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Are Spectrum Arguments Defused by Vagueness?

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ABSTRACT
I consider paradoxical spectrum arguments involving transitive relations like 'better than'. I argue that, despite being formally different from sorites arguments, at least some spectrum arguments arise from vagueness, and that vagueness might often be the most natural diagnosis.

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KEYWORDS spectrum or continuum arguments; sorites arguments; moral vagueness; transitivity; parity

1. Introduction

Spectrum arguments are a class of paradoxical arguments that proceed by a long sequence of steps. They trade on the transitivity of a binary relation like 'better than'.[1] In section 2, I will describe what I take to be their general character; for now, I focus on the following example. Consider an ecstatic pleasure, perhaps hours in duration. A pleasure twice as long, and only slightly less intense, would be better. And a third pleasure, twice as long and slightly less intense than the second, would be better than the second. If we continue in this way, we obtain a sequence of possible pleasures, each better than the previous one, starting from one that is ecstatic and extended but relatively short, and ending with one that is barely noticeable but extremely long. Since 'better than' is transitive, we conclude that the extremely long but barely noticeable pleasure would be better than the relatively short but ecstatic one—a conclusion that many find implausible.[2]

A common initial reaction is that spectrum arguments, in relying on a long sequence of steps, resemble sorites arguments, and that therefore they might be unsound in the same way.[3] To pin down the idea a little more, here is a paradigmatic sorites argument. Consider a sequence of 1,000 people, each a mere millimetre shorter than the one before; the first is 2.5 m in height, so clearly tall. The key 'inductive' premise is that one millimetre cannot make the difference between being tall and

[1] A binary relation R is *transitive* if $R(X,Y)$ and $R(Y,Z)$ together entail $R(X,Z)$.
[2] This example is essentially the second one in Rachels [1998]. Temkin [2012: chs 2, 5] provides a survey of spectrum arguments in different contexts. Spectrum arguments have been especially influential in population ethics, where they seem to support the 'Repugnant Conclusion' made famous by Parfit [1984].
[3] For example, Pummer [2018: 1737] calls this 'one of the most popular objections, if not *the* most popular objection' to spectrum arguments, but quickly sets it aside, citing the response of Temkin [2012] that I discuss below. Authors advocating vagueness to defuse spectrum arguments include Qizilbash [2005] and Knapp [2007].

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not being tall. By applying this premise many times, we reach the conclusion that the last person, a mere 1.5 m in height, is tall. We should not, of course, accept this absurd conclusion. We should instead realise that 'tall' is vague in a way that *defuses* the sorites argument: vagueness explains why the premises seem compelling even though the argument is unsound. Theories of vagueness being diverse, it is unfortunately hard to say what this amounts to in theory-neutral terms, but it is precisely *by* theorising about vagueness that we should hope to understand the sorites. So, too, one might hold the view, of any given spectrum argument, that the relevant relation—'better than', in my basic example—is vague in a way that defuses the argument in the very same sense. Call this *the vagueness view*.

Purveyors of spectrum arguments tend to dismiss the vagueness view almost out of hand. After all, a spectrum argument is *not* a sorites argument, and so why should worries about the latter be relevant to the former? Why think that vagueness can do the work? Rachels [1998], Parfit [2004], and Temkin [2012] have, more carefully, pointed out what they take to be crucial formal differences between the two types of argument.[4] If the vagueness view is based on mere resemblance, these objections might appear decisive.

But one can do better. In this paper, I show there are *some* spectrum arguments for which the vagueness view is clearly the correct one. So, Rachel's, Parfit's, and Temkin's objections—and any of a similarly general nature—must misfire, and I will explain how. Of course, there will be many considerations relevant to our overall evaluation of spectrum arguments, and I leave open whether the vagueness view is ultimately more satisfying for some spectrum arguments than for others. However, I also adduce some general reasons to consider the vagueness view as a serious contender in any particular case. For one thing, I will argue that each spectrum argument generates a closely related sorites argument—strong evidence implicating vagueness. And I will explain why the vagueness view is a complement, rather than a rival, to some other well-known approaches, including those that seek to block the spectrum argument by appeal to parity or incommensurability.

The philosophical stakes are high. Arrhenius [2000, ms] sees spectrum arguments in the context of population ethics as impossibility theorems, threatening to undermine the basic methodology of moral philosophy. Temkin [1996, 2012] and Rachels [1998, 2004] have a more specific, but perhaps equally radical, diagnosis: they take spectrum arguments to show that 'better than' is not, after all, a transitive relation. Regardless of whether or not Broome [2004: sec. 4.1] is right to insist that transitivity is a *logical* feature of comparatives like 'better than', abandoning transitivity strikes many of us as a desperately revisionary move that threatens to leave axiology and practical reason in disarray. From this perspective, the vagueness view suggests a conservative way forward. I will say more about this later, but the bottom line is that we constantly and successfully reason with vague predicates. Recognising that 'better than' is vague in a specific way is no threat to the general cogency of axiological thinking.

