

Fundamental Indeterminacy

Abstract: This paper is about reasons to believe that the world itself is indeterminate (as opposed to being merely indeterminately described or represented). I argue that in order to successfully defend metaphysical indeterminacy, you need to show that indeterminacy can be fundamental. Standard arguments for metaphysical indeterminacy cannot show this, and so the case for metaphysical indeterminacy, as it stands, has a serious weakness. I offer some alternative arguments for metaphysical indeterminacy, ones which can establish fundamental indeterminacy. I argue that the case for metaphysical indeterminacy does not depend on derivative or permissive ontology; even extremely austere metaphysics can have good reason to accept fundamental indeterminacy.

Metaphysical indeterminacy is indeterminacy in how things are, rather than how they are described or what we know about them. It is indeterminacy that would remain even if we spoke a perfect language and were omniscient. The purpose of this paper isn't to give a theory of metaphysical indeterminacy or defend it from general skeptical challenges (e.g., worries that it's incoherent or can't be properly defined).¹ Instead, I want to focus on a simple question. Suppose we grant for the sake of argument that metaphysical indeterminacy is coherent. What - if any - reason might there be to accept metaphysical indeterminacy? What I'm going to argue is that the question of whether there can be metaphysical indeterminacy goes hand in hand with the question of whether there can ever be indeterminacy in what's *fundamental*. And so, in order to successfully argue for metaphysical indeterminacy, we need to argue for *fundamental indeterminacy*.

¹ For arguments that metaphysical indeterminacy is coherent, and can be explicated in a classical, bivalent framework and for responses to some standard objections to the coherence of metaphysical indeterminacy, see, inter alia, Barnes (2010), Barnes and Williams (2011), Barnes (2011).

A prevailing thought in realist metaphysics is that some, but not all, entities are fundamental.² Theories diverge on what exactly it means to be ‘fundamental’, but the common thought is that the fundamental is in some sense the ontological bedrock. When God creates the world, all she has to do is create the fundamental entities. Everything else – the non-fundamental or ‘derivative’ entities – she gets for free, in virtue of creating the fundamental.

Standard arguments for metaphysical indeterminacy (and the more specific metaphysical *vagueness*) tend to follow a common form: determinately, some fundamental state of the world Φ obtains; it’s indeterminate whether the world’s being (determinately) Φ is a sufficient condition for the world being some derivative way Ψ .³ Even if such arguments succeed in motivating metaphysical indeterminacy (hereafter simply ‘indeterminacy’), they locate such indeterminacy only in derivative ontology. Fundamental indeterminacy looks harder to come by.

In what follows, I will argue that a defender of indeterminacy needs to show that indeterminacy can be fundamental, but that her standard arguments, even if they work, only establish derivative indeterminacy (§1). I then move on to the case for fundamental indeterminacy, first giving a brief explanation of different ways we might characterize the idea that there is fundamental indeterminacy (§2) and then examining arguments for

² Or, on frameworks which accept degrees of fundamentality, *absolutely* fundamental.

³ Eg., Sorites series for composition (for restricted composition) and persistence (in endurantist metaphysics). For examples see, *inter alia*, Hawley (2001), Lowe (1995), Tye (1990), van Inwagen (1990). See §1.1 for further discussion.

indeterminacy which (unlike standard arguments) if successful can establish fundamental indeterminacy (§3). I argue that the best strategy for motivating fundamental indeterminacy is to focus on its ability to increase theoretical expressiveness.

1. Why it matters

1.1 *The standard arguments*

Why would we ever think that the *world itself* is indeterminate? Familiarly, indeterminacy is often motivated via a ‘metaphysical’ version of the classic Sorites paradox. Suppose we wanted to argue that it could be indeterminate whether F obtains, for some derivative state of the world F. The form of argument would be as follows. Imagine some determinate fundamental state of the world, G. In a world in which things are fundamentally G, it’s obvious that, derivatively, things are F. There’s no question of indeterminacy. But now imagine a world in which things are G*, where G* is a fundamental state of the world which differs (but only marginally) in some relevant respect from G. When G* obtains instead of G, does F still obtain? Well, plausibly we should say yes, since F obtains when G obtains, and G* differs only marginally from G. To say otherwise would be commit to an ad hoc or brute transition in Fness, which is a *bad thing*. But, familiarly, we can keep going like this, by a series of marginal changes, until we get to some state G+, at which, intuitively, we should say it’s obvious that things are no longer F. That’s a classic Sorites paradox: large changes seem like they must make

a difference, small changes seem like they shouldn't make a difference, but when we add up a bunch of small changes (none of which should itself make a difference) we get a large change (which has to make a difference). Then we add in the extra claim that a diagnosis of semantic indecision is inappropriate for the particular case and hey presto, we have your standard argument that the world could be indeterminate.

This is, for example, exactly the kind of argument pressed against restricted composition.⁴ Start with simples far apart⁵ – they shouldn't compose. Move them marginally closer together – if they didn't compose before, they still shouldn't compose. But keep doing that enough times and you'll end up with the simples having no space whatsoever in between them – as clear a case of composition as the restricted composition theorist could wish for. And so on, *mutatis mutandis*, for other familiar arguments for metaphysical indeterminacy: indeterminacy in whether a particular

⁴ You might protest that the Sorites for composition, if it works, *does* motivate fundamental indeterminacy, because those who believe in composition are committed to a fundamental parthood relation, and the Sorites for composition entails that this relation can be indeterminate (and, perhaps as a result, entails that it can be indeterminate what exists - see Sider (2001)). Whether this is right will depend in part of what is meant by 'fundamental indeterminacy' - see §2. An important thing to note is that, if successful, the Sorites for composition wouldn't entail that there's a relation of indeterminate parthood; it would just entail that whether the relation of parthood obtains can sometimes be indeterminate (and likewise, *mutatis mutandis*, for indeterminate existence). Whether this is enough to satisfy the demand for fundamental indeterminacy will depend on issues about parthood and composition which I don't want to wade in to. I'm looking for examples of indeterminacy which don't rely on supervenient ontology (e.g., the As supervene on the Bs, it's determinate that the Bs are F, but it's indeterminate whether the Bs being F is sufficient for the As being G).

⁵ If spatial proximity is the salient variable. Other candidates could be the amount of force they exert on each other, or what causal interaction they have with one another, etc. Sub in whatever the restricted composition theorist says should matter to composition, which is sometimes present and sometimes absent.

enduring object persists through time, indeterminacy in whether something is a living being, indeterminacy in whether a foetus is a person, etc.⁶

In all these so-called ‘metaphysical Sorites’ arguments, fundamentally everything is determinate.⁷ They work by specifying determinate ways things are fundamentally, and then motivate the idea that the (determinate) way things are fundamentally gives rise to indeterminacy in the derivative facts which supervene on these fundamental facts. But if this is the entire case for metaphysical indeterminacy, then the case for metaphysical indeterminacy is weak - as we’ll see.

1.2 Indeterminacy all the way down⁸

Standard arguments for indeterminacy only give us derivative indeterminacy. But one major reason for caring about whether there is any *fundamental* indeterminacy is the thought that for there to be any indeterminacy at all there would have to be indeterminacy ‘all the way down’. That is, a world which is determinate in fundamentals is not a world which can truly be said to be indeterminate. If the world really is indeterminate, then it must be in virtue of indeterminacy in fundamentals.

