

Ungrounded Ground

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What grounds ground?¹ The ball's being scarlet grounds its being red. And one's being in such-and-such neural state grounds one's experiencing pain. But in virtue of what do those grounding-connections hold?

This question has generated significant discussion in the recent literature about ground. When *a* grounds *b*, call *a* the *grounder* and *b* the *grounded* of this *grounding fact*. In this terminology, Bennett (2011) and deRosset (2013) argue that grounding facts are grounded in their grounders: the ball's being scarlet grounds the fact that its being scarlet grounds its being red. Wilson (2017a) adds that the *grounding principle* connecting grounder to grounded also grounds the grounding fact. Dasgupta (2014) rejects this approach, arguing instead that facts about the grounded's essence ground the grounding fact: the essence of redness grounds the fact that the ball's being scarlet grounds its being red. Sider (2017) claims that there is no systematic story to be told, with different grounding facts grounded in different ways. And Litland (2017) suggests that grounding facts are *zero-grounded*: the empty collection of facts grounds the fact that the ball's being scarlet grounds its being red.

A simpler view is available: nothing grounds the grounding facts; facts about ground are ungrounded. As far as I'm aware, this attractively simple thesis has no defenders in the literature. This appears to be because a simple valid argument leads from plausible premises to the conclusion that grounding facts are grounded. Sider (2011, pp143–145) (2017), deRosset (2013, §2), Dasgupta (2014, §2), Raven (2015, §7), and Litland (2017, §3) all endorse versions of this argument. Here I present an independently attractive theoretical perspective according to which one of this argument's key premises isn't merely false, but isn't even semantically evaluable: it fails to express a proposition. I use this as the basis of a defence of the ungroundedness of grounding facts.

This is not merely an unoccupied niche in logical space. The view that grounding facts are ungrounded is both natural and attractive, and made more so by the seeming artificiality of the alternatives. On this view, the reality's fundamental facts include a specification of how the more fundamental generates the derivative. The method of generation is written deep into the foundation of things. And how could it be otherwise? Since all reality arises from the fundamentals, those fundamentals must somehow encode how

¹ I assume that the notion of ground is now sufficiently well entrenched that I needn't repeat the standard introductory remarks, glosses, and examples. Readers unfamiliar with the topic should see (Fine, 2001, 2012), (Rosen, 2010), (Correia and Schnieder, 2012), (Raven, 2015).

the derivatives arise. Merely specifying the fundamentals without the method of generation won't suffice: the fundamental particles know nothing of cities and societies (to adapt Sider's (2011, p109) metaphor). Nor do derivative phenomena like cityhood and its essence know anything of fundamental particles: such high-level phenomena know of only similarly high-level phenomena, remaining neutral on the underlying mechanism by which they arise. So the method of generation itself must be fundamental, an additional feature of fundamental reality that specifies how the derivatives come to be. Although certainly not unassailable, this line of reasoning is both plausible and natural. As far as I can tell, the resulting view lacks defenders only because of the argument discussed below. So we have two intuitively compelling arguments leading to incompatible conclusions. We ought therefore to examine how both arguments may be resisted. Whereas extant discussion has concerned views that accept the argument below and (implicitly) reject the one just given, this paper explores an alternative approach. Perhaps this view developed below cannot ultimately be sustained—and in all honesty, I'm far from certain that it can be. But we'll never know unless we try.

To ward off misunderstanding later, let me be clear about my goal. My goal is not to show that grounding facts are ungrounded; for the framework I present is consistent with both options. My goal is merely to defend the ungroundedness of grounding facts against a widely endorsed argument that is, as far as I can see, the only extant reason to think otherwise. I will proceed by presenting an independently attractive theoretical framework that entails that one of this argument's key premises isn't semantically evaluable. My goal is to defend the attractively simple thesis that grounding facts are ungrounded *from within this framework*, not to show that everyone whatsoever, regardless of their attitude towards the framework, should reject the argument or regard grounding facts as ungrounded.

I first present the argument to show that grounding facts are grounded in §1. I then present my preferred framework for theorising about ground in §2. I return to the initial argument in §3, arguing that two of its key premises are not semantically evaluable within §2's framework. The next four sections respond to objections. The first three objections (in §4–§6) work by supplementing §2's framework with additional resources designed to ensure that the argument's premises are all semantically evaluable. §4's objection multiplies notions of fundamentality. §5's objection introduces a higher-order constituency relation on sentential aspects of reality. §6's objection attempts to reconstruct a version of the original argument within a metaphysics of entities that are propositions. The fourth objection, in §7, targets the ungroundedness of grounding facts directly, claiming that it collapses reality's hierarchical structure. §8 concludes with some speculative remarks about the wider significance of the ungroundedness of grounding facts for a ground-theoretic analogue of the debate about Humean and anti-Humean conceptions of laws of nature.

1 The argument

This section presents the argument on which the rest of the paper will focus. The intuitive idea is as follows. If grounding facts are ungrounded, they and hence their constituents belong to the fundamental structure of reality. But redness, pains, and cities, for example, do not belong to reality's fundamental structure. So grounding facts are not ungrounded:

they obtain in virtue of some other, deeper, more fundamental facts.

It will be useful to have a more careful and explicit version of this argument. To simplify discussion, we focus throughout on one representative grounding fact, recorded in premise (1) below. The argument's premises are:

- (1) The fact that the ball's scarlet grounds the fact that the ball's red.
- (2) If a fact is ungrounded, then it's fundamental.
- (3) If a fact is fundamental, then all of its constituents are fundamental.
- (4) Some constituents of the grounding fact in (1) are not fundamental.

Suppose for *reductio* that the grounding fact recorded in (1) is ungrounded. Then by (2), it's fundamental. So by (3), its constituents are all fundamental, contrary to (4). So by *reductio*, (1) must be grounded somehow. The question then arises as to how.²

The argument shows that if (1)–(4) are all true, then grounding fact (1) is grounded. Should we use *modus ponens* to conclude that (1) is grounded? Or should we instead use *modus tollens* to conclude that (1)–(4) are not all true? The next section presents an independently attractive theoretical framework that entails the latter: (3) is untrue. But first, a few words in defence of (1)–(4), to give a feel for why others have concluded that (1) is grounded. Those reasonably happy with the argument as it stands, and keen to get to the philosophical action, are invited to skip ahead to §2.

On (1). Think of it as a representative example. Any other grounding fact could have been chosen in its place. The argument requires only that (4) remain plausible when other such facts are substituted for (1). Since the below justification for (4) employs only general principles about ground, (4) should remain plausible with any other grounding fact in place of (1). So although the argument immediately concerns only the specific grounding fact (1), it generalises to all grounding facts

On (2). Distinguish absolute fundamentality—the monadic: x is fundamental—from relative fundamentality—the dyadic: x is more fundamental than y . (2) concerns absolute fundamentality. It says that the ungrounded is absolutely fundamental. However, it is natural to connect absolute and relative fundamentality by equating the absolutely fundamental with the maximally fundamental, i.e. with that such that nothing is more fundamental than it.³ Given this equation, (2) says that nothing is more fundamental than the ungrounded facts. In a ground-theoretic setting, metaphysical structure and relative fundamentality arise out of ground: ground is what connects the less fundamental to the more fundamental. But then the ungrounded is the maximally fundamental at the bottom of

² Although (1) doesn't strictly appear as a premise in this argument, it's needed to provide the grounding fact referenced in both (4) and the initial assumption for *reductio*.

³ I ignore the putative possibility of non-well-founded chains of relative fundamentality. Nothing in such a chain is maximally fundamental. So if they can contain absolute fundamentalia, the equation of absolute and maximal fundamentality would fail. It would take us too far afield to examine this issue here, and I've yet to be convinced that such chains are genuinely possible. For discussion, see (Cameron, 2008), (Morganti, 2009), (Bliss, 2013), (Thompson, 2016), and (Rodriguez-Pereyra, 2015).

the grounding/fundamentality hierarchy. So the ungrounded is absolutely fundamental, just as (2) says.⁴

On (3). Despite their prominence in the literature, extant defences of principles like (3) leave much to be desired.⁵ Perhaps the most prominent goes via Sider's principle of *purity*: "fundamental truths involve only fundamental notions" (Sider, 2011, p106). This is clearly very similar to (3). The key difference is that purity concerns representations—*truths* and *notions*—whereas (3) bypasses the representational intermediary to target reality itself—*facts* and their *constituents*. Here's how Sider summarises his defence of purity:⁶

My argument has been simply that the fundamental story of the world ought not to mention cityhood [or any other non-fundamentalia] at all..."When God created the world, she did not need to use 'city.'" (Sider, 2011, p109).

Sider's idea is that the fundamental story of reality need not mention the non-fundamental at all; for by doing so, it goes beyond fundamental reality. We can use purity to argue for (3) as follows. The fundamental story characterises (at least) all the fundamental facts and their constituents. So those constituents are all fundamental; for otherwise the story goes beyond the fundamental, contrary to its being the fundamental story. Hence (3) is true.

This argument is only as compelling as its major premise: the fundamental story of reality need not mention the non-fundamental at all. The key notion here is clearly that of a fundamental story. What does that mean? To be a fundamental story is presumably, at least in part, to be an account of the fundamental facts. So the content of the major premise amounts, at least in part, to the thesis that an account of the fundamental facts need not mention the non-fundamental at all. Maybe so. But this is so close to the target thesis (3) that it can hardly provide independent justification for it. Moreover, features of fundamental stories should surely flow from features of the fundamental facts they're stories about, rather than provide an independent source of constraints on such facts. I therefore find this purity-based argument for (3) unconvincing.

That said, the following two kinds of situations do seem somewhat strange.

- (i) Non-fundamental object o has property F (which may or may not be fundamental). There is no more fundamental account of why they combine in this way.
- (ii) Object o (which may or may not be fundamental) has non-fundamental property F . There is no more fundamental account of why they combine in this way.

