A Determinable-Based Account of Metaphysical Indeterminacy

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ABSTRACT   *Many phenomena appear to be indeterminate, including material macro-object boundaries and certain open future claims. Here I provide an account of indeterminacy in metaphysical, rather than semantic or epistemic, terms. Previous accounts of metaphysical indeterminacy (MI) have typically taken this to involve its being indeterminate which of various determinate (precise) states of affairs obtain. On my alternative account, MI involves its being determinate (or just plain true) that an indeterminate (imprecise) state of affairs obtains. I more specifically suggest that MI involves an object's (i) having a determinable property, but (ii) not having any unique determinate of that determinable. I motivate the needed extension of the traditional understanding of determinables, then argue that a determinable-based account of MI accommodates, in illuminating fashion, both 'glutty' and 'gappy' cases of MI, while satisfactorily treating concerns about MI stemming from Evans' argument and the problem of the many.*

I. Introduction

Many phenomena appear to be indeterminate, in one way or other. For example, macro-objects (mountains, tables, statues, cats) appear to have imprecise boundaries, and it seems (determinism aside) that the future might be genuinely open, with there being no present fact of the matter about whether a given future event will occur. It remains unclear how to understand these phenomena and, relatedly, how to do so in a way responsive to certain puzzles—for example, the problem of the many—to which indeterminacy gives rise.[1]

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[1]Cases of predicates or properties ('red', 'bald') seeming to admit of borderline cases, and certain quantum phenomena (superpositions, duality), have also been associated with indeterminacy

Strategies for treating indeterminacy and the associated puzzles typically fall into one of three categories.[2] The first takes indeterminacy to have its source in how we represent the world: here indeterminacy is seen as semantic or representational. The second takes indeterminacy to reflect the limits of our knowledge of the world: here indeterminacy is seen as epistemic. And the third takes indeterminacy to have its source, somehow or other, in the world itself: here indeterminacy is seen as metaphysical.

To my mind, the third, metaphysical, approach is more natural than the other approaches for the cases mentioned above. I do not see how the indeterminacy in macro-object boundaries might be a semantic matter, reflecting that we have not gotten around to drawing certain lines: we are not inclined to draw such lines, arguably because any such lines would be both arbitrary and such as to change the subject (or object). Even less plausible is the idea that these cases reflect certain inabilities on our part to discern the perfectly precise facts; such a view is especially implausible as a treatment of the seemingly open future. Be all this as it may, many have found the notion of metaphysical indeterminacy—henceforth, MI—problematic. Hence, for example, Evans argues that MI leads to contradiction, Lewis maintains that there is no clear conception of MI, and Dummett claims that MI is 'not properly intelligible'.[3] Such pessimism, combined with developments in semantic and epistemic approaches, has resulted in longstanding neglect of metaphysical approaches to indeterminacy. The trend has shifted a bit of late, but for reasons I shall touch on down the line, I do not find existing accounts of MI satisfactory. My primary aim here is not critical, however.[4] What I rather aim to do is offer a new and quite different account of MI, and provide reasons to think that the account is both illuminating and robust.

Let me start by prefiguring, in a heuristic way, what is different about my approach. Previous accounts of MI have typically supposed that what it is for there to be MI is for it to be *indeterminate* which of various *determinate* (precise) states of affairs (SOAs), typically involving an object's having some property, obtain. Here I present an account on which what it is for there to be MI is for it to be *determinate* (or just plain true) that an *indeterminate* (imprecise) SOA obtains. I more specifically suggest that the obtaining of an indeterminate SOA is profitably understood in terms of an object's having, on the one hand, a determinable property, but not having, on the other hand, a

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and thought to give rise to certain puzzles (e.g. sorites paradoxes). These phenomena can also be treated by the approach I recommend here, but I leave discussion of these cases for another occasion (apart from a motivating case involving quantum phenomena offered in Section III.iii).

[2] One could, of course, hold a mixed view, using different strategies to treat different cases.

[3] Evans, 'Can There Be Vague Objects?'; Lewis, 'Many but Almost One'; Dummett, 'Wang's Paradox'.

[4] However, see Wilson, 'Are There Indeterminate State of Affairs?'.

unique property that is a determinate of that determinable.[5] In metaphorical but hopefully evocative terms, I refer to the first sort of account as locating MI at the 'meta-level', and the second as locating MI at the 'object level'.[6]

I first substantiate that discussions of MI, by proponents and opponents alike, have typically supposed that this involves a meta-level account (Section II). I next motivate my alternative determinable-based object-level account (Section III). I then argue that a determinable-based account makes sense of macro-object boundary and open future cases of seeming indeterminacy, while avoiding certain difficulties pressed against meta-level accounts of these phenomena (Section IV). Finally, I consider the extent to which a determinable-based account of MI is reductive, intelligible and illuminating, and systematic (Section VI).

II. Meta-Level Accounts of Metaphysical Indeterminacy

I shall now substantiate that MI has typically been understood in meta-level terms.

- Evans argues that MI (about boundaries, in particular) is inconsistent, on grounds that MI invokes indeterminate identity, and indeterminate identity leads to contradiction.[7] Why does Evans suppose that MI invokes indeterminate identity? Though his reasoning is compressed, he seems to assume that if an object *a* has an indeterminate boundary then it is *indeterminate* which of various *determinate* boundaries *a* has, such that boundary indeterminacy in *a* entails that it is *indeterminate* to which *determinately* (precisely) boundaried object *a* is identical. In other words, Evans is plausibly assuming a meta-level account of MI.

- Parsons and Woodruff disagree with Evans that MI leads to inconsistency, but agree that MI invokes indeterminate identity.[8] Their reasoning as regards the latter claim again presupposes a meta-level account of MI. So, for example, in presenting a Tibbles-the-cat version of the problem of the many, they say, '[T]he p-cats are definitely distinct from one another, but there may be no answer to the question of whether the cat itself is

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[5]These conditions may be met either by the determinable's being multiply determined at a time (reflecting that determination may be a relativized matter), or by the determinable's not being at all determined at a time. I shall argue for these patterns of determination in due course.

[6]Relatedly, the heuristic characterization here puns a bit on the use of 'determinate' ('indeterminate') as signifying either that some matter of fact or associated truth value is (is not) determinate or else that some SOA is (is not) precise.

[7]Evans, 'Can There Be Vague Objects?'. I discuss Evans' argument in more detail in Section IV.i.ii.

[8]Parsons and Woodruff, 'Worldly Indeterminacy of Identity'. For discussion of bridge arguments from MI to indeterminate identity, each of which presuppose a meta-level account, see Williams, 'Ontic Vagueness'.

identical with p-cat number 9, and so on for all the others'.[9] Here the 'p-cats' are *precise* cats (or cat-candidates), and the MI of Tibbles explicitly involves its being *indeterminate* to which of various *determinate* (precise) p-cats Tibbles is identical.

- On Morreau's account, indeterminacy is located in the parthood or constitution relations: 'How can material objects be vague if . . . quantities of matter cannot have questionable parts and are precise? . . . [M]aterial objects can be vague if they are indefinitely constituted by quantities of matter'.[10] Here MI involves its being *indeterminate* which of various *determinate* (precise) quantities of matter are constitutive parts of a given object.

- On Rosen and Smith's 'fuzzy view' account, '[A]n object is indeterminate in a certain respect (color, size, etc.) just in case it is a borderline case of a maximally specific color (size, etc.) property'.[11] The notion of being a 'borderline case', in turn, is understood in terms of possession of a perfectly specific property to an intermediate degree: 'An object is indeterminate in respect of F iff it is an intermediate instance of some point property in F'.[12] Indeterminacy is here placed in the instantiation relation: for an object to be MI is for it to *indeterminately* instantiate a *determinate* (precise) property.

