

Grounding, Metaphysical Explanation, and the Structure of Reality

ABSTRACT: This paper explores a new approach to characterising the structure of reality. Structure is to be characterised in terms of metaphysical explanations, where metaphysical explanations are answers to *what-makes-it-the-case-that* questions. Constraints on the question asked guarantee the role of understanding in explanation, and allow (but do not require) that explanations might be holistic, and might obtain in domains of discourse about which we are antirealist. I consider some objections to the view, in particular to my claim that metaphysical structure is not itself fundamental, and I argue that the account developed here is superior to accounts which take the structure of reality to be characterised in terms of grounding relations.

Contemporary metaphysics has become preoccupied with talk of grounding. Grounding relations are thought to be apt to cash out our intuitions about ontological dependence, to characterise the structure of reality, and to back a certain kind of explanation. In this paper I argue that the work earmarked for grounding can be achieved, more simply and more effectively, by concentrating instead on the notion of metaphysical explanation with which grounding is usually taken to be closely associated. In the literature, talk of metaphysical explanation is somewhat vague, and the notion is underdeveloped and very rarely discussed apart from in discussions of grounding. My aim here is to develop a stand-alone theory of metaphysical explanation, and to explain how we can use it in characterising the structure of reality.

I begin in §1 by briefly introducing the notion of grounding and its relation to explanation and fundamentality. In §2 I highlight key features of the discussion of metaphysical explanation in the literature. §3 is where I outline my preferred account of metaphysical explanation, and I explain how it can be used to give a characterisation of the structure of reality in §4. In §5 I compare the picture I develop here with the orthodox picture which includes both grounding and metaphysical explanation.¹ §6 concludes.

¹ I am not able here to consider other approaches to limning the structure of reality, such as those developed by Chalmers (2012), Lewis (1983; 1984; 1986), or Sider (2011). I am also not able to consider alternatives to my preferred way of thinking about metaphysical explanation in any detail.

1. Grounding

Grounding is taken to be a relation of metaphysical dependence, usually thought of as a metaphysical primitive (it can't be analysed in other terms). Friends of grounding try to elucidate the notion by citing the logical and structural properties of grounding, by connecting grounding to other, more familiar notions, and by appeal to a range of paradigm examples (see e.g. Audi, 2012; Fine, 2012; Schaffer, 2009; forthcoming; Raven, 2015; Rosen, 2010; Trogdon, 2013).

Grounding relations are taken to be transitive (if x grounds y , and y grounds z , then x grounds z), irreflexive (nothing grounds itself), asymmetric (if x grounds y , y doesn't also ground x), non-monotonic (it doesn't follow from the fact that x grounds z that x and y together ground z) and hyperintensional (co-referring terms for the relata of grounding relations cannot be substituted *salva veritate*). It is important for our purposes to note that these properties are usually also thought to be properties of explanation. Indeed, friends of grounding often insist that grounding has these properties precisely because they are properties of explanation, and grounding is an explanatory relation (see e.g. Raven, 2015: 327).

As mentioned above, one of the key roles grounding is taken to play is that grounding relations furnish reality with its structure. Most often this structure-talk arises in discussions of fundamentality. Schaffer (2009: 379) declared that 'metaphysics...is about what grounds what. It is about the structure of the world. It is about what is fundamental, and what derives from it.' 'Flat' approaches to metaphysics preoccupied with questions about what exist have been superseded by approaches concerned with fundamentality and grounding. Though the relationship between grounding and fundamentality is not a point of absolute consensus amongst grounding theorists, it is tempting for friends of grounding (as Schaffer does) to identify the fundamental with the ungrounded.² Any prior understanding we have of what it is for something to be fundamental (or derivative) can therefore help elucidate the notion of grounding.

A second notion closely related to grounding is that of explanation. As we have already seen, the logical and structural properties of grounding are generally taken to be shared with those of explanation. Furthermore, grounding is thought to be an explanatory relation. This could mean one of two things; either grounding *just is* a kind of (metaphysical) explanation, or grounding *backs* metaphysical explanations. Raven (2015: 326) calls friends of the former conception unionists (these include Dasgupta (2014); Fine (2012); Raven (2012); and Rosen (2010)), and friends of the latter conception separatists (separatists include Audi (2012); Koslicki (2012); Schaffer

² Reasons to resist such an identification can be found in Barnes (2012) who argues for a category of grounded fundamentalia.

(2012); and Trogon (2013)). I'll explore these two options in the next section, but for now we can note that either way, grounding is supposed to be closely enough connected to explanation that our understanding of explanation can help elucidate grounding, and that our explanatory intuitions are revealing when it comes to determining what grounds what (see e.g. Fine, 2012).

Finally, we can consider some paradigm examples of grounding. Take the following:

- (a) Singleton sets are grounded in their sole members
- (b) Disjunctions are grounded in their true disjuncts
- (c) The ball is red in virtue of it's being crimson
- (d) The action is morally right because the gods approve of it

As these examples demonstrate, grounding relations can be expressed using a number of different locutions. The relata of the grounding relation might be entities of various ontological categories, though many maintain that grounding relations obtain only between facts. It is common (following Fine, 2012: 50) to distinguish between full and partial grounding, such that x is a partial ground for y iff x , by itself or with some other entities, is a full ground for y . With this notion of grounding on the table, we can now turn our attention to a discussion of metaphysical explanation.

2. Metaphysical explanation and grounding

I mentioned by way of introduction that very little has been said about the notion of metaphysical explanation with which grounding is thought to be connected. I'll first give a brief overview of the positions of the unionists and the separatists, before explaining how accounts of metaphysical explanation might be derived from extant accounts of scientific explanation.

The notion of metaphysical explanation is first introduced in connection with grounding by Kit Fine, who says:

‘We take ground to be an explanatory relation: if the truth that P is grounded in other truths, then they account for its truth; P's being the case holds in virtue of the other truths' being the case. There are, of course, many other explanatory connections among truths. But the relation of ground is distinguished from them by being the tightest such connection....[i]t is the ultimate form of explanation.’ (2001: 15)

And then in later work that:

‘[T]here may be a distinctive kind of metaphysical explanation, in which explanans and explanandum are connected, not through

some sort of causal mechanism, but through some constitutive form of determination.’ (2012: 37)

‘[It] is properly implied by the statement of (metaphysical) ground...that there is no stricter or fuller account of that in virtue of which the explanandum holds. If there is a gap between the grounds and what is grounded, then it is not an explanatory gap.’ (2012: 39)

Fine thus subscribes to the unionist view of the relationship between ground and explanation, and thinks of metaphysical explanation as a peculiarly tight explanatory connection. Others appeal to examples to elucidate the relevant notion. Dasgupta (2014: 3) says that to metaphysically explain why a conference is occurring, one might try to ‘say what it is about the event that makes it count as a conference’ (perhaps that some people are giving talks, others are responding, asking questions, etc.). Since unionists think that ground and metaphysical explanation are the same notion, any devices used to clue us in to the notion of grounding (such as those discussed in §1 above) will be similarly taken to work for metaphysical explanation.

