


ARTICLE

Platonic Laws of Nature

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Abstract

David Armstrong accepted the following three theses: universals are immanent, laws are relations between universals, and laws govern. Taken together, they form an attractive position, for they promise to explain regularities in nature—one of the most important desiderata for a theory of laws and properties—while remaining compatible with naturalism. However, I argue that the three theses are incompatible. The basic idea is that each thesis makes an explanatory claim, but the three claims can be shown to run in a problematic circle. I then consider which thesis we ought to reject (hint: see the title) and suggest some general lessons for the metaphysics of laws.

Keywords: Laws of nature; universals; governance; explanation; David Armstrong

1. Introduction

Metaphysical theories of laws and properties are often packaged together. In this paper, I'll provide an objection to David Armstrong's combined theory of laws and properties (1978a; 1978b; 1983; 1997). My objection is based on three central components of his metaphysics:

- (A) Universals are immanent.
- (B) Laws are second-order external relations between universals.
- (C) Laws govern particular matters of fact and are thus responsible for natural regularities.

Each thesis can be interpreted as making a claim involving a metaphysically explanatory relation I'll call "ontological priority." In [section 2](#), I'll discuss ontological priority. In [section 3](#), I'll explain and motivate my interpretation of Armstrong's theses. In [section 4](#), I'll argue that, so interpreted, they are jointly incompatible.¹ And in [section 5](#), I'll reflect on which thesis we should reject. Two takeaways are especially interesting. First, Armstrong's theory of laws requires transcendent universals. As a result, any argument in favour of the view that laws are relations between universals is also an argument in favour of transcendent universals, and any objection to transcendent universals is an objection to the theory of laws. Second, *all* theories capable of explaining regularities seem to be incompatible with the spirit of Armstrong's "Naturalism," according to which everything that exists is or is a part of our spatiotemporal world (Armstrong 1997, 5–6, 41).

¹I'm not the first to notice that immanent universals may be in tension with other components of Armstrong's metaphysics. See, for example, Bolender (2006), Mumford (2004, 101–3), Rives (2014), Bennett (2017, 14), Barnes (2018, 3.1), and Raven (manuscript). I'll discuss important differences between their arguments and mine in the Appendix.

2. Ontological priority

Any systematic metaphysics should allow for a creation story that describes the explanatory order in which entities in the ontology come to be. When we claim that some things exist *because* other things exist, or that some things exist *in virtue of* the existence of others, we contribute to such a story. Here are some examples of claims that invoke this sort of explanatory order: “{Socrates} exists because Socrates exists,” “my Lego airplane exists because it is composed of bricks suitably configured,” “contingent beings exist because a necessary being exists,” etc.² A necessary condition for such explanations is that the entities doing the explaining exist *prior to* the entities being explained. Thus, I’ll call the relation central to such a story “ontological priority.” I’ll stipulate that it forms a *strict partial order*: it is *transitive* (because ordering explanations chain), *asymmetric* (because we don’t like explanatory circles in ordering explanations), and *irreflexive* (because nothing explains itself). The point of the relation is to establish an order suitable for a creation story. To adapt a popular metaphor (Schaffer 2009, 351), priority relations specify the order in which God would have to create things to make a world like ours. Without these formal features, the relation would have a hard time playing that role.³

Readers may wonder why I’ve labeled this relation “ontological priority” instead of “ground.” Though I don’t have any major objection to casting my argument in terms of ground, doing so might make one of my premises appear to be more contentious than it really is. In 3.c, I’ll argue that governing laws are prior to the regularities they bring about. However, the relation between governing law and regularity (call it “governance”) has some features that distinguish it from more commonly discussed cases of ground, and for that reason my argument may not suffice to show that governing laws *ground* regularities. I want to allow that ground and governance could be distinct relations. Nevertheless, I think they play the same role in establishing an order for a creation story, which is to say that they make the same contribution to matters of ontological priority. I’ll defend this claim in 3.c after I’ve explained how I understand governance (and I’ll revisit the issue in 4.d, where I consider a related objection).

3. Armstrong’s theories of laws and properties

3.a Universals are immanent

I take the distinction between immanent and transcendent universals to be captured by the following theses:

Immanence: States of affairs—that is, instances of universals—are prior to universals.

Transcendence: Universals are prior to states of affairs.

Proponents of Immanence and proponents of Transcendence need not disagree about what exists. They can accept all the same states of affairs, universals, and so on. Their disagreement is over which comes first. Ontological priority is an appropriate explanatory relation for expressing these views because its formal features respect our general principles of ordering. For example, Immanence and

²The literature on metaphysically explanatory relations is vast. See, for example, Lowe (1998) on asymmetric dependence, Fine (2001), Schaffer (2009), and Rosen (2010) on ground, and Wilson (2014), Koslicki (2015), and Bennett (2017) for defences of pluralism about metaphysically explanatory relations. For introductory surveys, see Koslicki (2013) and Raven (2015).

³See Raven (2013) and Raven (2015, 6.2) for discussions of why metaphysically explanatory relations—and in particular, the relation of ground—have such properties. For dissent, see Jenkins (2011), Schaffer (2012), and Rodriguez-Pereyra (2015). It’s worth noting that those who doubt that certain metaphysically explanatory relations have these formal properties might nevertheless agree that ontological priority—as the central relation in a metaphysical creation story—does have them. For example, Barnes (2018) argues that dependence isn’t asymmetric, but suggests that ordering relations like relative fundamentality are. In any case, I’ll consider the objection that ontological priority lacks these features in 4.d.

Transcendence are supposed to be incompatible, but they would be compatible if we allowed symmetric relations of priority.

