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ABSTRACT
There is a tension in our theorizing about laws of nature: our practice of using and reasoning with laws of nature suggests that laws are universal generalizations, but if laws are universal generalizations then we face the *problem of explanatory circularity*. In this paper I elucidate this tension and show how it motivates a view of laws that I call *Minimal Anti-Humeanism*. This view says that the laws are the universal generalizations that are not grounded in their instances. I argue that this view has a variety of advantages that could make it attractive to people with both Humean and anti-Humean inclinations.

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1. Introduction

There is, I will argue, an important tension in our theorizing about laws of nature. We have powerful reasons to think that laws are propositions, stemming from our practice of using and reasoning with laws of nature. But the *problem of explanatory circularity* suggests that laws cannot be propositions. The aim of this paper is to elucidate this tension and then to show how a very natural way of avoiding it results in a very attractive, but underappreciated, view of scientific laws—a view that I call *Minimal Anti-Humeanism*.

In sections 2 and 3 I develop this tension. In section 4 I develop Minimal Anti-Humeanism, noting how it avoids the tension and that it has other advantages. In section 5 I locate the view in terms of the traditional Humean/anti-Humean debate about laws.

2. Explanatory Circularity

The *problem of explanatory circularity* seems to give us a good reason to think that laws of nature cannot be propositions. Assume, for *reductio*, that laws of nature are propositions. Further, let's assume that if laws are propositions then they are a particular type of proposition—they are universal generalizations.[1]

[1] Perhaps there could be some laws that are propositions but are not universal generalizations. Perhaps some aspects of the boundary or initial conditions of the universe count as laws—for example, the Past Hypothesis defended by Albert [2000] and Loewer [2012]. But, it won't be the case that *all* laws are like this. If laws are propositions, then *some* of them will be universal generalizations. This is enough for the tension to develop. So, for simplicity, I'm going to assume that if laws are propositions then they are universal generalizations.

It has commonly been argued that taking laws to be universal generalizations leads to explanatory circularity, or to some similar explanatory badness. Here is Armstrong making the point [1983: 40]:

> Suppose, however, that laws are mere regularities. We are then trying to explain the fact that all observed Fs are Gs by appealing to the hypothesis that all Fs are Gs. Could this hypothesis serve as an explanation? It does not seem that it could. That all Fs are Gs is a complex state of affairs which is in part constituted by the fact that all observed Fs are Gs. 'All Fs are Gs' can even be rewritten as 'All observed Fs are Gs and all unobserved Fs are Gs'. As a result trying to explain why all observed Fs are Gs by postulating that all Fs are Gs is a case of trying to explain something by appealing to a state of affairs part of which is the thing to be explained.

Armstrong uses the terminology of 'states of affairs', but the point applies equally when using the terminology of propositions. Laws can explain their instances. But if a law is just a universal generalization then the law is *constituted* (at least in part) by the instances. And if the law is constituted by the instances then it can't explain them. Maudlin [2007: 172] makes a very similar point using the 'in virtue of' locution—if the generalization holds in virtue of the instances then it looks like it cannot explain the instances.

Constitute and *in virtue of* are similar locutions. Both express the idea that there is an extremely close relation between the generalization and its instances. What's more, this relation is asymmetric: if A constitutes B then B cannot constitute A; similarly with the 'in virtue of' relation. And we seem to be able to answer some 'why questions' by appealing to both relations. 'Why does B hold?' 'Because A holds and A constitutes B'. 'Why is B true?' 'B is true in virtue of A'.

It seems, then, that the talk of both 'constitution' and 'in virtue of' relations is getting at the idea that there is an explanatory connection between the generalization and the instances. In effect, Armstrong and Maudlin suggest that instances explain universal generalizations. But laws explain their instances. So, it looks as though if we say that laws are universal generalizations we are faced with explanatory circularity.

This problem is usually raised in the context of criticizing Humean accounts of law—that is, accounts saying that the facts about the laws are reducible to (or supervene on) the occurrent facts (or some subset thereof).[2] But it applies just as well to non-Humean accounts that say that laws are generalizations. Take, for example, a view saying that laws are generalizations but what makes those particular generalizations laws is the existence of certain primitive nomic entities. This is clearly an anti-Humean view—there are facts about the laws that are not reducible to (nor do they supervene on) the occurrent facts—but it does face this problem.

This problem strongly suggests that laws cannot be generalizations. But there is a response that has been gaining in popularity recently, stemming from a suggestion by Loewer [2012: 130–2]. This response involves distinguishing between two types of explanation. The idea is that the circularity does not arise if the way in which the instances explain the generalization is different from the way in which the laws explain the instances. Loewer claims that the laws are *metaphysically explained by*, but nevertheless *scientifically explain*, their instances.

[2] There is more discussion of exactly how to formulate Humeanism in section 4. But characterizing Humeanism as the view that facts about laws reduce to the occurrent facts will do for now.