On the separatist view, grounding is not itself an explanatory relation, but metaphysical explanations track grounding relations. This is somewhat familiar from discussions about causation; just as causal explanations are information about portions of the causal network, so grounding explanations are information about portions of the grounding network. Thus, Schaffer (2012: 124) advises ‘one should distinguish the worldly relation of grounding from the metaphysical explanations between facts that it backs, just as one should distinguish the worldly relation of causation from the causal explanations between facts that it backs’, and Audi (2012a: 119-120) insists ‘grounding is not a form of explanation, even though it is intimately connected with explanation...[a]n explanation...is something you can literally know; a grounding relation is something you can merely know about’.

Whilst little has been said in the literature about *metaphysical* explanation, the philosophical literature on scientific explanation is extensive and varied. Two accounts of scientific explanation have been thought particularly relevant to discussions of metaphysical explanation: The Deductive-Nomological (DN) account introduced by Hempel (1965); and the causal account of explanation favoured by Salmon (1984) and Lewis (1986). I am not able here to offer much in the way of evaluation of these accounts, but I’ll briefly outline them and suggest some reasons to look for alternatives. My own view is derived from a different account of scientific explanation; that defended by van Fraassen (1980).

First, Hempel’s DN account holds explanations take the form of a sound deductive argument where at least one essential premise is a law. Wilsch (2016) has recently developed an account of metaphysical explanation modelled on Hempel’s DN

account, according to which a set of propositions $p_1 \dots p_n$ ground a further proposition q iff metaphysical laws determine q on the basis of $p_1 \dots p_n$. Determination is a matter of logical entailment, such that the metaphysical laws determine q on the basis of $p_1 \dots p_n$ just in case the laws and $p_1 \dots p_n$ logically entail q (Wilsch, 2016: 3). Wilsch is explicit that his account precludes thinking of metaphysical explanation as an epistemic phenomenon. Wilsch thinks of this as an advantage of his view, but I see it as a significant departure from our usual understanding of what we mean by the term ‘explanation’.

I contend that explanation is always an epistemic phenomenon. As Kim (1994: 54) remarks ‘the idea of explaining something is inseparable from the idea of making it intelligible; to seek an explanation of something is to seek to understand it, to render it intelligible’. Though it is rarely discussed, this commitment is present in the work of theorists like Hempel, Salmon and Lewis (as well as more explicitly in the work of theorists like van Fraassen and Kitcher). For Hempel, successful explanations require that we are able to deduce the explanandum from the explanans. In his words ‘the argument shows that, given the particular circumstances and the laws in question, the occurrence of the phenomenon *was to be expected*; and it is in this sense that the explanation enables us to *understand why* the phenomenon occurred’ (Hempel, 1965: 337, italics in original). Lewis (1986: 227-8) lays down a number of conditions on satisfactory explanation, all of which are pragmatic conditions. They include that a satisfactory explanation must be proportionate, sought-after, informative, and convincing.

I think that any account of explanation that fails to pay proper attention to these epistemic desiderata is importantly lacking, and since metaphysical explanation is, first and foremost, a form of explanation, there must be a sense in which we think of metaphysical explanation as an epistemic phenomenon. This is a reason to be suspicious of Wilsch’s account, but it is moreover a reason to be suspicious in general of unionist accounts of the connection between grounding and metaphysical explanation. Friends of grounding are united in their insistence that ground is *not* to be considered an epistemic phenomenon, and so unionists must explain how they are able to reconcile this with their claim that grounding is an explanatory relation (e.g. by denying, like Wilsch, that metaphysical explanation is sensitive to epistemic constraints).

Separatists here have an advantage in that they can maintain that metaphysical explanation is subject to epistemic and practical constraints whilst the grounding relations those explanations track are fully metaphysical. As noted above, the causal account of explanation can be fairly straightforwardly adapted to give an account of metaphysical explanation in the form favoured by separatists. Causal explanations are information about portions of the causal network (however the mechanism of

causation is to be further understood). Analogously, metaphysical explanations are information about the grounding network.

I think there are a number of problems with this view, some of which I will discuss in §5, and one which I'll mention here. It is not enough for the separatist to state that metaphysical explanations track grounding relations. They owe, in addition, an account of that tracking. It is perhaps natural for the friend of grounding to say that the relationship here is one of grounding (if y tracks x , then x grounds y). Such an account is at best uninformative, and at worst circular. Myriad propositions are grounded in the worldly states of affairs we might take to ground the metaphysical explanations, and certainly not all of them are themselves to be considered metaphysical explanations.

3. Questions and metaphysical explanation

Like van Fraassen (1980), I think that an explanation is an answer to a question. More precisely, on my view an explanation is the pair made up of the question and the answer (I'll often talk of the explanation as an answer to a question, but I'm taking the question itself to be playing a substantive role in comprising the explanation). This captures the idea that explanations are intimately related to understanding, but it also allows us to secure a measure of objectivity, so long as questions have determinate answers. This account of explanation takes seriously the phenomenology of seeking an explanation for something; we ask a question of ourselves or of somebody else, and we look for a satisfactory answer. Two important questions: (1) what determines which questions and answers count as explanations; and (2) what is characteristic of *metaphysical* explanation in particular?

Let's start with the second question first. Metaphysical explanations are answers to *what-makes-it-the-case-that*-questions. It follows from this characterisation of metaphysical explanation that the relata of metaphysical explanations are propositions; they are pairs of the topic of the question and the relevant answer. Answers to what-makes-it-the-case-that-questions are to be distinguished from answers to why-questions that will themselves provide different sorts of explanations. Asking what makes it the case that the window is broken demands an answer which has to do with the way in which the parts of the window are disconnected. Asking *why* the window is broken solicits a different kind of explanation (such as that a brick was thrown at it). Asking what makes it the case that Aria performed a wrong action requires an answer which has to do with the basis for morality (Aria caused somebody pain, or she acted contrary to the divine law), asking *why* she performed a wrong action demands an explanation like 'she was wronged first', or 'she didn't know it was wrong'.

What determines which answers are correct is a matter for whatever domain of discourse a given request for a metaphysical explanation arises in. In our first example,

it is a question for mereologists; in our second, a question for metaethicists. Satisfactory answers don't cite portions of a universal grounding network, but relations familiar from debates in the relevant domain of discourse. Because the relevant explanations are metaphysical and it is difficult to uncover metaphysical truths, we can expect disagreement between those who subscribe to different views. (This is no more surprising than when physicists disagree about what explains some new observation.)