It's worth discussing the relationship between Immanence, Transcendence, and a third principle that Armstrong endorses:

The Principle of Instantiation: There are no uninstantiated universals.

Immanence entails the Principle of Instantiation, so it's natural to associate these theses with one another. However, the Principle of Instantiation is compatible with Transcendence as well, since it is possible for there to be worlds in which all transcendent universals are instantiated. Although Armstrong usually describes his view in terms of the Principle of Instantiation, he clearly accepts Immanence as well (see Armstrong, 1983, 165; 1989, 82; and 1997, 29, 118).

Why does Armstrong accept Immanence? There are two main reasons. First, Transcendence is incompatible with Armstrong's Naturalism (Armstrong 1997, 5–6, 41). Transcendent universals exist (or are at least capable of existing) independently of their instances. This seems to put them in "Platonic heaven" (Armstrong 1989, 76). Second, Armstrong believes that because transcendent universals are separable from states of affairs, Transcendence is especially susceptible to Bradley-inspired relation regresses (see, for example, Armstrong [1978a, 70] and Armstrong [1989, 108–10]). For myself, I don't find either of Armstrong's reasons to be very compelling, but more on that in the last section of the paper.

3.b Laws are second-order relations between universals

According to Armstrong (1983), laws of nature are higher-order states of affairs. They consist of a nomic relation holding between first-order universals, having a form such as $N(F,G)$ —where N is the nomic relation binding first-order universals F and G . Nomic relations (like N) have four crucial features. First, they are *second-order*: their relata are universals, not particulars. Second, they are *external*: they do not hold solely in virtue of (the natures of) their relata. Third, they are *modally laden*. For example, it is a necessary truth that if two universals stand in the relation of nomic necessitation then there is a corresponding regularity among their instances.⁴ Finally, they are *irreducible*: this is to say that whether a nomic relation binds two universals cannot be reduced to (does not supervene on, is not grounded in) other features of the world, including natural regularities. Since this theory of laws was proposed independently by Dretske (1977), Tooley (1977), and Armstrong (1983), I'll call it the "DTA Theory of Laws" (DTA). Using this label allows us to avoid an ambiguity in "Armstrong's theory of laws." This expression can refer to DTA in general, or it can refer to Armstrong's specific development of DTA that incorporates a great many additional theses: for example, his claims about the modal strength of laws, his account of functional laws, his account of probabilistic laws, his solution to van Fraassen's (1989) inference problem, etc. My argument appeals to DTA in general, not to Armstrong's specific version. In 4.c, I'll argue that DTA should be understood to involve the claim that universals are prior to laws, but that argument will be easier to make with more background in place.

DTA is supposed to have a number of advantages (Armstrong 1983, 99–107). I'll mention just a few. First, it nicely distinguishes between lawlike and accidental regularities, since the former are (whereas the latter are not) supported by nomic relations between universals. Second, DTA laws support counterfactuals. Third, DTA laws support induction, or at least help to make sense of the rationality of induction. Fourth, DTA laws can *explain* their instances, thereby providing an explanation of regularities in nature. All of these purported advantages are contentious, but my

⁴Some nomic relations (such as irreducibly probabilistic nomic relations) may not bring about their corresponding regularities with necessity. However, they still involve a kind of modal force capable of explaining regularities and supporting counterfactuals.

goal here is not to defend them. I just want to point out that they are important for motivating DTA. The fourth putative advantage is especially important, because the second and third seem to depend on it. If laws can't explain their observed instances, then it's hard to see how they could imply anything about their unobserved instances (as they'd have to do to support induction) or facts in other possible worlds (as they'd have to do to support counterfactuals). Another reason is that the explanatory power of DTA laws is what makes them epistemically accessible (Armstrong 1983, 104). They are theoretical entities, so we can't know them by way of an explanatory inference if they can't explain. What gives DTA laws these advantages? In short, their modal attributes make them *governing* as opposed to merely *descriptive*. Let's turn to this feature of Armstrong's metaphysics.

3.c Laws govern

How should we understand Armstrong's claim that DTA laws govern particular matters of fact (Armstrong 1983, 106)? Instead of starting with Armstrong, I'd like to review some more recent attempts to describe governance. Beebe (2000, 578–79) characterizes DTA laws as “governing” and “grounding” regularities, as “making” the future turn out the way it does (in contrast to Humean laws which don't “do” anything, but merely describe), and as being “already present” before future regularities obtain. Tim Maudlin, a proponent of primitive governing laws, describes his laws as follows:

The universe started out in some particular initial state. The laws of temporal evolution operate, whether deterministically or stochastically, from that initial state to generate or produce later states. And the sum total of all the states so produced *is* the Humean mosaic. (Maudlin 2007, 174)

Heather Demarest says that non-Humean entities such as governing laws or powers possess a kind of metaphysical “oomph” or “power” that is “best thought of as a *dynamic, metaphysical dependence*” (2017, Section 2.d). Nina Emery (2019) argues that non-Humean laws *ground* their instances. On any of these characterizations of governance, it's reasonable to conclude that governing laws are ontologically prior to the particular matters of fact they govern.

Returning to Armstrong, we find that he uses similar language to explain what his nomic relations between universals *do* (see 1983, 86–106). For example, he says that laws entail regularities without being dependent on them (85–88), and at least expresses some sympathy towards the suggestion that laws actively produce the regularities: “we will have to say that the entailment holds in virtue of a *de re* necessity linking the relation between the universals, on the one hand, and the uniformity it ‘produces,’ on the other” (86). Consider also his elucidation of the connection between law and regularity, i.e., his attempt to clarify the nature of the relation of nomic necessitation by considering its role in causal interactions:

We may perhaps render “N(F,G)”, the assertion of a state of affairs which is simultaneously a relation, in words as follows:

Something's being F necessitates that same something's being G, in virtue of the universals F and G.