The seeming strangeness arises, I think, from the following line of thought. If the object or property's not fundamental, facts about it should be grounded in other facts. That

⁴ One could respond to this argument by invoking non-ground-theoretic sources of relative fundamentality. But it is unclear why one would wish to do so. What does one gain from this additional ideology and theoretical complexity?

⁵ Litland (2017, §3) offers what amounts to a defence of the conjunction of (2) and (3), under an interpretation of 'fundamental' as expressing a technical notion of O-fundamentality that he defines. §4 discusses the difficulties afflicting this kind of use of O-fundamentality.

⁶ A word of caution. Sider is plausibly interpreted as neither defending nor arguing for purity, but as merely endorsing it and examining its consequences. Since we are seeking arguments for principles like purity and (3), however, let us treat Sider as arguing for purity, whilst bearing that proviso in mind.

includes the facts cited in (i) and (ii). But if they're grounded, those facts are not fundamental. So if an object-instantiating-property-fact has non-fundamental constituents, it's non-fundamental too. So (3) is true for at least that central class of facts. (3) should thus be plausible insofar as (i) and (ii) seem strange, and this diagnosis of the strangeness seems correct.⁷

In order to properly assess this argument, we'd need to know more about what it is for an object or property (as opposed to a fact) to be fundamental. To support (3), this knowledge would need to explain why neither of the previous cases (i) or (ii) can arise. I do not know how to produce such an account. Moreover, since ground is a theoretical notion, postulated to serve certain theoretical needs, we are surely free to accept cases of form (i) and (ii) (and whatever features of ground that result) if that's what best theory requires. Nonetheless, I've hopefully said enough to explain why (3) might seem attractive to some, though that clearly falls far short of a fully suasive case. Since my ultimate goal is to present a framework within which (3) isn't even semantically evaluable, I won't dwell any further on how one might argue for it.

On (4). Note first that ground connects more fundamental grounders to less fundamental groundeds. Since the groundeds are non-fundamental, they presumably have non-fundamental constituents.⁸ Assuming that constituency (like other forms of parthood) is transitive, those non-fundamental constituents of the grounded are constituents of the grounding fact too. So grounding facts have non-fundamental constituents, and hence (4) is true. Like the arguments for (3), this argument turns on a principle connecting fact-(non-)fundamentality with constituent-(non-)fundamentality: non-fundamental facts have non-fundamental constituents. Although this sounds plausible at a first pass, it's unclear how to offer systematic argument for it. Even so, it seems reasonably clear that in most grounding facts one could offer—including (1)—some of their constituents are non-fundamental. For example, the constituents of (1) include an object—the ball—and two properties—*being scarlet* and *being red*—which are surely not fundamental entities. That's all the argument needs in order to show that grounding facts like (1) are grounded. Moreover, if some grounding facts are grounded, then either they all are or there's a principled account of why the grounded ones are grounded but the ungrounded ones aren't. I have no idea how to provide such an account.

The preliminary defence of (1)–(4) is now complete. It's hopefully now clear why grounding facts are widely regarded as grounded. My goal is to rebut the argument from (1)–(4) to that conclusion. The next section presents my preferred framework for theo-

⁷ It is worth noting that this diagnosis of the strangeness is not mandatory. Bennett (2011, p29), for example, seriously considers views akin to (i) and (ii). And if we characterise non-fundamental objects/properties as those whose existence is grounded, there is no obvious reason why other facts about which properties/objects they instantiate/are instantiated by should also be grounded.

⁸ A complication: this claim might not be true in full generality, but only when restricted to facts. Since that restriction suffices for (4), we needn't worry about it here. To see why it might not be true in full generality, consider the fact f that fundamental object o has fundamental property F . f plausibly lacks fundamental constituents. Assume that facts are grounded in their constituents. Then f is grounded in F and o , hence plausibly non-fundamental. So this non-fundamental f has only fundamental constituents, contrary to the claim in the text. Note that this argument turns on an assumption about how grounding connects facts with non-facts. Such connections are cannot hold within §2's framework, for the same reason that (3) is not semantically evaluable in that framework (as §3 will argue).

rising about ground. §3 then argues that premise (3) isn't semantically evaluable in that setting.

2 The framework

My preferred framework for theorising about ground comprises three theses. This section introduces them.

The first thesis is:

Structure: Ground is *the* structuring notion of metaphysics: reality's fundamentality-structure arises solely out of ground.

Theorists of ground conceive reality as exhibiting a hierarchical structure. At the structure's base lie the fundamentals.⁹ Further up the structure lie the derivatives. The derivatives are generated from the fundamentals and thereby dependent upon them. The central task of metaphysics is to understand this structure. What are the fundamentals? What are the derivatives? And how do the former generate the latter? **Structure** says that this last question is always a question about ground: how do the fundamentals ground the derivatives? If **Structure** is true, then the only way to generate derivatives from fundamentals is by grounding the former in the latter; and the only way for one entity to metaphysically depend upon another is for an appropriate chain of grounding facts to connect them.¹⁰ Reality's hierarchical fundamentality-structure arises from connections of ground between its nodes.¹¹

This is not the only possible conception of ground. One could supplement ground with other notions. Candidates include Fine's notions of *reality* (2001) and *essence* (1994), where these are not understood as definable via ground. My argument is affected by admitting these notions only if doing so affects the account of fundamentality on which it rests.¹² What **Structure** and my argument require is that all relations of relative fundamentality and metaphysical priority arise out of ground. That rules out supplementing ground with additional such relations not definable via ground. It also rules out notions like reality and essence, *if* they can be used to define non-ground-theoretic relations of relative fundamentality (as Fine (1995) suggests about essence). Although one could in principle supplement ground with such relations—thereby licensing multiple ways of generating derivatives from fundamentals—it is unclear why one would wish to do so, or what additional theoretical work they would do that ground alone cannot. If one can find work for such relations, one has reason to reject **Structure** and the next section's argument along with it. But absent such work, the economy of admitting only one relation of metaphysical priority, in line with **Structure**, has much to recommend it.

⁹ For simplicity, I ignore views on which the structure lacks a fundamental base. See note 3.

¹⁰ I say metaphysical dependence to differentiate it from other, more innocuous forms of dependence that clearly don't require grounding chains linking their relata, e.g., causal or counterfactual dependence.

¹¹ (Schaffer, 2009, esp. p364) articulates and defends this conception of ground's role within metaphysics.

¹² The relevant objection to my argument is discussed in §4. It proceeds by supplementing the ground-theoretic notion of fundamentality with a non-ground-theoretic one, presumably definable via some non-ground-theoretic notion of metaphysical priority or dependence, though such definability isn't strictly required by the objection.

Before continuing, I pause to note how **Structure** constrains the notion of ground at work in this paper, since it will be important in §5.3. Our concern henceforth will be with non-factive ground, rather than factive ground.¹³ Whereas factive grounding facts entail both their grounders and grounded, non-factive grounding facts entail neither: A can non-factively ground B when neither A nor B is the case. Factive ground concerns the manner in which the actual fundamentalia actually generate derivatives. Non-factive ground, by contrast, concerns the potential pattern of such connections, without regard for whether actuality's fundamentalia are actually appropriately configured to give rise to the grounded, or even whether they could possibly be so configured. Both notions are clearly legitimate and interesting. Moreover, factive ground is straightforwardly definable from non-factive ground:

A factively grounds $B =_{df} A$, and A non-factively grounds B

But it does not seem possible to define non-factive ground from factive ground.¹⁴ Were we to take factive ground as primitive, we would therefore be forced to admit two primitive sources for reality's fundamentality-structure, contrary to **Structure**. So my concern henceforth will be with the primary, non-factive notion. Although less familiar than factive ground, it is worth noting that the primacy of the non-factive notion is central to Litland's (2017, §1) alternative theory of iterated ground, and that Correia's (2014) account of logical ground is based around it. As Correia's paper shows, taking the non-factive as primary enables important theoretical work elsewhere, independent of iterated ground; this lends credibility to it. Those unconvinced by the primacy of non-factive ground—whether unconvinced by the argument from **Structure**, or by the theoretical work it can do elsewhere—are invited to see it as an additional component of the framework deployed in this paper. It will be important in §5.3, where I will use it to respond to a version of §1's argument.

¹³ The distinction is due to Fine (2012, pp48–50).

¹⁴ The argument is due to Fine (2012, pp48–50). It employs a transitivity-like principle: if (i) A non-factively grounds B , and (ii) B, C non-factively ground D , then (iii) A, C non-factively ground D . Now, (i*) A non-factively grounds $A \vee B$, and (ii*) $A \vee B, \neg A$ non-factively ground $(A \vee B) \wedge \neg A$. So by the transitivity principle: (iii*) $A, \neg A$ non-factively ground $(A \vee B) \wedge \neg A$. The only obvious definition of non-factive ground via factive ground is: Γ non-factively ground C iff $\diamond(\Gamma$ factively ground $C)$. Since it's not possible for both A and $\neg A$ to be true, however, this definition implies that $A, \neg A$ don't non-factively ground $(A \vee B) \wedge \neg A$, contrary to (iii*).

One could respond by rejecting the transitivity principle in Fine's argument. Although I find the principle plausible, I have no independent argument for it. Yet a simpler argument without the transitivity principle may also be available.

Consider any necessary falsehood, e.g.: Socrates exists and his singleton doesn't. It's clear what's required to ground this. Like any conjunction, it's jointly grounded by the pair of its conjuncts: (Socrates exists, his singleton doesn't exist). This is non-factive ground, since Socrates' singleton exists. But because it's impossible for Socrates to exist without his singleton, this case of non-factive ground isn't equivalent to the possibility of: (Socrates exists, his singleton exists) jointly factively ground (Socrates exists and his singleton doesn't). So non-factive ground is not equivalent to the possibility of factive ground, contrary to the only available definition of non-factive ground.

From the definability of factive ground via non-factive ground but not conversely, Fine concludes that factive ground should be treated as primitive. This seems a strange conclusion to draw. The more natural response is to take the non-factive notion as primitive and define the factive from it, since otherwise both must be taken as primitive.