Suppose we're looking for a metaphysical explanation of the fact that Aria did something wrong; we're looking for an answer to the question Q: 'what makes it the case that Aria did something wrong?'. Here are three candidate answers: (i) Aria acted contrary to the divinely prescribed moral law; (ii) According to the fiction of morality Aria did something wrong; (iii) Aria stole something, and stealing is wrong. Any of those answers, if true, would be a metaphysical explanation of Aria's wrongdoing, because it would be a reasonable, proportionate, intelligible answer to the relevant what-makes-it-the-case-that question. Suppose that divine command theory is true. We might then say that the *correct* explanation of Aria's wrongdoing is that she acted contrary to the divinely prescribed moral law. But propositions (ii) and (iii) are still explanatory, because they are satisfactory answers to the relevant question. They are to be contrasted with propositions like (iv) Aria likes dogs more than cats, and (v) Aria is 31 years old, which under no circumstances would count as explanatory answers to the relevant question.

So, we need some distinctions, and some terminology to go with them. False metaphysical theories can be explanatory when they constitute appropriate answers to what-makes-it-the-case-that-questions, and true theories can fail to be explanatory when they fail to constitute an appropriate answer (e.g. because they are overly complex). We'll return to the question of what constitutes an appropriate answer shortly. I'll call explanatory propositions that are appropriate answers to what-makes-it-the-case-that questions *candidate metaphysical explanations*. When theorists disagree about candidate metaphysical explanations, their disagreement is about which of these explanations is *correct*. It need not be built in to our account of metaphysical explanation that every relevant proposition has a unique correct metaphysical explanation for two reasons.

First, we might adopt a view whereby which explanation is correct is to be considered relativized to a theory. (Compare the way in which we might say that the correct explanation of light seeming to pass through just one slit in the two-split experiment has to do with the interaction of an external observer according to the Copenhagen interpretation of quantum mechanics, but that according to the many-worlds interpretation, the correct explanation has to do with decoherence.) Second, we might deny that explanations are to be relativized to a theory, but hold that two correct explanations might differ merely in their complexity.

Because this account of explanation is centred on questions, it is bound to be dependent on context. Explanations are responses to questions, and so what question is asked constrains which responses are appropriate. Van Fraassen's (1980, chapter 5) account of explanations as answers to why-questions takes questions to be context sensitive along three dimensions: the topic of the question; the contrast class; and the relevance relation. The same seems to be true of the questions involved in our theory of metaphysical explanation. The topic of the question is just the proposition involved in the question. To use van Fraassen's example (1980: 141), a question like 'why is this conductor warped?' will express a proposition about a particular conductor, as specified by the context. The same sort of context sensitivity might come in to play in the metaphysical case (e.g. 'what makes it the case that this action is wrong?'), although the relevant sorts of metaphysical questions are often specified highly enough that the topic of the question is apparent without taking this element of context in to consideration. In any case, this degree of context sensitivity in particular seems fairly uncontroversial.

The second dimension of context sensitivity van Fraassen identifies concerns the contrast class of alternatives to the topic of the question; a set of propositions that includes the topic. So, in our example 'what makes it the case the Aria did something wrong?', the topic is: Aria did something wrong, and the contrast class would be a set of propositions including: Aria did something right; Aria did something morally neutral. The contrast class focusses the question. Again, this should be considered fairly uncontroversial in the metaphysical case.

Here's an example. Let's assume that what makes it the case that the disjunctive proposition $P \vee Q$ is true is that P is true. A further question then is 'what makes it the case that the truth of P makes it the case that $P \vee Q$ is true?' And here we can distinguish two different questions by their contrast class. The first contrast class includes (i) the truth of Q makes it the case that $P \vee Q$ is true, and (ii) the truth of P and the truth of Q makes it the case that $P \vee Q$ is true. Answering that question draws us in to another part of our theory (Q is false, and we'll next want to know what makes that the case).

The second contrast class might include (i) the truth of P makes it the case that Q is true, (ii) the truth of P makes it the case that $Q \vee R$ is true, (iii) the truth of P makes it the case that $\sim Q$ is true, and so on. Candidate answers to *that* question cite facts about the nature of disjunction; it is the disjunction-introduction rule in classical logic which makes it the case that disjunctions are true iff they have at least one true disjunct.

The final consideration is explanatory relevance; what determines what will count as a possible explanatory factor; what sort of thing is being requested in an answer. A given proposition might be relevant or not to the topic with respect to the particular

contrast-class. Thus, to say that Aria acted contrary to the divinely prescribed moral law is relevant to question Q, when the contrast class is understood in the way specified above. If, however, the contrast class included Aria's performing no action at all, none of the answers suggested above would be relevant (instead, a relevant answer might be something like: Aria formed an intention and behaved in accordance with that intention).

In giving a theory of *metaphysical* explanation, context seems to play less of a role than it does in van Fraassen's account of scientific explanation. Imagine that we are both divine command theorists. If you ask Q above, and I respond with answer (i), there is a sense in which my answer is unsatisfying; divine command theory is a shared presupposition of ours, and so I don't give you any new information when I repeat it in response to your request for a metaphysical explanation. But there is something in the Finean idea that a metaphysical explanation is the tightest explanatory connection between truths. Unsatisfying or not, we both agree that it is indeed Aria's acting contrary to the divinely prescribed moral law that makes it the case that she did something wrong. Thus, (i) is the candidate metaphysical explanation that a divine command theorist should offer, notwithstanding any presuppositions shared with the questioner.

Answers to what-makes-it-the-case-that-questions are propositions that bear the relevance relation to the pair formed of the topic of the question and the contrast class. They tell us what makes it the case that Aria did something wrong, given the contrast class determined by the question, and constrained in accordance with relevance. An answer A (a candidate metaphysical explanation) claims that the topic of the question is true, that the other members of the contrast class are not, and that A bears the relevance relation to the pair made up of the topic and the contrast class (van Fraassen, 1980: 143).

Let's think again about our question Q, and propositions (i), (ii), and (iii). All three of these (though not (iv) and (v)) are relevant answers to the question, and all of them presuppose that the topic of the question is true, and that the contrast class is as specified as above. Therefore, each is a candidate metaphysical explanation. It's an important part of van Fraassen's evaluation of answers that a good answer to a relevant question raises the probability of the topic of the question rather than that of the contrast class. In cases of metaphysical explanation we will often be dealing with theories whereby some answer A is thought to *necessitate* the topic of the question (e.g. the probability that Aria did something wrong given that she acted contrary to the divine law is 1, according to the divine command theorist, but according to the moral fictionalist, the probability that Aria did something wrong given that she did something wrong according to the fiction of morality is also 1. We can't then appeal to Bayesian probability calculations in an evaluation of candidate metaphysical explanations. How,

in this metaphysical case, are we further to determine which of these candidate explanations is the ‘correct’ one?