This is *not* to be taken simply as:

For all *x*, *x* being F necessitates that *x* is G.

because this would be to fall back, once again, into a form of the Regularity theory. Instead, as the phrase “in virtue of the universals F and G” is supposed to indicate, what is involved is a real, irreducible, relation, a particular species of the necessitation relation, holding between the universals F and G (*being an F, being a G*). (Armstrong 1983, 96–97; italics in original)

Because DTA laws are atomic states of affairs that cannot be analyzed in terms of natural regularities, and because they are nonetheless supposed to bring about regularities with modal force, it seems very natural to interpret the claim that laws govern as involving a claim about ontological priority: our world contains governing laws of nature, and it is in virtue of these governing laws that regularities obtain. In other words, the states of affairs constituting regularities exist *because* governing laws exist.

Indeed, something like this robust notion of governance seems required if DTA laws are to have the advantages discussed at the end of the subsection above (explanatory power, etc.). It will be helpful to contrast the kind of explanation available to proponents of governing laws with the sort of explanation available to those who reduce laws to regularities in a Humean mosaic (Lewis 1973, 1983; Loewer 1996; Beebe 2000; Schaffer 2008). In a continuation of the quote above, here's what Maudlin says about explanations involving governing laws:

This counts as an explanation exactly because the explanans (namely the initial state, or the state up to some time, and the laws) are ontologically distinct from the explanandum (namely the rest of the Mosaic). The laws can *operate to produce* the rest of the Mosaic exactly because their existence does not ontologically depend on the Mosaic. If it did (as the Humean would have it) then they could not play this sort of role in producing the Mosaic, and hence could not play any role in this sort of explanation of the Mosaic. (Maudlin 2007, 175)

Armstrong (1983, 102) makes a similar claim:

... if all the observed Fs are Gs, then it seems to be an explanation of this fact that it is a law that Fs are Gs. But, given the Regularity theory, the explanatory element seems to vanish. For to say that all the observed Fs are Gs because all the Fs are Gs involves explaining the observations in terms of themselves.⁵

Both Maudlin and Armstrong claim that there is an important sense in which governing laws do, but Humean laws do not, explain. This is compatible with allowing that Humean laws can explain in some less metaphysically robust sense—say, by supporting deductive-nomological explanations in which statements of laws feature merely as general premises in deductive arguments (Hempel 1965). The sense in which governing laws explain is more robust. Instances of a law $N(F,G)$ fall under the law because they acquire G via the operation of the law. This contrast strengthens the case that DTA laws are ontologically prior to their instances.⁶ The kind of explanation in question is a robust metaphysical explanation with the same formal features as the relation of ontological priority. Thus, the putative advantages of DTA laws discussed above are closely intertwined with the fact that they govern—and thus with ontological priority—since that is required to make sense of their distinctive explanatory power.

I can now elaborate on my reasons for labeling the relation central to a metaphysical creation story “ontological priority” instead of “ground.” The way a law governs its instances seems different from the way in which, say, parts compose a whole, Socrates grounds his singleton, and similarly for other paradigm instances of ground. It is usually held that grounding relations necessitate: if x grounds y , then it is necessary that if x then y . However, if we accept the possibility of irreducibly probabilistic governing laws, it's not necessary that all laws give rise to their corresponding regularities. Moreover, there's a controversy about the modal strength of deterministic laws of nature. For example, Wilsch (2018, sec. 4) argues that the necessity with which a governing law brings about its instances is weaker

⁵For related arguments, see Maudlin (2007, 172), Foster (1983), Fales (1990, chap. 4), and Hildebrand (2013a).

⁶In drawing this contrast, I simply wish to highlight the distinctive character of explanation involved in governance. I take no stand on the issue of whether Humean accounts are susceptible to a kind of explanatory circularity. For recent discussion, see Loewer (2012), Lange (2013), Hicks and van Elswyk (2015), Miller (2015), Lange (2018), Emery (2019), and Shumener (2019).

than metaphysical necessity: it has its own unique nomological character determined by its unique essence. Finally, ground is sometimes described as a relation of constitutive explanation, but there is no reasonable sense in which a governing law is constitutive of regularities.

Thus, as Emery (2019, sec. 7) mentions, we have interpretive options. We can adopt an expansive conception of ground that includes governance as a species; or we can treat governance as a *sui generis* explanatory relation distinct from ground.⁷ It's not necessary to settle this matter here. If governance is a species of ground, my claims about ontological priority can be recast as grounding claims. If ground and governance are distinct, my argument in the next section won't generate a circle of *grounding* relations. Nevertheless, I think that ground and governance play essentially the same role in ordering a creation story, even if we take them to be distinct metaphysical relations. To ground laws in regularities (fully or partially) is to give a reductive account of laws; regularities have to exist already in order to ground laws, which means that if they were to exist already then there'd be nothing left for governing laws to do. To produce regularities, governing laws must exist *in advance*, so to speak; they can't be grounded by the very things they are responsible for bringing into existence. Therefore, even if governance is distinct from ground, the two relations play the same ordering role. Grounds are prior to the grounded; that which governs is prior to that which is governed.

4. The incompatibility of Armstrong's three theses

I'll now argue that Armstrong's three theses are incompatible because they form an unacceptable circle of ontological priority relations.

4.a Stage 1: Setup

We begin with two premises established in the section above:

- (1) States of affairs are prior to universals.⁸
- (2) Laws are prior to regularities.

