of measuring difference in physical measurements there will be a small but non-zero constant c such that:

- (!) If x and y differ in physical measurements by less than c and x is known to be thin, y is thin.

Similar principles can be formulated for other vague terms. Vague knowledge requires a margin for error.

Given (!), one cannot know a conjunction of the form ' x is thin and y is not thin' when x and y differ in physical measurements by less than c . To know the conjunction, one would have to know its first conjunct; but then by (!) its second conjunct would be false, making the whole conjunction false and therefore unknown. Since such conjunctions cannot be known, the unwary may suppose that they cannot be true. 'Thin' will then look as though it is governed by a tolerance principle of the form: if x and y differ in physical measurements by less than c and x is thin, y is thin. One can now construct a sorites paradox by considering a series of men, the first very thin, the last very fat, and each differing from the next in physical measurements by less than c : by repeated applications of the tolerance principle, since the first man is thin, so is the last man. Fortunately, 'thin' is not governed by the tolerance principle; it is governed by the margin for error principle (!), which generates no sorites paradox.²²

21 What goes for words in your idiolect also goes for your concepts.

22 (!) might be thought to generate a sorites paradox not for 'thin' but for 'known to be thin', given that (!) is known, that each man in the series is known to differ from the next in physical measurements by less than c , and that the very thin man is known to be thin. However, analysis of the argument shows it to require the KK principle that what is known is known to be known. But since 'known to be thin' is itself vague, it too obeys a margin for error principle, which in turn implies that one can know x to be thin without being in a position to know that one knows that x is thin. Thus the KK principle fails. The failure of the KK principle (i.e. the S4 axiom) in the modal logic KT is essential to

The plausibility of (!) does not depend on the epistemic view of vagueness. Its rationale is that reliable truth is a necessary (perhaps not sufficient) condition of knowledge, and that a vague judgement is reliably true only if it is true in sufficiently similar cases. This point does not require the judgement to be true or false in every case. But once our uncertainty has been explained in terms of the independently plausible principle (!), it no longer provides a reason for not asserting bivalence, for bivalence is quite compatible with (!).

VII

The most obvious argument for the epistemic view of vagueness has so far not been mentioned. The epistemic view involves no revision of classical logic and semantics; its rivals do involve such revisions. Classical logic and semantics are vastly superior to the alternatives in simplicity, power, past success, and integration with theories in other domains. In these circumstances it would be sensible to adopt the epistemic view in order to retain classical logic and semantics even if it were subject to philosophical criticisms in which we could locate no fallacy; not every anomaly falsifies a theory.²³ Although that second line of defence exists, there is no need to occupy it if the argument of this paper is correct, for we can locate the fallacies in philosophical criticisms of the epistemic view of vagueness.²⁴

the result cited at n. 19.

23 For another argument for the epistemic view see *Identity and Discrimination* (op. cit.): 107.

24 Some of the material on which this paper is based has been presented in talks at the universities of Oxford, London (University College), Dundee, Stirling, A.N.U., New England (Armidale) Queensland, Monash, Bradford, Lisbon, and Bristol. More people have helped with good questions than I can name.

VAGUENESS AND IGNORANCE

Timothy Williamson and Peter Simons

II—Peter Simons

I

I*ntroduction.* The classical principle of bivalence is the view that every sentence has just one of the two truth-values True and False. This excludes that any sentence has both, and that any sentence fails to have either, whether because it has some further truth-value or because it lacks any truth-value whatever. Vague predicates seem to threaten bivalence in that they allow borderline cases, and a plausible way to characterize borderline cases is to say they yield sentences that are neither true nor false. Being a sentence that is neither true nor false is a semantic property. The common denominator of the theories Timothy Williamson rejects is that they take the existence of vagueness to entail that some sentences have this semantic property, although how it is interpreted and modelled and what consequent revisions are called for in logic is a matter on which there has been a variety of opinions.¹ Williamson gives a general argument reducing the rejection of bivalence to absurdity, criticises those who reject bivalence while continuing to use vague sentences as indulging in a form of hypocrisy, and proposes instead the view that vagueness consists not in the failure of a predicate or its negation to apply to something but in our not knowing which is the case. This has what seem to be absurd consequences, such as that for a particular man there is a precise number N such that if he has $N + 1$ hairs on his head he is not bald, but if he has only N he is bald. Williamson spends much of his paper fending off objections to his theory that I would not make. I shall not propose a new theory of vagueness,² but try to fend off his objections to the idea that it is

1 These are usefully surveyed in Pinkal 1985, though Pinkal does not consider an epistemic theory like that of Williamson.