Metaphysical explanation has some distinctive features. It is very closely connected to metaphysical dependence relations, like *grounding* or *constitution*. The explanandum in a metaphysical explanation is *nothing over and above* the explanans. Further, as Loewer [2012: 131] notes, the explanans and explananda of metaphysical explanations are co-temporal (if the relevant entities are temporal) and the relation cannot be probabilistic.

Loewer's strategy is to say that the instances of the generalization explain the law in this metaphysical way. This differs from the scientific explanation that the law gives of its instances. Scientific explanation is a different type of relation—one captured by accounts of covering law explanation, like the Deductive–Nomological model and its variants. Scientific explanation does not always link entities that are co-temporal: it can be probabilistic, and it does not generally back 'nothing over and above' claims.

I'm not going to discuss the nature of scientific explanation in more detail here. There is a large literature on scientific explanations and particularly on how laws explain, which is the type of explanation that is relevant here. The key point is just that scientific and metaphysical explanation are substantially different relations. (And indeed Loewer—and the authors who follow and discuss his strategy, such as Miller [2015] and Hicks and Van Elswyk [2015]—do not discuss the nature of scientific explanation at length.)

There is something clearly right about this response. The way in which the instances explain the generalization does seem to be via grounding or some other type of metaphysical dependence relation. And that does seem to differ from the way in which the laws are supposed to explain the instances. But it's not clear that this solves the problem. It is further required that we cannot chain together the metaphysical explanation of the generalization from the instances with a scientific explanation of an instance from the generalization to form a larger scientific explanation. If we could, then this would leave us with a scientific explanation of an instance from a set of instances including itself—clearly no progress over the initial circularity problem that we faced.

Furthermore, we have to deny this particular instance of chaining, while accepting that in many cases *we can* chain together scientific and metaphysical explanations to form larger scientific explanations. For example, we can chain together (i) a scientific explanation of the facts about the energy of the particles in this room from facts about those particles ten minutes ago, with (ii) a metaphysical explanation of the fact about the current temperature of the room in terms of facts about the energy of the particles in the room, to form (iii) a larger scientific explanation of the fact about the temperature in this room from the facts about the particles ten minutes ago.

This seems like a difficult task. Miller [2015] and Hicks and Van Elswyk [2015] provide reasons to think that we cannot always chain together metaphysical and scientific explanations.[3] But they do not give an account of how and why this chaining can occur in some cases but not in the cases that would cause problems for this response to the circularity worry. Perhaps it can be done successfully; in which case, the explanatory

[3] That is, they give reasons to deny the 'Transitivity Condition' of Lange [2013], which says you can always chain metaphysical and scientific explanations to form a larger scientific explanation.

circularity problem would not give us reason to think that laws are not generalizations. But in the absence of such a convincing response we have good reason to think that laws cannot be generalizations.[4]

3. Laws as Propositions

The explanatory circularity problem gives us a good reason to think that laws are not propositions. But there are other considerations that give us powerful reasons to think that laws are propositions. Before we discuss those, though, notice that the view that laws are propositions is philosophically very common. For a long time, laws were assumed to be universal generalizations, and the central philosophical issue about laws was taken to be that of how to separate the laws from the other universal generalizations (see, amongst many others, Goodman [1955], Popper [1959], and Hempel [1965]). This is baldly assumed less often now, perhaps due to the influence of Armstrong [1983]: he claimed that a law is not a generalization; rather, it consists of a relation of necessitation holding between universals. But even Dretske, whose view of laws shared so much with Armstrong's, asserted that 'a law is the proposition expressed, not the vehicle we use to express it' [1977: 255], simply assuming that laws are propositions, only taking care to distinguish this from the view that laws are sentences.

The main reason that we have for believing that laws are propositions, however, is that it is powerfully suggested by our practice of talking and reasoning about laws. When scientists attempt to state laws, it looks like they state propositions. $F = ma$ was a candidate law of nature—it seems to have the form of a universal generalization (with the quantifiers suppressed). Similarly, Schrödinger's equation looks like a generalization. We seem to refer to these laws in exactly the same way that we refer to other propositions. If we open a quantum mechanics textbook, the statement of Schrödinger's equation looks just like the statement of many other equations. The difference is that Schrödinger's equation might be highlighted as particularly important or as playing special role in predicting or explaining other facts. Otherwise, we talk about Schrödinger's equation in the same way as we do other equations.

Furthermore, we seem to be able to sensibly ask of propositions whether or not they are laws. We can sensibly ask whether it is a law that all ravens are black. Similarly, 'it is a law that' seems to be a propositional operator, just like 'it is true that' does. In fact, it is often said that it is a condition on laws that they have to be true (for example, Carroll [1994: 22–3]). And if laws are true then it seems like they have to be propositions (or perhaps sentences; but the view that laws are sentences is a non-starter).