Premise (1) is a restatement of Immanence. Premise (2) follows from my interpretation of Armstrong's claim that laws govern particular matters of fact and thus explain regularities. Recall that when a relation of priority holds between two things, the existence of one explains (or helps to explain) the existence of the other. Thus, (1) says that the existence of first-order states of affairs is prior to (explains) which universals exist. And (2) says that the existence of the laws is prior to (explains) which regularities there are. These premises are illustrated in Figure 1, in which arrows represent relations of priority.

To derive a circularity, we need to spell out the relationships between states of affairs and regularities, and between universals and laws. The circularity will entail a contradiction, given the formal features of priority relations.



Figure 1

⁷Emery (2019) prefers the former, Wilsch (manuscript) prefers the latter, and I suspect that pluralists such as Wilson (2014) would prefer the latter as well.

⁸Strictly speaking, I should say that states of affairs of order n are prior to universals of order n , but more on this later.

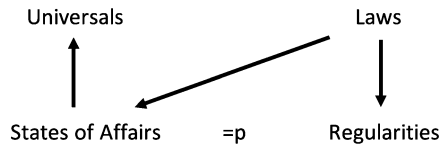


Figure 2

4.b Stage 2: States of affairs and regularities

Let's now consider the relationship between natural regularities and the states of affairs from which first-order universals are abstracted. A regularity is a pattern that holds among states of affairs. Thus, the regularities governed by laws are a subset of the first-order states of affairs that metaphysically explain which first-order universals there are. In other words, there is a relationship of (at least) partial identity between (i) the states of affairs that determine which first-order universals there are and (ii) regularities governed by laws. (This relationship is represented in Figure 2 by the “=p” symbol.) This is almost the conclusion we want, but not quite.

Sometimes the existence of an entity or state of affairs is metaphysically explained by a multiplicity of other entities and/or states of affairs. Suppose that the parts are prior to the whole. Arguably, the parts must be suitably configured—their mere existence is insufficient for constitution. But although the parts do not suffice to explain the whole, they seem to be prior to the whole without qualification. We do not need to introduce a new relation of *partial* ontological priority to account for the priority relation between parts and whole.⁹ Here is an application of analogous reasoning in the case of laws. Suppose that the first-order states of affairs at the present moment are determined by initial conditions and governing laws. The laws partially explain the present, but they are insufficient to explain the present on their own. Nevertheless, the laws are prior to the present without qualification. The principle that partial explanation (of the relevant metaphysical sort) requires unqualified priority allows us to infer the conclusion we want from the fact that regularities and states of affairs are partially identical:

- (3) Laws are prior to states of affairs.

More carefully, (3) says that the existence of the laws is prior to (helps explain) which first-order states of affairs exist. This is represented in Figure 2. This is not to say that *every* state of affairs requires a law to explain its existence, but that *some* do. Another way to express the thesis is to say that laws are prior to the states of affairs they govern. My argument merely requires that some states of affairs types have instances in virtue of governing laws, and it is plausible that this could be the case. For example, many presently instantiated fundamental properties may have had no instances in the early moments after the big bang. (I'll consider the objection that laws aren't prior to *all* instances of states of affairs in 4.e.)

4.c Stage 3: Universals and laws

We're now in the position to consider the relationship between universals and laws. For any two entities x and y , either x and y stand in no priority relation to one another, x is prior to y , or y is prior to x .

Could universals and laws stand in no priority relation to one another? There are two reasons to think that the answer is no. First, this seems incompatible with Armstrong's theory of laws, since laws are states

⁹In distinguishing an explanatory relation sufficient to bring about the existence of something from one that is merely necessary, we arrive at a distinction similar to Fine's (2012) distinction between full and partial ground. In both cases, the ground (full or partial) is prior to the grounded without qualification.

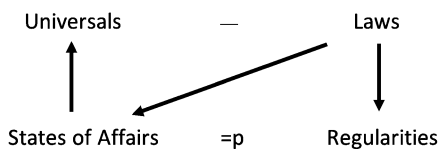


Figure 3

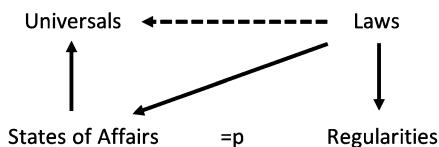


Figure 4

of affairs with universals as constituents. If one has the other as constituent, surely there is some relation of priority between them. Second, this relationship leads to a contradiction. Consider Figure 3, in which the “—” symbol indicates no relationship of priority. From the fact that laws are prior to states of affairs and states of affairs are prior to universals, by transitivity it follows that laws are prior to universals. But if laws are prior to universals then it can’t be the case that there is no priority relation between them.

Could laws be prior to universals? This relationship is expressed in Figure 4. (Note: Figures 4, 5, and 6 include a dashed arrow; this expresses the same relation of ontological priority as a solid arrow and is merely for the purpose of emphasizing key differences between the figures.) The natural way to interpret Figure 4 is as follows. We start with laws. They’re fundamental. Universals are abstracted from laws by way of states of affairs. Unfortunately, this story doesn’t fit nicely with Naturalism (and therefore with one of the main motivations of Immanence). Laws, being more fundamental than anything else in the diagram, seem to be in Platonic heaven. And since laws are relations between universals, the universals would seem to be in Platonic heaven as well. It’s also unclear that this proposal is compatible with Armstrong’s theory of laws, for reasons I discuss in the next paragraph.¹⁰

We arrive at the final, and most natural alternative, expressed by Figure 5: first-order universals are prior to DTA laws. Recall that DTA laws are states of affairs in which external relations bind first-order universals. But notice that first-order universals don’t determine which laws there are. In fact, it seems perfectly possible to have a world of Armstrong’s first-order states of affairs *without* any laws of nature at all. Just imagine a chaotic world of states of affairs without lawlike regularities. Thus, it’s possible to have first-order universals without laws (Armstrong 1997, 196–97). However, it’s not possible to have DTA laws without first-order universals. Given these facts, we should treat first-order universals as being prior to laws.¹¹

(4) Universals are prior to laws.