The second thesis is:

Operator: Ground is most perspicuously regimented using a sentential operator, not a relational predicate.

I use ‘ \Rightarrow ’ for this operator. It forms a whole sentence from a collection of sentences on its left and a single sentence on its right.¹⁵ When a sentence ‘ $\Gamma \Rightarrow A$ ’ is true, the sentences Γ on the left express the grounders and sentence A on the right expresses the grounded. Perhaps the closest English analogue is ‘because’, though this certainly doesn’t always express a ground-theoretic notion.¹⁶ In this regimentation of ground, I follow Fine (2012).

I see two main reasons to favour **Operator**.

The first reason to favour **Operator** is ontological neutrality.¹⁷ Were ground regimented using a relational predicate ‘ x grounds y ’,¹⁸ true grounding claims ‘ a grounds b ’ would require denotations for the terms ‘ a ’ and ‘ b ’. ‘ a ’ would denote the grounder and ‘ b ’ the grounded. Since singular terms denote objects over which first-order quantifiers range, true grounding claims would require an ontology of objects that are grounders and grounded. Given another natural view about ground, this brings highly controversial ontological commitments about which a theory of ground should ideally remain neutral. In its role as a device for generating metaphysical structure, ground should be reasonably (though not necessarily completely) neutral about what occupies the nodes of that structure, so that it can subserve a wide range of metaphysical views.

The natural view that combines with a grounding predicate ‘ x grounds y ’ to generate these undesirable commitments is that particular individuals are not (at least typically) grounders themselves, but structurally rich complexes combining individuals with their features. For example, the ball itself doesn’t ground its being red; the ball’s being scarlet is what does so. Likewise, the collection of particles doesn’t ground the existence of a cat; their being arranged cat-wise is what does so. This follows from a more general sufficiency constraint on (full) ground: the grounder suffices for the grounded. Since the ball could exist without being red, it doesn’t suffice for, and hence doesn’t ground, its being red. What suffices for and grounds the ball’s being red is its being scarlet (or any other shade of red). And since the particles could exist without constituting a cat, they don’t suffice for, and hence don’t ground, the existence of a cat. What suffices for and grounds the existence of the cat is the particles being arranged cat-wise.¹⁹

¹⁵ Variables from the same type as whole sentences are also permitted.

¹⁶ A complication. As used to express ground, ‘because’ reverses the order of argument positions: $A \Rightarrow B$ iff B because A .

¹⁷ See (Melia, 2005) for an early use of a similar view about the logical form of truthmaking to avoid an Armstrong-style ontology of states of affairs.

¹⁸ Or perhaps ‘ xx ground y ’ where ‘ xx ’ is a plural variable.

¹⁹ The exact modal strength of the appropriate form of sufficiency is a matter of dispute; see (Skiles, 2015), (Trogon, 2013), and (Fine, 2012, §1). So perhaps one could respond to this argument by maintaining that although the ball could exist without being red, it doesn’t follow that the ball’s existence is insufficient—in the sense in which grounders suffice for what they ground—for it to be red. Note, however, that full metaphysical possibility isn’t the only sense in which the ball could possibly exist without being red. Many more ordinary and more restrictive notions of possibility also have that feature. So merely denying that grounders metaphysically necessitate what they ground won’t block the argument. One would also need to

We've seen that grounders are typically objects-exhibiting-features, not particular objects themselves. Regimenting ground using a relational predicate forces us to treat these objects-exhibiting-features as particular entities, objects, or individuals. And that's just what I did above, in my informal discussion and presentation of §1's argument. That discussion treated grounder and grounded as facts, and included many claims of the form 'the fact that...grounds the fact that...'. Elsewhere, I invoked such entities as *the ball's being red* and *the particles' being arranged cat-wise*. I thereby reified objects-exhibiting-features into objects that are facts by using singular terms for them, as required by my use of the relational predicate '*x grounds y*' to express ground. But whether there are such entities is a matter of dispute, and a general theory of metaphysical structure oughtn't presuppose it.

Operator allows us to bypass this concern. Features are most naturally attributed to objects using sentences, e.g. 'the ball is red' and 'the particles are arranged cat-wise'. **Operator** allows us to make claims of ground by flanking the grounding connective ' \Rightarrow ' with the appropriate sentences:

The ball is scarlet \Rightarrow the ball is red

The particles on the mat are arranged cat-wise \Rightarrow there is a cat on the mat

There is no appeal to entities that are facts here. The metaphysical commitments of the expressions for grounder and grounded are just those of whole sentences. Whatever exactly those commitments amount to, every metaphysical theory must employ such sentences, which renders their commitments relatively uncontroversial. The ontological commitments of singular terms for facts, by contrast, are highly controversial. **Operator** thereby avoids unwanted and controversial ontological commitment to facts or other fact-like entities.

The second reason to favour **Operator** is that it dovetails nicely with an attractive general framework for theorising about ground: the structural equations framework of Wilson (2016, 2017b) and Schaffer (2015). This view represents cases of grounding via (i) a collection of variables that may take a range of different values, together with (ii) a collection of structural equations that encode how variations in the values of variables affect the values of other variables. In this setting, grounders and grounded are not particular objects or facts about them, but assignments of values to variables.²⁰ These assignments are expressed in the theory using whole sentences: variable *X* has value *x*. And grounding-connections are recorded in the theory by the truth of certain (broadly interventionist) counterfactuals where assignments of values to variables appear as antecedent and consequent, e.g.: were variable *X* not to take value *x* (due to a certain kind of intervention on *X*), variable *Y* would not take value *y*. Taking the theory at face value, it treats the nodes in the ground-theoretic hierarchy as sentential features of reality, not entities, objects, or individuals. This is just what **Operator** says.

hold that there is no notion of possibility according to which both (i) it's possible for the ball to exist without being red, and (ii) it's not possible for grounders to exist without what they ground. It is far from obvious that there is no such notion, and none of the papers cited at the beginning of this note even purports to establish this claim.

²⁰ Alternatively, in Schaffer's setup, grounder and grounded are contrasts: variable *X* takes value *x* rather than *x**. Note that this is still expressed by a whole sentence.

The underlying issue here is that ground is an explanatory notion: when A grounds B , A provides—or perhaps, can be used to provide—a certain kind of peculiarly metaphysical explanation of B . When one explains, however, one doesn't merely exhibit an individual; rather, one says something about it. For example, one doesn't explain why the ball's red by merely exhibiting the ball, but by pointing out that the ball is scarlet. And one doesn't explain why Socrates' singleton exists by merely exhibiting Socrates, but by pointing out that he exists. What one offers as explanation in such cases is expressed sententially. It is thus unclear what it would be for individuals to serve this explanatory role, as expressing ground by a relational predicate requires them to. The connection between ground and explanation thereby motivates **Operator**.

This motivation for **Operator** is defeasible. One can reify the semantic role of sentences by postulating a supply of richly structured individuals corresponding to true sentences (and only to true sentences), aka facts or states of affairs. One may then exhibit members of this special class as explanations. But this ontological extravagance is artificial, unnecessary, and rightly controversial. The explanatory power of these entities is parasitic on that of the sentential phenomena they reify. And **Operator** allows us to avoid them entirely (at least, insofar as concerns the theory of ground). Note, however, that **Operator** is not incompatible with the existence of such entities, or with there being a ground-like relation on them; given **Structure**, it requires only that this relation mirror the operator-theoretic notion in the following sense: the relation holds between facts iff the operator-theoretic notion holds between the corresponding sentential features of reality. §6 discusses an objection to my argument based around this idea. For ease of expression, I will often write about facts grounding facts, though this is always eliminable in favour of alternatives compatible with **Operator**.

The third thesis is:

Restrictivism (about semantic evaluability): Each argument-position accepts expressions of only one type. When argument positions are filled by expressions of the wrong type, the result isn't semantically evaluable. This failure of semantic evaluability isn't the result of an artificial restriction on the compositional rules. It's because there are no contents of the sort there would have to be in order for it to be semantically evaluable.²¹

²¹ A qualification. **Restrictivism** doesn't concern English or any other natural language directly. It concerns only languages that have been regimented so that different semantic values are always expressed by different expressions. So English expressions capable of combining with expressions of multiple types are counterexamples to **Restrictivism** only if the same semantic value is operative regardless of the type of expression with which it's combined. As far as I'm aware, however, standard semantic treatments of such expressions don't work by modifying the underlying type-theoretic hierarchy of semantic values to permit values capable of composing with values drawn from multiple types. Instead, they find ways to connect one expression with multiple semantic values drawn from different types, and to allow different values to operate in different linguistic contexts. Type-shifting principles provide the paradigm mechanism for doing so. English expressions that function in this way will be regimented by different (and differently typed) expressions in (regimentations of) these different linguistic contexts, depending on which semantic value is operative in the context. This renders them compatible with **Restrictivism**. **Restrictivism** is restricted to appropriately regimented languages because our goal is to capture a feature of the underlying semantics, not the surface grammar that it governs.

Perhaps the best way to see **Restrictivism**'s import is by considering examples. Consider the predicate 'is hungry'. Filling its argument position with the singular term 'Aida' produces the sentence 'Aida is hungry'. This sentence is semantically evaluable: application of the compositional rules delivers the result that it says that Aida is hungry.²² Because it's semantically evaluable as saying that Aida is hungry, it's also truth-evaluable as true or false depending on whether Aida is hungry or not.