⁶ The claim is not that *all* purported examples of metaphysical indeterminacy fit this pattern. The open future, understood as a kind of metaphysical indeterminacy, doesn’t seem to (more on this later - §3.3). Neither does, for example, the case of indeterminate identity offered in Lowe (1994). But certainly *most* of the offered examples of metaphysical indeterminacy run along these lines -- to the extent that it makes the question of whether indeterminacy can be fundamental a compelling one.

⁷ Although Hawley (2004) gives an elegant argument that if you accept the sorites for whether simples compose, you should likewise accept a sorites for *whether something is a simple*.

⁸ I’m particularly grateful to Ross Cameron for extensive discussion of the material in this section.

The thought is simple: if you've got determinate components and combine them in determinate ways, there's nowhere for indeterminacy to come from. The standard arguments for metaphysical indeterminacy are of the form: determinately the fundamental things are F, but it's indeterminate whether the fundamental things being F suffices for derivative things being G. The 'all the way down' worry is simply that if you combine a bunch of determinate things, you won't (no matter how you combine them) be able to get any (genuine) indeterminacy.⁹

Here's an argument that in order for there to be metaphysical indeterminacy at all there has to be indeterminacy in how things are fundamentally. (Lower case 'f' and 'd' are variable ranging over descriptions of the world at the fundamental and derivative level respectively. Upper case 'F' and 'D' are names of particular such descriptions.)

- (1) For any complete true description of how things are fundamentally, f, and any complete description, d, of how things are derivatively, either f entails d or f is incompatible with d. (Assumption)
- (2) Entailment is determinacy preserving. (Assumption)
- (3) For some complete description, D, of a way for things to be derivatively, it is indeterminate whether D is true. (Assumption)

⁹ Though see Hyde (1998) for an argument to the contrary.

- (4) For some complete description, F, of a way for things to be fundamentally, it is determinate that F is true. (Assumption)
- (5) Either F entails D or F is incompatible with D. (From 1)
- (6) If F entails D and F is determinately true then D is determinately true. (From 2)
- (7) If F is incompatible with D (i.e. F entails not-D) and F is determinately true then not-D is determinately true. (From 2)
- (8) Either D is determinately true or not-D is determinately true. (From 4, 5, 6, 7)
- (9) Contradiction. (From 3 and 8)

The four assumptions lead to contradiction, and so cannot all be true. Assumptions (3) and (4) together capture the claim that there is indeterminacy in how the world is at the derivative level but no indeterminacy in how the world is at the fundamental level. So if assumptions (1) and (2) are true then we have a proof that if there is indeterminacy at all in the world, there has to be indeterminacy in how the world is at the fundamental level (assuming that if there is indeterminacy in how the world is then there has to be indeterminacy either in how things are fundamentally or in how things are derivatively or both).

(1) is intended to be an unpacking of the thought that the fundamental facts fix the derivative. The thought is that a complete true description of how things are fundamentally will entail any complete true description of how things are derivatively; in

which case, since any complete true description of how things are derivatively will be incompatible with any complete false description of how things are derivatively, a complete true description of how things are fundamentally will also be incompatible with any complete false description of how things are derivatively. So for any complete description of how things are derivatively, either it is entailed by a complete description of how things are fundamentally or it is incompatible with it.

It might be thought that the appeal to entailment in (1) is a mistake: that while the fundamental facts do indeed fix the derivative facts, there is no reason to suppose that the former entail the latter. Perhaps instead, for example, the fundamental facts *ground* the derivative facts. But as long as the relationship between the fundamental and derivative is determinacy preserving, the argument will still go through. So if you think the fundamental facts ground the derivative facts then, provided that ‘Determinately, p’ and ‘p grounds q’ entails ‘Determinately, q’, the argument still works, and still rules out the situation whereby we have determinate fundamental reality that gives rise to an indeterminate derivative reality.

This argument is, of course, resistable. The most plausible (it seems to me) way of resisting this argument to maintain that the facts concerning the link between the fundamental and derivative, whatever it is, can themselves be indeterminate. So suppose you think the link is indeed entailment. You might think that there is a determinately true complete fundamental description of the world but that there is no determinately true

complete derivative description of the world because you think that it is indeterminate which derivative descriptions of the world are entailed by the fundamental description. So the fundamental facts do indeed fix the derivative ones, but since it can be indeterminate *which* derivative facts the fundamental facts fix, it is indeterminate what derivative facts are fixed by the (determinate) fundamental facts.

If this is your view, then you will resist the above argument either by rejecting (1) or (2). If you think indeterminacy with respect to p rules out both p being the case and not-p's being the case, then you will reject (1) (or the analogue of (1) for whatever you think should be in place of entailment). For (1) relies on the thought that if you have a fundamental description f and a fundamental description d then either f fixes that d, or f fixes a rival derivative description in which case f fixes that not-d. But if it can simply be indeterminate whether f fixes that d, then on this view neither of those will hold.

Alternatively, you might be happy to say indeterminacy with respect to p is compatible with p's being the case and with not-p's being the case: one or other will be the case, it will simply be indeterminate which. In that case, you should accept (1) but deny (2). Entailment (or whatever you think the link is) won't be determinacy preserving, on this view, only determinate entailment. That is, you can't infer 'determinately, q' from 'determinately, p' and 'p entails q', you need 'determinately, p entails q'. But then the argument will be blocked, for you would need instead of (5), (5*) Either F determinately

entails D or F is determinately incompatible with D. But (5*) does not follow from (1), and ought to be rejected if the facts about what F entails can themselves be indeterminate.

However, suppose the link between the fundamental and derivative can itself be indeterminate. If the facts about that link are *themselves* fundamental then this is simply another route to fundamental indeterminacy. If the fundamental facts entail the derivative ones but it's indeterminate what derivative facts the fundamental facts entail then if the facts about what entails what are fundamental then there is indeterminacy in what fundamental facts obtain. So if the link between the fundamental and the derivative is determinacy preserving, then there cannot be indeterminacy at all without there being indeterminacy in the fundamental facts. If the link is not determinacy preserving then that is because it itself can be a locus of indeterminacy. And so if the facts concerning the link are fundamental facts, then there is indeterminacy in the fundamental facts.

1.3 Biting bullets at the derivative level

Regardless of whether you find the 'all the way down' worry compelling, though, the absence of indeterminacy in fundamentals can still give you reason to find standard arguments for indeterminacy suspicious. Again, most arguments for indeterminacy are meant to support the intuition that a certain determinate way things are fundamentally might give rise to indeterminacy in how things are derivatively. But if indeterminacy is

present only in how things are derivatively, these arguments become fairly easy to resist - at least on many conceptions of derivative ontology.

The motivations for adopting indeterminacy based on arguments like those in §1.1 are varied. Some object to arbitrariness: any sharp cut-off you posit in a metaphysical Sorites would be arbitrary, arbitrariness is bad, so you ought not to posit a cut-off. Some draw analogy to semantic vagueness: if you're reluctant to posit cut-offs in the more familiar versions of the Sorites paradox, then by parity of reasoning you shouldn't posit cut-offs in the metaphysical version (since it's strongly analogous). And so on.