¹⁰Also, a puzzle arises concerning the relationship between universals that feature in laws and those that feature in first-order states of affairs. Consider first-order state of affairs Fa and the law $N(F,G)$. F -ness the first-order universal is abstracted from Fa as a universal, but from $N(F,G)$ as a particular. What makes the F -ness in these two states of affairs the same? Without an answer, it’s hard to see how laws explain their instances. See Rives (2014, 502ff.) for relevant discussion.

¹¹*Objection:* Laws are states of affairs, so by Immanence they’re prior to universals! *Reply:* The objection is based on a failure to understand Immanence. We must qualify the claim that states of affairs are prior to universals so that it says that states of affairs of order n are prior to universals of order n . So interpreted, Immanence is compatible with the claim that first-order universals are prior to second-order states of affairs (that is, laws).

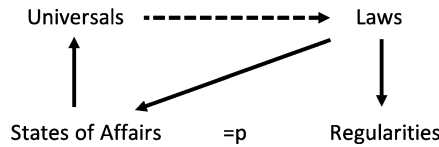


Figure 5

More carefully, (4) says that the existence of first-order universals is prior to (helps explain) the existence of laws (i.e., which laws there are). This relationship fits naturally with DTA laws, whereas the other two possible relationships do not.

The claim that universals are prior to laws is compatible with Immanence. It's also compatible with the claim that laws govern (and explain regularities). However, it is not compatible with both Immanence and the claim that laws govern, for the diagram in Figure 5 contains a circle of priority relations. By Transitivity, every element in the circle is prior to every element, violating Asymmetry and Irreflexivity. Thus, we have arrived at a contradiction.

4.d Objections: Different formal features and different relations

In section 2, I hinted at two potential strategies for responding to my argument: first, deny that ontological priority forms a strict partial order; second, insist that the relations in Armstrong's circle are of different types. Let's consider them in turn.

In relaxing the formal features of ontological priority, we allow that circles in a creation story needn't be problematic as a general rule. Nevertheless, the harmlessness of some circles doesn't imply the harmlessness of all circles, and I think there's a good case to be made that the particular circle formed by (1), (3), and (4) is problematic.¹² (The purpose of [2] is to establish [3], so we can ignore it.) Consider the following questions and their answers, corresponding to the premises in the argument above.

- (1') Why does our world contain the first-order universals it does? Because it contains the first-order states of affairs it does.
- (3') Why does our world contain the states of affairs it does? Because (in part) it contains the laws it does.
- (4') Why does our world contain the laws it does? Because (in part) it contains the first-order universals it does.

In each case, we're asking a question about the order of creation. Each thesis seems to suggest a *unique* starting point, but not even God can uniquely start in all three places at once. That would contradict the theses themselves.

Suppose we try to tell Armstrong's creation story. God can't create all the first-order states of affairs first because that contradicts the claim that laws govern. God can't create the first-order universals first because that contradicts Immanence. God can't create the laws first because that contradicts the claim that universals are prior to laws (and it seems to make the laws Platonic). Intuitively, the circle formed by claims (1), (3), and (4) is incoherent even if relations of ontological priority don't form a strict partial order, generally speaking. Our theses themselves imply asymmetry even if priority relations need not be asymmetric in general. And our theses seem to form a chain even if priority relations need not form chains in general. This suggests that *this particular*

¹²It's worth noting that the putative counterexamples to the strict partial ordering of ground found in Jenkins (2011), Schaffer (2012), and Rodriguez-Pereyra (2015) involve cases that differ significantly from claims (1), (3), and (4).

circle is problematic even if some circles of priority relations are benign. I suppose that one could dig in one's heels and insist that the circle isn't vicious, but I don't understand how such a creation story is supposed to go.

Considerations like these also lead me to think that it will not help to insist that the relations in my circle are of different types. Suppose that, like me, one thinks that (1) and (4) involve ground whereas (3) involves governance. But suppose that, unlike me, one doesn't think they are unified by a deeper ordering relation of ontological priority. Once again, one could dig in one's heels and insist that my "circle" is unproblematic, but again I don't understand how such a creation story is supposed to go.

My responses may seem question-begging. Perhaps it is built into the very idea of a "creation story" as I understand it that there must be a single, objective relation that forms a strict partial order. If that is so, we have at the very least learned that there are serious limits to the kind of creation story available to Armstrong. He would be committed to denying that ontological priority forms a strict partial order.

4.e Objection: Nothing new under the sun

Some might worry that the partial character of explanation involved in (3) and (4) (and in [3'] and [4']) allows for a creation story according to which God creates some (but not all) first-order states of affairs first, followed by universals, and then by DTA laws, which then dynamically bring about the rest of the first-order states of affairs.

Suppose a Laplacian worldview, according to which the laws operate on a set of initial conditions to determine the subsequent course of history. On this picture, it seems possible that governing laws are *not* prior to the initial conditions even though they are prior to the subsequent first-order states of affairs brought about by their operation. Why? Consider "Nothing New Worlds." These are worlds in which every fundamental property has instances in the initial conditions. In these worlds, no previously uninstantiated properties are ever instantiated at later times. The possibility of Nothing New Worlds suggests that a crucial step of my argument has been overstated. In these worlds, although the laws partially determine which first-order states of affairs there are, the laws fail to be prior to *all* instances of every universal. This blocks the circularity. In such worlds, the laws make no positive contribution to explaining why we have the universals (state of affair types) we have, because they never bring any new types of states of affairs into existence.