- On Barnes and Williams' modal precisificational approach (prefigured by Akiba's 'modal account'), '[w]hen p is MI, there are two possible (exhaustive, exclusive) states of affairs—the state of affairs that p and the state of affairs that not-p—and it is simply unsettled which in fact obtains'.[13] The approach is developed in terms of a space of 'precisificationally possible worlds', effectively along lines of a metaphysically interpreted supervaluationist account of MI. They say, 'all the worlds in the space of precisifications are themselves maximal and classical'; 'when matters are metaphysically indeterminate, it is indeterminate which world is actualized'.[14] Here MI involves its being *indeterminate* which *determinate* world (i.e. precise maximal SOA) obtains.[15]

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[9]Parsons and Woodruff, 'Worldly Indeterminacy of Identity', 172. I discuss the problem of the many in more detail in Section IV.i.iii.

[10]Morreau, 'What Vague Objects Are Like', 342.

[11]Rosen and Smith, 'Worldly Indeterminacy', 185.

[12]Ibid., 185.

[13]Barnes and Williams, 'Theory of Metaphysical Indeterminacy', 9; Akiba, 'Vagueness in the World'.

[14]Barnes and Williams, 'Theory of Metaphysical Indeterminacy', 10; see also Williams, 'Ontic Vagueness'.

[15]See also Barnes' litmus test for MI, the gist of which is that 'If we give our language fully precise truth-conditions and indeterminacy *still* arises, then it must be because it is somehow unsettled whether those truth-conditions in fact obtain. And that's a fact about the world.' Barnes, 'Ontic Vagueness', 604.

- On Barnes and Cameron's account of the open future, 'The future is open with respect to some future contingent [sentence] p at t if and only if (1) p is, at t, metaphysically indeterminate in truth-value and (2) either it will be the case that, determinately, p was true, or it will be the case that, determinately, p was false'.[16] So, for example, 'According to every candidate history it's either true that there's a space battle or false that there's a space-battle. So "There will be a space-battle" is determinately either true or false—it's just indeterminate which'.[17] Here open future MI involves its being *indeterminate (*at t) which of various *determinate* truth values a given open future claim has (at t).

Why have so many supposed that MI must be cashed in meta-level terms? One reason, I speculate, is the common assumption that worldly entities are or must be precise:

> The only intelligible account of vagueness locates it in our thought and language. The reason it's vague where the outback begins is not that there's this thing, the outback, with imprecise borders; rather, there are many things, with different borders, and nobody's been fool enough to try to enforce a choice of one of them as the official referent of the word 'outback'.[18]

Fans of MI disagree that 'the world must be a fully determinate array of [determinate] facts or things',[19] but they *agree* that there is not 'this thing' with imprecise borders (where the imprecision here is understood in the object-level sense, as involving some irreducibly indeterminate SOA). They rather think that the world can be an *indeterminate* array of (determinate) facts or things.[20]

Relatedly, semantic and epistemic accounts also treat indeterminacy as a meta-level phenomenon. As Rosen and Smith say:

> Consider the standard supervaluationist view. Suppose 'Bob is tall' comes out true on some admissible precisifications of 'tall' and false on

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[16] Barnes and Cameron, 'Back to the Open Future', 5.

[17] Ibid., 3.

[18] Lewis, *On the Plurality of Worlds*, 212.

[19] Rosen and Smith, 'Worldly Indeterminacy', 185.

[20] I do not mean to imply that the assumption that worldly entities are 'fully determinate' is the only reason accounts of MI have standardly been meta-level; as Josh Dever pointed out (p.c.), meta-level treatments of borderline cases need not assume that the options are maximally precise. That said, the usual meta-level resolutions of such cases do take MI to involve indeterminacy in which of some comparatively more precise SOAs obtains (such that, for example, a meta-level treatment of baldness involves indeterminacy between SOAs involving precise numbers of hairs); so the spirit if not the letter of the speculation still holds.

others. Then 'Bob is tall' is neither true nor false. But this does *not* mean that the property of tallness is vague. The point is rather that there is no unique property of tallness. There are many properties, each . . . precise . . . . When we speak vaguely we fail to single out a unique such property.[21]

Here indeterminacy involves its being semantically *indeterminate* which *determinate* (precise) property is to be associated with a given term. No surprise, then, that recent accounts of MI giving a metaphysical spin to the supervaluationist strategy are meta-level accounts. Similarly, on epistemic accounts, it is epistemically *indeterminate* which *determinate* (precise) SOA obtains. Meta-level accounts have been hegemonic, giving the impression, perhaps, that no other approach was available.

Even so, and though my primary concern here is not critical, it may be worth registering that meta-level approaches to MI face difficulties in interpretation which render them—to my mind, at least—less than metaphysically illuminating. It is unclear, to start, how MI might involve an indeterminate degree of instantiation: properties are ways things are, so (it seems to me) either a thing is that way or it is not. The suggestion that MI might involve indeterminate constitution also faces a problem; for insofar as it is unclear how to understand constitution (which it is), it is unclear how to understand indeterminate constitution. Finally, metaphysical supervaluationist accounts are notoriously hard to 'grok': it is clear how (semantic) indeterminacy might reflect our having not yet decided how to use our language, but what would it be for the *world* to be undecided about, for example, what boundary a given macro-object has? There have been valiant attempts to make sense of metaphysical supervaluationism—as reflecting, e.g. that it may be 'indeterminate which world is actualized',[22] or that there may be multiple 'actual' worlds.[23] But even if such conceptions are coherent, I think I speak for many in saying that these accounts of MI occupy a metaphysically tenuous region of logical space.[24]

Such difficulties serve as some motivation for considering the viability of an object-level approach. But here again, previous accounts have been less than illuminating. J.A. Burgess endorses what appears to be an object-level account, on which indeterminate boundaries involve primitive vagueness in

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[21]Rosen and Smith, 'Worldly Indeterminacy', 186.

[22]Barnes and Williams, 'Back to the Open Future', 10.

[23]Williams, 'Multiple Actualities'.

[24]At least this is so for cases of MI in temporally present SOAs; I feel more comfortable with thinking of there being multiple future worlds between which the present actual world has not settled, as per a metaphysical supervaluationist account of the open future (though such a view faces other difficulties, as per Section IV.ii).

the property at issue.[25] But Burgess does little to develop the view, his stated project being primarily to criticize existing (meta-level) accounts; he does not offer principles, analogies, or any other means by which the posit of primitive indeterminacy might be seen as illuminating the phenomena at issue. Greenough's 'truthmaker gap' approach, on which MI reflects the absence of a worldly truthmaker for a given precise claim, might be thought to be an object-level account.[26] In fact, categorizing Greenough's account is tricky: from another perspective, his account is meta-level, since Greenough supposes (as per his acceptance of bivalence) that even in the absence of a truthmaker the claim is either true or false; hence on his account MI involves its being *indeterminate* (thanks to the absence of a truthmaker) which *determinate* truth value is associated with the claim. In any case, to the extent that it remains unclear how a claim about the world could have a determinate truth value in the absence of any worldly truthmaker, Greenough's account, like other existing accounts of MI, faces difficulties in interpretation rendering it less than illuminating.

III. A Determinable-Based Account of Metaphysical Indeterminacy

It is in service of formulating an illuminating object-level account of MI that attention to determinables may prove useful. I do not say 'renewed' attention because, so far as I know, that determinables might enter into characterizing MI has not been previously explored. This is somewhat surprising, given that determinables are aspects of reality that are somewhat unspecific. The neglect of a determinable-based approach to MI is, I speculate, largely explained by its having been almost uniformly assumed that determinables are either eliminable, reducible to determinates, or (even if existing and irreducible) in any case less fundamental than their associated determinates. If determinables irreducibly exist and are not just abstract shadows of determinates, however, they can, as we shall see in this and the following sections, provide the basis for an object-level account of MI having good claim to be not just illuminating, but also systematic and robust. In previous work, I argue for the truth of the antecedent of this conditional.[27] Even without considering these arguments, however, such a conception of determinates might be independently motivated, as entering into an illuminating and robust account of MI.