Before continuing, let me clear up a common initial confusion. One might think that 'tall' is vague, but that the comparative 'taller than' is precise; analogously, one might allow that 'good' is vague, but that 'better than' must be precise. But in fact 'taller than' and other comparatives are also typically vague. A nice example is 'hairier than': it can be vague whether one head is hairier than another. It can be

[4] Parfit's and Rachels's objections are essentially the same. Temkin [1996] emphasises an objection of a different, less formal, kind, which I briefly address in the conclusion.

vague how many hairs each head has (perhaps some hairs are semi-detached, and it's vague whether they count), or, supposing that both the number of hairs and their distribution are relevant, it might be vague how these factors weigh up.[5] The vagueness of 'better than' might spring from analogous sources: it might be vague whether particular good-making features are instantiated, and it might be vague how different factors weigh up. Perhaps it is also vague which features are good-makers [Carlson 2004].

Here is an outline of this paper. In section 2, I formalise the basic spectrum argument, introducing some useful notation. I also delimit the general class of 'spectrum arguments' to which my discussion applies. In section 3, I produce the central example—a spectrum argument, for which the vagueness view is clearly the correct one. To illustrate what it means for vagueness to 'defuse' a spectrum argument, I explain in some detail what one prominent theory of vagueness—a form of supervaluationism—would say about it, and I note that the same moves are available in principle for any other spectrum argument. In section 4, I adduce general considerations in favour of the vagueness view. In section 5, I rebut the objections raised by Rachels, Parfit, and Temkin. The concluding section 6 highlights some remaining ways in which one might try to resist the vagueness view.

2. Spectrum Arguments

I start by formalising the initial spectrum argument about pleasures, which I will use throughout as my main example. I then define the general class of spectrum arguments to which the vagueness view plausibly applies.

We posit a decreasing sequence of pleasure intensities, $w_0, w_1, \ldots, w_n$. Here, w_0 is the intensity of some ecstatic pleasure, while w_n is barely noticeable. The difference between consecutive terms of the sequence is very small—small enough to make the following *generating principle* compelling:

(**GP**) For any pleasure P at intensity w_i, there is a pleasure Q at intensity w_{i+1} that is better than P.

GP reflects the idea that a one-step decrease in the intensity of pleasure can always be made up by some sufficient increase in duration. Starting from any pleasure P_0 at intensity w_0, we can thereby generate a sequence of pleasures $P_1, \ldots, P_n$, such that each P_i has intensity w_i, and satisfying the *intermediate conclusion*

(**IC**) P_{i+1} is better than P_i.

By transitivity, P_n is better than P_0. In fact, the argument leads to this *counterintuitive conclusion*:

(**CC**) For any pleasure P at intensity w_0, there is a better pleasure Q at intensity w_n.

The spectrum argument is best understood as the argument from GP and transitivity to CC. Two points should be made. First, I stipulate for the sake of discussion that CC is untenable. The vagueness view is relevant only in so far as one finds a given

[5] Temkin [2012: sec. 9.2.3], following Ryan Wasserman, considers spectrum arguments for 'hairier than' and other non-evaluative predicates. In so far as those arguments are paradoxical, the discussion in this paper applies to them as well. In fact, for those with meta-ethical doubts about evaluative vagueness (see section 6), the application to those cases might be more persuasive.

argument paradoxical, and different readers may favour different examples. Second, Temkin and Rachels have taken spectrum arguments to provide a *reductio* of transitivity. Since I see the vagueness view as a conservative alternative to theirs, I will generally take transitivity for granted.[6]

While I will focus on the pleasure spectrum argument, the considerations in this paper concern spectrum arguments in general. It is time to say what I take this class of arguments to be. The general setup involves a putatively transitive relation R on a domain D (like the relation of betterness on the domain of possible pleasures). There is also a parameter (like the level of intensity) that takes a sequence of values $w_0,w_1, \ldots ,w_n$. For each $i = 0,1, \ldots ,n$, there is a subset D_i of D (like the set of possible pleasures of constant intensity w_i). Given this setup, the main premise is the generating principle, generalising GP:

> For each P in D_i, there is some Q in D_{i+1} such that $R(Q,P)$ obtains.

By applying it many times, we reach the conclusion of the spectrum argument, generalising CC:

> For every P in D_0, there is some Q in D_n such that $R(Q,P)$ obtains.

Beyond this logical form, I stipulate that a spectrum argument must satisfy two less-formal conditions. First, it must be paradoxical, in that the generating principle seems compelling and the conclusion implausible; otherwise, the vagueness view is irrelevant, since there is nothing to explain. Second, I'll require that consecutive terms in the sequence $w_0,w_1, \ldots ,w_n$ are intuitively close together, as they are in a sorites, and the very fact that they are close together must contribute to the plausibility of the generating principle.