What happens if we fill the argument position of 'is hungry' not with a term but, say, a predicate or sentential connective? It is natural to regard the resulting strings like 'is red is hungry' and 'it is not the case that is hungry' as failing to say anything: they don't present reality as being any way, hence aren't truth-evaluable. Application of the compositional rules does not yield a result as to what such strings say, unlike 'Aida is hungry'. Moreover, it is hard to see this as an artificial restriction on the compositional rules, something that could be avoided simply by being more permissive. In this respect, it's unlike the string 'schnee is white'.²³ Arguably, since that string belongs to no (actual) language, no such language's compositional rules are defined for the result of filling the argument position of the English 'is white' with the German 'schnee'. So no actual language's compositional rules treat it as saying something. But a slight liberalisation of the semantic rules of English is possible, allowing them to apply to strings other than English. Applying those more liberal rules delivers the result that 'schnee is white' says that snow is white. That content was already out there, waiting to be expressed; 'schnee is white' was just prevented from doing so by an unnecessary restriction on the compositional rules that determine what strings say, restricting them to strings of English or of German, and thereby excluding mixed strings. **Restrictivism** says that strings like 'is red is hungry' and 'it is not the case that is hungry' are not like that. Unlike the previous cases, contents of the sort that would have to exist in order for these strings to be semantically evaluable simply do not exist.²⁴

Although controversial, **Restrictivism** is pretty orthodox.²⁵ Something like it has good claim to be Frege's view in his (1892, esp. p189), for example. This isn't the place to attempt to settle this technical matter in the foundations of logic and language. I simply note that **Restrictivism** is both orthodox and *prima facie* attractive. My primary goal is not to defend this section's framework, but to exhibit its existence, independent plausibility, and connection with §1's argument that grounding facts must be grounded. Those who reject **Restrictivism** are free to treat the following discussion conditionally, as an ex-

²² See (Rumfitt, 2014, pp32–33) for details.

²³ Here I draw on (Magidor, 2009, pp3–4).

²⁴ Here's an illustration of how this could work. When an expression *e* occupies the argument position of 'is hungry', the resulting string says that the particular object introduced by *e* is hungry. That's the semantic role of 'is hungry': to say of objects that they're hungry. Similarly, when an expression *e* occupies the argument position of 'is red', the resulting string says that the particular object introduced by *e* is red. That's the semantic role of 'is red': to say of objects that they're red. Since neither 'is red' nor 'is hungry' introduces a particular object, however, this doesn't suffice for semantic evaluability of 'is red is hungry', where one is in the argument position of the other. And that isn't just because the compositional rules have been restricted to exclude this case. It's because neither expression plays the right kind of semantic role for those rules to sensibly apply to strings of this kind.

²⁵ For criticism of **Restrictivism**, see (Magidor, 2009), (Linnebo and Rayo, 2012), (Liebesman, 2015), (Krämer, 2017). For other applications of **Restrictivism**, see (Jones, 2016, 2017).

amination of what follows from it.²⁶

One might be suspicious about theses like **Operator** and **Restrictivism** in the context of a metaphysics paper. Our goal is to understand the structure of reality, not language. The former arguably cannot simply be read off from the latter. So linguistic theses like **Operator** and **Restrictivism** are irrelevant to our present metaphysical concerns. Or so the worry goes.

To allay this concern, note that metaphysics' goal is not—or at least, should not be—some kind of direct intellectual insight into the deep structure of reality. The goal is to *theorise* about that structure, to communicate such theories to others, and to evaluate them. This theorising and communication are conducted in language. It is therefore important that we understand how the language of theorising works, so that we can pick the right words to say what we mean. Different kinds of expression with different kinds of meaning allow us to make different kinds of claim about reality. So we should choose the right kinds of expression for the task. For example, the distinction between a conditional and its converse certainly isn't irrelevant to metaphysical theorising. Similarly, other kinds of semantic distinctions surely matter too, including that between sentential operators and relational predicates. **Operator** is a view about what kind of claim about reality is (or perhaps should be) made by talk of ground. **Restrictivism** is a view about what kinds of strings are even capable of making such claims, and which enforces a distinction between the kinds of claims made by sentences built from (i) operators and sentences, and (ii) relational predicates and singular terms. Both views are clearly of foundational import for the content of metaphysical theorising.

3 Regimenting the argument

§1 presented an argument for the conclusion that grounding facts are grounded. By way of reminder, the argument employed these four premises:

- (1) The fact that the ball's scarlet grounds the fact that the ball's red.
- (2) If a fact is ungrounded, then it's fundamental.
- (3) If a fact is fundamental, then all of its constituents are fundamental.
- (4) Some constituents of the grounding fact in (1) are not fundamental.

Our goal now is to examine this argument within §2's framework. Our first task is to regiment (1)–(4) into that framework. Although this is straightforward for (1) and (2), it is impossible for (3) and (4).

Let's start with (1). This employs a relational predicate for ground 'x grounds y' flanked by two singular terms for facts. Following **Operator**, this should be regimented with the

²⁶ It's worth noting that a weaker thesis than **Restrictivism** will suffice for my purposes. I don't need to reject the possibility of (unambiguous) expressions meaningfully taking (unambiguous) expressions of more than one type in their argument positions. I only need to maintain that (i) not all expressions are like that, and (ii) ground is one such. I work with **Restrictivism** for simplicity and because of its relatively orthodox status.

grounding connective ‘ \Rightarrow ’ in place of the predicate, and two whole sentences flanking it in place of the terms. The result is:

(1*) The ball is scarlet \Rightarrow the ball is red.

Now for (2). This employs two pieces of terminology that need regimenting into the present setting, ‘fundamental’ and ‘ungrounded’. Let’s start with the latter. To be ungrounded is to lack a grounder. Were ground regimented using a relational predicate ‘ R ’, to say that x is ungrounded would be to say that:

$$\neg\exists y(R(x, y))$$

In line with **Operator**, the grounding predicate ‘ R ’ needs replacing with the grounding connective ‘ \Rightarrow ’. So the first-order variables ‘ x ’ and ‘ y ’ need replacing with sentential variables ‘ P ’ and ‘ Q ’. Making these changes, the resulting regimentation of ungroundedness is:

$$\neg\exists Q(Q \Rightarrow P)$$

Think of this as defining a sentential operator of ungroundedness, ‘it is ungrounded that P ’.

Note that ‘ P ’ and ‘ Q ’ in this regimentation of ungroundedness are higher-order variables occupying the positions of whole sentences, not familiar first-order variables in singular term position restricted to range only over (e.g.) objects that are propositions. On this approach, ungroundedness isn’t a property of objects (such as facts) that can be denoted by singular terms and over which first-order quantifiers range. It is a higher-order feature of reality akin to possibility, negation, and conjunction in being expressed by a sentential operator, and which classifies those (pairs of) sentential aspects of reality to which the grounding operator ‘ \Rightarrow ’—like ‘ \diamond ’, ‘ \neg ’, and ‘ \wedge ’—applies.

What about fundamentality? Even prescinding from questions about exactly what this amounts to, (2) significantly constrains its logical form. A key feature of (2) is that it connects ungroundedness and fundamentality for one and the same fact. So the same variable must be able to occur in the argument positions of expressions for ungroundedness and fundamentality.²⁷ Since ungroundedness is regimented with a sentential operator, fundamentality therefore must be too. I introduce a new monadic sentential operator of fundamentality, ‘**FUND**’ or ‘it is fundamental that’, for this purpose.

With ungroundedness and fundamentality regimented in these ways, (2) becomes:

(2*) $\forall P(\neg\exists Q(Q \Rightarrow P) \rightarrow \text{FUND}(P))$.

²⁷ This is a slight simplification. It needn’t be the very same variable in the argument positions of expressions for fundamentality and ungroundedness. We could have different variables v and v' in each argument position alongside an additional clause $\lceil v = v' \rceil$. Will that permit a non-sentential variable in the argument position of the fundamentality-expression in a regimentation of (2)? Only if (open) sentences like ‘ $P = x$ ’, where the identity sign connects a sentential variable to a first-order variable, can be true (relative to an assignment). But if such sentences can be true, then **Restrictivism** is false. For there is then only a linguistic difference in the kinds of expression—sentence or singular term—used to pick out the very same entities, not a deep semantic difference between the roles of those expression. So there no in principle obstacle to applying sentential operators to the objects denoted by singular terms, contrary to **Restrictivism**.

Note how reference to facts in (2) is eliminated in favour of higher-order quantification into sentence position and sentential variables in (2*).²⁸

This regimentation of (2) will be controversial due to the presence of higher-order quantifiers binding variables in sentence position. According to one influential view, all quantification is really quantification into singular term position, and apparent quantification into other positions is meaningful only if interpreted using quantification into singular term position.²⁹ I cannot discuss this issue properly here. Instead, I simply (a) note that I have yet to see a remotely plausible argument for this Quinean view of quantification, and (b) assume without argument an attractive and influential alternative view.³⁰ According to this view, quantification into positions other than of singular terms is perfectly coherent and intelligible without being reducible to any form of first-order quantification into singular term position. Sentences containing such quantifiers express genuinely quantificational (non-substitutional) truth-conditions not expressible with first-order quantifiers (i.e. not expressible with quantifiers binding variables in singular term position).

Problems arise with (3) and (4). Let's begin with (3). Like (2), it's a universally quantified conditional. We already have the tools to regiment its antecedent:

$$\forall P(\text{FUND}(P) \rightarrow \dots)$$

How should we regiment the consequent?

(3)'s consequent says that every constituent of the fact to which fundamentality is attributed in the antecedent is fundamental. Our regimentation replaces reference to facts with sentential variables and uses a sentential operator to express fundamentality. So instead of a relational predicate 'x is a constituent of y' that takes two singular in its argument positions, we need an expression whose second argument-position accepts whole sentences and sentential variables. I'll use the two-place ' $\dots < P$ ' for this purpose. The ellipses mark the first argument position. What type of expression does that position accept?