III.i. Determinable-based metaphysical indeterminacy

My suggestion is that some or all of the cases motivating MI involve a *determinable* SOA, as follows:

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[25] Burgess, 'Vague Objects'.

[26] Greenough, 'Indeterminate Truth'.

[27] Wilson, 'Fundamental Determinables'.

> *Determinable-based MI*: What it is for an SOA to be MI in a given
> respect *R* at a time *t* is for the SOA to constitutively involve an object
> (more generally, entity) *O* such that (i) *O* has a determinable property *P*
> at *t*, and (ii) for some level *L* of determination of *P*, *O* does not have a
> unique level-*L* determinate of *P* at *t*.

Here the locution 'what it is for' is intended to flag that the aim of
Determinable-based MI is to provide a schematic basis for metaphysically
explaining a given case of MI. The account takes as input an SOA that is
(supposed to be) MI in a given respect R at a time *t*, and, properly applied,
outputs a determinable-based metaphysical explanation of that phenomenon.
In a coarse formal sense, the account provides necessary conditions on an
SOA's being MI; but to characterize the account in these terms would be to
miss the deeper point; hence I use the 'what it is for' locution.

Three preliminary remarks are in order. First, the reference to levels
of determination in condition (ii) of *Determinable-based MI* reflects that
determinables may be determined at different levels of specificity—for exam-
ple, the property of *being colored* might be determined both by *being red*
(at one level of determination) and by *being scarlet* (at another level of
determination). At issue in condition (ii) is a failure of unique determina-
tion of any level of determination of *P*.[28] Second, the reference to being
MI in a given respect *R* is included in order to flag that an object's
being MI in one respect need not entail indeterminacy in all respects.[29]
As we shall see, whether *R* coincides with *P* (or not) will depend on the
case at issue. Third, *Determinable-based MI* aims to accommodate MI in
first-order SOAs, again typically involving an object's having a property; I
leave treatment of higher-order MI for another occasion, but the qualifier
'(more generally, entity)' reflects that making sense of higher-order MI may
require that the determinable property *P* be had by an SOA rather than an
object.[30]

Now, it is traditionally supposed that when an object possesses a
determinable property at a time, it also possesses one and only one determi-
nate (at a given level of determination) at that time. As I argue in this section,
there are cases indicating that the traditional supposition is too strong, and
should be rejected as generally characterizing determinables and determi-
nates. This will provide positive (and largely independent) motivation for
thinking that the conditions in *Determinable-based MI* can be satisfied.

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[28]Thanks to Ori Simchen here.
[29]Thanks to Jonathan Ichikawa here.
[30]Thanks to Carrie Jenkins here.

III.ii. Multiple relativized determination

Consider an iridescent feather whose color shifts from red to blue, depending on the angle of viewing, as is the case with the throat feathers ('gorgets') of certain hummingbirds:[31]

> The highly iridescent feathers of the hummingbird gorgets are among the most specialized of all bird feathers . . . . The iridescence is produced by the proximal part of the barbules. . . . The colors do not directly depend on selective pigment absorption and reflection, as do brown and blacks produced by the melanin pigments of non-iridescent feathers. Rather, they depend on interference coloration, such as that resulting from the colors seen in an oil film or soap-bubble . . . . Put simply, red wavelengths are longer than those at the violet end of the spectrum and generally require films that are thicker or have higher refractive indices than those able to refract bluish or violet light. Thus, the optimum refractive index for red feathers is about 1.85; for blue feathers it is about 1.5 . . . . When an optical film is viewed from about, it reflects longer wavelengths than when viewed from angles progressively farther away from the perpendicular. Thus, a gorget may appear ruby red when seen with a beam of light coming from directly behind the eye, but as the angle is changed the gorget color will shift from red to blue and finally to black, as the angle of incidence increases.[32]

Simplifying a bit, it seems reasonable to take this account as suggesting that the determinate color of an iridescent hummingbird feather is relative to perspective. Moreover, the account suggests that multiple of these perspectives may be in place, and the associated determinate colors instanced, *at a time*: I can look at the feather and see red, you can look at the feather at the same time and see blue. Let 'the feather case' in what follows involve this latter sort of situation.

The feather case provides reason for rejecting the traditional supposition that when an object possesses a determinable property at a time, it always possesses or must possess one and only one (for short: a 'unique') determinate at that time. The line of thought is as follows:

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[31] Thanks to Roger Clarke for suggesting the case of iridescent feathers as involving multiple relativized determination. The original case I presented of this phenomenon involved a novelty card with an image that changes as one changes perspective. The case of iridescence is preferable to the card case in that the latter, but not the former, might be thought to be more like the case of an object having differently colored parts (as Chris Mole suggested).

[32] Johnsgard, *Hummingbirds of North America*.

(1) The form of color determination in the feather case indicates that determination may be a *relativized* phenomenon: which determinate determines a given determinable at a time may depend on specific circumstances.

(2) The feather case indicates that at least sometimes, multiple such circumstances may hold at the same time *t*: I can look at the feather at *t* and see one color; you can look at the feather at *t* and see a different color. That is, we can take the case to involve *multiple relativized determination*.

(3) In the feather case, it is reasonable to assume that the feather has only a single instance of the determinable property 'being colored' at *t*. It would, in particular, be redundant to take the feather to possess multiple instances of this determinable property at *t*.

(4) In the feather case, the various relativized determinates are on a par; hence it would be arbitrary and inappropriate to attribute one rather than another of the determinate instances to the feather, as being the 'unique' determinate of the determinable property 'being colored' which the feather possesses at *t*.

(5) So, in the feather case, the feather has the determinable property 'being colored' at a time, and it does not have a unique property that is a determinate of this determinable at that time.

Supposing this understanding of the feather case makes sense, we have here independent reason (independent, that is, of fruitful application to cases of MI), involving properties taken to be paradigmatic of determinables and determinates, for thinking that the conditions at issue in *Determinable-based MI* can be satisfied.

Does this understanding of the case make sense? Sure. The first premise reflects a reasonable understanding of the scientific account of iridescence as suggesting that determinate colors of the feather are relative to certain circumstances. The second reflects that multiple of these circumstances can be in place at the same time—hence multiple relativized determination.[33] The third reflects that properties are *ways things are*, and that such ways (and associated properties or property instances) should not be multiplied beyond necessity. Since the feather is the same way—*colored*—whichever perspectival circumstances are in place, it would be redundant to attribute to the feather distinct instances of the property 'being colored', corresponding to each of these circumstances and associated determinates. The fourth reflects that, insofar as the various perspectives and associated determinate colors are on a par, it

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[33]The considerations here reflect a case in which two or more circumstances relevant to the instantiation of a given determinate are actually in place (as when two or more people look at a feather at the same time); however, once it has been established that the determinate of a given determinable may be relative to circumstances, it would more generally be natural to allow that, even in cases of merely potential multiple determination (as when only one person is looking at the feather), it would be inappropriate to attribute a unique determinate to the object at issue.

would be arbitrary to pick out and attribute any one of these determinates as being 'the' determinate shade (relativized or not) possessed by the feather. So we can certainly make sense of the feather case as involving a feather that has a determinable property, but no unique determinate of that property. And this much shows that the traditional supposition that when an object possesses a determinable property at a time, it always possesses or must possess a unique determinate at that time, is reasonably rejected—thus making room for the conditions on *Determinable-based MI* to be satisfied.

Before proceeding, it is worth noting three points about my suggested understanding of the feather case. First, this understanding, as involving a single determinable instance of color, determinates of which are relativized to different circumstances, is compatible with a wide range of accounts of color.[34] Second, I am not arguing here that there is no other way in which the case might be understood. For example, notwithstanding the clear redundancy, one *could* posit multiple determinable color instances as had by the feather, one for each perspective-relative determinate; I think that would be metaphysical overkill, but what is most important for my purposes is that one *could*, quite naturally, understand the case in the way I have suggested.