That sums up the class of paradoxical arguments for which I think the vagueness view is a plausible contender.[7] However, many classic spectrum arguments have at least two other features worth mentioning. The relation R, like 'better than', is often *irreflexive*: nothing can be R-related to itself.[8] Second, the generating principle encodes a specific pattern of trade-offs: a small change in the main parameter w (like the intensity) can be made up by a sufficiently large change in another (like the duration). To emphasise the relevance of this paper to such 'proper' spectrum arguments, I will defend the view that vagueness can, and sometimes does, defuse spectrum arguments *even* when, but not only when, they satisfy these additional criteria.[9]

[6] Some authors claim that vagueness itself leads to intransitivity: see Aldred [2007] for invaluable discussion. This claim, typically made about preference rather than betterness, involves issues orthogonal to the ones that I consider here. However, Aldred's main example, if adapted to betterness (cf. his section 5.1), counts as a spectrum argument in my broad sense, and the vagueness view would still be a competitor to intransitivity.

[7] To illustrate the generality of this characterization, the 'Second Paradox' of Parfit [2004] and the impossibility theorems of Arrhenius [2000, ms] based on 'non-elitism' can be seen as involving spectrum arguments, even though the relevant generating principles are quite different from GP. See also notes 6 and 9.

[8] Of course, the basic spectrum argument would be just as troubling if we replaced 'better than' by 'at least as good as', which is not irreflexive. But focusing on the irreflexive case will help to answer the objection by Parfit and Rachels in section 5.

[9] To fully appreciate this point, note that a sorites argument for a predicate F can be construed as a spectrum argument for the relation $R(X,Y)$ defined by 'If Y is F, then X is F'—but not as a *proper* spectrum argument on either count. I find it instructive that the vagueness view *generalises* from sorites arguments to the broader class. But I'm still obliged to show that the vagueness view is the right view of some proper spectrum arguments.

3. The Vagueness View Is Sometimes Right

Indeed, I now give an example of a proper spectrum argument for which the vagueness view is clearly right. I then describe in detail how a supervaluationist theory of vagueness would treat this example, and I note that the same moves can apply in principle to any spectrum argument.

To construct the example, I'll need a sorites argument for 'ecstatic', as a predicate of pleasure intensities. I will use the fine-grained sequence of intensities $w_0, w_1, \ldots, w_n$, introduced in section 2.

The sorites argument has the following premises.

(A1) The first intensity w_0 is ecstatic.
(A2) If w_i is ecstatic, then w_{i+1} is also ecstatic.

Given that w_i and w_{i+1} are so close together, intuitively it cannot be the case that one of them is ecstatic and the other is not. By repeated applications of *modus ponens*, we may conclude thus:

(A3) The barely noticeable w_n is ecstatic.

This argument is paradoxical, in that the premises are pretheoretically compelling and the conclusion is absurd. We know the diagnosis in broad terms: 'ecstatic' is vague in the relevant way.

Now for the main course. I will say that one pleasure *outdoes* another if and only if it is ecstatic for at least as long and has greater total intensity over time.[10] 'Outdoes' is, on its face, a transitive relation, and we can construct a spectrum argument for it in the following way.

First, the inductive premise A2 in the sorites argument for 'ecstatic' is equivalent to the following generating principle:

(**GP′**) For any pleasure P at intensity w_i, there is a pleasure Q at intensity w_{i+1} that outdoes P.

To see the equivalence, suppose that P is a pleasure at intensity w_i. Given A2, either both w_i and w_{i+1} are ecstatic, or both are not. Either way, if we choose Q to last at least as long as P, then it will be ecstatic for at least as long; and if it is *sufficiently* long then it will have greater total intensity and will thus outdo P. On the other hand, if, contrary to A2, w_i is ecstatic and w_{i+1} is not, then no pleasure Q at intensity w_{i+1} is ecstatic for at least as long as P (or for any time at all!). Hence no such Q outdoes P, contradicting GP′.

Next, we can use GP′ to generate a sequence of pleasures $P_0, P_1, \ldots, P_n$, starting from an ecstatic one and ending with a barely perceptible one. If, for example, w_{i+1} is always more than half as intense as w_i, then, concretely, it suffices that each pleasure be twice as long as the one before. We have this intermediate conclusion:

(**IC′**) P_{i+1} outdoes P_i.

Using transitivity, one thus gets a spectrum argument from GP′ for the conclusion that P_n outdoes P_0, and more generally for this conclusion:

[10] To speak of total intensity, we must quantify intensity somehow, but the numbers need not have any deep meaning. We could just say that $w_n = 10$, $w_{n-1} = 11$, and so on, up to the ecstatic $w_0 = 10 + n$. Using real numbers ensures that, for any pleasure at w_i, a sufficiently long pleasure at w_{i+1} would have greater total intensity—a fact to which I will appeal below.

(**CC′**) For any pleasure P at intensity w_0, there is a pleasure Q at intensity w_n that outdoes it.