Even further, we can reformulate laws via logical transformation in a way that makes them seem like propositions. Two statements of law that are obviously logically equivalent pick out the same law, just as two such statements would also pick out the same proposition. The law that $F = ma$ is the same as the law that $F/m = a$, and similarly with the propositions $F = ma$ and $F/m = a$. We might think that some logical equivalencies don't pick out the same law. For example, the law that $F = ma$ is not the same

[4] In my manuscript 'Nomothetic Explanation and Humeanism about Laws of Nature' I give an account—of when chaining can occur—with which we can avoid the circularity problem. Ultimately, I favour a Humean view based on this account, not the anti-Humean view developed in this paper. However, the view of that paper does incur some controversial commitments, in particular, the explanatory value of *unification*. In this paper I develop an attractive view that does not rely on such commitments.

as the law that F = *m*a and 2+2 = 4. But, to the extent that we think this, we likely also think that the proposition F = *m*a is not the same as the proposition F = *m*a and 2+2 = 4. So, the 'grain' of laws seems to match the grain of propositions. (However, because these issues of equivalency between laws and between propositions are both highly controversial, we shouldn't rest too much weight on this.)

So, the way in which we talk about laws seems to heavily suggest that they are propositions. Of course, the denier of the claim that laws are propositions has options in response to these observations. The most attractive one is to claim that, although laws are not propositions, there is a very close relation between laws, whatever they are, and corresponding propositions. All of the talk that suggests that laws are propositions would be interpreted as strictly false but, in light of this close relation between laws and propositions, as not especially misleading in most contexts.

I find rather unattractive the idea that we should interpret this mass of talk about laws as strictly false. But, ignoring this, the bigger issue is about what, exactly, this relation is between laws and the corresponding propositions. It is not clear what this relation between laws and propositions is that is so tight that it fools people into thinking that the law *just is* the proposition. This is not a new issue. It is very close to the classic *inference problem* for accounts of laws [van Fraassen 1989: 38–9]. Whatever a law is, if it is the law that F = *m*a then it must be that the holding of the law implies, or necessitates, F = *m*a. But, for many views of laws, it is not clear how this works.

In a famous passage [1983: 366], Lewis expresses this as a problem for Armstrong's account of laws as the holding of a necessitation relation N between universals—for example, the universals F and G (so that N(F,G) expresses the holding of the necessitation relation between F and G):

> Whatever N may be, I cannot see how it could be absolutely impossible to have N(F,G) and Fa without Ga … The mystery is somewhat hidden by Armstrong's terminology. He uses 'necessitates' as a name for the lawmaking universal N; and who would be surprised to hear that if F 'necessitates' G and a has F, then a must have G? But I say that N deserves the name of 'necessitation' only if, somehow, it really can enter into the requisite necessary connections. It can't enter into them just by bearing a name, any more than one can have mighty biceps just by being called 'Armstrong'.

The worry is that it is hard to see what the relation is between N(F,G) and *all Fs are Gs*. N(F,G) is supposed to be the law that all Fs are Gs. But, for this to be true, it must be that N(F,G) necessitates *all Fs are Gs*. And, more generally, the relation between N(F,G) and *all Fs are Gs* must be so tight that people are fooled into thinking that the law is the generalization *all Fs are Gs*, rather than the holding of the necessitation relation N(F,G). But Lewis's criticism is that Armstrong doesn't look like he has a substantive account of this relation.

Similarly, consider Maudlin's [2007] primitivist view of laws. He takes laws to be a novel and irreducible addition to the ontology. Analogous worries can be raised here. It's not clear exactly how such an entity guarantees the truth of a corresponding generalization. And, further, it's hard to see how this entity comes to be so closely connected with a particular generalization that people think that the generalization *just is* the law.

These worries disappear, though, if we accept that the law *just is* the generalization—the connection between the law and the corresponding proposition is one of identity. This is not to say that these worries can't be dealt with in some other way. Plausibly, there are other substantive stories that could be told about the connection between laws and corresponding propositions and other ways of responding to the inference

problem. But it looks like the view that laws are propositions has a significant advantage here. First, it fits with the way in which we use and talk about laws; second, it makes sense of the connection between laws and the corresponding propositions.

These considerations, therefore, suggest that laws are propositions. They are not conclusive, but an account that says that laws are propositions looks attractive.

4. Minimal Anti-Humeanism

The explanatory circularity problem suggests that there is some space between the laws and the corresponding propositions—the laws aren't just the propositions. But this looks to be in tension with our practice and it lands us with the inference problem of giving a story about the connection between the laws and the propositions.

Looking at this tension and how to resolve it suggests a certain view—a view that I call *Minimal Anti-Humeanism*. I make no claims that this view is the only way of resolving this tension, but it is a rather attractive one. Here's the first step in building the view. Our practice of using and referring to laws suggests that laws are propositions. So let's just accept this. Laws are propositions. And, in particular, they are generalizations. If Newtonian mechanics were true then the proposition that $F = ma$ would be a law. And if quantum mechanics is true then Schrödinger's equation is a law.