2 The one I found most satisfying to date was the supervaluational view of Fine 1975, which

(at least in some cases) a semantic property of expressions (the only kind I shall consider being predicates).

II

Ignorance. There may be forms of ignorance or uncertainty which are inherent in our being part of an indeterminate world, as described by physics. I do not consider such forms of indeterminacy as cases of vagueness. There are ramifications of quantum indeterminacy in the idea of making some predicate perfectly precise, or replacing a vague predicate by a perfectly precise one. But I do not think a defence of semantic vagueness should rely on such facts. It ought to be possible to defend vagueness as semantic even if the world were perfectly determinate: the kinds of predicate where vagueness typically and obviously occurs are sufficiently remote from microphysics for this to be plausible. There is nevertheless an instructive parallel whose significance will emerge below. Standard prose versions of Heisenberg's so-called uncertainty principle³ state that for a certain wave packet whose position and momentum at a certain moment are to be ascertained 'we cannot know the position and momentum together to better than to a certain degree of accuracy'.⁴ This wording suggests that there is a fact of the matter about the position and momentum at a time, only that the world is so perverse as to make it physically impossible for us to discover this fact. This leads to the idea that there are 'hidden variables' in quantum theory, the view vigorously defended by Einstein. We now know Einstein was wrong. This outcome strongly enjoins that where no data could furnish us with answers, we should discard the idea that there is something of which we are (here, of physical necessity) ignorant. And this indeed has been the reaction of many in the case of quantum theory.

In order not to prejudice the case for or against a semantic or an epistemic theory, I shall characterize vagueness using the notion of

has now been extended in a wider context by McGee 1991.

- 3 Heisenberg himself called the relation one of *Unschärfe*, which is neutral as between epistemic and other interpretations. Gibbins 1987, 10, for instance, prefers to talk of 'indeterminacy relations'.
- 4 Landshoff & Metherell 1979, 33. Similar statements can be found in the prose of many textbooks.

an object's being *clearly* thus or so. We understand, sufficiently for present purposes, what it is for a predicate to clearly apply to an object. I leave it open for now whether 'clearly' has semantic or epistemic or some other force. Call those cases where an object clearly falls under a predicate its *clear positive extension*, and those where an object clearly does not fall under a predicate its *clear negative extension*. Borderline cases of a predicate comprise precisely those objects for which it makes sense to ascribe this predicate to them (no category mistakes) but which fall neither into the clear positive nor the clear negative extension. I assume that we can adapt the idea *clearly* to truth and falsity by the familiar Tarskian connection between satisfaction and truth: *Timothy Williamson is thin* is clearly true if and only if Timothy Williamson is clearly thin.⁵

Can there be cases where an object *clearly* falls neither into the clear positive nor the clear negative extension of a predicate: in other words, can there be clear-cut borderline cases? It seems there can. Colours provide one example. Certain shades of turquoise seem to sit firmly more or less mid-way between green and blue, yet it seems that green and blue are adjacent colour areas without a gap.⁶ Some people hover determinately on the border between being young and not being young or between being thin and being not thin. Can we find second-order borderline cases? Untersberg marble is a local variety much used in public buildings in Salzburg. It is a warm reddish brown or brownish red. Is it red, brown, or a borderline case? Informants vary: some hedge, some don't. Some tell me it is brown, others tell me it is a red/brown borderline case. Personally, I am unsure. Allowing for variation among samples, minor variations in word use, and the unscientific way in which I put the question, it nevertheless seems to be unclear whether it is a borderline case or not. And if that example does not work, some other one will. There is no clear point at which a heap of sand stops being clearly a heap and it starts to become unclear whether it is a

5 To save on quotation marks, formulas and letters will be displayed rather than quoted, while examples from natural language are mentioned by using *Italics*.