Is CC′ counterintuitive? It is. In fact, just as GP′ is equivalent to A2, one can see that CC′ is equivalent to the conditional 'If A1 then A3': if w_0 is ecstatic, then so is w_n. So, this spectrum argument is paradoxical. It is also a *proper* spectrum argument. 'Outdoes' is irreflexive, and GP′ reflects the idea that 'outdoes' admits of certain trade-offs: if Q differs from P only in that its intensity is one step lower, then P outdoes Q; but if Q is also sufficiently much longer than P, then, granting A2, Q outdoes P.

Now here is the key point: this spectrum argument is just a repackaging of the sorites argument for 'ecstatic'. The main premise GP′ is equivalent to A2, and the conclusion is equivalent to 'if A1 then A3.' The right story about how to defuse the 'ecstatic' sorites must inevitably defuse this spectrum argument as well. And we know that, in general terms, the right story is that 'ecstatic' (and therefore 'outdoes') is vague. This spectrum argument is defused by vagueness.

To provide a foundation for further discussion, the rest of this section will illustrate concretely what a theory of vagueness might say about the spectrum argument for 'outdoes'. I'll focus on a version of supervaluationism, representing the popular class of views that broadly respect classical logic.[11] Recall that supervaluationism can be understood in terms of *precisifications*, roughly glossed as ways that our language could be made precise. Each precisification assigns a classical truth value to each proposition. Some precisifications are *admissible*. A proposition is *true* just in case it would be true on every admissible precisification; it is *false* (to be distinguished from *not true*) just in case it would be false on every one; and it is *borderline true* or *indeterminate* otherwise. So, for example, it might be that, on one admissible precisification, exactly the first 100 intensities $w_0, \ldots, w_{99}$ count as ecstatic, and, on another, exactly the first 101 do. If so, then it is only borderline true that w_{100} is ecstatic; or, as it is convenient to say, w_{100} is only borderline ecstatic, rather than determinately ecstatic.

Every theory of vagueness has its costs, and we must be careful not to impute these costs to the vagueness view, since we must make sense of vagueness anyhow. The most obvious cost of supervaluationism in this context is that it endorses

'Ecstatic' Cut-offs
For some i, w_i is ecstatic and w_{i+1} is not.

In other words, some instance of A2 is not true, and it is thus that supervaluationism renders the sorites argument unsound. By the same token, supervaluationism will admit that the corresponding instances of GP′ are not true; and, given our sequence of pleasures doubling in length, it will admit that the corresponding instances of IC′ are not true either. But, once we accept supervaluationism about 'ecstatic', the mere implausibility of these claims cannot count against the vagueness view. Supervaluationism is already committed to these implausibilities, and to explaining them away.

How does it claim to do so? The main move is to observe that, even if there is a cut-off, it is indeterminate where the cut-off lies: the cut-off itself is vague. More formally,

[11] As Varzi [2007] explains, there are many subtly different ways to think about supervaluationism and its logic. The sense in which supervaluationism respects classical logic is made clearest by introducing a disquotational truth predicate and a 'local' approach to validity. The result is a classical modal logic (like KT) with respect to the 'Determinately' operator. In this paper, I will stay with the more traditional view that truth is non-disquotational 'super-truth' (see Keefe [2000: ch. 8] for discussion). Bacon [2018] provides an up-to-date analysis of the relationship between supervaluationism and other theories of vagueness.

'Ecstatic' Cut-offs is easily confounded with a similar-sounding but stronger claim that we can still deny:[12]

SHARP 'ECSTATIC' CUT-OFFS
For some i, it is true that w_i is ecstatic and w_{i+1} is not.

Denying Sharp 'Ecstatic' Cut-offs means that each instance of A2 is at least borderline true: no instance is false. The burden on the supervaluationist is to explain in detail why this should satisfy us. One possible route is to note that each instance of A2 is at least *nearly* true—true on nearly all precisifications. Specifically, A2 is false only on those precisifications that place the cut-off for 'ecstatic' between w_i and w_{i+1}. Since these intensities are close together, there are relatively few such precisifications. One can, optionally, seek to make these qualitative considerations more quantitative by assigning numerical measures to sets of admissible precisifications. The 'degree of truth' of a proposition is then the measure of the set of precisifications on which it is true.[13]

The idea of this manoeuvre is that the near-truth of premises like A2 helps to explain their plausibility: it helps to explain, in particular, the way in which their plausibility depends on the fact that the increments in intensity are small. Perhaps it's just hard to distinguish the nearly true from the true *simpliciter*. That would suffice as an explanation, but, more ambitiously, perhaps a well-informed person's attitudes *should* be continuous between true and nearly true propositions. While true propositions may command belief or certainty, a proposition that is nearly true might command high credence,[14] or might require that the agent acts with high probability as if believing it.[15] Edgington [1996] emphasises that such propositions are even *inferentially* reliable: roughly speaking, a conclusion validly deduced from a small number of nearly true premises will itself be nearly true.[16] So, in so far as the premises command something close to full belief, a similar attitude is commanded by the conclusion. It is only when one has a large number of premises—as in a sorites or a spectrum argument—that one can be led far from the truth.