But saying that laws are generalizations leads to the explanatory circularity problem. Given that laws explain their instances, circularity arises since the instances explain the laws. The key premise here is that generalizations like $F = ma$ are metaphysically explained by, or grounded in, their instances.[5] A natural, and simple, way to respond to this problem is just to deny this—to deny that all generalizations are grounded in their instances. Laws, on this account, are not grounded in their instances. This naturally suggests a view about the nature of laws: laws are the universal generalizations that are not grounded in their instances. (This view is in the spirit of the 'Contrarian Humean' view discussed by Miller [2015] and the view discussed towards the end of section 4 of Marshall [forthcoming]. However, both Miller and Marshall take those views to be versions of Humeanism about laws. I take the view to be anti-Humean, although classifying the view is a little complicated, as I'll discuss later.)

If universal generalizations that are laws are not grounded in their instances, in what are they grounded? One option is that they are grounded in some occurrent facts but not their instances. For example, if it is a law that all Fs are Gs the generalization *all Fs are Gs* could be grounded in instantiations of other properties, like Js being Ks. This is clearly an implausible view. It is possible that all Fs are Gs could be grounded in its instances *and* some other occurrent facts. But this isn't enough: in saying that universal generalizations are laws that are not grounded in their instances, I mean to rule out cases where laws are partially grounded in their instances. And it is hard to see how a universal generalization could be grounded in the set of occurrent facts that excludes their instances.

Another possibility is that those universal generalizations are grounded in some nomic or dispositional entity. For example, perhaps the holding of an Armstrongian necessitation relation N(F,G) could ground the generalization *all Fs are Gs*

[5] To avoid using the rather cumbersome term 'metaphysical explanation', from now on I'm just going to use the terminology of 'grounding'.

but nevertheless the law is the generalization, not the holding of the necessitation relation. Or, alternatively, the generalization could be a law because it is grounded not in its instances but instead in dispositional properties of the kind discussed by Bird [2007].[6] These options are perfectly reasonable, if a convincing story about the necessitation relation or dispositional properties can be told. But I want to avoid the tension in the most direct way possible, without postulating controversial additions to the ontology.

Rather, my view says that the fundamental laws are universal generalizations that are *ungrounded*. The views gestured at in the last paragraph can be though of as variants of Arnstrongian necessitism or Birdian dispositionalism. In a similar way, my view is best thought of as a kind of *primitivism* about laws. On my account, laws are not reduced to anything else, but they are not taken as *sui generis* entities like Maudlin's version of primitivism—they are just propositions. My view is naturally thought of, then, as a kind of primitivism, but one that is ontologically parsimonious.

It is in this sense that the view is a *minimal* anti-Humeanism. Typical anti-Humean views take laws not to be grounded in their instances. But the way in which they do that is by adding new basic ontology. For example, Armstrong, in taking a law to be the holding of a necessitation relation between universals, and Maudlin, in taking a law to be a primitive *sui generis* entity, take laws not to be grounded in their instances.

My account takes laws not to be grounded in their instances, but it does not add new ontology. The ontology consists solely of propositions and grounding relations between them. We read the laws off the grounding structure of the world: some of the propositions—the universal generalizations that are not grounded in their instances—count as laws. My view, then, avoids the substantial ontological commitments of traditional anti-Humeanism.

Of course, since my view is a primitivist view it inherits some of the features of primitivism more generally. In particular, it postulates a certain brute unanalyzed structure to the world. Maudlin's version postulated *sui generis* entities; mine postulates a certain grounding structure as baked into the world.[7] Some people, of course, are dissatisfied with the way that primitivism postulates brute entities. They will likely feel similarly towards my view. This is true even though my view does not postulate a new type of entity (given that we are already committed to the grounding relation, or to some other metaphysical explanation relation); rather, it postulates a certain structure to the instantiation of this relation.

My account says that there are laws that are ungrounded universal generalizations. However, it seems like there are some laws that are not ungrounded. In particular, some laws count as laws because they follow from other laws. Call these the non-fundamental laws. My account can perfectly well allow for this because such non-fundamental laws are also not grounded in their instances; rather, they are grounded in the fundamental laws.

So, my account says that laws are generalizations that are not grounded in their instances. The fundamental laws are ungrounded generalizations. The non-

[6] Many thanks to a referee for suggesting possibilities of this kind.

[7] There is a technical question of what grounds grounding facts. I'm going to ignore this question here; but, no matter how the question is answered, we shouldn't expect this to be a reductive account of what makes the grounding structure what it is.

fundamental laws are grounded in the fundamental laws. Ultimately, then, it is the grounding structure of the world that fixes the laws.

This view has a variety of attractive features. But, just before discussing those, I want to note that there are a couple of variations of the view. My view says that laws are not grounded in their instances. But, then, what is the relationship between the laws and those instances? We know that the laws have to explain their instances—this is a platitude about laws. But what type of explanation is this? One option is that the laws ground, or metaphysically explain, their instances. The other is that the laws merely scientifically explain their instances, in the same kind of way that, on Loewer's suggestion, laws explain.