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[34]What follows draws on Maund, 'Color'. On a dispositionalist account, for something to be, for example, yellow is for it to be such as to look yellow to normal observers, in standard conditions (McGinn, *Subjective View*; Johnston, 'How to Speak'; Levin, 'Dispositional Theories'); since the 'standard conditions' in the feather case do not specifically advert to a single angle of visual approach, a dispositionalist account can make sense of the feather's being (at a time) colored (in having the property of appearing colored to normal observers in standard conditions), red (in having the property of appearing red to normal observers in standard conditions incorporating one perspective), and blue (in having the property of appearing blue to normal observers in standard conditions incorporating a different perspective). On a functionalist physicalist account (McLaughlin, 'Place of Color'; Jackson, *From Metaphysics to Ethics*), colors are the occupants of functional roles specified in terms of the ways things look that are associated with colours; such an account can make sense of the feather's being, at a time, colored (in virtue of the feather's having a property that, from any relevant perspectival condition, fills the 'looking colored' role), red (in virtue of the feathers having a property that, from one perspective, fills the 'looking red' role), and blue (in virtue of the feather's having a property that, from another perspective, fills the 'looking blue' role). On a reductivist account, the colors we experience are reducible to certain physical features of objects, such as having a certain spectral reflectance property (Matthan, 'Biological Function'; Byrne and Hilbert, 'Color Realism'; Tye, *Consciousness, Color and Content*); such an account can accommodate the case, assuming that spectral reflectance properties are direction-relative or extrinsically dependent on features of the environment (a view which Tye says can be made plausible, though he doesn't endorse it), and that the determinable instance might be supposed to be a more general surface property. On a projectivist account, colors are subjective qualities 'projected' onto physical objects and light-sources; here the case may be accommodated as involving the projection onto the feather, by the different observers, of the quality of being colored, the quality of being red, and the quality of being blue. An 'ecological' relationist account according to which 'being colored a particular determinate color or shade is equivalent to having a particular spectral reflectance, illuminance, or emittance that looks that color to a particular perceiver in specific viewing conditions' (Thompson, 'Colour Vision', 245) can accommodate the case. And so on.

Third, in the feather case, it seems natural to take the feather to have each of the specific determinates in relativized fashion: the feather is colored, simpliciter, but it is only red (i.e. some precise shade of red) relative to perspective 1, blue (some precise shade of blue) relative to perspective 2, etc. (Certainly, on pain of inconsistency, one cannot attribute all, or even more than one, of the determinate instances to the feather, as being *unrelativized* determinates of the determinable instance 'being colored': the feather cannot be both red, simpliciter, and blue, simpliciter, all over.) As we shall see, however, this option is not forced by the fact of multiple determination; I later discuss a case of multiple determination in which one might rather be inclined to say that the object whose determinable instance is multiply determined does not have these determinates, even in relativized fashion.[35]

Either way, in cases of relativized multiple determination, the object having the determinable does not have a unique determinate of that determinable. The (coherence of the proposed understanding of the) feather case thus provides independent reason to think that the traditional understanding of determinables and determinates should be extended to allow that at least some determinables may be multiply determined at a time, in such a way that the conditions in *Determinable-based MI* may be met.

III.iii. Lack of determination

There is another way in which the traditional supposition may fail—namely, if an object possesses a determinable property at a time that is *not at all* determined at that time, even relative to a given perspective or other circumstances. There are two routes to seeing the in-principle viability of this sort of possibility.

The first draws on the previous observation that determination may be a relativized phenomenon. As previously, the possibility of relativization makes room for an existing (instance of a) determinable to be multiply determined at a time, when multiple circumstances relevant to the instantiation of the determinate may be present. But the possibility of relativization might also make room for an existing (instance of a) determinable to be not at all determined at a time, even as a relativized matter of fact, if *none* of the circumstances relevant to determining the determinable is present. This may not seem plausible for the case of colors—how could something be colored without being (either absolutely or relatively) some specific color? But perhaps in other cases it might make sense. My present point is just that the possibility that determination may be relativized also points toward the in-principle possibility of undetermined determinables.

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[35]Rather, some other objects, acting, for example, as multiple constituters or realizers of the original object, have the determinate properties (see Section IV.i).

The second route to this possibility adverts to cases of quantum superposition, which on some interpretations may be seen as involving undetermined determinables.[36] We start with ordinary quantum mechanics and the associated rule according to which a system has a determinate property if and only if the quantum state is an eigenstate of the operator associated with that property. We may think of different quantum operators as asking a given state various questions, such as: Are you spin-up? Are you spin-down? Are you located in the box? Are you alive? And so on. The system is in an eigenstate of the operator if the answer is determinately 'yes' or 'no'. Since the rule says that the system has the property if and only if it is an eigenstate of the relevant operator, then if the answer is not determinately 'yes' or 'no' (equivalently, not an eigenstate), then the system does not have the associated determinate property.

Consider, for example, a simple system involving a single electron suspended in a superposition of being spin-up and being spin-down in the x-direction:

$$\psi = \frac{1}{\sqrt{2}}(|\text{spin-x} \uparrow> + |\text{spin-x} \downarrow>).$$

Here ψ is an eigenstate of the operator O corresponding to: Do you have a spin? Hence the system has the property of having a spin. But ψ is not an eigenstate of the operator O* corresponding to: are you x-spin ↑? So the system does not have the property of having spin-x ↑; nor does it have the property of having spin-x ↓. Here the property corresponding to O acts as the determinable and the property corresponding to O* acts as the determinate, with the system having the determinable but not any of the corresponding determinates. Note as well that this is entirely synchronic: ψ has the determinable O-property at a time and does not have a determinate O*-property at that time.[37]

Quantum superpositions can thus be seen as involving undetermined determinables, though this understanding is compatible with only some interpretations of quantum mechanics (e.g. Albertian 'bare theory' no collapse interpretations and some collapse interpretations), and in being a case of seeming MI is not independent of this issue in the way that the feather case is. Still, the case provides reason to think that the notion of an undetermined determinable is both coherent and scientifically respectable, and so is potentially available as another basis for satisfaction of the conditions at issue in *Determinable-based MI*. Further motivation for the possibility of

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[36] Thanks to Craig Callender here.

[37] Similar remarks apply to Schrödinger's cat. Hit the relevant quantum state with the question 'Is there a cat in the box?' and the answer is 'yes'; hit it with 'Is there a dead cat?' or 'Is there a live cat?' and the answer either way is 'no'.

undetermined determinables may stem from the successful application of the notion to other cases of seeming MI—in particular, the case of the open future, to be treated below.

III.iv. Does the extended understanding strip the notion(s) of determinables and determinates of useful content?

One might be concerned that allowing that an object might have a determinable property, but not have a unique determinate of that determinable property, and associated rejection of certain broadly formal principles associated with the traditional understanding, will render the resulting notions of determinables and determinates too etiolated to be of use. But this concern is not, after all, pressing.

To start, it is not as if our primary route to understanding determinables and determinates is via the formal correlations that are rejected as fully generalizable on the extended understanding. Our understanding is rather anchored in the paradigm cases; hence in attempting to characterize these notions, formally or otherwise, we simply must go where the facts lead (e.g. in allowing that determination may be a relativized phenomenon, making room in turn for multiple determination). As such, the rejection of a given formal principle in the face of the facts should be seen as indicating that we previously got it wrong about the rejected principle, at least as fully generalizable, as opposed to being seen as indicating that the target notions are lacking in interesting substance.