I don't think that the possibility of Nothing New Worlds vindicates Armstrong's position. For starters, stipulating that all fundamental properties have instances in the initial conditions seems ad hoc. I think Armstrong would have been uncomfortable with this, because he thought that there could be times at which certain universals were uninstantiated (Armstrong 1983, 82). Relatedly, it seems possible for there to be "Something New Worlds," in which some universals are not instantiated during the initial conditions but are instantiated later in virtue of the operation of governing laws.

In fact, the possibility of Something New Worlds is much more significant than the possibility of Nothing New Worlds. My arguments in section 4 show that Something New Worlds require transcendent universals. Laws involving initially uninstantiated universals are prior to their instances, and the universals involved in such laws are prior to the laws. Thus, initially uninstantiated universals are prior to their instances, making them transcendent. However, the possibility of Nothing New Worlds does not entail the possibility of immanent universals since Transcendence is compatible with the Principle of Instantiation. Since it's plausible that universals are either essentially transcendent or essentially immanent (Armstrong 1983, 120–21), we'd have to deny the possibility of Something New Worlds to save Immanence. For the objection under consideration to succeed, it would have to be *necessary* that, if there were DTA laws, then all properties involved in fundamental laws would be instantiated during the initial conditions of the world. That is intuitively implausible, and it imposes a strong constraint on the content of scientific theorizing: namely, that the correct scientific theory must not involve fundamental properties that

are not instantiated in our world's initial conditions. Neither I nor Armstrong think that metaphysicians should be in the business of imposing such constraints on the natural sciences.

Something New Worlds may sound familiar. Michael Tooley (1977, 685) has appealed to similar possibilities:

Suppose that materialism is false, and that there is, for example, a nonphysical property of being an experience of the red variety. Then consider what our world would have been like if the earth had been slightly closer to the sun, and if conditions in other parts of the universe had been such that life evolved nowhere else. The universe would have contained no sentient organism, and hence no experiences of the red variety. But wouldn't it have been true in *that* world that if the earth had been a bit farther from the sun, life would have evolved, and there would have been experiences of the red variety?

Tooley's conclusion is that we ought to endorse the possibility of uninstantiated laws and, along with it, the possibility of uninstantiated universals. Something New Worlds are structurally similar to Tooley's world, but there are some important differences that make their possibility much less controversial than the possibility of Tooley's world. First, Tooley's world requires properties that are *never* instantiated, whereas Something New Worlds merely require properties that are not *initially* instantiated. Second, Tooley's world requires *emergent* universals, whereas Something New Worlds don't. Third, Armstrong's (1983, chap. 8) response to Tooley's argument doesn't transfer. Armstrong denies that there are uninstantiated laws in Tooley's world, but Something New Worlds do not involve *uninstantiated* laws. They merely require laws involving properties that are not *initially* instantiated. Thus, denying uninstantiated laws does not help in the present context. For these reasons, even if we grant the possibility of Nothing New Worlds, my argument in section 4 is crucial for revealing the depth of the problem in pairing Immanence with DTA. Ultimately, our judgment of Armstrong's combined theory may rest on our intuitions about certain cases, but these seem significantly less controversial than the cases already in the literature.

5. Implications of my argument

We've derived a contradiction from Armstrong's three theses. Which one should we reject? It depends on what we think about a number of other issues. I'll give a cursory sketch of where I think we're led, but I must emphasize that I don't have the space here to do much more than merely gesture at the options available.

To begin, let's consider the result of pairing DTA with Transcendence. Does this theory allow for a coherent creation story?

Figure 6 looks just like Figure 5 except the priority relation between first-order universals and first-order states of affairs has been reversed. We can tell a coherent creation story for a world with this structure: God creates universals first, laws second, and initial conditions third. The universals are required to make laws as well as initial conditions. The laws together with initial conditions explain the subsequent course of history, including the regularities that result. Universals explain similarity relations among states of affairs throughout the history of the world. There is no contradiction in this story analogous to that found in Armstrong's combined theory of laws

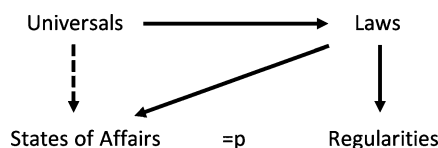


Figure 6

and properties.¹³ Immanence is required to derive the contradiction identified in section 4, and rejecting it yields a coherent theory.

This is an interesting result. Any reasons to accept the DTA theory of laws become reasons to accept Transcendence (provided that one's reason isn't DTA's supposed compatibility with Naturalism). Likewise, any reasons to reject Transcendence become reasons to reject DTA. Recognizing the connection between DTA and the theories of universals may put us in the position to make progress concerning debates about both subjects. One in particular is worth highlighting.

There is a class of objections to transcendent universals based on the idea, roughly put, that transcendent universals are far removed from us both metaphysically and epistemically.¹⁴ They're causally inert and disconnected from space and time. How, then, can they play an important role in our metaphysics? How, even in principle, could we learn anything about them? Well, if there are governing DTA laws, transcendent universals are not *entirely* disconnected from us. Although they may not themselves be *causal*, they do play an important role in *governance*, and thus in productive explanations. It is widely recognized that universals are posited in order to play a certain explanatory role: namely, to explain similarities and differences. But we are now considering a *different* explanatory role: namely, to help explain (along with nomic relations) regularities in nature. In expanding the explanatory role of transcendent universals in this way, we may be better placed to account for our epistemic access to them.¹⁵ If this is right, there may be an argument for transcendent universals that simultaneously undercuts some of the more influential objections to transcendent universals.