Answers to that second question are not delivered in isolation. Proponents of the different theories responsible for delivering different answers to the relevant question will each take their candidate metaphysical explanation to be the correct one, because they each think that the answer they favour is part of the best theory of the world. Which *really is* the correct metaphysical explanation comes down to which (if any) of the relevant theories is in fact true. In this context, it is a question of which is the correct theory of metaethics.

To the extent that my proposed account of metaphysical explanation deflects questions about metaphysical explanation on to more finely distinguished domains of discourse, my view has something in common with that of Wilson (2014). Wilson claims that there are no ‘big-G’ Grounding relations, just ‘small-g’ relations like composition, constitution, identity, set membership, and so on. On my view, it is indeed facts about these small-g relations that account for the correctness of a given explanation, but there is more to be said. Metaphysical explanations constitute a category of explanation worth thinking and talking about. They are the sorts of explanations sought in metaphysical investigations, and they give voice to our intuitions about dependence. Metaphysical explanation is suited to characterising the structure of reality in a way that is impossible if all we have to work with are incommensurable small-g relations.

4. The structure of reality

Structure is about how things relate to one another; about how they fit together. Usually when people think about structure they think of something well-founded; structures are such that some things are supported by other things which themselves are the base or the foundation of the structure. The structure of justification according to an epistemic foundationalist serves as a good example; justification for most of our beliefs is inferred along linear chains from basic, self-justifying beliefs. But not everybody thinks that structures are well-founded. Consider the epistemic infinitist, who thinks that a belief is justified just in case there is an infinite chain of reasons for that belief. Or the coherentist, who thinks that beliefs are justified when they are part of a coherent network of mutually supporting beliefs. There is no *prima facie* ban on structures without foundations.

In the case of *metaphysical* structure, the drive towards foundationalism is particularly strong. Furnishing reality with its structure is a matter of ‘carving nature at the joints’, of discerning what are the right categories for describing the world, of discovering what reality is like, ‘at-bottom’, and of giving an account of how the fundamental

relates to the derivative. This is seen as a purely metaphysical enterprise. The structure of the world is out there to be discovered.

My preferred view departs from this standard conception in three ways. First, I don't think that we should assume that metaphysical structure is asymmetric and well-founded; second, I don't think we should think of structure as something out there in the world for us to discover; and third, I think we can make sense of the idea of structure in domains of discourse about which we are anti-relaist (I take these three claims to be related). In what follows I'll offer some defence of all three claims, but first I want to point out that only the second is essential to my main point, and even then that point turns out to be much less surprising than it might seem initially.

Let me develop the more conservative view first, according to which metaphysical structure is characterised in terms of metaphysical explanation on the theory of metaphysical explanation outlined above, and is consistent with a foundationalist conception of reality. Let's begin with the foundations. According to the foundationalist, reality's structure is built up from a basis that does not itself depend on anything further. These will be propositions for which there are no candidate answers to what-makes-it-the-case-that questions; the metaphysically brute facts.

These facts will then themselves figure in answers to what-makes-it-the-case-that questions featuring other propositions. Which questions are asked is, of course, contextually determined, but the answers to those questions nevertheless allow us to discern a hierarchical structure. Different accounts of this structure will be given by those who subscribe to different metaphysical theories, but there is no mystery here (it is exactly analogous to disagreements about what grounds what).

Anybody who has the intuition that metaphysical structure should be objective can maintain that there is a (unique) correct answer to every what-makes-it-the-case-that-question. Questions can be asked in different ways specifying different topics and different contrast classes, but veridical answers form a well-founded partial order. The only sense in which structure is non-objective is that contextually determined questions play an ineliminable role. What-makes-it-the-case-that questions have determinate answers, but metaphysical structure is characterised by metaphysical explanations themselves determined in part by the asking of the question. What exists before the question is asked (or without the question) are the myriad relations that obtain between facts and entities in different domains of discourse: supervenience relations set-forming relations; logical relations; mereological relations; determinate-determinable relations; identity; and so on.

I explained above how I take this view to differ from that of Wilson (2014): metaphysical explanations matter, in part because of the role they play in structuring reality. With that in mind, one might ask the following question: *how does this differ from the separatist view that metaphysical explanations are information about portions of a pre-existing*

network of relations? The first point to make is that on this view there are no grounding relations, and separatism is a thesis about grounding. On the view I develop here, answers to what-makes-it-the-case-that questions are to be found in the domain of discourse in which the topic of the relevant question falls. What unifies answers to questions with diverse topics is that they are all answers to the same kind of question; a what-makes-it-the-case-that question (and not that they all provide information about the same sort of relation). I'll outline the advantages this brings in §5.

The second point to emphasise is that we can't make sense of a unified account of metaphysical structure on this view, without the *asking of the relevant questions* (the answers are far too disparate to form any kind of structure without the regimentation gained from being part of a question-answer pair). Thus, though there might be unique, correct answers to the relevant questions, we can't make sense of metaphysical explanation in the absence of the asking of those questions. The way in which context helps to specify the relevant questions is therefore an ineliminable part of the theory of metaphysical explanation, as is the asking of the questions in the first place. This guarantees that explanation is a properly epistemic phenomenon, but also allows us to highlight that the notion with which structure is to be characterised itself (and not just an interpretation of information about its arrangement) is partially dependent on us.

To suggest that reality's structure is to be characterised by answers to what-makes-it-the-case-that questions is therefore a departure from the standard view that the structure of reality is determined independently of us. It is to suggest that there is at least an element of *projection* of structure on to reality, and this is a departure from the 'knee-jerk realism' about structure that pervades the contemporary discussion (see Sider, 2011). But it is not such a radical departure as it might at first have seemed. The questions asked constrain the way in which reality's structure is constituted, but those questions might nevertheless have determinate, correct answers.

One important upshot of the view I defend is that metaphysical structure cannot be itself fundamental. It is derivative, because it depends on (amongst other things) the questions we ask. I expect that some will balk at this idea that the structure of reality is itself derivative, though in fact (as I argue below) it is common amongst the main attempts to define a notion suited to characterising reality's structure to deny (or at least to fail to argue convincingly) that structural notions are fundamental.

4.1 Fundamentality

Considerations about whether notions used to characterise the structure of reality are themselves fundamental are not new.³ When we're thinking about fundamentality and reality's structure, we're thinking about what there is *at bottom* – what is most significant

³ See e.g. Bennett (2011); deRossett (2013; and Litland (forthcoming) on whether grounding is grounded; Sider (2011, section 7.13) and Schaffer (2014) on whether Sider's *structure* is structural; and Thompson (forthcoming) on whether Lewisian naturalness is natural.