Moreover, the traditionally endorsed features can be imported without much ado into the extended understanding, when tweaked to reflect the potential for relativization or lack of determination. So, for example, consider what is arguably the 'core' feature of the determinable/determinate relation; namely, that it is a relation of *increased specificity*, distinct from other specification relations, including the conjunct/conjunction and disjunction/disjunct relations.[38] Even if a determinable instance may be multiply determined or undetermined, this core feature would characterize each of the actual or counterfactual determinable/determinate relations at issue. Relatedly, the principle according to which an object possessing a determinable possesses a unique determinate of that determinable might be tweaked to require that, when an object possesses a determinable, it possesses at most one determinate of that determinable, either simpliciter or relative to a given set of circumstances. The principle according to which determinable instances always stand in relation to some determinate might be tweaked to render it compatible with undetermined determinables, as requiring that determinable instances either *actually or possibly* stand in some relation to associated determinates. The traditional

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[38]See Johnson, *Logic*; Yablo, 'Mental Causation'; Funkhauser, 'Determinable–Determinate Relation'.

supposition that the determinates associated with a given determinable may be ordered along one or more 'determination dimensions' remains intact. And so on.

So there is no call for concern that allowing for multiply determined or undetermined determinables will render the notions of determinable and determinate too unsubstantive to do good metaphysical work. Indeed, in incorporating these possibilities while accommodating the spirit of the traditional features, the extended understanding is *more* substantive than the traditional understanding, not less.

IV. *Determinable-Based MI*: Applications and Advantages

I now turn to applying the *Determinable-based MI* to the motivating cases. Along the way we will see how a determinable-based account has the resources to avoid both Evans' argument and the problem of the many.

IV.i. Macro-object boundaries

Consider Mount Everest. Intuitively, there is no precise fact of the matter about exactly where, at a given time, the spatial boundaries of this mountain are; similarly for macro-objects that appear to be more distinctly spatially individuated, such as tables, statues and cats.

I suggest that such cases be treated as follows:

> *Determinable-based MI (macro-object boundaries)*: What it is for a macro-object *O* to have an indeterminate boundary is for it to be determinately the case (or just plain true) that (i) *O* has a determinable boundary property *P*, and (ii) for some level *L* of determination of *P*, *O* does not have a unique level-*L* determinate of *P* at *t*.

For example (and leaving talk of levels of determination implicit), what it is for Mount Everest to have an indeterminate boundary is for Mount Everest to have a determinable boundary property, but not to have a unique determinate of that boundary property. What it is for a table (call it Woody) to be spatially indeterminate is for Woody to have an indeterminate boundary property, but no unique determinate of that property. And the same for Venus, Tibbles, and so on.

Why think that mountains, tables, statues and cats can have a determinable boundary property, but no unique determinate boundary property? There are two routes to this conclusion, each of which presupposes, as is commonly done, that material macro-objects depend on micro-aggregates, in the sense, in particular, that features of material macro-objects are 'realized by' features of micro-aggregates. Now, there are a number of accounts of realization on offer; however, one of them, first proposed by Yablo in 1996 as making sense

of the realization of mental in physical features, and developed in my 1999 and 2009, takes realization to be a variety of the determinable/determinate relation (in particular, one allowing that determinable and associated determinate instances may be possessed by different objects).[39] The determinable-based account of realization is a version of what is sometimes called the 'subset' view of realization, according to which, roughly speaking, one property realizes another if the former is associated with a proper subset of the powers associated (perhaps only contingently, with the strength of the laws of nature) with the latter.[40] The discussion to follow appeals to a determinable-based account of realization, again with an eye to establishing that a reasonable understanding of macro-object boundaries might do so.

The first route to satisfaction of the conditions in *Determinable-based MI* incorporates the additional assumption, commonly taken for granted in debates about seemingly indeterminate macro-object boundaries, that the micro-aggregates upon which macro-objects constitutively depend have precise boundaries in the vicinity of the object. Here the line of thought is as follows:

(1)   Macro-object boundary properties are realized by precise micro-boundary properties.

(2)   Macro-object boundary properties are determinables of determinate micro-boundary properties.

(3)   Moreover, there are typically *many* such realizing micro-boundary properties associated with a given determinable macro-boundary property at a time—it is this that gives rise to the problem of the many (discussed in more detail in Section IV.i.iii). Hence a determinable macro-boundary property had by a given macro-object at a time *t* will typically be *multiply* determined at *t*.

(4)   As in the feather case, it is here reasonable to assume that there is only a single determinable boundary property (instance) had by the macro-object at *t*: it would be redundant to suppose that the macro-object has a distinct determinable boundary property (instance) for each multiple determinate boundary property (instance).

(5)   As in the feather case, it would be arbitrary to single out one among the multiple determinate boundary properties as that which is uniquely had by the macro-object at *t*, whether or not the determinate properties are assumed (somehow) to be relativized to circumstances.

(6)   So, in cases in which a macro-object boundary property is multiply realized at a time *t*, the macro-object has a determinable boundary property at *t* (as per the first condition of *Determinable-based MI*), and it does

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[39] Yablo, 'Mental Causation'.
[40] Wilson, 'How Superduper', 'Non-Reductive Realization'; Shoemaker, 'Realization and Mental Causation'. See also Wilson, 'Determination, Realization'.

not have a unique property that is a determinate of this determinable
property at *t* (as per the second condition of *Determinable-based MI*).

Again, I do not claim that this is the *only* way to understand the rela-
tion between macro-object and micro-aggregate boundaries; what is most
important for my purposes is that one *could*, quite naturally, understand
the case in the way I have suggested. A potential difference with the
feather case here is that we might not be inclined to attribute any determi-
nate boundary property to the macro-objects at issue, even as a relativized
matter of fact, for reasons I discuss down the line. But this is a choice
point. Either way, the above line of thought shows how, under the typical
assumption that the boundaries of macro-objects are realized by multi-
ple precise micro-boundaries, the conditions of *Determinable-based MI* are
satisfied.

There is a second route to the conclusion that some macro-objects have
a determinable boundary property, but no unique determinate boundary
property. Here we start by rejecting the assumption that the boundaries
of micro-aggregates are precise, which assumption is after all scientifically
implausible. Micro-aggregates consist in micro-entities standing in micro-
relations—for example, bonding relations; and these micro-relations are
constituted by fundamental interactions—for example, the electro-magnetic
interaction, gravity. But as a matter of fact, these are long-range inter-
actions: their influence is neither local nor precise, but rather *shades off
to infinity*. Indeed, not only interactions between micro-entities but micro-
entities themselves will be constituted, in part, by long-range interactions.
Given that the micro-aggregates upon which the boundaries of macro-objects
depend are partly constituted by interactions shading out to infinity, there
is no candidate precise boundary available for the macro-object to have
(and this would remain the case even if the macro-boundary were, some-
how, constituted by only a single micro-boundary). Well, that is not quite
right: we could, perhaps, make sense of a macro-object's having a pre-
cise boundary *if* we took micro-objects, as well as the macro-objects they
enter into constituting, to be either the size of the entire universe or (at a
time) the interactive light-cone. But those options are extremely revision-
ary, and would make general hay of our usual spatiotemporal means—vague
though they may be—of individuating material objects, whether micro or
macro. The remaining, less revisionary option is to allow that both micro-
aggregates and the macro-objects they enter into constituting have imprecise
boundaries—that is, have determinable boundaries but do not have any max-
imally determinate boundary, again as per the conditions of *Determinable-
based MI*.

I argue next that a determinable-based account of macro-object indeter-
minacy both accommodates certain intuitions, and addresses two pressing
concerns with a metaphysical interpretation of this phenomenon.

IV.i.i. The accommodation of intuition

Determinable-based MI (macro-object boundaries) does better than meta-level accounts, from an intuitive point of view.[41] Meta-level accounts locate the MI at issue in its being indeterminate which precise boundary a given macro-object has; but intuitively it is determinate (or just plain true) that, for any precise boundary, a macro-object such as Mount Everest, or Woody, does not have that precise boundary, even as a (somehow) relativized property.[42] Relatedly, proper accommodation of macro-object boundary indeterminacy should render it determinate (or just plain true) that any macro-object with an indeterminate boundary (Mount Everest, or Woody) is not identical with any precisely boundaried object; but again, most meta-level accounts will take some such identities to be indeterminate. To be sure, some meta-level accounts are designed to yield indeterminate boundaries without indeterminate identity;[43] but these accounts, unlike a determinable-based account, are compatible with a macro-object's being determinately identical to a precisely boundaried object, so again fail to accommodate properly the intuition.