But insofar as these motivations are directed at derivative ontology, they'll be unpersuasive to many. Accepting indeterminacy is a theoretical cost.¹⁰ Some amount of arbitrariness or sharp cut-offs might be usefully incorporated into a theory to avoid that cost, particularly if it was not fundamental arbitrariness or fundamental cut-offs. That is, the bad things that a metaphysical Sorites presses as intuitively implausible may be much more acceptable if they are merely derivative, rather than fundamental.

This is straightforwardly the case for those tempted by a deflationary view of derivative ontology. If derivative entities exist, but don't 'really exist'¹¹ or don't exist 'in reality'¹², then a certain amount of arbitrariness in derivative ontology looks wholly unproblematic.

¹⁰ *At least* insofar as it involves addition to ideology – you will at the very least need to complicate your ideology enough to express indeterminacy.

¹¹ See, e.g., Cameron (2010)

¹² See Fine (2001), (2009)

But even those with a more inflationary view of derivative ontology might be happier to locate arbitrariness and cut-offs in derivative ontology than in fundamental ontology – and likely far happier to allow such costs in derivative ontology than to embrace indeterminacy.

Consider the view of fundamentality defended in Schaffer (2009). Schaffer argues that theoretical virtues should be applied to what a metaphysical theory says is fundamental, rather than to what a theory says exists simpliciter. On an interpretation like this, the theoretical reasons we have for discounting arbitrariness and cut-offs apply only if the arbitrariness and cut-offs are fundamental. As long as fundamental ontology is free from such features, a theory can be judged virtuous. For those sympathetic to Schaffer's account of theoretical virtue, the common metaphysical Sorites will be utterly unpersuasive, relying as it does on the claim that there's something objectionable about arbitrariness or cut-offs in derivative ontology.

1.4 Ontological sparsity

A final reason why you might find the standard arguments for indeterminacy unpersuasive is that you simply don't believe in the entities purported to be indeterminate. Arguments for indeterminacy often rely on permissive ontological

commitments: persons, composite objects¹³, enduring objects, mountains, cats, etc. These are all the kinds of things you won't find in a desert landscape ontology. And where defenders of indeterminacy see a modus ponens ('there are Fs; Fs are indeterminate; there is indeterminacy in the world!') skeptics often see a modus tollens ('if there were any Fs, the Fs would be indeterminate; therefore there are no Fs'). The presence of indeterminacy is more often than not seen as a problem for permissive ontologies, not as a good reason to think the world is indeterminate.

Indeed, compositional nihilism is sometimes offered as the ultimate escape clause for the arguments in question, and the absence of indeterminacy put forward as a reason to be a compositional nihilist.¹⁴ If you think the only things that exist are simples, the thought goes, then you're off the hook as far as indeterminacy goes.

However, very sparse ontologies, even as sparse as compositional nihilism, are no longer a clear panacea to indeterminacy-related worries, if we think that indeterminacy can be fundamental. I'll argue below that there are motivations for adopting fundamental indeterminacy which apply even to the sparsest ontologies - compositional nihilism

¹³ It is, familiarly, *restricted* composition - not composition per se - that is considered particularly indeterminacy-prone. Universalists think there are composite objects, but they think that any collection of objects whatsoever composes a further object. It's the claim that some, but not all, collections of objects compose a further object that is prone to sorites-style arguments. But universalists often resist the claim that composite objects really are an extra ontological commitment. Composition is 'identity like' in some sense - you get the composite objects 'for free', they are 'nothing over and above' the things that compose them. See especially Lewis (1986).

¹⁴ See, inter alia, Sider (2001), Unger (1980), Van Inwagen (1990), for discussion. Depending on what version of nihilism you endorse, this worry may overlap with previous ones. Recent defenders of nihilism are happy to accept the truth of natural language sentences like 'There are tables'. Their central claim is simply that the only things which are fundamental are simples (see, e.g., Cameron (2008), Sider (2011)). But any defender of nihilism endorses an extremely sparse fundamental ontology (regardless of which sentences of English she is willing to accept).

included. When commitment to indeterminacy is properly understood, there's no ontology which is inherently 'indeterminacy proof'. And if that's the case, then indeterminacy can't be merely the symptom of an overly permissive ontology.

2. What is fundamental indeterminacy?

Here are two separate claims: that there is indeterminacy in what our fundamental ontology *is like* and that indeterminacy is *itself* fundamental. The former is an ontological claim, the latter is an ideological claim. There is indeterminacy in what's fundamental just in case our fundamental ontology can sometimes be indeterminate: i.e. if it is indeterminate what there fundamentally is, or indeterminate what the fundamental things are like, etc. Indeterminacy is itself fundamental just in case our fundamental ideology must involve indeterminacy: i.e. if our fundamental ideology must include a primitive indeterminacy operator¹⁵, or if our fundamental logic be degree theoretic¹⁶, etc.

These two separate claims can come apart. For example, suppose that you think that talk of indeterminacy can ultimately be reduced to talk of objective chance.¹⁷ And suppose, furthermore, that you think that a complete description of fundamental ontology includes facts about objective chance. In that case, you might believe in fundamental indeterminacy in the former sense, but not in the latter sense. Facts about indeterminacy

¹⁵ As in Barnes and Williams (2011)

¹⁶ As in Smith (2005), Smith and Rosen (2004)

¹⁷ As suggested in Eagle (ms)

can have their locus or source in fundamental ontology. But our fundamental theory need not include the resources to express indeterminacy - since indeterminacy is reducible to objective chance.¹⁸

Now consider instead the presentist who believes in the open future. If we grant that the open future can be understood as a kind of indeterminacy (see §3.3), then this can be construed as a case of someone who believes in fundamental indeterminacy in the latter, but not the former, sense. There is no fundamental ontology which she is saying is a source or locus of indeterminacy. (On her view, the future doesn't exist.) But her fundamental theory needs the resources to express indeterminacy. She needs to be able to say that it's fundamentally indeterminate what *will happen*. On her view, there's no ontology such that it's indeterminate what that ontology is like. But she's still committed to fundamental indeterminacy, because it's fundamentally indeterminate what the future will be like (and to say this, her theory's ideology needs the resources to express indeterminacy).

I'm sometimes tempted by the thought that a case for metaphysical indeterminacy - or at least an *interesting* case for metaphysical indeterminacy - requires commitment to fundamentality of indeterminacy itself (that is, to a fundamental theory which is indeterminacy-involving). If we want to argue that the world could really *be* indeterminate, this plausibly requires not simply that there must there be indeterminacy in

¹⁸ Cf. Lewis (1986) on modality. Lewis thinks fundamental ontology can be a source of modality (that is, there are claims of possibility and necessity which are true of fundamental ontology). But modality is not itself part of Lewis's fundamental theory - since modality is ultimately reduced to truth at worlds.

what's fundamental (given the arguments in §1), but also that indeterminacy must itself be fundamental. David Lewis gives a reduction of modality to truth at worlds. Though there are modal claims true about what's fundamental, reality is fundamentally a non-modal place. In a similar strategy, Ken Akiba (2004) reduces indeterminacy to what's true at 'precisificational space'. Reality, on this picture, does not fundamentally involve indeterminacy; fundamentally, everything is settled. Arguably, this isn't a theory according to which the world *really is* (bang the table) indeterminate in the interesting, provocative sense that a theory of metaphysical indeterminacy should capture.