– what it is that accounts for all the other things. For those who care about the fundamental and how it relates to the non-fundamental, it would be an unfortunate result if it turned out that the very notion with which they think the structure of reality is characterised were not itself amongst the fundamental notions. The worry is that if we think of the fundamental as the most important stuff and the notion with which we characterise reality’s structure isn’t amongst the fundamental notions, then it’s not clear why, by the lights of our own theory, we should think that the distinction we take the notion of fundamentality to carve out is an important one.

I’m going to consider two arguments against this idea in this section. The first is that there are good reasons to think that none of the best candidates for describing reality’s structure are to be considered fundamental by their own lights. The second is that it is not in fact a big worry if the notion we use to characterise the structure of reality is not amongst the fundamental notions. A third argument, which is that the idea that some things are fundamental is a dispensable part of the idea that reality has a structure (if nothing is fundamental, then it’s no surprise that the notion with which the structure of reality is to be characterised isn’t fundamental) can be inferred from remarks I make in §4.2.

First then, I’ll claim that each of the primary candidates for describing fundamentality does not itself come out as fundamental. This is a companions-in-guilt strategy; the account of fundamentality I’m defending here is no worse off with respect to the derivative nature of fundamentality than its rivals. Let’s start with David Lewis’ account of the *perfectly natural properties*. Lewis (1983) argues that an elite group of simple, non-arbitrary, non-gerrymandered properties (such as the properties of fundamental physics) carve nature at the joints. They are the properties that make for objective similarity and difference, act as reference magnets for our expressions, and figure in the laws of nature. These properties form a minimal supervenience base, such that all facts supervene on facts about the instantiation of the perfectly natural properties – ‘there are just enough of [the perfectly natural properties] to characterise things completely and without redundancy’ (Lewis, 1986: 60). The perfectly natural properties are the fundamental ones.

There are good reasons to think, however, that *perfect naturalness* is not itself a perfectly natural property. It is not a property of fundamental physics, it doesn’t make for objective similarity and difference (since that work is done by the perfectly natural properties themselves), it doesn’t figure in the laws of nature, and, most importantly, it isn’t amongst any set of things that characterise things completely and without redundancy, since things are completely characterised (according to naturalness theory)

in terms of the perfectly natural properties themselves.⁴ An account of fundamentality in terms of naturalness does not render fundamentality itself fundamental.

Sider's (2011) account of fundamentality builds on Lewis' naturalness theory. Sider's project pushes naturalness 'beyond the predicate', extending the idea that some bits of language are elite far enough to allow for joint-carving quantifiers, logical connectives, and set-theoretic notions. Sider posits a primitive 'structural' operator, which attaches to any bit of language that carves nature at the joints. For Sider then, the question of whether fundamentality is fundamental is a question of whether structure is structural; does Sider's notion of structure itself carve nature at the joints. Sider claims that the answer must be 'yes', for the reasons described above.

Schaffer (2014) argues in his review of Sider's book that there is a mismatch between Sider's notions of structure. The roles Sider identifies as being played by a notion of structure are roles for 'structural enough', and 'more structural than', whilst Sider's official primitive is 'perfectly structural'. This matters, because it looks as though what plays the important roles in metaphysics for Sider is not in fact the notion he claims must be fundamental, but a derivative notion of relative structure. Sider says himself that 'genuineness of explanation does not require *perfectly* structural notions' (2011: 141, italics his). So, a notion need not be fundamental to feature in a metaphysical explanation. Since Sider thinks that the point of an appeal to a notion of fundamentality is to enhance the explanatory power of our best theory, it looks as though the notion of fundamentality need not itself be fundamental on Sider's account.

Let's now turn to think about grounding. One might think that grounding theorists have the edge here, since grounding is thought to be a primitive notion; it is considered irreducible, not to be defined in any other terms. Presumably this is just like saying that grounding is a fundamental notion, and so if we describe fundamentality in terms of grounding, we have an account of fundamentality which is itself fundamental.

Unfortunately, this leads quickly to a serious problem, as a number of people have pointed out.⁵ It is plausible to suppose that fundamental facts involve only fundamental notions. The fundamental truths include all and only what we need to tell a complete story (see Sider 2011, section 7.2; deRosset 2013: 6-7 for a defence of this principle). This principle entails that connections between the fundamental and the derivative cannot themselves be fundamental; grounding facts must be derivative facts. The implausible alternative would be to say that all grounding facts are fundamental. If fundamental facts involve only fundamental notions, then every notion is fundamental, and we've lost the ability to describe reality as having a layered structure.

⁴ These arguments are spelled out in much greater detail in Thompson (forthcoming).

⁵ See e.g. Sider, (2011, section 7.2); Bennett (2011); DeRosset (2013).

A second problem is mentioned by Bennett (2011: 27), and she attributes it to Schaffer. The fundamental elements of the world should be open to free modal recombination; they're not themselves grounded, and so there is no constraint on how they fit together. But if *grounding* is fundamental (or facts about grounding are fundamental facts), then there is a possible world w^* which is just like ours with respect to all the other fundamental entities, but where nothing grounds anything else. Any actually grounded entity would, in w^* , either fail to exist, or be fundamental. Neither option is plausible – the first gives rise to a sort of 'extreme zombie world' (Bennett, 2011: 27 f.n. 7), and the second involves denying that entities have their fundamentality status necessarily.

Escaping these troubling consequences means denying the fundamentality of grounding. Neither grounding, nor naturalness, nor structure can reasonably maintain that the notion with which fundamentality is to be described is itself fundamental. Our proposal here that the structure of reality is to be described in terms of a derivative notion of metaphysical explanation should not be considered a problematic upshot of the account.

Here's the second argument for thinking it's not a problem if metaphysical explanation is not a fundamental notion. Sider (2011: 138) claims that a 'vivid test' for whether a given expression is fundamental is whether or not God would have to think in those terms when creating the world. And Sider admits that there is no reason to think that God should have to think in terms of fundamentality when creating – God needs to think in terms of the categories that do in fact carve at the joints (mass, spin, charge, and so on), but there is no need for God further to decree that these things are fundamental. Notwithstanding this observation, Sider insists that the applications of fundamentality would be undermined if fundamentality were not fundamental, and his reason for this has to do with the explanatory role of the fundamental.

Sider thinks that the explanatory power of our best theory is enhanced when we posit a category of *fundamental*ia; facts about fundamentality, and fundamental notions, are those that figure in explanations. When we want to explain why, for example, two apples are exactly similar, we won't be interested in the fact that they're both in my bag, or that neither of them has ever been to Germany, or that my brother doesn't want to eat either of them. Similarity has to do with the intrinsic properties of the apples: they both have mass m , they're both made up of n electrons, arranged to form shape s . If we want to explain what makes for similarity *in general*, we need to appeal to generalisations about similarity. The relevant generalisation is that objects are perfectly similar when they have the same perfectly natural properties (and that is a fact about fundamental reality).