6 Even if there were a gap, our having the name *turquoise*, whose focus is in or near the original area of unclarity, does not solve the problem of the vagueness, since whether some blue things are turquoise or not, the unclarity of the boundary between blue and not-blue (whether it locally coincides with that between blue and green) is unaffected.

heap.⁷ Beyond such cases simple observation fails to go: there seems to be no readily discoverable and distinct third-order vagueness.

Does the existence of *clear* border cases show the epistemic view is wrong? After all, in such cases, it is clear that the object does not clearly fall in the extension of the predicate, and it is equally clear that it does not clearly fall outside the extension. And further, there is a border area about which there is some stability of consensus that it is a border. In principle, the epistemic theory seems able to cope. There are cases where I know I am ignorant. Until I looked it up, I did not know the exact date of birth of Alfred Tarski, and knew I did not. There are many philosophers whose date of birth no one knows, like William of Ockham, so we can be clear that we are all in ignorance. The case of vagueness seems to be different however. Whereas we know what sort of discovery can fill the gap in our knowledge in cases like that of Tarski or Ockham, what further discovery would tell me whether Untersberg marble is brown or not?⁸ This is the kind of consideration behind the idea that in the case of vagueness there is no hidden fact of the matter, a position Williamson criticises as mismanagement of the idea that vague facts supervene on precise ones. His argument is that even if the supervenience is necessary, it does not follow that we should be able to know the vague facts, given adequate knowledge of the exact ones. The semantic theorist agrees that adequate knowledge of exact facts does not yield knowledge of vague facts, not because the metaphysical necessity of supervenience is epistemically inscrutable, but because the kinds of procedure that typically enhance our knowledge of something are here evidently of no use in deciding the question. Where we can suggest no kind of

7 I assume in such a case that whatever contextual elements there are to the vagueness (a big heap of sand in Sweden is a small heap in Saudi Arabia) have been screened out or neutralized.

8 There are cases where one will be willing to admit revisionary discoveries, although all the relevant facts about the object itself are in. If I discover by a suitable survey of native speakers that my positive and negative extensions of a predicate deviate from the norm for the speakers of that language, then I can admit that what I took to be a borderline case of a predicate is not, and that my understanding of the predicate was defective. We need not worry about whether the case in question was a genuine borderline for my previous understanding. What matters is that there are predicates such that even when all such cases of idiolectal variation are cleared up, a hard residue remains where no further linguistic survey will help any more than investigation of the object.

measurement or discovery could lead to deciding the question, why should we regard the gap as one of ignorance? To counter that ignorance of vague facts is a different and *sui generis* type of ignorance names the problem rather than solving it. By what procedure or by what happy accident could we find out that T.W. is thin? If, to borrow his own expression, vague facts supervene in an unsurveyably chaotic way on precise ones, then we have not even the beginnings of an account of the nature of this supervenience, and the semanticist option of dispensing with unknown vague facts altogether gains in attractiveness.

One might object that this attitude evinces an unacceptable verificationism. To this I would reply that even if one does not accept verificationism in general (as I do not) there are places where it is acceptable. It would be a pity to throw the Vienna Circle baby out with its bathwater. One (perhaps defeasible) test for verificationism's being acceptable in a particular domain is that we either know there can be no method which would decide the truth value of the sentence in question (as in the case of quantum measurement) or have little or no idea what such a method could be like (in the case of deciding the truth value of borderline cases according to the epistemic view of vagueness). One reason why metaphysics cannot be junked wholesale is that we have methods there which, even if they creak and are uncertain, offer at least faltering progress towards enlightenment. I readily concede that this consideration is not conclusive against Williamson. I am trying to elaborate what is behind the idea that the uncertainty of borderline cases is not ignorance. At the very least, it must be an unusual kind of ignorance.