For the purposes here, though, I'll be more ecumenical. In what follows, I'll assume that a theory counts as committed to fundamental indeterminacy just in case the basic/fundamental/most natural/etc description of that theory includes sentences which are indeterminate. To use the popular explanatory tool of 'joint-carving languages', suppose that Ontologese is a language using only natural, joint-carving vocabulary.¹⁹ A theory is committed to fundamental indeterminacy just in case according to that theory a sentence of Ontologese can be indeterminate. Indeterminacy itself needn't be fundamental for this to be the case. All that needs to be the case is that descriptions of fundamental reality can be indeterminate (though we might then reduce the indeterminacy in question to something else).

¹⁹ As in, inter alia, Sider (2009), Dorr (2004).

3. Arguing for fundamental indeterminacy: theoretical expressiveness

The arguments which I think go furthest in making the case for fundamental indeterminacy are those which focus on the theoretical utility of indeterminacy. In what follows, I'll argue that the expressive power of our fundamental theory can be usefully increased by incorporating indeterminacy into it. In some cases, this expressive increase is a tradeoff of ideological complexity for ontological parsimony. By incorporating indeterminacy, someone attracted to a sparse fundamental ontology can ground phenomena that might otherwise be inexplicable, and she can do this without committing to more *things*. In other cases, indeterminacy simply gives you the resources to say things about the structure of your fundamental theory that you might well have good reason to say, and that you otherwise wouldn't be able say. So the question isn't simply one of ideology vs. ontology. It's a more general question of what you want to be able to capture in your fundamental theory.

Depending on how plausible or attractive you find the individual cases, these examples may give you a reason to adopt indeterminacy. The reason would be this: indeterminacy usefully and elegantly increases the expressive power of a theory. But abstracting away from the particular examples I give, what I'm most interested in is showing *how* fundamental indeterminacy can be motivated. That is, I'm most concerned with showing the *kinds* of arguments - quite different from the more familiar 'metaphysical' versions of

sorites paradoxes - that I think can usefully support the idea that the world is indeterminate.

3.1 Failures of grounding or determination

For various reasons, we might want our metaphysics to allow for certain kinds of grounding or determination failures. That is, we may want to posit a metaphysic which involves global or macro features which aren't grounded in or determined by facts about basic particles (whatever they may be). A common response to such failures of grounding has been that they require extra ontology 'over and above' the basic particles (the thought being that if not everything is grounded in or determined by the basic particles, then you had better believe in more than just the basic particles and the things you get merely from combining those basic particles). You need to talk about a holistic system, emergent properties, or some other extra thing in order to adequately explain such failures of grounding.

First, let's look at a toy example that highlights the salient kind of grounding failure I'm talking about. (I'll be talking about grounding and determination, but you can easily replace this with talk of an 'in virtue of' relation if you prefer. Such cases are also sometimes cast as failures of supervenience, but I think that supervenience is too blunt a tool to do the work required here.) Suppose we've got two simples, a and b. We've also got two spatial regions: simple a is in region 1 and simple b is in region 2. We've also

got two fundamental properties (or fundamental predicates) F and G.²⁰ One of each of a and b is one of each of F and G. It's not the case that both a and b are F, or that both a and b are G. But suppose that's all that's settled. Suppose nothing settles whether a is F and b is G, or vice versa. So we either have a case where things are F at 1 and G at 2, or a case where things are G at 1 and F at 2. But we can't say anymore than this.

In a case like this, there are global facts about the instantiation and distribution of Fness and Gness that fail to be grounded or determined by the basic particles and the properties they instantiate. And commonly, in a case like this, we're thus pushed toward believing in a complex system and properties had by that system - or at the very least in properties that emerge from the collective activity of the simples - in addition to the simples themselves. The basic thought is that if what is the case can fail to be grounded in this way on what simples there are, where they are, and what they're like, then we need to believe in more than just what we can get from simples, their locations, and the properties they instantiate in order to explain what's going on. We need, for example, to believe in the property F+G – a property which specifies the distributional facts about Fness and Gness while leaving it unsettled whether Fness is instantiated at region 1 or region 2 (and likewise for Gness) – a property which is in some sense 'emergent' from the activity of the simples a and b. Or we need to believe in the *system* a+b²¹ – the thing formed by the

²⁰ Some sparse ontologists will likely object to talk of properties (or at least any talk of properties taken to be ontologically perspicuous). Nominalists of this sort can read F and G as fundamental predicates (in which case her theory is still committed to F and G, but at the level of ideology rather than ontology). Nothing in the example hangs on this.

²¹ I'm going to use the unanalyzed term 'system' here as a neutral filler, since opinions vary as to what, exactly, the ontological import of cases like the above should be. Read 'system' as a placeholder for whatever the thing is you need to believe in for this case that isn't just simples and sets of simples.

collective activity of a and b, which can be the thing which has the property F+G (since F+G is not had by either simple).

It's worth rehearsing the push for ontological complication in a little more detail. The thought is simply that appealing only to the simples, their locations, the objects they compose, or the properties they instantiate (or the predicates true of them) isn't enough to capture the phenomenon described above. We can't say that a is F and b is G, nor that there's Fness at region 1 and Gness at region 2 (and vice versa in both cases). But we need to be able to say that Fness and Gness are distributed across regions 1 and 2 and had by a and b. And more specifically, we need to say that Fness and Gness are distributed in a specific pattern (neither region 1 nor region 2 contains instances of both Fness and Gness) and had by a and b in a particular way (each of a and b must be one of F and G, but a and b cannot both be F and a and b cannot both be G). And one way of capturing this worry is that the facts about Fness and Gness look like instances of grounding failure for fundamental ontology – they aren't grounded by simples a and b, their locations, the set containing both simples, or the mereological sum of both simples.²² If truth should be grounded in being, then we need some extra ontology: e.g., a property F+G and perhaps a system a+b which can ground that property. Whatever the particular commitments, we need *something* which can settle the distributional facts about Fness and Gness without settling which of a or b is F (and likewise for G).

²² It's important to note that complicating your ontology just by believing in more things - e.g., moving from mereological nihilism to mereological universalism - doesn't help in a case like this, at least on the assumption that the properties of a mereological sum supervene on the properties of its parts. The problem arises for any fundamental metaphysics according to which everything is grounded by or determined by simples and the properties of simples. Ontology would have to be complicated in a way that doesn't preserve this grounding relation in order to avoid the worry.

Commitments of this kind are ontological complications - they introduce a new kind of entity or entities (of the sort which may wind up with dreaded label 'mysterious'). In doing so, they not only reduce ontological simplicity, but undermine elegant explanatory principles like Humean supervenience as well. We thus have good reason to avoid such commitments, if we can. And so we have a dilemma: if we have reason to believe that a fundamental theory should be able to allow for cases of grounding failure like the one described above (as I'll argue subsequently that we do), and these phenomena really do incur the above commitments, then we have good reason to accept them; but if these commitments are an unattractive ontological complication, we have good reason to reject them.