IV.i.ii. Evans' argument against metaphysical indeterminacy

Evans' brief but powerful argument against MI is as follows. Suppose that *a* is a vague object, in the sense that *a* has an indeterminate boundary. Then for some object *b*, it is indeterminate whether *a* is identical with *b*. Next, consider the property: 'being indeterminately identical with *a*'. Now, *b* has this property, but *a* does not. So by Leibniz's law, it follows that *a* is *not* identical with *b*, and moreover this is determinately so, contra the original assumption that it is indeterminate whether *a* is identical with *b*.

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[41] *Determinable-based MI* also does better by way of conformity to intuitions, so it seems to me, than any semantic or epistemic account of macro-object boundary indeterminacy, since the indeterminacy here is intuitively a matter of the nature of the macro-objects at issue (or, more weakly but still metaphysically, of the way such objects are), as opposed to a matter of semantic underdetermination or epistemic inadequacy.

[42] A proponent of a meta-level account might claim that the intuition just registered is ambiguous, for *B* a precise boundary and *O* a candidate macro-object, between the intuition that it is determinately not the case that *O* has *B* and the intuition that it is not the case that it is determinate that *O* has *B*; then go on to maintain that a meta-level account does accommodate the latter reading of the intuition. But this strategy does not succeed. To start, the second reading is compatible with thinking that O has some precise boundary or other, with its being indeterminate whether this boundary is *B* or some other precise boundary; but the intuition to be accommodated is rather that for *no* precise boundary *B* does *O* have *B*. Moreover, ordinary speakers do not distinguish between things being the case and their being 'determinately' the case (nor do I; hence my qualifier 'or just plain true'), so the intuition to be accommodated has only a single reading, according to which for candidate macro-object *O* and (any) precise *B*, *O* does not have *B*.

[43] See, for example, Rosen and Smith, 'Worldly Indeterminacy'.

Again, the starting point of this argument is the assumption that MI brings indeterminate identity in its wake—a plausible enough assumption, if MI is understood in meta-level terms. Nearly all meta-level accounts of MI invoke indeterminate identity (though as above, there are exceptions to this rule), in taking MI to involve its being *indeterminate* which of various *determinate* (maximally precise) SOAs obtain. Hence it is that, on such accounts, for object *a* to have an indeterminate boundary involves its being indeterminate to which determinately boundaried object *a* is identical.

Determinable-based MI (macro-object boundaries) does not invoke indeterminate identities in this way. On the determinable-based account, for a macro-object to have an indeterminate boundary is for it to have a *determinable* boundary but (for some level of determination) no *determinate* of that boundary. Hence an indeterminately boundaried macro-object will be *determinately non-identical* to any object with such a determinate boundary. Consequently, Evans' argument against MI cannot get off the ground, at least as it is usually presented.

But might there be other routes to indeterminate identities? One alternative route aims more generally to show that any indeterminacy in whether *a* is *F* will give rise to indeterminate identities—involving not the object directly, but rather the set of all *F*s.[44] To put the concern in relief, suppose that all objects besides *a* are determinately not *F*. Then is the set of all *F*s identical to the empty set? Presumably this is indeterminate, by the extensionality of sets; hence indeterminacy in whether *a* is *F* will give rise to an indeterminate identity, after all. But note that, at least for the case of macro-object boundary indeterminacy on a determinable-based account of MI, it is not indeterminate, for any boundary property *F*, 'whether *a* is *F*': if *F* is the determinable boundary property at issue, then it is determinate, or just plain true, that *a* is *F*; and if *F* is any determinate boundary property at (or more precise than determinates at) the relevant level of determination L, then it is determinate, or just plain true, that *a* is not *F*. So here again, the route to indeterminate identities via set-theoretic extensionality cannot get off the ground.[45]

IV.i.iii. The problem of the many

The problem of the many arises from the supposition that a given macro-object at a time is typically associated with multiple overlapping

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[44]See Hawley, 'Indeterminism and Indeterminacy'; Parsons and Woodruff, 'Indeterminacy of Identity of Objects'; Williams, 'Ontic Vagueness'.

[45]Of course, some proponents of MI agree that MI entails indeterminate identities, but think that this can be shown not to be problematic; hence even if a determinable-based account were tacitly committed to such identities, that might not be a serious problem. See Parsons and Woodruff, 'Indeterminacy of Identity of Objects'; Barnes and Williams, 'Theory of Metaphysical Indeterminacy'.

micro-aggregates, each having a different precise boundary, and each of which could adequately serve as constituting a given macro-object. For example, a given cat—for example, Tibbles—might be associated with many 'cat-constituters', or 'p-cats', each consisting of a precise configuration of molecules and the like. But if a cat may be constituted by any given 'p-cat', then are there not many, cats in the vicinity of Tibbles—one for each p-cat sufficient unto the task of constituting Tibbles and, in particular, having features sufficient unto realizing Tibbles' boundary?

This seeming problem rests, however, on the supposition that the boundary of a given cat is determinate, which in turn suggests that the presence of multiple partially overlapping determinate 'cat-constituters', or 'p-cats' would entail the presence of multiple partially overlapping cats.

This supposition is rejected on *Determinable-based MI* (macro-object boundaries). This account provides the following straightforward answer to the problem of the many:

> There is just one cat there: the one with the determinable boundary.

Tibbles has a determinable boundary, but (for some level of determination) no unique determinate of that boundary; the cat-constituters (being precise) have determinate (precise) boundaries; hence there is only one cat. Similarly for mountains, tables, statues and other macro-objects that are constitutively dependent on or realized by microscopic aggregates:

> There is just one mountain (table, statue) there: the one with the determinable boundary.

Depending on further assumptions about the nature of mental states, the strategy might also work to resolve the related 'too many thinkers' problem:[46]

> There is just one thinker there: the one with the determinable mental state.

That mental states might be determinable relative to their determinate physical realizers is a live and independently motivated possibility: again, see Yablo for the initial suggestion that mental states might be determinables of which diverse physical realizers are determinates, and Wilson for development and defense of this suggestion.[47]

That's the straightforward answer to the problem of the many. An optional deeper answer to the problem (optional since it presupposes certain facts

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[46]See Merricks, *Objects and Persons*.
[47]Yablo, 'Mental Causation'; Wilson, 'Determination, Realization'.

about modal profiles that not everyone will accept) is that the conditions in *Determinable-based MI* encode a *modal* basis for singling out a cat from its multiple cat-constituters. The latter are micro-aggregates, consisting of certain lower-level entities standing in lower-level relations. Such relational micro-aggregates are commonly assumed to have their parts and relations, hence their boundaries, essentially; more weakly, the boundaries of cat-constituters are commonly assumed to be *less* modally flexible than those of the cats they constitute. As such, a cat-constituter cannot survive certain changes to its boundary that the cat it constitutes can survive. That this is so is here explained by the fact that, unlike a cat-constituter, a cat has a determinable boundary property but (at or below level L, etc) no unique determinate of that property; hence the cat's existence and features are compatible with the determinable boundary's being determined by the determinate boundary of any appropriate candidate cat-constituter. We thus have here a solution not just to the problem of the many, but the basis for an explanation of why and how macro-objects can persist through certain changes.

IV.ii. Open future indeterminacy

I now turn to the case of the open future, treatment of which reflects the second, 'gappy', way in which the conditions of *Determinable-based MI* may be satisfied.