On the first version of the view, there is a substantial metaphysical dependence relation between the laws and the instances. It's natural, therefore, to say that this is a sense in which laws *govern* their instances. It's not totally clear exactly what governing comes to: detailed discussions of the nature of governing are rare, even though references to governing are extremely common in discussions of laws. But governing is supposed to be some kind of metaphysical production relation that the laws have to instances—the grounding connection between laws and instances looks suitable for this. We can reasonably, then, call this the 'governing variant' of the view.

The second version of the view has no such metaphysical dependence between the laws and the instances. Rather, the laws scientifically explain the instances. This is plausibly called the 'non-governing' variant. Different people might well be attracted to each of these different variants of the view, depending on their antecedent views about whether or not laws are required to govern. Some philosophers will think that governing is a prerequisite for any adequate account of laws; others (for example, Beebee [2000]) take it to be a confused holdover from views that take what happens in the world to be a matter of divine decree. Officially, I'm going to remain agnostic about which version of the view to accept. Both avoid the tension that is motivating the paper and both have the attractive features that I'm going to discuss now.

As I noted, the account has a variety of attractive features. First, it deals with the tension that motivated this paper: it avoids the explanatory circularity problem while accepting that laws are propositions.

Second, it gives a substantive account of which propositions are laws and how they differ from non-laws. Obviously, not every proposition is a law. This account says that certain propositions—the universal generalizations that are not grounded in their instances—are laws. The picture, then, is that there are two different types of universal generalization. One type of universal generalization is grounded in its instances. These are the 'accidental' or 'non-lawlike' generalizations. Since these generalizations are grounded in their instances, we can think of them as being merely *descriptions* or *summaries* of their instances. In fact, it is plausible that what it is for a generalization to merely be a summary of its instances is for it to be grounded in those instances. This type of generalization includes classic accidental generalizations like 'everyone in this room right now is a philosopher.' This fact clearly holds in virtue of its instances—the people in this room and their status as philosophers. There is another type of generalization, though, that works very differently. These generalizations are not grounded in their instances. These are the laws. Laws like $F = ma$ are plausibly ungrounded—they don't look to be just grounded in their instances in the way that 'everyone in this room right now is a philosopher' is. The account draws a plausible distinction between these two types of generalization.

Third, the account of laws captures the sense that (at least some) laws are fundamental and irreducible. Consider Maudlin making this point [2007: 105]:

> nothing in *scientific practice* suggests that one ought to try to reduce fundamental laws to anything else. Physicists simply postulate fundamental laws, then try to figure out how to test their theories; they nowhere even attempt to analyze those laws in terms of patterns of instantiation of physical quantities.

This paper's account of laws is consistent with Maudlin's thought. Fundamental laws aren't reduced to anything else. If a law is an ungrounded generalization then it is, in an important sense, fundamental and irreducible.

Fourth, as we noted above, the problem of how laws are associated with relevant propositions—the core of the inference problem of laws—is trivial on this account. But, also, this account deals with the *identification problem*. The identification problem is, in effect, a request for a substantive account of what laws are. Here is how van Fraassen [1989: 39] puts it: 'one must identify the relevant sort of fact about the world that gives "law" its sense; that is the problem of identification.' But, in giving an account of laws as ungrounded generalizations, this has been done.

Finally, as we noted above, it does this in an ontologically minimal way—the ontology just consists in propositions and grounding relations between them.

So, this view does have some significant advantages. What are its disadvantages? The most substantial disadvantage is that it denies certain claims about grounding that may have seemed plausible. In particular, it denies that universal generalizations are always grounded in their instances [Fine 2012]. Rather some universal generalizations are either ungrounded or grounded in other generalizations. I don't take this to be a particularly significant disadvantage of the view. First, certain authors have been open to certain generalizations being grounded in a different way—for example, by essences or some nomic entity [Rosen 2010]. Second, there isn't much agreement on exactly how universal generalizations are grounded. It doesn't look like universal generalizations can be grounded *solely* in their instances. Consider a world that contains just ten entities, all of which are Fs and Gs. Then all Fs are Gs is true. But it can't be wholly grounded in the instances because there could be a world where all of those ten instances are present, but there is also an eleventh entity that is an F but not a G. In this world, the ten original entities are present but the generalization does not hold. The typical solution to this is to say that the universal generalization is grounded in the instances plus a *totality fact*—the fact that those ten entities are the only entities that exist (or perhaps are the only entities that are F). But it is not clear exactly what this totality fact is and how the grounding works [Fine 2012: 59–63]. And there are authors who are very suspicious of the postulation of these totality facts (for example, Molnar [2000] and Parsons [2006]).[8] So, the mainstream position on grounding universal generalizations is up in the air. My view is not one that runs contrary to an established consensus.