Admittedly, this is all very speculative. I'm assuming that we might have good reasons to accept the theory that laws are relations between universals, but I haven't provided any such reasons here. Nor have I said much at all about what an appropriate epistemology for laws and universals might look like. Furthermore, I've only examined *one* potential connection, but there are others.¹⁶ Despite these limitations, this brief discussion provides good reason to think that the connection between DTA laws and transcendent universals is not merely of concern to Armstrong scholars. It may have significant implications for other philosophical debates.

My discussion of the potential virtues of pairing DTA with Transcendence is predicated on some controversial assumptions. If we reject these assumptions, another response to the incompatibility of Armstrong's three theses may be required. Once again, we'll arrive at an interesting result.

To begin, let's consider the possibility of rejecting only the claim that laws govern. On this option, we retain our commitment to both Immanence and DTA. This would require us to reject the claim that laws explain in the robust sense discussed in 3.c. As noted there and at the end of 3.b, that would

¹³One might worry that the explanation of states of affairs is overdetermined, since there are two paths leading to it. However, the dashed arrow linking universals to states of affairs explains similarity relations among first-order states of affairs, whereas the sequence of solid arrows leading from universals to states of affairs explain regularities (distribution patterns among first-order states of affairs).

¹⁴There is a very large literature on objections of this kind. For a recent overview, see Cowling (2017, chap. 4).

¹⁵This fits nicely with the popular view that the metaphysics of laws and properties are a package deal. See Hicks and Schaffer (2017) for critical discussion, and my (Hildebrand 2019) for a recent attempt to articulate an epistemology for governing laws and natural properties based on their explanatory role. I assume that some non-Humean theory of laws (such as DTA or Dispositionalism) provides a better explanation of regularities than its Humean competitors. This is controversial, but see Foster (1983), Fales (1990, chap. 4), Bird (2007, 86–90), and Hildebrand (2013a) for defenses.

¹⁶I'd be remiss if I didn't mention the following two problems for DTA. First, rejecting Immanence might seem to make the theory more susceptible to Bradley-inspired relation regresses (Armstrong 1989, 108–10). My preferred response to relation regresses is insensitive to the distinction between immanent and transcendent universals. In short, such regresses rest on an unreasonable demand to avoid unanalyzed predication (Lewis 1983), which amounts to a refusal to allow a theorist to axiomatize the ontological primitives involved in their theory (Schaffer 2016) or to incorporate ideological primitives in their metaphysics (Cowling 2017, 125–27). Second, some have thought that the Dretske/Tooley/Armstrong approach to laws is particularly susceptible to van Fraassen's (1989) inference problem, and Armstrong's specific solution is connected to his acceptance of Immanence. I'll discuss this in the appendix.

undercut many putative advantages of DTA while threatening to make DTA laws epistemically inaccessible. I do not think that this will be an attractive option for anyone.

Let's now consider the possibility of rejecting Armstrong's theory of laws. If Armstrong's theory of laws is rejected in favor of a Humean theory, its explanatory benefits are lost entirely, but it does allow us to preserve the spirit of Armstrong's Naturalism.¹⁷ However, those attracted to non-Humeanism because of its purported explanatory benefits will probably want to look elsewhere. One non-Humean option is to shift to dispositionalism (Ellis 2001; Mumford 2004; Bird 2007). However, dispositionalists may be forced to accept Transcendence anyway, for independent reasons (Tugby 2013), and dispositionalists may have to admit some DTA-type nomic relations in order to explain all regularities that we might like to explain, such as regularities involved in conservation laws (French 2014) or in the retention of dispositions through time (Tugby 2017). Another option is to treat governing laws as unanalyzable primitives in the manner of Carroll (1994) and Maudlin (2007). This option appears to be incompatible with Naturalism because primitive laws must be independent of the spatiotemporal world in order to govern it.¹⁸ Governing laws could be analyzed by appealing to God (Foster 2004; Swinburne 2006), but this proposal is incompatible with Naturalism as well. I'm moving quickly here, but my goal is modest. I'm not trying to provide reasons to prefer DTA to these competing theories. I just want to motivate the claim that there is no obvious alternative theory that promises a Naturalism-compatible explanation of regularities.

In sum, my argument has two interesting implications. First, in learning that DTA requires transcendent universals, we uncover a deep and potentially promising connection between two areas of philosophy. Arguments for DTA become arguments for Transcendence, and objections to Transcendence become objections to DTA. Second, we face something like the following choice. We can accept Naturalism and pair it with a Humean theory of laws, or we can try to explain regularities in nature by pumping up our ontology in ways incompatible with Naturalism. Armstrong tried to carve out an intermediate space between these two options. I have argued that there is no such space to be found.

6. Appendix: Earlier objections to Armstrong

I'll now discuss two earlier attempts to identify a tension between Immanence and other elements of Armstrong's metaphysics and explain why mine is importantly different.

6.a Mumford and Bolender's objection

David Lewis (1983, 366) claims not to understand the modal connection between DTA laws and regularities. The general problem of giving an account of the modal connection between law and regularity has become known as the *inference problem*, following Bas van Fraassen's (1989) influential development. Armstrong adds a controversial thesis to DTA (explained below) in an attempt to solve the inference problem. Mumford (2004, 101–3) and Bolender (2006) attempt to derive a contradiction between Immanence, the claim that DTA laws govern, and this extra thesis.¹⁹ However, I do not think that Armstrong's controversial thesis is required for a solution to the inference problem—neither Tooley (1977; 1987) nor Dretske (1977) accept it. Thus, one possible

¹⁷I'm using "Humean" not to refer to Hume's position, but to refer to the sort of reductionism defended by Lewis (1973, 1983), Loewer (1996), Beebe (2000), and Schaffer (2008).

¹⁸Strictly speaking, primitive laws are compatible with Immanence, but one of the main reasons for accepting Immanence is lost on this picture.