I do not think a proponent of a semantic theory of vagueness should rule out that ignorance can play a part. One might for instance concede that second-order vagueness consists in part in ignorance of where a vague concept starts to become vague. One can be wrong even where there is no exact fact of the matter. If for instance a man who is 1.77 m. tall is in the clear positive extension of *tall man* but I think this height might be already just inside the penumbral zone, I am wrong. One reason why vagueness is a complex matter is that this and other factors all clamour for attention at once. For instance, variation among speakers as to where the boundaries (or boundary zones) of a concept lie also

contribute to uncertainty. Boundary disputes, sometimes intense, for example about whether a particular piece of material is a shade of green or a shade of blue, are probably familiar to most of us. If everyone agreed where the boundaries were, or where the boundary zones began, there would be no occasion for such arguments. Someone is *clearly* overstepping someone else's boundaries. According to Williamson's theory, in such a case, inevitably one party will be right, and the other wrong (though no one might be able to tell which). I agree that it can happen that one party is right and the other wrong, but that *such* mistakes can be discovered and rectified (assuming good will). But semantic theories of vagueness have not been popular for no reason: according to the semanticists, even when all such cases have been considered, there remains a hard core of cases where the best explanation of the uncertainty is that neither party is right over the other.

III

Hypocrisy. Williamson says that denying bivalence for vague sentences while continuing to use them is an unstable position, a form of hypocrisy which rejects the practice of using such sentences while continuing to use them. I assume the harsh moral tone is intended to sting the semanticist into response. If so, it succeeded. Firstly, it is clear that not all uses of vague predicates, even by a confirmed semanticist, are condemnable. This is the case where the predicate is used far from the disputed cases. Even a semanticist may use the word 'red' with a clear conscience provided he or she affirms it of clearly red things and denies it of clearly non-red things. Other cases are equally admissible, e.g., where, talking of two things very nearly alike in colour, but both in the boundary area, one says 'If this one is red, then so is that one'. This is simply true on most semantic theories, and if not on all theories 100% true,⁹ is near enough not to excite a murmur among the zealots. But these are not vague *sentences* of the sort Williamson has in mind.

There are uses of vague sentences where it is patent that they are vague, and that it is (at least morally) advisable or even obligatory

9 Cf. the fuzzy theory of Goguen 1969, where such cases may be very slightly less than wholly true.

to use them. This happens in such non-philosophical contexts as peace negotiations and wage bargaining, where a 'common formula' is found to which both parties can agree, sometimes thereby averting or postponing more radical disagreements. Some common formulas involve straightforward ambiguity, but others, such as *a free election to take place within a reasonable period* are intentionally vague, since it is generally known that attempts to be more precise will be bound to end in disagreement. Each side may know that the other would prefer to have a more rigorous formula, but each concedes for the sake of the agreement, and perhaps in the hope that attitudes may change in the course of time. Such bridgebuilding vaguenesses and their proponents might be cast by the puritan as morally slippery or hypocritical, and perhaps sometimes they are, but they may be morally defended as a way of averting greater evil. I take it that Williamson could morally condone such uses of vague sentences by negotiators while insisting that such usage on the part of a semanticist would still be theoretically two-faced, maybe forced upon him or her morally by the wickedness of the world, but two-faced nevertheless.

Are there other occasions where the manifest use of a vague sentence is justifiable even to someone who admits it has no (definite) truth value? Surely there are. Where no other word is readily available, where time and/or space are short, and a characterization of something is called for, a vague predicate which gets near to truth is better than an exact one which misses. We might be speaking to a child or a foreigner who cannot be expected to have encountered a more precise and appropriate expression. Were there but world enough and time, one might either look up the right word, coin a new one, hedge, explain, or circumlocute to speak truly. If a semantically better alternative is available and the conditions for its use are propitious, then we are enjoined to speak truly rather than indeterminately. But since such ideal conditions very often do not apply, the use of vague sentences is frequently pragmatically justified. So I do not see how the rejection of bivalence for vague sentences can amount to a rejection of the *practice* of using them, as Williamson says. One may admit that it would be semantically preferable not to have to use them, but the world and the demands it places on language use are not so kind. In this respect I think the use of vague sentences is clearly more justifiable than that of

sentences where one or more of the terms fails of reference, a case which I agree with Williamson is quite different in kind.

IV

Bivalence. The core of Williamson's attack on semantic theories of vagueness is the argument at the beginning of his paper that someone who rejects bivalence for a particular sentence p is asserting something no more true than the contradiction $\sim p \ \& \ \sim\sim p$. Since nearly all advocates of a semantic theory of vagueness admit that contradictions cannot be true (even if in some theories not all contradictions are false), they are required to reply. Essentially the argument amounts to cancelling the Ts and quotes from the sentence $\sim T('p') \ \& \ \sim T(' \sim p')$, asserted as true by the proponent of semantic vagueness, for some particular sentence taking the place of the sentential metavariable. The argument is framed, especially in the footnoted version, so as to confront a broad spectrum of semantic theories. According to Williamson, 'The core of the argument is its use of Tarski's disquotational schema for truth; everything else is relatively uncontroversial'. I think more than just the Tarski schema is up for discussion: in particular the question whether there might be different negations at work, a possibility which always rears itself as soon as we leave the safe haven of classical logic.