Furthermore, given that we treat the universal generalizations that are laws so differently from accidental universal generalizations, there is little pressure for a unified story about universal generalizations. As we noted above, accidental universal generalizations seem to be purely descriptive of the particular facts in a way in which universal

[8] This debate about totality facts has mainly been carried out in the literature on 'truthmakers', but the relevant thoughts apply to grounding, too.

generalizations that are laws are not. And the roles played by the generalizations that are laws are obviously different from those played by accidental generalizations—for example, the laws have connections that the accidental generalizations do not have to explanations, induction, and counterfactuals. It's acceptable, and perhaps desirable, then, to treat generalizations that are laws as being grounded in a different way to how accidental generalizations are grounded.

But my view interacts with principles about grounding in another way—in particular, with principles linking grounding and modality. These interactions might seem to be a disadvantage for my view.

The most widely accepted principle linking grounding and modality is *grounding necessitism*. This principle says that if A grounds B then necessarily if A holds then B holds. (See Rosen [2010: 118], Trogdon [2013: 466], Dasgupta [2014: 4], and Skiles [2015: 718], amongst many others, for formulations of such a principle along these lines.) There is no tension between my account and this principle. But there is a possible tension with another principle—namely, *grounding internality* [Bennett 2011; Litland 2015].

This principle says that if A grounds B then it is necessary that if A and B then A grounds B. To see the possible tension with my view, assume that all Fs are Gs is an accidental universal generalization. This generalization is, then, grounded in the instances of Fs being Gs, and a totality fact. Grounding internality, then, implies that in any world where all Fs are Gs, and where those instances and the totality fact also hold, then they ground all Fs being Gs. So, given my account, in any world where the instances, the totality fact, and the generalization that all Fs are Gs hold, the generalization is not a law, because it is grounded in its instances.

If in two worlds exactly the same occurrent facts hold, then the instances of Fs being Gs and the totality fact will also be same between these worlds. This means that, given that all Fs are Gs is an accidental universal generalization, there is no world with the same occurrent facts where it is a law. What we've shown, then, is that there can't be two different worlds where the occurrent facts are the same but where a generalization is a law in one world but not a law in the other. That is, given grounding internality, my view implies that the laws supervene on the occurrent facts!

Whether you take this to be a bad result is perhaps a matter of taste. Many philosophers are committed to the supervenience of the laws on the occurrent facts. In particular, as we noted above, and as we will discuss more in the next section, this supervenience of the laws on the occurrent facts is a possible way to formulate Humeanism about laws of nature. I, however, do take it to be a disadvantage of my view if it were to imply supervenience of the laws on the occurrent facts, since there are often taken to be counterexamples to such supervenience [Tooley 1977; 669; Carroll 1994: 57–67; Maudlin 2007: 67–8]. Here is a particularly simple case. Imagine a world that consists only in one particle moving inertially though an otherwise empty spacetime. This world is consistent with the laws of Newtonian mechanics, so it looks like there could be a world like this where the laws are Newtonian. But the single particle moving inertially is also consistent with the law that everything always moves inertially. So, it seems like there could be such a single particle world where the laws say that 'everything always moves inertially.' But now we have two worlds where the laws differ but the occurrent facts are the same, thus violating supervenience.

I think that the right thing to do, then, is to reject grounding internality. This, then, is a commitment of the best version of my view, but I don't think that it is an especially

onerous one. Grounding internality is not as widely accepted, or even discussed, a view as grounding necessitism. Further, doubts have been raised over the principle [Leuenberger 2014; Litland 2015; Skiles 2015]. And influential arguments for grounding necessitism, like those given by deRosset [2010] and Trogdon [2013], do not generalise to grounding internality.

My account has some significant advantages: in particular, it is an ontologically minimal way of avoiding the tension that motivates this paper. But it does incur commitments about grounding—about how universal generalizations are grounded and about the link between grounding and modality.

5. Classifying the View

Although the title of this paper is 'Minimal Anti-Humeanism' the dispute between Humeans and anti-Humeans has not been particularly central to the discussion so far. The central tension—we have reasons to think that laws are propositions, but this leads us into the explanatory circularity problem—is independent of the Humean/anti-Humean distinction. But, given that in the last section we started to see that my view interacts with some principles that are closely associated with Humeanism, and given that the Humean/anti-Humean distinction dominates the modern literature on laws, I should discuss how my view fits into this distinction. As it turns out, given the looseness of the distinction between what is Humean and what is anti-Humean, my view is one that isn't especially easily placed into one camp or another. Of course, as the title suggests, I think that it is best understood as a version of anti-Humeanism, but reasonable people could disagree. So, the aim of this section is somewhat exploratory—I'm going to consider a few different ways that we can characterize Humeanism about laws of nature and I'll look at how my view interacts with these characterizations.

I am going to consider three approaches to Humeanism—the *modal approach*, the *necessary connection approach*, and the *dependence approach*.