Adopting indeterminacy can help dissolve this dilemma. The simplified example is worrying insofar as it gives us reason to accept new and perhaps quite complex ontology. The argument was that we need the new ontology (the complex system, the emergent property, etc) because we need something which settles the (primitively) distributional facts about Fness and Gness. But appeal to indeterminacy can undermine the need to complicate ontology in this way.

If we allow ourselves an ideology with the resources to talk about indeterminacy, then we can say the following: it's indeterminate whether a is F and indeterminate whether b is F, but determinate that either a is F or b is F. That is, determinately one of a or b is F, but it

is indeterminate which. If we say the same for G, and then add the claim that determinately only one thing is F and determinately only one thing is G, we've settled the distribution of F and G. We don't need to appeal to an emergent property F+G, or a system a+b which has that property.

To review: I've given a simplified example case in which the total distributional facts fail supervene (in a particular way²³) on facts about the simples. Cases like these have sometimes been used as arguments for additional ontological complexity. But one way of avoiding commitment to extra ontology in these cases is to adopt indeterminacy.

But the salient question is of course: why think that such failures of grounding are possible? Even if indeterminacy gives you the resources to talk about cases like the above, it's far from uncontroversial that cases like the above are something we want to be able to talk about.

Perhaps the most salient and widely-discussed examples that purport to show such failures of grounding or determination come from the philosophy of physics. For example, Maudlin (2007), discussing quantum entanglement, writes:

²³ Not all cases of grounding failure will have the kind of structure I'm looking for. Trenton Merricks (2001), for example, argues that facts about persons aren't grounded in facts about simples. But that kind of grounding failure doesn't replicate the structure I'm interested in. I'm focusing on cases where we can say something about the global distribution of properties, without being able to say how this global distribution of properties is grounded in or fixed by the properties had by simples.

Suppose there are two electrons, well separated in space (perhaps at opposite ends of a laboratory), that are in the Singlet State. If the principle of Separability held, then each electron, occupying a region disjoint from the other, would have its own intrinsic spin state, and the spin state of the composite system would be determined by the states of the particles taken individually, together with the spatio-temporal relations between them. But. . .no pure state for a single particle yields the same predictions as the Singlet State, and if one were to ascribe a pure state to each of the electrons, their joint state would be a product state rather than an entangled state. The joint state of the pair simply cannot be analyzed into pure states for each of the components (pg. 57).

And Schaffer (2010), also on entanglement, writes:

Thus consider the EPR system's intrinsic correlational property of having total spin zero. This property is not fixed by the Democritean base—it is not fixed by fixing the quantum states of the two particles, along with their spatiotemporal arrangement. In general, duplicating the intrinsic properties of the particles, along with the spatiotemporal relations between the particles, does not metaphysically suffice to duplicate the cosmos and its contents. The intrinsic correlational properties of entangled wholes would not be duplicated. So on the assumption that the basic actual concrete objects must be complete, Democritean pluralism is ruled out. Lifting the Democritean supposition, it should be obvious that no

movement to larger molecules or further intrinsic properties will help the pluralist find a complete basis for the entangled cosmos. The physical properties of the whole are not fixed by the total intrinsic properties of any subsystems.

These kinds of explicit grounding failures create pressure to complicate ontology, to believe in more than just simples, their properties, and whatever supervenes on that (Maudlin argues that they push toward complex systems, Schaffer that they push toward monism). But as we've seen, adopting indeterminacy might allow us to resist this pressure. The case I gave above is, of course, a toy example. Addressing the specific cases discussed in the literature on quantum mechanics would call for a much more nuanced theory of indeterminacy suited to the details of the case in question.²⁴ It's far from obvious that the salient features of the toy case translate to the more complicated cases; nor is it obvious that the best interpretation of what's going on in these cases must involve such failures of grounding.²⁵

But while I think the cases from physics are interesting - and dialectically helpful as a response to the metaphysician who thinks she can tell by pure intuition that such failures of grounding or determination are obviously impossible - they aren't the only place to

²⁴ A degree-theoretic version of indeterminacy, like that defended by Smith (2005) might be particularly apt for such cases.

²⁵ There are interpretations of quantum mechanics (e.g., Bohmianism) which don't involve any such failures of supervenience. It's worth noting as an aside, though, that Bohmianism doesn't obviously eliminate the motivation to adopt indeterminacy. Since many people balk at the 'hidden variables' associated with Bohmianism, indeterminacy could be used to assuage such worries -- determinately, the thought goes, there are such hidden variables, but it's indeterminate *which* (of the different empirically adequate) hidden variables there are.

look for examples. And other, non-physics examples may much more clearly and uncontroversially resemble the structure of the toy example.

Suppose, for instance, that you are the sort of moral realist who thinks that moral properties are irreducible to non-moral properties (though they may supervene on or covary with non-moral properties). A plausible way of construing your view is that the moral is fundamental - the moral might be connected to the non-moral in certain important ways (namely, you can't get a change in moral facts without a corresponding change in non-moral facts), but you can't give a complete description of the world using only non-moral vocabulary. Suppose further that you think there can be genuine conflicts of duty. One way of construing conflicts of duty is as a failure of determination or groundedness for the moral. Imagine a case where your duties conflict between X and Y. You are obligated to do either X or Y. Being obligated to X entails not being obligated to Y, and vice versa. But one way of interpreting conflicts of duties is that nothing further can be said - nothing determines which of X or Y you are obligated to do. And so there are global facts about the structure of your duties - that you are either obligated to X or Y, and that if you are obligated to X you are obligated not to Y and vice versa - which fail to be grounded in local facts about your obligations to do specific things. That is, the global facts about your obligations with respect to X and Y aren't grounded in or determined by your obligation to X or your obligation to Y.

So suppose, for example, that two children - Jane and John - are drowning. You can only save one. You're surely obligated to save a child. But if you're obligated to save Jane, you're not obligated to save John (since if you save Jane, you can't save John) and vice versa. One way of interpreting this case is precisely as a failure of grounding. You're obligated to save Jane or John, but this global obligation isn't grounded in a particular local obligation (the obligation to save Jane or the obligation to save John).

And, again, indeterminacy can help us capture this. We can say that determinately you are obligated to do either X or Y, and determinately if you are obligated to X you are not obligated to do Y (and vice versa). But it's indeterminate whether you are obligated to do X, and likewise indeterminate whether you are obligated to do Y.²⁶ That is, it's determinate what the overall duty structure is (determinately, you must do one and only one of X or Y), but it's indeterminate what you should do (it's indeterminate whether you should X or Y).