In the typical case, open future indeterminacy at a time t gets resolved at a future time t'. As a first pass, then, the determinable-based account is as follows:

> *Determinable-based MI* (open future, first pass). What it is for a claim p about a specific future time t' to be MI at an earlier time t is (a) for it to be settled at t that a certain determinable SOA S will obtain at t', and (b) for some level L of determination of S, it not to be settled at t which unique L-level determinate of S will obtain at t'.

(We might also want to require that p express the obtaining of some determinate of SOA S, or to specify that S's lack of determination is ultimately a matter of the lack of determination of some property P constitutively involved in S; but there is no harm and perhaps some gain in remaining neutral on such further details.) So, for example, if the claim 'There will be a sea-battle tomorrow' is genuinely MI at time t, then while it is settled at t that some determinable SOA will obtain the day after t—here, an SOA that may be determined by the occurrence of a sea-battle, or by the non-occurrence of a sea-battle—it is not settled at t which of these determinates will obtain.

Why think that an account of future indeterminacy requires that it be settled (i.e. determinately the case, or just plain true) that a determinable SOA will obtain at the future time in question? This assumption is needed if the

sort of indeterminacy at issue in open future claims to be appropriately characterized. For example, one way for it to be indeterminate whether there will be a sea battle tomorrow would be if it were indeterminate when 'tomorrow' begins, and another would be if it were indeterminate whether the world will end before tomorrow; but such indeterminacy is not to the point here. The indeterminacy associated with the open future rather presupposes that some general SOA relevant to the future claim at issue will occur—say, the outcome of some negotiations, which may lead to peace or to war—and that the indeterminacy lies in precisely which outcome will occur. Open future indeterminacy thus presupposes that at a given earlier time t it is determinately the case, or just plain true, that some general SOA relevant to the future claim will occur.

Why think that this SOA should be understood as a determinable, as opposed to some other type of general SOA? While here again my purposes do not require that the SOA *must* be understood this way, doing so appears to be a natural and plausible way of understanding how the open future claim gets eventually settled, as in the typical case it is assumed to do. In this case, the unfolding of the future appears to involve a specification relation, in which an SOA that was previously indeterminate becomes determinate. But which specification relation is at issue? As previously, there are various specification relations besides the determinable/determinate relation; notably:

> The relation between a conjunct and a conjunction
> The relation beween a disjunction and a disjunct
> The relation between a genus and a species

These alternative relations do not, however, seem well suited to characterize the increase in specificity at issue in cases of open future MI. Perhaps the best hope here would be to take open future claims to involve a disjunctive SOA that gets whittled down to one disjunct when the future unfolds.[48] But many do not accept that there are disjunctive properties; perhaps relatedly, to my mind disjunctive specification corresponds more to a logical than a properly metaphysical notion. In any case, the specification associated with determinables and determinates is clearly properly metaphysical; so if we can make sense of its being settled at a given time t that a given determinable SOA can exist at a future time t' without its also being settled at t that (for some level of determination) any associated determinate SOA exists at time t', temporal specification can be understood in these properly metaphysical terms.

The primary barrier to making sense of this is, it seems to me, the traditional assumption that the existence of a determinable instance entails (for

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[48]This is effectively the strategy implemented in Barnes and Cameron's meta-level account of the open future (Barnes and Cameron, 'Back to the Open Future').

every level of determination) the existence of a specific determinate instance, such that if it were settled that a determinable instance existed, it would also be thereby settled that a specific determinate instance existed, contra the assumption of open future indeterminacy. But as per Section III.iii, there are reasons to think that determinables can exist undetermined. Hence, even if it is settled at *t* that a determinable SOA will exist at a future time *t′*, it might be unsettled at *t* how this determinable SOA will be determined at *t′*, when the future unfolds, as desired for open future MI.

Why is the determinable-based account above presented as just a 'first pass'? This reflects that, in addition to the typical case whereby open future indeterminacy eventually gets resolved, there seem to be cases of open future indeterminacy that never get settled. This might be true in a case in which the claim 'Jesus will return someday' is uttered in a world where time never ends, and where, at any given moment, Jesus has not yet shown up. This sort of possibility is not straightforwardly handled on a meta-level treatment of open future claims, since in supposing that MI consists in its being indeterminate which determinate (precise) future SOA obtains, it is presupposed that the future get settled, one way or another. Barnes and Cameron accommodate the Jesus case as involving a future that gets settled 'in the limit', in favor of Jesus' never returning.[49] It is unclear to me that the notions of limit and convergence apply to the case at hand, but at any rate other cases of never-resolved open future indeterminacy will not admit of this sort of treatment. For example, consider the claim, uttered the day before Sam enters the duplication machine, 'Sam will be around tomorrow'. This is an open future claim that might never get settled, as a result of unresolved MI in personal identity.

At any rate, *Determinable-based MI* straightforwardly accommodates the possibility of a perpetually open future: it is just that the determinable SOA never gets relevantly further determined. The second and final pass account of open future indeterminacy, allowing for this possibility, is as follows:

> *Determinable-based MI* (open future). What it is for a claim *p* about a specific future time *t′* to be MI at an earlier time *t* is (a) for it to be settled at *t* that a certain determinable SOA *S* will obtain at *t′*, and (b) for some level *L* of determination of *S*, for it not to be settled which, if any, unique level-*L* determinate of *S* will obtain at *t′*.

V. Reduction and Fundamentality, Intelligibility and Illumination, Systematicity

I want to finish up by considering some general features and further advantages of a determinable-based account of MI.

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[49] Ibid.

V.i. Reduction and fundamentality

Barnes, Cameron, and Williams take MI to be metaphysically fundamental. They maintain, and I agree, that there is no in-principle problem with such a supposition. How do things stand with *Determinable-based MI* It depends. On a determinable-based account, MI ultimately comes down to a certain pattern of possession of a determinable property. And as I have argued,[50] determinables are not reducible to (any) determinates, and moreover may be fundamental (and in any case, are as fundamental as their associated determinants). From this perspective, whether a given case of MI is properly deemed 'metaphysically fundamental' may depend on the status, as fundamental or not, of the determinable at issue. From another perspective, however, *Determinable-based MI* is at least weakly reductive, in characterizing MI in terms of (a certain pattern of possession of) determinables and determinates, as opposed to taking this to be a primitive phenomenon.

V.ii. Intelligibility and illumination

Related to the last point, *Determinable-based MI* has a claim to be intelligible and illuminating, in characterizing MI in terms that we have pretheoretic and metaphysical claim to already grasp.

To be sure, this account rejects the traditional understanding which assigns, to an object possessing a determinable property, one and only one (i.e. a unique) determinate of that property (at a level of determination). But this rejection is motivated by attention to the fact that the determination of (some) determinables may be relative to circumstances, which may be multiply or not at all in place, as well as by the fact that the notion of an undetermined determinate is a scientifically respectable component of certain (interpretations of) quantum mechanical goings-on. Moreover, the traditional formal associations between determinables and determinates may be tweaked, or preserved as is, compatible with the more substantive—and more accurate—understanding of these notions.

Hence it remains that the conceptual and metaphysical machinery of *Determinable-based MI* is independently motivated and understood, and serves to provide a substantive basis for establishing the general intelligibility of MI, and for illuminating how indeterminacy might be located in the world itself. Intelligibility and illumination are gained by seeing how the conditions of *Determinable-based MI* may be satisfied, both in principle and as applied to the cases of seeming MI that have been our focus here: and by means of our intuitive and theoretical understanding of determinables as less than maximally specific features of reality, that may stand, either actually or

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[50] Wilson, 'Fundamental Determinables'.

counterfactually, either singly or multiply, in relations of specification to other features of reality.