The modal approach stems from the work of Lewis, particularly the introduction to his [1986]. The idea is to characterize Humeanism as a supervenience thesis. In the context of the debate about laws of nature, the relevant supervenience thesis is that the facts about laws of nature supervene upon a certain 'non-modal' base or a base consisting of 'occurrent' facts. Exactly what this base consists in is a little unclear [Bhogal and Perry forthcoming: sec. 3], but that is not especially important for our purposes. The point is that there is a sparse 'Humean-ly acceptable' base of occurrent facts, which intuitively does not contain anything lawlike, and the laws supervene on this base.

As we saw in the previous section, whether my account is Humean in this sense depends upon the status of grounding internality. If internality holds, then my account implies that the laws supervene upon the occurrent facts. If it does not, then there is nothing to prevent cases where the occurrent facts are the same but some generalizations are grounded in their instances in one world but not in another (that is, cases where the laws differ but the occurrent facts do not). As I noted, I think that the best version of my view rejects internality and thus counts as non-Humean in this sense.

However, this modal approach isn't a particularly good way of characterizing Humeanism. The Humean has certain ontological scruples—she is suspicious of 'spooky' nomic entities like primitive laws, dispositions, or necessitation relations. It is not at all clear how principles about how the laws covary with the occurrent facts can satisfy these scruples. They do not, after all, say that such spooky entities don't exist, or

that in some other sense they are not a significant addition to the ontology. The second and third approaches to Humeanism do better on this count.

Consider the *necessary connection approach* to Humeanism. The idea of this approach is that there are no necessary connections between distinct existences.[9] The existence of primitive laws, for example, would violate this because there would be a necessary connection between the laws and their instances—the laws guarantee that the instances are a certain way. If laws were reduced to their instances this would not be in violation of the ban on necessary connections, because the law would not be distinct from its instances.

Does my view count as Humean in this sense? Well, it depends on whether the instances are grounded in the laws. In section 4 we noted that one version of the view takes the laws to ground their instances. If this is the case, then the instances are not distinct existences from the laws, and so the necessary connection between the laws and the instances does not violate this formulation of Humeanism. However, the other version of the view, where the laws do not ground their instances, does take there to be necessary connections between distinct existences.

However, I take the third approach to Humeanism—the *dependence approach*—to be the most natural way of formulating Humeanism about laws of nature. This approach does not use modal locutions or talk of necessary connections; rather, it formulates the view by using notions like 'reduction', 'dependence', or 'ground'. Let's stick with the terminology of 'ground'. Humeanism, then, would be formulated not as the thesis that the facts about the laws supervene on a base of Humean-ly acceptable occurrent facts, but rather as the thesis that the facts about the laws are grounded in that base. This seems like a reasonable formulation because grounding claims are supposed to back 'nothing over and above' claims. So, if the laws are grounded in those occurrent facts then the laws are nothing over and above the occurrent facts. This approach directly captures the core Humean commitment that laws don't constitute a significant addition to the ontology.

On this understanding of Humeanism, it looks like the view developed here fails to count as Humean. This is because the fundamental laws are the ungrounded generalizations. So, it is obviously not the case that those laws are grounded in the base of occurrent facts.

Things are a little more complicated than this makes it seem, though. Perhaps it could be argued that, although these generalizations are not grounded in the occurrent facts, they *just are* occurrent facts and so their existence should not violate Humeanism. That is, we should allow these ungrounded generalizations to be part of the Humean-ly acceptable base of facts in which other facts are grounded.

Classic formulations of Humeanism, particularly the one given by Lewis [1986], characterize the Humean-ly acceptable base as consisting of the *local* occurrent facts. On such formulations, ungrounded universal generalizations are not part of the base.

But perhaps we might think that the *correct* formulation of Humeanism does not exclude such generalizations from the base. Here we are drifting far away from seeing how the view fits with standard formulations of Humeanism—and deep into considerations about the 'spirit' of Humeanism. I'm not going to discuss this in detail here, but I do think that Humeanism should not allow these generalizations to be part of the base.

[9] Thanks to a referee for pressing me on this approach.

The reason is that it is part of the spirit of Humeanism that accidental universal generalizations aren't substantially metaphysically different from the generalizations that are the laws (although they might be different in other respects, like their informativeness about other facts). But, the view developed here does treat them as substantially metaphysically different—the former is grounded in their instances and the latter is not. So, the spirit of Humeanism suggests that we rule out these views, instead of allowing these ungrounded generalizations into the Humean-ly acceptable base.[10] (And in fact my unscientific survey of self-professed Humeans suggests to me that most of them would take this to be contrary to the spirit of Humeanism.)

I think that the dependence approach is the most natural way to formulate Humeanism, and the view counts as anti-Humean on that approach. Thus I take the view to be anti-Humean. However, reasonable people might disagree and favour alternative conceptions of Humeanism. If you think, therefore, that the view counts as Humean, don't call it 'Minimal anti-Humeanism'; instead, call it 'Primitivist Humeanism'.