Determinately, you must save Jane or John. And determinately, if you must save John then it's not the case that you must save Jane (and vice versa). Likewise, determinately if it's not the case that you must save Jane then you must save John (and vice versa). But it's indeterminate whether you must save John, and indeterminate whether you must save Jane. The determinacy of the disjunction is explicable (you must save one), but the

²⁶ This case is slightly different to the structure of the toy example, insofar as in the toy example it is determinate which properties are instantiated but indeterminate what instantiates them and likewise indeterminate where they are instantiated. In this case, it is indeterminate which of two properties is instantiated. It's easy to construct a case that that mirrors the structure of the toy example more precisely and which is based on the conflict of duty example (e.g., failure of grounding for *betterness* and *worseness*), but I chose to use the basic conflict of duty case for its familiarity.

quandary remains (it's indeterminate which one you must save) - your determinate global duties aren't grounded in determinate local duties.

Unlike some other cases of grounding or determination failure, conflicts of duties aren't generally associated with new ontology - even for the moral realist. But they are often dismissed as mysterious or even incoherent. An advantage of incorporating indeterminacy into your theory is that it allows you to express, quite easily, the phenomenon of conflict of duties. Indeterminacy isn't the *only* way to do that, of course. We can always redescribe these cases without invoking indeterminacy. We could, e.g., say that it's simply false that you're obligated to save John and false that you're obligated to save Jane, but true that you're obligated to save one or other of John and Jane - end of story.

But there's a lot left wanting in this redescription. The view now is that we have an obligation to save a person without having an obligation to save any particular person. This doesn't sit well with the thought that our collective duties to John or Jane should be explained by duties the individuals - John and Jane. It seems odd to suppose that we could have an obligation to save one or the other of John or Jane, while at the same time we have no obligation to save John and no obligation to save Jane. So indeterminacy lets us hold on to the link between de dicto obligation and de re obligation.

But conflict of duties is a case that already involves fairly permissive ontology - moral realism. Another - quite different, sparsity-friendly - example comes from the famous world described by Max Black as an argument against the identity of indiscernibles. Black wants to describe the world as being one in which there are two homogenous spheres. It's standardly thought that the only way to agree with this description is to accept haecceitistic facts (since the only difference between the two spheres, if there is any difference, is a haecceitistic one). Alternatively, though, we might instead describe Black's world as another instance of grounding failure - this time involving identity facts. Rather than a world in which there are two things that differ haecceitistically, we can instead say that Black's world is one in which the global facts about how many things there are fails to be grounded in or determined by individual identity facts. If we have the resources of indeterminacy, we can say that determinately there are two things in the Black world, but that it's indeterminate which thing is which. That is, it's determinate that we have two things - Castor and Pollux. But it's indeterminate which thing is Castor, and likewise indeterminate which thing is Pollux.

To say this is to block the inference from indeterminacy in identity to indeterminacy in number. We generally think that if there's indeterminacy in identity there will be resultant indeterminacy in number - it will be indeterminate whether there are n things or $n+1$ things.²⁷ But that's because we generally assume that the facts about how many things

²⁷ Here's the thought behind this. Indeterminacy in identity is indeterminacy between two polar options - identity and distinctness. If the indeterminacy were resolved as identity, there would be n things. If it was resolved as distinctness, there would be $n+1$ things. But the indeterminacy remains (ex hypothesi) unresolved, and so it's indeterminate how many things there are.

there are determined by facts about individual identity. This description of the Black world denies that determination claim (in order to avoid haecceitistic properties).

Determinately, if one thing is Castor then the other is Pollux. Likewise, determinately if one thing is Pollux then the other is Castor. But it's indeterminate which is which. The overall facts about number (there are two things) and identity (one thing is Castor and one thing is Pollux) are fixed, but they aren't grounded in local facts about individual identity (about which thing is Castor and which thing is Pollux).

But why isn't the case as I've described it above simply one in which there is indeterminacy in which haecceitistic properties are instantiated, rather than one in which there aren't haecceitistic properties at all? The idea is not that there are haecceitistic properties ("being Castor" and "being Pollux") such that it's indeterminate what instantiates these properties. Rather, "Castor" and "Pollux" are introduced as rigid designators. But because nothing grounds the difference between the two spheres, there's nothing which can make it the case that "Castor" refers determinately to one sphere and not to the other (and likewise for "Pollux").

For it to be determinate which thing is Castor and which is Pollux - that is, for it to be determinate which thing is picked out by the name "Castor" and which thing is picked out by the name "Pollux" - there would need to be something that grounds their difference - a Castor-haecceity and a Pollux-haecceity. But there are no such differences. It's determinately the case that both Castor and Pollux exist, and that Castor

and Pollux are spheres. But it's indeterminate which thing is Castor, and indeterminate which thing is Pollux. There's a sense in which this is referential indeterminacy. But it doesn't follow that the indeterminacy is therefore primarily semantic (rather than metaphysical) in origin or explanation. And that's because it's referential indeterminacy that arises *because of what the world is like*.²⁸ It's determinate that there are two things, even though there is nothing that determines the distinctness of those two things.²⁹ And that's what gives us a failure of grounding: facts about the number of individuals fails to be grounded in facts about individual identity.

The key point here, abstracting from the specifics of the cases I gave, is the following. Adding indeterminacy into your ideology gives you a richer theory – allowing that theory to account for a particular kind of grounding failure without committing to more *things*. If indeterminacy can play this kind of role in a fundamental theory, that's exactly the kind of thing which can give us good reason to adopt indeterminacy.

3.2 Messy distinctions

Above I discussed some cases in which adopting indeterminacy might let you avoid complicating your theory - or at least avoid complicating your ontology. But there are also cases in which adopting indeterminacy might *help* you complicate your theory.

²⁸ See Williams (2008) for discussion. There's no way to refer determinately to one sphere and not the other, because nothing grounds the difference between the spheres.

²⁹ Interestingly, this is (as I interpret it, in any case) a similar position on identity to that defended in French and Krause (2006), so there's potentially empirical motivation for such a view as well as purely theoretical motivation.

Having the resources to express indeterminacy allows you to say unique things about what your ontology is like. In some cases, these additional expressive resources can help to undermine objections to certain theoretical commitments. The examples I'll focus on here all relate to metaphysics which want to characterize certain basic distinctions - between essential and accidental properties, between intrinsic and extrinsic properties, etc. A common way of being a skeptic about the viability or plausibility of such distinctions is to argue that they are *messy*: paradigm cases are perhaps easy to identify, but for plenty of cases it isn't clear which side of the distinction they belong on. The thought seems to be that if a distinction is messy, then it isn't a real metaphysical distinction - or at the very least not a fundamental distinction.

This is, I take it, a major part of Richard Cartwright's (1968) objection to essentialism. It's implausible, argues Cartwright, that we can neatly classify *all* properties as either essential or accidental. There are properties we can point to that fit the paradigms of either essential or accidental, but there will be plenty of others which don't look obviously essential or obviously accidental. That is, there are "hard cases which admit of no clear decision" (Cartwright (1968), pg. 615).³⁰ Such difficulty in clarifying the essential/accidental distinction is meant to be a major problem for the would-be essentialist. To say that the difference between essential and accidental properties neatly and unequivocally divides properties seems to render the distinction implausibly brute or

³⁰ Daniel Nolan has, in unpublished work, argued against essentialism explicitly based on the idea that were we to commit to essentialism we would thereby be committed to indeterminacy, therefore we should not commit to essentialism. What follows is, in essence (sorry!), an attempt to ponens that tollens.

ad hoc. But to say that the distinction is messy seems to undermine the idea that the distinction really is tracking something objective or fundamental.³¹

There is meant to be a connection between a distinction's being messy and its lacking objectivity or fundamentality. But if you're, for whatever reason, inclined to think that some messy distinctions might be fundamental, adopting indeterminacy into your theory can undermine this connection. A theory that has the resources to express indeterminacy is one that can explain how objective, fundamental distinctions can nevertheless be messy distinctions.