The first and most obvious reply of the defender of semantic vagueness to the argument will inevitably turn on truth. 'The argument', goes the objection, 'turns on an ambiguity in the concept of truth. The predicate T is used in two senses. In one sense, the premiss $\sim T('p') \ \& \ \sim T(' \sim p')$ is acceptable to the defender of semantic vagueness, indeed is what is intended by denying bivalence in such a case. But in this sense the Tarski schema is not acceptable. On the other hand, there is a sense of T making the Tarski schema acceptable,¹⁰ but this use is one for which the defender of semantic vagueness would not wish to assert the anti-bivalence formula $\sim T('p') \ \& \ \sim T(' \sim p')$ '. The most obvious sense of T in which the anti-bivalence formula would call for assertion is the metalinguistic counterpart of strong assertion in

10 At least in this context: we assume ourselves well clear of semantic paradoxes like the Liar.

systems of many-valued logic, or the notion of clear or definite truth. For a borderline sentence, neither it nor its negation (assuming we know for now what that is) is a clear truth. It is obvious why the Tarski schema fails for clear truth. A vague sentence is not clearly true, therefore the value of the sentence p is different from that of *It is clearly true that p* : the latter is clearly false, the former not.

Now for the sense of *clearly true* which he would endorse, Williamson too admits that clear truth and clear falsehood do not exhaust the possibilities. There are unclear cases. Only he denies that clear truth, in the sense in which a middle is excluded, is a kind of truth. If it is made an analytic condition of being truth that the Tarski schema be fulfilled, then there is no point in arguing: one may as well say, 'If that is what truth has to be, it is not interesting in this case: consider this other semantic property instead'. I do not think that fulfilling the Tarski schema is an analytic property of a truth concept. Though this is not an argument, it is interesting that Tarski himself did not say so either. He only said that his Convention T was something one should require of a concept of truth in the traditional Aristotelian sense,¹¹ one which in his hands turns out to be bivalent. While the T-schema is certainly central to our intuitive or naive concept of truth, the semantic paradoxes show that it cannot be maintained at the same time as expecting the single same truth-predicate to apply bivalently within a comprehensive language such as English. Whatever we give up of this package, whether maintaining bivalence by restricting the expressive power of the language like Tarski, or sacrificing bivalence to allow partially defined truth-predicates within a more comprehensive language as in later theories, the paradoxes extract their price, which in one way or the other restricts the scope of application of the naive T-schema.

Williamson argues that since failure of reference brings failure of bivalence, but vagueness, unlike reference failure, supports counterfactuals, so the T-biconditionals, which can be rejected as saying nothing in the case of reference failure, do say something in the case of vagueness, and if they say something, must be true. I

11 Tarski 1983, 153. He calls it the 'classical' conception.

agree that the cases differ radically, and I agree that in the case of vague sentences the T-biconditionals say something. But why should it be something true? There seems to be one set of considerations pushing us towards accepting the T-schema and another pushing us away from it. Suppose we follow the latter. Williamson's point in that case is that the new sense of T—*clear truth* or *definite truth* or whatever—is not truth: 'On the face of it, the claim that a sentence is neither definitely true nor definitely false has no more to do with bivalence than the claim that it is neither necessarily true nor necessarily false, or that it is neither obviously true nor obviously false'. On the face of it. That face features wording of the form *X truth*, for some adjective *X*, which looks like a mere restriction to a subclass of truths. But the wording is a red herring, a dispensable embarrassment. The semantic theorist must be willing to drop the adjective and simply say that vague sentences are neither true nor false. Then of course the T-schema will not be true (assuming it is only true if both sides have the same semantic value) when the right-hand side is neither true nor false, for the left-hand side will be false.