Now let us turn to the spectrum argument. Again, GP′ and IC′ are both equivalent to A2, and a supervaluationist will say the same things about them: each instance is at least borderline true, and indeed nearly true in a way that depends on the small margin between w_i and w_{i+1}. This is what the supervaluationist says about the spectrum argument for 'outdoes', but it should be clear that there is no formal barrier to applying the same diagnosis to any spectrum argument, proper or otherwise. For example, one could hold that each instance of GP is either true or nearly true, corresponding to the small margin between w_i and w_{i+1}.[17]

[12] See, e.g., Keefe [2000: 185–6] for discussion of this move.
[13] This way of thinking, pioneered by Lewis [1970] and Kamp [1975], was especially developed by Edgington [1992, 1996].
[14] Views in this neighbourhood (if not specifically supervaluationist) are advocated, for example, by Williams [2011], Smith [2013], Dunaway [2017], and Bacon [2018].
[15] I am merely gesturing here at the sort of view proposed by Williams [2014]. Yet another view is that borderline betterness is what makes fitting borderline preference [Thomas forthcoming].
[16] This is right if we adopt a 'local' notion of validity (see note 11), or as long as we set aside arguments involving the truth predicate and similar apparatus.
[17] Here are two objections that have been put to me at this point. First, even if we reconcile ourselves to the idea that some instances of GP are only nearly true, won't there still be a problematic cut-off between the instances that are nearly true and those that are true *simpliciter*? Not if our theory of vagueness does its job. We should, after all, also understand the vagueness of 'ecstatic' in such a way that there is no sharp cut-off between cases in which A2 is nearly true and cases in which A2 is true *simpliciter*. This is a tricky area, but the basic

At this point, one might entertain the hypothesis that 'better than', as applied to constant-intensity pleasures, is coextensive with 'outdoes'. I don't endorse this hypothesis, but it does *illustrate* how one could combine the vagueness view with 'value superiority', an idea often mooted in order to deny CC and similar principles (see Arrhenius and Rabinowicz [2015] for a critical overview). When it comes to outdoing, there is an important distinction between 'superior' (ecstatic) and 'inferior' (non-ecstatic) pleasures; the vagueness view exploits the vagueness of the boundary between them. (See Nebel [forthcoming] for a recent proposal along these lines.)

4. General Arguments for the Vagueness View

Section 3 established that the vagueness view is right about *some* spectrum arguments, and indeed about some proper ones. Although I won't go so far as to claim that it is the right view about *all* spectrum arguments, there are some general features that make it an attractive option.

4.1 Theoretical Virtues

First, the vagueness view has some general theoretical virtues. It is theoretically conservative: it identifies the intuitive data given by the spectrum argument as an instance of a widespread phenomenon, something that we were committed to explaining anyway. We do not need any new conceptual resources. This is true even in the normative domain, since moral vagueness seems to be commonplace (a point that I'll revisit in section 6). Relatedly, when it comes to spectrum arguments for 'better than', the vagueness view promises to leave untouched most of our axiological thinking. The sorites paradox shows that reasoning with vague predicates is a delicate matter. But we manage with vague language all of the time: we don't need to give it up altogether, and we couldn't, even if we wanted to do so. By the same token, according to the vagueness view, spectrum arguments show that axiology is a delicate matter, but it is not rotten through and through.

At the same time, the vagueness view is charitable to our intuitions. As I explained in section 3, supervaluationism and similar theories of vagueness point to some defect in the inductive premise A2. But, in doing so, they also aim to explain what is right about it—why it seems compelling, and under what circumstances we may even rely on it. According to the vagueness view, the very same type of explanation will apply to the premises of the spectrum argument. Granted, this explanation might not be

supervaluationist explanation for such 'higher-order vagueness' is that the notion of admissibility, and thus of truth, is also vague (see Keefe [2000: sec. 8.1]). Second, a referee observes that, by the median voter theorem, the following three claims are incompatible: (a) for each i, it's nearly true that P_{i+1} is better than P_i; (b) it's true that P_0 is better than P_n; (c) betterness is 'single-peaked':

> (**SP**) For some arrangement of $P_0, \ldots, P_n$ along a line, it's true that the options become steadily worse as one moves away from the best option in either direction.

As usual, the 'it's true' means that the subsequent clause must hold on each precisification. While worth keeping in mind, I think single-peakedness is not so compelling that it renders my discussion moot. For one thing, the conflict dissolves if we remove the embedded truth predicate from SP, and so one can still maintain that weaker claim. And SP is not *especially* suggested by the intuitions that I discuss in this paper. Intuitively (albeit paradoxically), the pleasures are naturally arranged in a cycle, rather than along a line with a single peak.

completely satisfying; but, then again, it is not as if we have a completely satisfying theory of vagueness.