It's implausible that all properties, for example, can be classified neatly as either essential or accidental - or so the thought goes. But if we help ourselves to talk of indeterminacy, we have the resources to say that the world doesn't carve this distinction neatly, even though it does carve the distinction. And that's because we can say that though it's determinately the case that there's a distinction, it's indeterminate what that distinction is like. There might, for example, be properties such that it's indeterminate whether those properties are had essentially or had accidentally. Or, less strongly, it might be the case that determinately all properties are had either essentially or accidentally, but that it can be indeterminate which properties are had essentially and which are had accidentally.

(The former claim is *de re* indeterminacy - there are some properties such that it is true of

³¹ There are, of course, views of essence that specifically address the Cartwright worry without invoking indeterminacy, such as Paul (2004). But while such views don't invoke indeterminacy, they are not without other costs. Paul takes Cartwright's objection as one of the major motivations for her view of essence, for example, but she accounts for essence in part by committing to a radically plenitudinous theory of properties, including properties involving what is represented at other worlds.

them that they are indeterminately essential; the latter is de dicto indeterminacy - it's indeterminate which properties are essential.)

Similar points will apply, mutatis mutandis, for other familiarly messy distinctions: the distinction between intrinsic and extrinsic properties, the distinction between mere groups and natural kinds, the distinction between acts and omissions, the distinction between killing and letting die, and so on. Not all of these examples will be compelling cases for fundamental indeterminacy, of course. To find an individual case compelling, you need to think both that (i) the distinction is a valuable one that does important theoretical work; and that (ii) the distinction is in fact messy. Not all cases of (ii) will be cases of (i), and vice versa.

But the basic point is simply that indeterminacy can help break the connection between messiness and lack of objectivity or fundamentality. In reply to the worry that it's implausible to suppose that, e.g., all properties fit neatly into the essential category or the accidental category, the person who believes in indeterminacy can simply agree that they don't fit neatly. There are properties which are neither determinately essential nor determinately accidental, for example. That doesn't mean that the distinction between essential and accidental is any less important or real. It's just to claim that a distinction which carves up the world at its joints needn't carve up the world *determinately*. If we accept fundamental indeterminacy, there's no link from lack of determinacy to lack of objectivity or fundamentality - as thus no link from a distinction's being messy to its non-

fundamentality. So if you think that some messy distinctions are plausibly fundamental distinctions, that gives you a good argument for fundamental indeterminacy.

3.3 Realism and structure

In the previous section, I discussed the idea that the world might carve a distinction between, e.g., essential and accidental properties, but it be indeterminate exactly how this distinction is drawn. The basics of this idea generalizes into another potential motivation for fundamental indeterminacy: that the world has an objective, mind-independent structure which nevertheless leaves some metaphysical questions underdetermined or unsettled.

An attractive feature of fundamental indeterminacy is that it opens up a wider range of options for what we can say about fundamentality itself. The particular example I'll look at is how adding indeterminacy to your theory can reconcile ontological realism with certain intuitions about what fundamental reality is like. David Chalmers (2009) and Stephen Yablo (2009) have recently characterized ontological anti-realism via indeterminacy: ontological anti-realism holds for a set of ontological claims if those claims are indeterminate. But at least *some* of what both Chalmers and Yablo say about ontology can easily be read as motivation for realism about indeterminacy, rather than anti-realism about ontology.³²

³² This is particularly true of the anti-realist Chalmers describes as 'the ontological indeterminist'.

Chalmers, for example, grants - along with ontological realists like Sider and Dorr - that the discourse of ontology is markedly different than ordinary-language discourse:

Ontological existence assertions differ significantly from ordinary existence assertions, in that they involve the attempt to express a heavyweight quantifier: the absolute existential quantifier. I think one should take these attempts at face-value (pg. 100).

On this picture, when we're doing ontology, we're trying to speak a language ('Ontologese') that uses purely joint-carving vocabulary. So far, then, Chalmers agrees with, e.g., Sider (2009) about what we're up to when we're doing ontology.³³ But here the similarities end, because according to Chalmers:

the absolute quantifier does not have a determinate extension: something (a class of properties, say) that would combine with the extensions of otherwise unproblematic expressions to yield a determinate truth-value. Rather, if it has an extension at all, its extension is highly indeterminate (pg. 102).

Yet the picture Chalmers is defending is not one which denies that any sense can be made of the world having a 'fundamental structure', nor one which maintains that whatever

³³ In contrast to deflationary approaches which deny the possibility of ever employing an 'absolute' existential quantifier (as in Hirsch (2009) or which tie ontology more closely to natural language (as in Thomasson (2009)).

structure the world has depends on what concepts we impose on it (there is no ‘world in itself’). Rather, Chalmers argues that the world has a fundamental structure, but that this structure is insufficient to determine a determinate domain for the fundamental existential quantifier³⁴:

One can see that the ontological realist is committed to a very strong claim about the fundamental structure of reality. On this view, the fundamental structure of reality involves, or at least determines, an absolute domain of entities. By contrast, the ontological anti-realist holds that the fundamental structure of reality is less rich than this: it does not involve or determine an absolute domain of entities. The world may have structure of many sorts, but an absolute domain is not among that structure (pg. 105-6).

According to Chalmers, it’s indeterminate what the domain of the fundamental quantifier is. The way the world is doesn’t settle what determinately exists. There are multiple different candidates for the domain of the ‘absolute’ quantifier, and none is a determinately better fit to the structure of the world than its rivals.

Chalmers takes this picture of the world’s structure to point toward ontological anti-realism. But why should it? The picture described above seems to be one according to which it is - fundamentally - indeterminate what exists. This only leads to anti-realism if

³⁴ Some have expressed skepticism that there could be multiple candidates for the domain of the fundamental quantifier (see especially Sider (2009)b). Chalmers seeks to allay these worries in his discussion on pg. 104-6.

there is a straightforward path from indeterminacy to anti-realism. But the prospect of fundamental *metaphysical* indeterminacy undermines this. A perfectly plausible way to interpret the picture of fundamentality Chalmers presents is one in which we're realist about ontology, but think that some existence questions are metaphysically indeterminate.