What if we accept the T-schema $T('p') \leftrightarrow p$? If truth (in this sense) is just disquotational, a semantic theory of vagueness will entail that if the right-hand side is neither true nor false, then neither is the left, and yet the whole biconditional can be true. This means saddling oneself with a vague truth-predicate with its own gaps in (definite) truth value. But we have seen that such a course is one possible reaction to the semantic paradoxes,¹² so a truth-predicate engendering truth value gaps is not in itself fearful. Disquotational truth is however not the kind of truth which the semanticist will deny of a vague sentence and its negation in the anti-bivalence formula $\sim T('p') \ \& \ \sim T('\sim p')$. He or she cannot assert the latter, since neither conjunct will be true. Admittedly, there will be meanings of negation for which neither conjunct is false, and if there is a negation which has a fixed point for a vague sentence *p*, i.e. *p* and $\sim p$ have the same semantic value for that negation, then both the anti-bivalence formula and the contradiction $\sim p \ \& \ \sim \sim p$ get this value, by the semantics of conjunction. So for such a negation the

12 Cf. McGee 1991, 217.

contradiction is not false.¹³ However, there are other negations which still assign contradictions *false* as value when the sentence is vague, and for such cases the anti-bivalence formula is also false. In neither case, however, will the supporter of semantic vagueness want to hold the anti-bivalence formula to be true, which means that for such an interpretation of T, the formula does not assert anti-bivalence.

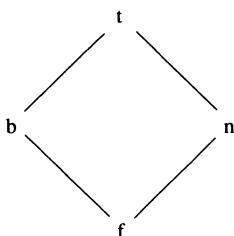
So I think the supporter of a semantic theory of vagueness need not be worried by Williamson's argument: each step in it has something he or she might wish to accept, but the whole argument can be accepted only on pain of equivocating on T: the price of this equivocation is, unsurprisingly, invalidity. This does not mean that Williamson's criticisms of views opposing his own are all wrong. I already admitted there may be room for ignorance in an account of vagueness, and would not want to define vagueness antecedently to exclude ignorance. Nor must one accept vestiges of the consensus theory of truth, or the view that all necessities are *a priori* knowable, or hold that our understanding of vague terms is partial. On the contrary, a semantic theorist may claim that it is because our understanding is complete that we see without trouble that there are clear borderline cases.

V

An Example. To illustrate what was said above about different truth and negation predicates, it is helpful to consider a pocket-sized example. Consider the single sentence, *Timothy Williamson is thin*, here abbreviated *p*, as a candidate for being neither true nor false by reason of vagueness. It is sufficient for illustration if we have four semantic values: t (true: he's thin), f (false: he's fat, where *fat* is here temporarily taken for alliterative reasons as the contradictory, not the contrary of thin), n (neither: he's neither thin nor fat), and finally b (both: he's both thin and fat). The last value may call for some comment. It's not that such a 'glut' as distinct from a 'gap' is expected to be satisfied by T.W. or anyone else, but that a fourth value is needed to secure the lattice structure of

13 In such a case, the appellation *contradiction* is a syntactic rather than a semantic one.

Williamson's argument, preserve the duality of disjunction and conjunction, and furnish us with two different sorts of negation. It is assumed that t , b , n and f are so partially ordered that f is the least and t the greatest element, b and n being intermediate and incomparable, thus:



The semantic value tables for conjunction and disjunction are computable as the Cartesian product of classical logic with itself,¹⁴ and look like

$\&$	t	b	n	f
t	t	b	n	f
b	b	b	f	f
n	n	f	n	f
f	f	f	f	f

\vee	t	b	n	f
t	t	t	t	t
b	t	b	t	b
n	t	t	n	n
f	t	b	n	f

Other binary functors may be defined, but the only one which is important is a strong biconditional \leftrightarrow which is t on the main diagonal and f off it. Three one-place functors correspond to different possible object-language lowerings of 'truth'-predicates: the simple assertion or identity functor I obeys $Iq \leftrightarrow q$ for all q : it leaves values as they were; the strong assertion functor S has value t for argument t and value f for the other three arguments, while the thin assertion functor T has value t for arguments t and b and value f otherwise. Two ideas of negation naturally suggest themselves,

¹⁴ Cf. Rescher 1969, 97.