4.2 The Associated Sorites

Second, and more tellingly, every spectrum argument gives rise to a sorites argument, or at least a paradoxical argument of sorites form. To illustrate this by using our basic spectrum argument, consider the predicate 'super' of pleasure intensities, defined by the following biconditional.

> An intensity w is *super* if and only if, for any pleasure P at intensity w_0, there is a better pleasure at intensity w.

Now, by GP we have this:

> (**B1**) The first intensity, w_1, is super.

Next, we have B2:

> (**B2**) If w_i is super, then w_{i+1} is also super.

Why? According to GP, given any pleasure at level w_i, some pleasure at level w_{i+1} would be better. So, for any pleasure P at level w_0, and for any better pleasure Q at level w_i, there is some pleasure at level w_{i+1} that would be better still. From B1 and B2 we can deduce B3:

> (**B3**) The last intensity, w_n, is super.

This conclusion is just a restatement of CC. Indeed, the spectrum argument for CC can be construed as (B1,B2,B3) plus the derivation of B1 and B2 from GP and transitivity.

This (B1,B2,B3) has the logical form of a sorites argument. Beyond its logical form, it also has the feature that the underlying parameter—the intensity—varies gradually from cases that are clearly super down to cases that are clearly not super. Finally, (B1,B2,B3) is paradoxical, in so far as the spectrum argument itself is paradoxical. The obvious conclusion is that (B1,B2,B3) is a sorites argument, and that 'super' is vague in a way that defuses it. And, since 'super' is constructed from 'better than' and logical functors, the underlying diagnosis is that 'better than' is vague.[18]

This might not be a water-tight argument that 'better than' is vague in a way that defuses (B1,B2,B3) and hence the spectrum argument. But it is at least an attractive feature of the vagueness view that it gives the standard diagnosis of this paradoxical argument of sorites form. How much weight this point will bear depends on the relationship between vagueness and sorites-susceptibility, an issue that I cannot adjudicate here. But some philosophers consider the existence of a sorites argument to be *decisive* evidence of vagueness. Witness Bueno and Colyvan [2012: 29]: 'A predicate is vague just in case it can be employed to generate a sorites argument'. In turn, a sorites argument is just 'an argument by degrees with premises that appear to be true, but with a conclusion that appears to be false' [ibid.]. It is hard to see how (B1,B2,B3) could fail

[18] Is B2 compelling in *exactly* the same way as the soritical premise A2? Perhaps not, but, as I discuss in section 6, the force of this kind of objection is unclear. Note that if we defined 'super' by using the 'outdoes' relation, rather than 'better than', then 'super' would be coextensive with 'ecstatic', making A2 and B2 equivalent—even if we initially grasp them in very different ways.

the test. Even if one rejects their account, one might agree with them that alternative characterizations of vagueness are not theory-neutral. If so, then it is hard to reject the vagueness view in a theory-neutral way.

4.3 A Complement to Other Views

Finally, in evaluating the vagueness view, it is important to realise that it can complement, rather than replace, other responses to spectrum arguments that have been proposed. Its genuine competitors are fewer than it might seem.

I mentioned in section 2 how the vagueness view can complement the idea of value superiority; similarly, Broome [2004] combines vagueness with a critical level theory of population ethics. Here I will focus on the perennially popular views that deny *trichotomy*—in our example, the claim that, for any pleasures P and Q, either P is better than Q, or P is worse than Q, or P and Q are equally good. They instead posit a fourth value relation, variously called incommensurability, parity, or imprecise equality.[19] It might *seem* that the vagueness view is just a competing view of the same type: doesn't it also involve a fourth value relation, that of borderline betterness? Not necessarily: borderline betterness is compatible with trichotomy, since it might be true that either P is better than Q, or P is worse than Q, or P and Q are equally good, but indeterminate which of these disjuncts obtains. By the same token, I'll argue that rejecting trichotomy still leaves an important role for the vagueness view.

Let's focus on parity. The basic idea of a parity-based response to the spectrum argument is to reject GP in favour of this:

> (**Parity GP**) For any pleasure P at intensity w_i, there is a pleasure Q at intensity w_{i+1} that is better than *or on a par* with P.

However, adopting Parity GP is not enough to defuse the spectrum argument. Replacing GP with Parity GP renders the argument invalid, but it does not explain why GP might have seemed compelling. For consider again a sequence of pleasures $P_0, \ldots, P_n$, each much longer than the one before. The argument that P_n is better than P_0 will fail so long as, for some i, P_{i+1} is merely on a par with P_i. This is what Parity GP allows. But, if they are merely on a par, why would we be tempted to think that P_{i+1} is better that P_i, rather than the other way around?

This is where the vagueness view can help. It can be true that, for some i, P_{i+1} is on a par with P_i and yet, for each i, nearly true that P_{i+1} is better. So, too, it is possible that, for each i, Parity GP is true and yet GP itself is nearly true. Thus, the main claims of the parity view are compatible with the main claims of the supervaluationist vagueness view, and the latter, not the former claims on their own, can explain why the spectrum argument seems paradoxical.[20]

Now, I am not suggesting that the vagueness view provides the only possible explanation along these lines. In unpublished work, Hájek and Rabinowicz [ms] develop an

[19] See Handfield [2014], Chang [2016], and Parfit [2016], respectively, for recent examples. Chang, in particular, seeks to distinguish between these notions.