Regardless of how we classify the view, though, it can be attractive to people with both Humean and anti-Humean inclinations. The view developed here is ontologically parsimonious: it doesn't postulate primitives that are unfamiliar to us; and it makes transparent the connection between the laws and the particular facts. These are features that Humeans often find attractive. But it also does not reduce laws to anything else, and allows laws to explain their instances without a whiff of circularity. These are features that the anti-Humean values. Of course, there are costs—we need to commit to certain claims about grounding, and the primitivist nature of the view might be unattractive to some. But Minimal anti-Humeanism, or Primitivist Humeanism, has some significant attractions and it deserves more attention than it has received so far.[11]

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References

Albert, David Z. 2000. *Time and Chance*, Cambridge, MA: Harvard University Press.
Armstrong, D.M. 1983. *What Is a Law of Nature*? Cambridge: Cambridge University Press.
Beebee, Helen 2000. The Non-Governing Conception of Laws of Nature, *Philosophy and Phenomenological Research* 61/3: 571–94.
Bennett, Karen 2011. By Our Bootstraps, *Philosophical Perspectives* 25/1: 27–41.
Bhogal, Harjit and Zee Perry forthcoming. What the Humean Should Say about Entanglement, *Noûs*.
Bird, Alexander 2007. *Nature's Metaphysics: Laws and Properties*, Oxford: Oxford University Press.
Carroll, J 1994. *Laws of Nature*, Cambridge: Cambridge University Press.
Dasgupta, Shamik 2014. On the Plurality of Grounds, *Philosophers' Imprint* 14/20: 1–28.
deRosset, Louis 2010. Getting Priority Straight, *Philosophical Studies* 149/1: 73–97.
Dretske, F.I. 1977. Laws of Nature, *Philosophy of Science* 44/2: 248–68.
Fine, Kit 2012. Guide to Ground, in *Metaphysical Grounding: Understanding the Structure of Reality*, ed. Fabrice Correia and Benjamin Schnieder, Cambridge: Cambridge University Press: 37–80.

[10] More generally, Bhogal and Perry [forthcoming: sec. 3] argue at length that a locality requirement on the facts making up the Humean-ly acceptable base is necessary for a clear account of Humeanism that captures the spirit of the view.

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Goodman, Nelson 1955. *Fact, Fiction and Forecast*, Cambridge, MA: Harvard University Press.
Hempel, Carl 1965, Aspects of Scientific Explanation, in *Aspects of Scientific Explanation, and Other Essays in the Philosophy of Science*, New York: The Free Press: 331–496.
Hicks, Michael Townsen and Peter van Elswyk 2015. Humean Laws and Circular Explanation, *Philosophical Studies* 172/2: 433–43.
Lange, Marc 2013. Grounding, Scientific Explanation, and Humean Laws, *Philosophical Studies* 164/1: 255–61.
Leuenberger, Stephan 2014. Grounding and Necessity, *Inquiry* 57/2: 151–74.
Lewis, David 1983. New Work for a Theory of Universals, *Australasian Journal of Philosophy* 61/4: 343–77.
Lewis, David 1986. *Philosophical Papers*, *Vol. II*, New York: Oxford University Press.
Litland, Jon Erling 2015. Grounding, Explanation, and the Limit of Internality, *The Philosophical Review*, 124/4: 481–532.
Loewer, Barry 2012. Two Accounts of Laws and Time, *Philosophical Studies* 160/1: 115–37.
Marshall, Dan 2015. Humean Laws and Explanation, *Philosophical Studies* 172/12: 3145–65.
Maudlin, Tim 2007. *The Metaphysics Within Physics*, Oxford: Oxford University Press.
Miller, Elizabeth 2015. Humean Scientific Explanation, *Philosophical Studies* 172/5: 1311–32.
Molnar, George 2000. Truthmakers for Negative Truths, *Australasian Journal of Philosophy* 78/1: 72–86.
Parsons, Josh 2006. Negative Truths from Positive Facts? *Australasian Journal of Philosophy* 84/4: 591–602.
Popper, Karl R. 1959. *The Logic of Scientific Discovery*, London: Hutchinson.
Rosen, Gideon 2010. Metaphysical Dependence: Grounding and Reduction, in *Modality: Metaphysics, Logic and Epistemology* ed. Bob Hale and Aviv Hoffmann, Oxford: Oxford University Press: 109–36.
Skiles, Alexander 2015. Against Grounding Necessitarianism, *Erkenntnis* 80/4: 717–51.
Tooley, Michael 1977. The Nature of Laws, *Canadian Journal of Philosophy* 7/4: 667–98.
Trogdon, Kelly 2013. Grounding: Necessary or Contingent? *Pacific Philosophical Quarterly* 94/4: 465–85.
van Fraassen, Bas C. 1989. *Laws and Symmetry*, Oxford: Clarendon Press.