To answer, observe that (4) also employs the notion of constituency. There, it concerns the constituents of grounding fact (1). Those constituents include a certain object—the ball—and properties—being scarlet and being red. These entities are denotable using singular terms—indeed, I just did so—and in the range of first-order quantifiers.³¹ So the first argument-position of the constituency expression '<' must accept singular terms and first-order variables. **Restrictivism** then requires that it accepts only singular terms and first-order variables. (3) and (4) should therefore be regimented as:

$$(3^*) \forall P(\text{FUND}(P) \rightarrow \forall x(x < P \rightarrow \text{FUND}(x)))$$

²⁸ It's a fact that P only if P . So quantification over facts should arguably be regimented with sentential quantifiers restricted to P such that P . On this approach, (2) would become: $(\forall P : P)(\neg \exists Q(Q \Rightarrow P) \rightarrow \text{FUND}(P))$. Given, however, that our concern is with non-factive ground—as was argued in §2—this restriction to facts—i.e. to P such that P —is unnecessary.

²⁹ (Quine, 1970, pp66–68)

³⁰ For discussion of this non-Quinean conception of quantification, see (Prior, 1971), (Williamson, 2003), (Rayo and Williamson, 2003), (Linnebo, 2006), (Wright, 2007), (Linnebo and Rayo, 2012), and (Jones, 2016, 2017).

³¹ Though for a different view about properties see (Frege, 1892) and (Jones, 2017).

$$(4^*) \exists x(x < (\text{The ball is scarlet} \Rightarrow \text{the ball is red}) \wedge \neg \text{FUND}(x))$$

We can now see the problem with the initial argument. Neither (3*) nor (4*) is well-formed. Given **Operator** and **Restrictivism**, regimenting (2) requires that ‘FUND’ be a sentential operator, as in (2*). Were it not such an operator, it would be impossible to attribute ungroundedness and fundamentality to one and the same aspect of reality in (2*), as adequate regimentation of (2) requires.³² But (3*) and (4*) require ‘FUND’ to take first-order variables in its argument-position. If it didn’t do so, it would be impossible to attribute fundamentality to the very same aspects of reality that are constituents of facts (i.e. that are constituents of P such that P). So either (2*) is ill-formed because ‘FUND’ isn’t a sentential operator but a monadic predicate, or (3*) and (4*) are ill-formed because ‘FUND’ isn’t a monadic predicate but a sentential operator. Either way, §1’s initial argument employs ill-formed premises.

The argument employs premises that are ill-formed because the argument-position of ‘FUND’ is filled with an expression of the wrong type. **Restrictivism** converts this grammatical fact about the language of regimentation into a semantic one: the ill-formed premises are not semantically evaluable; they fail to say something, to express a proposition, or to represent things as being any way (depending how one prefers to think of the semantic role of whole declarative sentences in context). According to **Restrictivism**, this isn’t due to a deficiency in our language of regimentation, something that might in principle be avoided by switching to a more liberal language. Rather, it’s because there are no contents of the appropriate sort out there to express. Assuming that fundamentality has been regimented using a sentential operator, as **Operator** requires, (3) and (4)—regimented as (3*) and (4*)—are not semantically evaluable because no contents attribute fundamentality to entities over which first-order quantifiers range. Those premises fail to express propositions. So they are not true. The initial argument to show that (1) is grounded is therefore not sound.

The remaining sections consider objections. The first three introduce additional theoretical resources in order to construct well-formed and valid versions of §1’s argument compatible with §2’s framework. §4 supplements the framework with a notion of fundamentality applicable to first-order entities. §5 uses a higher-order constituency relation to regiment well-formed versions of (3) and (4). §6 adds an ontology of entities that are facts or propositions to the framework, to enable regimentation of the argument using only first-order resources. The fourth objection, in §7, differs in that it targets the ungroundedness of grounding facts directly, claiming that it collapses reality’s hierarchical structure of entities.

Before discussing these objections, a reminder of my goal may be in order: to defend the ungroundedness of grounding facts within §2’s framework by blocking §1’s argument. My goal is not to argue that grounding facts are ungrounded, or to argue that nobody should be persuaded by §1’s argument. My goal is just to show that *if* one adopts §2’s framework—as I think one should—*then* §1’s argument should be unpersuasive and, more generally, the ungroundedness of grounding facts appears to be defensible. It is in this light that objections will be evaluated: what should one make of them, given **Structure**,

³² See note 27 for a slight qualification of this claim.

Operator, and Restrictivism?

4 Two kinds of fundamentality

This section's objection begins by postulating a distinction between two kinds of fundamentality: fact-fundamentality and entity-fundamentality. On this view, different kinds of fundamentality are at issue in (2) on the one hand, and (3) and (4) on the other. Fact-fundamentality is at issue in (2), where fundamentality is attributed to facts. In our regimentation (2*) of (2), this is expressed by the sentential operator 'FUND'. Entity-fundamentality, by contrast, is at issue in (3) and (4), where fundamentality is attributed to the constituents of facts. Since the constituency expression ' $x < P$ ' takes singular terms in its first argument-position, entity-fundamentality should be regimented using a monadic predicate 'E-FUND' which also takes singular terms in its sole argument-position. We can then regiment (3) and (4) as:

$$(3^{**}) \quad \forall P(\text{FUND}(P) \rightarrow \forall x(x < P \rightarrow \text{E-FUND}(x)))$$

$$(4^{**}) \quad \exists x(x < (\text{The ball is scarlet} \Rightarrow \text{the ball is red}) \wedge \neg \text{E-FUND}(x))$$

Since these are both well-formed, **Restrictivism** is no obstacle to their semantic evaluability. So we appear to have reinstated the original argument: (2*), (3**) and (4**) entail that (1*) is grounded, i.e.:

$$\exists Q(Q \Rightarrow (\text{the ball is scarlet} \Rightarrow \text{the ball is red}))$$

This response conflicts with **Structure**. The notion of entity-fundamentality expressed by 'E-FUND' is a notion of metaphysical fundamentality not defined in terms of ground. But **Structure** says that all forms of metaphysical fundamentality are induced by ground. So **Structure** precludes this kind of response, which works by introducing non-ground-theoretic notions of metaphysical structure.

To avoid proliferation of kinds of metaphysical structure, one could use fact-fundamentality and constituency to define a notion of entity-fundamentality:

$$\text{E-FUND}(x) =_{\text{df}} \exists Q(\text{FUND}(Q) \wedge x < Q)$$

This definition makes (3**) logically true, thereby reinstating the argument compatibly with **Structure**.^{33, 34}

³³ Here's why the definition makes (3**) logically true. Use the definition to substitute definitional equivalents within (3**)’s consequent: $\forall P(\text{FUND}(P) \rightarrow \forall x(x < P \rightarrow \exists Q(\text{FUND}(Q) \wedge x < Q)))$. That's equivalent to: $\forall P \forall x((\text{FUND}(P) \wedge x < P) \rightarrow \exists Q(\text{FUND}(Q) \wedge x < Q))$. And that has the form: $\forall P \forall x(\Phi(P, x) \rightarrow \exists Q \Phi(Q, x))$. Any sentence of that form is true because any assignment of value to ' P ' that satisfies $\ulcorner \Phi(P, x) \urcorner$ (for a given assignment to ' x ') also satisfies $\ulcorner \exists x \Phi(P, x) \urcorner$ (for the same assignment to ' x '). Because this argument turns only on logical form, (3**) is logically true given the definition of entity-fundamentality in the text.

³⁴ Litland (2017, §3) calls this defined notion *O-fundamentality*. He claims that an adequacy condition on theories of iterated ground is consistency with the existence of entities that are not O-fundamental. If grounding facts are ungrounded, however, the constraint is violated because there are no such entities. How-

Anyone who regards grounding facts as ungrounded, or even anyone neutral on the issue, will find this argument unpersuasive. One's view about a defined notion should depend on one's view about that in terms of which it is defined, rather than conversely. So an argument employing a defined term is suasive only if the parallel argument obtained by replacing that term with its definition is also suasive. In the present case, replacing 'E-FUND' in (4**) with its definition yields something obviously unacceptable to anyone who regards grounding facts as ungrounded, and which apparently lacks independent motivation. So the argument to show that (1*) is grounded is not suasive.

In more detail, note first that the above definition of 'E-FUND' makes (4**) definitionally equivalent to:

$$(4^{***}) \exists x(x < (\text{the ball is scarlet} \Rightarrow \text{the ball is red}) \wedge \neg \exists Q(\text{FUND}(Q) \wedge x < Q))$$

This says that some constituent of (1*) is not a constituent of any fact-fundamental Q . It follows immediately that (1*) itself is not a fact-fundamental Q . But absent independent argument for (4***)—which I have yet to see—one's view about whether a constituent of (1*) is a constituent of some fact-fundamental Q should surely depend on one's views about (i) which fact-fundamental Q s there are and (ii) what the constituents of (1*) are, and hence in particular on (iii) whether (1*) itself is fact-fundamental. Given the identification of ungroundedness with fact-fundamentality used to motivate (2)/(2*) in §1, the view that (1*) is ungrounded just is the view that (1*) is fact-fundamental, which obviously and immediately entails that all of its constituents are constituents of some fact-fundamental Q , namely (1*) itself. So (4***) can hardly serve as a neutral premise in an argument against the ungroundedness of (1*). Persuading those who regard grounding facts as ungrounded or who are neutral on the matter, would require independent reason to believe (4***) .

The arguments for (4) in §1 don't carry over into arguments for (4***) given (a) the above definition of entity-fundamentality and (b) the identification of ungroundedness with (fact-)fundamentality used to motivate (2). There were two such arguments. One exhibited certain constituents of (1)—the ball, the property of being scarlet, and the property of being red—and then claimed that they're not (entity-)fundamental. But given (a) and (b), that's just to claim that they're not constituents of any ungrounded Q , which will obviously not be acceptable to anyone who regards (1) as ungrounded, or even to anyone who is neutral on the matter. The other argument for (4) employed the principle: non-(fact)-fundamental facts have non-(entity)-fundamental constituents. Given (a) and (b), that's just to say: if x is a constituent of some grounded P , x isn't a constituent of any ungrounded Q . Again, that will be obviously unacceptable to anyone who regards grounding facts like (1) as ungrounded: that view just is, in part, the view that grounded facts (and hence also their constituents) can be constituents of ungrounded facts (since they're also constituents of grounding facts, which the view says are ungrounded). Absent some additional reason to believe (4***) , we therefore lack a suasive regimentation of §1's argument. Distinguishing entity-fundamentality from fact-fundamentality does not rehabilitate the original argument.

ever, this argument fails for broadly the reasons about to be given for why arguments employing (3**) and (4**) fail: since O-fundamentality is a newly defined technical notion, our views about it should be determined by our views about that used to define it, rather than serving as an independent source of constraints on the latter.