[20] To see the formal compatibility, consider the following view: P is better than Q if and only if P outdoes Q; they are equally good if and only if they are equal with respect to both length of ecstasy and total intensity; if neither is better than the other, and they are not equally good, then they are on a par. Here, each instance of Parity GP is true, while each instance of GP is at least nearly true. (On the other hand, the 'outdoes' relation can be extended to yield trichotomy without affecting the main arguments of this paper.)

alternative that appeals to 'degrees of incommensurability': the rough idea is that, even if it's true that P_i and P_{i+1} are on a par, the degree of incommensurability might be low, making P_{i+1} 'almost better than' P_i. Their explication of this idea depends on Rabinowicz's fitting attitudes theory of parity, and evaluating it properly would take me too far afield. However, my arguments in this section suggest two basic points. First, some are sceptical about parity in general, with Broome [1997] notably arguing that apparent failures of trichotomy are really instances of vagueness. Others may doubt its elaboration in the hands of Hájek and Rabinowicz. In contrast, vagueness is an indisputable phenomenon, and, I have argued, it can, and in some examples actually does, provide the resources that we need. Second, the argument (B1,B2,B3) has the appearance of a sorites argument. This indicates that vagueness is at work.

5. Structural Objections

Now I turn to some objections to the vagueness view found in the literature. These objections point to structural disanalogies between spectrum arguments and sorites arguments. For example, Parfit [2004: 22n13] writes thus:

> A Sorites Argument appeals to a series of steps, each of which is assumed to *make no difference*. My argument would be like this if it claimed that $[P_1]$ is *not worse* than $[P_0]$, $[P_2]$ is not worse than $[P_1]$, $[P_3]$ is not worse than $[P_2]$, and so on. But the argument claims that $[P_1]$ is better than $[P_0]$, $[P_2]$ is better than $[P_1]$, $[P_3]$ is better than $[P_2]$, and so on. The objections to Sorites Arguments are therefore irrelevant.[21]

Rachels [1998] makes essentially the same point. While my main example of a sorites argument claims that w_i and w_{i+1} are *alike* with respect to being ecstatic, my main example of a spectrum argument claims that P_i and P_{i+1} *differ* in a certain way: one is better than the other. Indeed, since 'better than' (unlike 'not worse than') is an irreflexive relation, the fact that P_{i+1} is better than P_i points to a difference between the two. In section 2, I stipulated that 'proper' spectrum arguments involve irreflexive relations, and so this is a general disanalogy between proper spectrum arguments and sorites.

A disanalogy it might be, but it fails as an objection to the vagueness view. After all, the vagueness view is the correct view about *some* proper spectrum arguments, including the one that I introduced in section 3. Moreover, we can call attention to the argument (B1,B2,B3). This argument appeals to a series of steps, each of which is assumed to make no difference to super-ness. Even by Parfit's lights, the objections to sorites arguments are directly relevant. But if they are directly relevant to (B1,B2,B3), then they are at least *prima facie* relevant to the spectrum argument as a whole.

The subtlest and most interesting objection of this structural kind is from Temkin [2012: ch. 9]. Here is my reconstruction of how he would draw a disanalogy between the 'ecstatic' sorites and the 'better than' spectrum argument.

> The sorites sequence for 'ecstatic' moves from an ecstatic case through *less and less intense* cases to a non-ecstatic case. It might be mysterious where and how the transition occurs from ecstatic to not ecstatic, but at least we are moving in the right direction. In the spectrum argument, however, we move from a better-than-P_0 case, P_1, through *better and better* cases to a not-better-than-P_0 case, P_n. This would be like moving from an ecstatic case through *more and more intense* cases to a non-ecstatic case. We are going in completely the wrong direction.

[21] He is really discussing a different spectrum that involves populations instead of pleasures.

As with Parfit's objection, there are no grounds here for distinguishing the spectrum argument for 'better than' from the spectrum argument for 'outdoes', and the vagueness view is the correct view of the latter. But we can see more specifically where Temkin's analysis goes wrong. The supervaluationist vagueness view rejects the claim that the cases get better and better: it is sometimes indeterminate whether P_{i+1} is better than P_i. Temkin can insist on the intuition that P_{i+1} is better than P_i, but this is precisely the kind of intuition that the vagueness view promises to explain away.