Suppose for a moment that the category of *fundamental*ia (or of being a fundamental fact) were itself an arbitrary category (or that facts about fundamentality were not

themselves fundamental facts). Then, Sider thinks, our explanation would be much less good; why should we care about the sharing of perfectly natural properties, if there's nothing fundamental unifying that class of properties? But now the reason we should care seems obvious; it's because the sharing of those properties makes for similarity, and that's what we were after an explanation of. Our explanatory interests themselves are a good reason to think something important, whether or not it is also fundamental.

For these two reasons then, we need not be worried about the failure of our notion of metaphysical explanation to be among the *fundamentalia*. Other structuring notions are not fundamental by their own lights, and it is a mistake to think that they ought to be (especially when think of them as closely connected to explanation). In the next section I explain how characterising the structure of reality by appeal to metaphysical explanation is best suited to a non-foundationalist account of the structure of reality.

4.2 Well-foundedness

Above I describe an account of the structure of reality as characterised by metaphysical interdependence that it consistent with a foundationalist view whereby explanations only run in one direction, and some facts or entities are such that they are not explained by anything further. As I hinted above, I think that a different account of the structure of metaphysical explanation is better, because it better accords with our experience of having something explained to us, and better fits my preferred way of thinking about explanation.

On the foundationalist account of metaphysical explanation given above, answers to what-makes-it-the-case-that questions are constrained such that they must always be 'downward' looking; all candidate answers must themselves either be a metaphysically brute fact, or be related in a linear topic-answer chain such that the topic of the final question has no candidate answers (and so it itself a metaphysically brute fact).

I think we should think of metaphysical explanation as more like a web than a chain. Questions and answers are related in a complicated network of propositions, such that sometimes the topic of some question A might have an answer B which is itself the topic of a question for which A is an answer. Here's an example. What makes it the case that this object falls to the ground when I drop it? Which object we're talking about is determined by the context, as is the contrast class which might include (i) the object floats away, (ii) the object disappears, (iii) the object sticks to my hand. A good candidate metaphysical explanation is that objects always fall when dropped, or perhaps that it is a law of nature that objects fall to the ground when dropped. But now consider a question that takes that very law as its topic; what makes it the case that objects fall to the ground when dropped? On a view which takes laws to be generalisations of their instances (e.g. Lewis, 1986), a good candidate answer will

include the topic of our former question; *that* object falls to the ground when dropped.⁶

Nothing turns on this particular example. The idea is that because explanations depend on our interests, we might ask for an explanation of any given proposition in the network, and the relevant answers given our particular circumstances as determined by the context might be such that they include ‘upwards looking’ propositions; candidate metaphysical explanations that run contrary to the expected direction. Often explanations are complicated and multi-faceted, and a complete explanation involves propositions from various different parts of the network of questions and answers.

Once we move away from the foundationalist account, we are able to make sense of a holistic approach to metaphysical explanation. A complete metaphysical explanation of reality is a complex system arranged such that we can best understand it, where explanations build on each other and lend mutual support to one another. In some cases the apparently best explanation cites very general propositions, and in others the candidate explanations are much more fine-grained. But a comprehensive defence of this view is a project for another time. In the next sub-section, I explain how we might take domains of discourse about which we are anti-realist to exhibit structure.

4.3 Structure and anti-realism

It is usually assumed that metaphysical structure is a feature of mind-independent reality. This follows from the orthodox idea that structure is entirely independent of our linguistic and conceptual schemes. But we have already given up on that, maintaining instead that structure is in part constituted by the questions we ask. There is now to reason to think that metaphysical structure is only exhibited in the domains of discourse about which we are realist.⁷

Allowing that domains of discourse about which we are anti-realist exhibit metaphysical structure makes for a unified and comprehensive worldview. Reasons to be interested in structure in the first place (accounting for our intuitions about dependence, enabling us to give a certain kind of explanation, characterising the way in which things fit together) apply just as much in domains of discourse about which we are anti-realist as they do in domains of discourse about which we are realists. Here’s an easy example: we can make sense of metaphysically explaining propositions that are true within some fiction (what makes it the case that Harry Potter is a wizard is that Harry is a man able to perform magic), and so we ought to be able to make sense of,

⁶ There is a literature on whether accounts of laws as generalisations make for circular explanations in general (see Bird 2007: 86 for an expression of the worry; Loewer 2012 for a denial that there is any genuine circularity; Lange 2013 for a response, and Hicks and Elswyk 2015 for a reply).

⁷ Fine’s 2001 account of grounding seems to allow for grounding relations between non-factual propositions.

for example, a mathematical fictionalist explaining some mathematical facts in terms of others.

Anti-realist systems of explanation do not float free of realist ones. For example, the moral anti-realist might maintain that what makes it the case that Bruce did something wrong has to do with our disgust-related attitude to his action, or the mathematical fictionalist might say that what makes it the case that mathematical facts are assertable is that they convey propositions about what is true according to a fiction. What determines whether we seek an explanation within the fiction, or an explanation of the relation between the fiction and reality, is the question asked.

Here's the big picture again. The structure of reality is characterised by pairs of what-makes-it-the-case-that questions, and answers to those questions. Depending on the degree to which we want to adopt a kind of relativism about the structure of reality, we can think of those questions as having answers that are correct simpliciter, or correct relative to a given theory. The topic of the question, the contrast class of alternatives, and the relevance of candidate answers are all partially determined by the context in which the question is asked. On one way of thinking about things, questions and answers form a complex network, such that any part of the network might be the topic of a question, and any part of it might, under the right circumstances, be a satisfactory answer. On a different account, some questions have no candidate answers, and the topic of those questions are fundamental facts. The topics of those questions are answers to higher-level questions, but not vice versa. Orthogonal to the question about asymmetry and well-foundedness is the question whether we can make sense of metaphysical explanations in domains of discourse about which we are anti-realist. I think we can, but that's a dispensable part of the view.

5. Arguments for metaphysical explanation

Now that our account of metaphysical explanation is on the table, we are finally in a position to consider some arguments for the view that we are better off abandoning grounding-talk in favour of metaphysical explanation as described here. I'll discuss three such arguments.

5.1 Epistemology

Friends of grounding run in to difficulties when trying to give an account of our knowledge of what grounds what; of what the structure of reality is like. We have no way of perceiving the grounding relations directly, and since grounding is supposed to be a metaphysical primitive, we can't find out about what grounds what by identifying other, more perceptible relations. Usually, friends of grounding appeal to intuitions as a guide to ground, trying to clue us in to identifying those intuitions by citing paradigm examples of ground (see e.g. Fine, 2001; 2012; Schaffer, 2010; Trogon, 2013; Raven,

2015; Rosen, 2010). There is no doubt that the relevant intuitions are explanatory intuitions.