5 Higher-order constituency

The last section considered multiplying notions of fundamentality so that there's one for objects and another for higher-order (sentential) features of reality. That was ruled out by **Structure**. An alternative is to multiply notions of constituency. That's not ruled out by any of **Structure**, **Operator**, and **Restrictivism**. §5.1 uses a higher-order notion of constituency to reinstate a well-formed and valid version of the initial argument. I then consider two different accounts of this unfamiliar notion. The account in §5.2 renders the argument sound but is easily seen to be false. The account in §5.3 is attractive but falsifies one of the argument's key premises. Absent an alternative account of higher-order constituency, we should therefore reject the argument as unpersuasive. Although I cannot argue that there is no viable alternative, I cannot see what it might be.

5.1 A well-formed argument

Let ' $P <_S Q$ ' be our higher-order constituency operator, taking a sentence (or sentential variable) in each argument-position. We can use this to regiment the initial argument's premises as:

(1*) The ball is scarlet \Rightarrow the ball is red.

(2*) $\forall P(\neg\exists Q(Q \Rightarrow P) \rightarrow \text{FUND}(P))$.

(3***) $\forall P(\text{FUND}(P) \rightarrow \forall Q(Q <_S P \rightarrow \text{FUND}(Q)))$

(4***) $\exists Q(Q <_S (\text{the ball is scarlet} \Rightarrow \text{the ball is red}) \wedge \neg\text{FUND}(Q))$

(3***) and (4***) are well-formed. Yet they combine with (2*) to entail:

$$\exists Q(Q \Rightarrow (\text{the ball is scarlet} \Rightarrow \text{the ball is red}))$$

So (2*), (3***), and (4***) entail that grounding fact (1*) is grounded. How to respond?

I think we should reject (4***). The obvious problem in doing so is that it has an apparently true instantiation:

The ball is scarlet $<_S$ (the ball is scarlet \Rightarrow the ball is red) $\wedge \neg\text{FUND}(\text{The ball is red})$

If (4***) is false, then so is that instantiation. And in particular, so is its first conjunct:

(5) The ball is scarlet $<_S$ (the ball is scarlet \Rightarrow the ball is red)

How could (5) be false? The key is to understand how the unfamiliar notion of higher-order constituency behaves. I see only two options. One (§5.2) makes (5) true, but has unacceptable consequences. The other (§5.3) is attractive but falsifies (5).

5.2 Logical structure and higher-order constituency

The question is: what are the higher-order constituents of P s and Q s expressible in our language of regimentation by logically complex sentences? Our first answer reads off these constituents from the logical structure of the relevant sentences. Because ‘the ball is red’ is a constituent of ‘the ball is scarlet \Rightarrow the ball is red’, this view makes (5) true. I see three problems with this view.

First problem. This view requires a conception of sentential contents according to which they have an internal structure that mirrors the logico-syntactic structure of the sentences that express them. It would be better to avoid such a heavy duty commitment in the theory of content, if possible.

Second problem. Higher-order constituency is unfamiliar. All we currently know about it is that (i) it’s a form of constituency, and (ii) it’s like conjunction in being a higher-order binary relation on sentential aspects of reality. We need to attain a better grip on the notion to guide our theorising about it. The best way to do so is to connect it with other notions we understand. Since constituency is a form of parthood, the following connection with a higher-order form of parthood seems required: if $P <_s Q$, then part of what it is for it to be that Q is for it to be that P . But if part of what it is for it to be that Q is for it to be that P , then it’s surely not possible for it to be that Q without it being that P . Putting these ideas together, this conception of higher-order constituency as a form of parthood entails that higher-order constituency is factive in at least the following sense:

Factivity: $\Box \forall P \forall Q ((P <_s Q \wedge Q) \rightarrow P)$

A problem now arises. According to the present account of constituency in terms of logical structure, these are all true:

$$\begin{aligned} & \forall P (P <_s \neg P) \\ & \forall P \forall Q (P <_s (P \vee Q)) \\ & \forall P \forall Q (Q <_s (P \vee Q)) \\ & \forall P (P <_s \Diamond P) \end{aligned}$$

So by **Factivity**, these are true too:

$$\begin{aligned} & \forall P (\neg P \rightarrow P) \\ & \forall P ((P \vee Q) \rightarrow P) \\ & \forall P ((P \vee Q) \rightarrow Q) \\ & \forall P (\Diamond P \rightarrow P) \end{aligned}$$

But none of those is true. So the present account of higher-order constituency is false and cannot be used to support (5) or (4***).

Third problem. Even if one rejects this connection between parthood and constituency, the view has implausible commitments about reality’s constituents. I am not a poached egg. That’s one aspect, hence constituent, of reality. But what are its constituents? According to the present view, one constituent is: I am a poached egg. This is utterly implausible. The reason why I’m not a poached egg is that me being a poached egg is not a constituent of reality at all; it’s not that me being a poached egg is a constituent of reality

but is somehow negated. To think otherwise is to lack the “vivid sense of reality” that Russell (1919, p56), in a closely related context, regarded as necessary for properly pursuing logic. Although the proposal avoids commitment to my being a poached egg by rejecting the previous connection between parthood and constituency that led to **Factivity**, it retains P as a constituent of the aspect of reality responsible for it not being the case that P —likewise for $P \vee Q$ and $\diamond P$ —which is almost as bad.³⁵

5.3 Yablo

The second account of higher-order constituency is due to Yablo (2014, chs2–3).³⁶ As far as I’m aware, this is the only extant plausible theory of the notion. Although attractive in many ways, Yablo’s view entails that (5) is false and so leaves us free to reject (4^{**}) as false.

According to Yablo, P is part of W —i.e. $P <_S W$ —iff:

- (a) W implies P .³⁷
- (b) Every way for P to be true is implied by a way for W to be true.
- (c) Every way for P to be false is implied by a way for W to be false.

Yablo calls these ways of being true and false *truthmakers* and *falsemakers* respectively. Using this terminology and shifting to cases of the currently relevant form, P is part of $P \Rightarrow Q$ —i.e. $P <_S (P \Rightarrow Q)$ —iff:

- (a^{*}) $(P \Rightarrow Q)$ implies P .
- (b^{*}) Every truthmaker for P is implied by a truthmaker for $(P \Rightarrow Q)$.
- (c^{*}) Every falsemaker for P is implied by a falsemaker for $(P \Rightarrow Q)$.

Turning to the presently relevant case, (5) is true iff:

- (a^{**}) (The ball is scarlet \Rightarrow the ball is red) implies the (ball is scarlet).
- (b^{**}) Every truthmaker for (the ball is scarlet) is implied by a truthmaker for (the ball is scarlet \Rightarrow the ball is red).

³⁵ Here’s another version of the same problem. A natural English gloss on sentential quantification is to read ‘ $\forall P$ ’ as ‘however things may be’ (following (Rumfitt, 2014, pp27–28) and (Prior, 1971)). This brings out that sentential quantifiers don’t range over propositions or other representations of reality; they range over ways for reality itself to be, or states of reality. Suppose reality’s such that not P : that’s one state, hence constituent, of reality. Then no constituent of reality should involve things beings such that P : that state isn’t a constituent of reality. But on the present account of higher-order constituency, that conflicts with the transitivity of constituency, regardless of whether reality’s having such a constituent implies that it’s the case that P . Perhaps a propositional *representation* of reality as such that P is a constituent of propositional *representations* of reality as such that not P ; but the *state* P itself certainly isn’t a constituent of the *state* reality’s in when it’s such that not P .

³⁶ Yablo’s discussion is couched in terms of content parthood. Despite this terminological difference, our topics are the same.

³⁷ Yablo’s notion of implication is the strict conditional: W implies P iff $\Box(W \rightarrow P)$.

(c**) Every falsemaker for (the ball is scarlet) is implied by a falsemaker for (the ball is scarlet \Rightarrow the ball is red).

(a**) is false.³⁸ To see why, recall that §2's framework requires a focus on non-factive ground:³⁹ $A \Rightarrow_{\text{non-factive}} B$ is compatible with both $\neg A$ and $\neg B$, and hence implies neither A nor B . In particular, (the ball is scarlet $\Rightarrow_{\text{non-factive}}$ the ball is red) implies neither the (ball is scarlet) nor (the ball is red). So (a**) is false and (the ball is scarlet) isn't a constituent of (the ball is scarlet $\Rightarrow_{\text{non-factive}}$ the ball is red). So (5) is false and we are free to reject (4**) as false along with it. This renders §5.1's argument unsound. Given the non-factivity of ground, this generalises to all other cases.⁴⁰

Under a factive reading of ' \Rightarrow ', by contrast, each of (a**)-(c**) is plausibly true. Likewise therefore for (5) and (4**). §5.1's argument can then be used to show that factive grounding facts are (factively) grounded. In particular, the argument shows:

$$\exists Q(Q \Rightarrow_{\text{factive}} (\text{the ball is scarlet} \Rightarrow_{\text{factive}} \text{the ball is red}))$$

Is this conclusion problematic for this paper's view that (non-factive) grounding facts are ungrounded? No.