Nevertheless, I think that it is illuminating to see that there *is* an explanatorily important sense in which the sequence of pleasures P_i *does* move gradually 'in the right direction' from cases that are better than P_0 to cases that are not. We should first distinguish between two senses in which the sequence of intensities in the sorites moves gradually from levels that are ecstatic to levels that are not. One sense, emphasised in my reconstruction of Temkin, is that the pleasures become less and less intense. But they also become ecstatic on gradually fewer admissible precisifications. When it comes to understanding how supervaluationism treats the sorites, it is the *latter* phenomenon that does all of the work. How so? We are trying to get from an intensity that is determinately ecstatic—ecstatic on every admissible precisification—to an intensity that is determinately not ecstatic—ecstatic on none. The characteristic claim that the inductive premise A2 is not always true (but is always *nearly* true) is the claim that w_{i+1} might be ecstatic on strictly fewer admissible precisifications than w_i (but not *many* fewer). Thus, the set of admissible precisifications on which w_i is ecstatic gradually shrinks as i increases. The diagnosis of the sorites argument is about how this set of admissible precisifications gradually diminishes from all to none, *not* directly about how the cases decline in intensity. So, too, when we look at the sequence of pleasures, the important claim is that the set of admissible precisifications on which P_i is better than P_0 gradually diminishes as i increases.[22]

This point is easy to overlook because, in a sorites argument, the two phenomena almost coincide: if two intensities are borderline ecstatic, then one is less intense than the other if and only if it is ecstatic on fewer precisifications. However—and here is the crux—it is entirely possible for P_{i+1} to be better-than-P_0 on fewer precisifications than is P_i, without being determinately worse than P_i. This possibility does not rely on the vagueness view as a view about spectrum arguments. It just relies on the general hypothesis that 'better than P_0' is vague, and an analogous point can be made about any vague comparative. For suppose that it is true that X is better than P_0, but that it is indeterminate whether Y is better than P_0, and also indeterminate whether Y is better than X. Then Y is better-than-P_0 on strictly fewer admissible precisifications than is X, but it is not true that Y is worse than X.

In short, even if, as Temkin emphasises, we cannot maintain that the pleasures in the spectrum argument consistently get worse, they might *still* move gradually in the right direction, in the sense that is important for vagueness to do its work.

[22] For example, if 'better than' and 'outdoes' are coextensive, then the set of admissible precisifications on which P_i is better than P_0 is the set on which w_i is ecstatic. This gradually diminishes as w_i decreases from w_0 down to w_n.

6. Conclusion

There will be a wide range of considerations relevant to our appraisal of any particular spectrum argument, in any particular domain. I have not claimed, for example, that, when all is said and done, the most plausible axiology of pleasures will turn out to be one in which vagueness defuses the spectrum argument with which I started. However, I have shown that there can be no entirely general objection to this view—no objection that trades on the features held in common by all proper spectrum arguments. And there are general reasons in favour of the vagueness view, not least that every spectrum argument gives rise to a paradoxical argument of sorites form.

My discussion suggests one way to resist the vagueness view, as applied to the 'better than' spectrum argument, or to one's favourite paradoxical example: find a difference between it and the spectrum argument for 'outdoes'. The difficulty is that not just any old difference will do; we need one that undermines the ability of vagueness to do the explanatory work.

Here's one example. If there are meta-ethical reasons to doubt the existence of evaluative vagueness, these would undermine the vagueness view about spectrum arguments for 'better than', but not ones for 'outdoes'. Schoenfield [2015], for instance, argues that, given robust moral realism, moral vagueness must be a metaphysical, rather than a merely semantic or epistemic, phenomenon. And, as she notes, the possibility of metaphysical vagueness is highly controversial. But even if her argument is valid, its force is unclear, since—regardless of spectrum arguments—moral vagueness seems commonplace.[23] In any case, this line of thought will not rule out the vagueness view about other spectrum arguments in non-normative domains.

Alternatively, it might be possible to identify a psychological or epistemic difference in the *ways* in which GP and GP′ seem compelling, or the ways in which CC and CC′ seem implausible, and to argue that vagueness can account for one but not the other (compare note 18). If there is such a difference, understanding it could represent a significant development in our understanding of sorites arguments as well. While this indeed seems to me to be one of the more promising ways to directly resist the vagueness view, there are some foreseeable difficulties. Some differences between the two arguments may be attributed to the fact that 'outdoes' is definitionally convoluted, or to the fact that betterness is epistemically mysterious, or perhaps to the fact that evaluative vagueness is metaphysical; and these facts would seem not to undermine the vagueness view.[24] Another difficulty is that there is no consensus as to what the correct theory of vagueness is, and so it is hard to know what the exact implications of the vagueness view might be. If there is no entirely general objection to the vagueness view, then attention to such details is required.[25]

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[23] For disagreements with Schoenfield, see Sud [2019] and Thomas [forthcoming]. For examples of the ubiquity of moral vagueness see, e.g., Shafer-Landau [1995], Dougherty [2014], Schoenfield [2015], and Dunaway [2017].
[24] Temkin [1996] objects to the vagueness view along these lines; a plausible takeaway from his discussion, however, is that if there are sorites arguments psychologically similar to his favoured spectrum arguments, they arise from metaphysical vagueness.
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