In defense of his 'less rich' ontological structure, Chalmers suggests that in some ontological debates decisive evidence is impossible to come by (and not due to our own epistemic limitations - God couldn't get deciding evidence). Consider the debate between compositional nihilists and compositional universalists. You could know, argues Chalmers, everything there is to know about the intrinsic character of two simples and everything there is to know about the relations that hold between them (compositional facts excluded, of course) without being in a position to know whether these two simples compose. There's thus no evidence you could get that would weigh in favor of nihilism or universalism. More strongly, Chalmers argues that we should conclude that there's nothing about the world which settles whether nihilism or universalism is correct. It's indeterminate whether the simples compose a sum.³⁵

Whether or not Chalmers is right about this - the evidential principles or the particulars of the case - the epistemic position he's describing is familiar. Compare it to the classic description of a borderline case in a Sorites series. If a color patch is borderline red, you could know everything there is to know about that particular shade and still not know

³⁵ Ibid., pg. 103 (though Chalmers takes this 'knowledge argument' as an argument against ontological realism).

whether it's red. And no further evidence will help you decide the case - even God doesn't know whether it's red.

We commonly explain these types of indeterminacy as arising from features in our natural language - e.g., our natural language terms aren't precise enough to determine exact extensions of words like 'red'. But in the case of ontology, we're - on the understanding Chalmers favors - not using natural language. We're using a language constructed from perfectly 'joint-carving' vocabulary. Even still, the terms in this language may fail to have exact extensions or (in the case of quantifiers) determinate domains. But in this case, the indeterminacy doesn't arise from imprecision in language. Expressions in Ontologese (or candidates for being Ontologese) have determinate truth conditions, but on the picture that Chalmers describes it can be indeterminate whether these truth conditions obtain. Picture several competing descriptions - sets of sentences, perhaps - each of which aims to be the complete fundamental description of reality. Because of what reality is like, there is simply no fact of the matter about which of these descriptions is correct. We can say that they're all determinately better than any other description. We can even say, if we want, that determinately one of them is correct, though it is indeterminate which. But on this picture of what fundamental reality is like, even God can't give a determinately correct Ontologese description of the world.

I make no claim to the above arguments being an accurate representation of Chalmers' exact views on meta-metaphysics. The point, rather, is that the *kinds* of motivation that

push Chalmers toward anti-realism could instead be used to motivate fundamental indeterminacy - especially once the link between indeterminacy and anti-realism is broken. We might be attracted both to the idea that the world has objective, mind-independent structure *and* to the idea that this structure is not rich enough to give fully determinate answers to all the metaphysical questions we can posit. This is, to my mind, both a reasonable construal of the meta-ontology that Chalmers presents *and* a good way of thinking about what it would be for the world to be fundamentally indeterminate.

I suspect that what suggests anti-realism on Chalmers' picture is less the presence of indeterminacy per se, and more how thorough-going the indeterminacy is. For Chalmers, huge swaths of debate in metaphysics have no determinate conclusion. Even someone happy in principle with metaphysical indeterminacy might not want *that much* metaphysical indeterminacy. But there are other cases which can be captured by the idea that the world has objective structure, but that this structure leaves some questions indeterminate - and which don't seem suggestive of anti-realism. For example, this is one way of interpreting the thesis of the open future.³⁶ The claim that the future is open - understood as a metaphysical thesis, at least - isn't a claim about what we know or how we use our words. It's a claim about what the world is like. And one very good way of interpreting that claim, I suggest, is as a kind of fundamental indeterminacy - the same kind of fundamental indeterminacy described above. The world has an objective, mind-independent structure. But that structure leaves some questions fundamentally unsettled -

³⁶ For a defense of the idea that the open future can be understood as a kind of indeterminacy see Barnes and Cameron (2009)

namely, questions about what *will happen*. That doesn't mean that questions about what will happen aren't questions about the objective, mind-independent world. It just means that you have a distinctive take on the answers to such questions - you think the objective structure of the world leaves their answers unsettled or underdetermined. But thinking that these questions are unsettled in this way certainly doesn't make you an anti-realist.

Similarly, Steven French and Decio Krause (1995), (2006) give a structural realist interpretation of quantum mechanics according to which it is plausibly indeterminate which fundamental identity facts hold (and perhaps more strongly, which things are individuals, depending on how we interpret the idea of a 'nonindividual').³⁷ The world has an objective, mind-independent structure, according to French and Krause, but that structure simply leaves it undetermined whether (fundamentally) certain identity facts obtain (and again, perhaps more strongly, whether some things are individuals). For French and Krause, the question of whether these identity facts obtain is a question about what the world is like, and they are certainly not an anti-realist about that question, even though they end up with large swaths of indeterminacy in their fundamental theory. The world has a mind-independent structure, on this view, but that structure simply leaves underdetermined important, substantive questions about identity.

The take home moral here is two-fold. Firstly, adding indeterminacy to your theory opens up new options for what you can say about - and captures a wider variety of

³⁷ Even more strongly, French has, in unpublished work, floated the idea that it could be indeterminate whether there are *any individuals at all* at the fundamental level.

intuitions about - the fundamental structure of reality. It allows us to countenance ontologies with a 'less rich structure' simply as ontologies with indeterminacy. The amount of 'richness' in a Chalmersian sense can then be mapped on to the amount of determinacy. A fully determinate ontology has a very rich structure, an ontology with radical amounts of indeterminacy has a very minimal structure, and there will be huge variety in between.

Secondly, fundamental indeterminacy allows us to reconcile the intuition that the world doesn't determine a single, determinately correct Ontologese description with ontological realism. If the only way to allow for a 'less rich' ontological structure was via ontological anti-realism, then those that share Chalmers' intuitions about reality's structure would either be forced to endorse ontological anti-realism (as Chalmers does) or find some other, non-Ontologese approach to thinking about fundamentality. Fundamental indeterminacy lets these views peacefully coexist. The ontological realist can think that something like the Ontologese story is the best way to think about fundamentality *and* agree with Chalmers that the structure of reality doesn't determine a determinately correct Ontologese description. She just has to add indeterminacy to her fundamental theory to do so.

4. Summing up

I've given three different arguments for fundamental indeterminacy - that it allows you to model certain kinds of grounding failures without complicating your ontology, that it can undermine objections to the 'messiness' of certain distinctions in your ontology, and that it can give you the resources to say unique things about the richness of your ontology's structure. (One important caveat: the first two arguments are neutral between the two senses of 'fundamental indeterminacy' disambiguated in §2, but as far as I can tell the third requires that your theory's fundamental ideology involve indeterminacy.) Each of these arguments can be seen as an argument from theoretical expressiveness: adding indeterminacy to your theory allows you to say more things, and in some cases allows you to say more things without believing in extra stuff.

But it is, of course, a cost to believe in indeterminacy. You are complicating your theory if you add indeterminacy to it. What I hope the arguments from theoretical expressiveness like those given above can show, however, is that indeterminacy is a very useful and helpful way to complicate your theory. It helps you to say a lot of different things, across many different areas. Given that everyone has to admit *some* ideological complications, I'd argue that indeterminacy is a good one - a lot of bang for your ideological buck, as it were.

More importantly, though, I think the general moral here is that there isn't anything special or *mysterious* in the debate over whether the world could be fundamentally indeterminate. In deciding whether to complicate your fundamental theory to include the

resources to express indeterminacy, you're just engaged in overall holistic theory comparison. What do you need to say? What allows you to say it with the minimal amount of complication? The question of whether the world could really, fundamentally be indeterminate is just like any other question in metaphysics - no more mysterious or esoteric just because it's a question about indeterminacy.

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