To see why, recall §2's definition of factive ground:⁴¹

$$\Gamma \Rightarrow_{\text{factive}} B =_{\text{df}} \gamma_1 \text{ and } \gamma_2 \text{ and } \dots (\text{for all } \gamma_i \in \Gamma) \text{ and } \Gamma \Rightarrow_{\text{non-factive}} B$$

³⁸ We can also argue that (b**) and (c**) are false. Plausibly, $A \Rightarrow B$ is true iff a certain relation R holds between the truthmakers for A and those for B . Different semantic analyses of ground/' \Rightarrow ' will offer different accounts of R . Since the truthmakers for a statement are the different possible ways of being true, what those truthmakers are is plausibly non-contingent. So the holding or otherwise of R will also plausibly be non-contingent. The only apparent source of contingency is variation in which truthmakers obtain at which worlds. But since we're concerned with non-factive ground, that should be irrelevant to the truth of grounding claims, hence also irrelevant to the holding of R . So $A \Rightarrow B$ will be necessarily true, if true. Moreover, without modal variation in the supply of truthmakers for A or B , it's hard to see how there could be modal variation in the way those collections R one another. So $A \Rightarrow B$ has only one truthmaker, which is therefore also a necessary truth. So no truthmaker for $A \Rightarrow B$ implies any truthmaker for any contingent A . But that's just what (b**) requires because it's contingent whether the ball is scarlet. Similarly for falsemakers and (c**).

³⁹ This was argued immediately before **Operator** was introduced in §2.

⁴⁰ A complication: if P is necessary, everything implies it, including $P \Rightarrow Q$. However, non-factive grounding statements plausibly have only one truthmaker: a certain (non-contingent) relation holds between the possible truthmakers for grounder and grounded (see note 38). So (b*) will fail for necessary truths with more than one truthmaker. So §5.1's argument can succeed only when (the ball is scarlet) is replaced by some necessary truth true in the same unique way at all worlds. In Yablo's setting, there is exactly one such necessary truth. And given what I just said about non-factive grounding statements—that they have only one truthmaker, and it involves a non-contingent relation between truthmakers for grounder and grounded—it is identical to every grounding truth $\Gamma \Rightarrow R$. What should we make of this? Two answers seem available. 1. Grounding truths are not all identical. So we have here reached the limits of Yablo's semantic model, beyond which it should not be applied. Since the model delivers problematic results about these cases, we should not apply it to them. So we should not trust the model's verdicts about higher-order constituency regarding these problematic cases. 2. Grounding truths are all identical. So Yablo's approach entails that each grounding truth $P \Rightarrow Q$ is an *improper* constituent of itself: a constituent identical to the whole. Does this vindicate §5.1's argument by providing a witnessing instance of (4**)? Only if such grounding facts are not fundamental. Since that's just what's at issue, the resulting argument is not suasive.

⁴¹ Caveat. This is a generalisation of §2's definition to permit multiple grounders on the left.

Applying this definition to the above conclusion of §5.1's argument, the question is as to what (non-factively) grounds:

The ball is scarlet \wedge (the ball is scarlet $\Rightarrow_{\text{non-factive}}$ the ball is red)

Since conjunctions are (non-factively) grounded in their conjuncts, this is jointly (non-factively) grounded in:

The ball is scarlet
The ball is scarlet $\Rightarrow_{\text{non-factive}}$ the ball is red

So we can accommodate the argument's conclusion. But doing so leaves open the question: what (non-factively) grounds this last non-factive grounding fact? Under a factive reading of ' \Rightarrow ', §5.1's argument is silent about that. And as I argued above, Yablo's account of constituency makes the argument unsound under a non-factive reading of ' \Rightarrow '.

6 Adding first-order propositions

Operator entails that ground is a higher-order relation on sentential aspects of reality, akin to conjunction. **Restrictivism** entails that ground isn't also a relation on anything else, including first-order entities like facts and propositions. But nothing in §2's framework precludes the existence of facts or propositions. Indeed, it shouldn't do so, given that one (of two) motivation(s) for **Operator** was ontological neutrality. Within ontological theories that admit such entities, we can define a relation on them that mirrors the higher-order behaviour of ground. A purely first-order version of §1's argument is available in such settings.

Since our concern is with non-factive ground, it's best to work with propositions rather than facts; for propositions can exist without being true, whereas facts cannot exist without being the case. I use angle brackets ' $\langle . . . \rangle$ ' to form singular terms for propositions from sentences, so that $\langle P \rangle$ is the proposition that P . I thereby treat propositions as entities denotable by singular terms, and over which first-order quantifiers range.

We can now define a relation \mapsto on propositions that mirrors the higher-order grounding operation:

$$\forall P \forall Q (\langle P \rangle \mapsto \langle Q \rangle \leftrightarrow P \Rightarrow Q)$$

That is: $\langle P \rangle$ bears the \mapsto relation to $\langle Q \rangle$ iff Q because P . We also employ §4's monadic fundamentality predicate 'E-FUND'. These resources allow us to formulate well-formed versions of the original argument's premises:

- (1†) $\langle \text{The ball is scarlet} \Rightarrow \text{the ball is red} \rangle$ exists.
- (2†) $(\forall x : \text{proposition}(x)) (\neg(\exists y : \text{proposition}(y)) (y \mapsto x) \rightarrow \text{E-FUND}(x))$
- (3†) $(\forall x : \text{proposition}(x)) (\text{E-FUND}(x) \rightarrow \forall y (y < x \rightarrow \text{E-FUND}(y)))$
- (4†) $\neg \forall y (y < \langle \text{the ball is scarlet} \Rightarrow \text{the ball is red} \rangle \rightarrow \text{E-FUND}(y))$

These jointly entail:

$$(\exists y : \text{proposition}(y))(y \mapsto \langle \text{the ball is scarlet} \Rightarrow \text{the ball is red} \rangle)$$

That is: some proposition grounds the (proposition that expresses the) grounding fact mentioned in (1†). What should we make of this argument?

Given the ontology of propositions, (1†) is presumably true. The underlying principle is:

$$\forall P \exists x (x = \langle P \rangle)$$

Because we're concerned with non-factive ground, the argument—and (4†) in particular—requires only that $\langle \text{The ball is scarlet} \Rightarrow \text{the ball is red} \rangle$ exist, not that it also be true. Note though that it's true if (1*) is.

We now turn to (2†). Just as ' \mapsto ' expresses the first-order image of ground, 'E-FUND' should express the first-order image of fundamentality. That was regimented using the sentential operator 'FUND'. So 'E-FUND' should satisfy:⁴²

$$\forall x (\text{E-FUND}(x) \leftrightarrow \exists P (x = \langle P \rangle \wedge \text{FUND}(P)))$$

That is: the e-fundamental entities are the propositions corresponding to the fundamental P s. With e-fundamentality understood in this way, (2†) is true within the ontology of propositions if (2*) is.

Things get more interesting with (3†). On the above account of e-fundamentality, only propositions can be e-fundamental. So (3†) is false if some ungrounded (hence e-fundamental) propositions have non-facts as constituents. On structured conceptions of propositions as complex entities constituted by objects, properties, logical operations etc., this makes (3†) false. To make it true, the quantifier in the consequent needs restricting to propositions:

$$(3\ddagger) (\forall x : \text{proposition}(x)) (\text{E-FUND}(x) \rightarrow (\forall y : \text{proposition}(y)) (y < x \rightarrow \text{E-FUND}(y)))$$

On unstructured conceptions of propositions, the only candidate constituents of propositions are other propositions. So such views can in principle accept both (3†) and (3‡).⁴³ Given this modification of (3†) to (3‡), validating the argument requires a similar change in (4†):

$$(4\ddagger) \neg(\forall y : \text{proposition}(y)) (y < \langle \text{the ball is scarlet} \Rightarrow \text{the ball is red} \rangle \rightarrow \text{E-FUND}(y))$$

⁴² An alternative treats e-fundamentality as equivalent to ungroundness in the relational sense: $\forall x (\text{E-FUND}(x) \leftrightarrow \neg \exists y (y \mapsto x))$. This makes all non-proposition entities e-fundamental. So all non-proposition constituents of $\langle \text{the ball is scarlet} \Rightarrow \text{the ball is red} \rangle$ are e-fundamental, which makes it harder to defend (4†). The approach in the text is therefore more congenial to opponents of ungrounded ground.

⁴³ Note that if propositions entirely lack constituents, (3‡) will be vacuously true. Although one might have thought that unstructured views entail that propositions aren't even constituents of propositions, Yablo's theory discussed in §5.3 shows otherwise.

On structured conceptions of propositions, (3†) and (4†) should be replaced with (3‡) and (4‡). Although the resulting argument is valid, both (3‡) and (4‡) are problematic. Similar problems afflict (3†) and (4†); I focus on (3†) and (4†) to accommodate both structured and unstructured conceptions of propositions.

Let's start with (4‡). The first question is: which propositions are constituents of ⟨the ball is scarlet \Rightarrow the ball is red⟩? I see two candidates:

⟨The ball is scarlet⟩
 ⟨The ball is red⟩

However, we rejected the parallel claims about higher-order constituency in §5. There, we saw two accounts of the notion. One account (§5.3) was taken from Yablo. Although attractive, Yablo's approach falsifies the relevant constituency claims. A parallel argument delivers the same result here.

The other account (§5.2) tied constituency to logical structure. Although that account verifies the relevant constituency claims, it was seen to be false. However, the analogous arguments are less compelling here. The primary argument used a connection between higher-order constituency and the locution 'part of what it is to be...is to be...' to motivate a factivity principle. Since that connection is much less plausible for the propositional constituents of propositions, the analogous argument fails here.⁴⁴ So (4‡) is plausibly true on a structured conception of propositions that ties constituency to the logico-syntactic structure of sentences expressing them. I now argue, however, that (3‡) may be rejected within that conception.

Within §2's framework, ground is a higher-order relation on sentential aspects of reality expressed by the operator ' \Rightarrow '. The \mapsto relation is not ground. It is merely the image projected by ground onto the first-order entities that are propositions. Insofar as it is such a projection, the principles governing it are also projections of parallel higher-order principles. The first-order principles lack an independent life of their own. Our views about them should thus be guided by our views about how the higher-order notion of ground proper behaves.