which have come to be called de Morgan negation and Boolean negation.¹⁵ Considering the 'base clauses' *He's thin* and *He's fat*, de Morgan negation takes us from each of these to the other and consequently the simple (classical) negation of each to the simple negation of the other. Boolean negation on the other hand takes *He's thin* to its simple negation *He's not thin* and likewise for *He's fat*.¹⁶ The upshot for the four values is that both negations behave classically on the values t and f, taking each to the other, whereas they differ on the other values: de Morgan negation leaves b as b and n as n, while Boolean negation switches them. Writing \neg for de Morgan negation and \sim for Boolean, their tables, together with the others, are

p	$\neg p$	$\sim p$	Ip	Sp	Tp
t	f	f	t	t	t
b	b	n	b	f	t
n	n	b	n	f	f
f	t	t	f	f	f

The significance of the two forms of negation is that they both satisfy the requirements of duality and contraposition laid down in Williamson's argument and so both satisfy the de Morgan laws. Nevertheless, Boolean negation makes contradictions $q \ \& \ \sim q$ always false (and excluded middle therefore always true), whereas de Morgan negation has the two intermediate values as fixed points and so the contradiction $q \ \& \ \neg q$ is only false for the classical values t and f, and dually for the excluded middle $q \vee \neg q$. Boolean negation is more 'classical' than de Morgan. Raising the functors I, S and T to 'truth'-predicates in a metalanguage in the obvious way makes I-truth Tarskian or disquotational, whereas S-truth and T-truth only

15 The terminology is due to Meyer & Routley 1973–4.

16 The negation used for the base clauses is classical two-valued negation, upon whose prior understanding the four-valued interpretation admittedly rests. Cf. Meyer and Martin 1986, 320.

satisfy the Tarski schema for the classical values. Consider now the possible interpretations of the anti-bivalence form *p is not true and the negation of p is not true*. If *true* is S-truth, then whether we take *not* as de Morgan or Boolean negation does not matter, since S-truth has only classical outputs. According then as we read *the negation of p* as de Morgan or Boolean negation respectively, the anti-bivalence form is interpretable as either $\neg Sp \ \& \ \neg S\neg p$ or $\sim Sp \ \& \ \sim S\neg p$. The result is the same in each case: f for the classical values, t for both intermediate ones. So one can have a true case of semantic vagueness according to this interpretation, but for just these cases the Tarskian schema is false. Conversely, if we understand truth as I-truth, then while Tarski goes through, the ‘anti-bivalence’ formula is never true no matter which negation or combination of negations one takes. The use of S-truth is somewhat insensitive however, since it makes the anti-bivalence formula true (t) even for the ‘impossible’ value b. So consider T-truth. This formulates what we might call the simple untainted truth of *He’s thin*, regardless of questions about whether or not he can be fat as well. In this respect it is not dual to F-truth, the untainted truth of *He’s fat*. Both are as it were sensitive to their arguments. *In fact*, since the value b represents the impossible case, they will never overlap,¹⁷ but the case is carried along to complete the formal structure. Since T too has only classical outputs, the outer negations can be of either sort, but the embedded one makes a difference: if it is Boolean negation, the whole formula is always f, but if it is de Morgan negation, the formula is f except for the argument n, where it is t. It is arguably de Morgan negation that we need when considering vagueness, because intuitively, if a sentence is neither true nor false, then neither is its negation. Boolean negation gives us the formally impeccable but intuitively absurd result that the negation of a vague sentence is an impossible one and vice versa.

This small model is not suitable as a general account of the semantics of vagueness because it simplifies in various respects. It supposes that vagueness is an all-or-nothing affair: there is no

17 This is I think the reason why Meinong, who for reasons unconnected with vagueness introduced a third value for sentences with intermediate truth strengths, never realised that he ought to have introduced a fourth according to his own principles. Cf. Simons 1989, 262.

second-order vagueness. To take that into account one would need more values. The idea of getting closer to one side of the border area is not represented. If we take argument-sensitive truth-operators like *T* seriously, we should need to multiply the values further or consider other ordered structures, such as spaces of ways of making predicates more precise, as in the supervaluational semantics. But for the purpose of showing how we can have reasonable semantic interpretations of a single case of vagueness with a gap between the classical truth values, it seems to suffice.

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