For the separatists, it isn't clear why explanatory intuitions should be taken so seriously when giving an account of the structure of reality. Metaphysical explanations are epistemically constrained information about the network of grounding relations, and so there is no reason to think that reflecting on our explanatory intuitions should allow us to give a veridical account of that network. The network of grounding relations is independent of us, it is primitive, and it is not open to manipulation to allow us to discover what it is like (unlike the causal network). Perhaps we have some special faculty that allows us to track the grounding relations (just as moral non-naturalists suggest we might have some special faculty for tracking the moral facts), but such a suggestion seems wildly implausible. Grounding is a semi-technical notion. It plays nothing like the role in our lives that morality plays, and strange intuitive faculties are on pretty shaky ground even in the moral case.

The friend of grounding might interject here to argue that we know about the network of grounding in part because of the logical properties of grounding, or its connections with notions of fundamentality and explanation, or its similarity to supervenience or logical necessitation. But the logical properties of ground are derived from those of explanation, and fundamentality is itself explicated in terms of grounding. Grounding might be a bit like supervenience and logical necessitation, but we need an epistemology specifically for ground, so we can justify our belief that grounding relations hold instead of or as well as those other relations.

For the unionists, things might seem a little easier. Explanatory intuitions are ways of knowing what grounds what because grounding is an explanatory relation. The worry is that this only works so long as grounding is thought to be a relation of metaphysical explanation which is epistemically constrained. There is no reason that we should expect our explanatory intuitions to be veridical if the relevant notion of explanation is divorced from what we understand about explanation. The situation then becomes much the same for the unionist as it is for the separatist; it isn't clear why we should think that intuitions about explanation (which are constrained by our explanatory interests) should be able to give us accurate and reliable information about a mind-independent grounding relation.

5.2 Hyperintensionality

Fine (1995: 272) argues that 'no modal characterisation of dependence could conceivably be correct'. Fine thinks that ontological dependence must be a hyperintensional notion, because we are able to make sense of dependence relations between necessary co-existents. His example concerns Socrates and {Socrates}; in all possible worlds in which Socrates exists, so does {Socrates}, and yet {Socrates} seems to depend on Socrates and not vice versa. Modal accounts of dependence are too

coarse-grained to respect this observation. Assuming (as I think is plausible) that discussions about reality's structure are discussions about ontological dependence, it follows that whatever notion we use to characterise the structure of reality must be a hyperintensional notion.

This intuition about the direction of dependence is (as Fine e.g. 2012: 38 readily accepts) an intuition about *explanatory* dependence. Explanatory notions are hyperintensional, but that hyperintensionality is located in the epistemic role of those notions; in the connection between explanation and understanding. You can't convince me that the planet Venus is visible by showing me the Morning Star, unless I also know that the Morning Star *is* the planet Venus. But you could of course convince somebody who knew the relevant identity in that way. If reality is structured through metaphysical explanations, then the structure of reality is hyperintensional because metaphysical explanation is hyperintensional.

If reality is structured through grounding relations, the unionist (who thinks that grounding is an explanatory relation) has an answer to the question of why grounding is to be considered hyperintensional. But she must explain how objective, mind-independent grounding relations could exhibit this epistemic feature of explanations. The separatist is in even more trouble, because hyperintensionality looks like exactly the kind of feature we should lump with the rest of the explanatory information about grounding. There is no reason to think that the grounding relation *itself* is hyperintensional.

The friend of grounding might retort at this point that the reason to think grounding is hyperintensional is precisely because we need a hyperintensional notion to characterise dependence between necessary co-existents. But why think that there is any such dependence? Grounding relations are thought to obtain between entities such as water and H₂O (see Rosen, 2010: 123-4), and between determinates and determinables like red and crimson (see Rosen 2010: 129; Audi 2012: 109). In these cases, it is hard to understand how there could be any purely *metaphysical* dependence between water and H₂O, and between being crimson and being red, because water *just is* H₂O, and to be crimson *just is* (a way of) being red. Physicalist philosophers of mind might say that mental facts are grounded in physical facts. They maintain that, metaphysically speaking, the mental facts *just* are physical facts, but the epistemic gap between the two has generated a vast literature. These cases bring out intuitions about explanatory dependence that should be distinguished from the facts about what is going on at a metaphysical level.

The point generalises. Socrates and {Socrates} cannot be separated modally; whenever we have Socrates, we have {Socrates} too. Given that we can account for the apparent hyperintensional dependence between the two in explanatory terms, it is a leap of faith to assume further that some hyperintensional dependence relation obtains

between Socrates and {Socrates}. At the very least, the friend of grounding has work to do to explain the source of the hyperintensionality of grounding in a way that doesn't depend on facts or intuitions about explanation.

Here's a different way to put the point. The friend of grounding says that grounding must be hyperintensional because it is the notion with which we characterise explanatory dependence. The structure of reality is characterised in terms of grounding, and so the structure of reality has something to do with explanatory dependence. So structure has something intimately to do with explanation. The friend of grounding needs to explain these various connections. The friend of metaphysical explanation can say exactly what structure has to do with explanation; structure is characterised in terms of explanation. That view is simpler, less objectionable, and makes fewer assumptions than the view that goes via grounding.

5.3 Parsimony

There are a number of respects in which the view described here is more parsimonious than the alternative grounding account. First, friends of grounding don't deny that there is any such notion as metaphysical explanation. Metaphysical explanation plays an essential (though generally underdeveloped) role in their theory, because the connection between grounding and explanation is taken to justify our appeal to explanatory intuitions to justify grounding claims, to help elucidate the notion of ground and to pin-point its general features, and to resist scepticism about ground by highlighting our need for such a notion (see e.g. Audi, 2012, who argues that grounding relations are required to back non-causal explanations). A theory that dispenses either with the notion of ground or with that of metaphysical explanation is more parsimonious than a theory that countenances both notions, and so if we can give a complete account of metaphysical structure by appealing to just one of those notions, so much the better. Metaphysical explanation plays an indispensable role by all accounts, but I have argued here that the role of grounding is dispensable.

Relatedly, friends of grounding don't claim that once we recognise a role for grounding, we no longer need to allow for what Wilson would call the 'small-g' grounding relations (truthmaking, set-membership, identity, composition, logical relations, the determinate-determinable connection, and so on). Friends of grounding don't deny that Socrates and {Socrates} enter in to the set-membership relation, or that the table and its mereological parts enter in to the composition relation, even though they maintain that grounding relations obtain between these pairs of entities. Again, it seems as though an account that allows both for (big-G) grounding and for these other relations is less parsimonious than one that dispenses with grounding.