Arguably, then, *Determinable-based MI* is both intelligible and illuminating. This marks a real advance, in my view. As noted earlier, there are difficulties in interpreting previously existing meta-level and object-level accounts of MI, with some such accounts (e.g. Burgess') positing MI as a bare primitive, with no explication; and other accounts involving the posit of notions—ungrounded truths (Greenough), indefinite constitution (Morreau), intermediate instantiation (Rosen and Smith), indeterminate actualization of a world (Akiba, Barnes and Cameron, Barnes and Williams), or multiple actual worlds (Williams)—whose metaphysical content and viability are unclear. By way of contrast, determinable-based MI provides a positive, experientially and metaphysically familiar, theoretically articulated account of how it can be that the world is genuinely indeterminate in certain respects. To be sure, the account requires that one accept the existence of determinables as existing irreducible to and moreover not completely grounded in determinates, and moreover accept that an object may have a determinable property without having a unique determinate of that property. But we are arguably committed to such an understanding of determinables even independent of considerations of MI; and in any case such commitment seems considerably less controversial than competing commitments to ungrounded truths, indeterminate constitution, intermediate instantiation, indeterminate actualization, and/or multiple actual worlds.

V.iii. Systematicity

Finally, *Determinable-based MI* is systematic, in providing a unified account of both 'glutty' and 'gappy' cases of MI: glutty cases of MI (e.g. macro-object boundaries) satisfy the conditions of *Determinable-based MI* owing to the involvement of determinables that are multiply determined, whereas gappy cases of MI (e.g. open future claims) satisfy these conditions owing to the involvement of determinables that are not further determined.

Here again we see an advantage over meta-level accounts; for the supposition that MI is a matter of its being indeterminate which of various determinate (precise) SOAs obtain presupposes that at least *one* determinate SOA obtains; hence it is unclear how such an account can accommodate gappy cases of MI, which prima facie involve the absence of *any* associated determinate SOA.

VI. Summing Up

I have here offered a new 'object-level' determinable-based account of metaphysical indeterminacy, and argued that such an account accommodates

certain paradigmatic cases of seeming indeterminacy in an intelligible, illuminating and systematic way, while avoiding the main problems attaching to meta-level accounts of such phenomena. There is more to say and do, including considering how a determinable-based account of MI might be applied to borderline cases of predicates or properties (and associated Sorites sequences), and considering the logic of a determinable-based account. Here my aim has been to establish the *metaphysical* viability of a determinable-based approach to MI. Though strangely neglected, with the help of an appropriately ecumenical understanding of determinables, determinates and their relation(s), there is room for a conception of MI that naturally and plausibly locates indeterminacy *directly* in the world.

Acknowledgements

References

Akiba, Ken. 'Vagueness in the World'. *Nous* 38 (2004): 407–29.

Barnes, Elizabeth. 'Back to the Open Future'. *Philosophical Perspectives* 25 (2011): 1–26.

Barnes, Elizabeth, and J. Robert G. Williams. 'A Theory of Metaphysical Indeterminacy'. In *Oxford Studies in Metaphysics*, vol. 6, ed. Karen Bennett and Dean Zimmerman. Oxford: Oxford University Press, 2011.

Barnes, Elizabeth, and Ross P. Cameron–. 'Ontic Vagueness: A Guide for the Perplexed'. *Nous* 44 (2010): 601–27.

Burgess, J.A. 'Vague Objects and Indefinite Identity'. *Philosophical Studies* 59 (1990): 262–87.

Byrne, Alex, and David R. Hilbert. 'Color Realism and Color Science'. *Behavioral and Brain Sciences* 26 (2003): 3–21.

Dummett, Michael. 'Wang's Paradox'. In *Vagueness: A Reader*, ed. Keefe and Smith, 99–118. Cambridge, MA: MIT Press, 1975.

Evans, Gareth. 'Can There Be Vague Objects?'. *Analysis* 38 (1978): 208.

Funkhouser, Eric. 'The Determinable–Determinate Relation'. *Nous* 40 (2006): 548–69.

Greenough, Patrick. 'Indeterminate Truth'. *Midwest Studies in Philosophy (Truth and its Deformities)* 32 (2008): 213–41.

Hawley, Katherine. 'Indeterminism and Indeterminacy'. *Analysis* 58 (1998): 101–06.

Jackson, Frank. *From Metaphysics to Ethics*. Oxford: Clarendon, 1998.

Johnsgard, Paul. *The Hummingbirds of North America*. Washington, DC: Smithsonian Institution Press, 1997.

Johnson, W.E. *Logic*, Part 2. Cambridge: Cambridge University Press,1922.

Johnston, Mark. 'How to Speak of the Colors'. In *Readings on Color*, Vol. 1: *The Philosophy of Color*, ed. Alex Byrne and David R. Hilbert, 137–76. Cambridge, MA: MIT Press, 1997.

Levin, Janet. 'Dispositional Theories of Color and the Claims of Common Sense'. *Philosophical Studies* 100 (2000): 151–74.

Lewis, David. 'Many, but Almost One'. In *Ontology, Causality and Mind: Essays on the Philosophy of D. M. Armstrong*, ed., John Bacon, Keith Campbell and Lloyd Reinhardt, 23–38. Cambridge: Cambridge University Press, 1993.

Lewis, David. *On the Plurality of Worlds*. Oxford: Blackwell, 1986.

Matthen, Mohan. 'Biological Function and Perceptual Content'. *Journal of Philosophy* 95 (1988): 5–27.

Maund, Barry. 'Color'. *Stanford Encyclopedia*, 2012.

McGinn, Colin. *The Subjective View*. Oxford: Clarendon, 1983.

McLaughlin, Brian. 'The Place of Color in Nature'. In *Color Perception: From Light to Object*, ed. R. Mausfield and D. Heyer, 475–502. New York: Oxford University Press, 2003.

Merricks, Trenton. *Objects and Persons*. Oxford: Oxford University Press, 2001.

Morreau, Michael. 'What Vague Objects Are Like'. *Journal of Philosophy* 99 (2002): 333–61.

Parsons, Terence, and Peter Woodruff. 'Indeterminacy of Identity of Objects and Sets'. *Philosophical Perspectives* 11 (1997): 321–48.

Parsons, Terence, and Peter Woodruff. 'Worldly Indeterminacy of Identity'. *Proceedings of the Aristotlean Society* (1995): 171–91.

Rosen, Gideon, and Nicholas J.J. Smith. 'Worldly Indeterminacy: A Rough Guide'. *Australasian Journal of Philosophy* 82 (2004): 185–98.

Shoemaker, Sydney. 'Realization and Mental Causation'. *The Proceedings of the Twentieth World Congress of Philosophy* 9 (2000): 23–33. (A longer version appears in *Physicalism and its Discontents*, ed. Carl Gillett and Barry Loewer, 74–98. Cambridge: Cambridge University Press, 2000.)

Thompson, Evan. *Color Vision: A Study in Cognitive Science and Philosophy of Science*. London, Routledge, 1995.

Tye, Michael. *Consciousness, Color and Content*. Cambridge: Cambridge University Press, 2000.

Williams, J. Robert G. 'Multiple Actualities and Ontically Vague Identity'. *Philosophical Quarterly* 52 (2008): 134–54.

Williams, J. Robert G. 'Ontic Vagueness and Metaphysical Indeterminacy'. *Philosophy Compass* 3/4 (2008): 763–788, doi:10.1111/j.1747-9991.2008.00151.x.

Wilson, Jessica M. 'Are There Indeterminate States of Affairs?' In *Current Controversises in Metaphysics*, ed. Elizabeth Barnes. London: Routledge, forthcoming.

Wilson, Jessica M. 'Determination, Realization, and Mental Causation'. *Philosophical Studies* 145 (2009): 149–69.

Wilson, Jessica M. 'Fundamental Determinables'. *Philosophers' Imprint* 12 (2012): 1–17.

Wilson, Jessica M. 'How Superduper Does a Physicalist Supervenience Need to Be?' *Philosophical Quarterly* 49 (1999): 33–52.

Wilson, Jessica M. 'Non-Reductive Realization and the Powers-Based Subset Strategy'. *The Monist* 94 (2011): 121–54.

Yablo, Stephen. 'Mental Causation'. *Philosophical Review* 101 (1992): 245–80.