Note first that (3‡) acquires no support from the truth of (3^{***}) in §5:

$$(3^{***}) \quad \forall P(\text{FUND}(P) \rightarrow \forall Q(Q <_S P \rightarrow \text{FUND}(Q)))$$

(3^{***}) entails (3‡) only if the propositional constituency relation mirrors the higher-order constituency relation in at least the following sense:

$$\forall P \forall Q (\langle P \rangle < \langle Q \rangle \rightarrow P <_S Q)$$

But that cannot be. Given the present connection between propositional constituency and logico-syntactic structure, that mirroring principle entails the parallel connection between higher-order constituency and logico-syntactic structure that we rejected in §5.2. So propositional constituency does not mirror higher-order constituency in the manner required for (3^{***}) to entail (3‡).

We can stipulatively define a new higher-order relation \prec to mirror the behaviour of propositional constituency:

⁴⁴ This was, in effect, pointed out at the end of note 35.

$$\forall P \forall Q (P \prec Q \leftrightarrow \langle P \rangle < \langle Q \rangle)$$

Then (3‡) is true iff (3^{***}) is true under an interpretation of ' \prec_S ' as expressing this newly defined relation \prec . According to the view that grounding facts are ungrounded, however, counterexamples abound, e.g.:

$$\begin{aligned} & \text{FUND}(\text{the ball is scarlet} \Rightarrow \text{the ball is red}) \\ & \text{The ball is red} \prec (\text{the ball is scarlet} \Rightarrow \text{the ball is red}) \\ & \neg \text{FUND}(\text{the ball is red}) \end{aligned}$$

Absent independent reason to believe (3^{***}) under an interpretation of ' \prec_S ' as expressing \prec , we are free to accept these counterexamples and so reject (3‡). We've seen that \prec is not a form of constituency. So the connection between fundamentality and constituency expressed by (3^{***}) on its intended interpretation does not provide such reason. Similarly, the initial motivations for (3) in §1 do not carry over to the present case. Those motivations concern constituency. But under the relevant interpretation of ' \prec_S ' as expressing \prec , (3^{***}) concerns not constituency but a newly defined higher-order relation that mirrors certain syntactic features of first-order entities that are propositions/sentences. I see no reason to believe (3^{***}) thus interpreted, and hence no reason to believe (3‡) within §2's framework. We are therefore free to reject it.

In summary, although the ontology of propositions enables a well-formed regimentation of the initial argument, we are free to reject it as resting on a false premise. If propositional constituency behaves as Yablo claims, then (4‡) is false. If propositional constituency tracks logico-syntactic structure, then (3‡)'s truth depends on how the higher-order relation \prec behaves. Because that's not a relation of constituency on its relata, there is no obvious reason to believe that it behaves as (3‡) requires, and so we are free to reject (3‡) as false. Is there an alternative notion of propositional constituency, not considered here, that verifies both (3‡) and (4‡)? The lesson from this discussion of \prec is that this depends on whether there is a matching higher-order constituency relation that verifies (3^{***}) and (4^{***}) from §5.1. As I said when discussing higher-order constituency in §5, although I cannot show that there is no such relation, I do not know how to characterise one.

7 Collapsing hierarchical reality

The preceding three sections concerned attempts to reconstruct a sound version of §1's argument within §2's framework, by supplementing that framework in various different ways. This section's objection is slightly different. It targets the view that grounding facts are ungrounded directly, using just one of the original argument's premises to argue that it has unpalatable consequences.

If grounding facts are ungrounded, then (2^{*}) entails that they're fundamental. So every entity is a constituent of some fundamental fact.⁴⁵ Louis deRosset argues that this means that reality's hierarchical fundamentality-structure cannot be articulated via ground, as **Structure** requires. He writes:

⁴⁵ Suppose entity e is a constituent of some grounding fact. Then if grounding facts are ungrounded, (2)/(2^{*}) entails that e is a constituent of some fundamental fact. Suppose instead that e is a constituent of

It would be fatal for the proposal to understand layered structure in terms of grounding, however, if it turned out that *every* entity somehow figured into a complete specification of the fundamental facts. Then grounding explanations might reveal an interesting structure among *facts*: some facts get explained in terms of others. But they wouldn't reveal any interesting structure among objects, states, properties, events, etc.: all such entities belong at the fundamental level. The erstwhile layered structure would collapse into a single, all-encompassing fundamental layer. (deRosset, 2013, p7)

deRosset is wrong about this. To show why, I'll explain how to articulate an interesting hierarchical fundamentality-structure on first-order entities. The structure will be defined in terms of the **Operator**-theoretic notion of ground. To aid readability, I'll follow deRosset and write about grounding relations between facts, though this unofficial idiom could be replaced without loss by higher-order sentential quantification within §2's framework.

Which entities go at the base of the structure? If the base contains every constituent of a fundamental fact, then every entity goes in the base. That would justify deRosset's claim that the hierarchy "collapse[s] into a single, all-encompassing fundamental layer" (deRosset, 2013, p7). But there is no reason why we must proceed in that way.

Consider the collection of all facts. Set aside the grounding facts. Arrange the remaining facts into a hierarchical structure on the basis of the grounding connections between them, with grounders below what they ground. We obtain a hierarchical structure of entities by replacing facts with their constituent entities as the nodes of this structure. On this approach, entity x sits above entity y in the structure when some (non-grounding) fact with x as constituent grounds some (non-grounding) fact with y as constituent.⁴⁶ This hierarchical structure of entities mirrors the hierarchical grounding structure of facts. This surely counts as an "interesting structure among objects, states, properties, events etc." (deRosset, 2013, p7). Since it's defined in terms of ground, it has good claim to be a fundamentality-structure. But since some entities are not constituents of ungrounded non-grounding facts—at least, that's consistent with the ungroundedness of grounding facts—the hierarchy does not collapse.⁴⁷

This is not the only way to characterise a hierarchical structure of first-order entities via the ground-theoretic structure of facts (= higher-order P s and Q s). It reveals one interesting set of distinctions between entities arising out of ground. More specifically, it

no grounding fact. By transitivity of constituency/parthood, no fact with e as a constituent is a constituent of any grounding fact. So no fact with e as constituent is grounded. Since every entity is a constituent of some fact, e is a constituent of some ungrounded fact. So (2)/(2*) again entails that e is a constituent of some fundamental fact. Either way, e is a constituent of some fundamental fact. Since e was arbitrary, we can generalise: if grounding facts are ungrounded, then every entity is a constituent of some fundamental fact.

⁴⁶ This assumes transitivity of ground. If ground is non-transitive, replace it with its ancestral.

⁴⁷ This admittedly simple way of obtaining a hierarchy of entities from a hierarchy of facts may not exhibit every feature we might want. For example, suppose relation R holds from a to b , and that this is grounded in a being F and b being G . So when we swap facts for their constituents at nodes of the hierarchy, nodes containing a and b will go below a node containing both a and b . So a and b will count as less fundamental than themselves according to this structure. If we want a structure in which relative fundamentality is irreflexive, we'll have to modify the approach. The natural suggestion is to delete all occurrences of an entity that occur above other occurrences of it. Other complications no doubt arise. To avoid getting bogged down, let us set them aside and move on.

captures distinctions between entities induced by ground-theoretic connections between the non-grounding facts of which they're constituents. Other ways of structuring the entities will reveal other distinctions induced by ground-theoretic connections between facts. And others will reveal nothing of interest at all. We can let a thousand flowers bloom here, since there is no need to decide once and for all between the various options. Different approaches may suit different theoretical interests.

8 Conclusion

I have argued that §2's framework of **Structure**, **Operator**, and **Restrictivism** is both independently attractive and blocks §1's argument for the conclusion that grounding facts are grounded. It does so because the argument's key premise (3) fails to express a proposition within the framework. It does not follow that grounding facts really are ungrounded. But absent other reasons to regard them as grounded, this is an attractively simple view of the matter. To conclude, I want to connect this view with a wider issue about a ground-theoretic analogue of the debate about Humean and anti-Humean conceptions of laws of nature.⁴⁸ I will be content merely to raise the issue and won't pretend to settle it.

The paper began with a brief overview of extant accounts of iterated ground. These include Wilson's (2017a) suggestion that grounding facts $\Gamma \Rightarrow C$ are grounded by the grounders Γ together with the *grounding principle* connecting Γ to C . Unlike this paper, Wilson focuses on factive ground. That's why he requires Γ alongside the principle, to ensure that C is actually true. Factoring out this difference, a natural nearby counterpart of Wilson's view holds that non-factive grounding facts are grounded by grounding principles alone. Γ enter into the story only in order to account for factive grounding facts (via p21's definition) by combining with principles. How does this differ from the present conception of non-factive grounding facts as ungrounded?

Grounding principles amount to lawful generalisations about how grounders generate groundeds. So Wilson's view is a form of anti-Humeanism about ground, on which the particular grounding facts are governed and constrained by the general laws of ground. On the present approach, by contrast, these general laws play no role. The particular grounding facts themselves are fundamental, with generalisations about them derivative. The view is thus a form of Humeanism about ground, with the laws determined by the supply of instances rather than conversly. Although the Humean/anti-Humean distinction has been central to the debate about laws of nature, the analogous ground-theoretic distinction has drawn little attention. I submit that this is a mistake. The natural parallels between grounding principles and natural laws, and between grounding facts and causal facts,⁴⁹ suggest that argumentative and theoretical techniques can likely be exported from one case to the other. Much may be learned from examining these exports to see where the parallels break down, if anywhere. What this suggests about the the present case, I believe, is that it is only by thinking through the costs and benefits of Humean and anti-Humean

⁴⁸ See (Beebe, 2000) for more on the issue underlying this debate: do laws of nature *govern* what they apply to?

⁴⁹ For discussion of the parallels alongside a unified analysis of both causation and ground, see (Wilson, 2017b).

approaches to laws in general, beyond the narrowly causal/natural case, that the present issue about iterated ground will be resolved.

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