The friend of grounding might object at this point that the relata of the relevant relations are different; the set-membership relation obtains between Socrates and {Socrates}, but that the grounding relation obtains between the *fact* that {Socrates}

exists and the *fact* that Socrates exists. Perhaps, but friends of grounding don't say that the fact that [*Socrates* exists is grounded in Socrates exists] is itself grounded in the fact that Socrates is the sole member of {Socrates}. The role of the set-membership relation is seemingly rendered superfluous by the appeal to grounding. That this is an unpalatable consequence is evident from the way in which friends of grounding don't deny that the set-membership relation obtains.

Perhaps at this point the friend of grounding can point to the way in which the positing of grounding unifies these disparate relations. That is undoubtedly an advantage of grounding talk (it allows for simplification and systemisation of metaphysical theories, and enables us to talk about metaphysical structure), but the advantage seems at least weakened by the fact that talk of grounding does not replace, but merely supplements the positing of those other relations. Here's why talk of metaphysical explanation (as described here) does a better job. Our theory has a clear account of the role of the 'small-g' grounding relations; they figure in answers to the relevant what-makes-it-the-case-that questions. They play an important role, and there is no worry about superfluity. But talk of metaphysical explanation also gives us the unifying advantage we recognised for grounding talk.

6. Concluding remarks

I have argued for an account of metaphysical explanation as answers to what-makes-it-the-case-that questions, and that this account of metaphysical explanation is all we need to characterise the structure of reality. This account respects the sense in which explanation is related to understanding, but nevertheless allows us to give a reasonably robust account of reality's structure. The account is more flexible than other accounts of reality's structure because it allows that structure might be non-well-founded, and it might obtain between propositions that we do not take to be part of metaphysical reality. It accounts for our explanatory intuitions about structure, and makes for a unified and parsimonious view.

Bibliography

- Audi, P. (2012a). A Clarification and Defense of the Notion of Ground. In B. Schnieder, & F. Correia, *Metaphysical Grounding: Understanding the Structure of Reality* (pp. 101-121). Cambridge: Cambridge University Press.
- Audi, P. (2012b). Grounding: Toward a Theory of the In-Virtue-Of Relation. *Journal of Philosophy*, 109, 685-711.
- Barnes, E. (2012). Emergence and Fundamentality. *Mind*, 121(484), 873-901.
- Bennett, K. (2011). By Our Bootstraps. *Philosophical Perspectives*, 25, 27-41.

- Bird, A. (2007). *Natures's Metaphysics: Laws and Properties*. Oxford: Oxford University Press.
- Chalmers, D. (2012). *Constructing the World*. Oxford: Oxford University Press.
- Dasgupta, S. (2014). On the Plurality of Grounds. *Philosopher's Imprint*, 14, 1-28.
- deRosset, L. (2013). Grounding Explanations. *Philosophers' Imprint*, 13, 1-26.
- Fine, K. (1995). Ontological Dependence. *Proceedings of the Aristotelian Society*, 95, 269-290.
- Fine, K. (2001). The Question of Realism. *Philosopher's Imprint*, 1-30.
- Fine, K. (2012). A Guide to Ground. In B. Schnieder, & F. Correia, *Metaphysical Grounding: Understanding the Structure of Reality* (pp. 37-80). Cambridge: Cambridge University Press.
- Hempel, C. (1965). *Aspects of Scientific Explanation and Other Essays in Philosophy of Science*. New York: Free Press.
- Hicks, M., & van Elswyk, P. (2015). Humean Laws and Circular Explanation. *Philosophical Studies*, 142, 433-443.
- Kim, J. (1994). Explanatory Knowledge and Metaphysical Dependence. *Philosophical Issues*, 5, 51-69.
- Koslicki, K. (2012). Varieties of Dependence. In Correia, Fabrice, & B. Schnieder, *Metaphysical Grounding: Understanding the Structure of Reality* (pp. 186-213). Cambridge: Cambridge University Press.
- Lange, M. (2013). Grounding, Scientific Explanation and Humean Laws. *Philosophical Studies*, 164(1), 255-261.
- Lewis, D. (1983). New Work for a Theory of Universals. *Australasian Journal of Philosophy*, 61(4), 343-377.
- Lewis, D. (1984). Putnam's Paradox. *Australasian Journal of Philosophy*, 61(3), 221-236.
- Lewis, D. (1986). Causal Explanation. In D. Lewis, *Philosophical Papers Volume II*. Oxford: Oxford University Press.
- Lewis, D. (1986). *On The Plurality of Worlds*. Oxford: Blackwell.
- Litland, J. (forthcoming). Grounding Grounding. In *Oxford Studies in Metaphysics*. Oxford: Oxford University Press.
- Loewer, B. (2012). Two Accounts of Laws and Time. *Philosophical Studies*, 160(1), 115-137.
- Raven, M. (2012). In Defence of Ground. *Australasian Journal of Philosophy*, 90, 687-701.
- Raven, M. (2015). Ground. *Philosophy Compass*, 10(5), 322-333.
- Rosen, G. (2010). Metaphysical dependence: Grounding and reduction. In B. Hale, & A. Hoffman, *Modality: Metaphysics, Logic, and Epistemology* (pp. 109-136). Oxford: Oxford University Press.
- Salmon, W. (1984). *Scientific Explanation and the Causal Structure of the World*. Princeton: Princeton University Press.

- Schaffer, J. (2009). On What Grounds What. In D. Chalmers, D. Manley, & R. Wasserman, *Metametaphysics: New Essays on the Foundations of Ontology* (pp. 347-383). Oxford: Oxford University Press.
- Schaffer, J. (2012). Grounding, Transitivity, and Contrastivity. In F. Correia, & B. Schnieder, *Metaphysical Grounding: Understanding the Structure of Reality* (pp. 122-138). Cambridge: Cambridge University Press.
- Schaffer, J. (2014). Review of Sider's *Writing the Book of the World*. *Philosophical Review*, 123, 125-9.
- Schaffer, J. (forthcoming). Grounding in the Image of Causation. *Philosophical Studies*.
- Sider, T. (2011). *Writing the Book of the World*. Oxford: Oxford University Press.
- Thompson, N. (forthcoming). Is Naturalness Natural? *American Philosophical Quarterly*.
- Trogdon, K. (2013a). An Introduction to Grounding. In M. Hoeltje, B. Schnieder, & A. Steinberg, *Varieties of Dependence* (pp. 97-122). Munich: Philosophia Verlag.
- van Fraassen, B. (1980). *The Scientific Image*. Oxford: Oxford University Press.
- Wilch, T. (2016). The Deductive-Nomological Account of Metaphysical Explanation. *Australasian Journal of Philosophy*.
- Wilson, J. (2014). No Work for a Theory of Grounding. *Inquiry*, 57(5-6), 1-45.