¹⁹Rives (2014) argues that Armstrong's solution to the inference problem requires transcendent universals; he relies on the same controversial premise as Mumford and Bolender's argument.

response is simply to reject the controversial thesis. As a result, Mumford and Bolender's argument lacks the interesting implications of my argument. Let's take a closer look.

Here is a brief summary of Armstrong's solution (1983, 88–99; 1997, 226–30). The second-order state of affairs $N(F,G)$ is not merely a *higher-order state of affairs*. It is simultaneously a *first-order structural universal* whose instances are complex states of affairs like *a's being F causes a's being G*. $N(F,G)$, understood as a first-order structural universal, is abstracted from complex causal states of affairs in the same way that a simple universal F is abstracted out of particular instances of F . The dual nature of the law—as both higher-order state of affairs and as a complex structural universal abstracted from *a's being F causes a's being G*—is supposed to be helpful in solving the inference problem because it allows Armstrong to claim that the higher-order relation N is identical to the singular causal relation. Thus, insofar as causation is familiar, N isn't mysterious.

The dual nature of $N(F,G)$ forms the basis of Mumford and Bolender's objection. Deriving a contradiction from that thesis, Immanence, and the claim that laws govern is straightforward. Because states of affairs are prior to universals, the complex causal states of affairs from which $N(F,G)$ is abstracted are prior to $N(F,G)$. But because $N(F,G)$ is a governing law, it is prior to the causal states of affairs that are its instances.

To respond to Mumford and Bolender's objection, we needn't reject Immanence, DTA, or the claim that laws govern. We can simply reject Armstrong's additional thesis concerning the dual nature of $N(F,G)$. This strategy is promising for two reasons. First, I don't think that Armstrong's solution to the inference problem is particularly satisfying. Second, I think that there is an alternative solution to the problem. I'll discuss these in turn.

I understand why positing a complex structural universal is relevant to making sense of the idea that instances of a law have something in common with one another. However, I don't think *identifying that structural universal with $N(F,G)$* makes any progress towards explaining the necessary connection between law and regularity. I just don't understand why some “new” instance of F would *have* to be a G just because existing F s are causally related to existing G s and $N(F,G)$ is abstracted from *them*. As a result, I don't find Armstrong's solution to the inference problem to be illuminating.²⁰

Even if I'm wrong about the intrinsic merits of Armstrong's solution, I don't think that rejecting it is costly. There are alternative solutions available. I prefer a solution most carefully developed by Jonathan Schaffer (2016), which mirrors my preferred solution to Bradley's relation regress (mentioned in footnote 16). The basic idea is this. *Everyone* needs ontological primitives. But the fact that something is a primitive element of our ontology does not mean that nothing can be said about it. Whenever we posit a primitive, we need to say what makes the primitive entity the entity that it is. We do this at least in part by specifying its relations to other elements of our ontology. To do this is to *axiomatize the primitive*. So, for example, suppose we stipulate that relation N is the irreducible second-order external relation such that, necessarily, for all universals F and G , if $N(F,G)$ then all F s are G s. That is the axiomatization of N . If we then posit a higher-order state of affairs $N(P,Q)$ in a world, we can't question whether all P s are Q s in that world. The axiomatization of N precludes the question from arising.²¹ If this is right, we have no need for Armstrong's controversial thesis concerning the dual nature of $N(F,G)$.

²⁰For what it's worth, I prefer a reductive account of the relevant structural universals. This is at odds with the claim the structural universal is identified with $N(F,G)$ since $N(F,G)$ as governing law is *not* supposed to be reducible. Readers familiar with Lewis's (1986) objection to structural universals will recognize that Armstrong's identification seems to commit him to a “magical account” of structural universals. Lewis finds this unintelligible as well, for reasons closely related to his failure to understand N .

²¹Tooley (1987, 123ff., 77–91) is at least open to the idea of solving the inference problem by way of axiomatization. See his discussion of the “indirect” or “general” approach to defining nomological relations. See Sider (1992) and Hildebrand (2013b) for arguments that Tooley's further “speculative account” fails so that he must rely on something like the axiomatic account.

6.b Bennett, Barnes, and Raven's objection

Bennett (2017, 14), Barnes (2018, 3.1), and Raven (manuscript) attempt to identify a smaller explanatory circle that arises between Immanence and Armstrong's account of states of affairs, with no need to bring laws into the picture. They appeal to various metaphysically explanatory relations (building, dependence, and ground, respectively), but I'll present the argument in terms of ontological priority.

Their basic worry is this. Armstrong seems to be committed to treating universals as prior to states of affairs, since they are constituents of states of affairs that explain relations of similarity (and difference) among states of affairs. But this is incompatible with Immanence, which says that states of affairs are prior to universals.

I suspect that Armstrong would accept Immanence and deal with the consequences. Here's how Barnes characterizes the consequences of this strategy:

If this horn of the dilemma is embraced, then the metaphysic becomes explanatorily impoverished. For example, we want to be able to say that the states of affairs of Jane's being human and Tom's being human have something in common. But if the ultimate explanatory bedrock is just the states of affairs, and not their constituents, then it's hard to see how we could explain this commonality. We want to be able to say that the constituents of a state of affairs *explain* why that state of affairs is the way it is. Jane's being human is the state of affairs it is because of the constituents Jane and being human, and it is more similar to Tom's being human than to Rex's being a dog because of the constituents involved in each state of affairs. (Barnes 2018, 57)

Here is a possible reply on behalf of Armstrong. Jane's being Human and Tom's being Human have something in common because we can abstract the same universal, *being Human*, out of them. That's what it is for states of affairs to resemble one another. Armstrong is pretty explicit that fundamental states of affairs have an internal structure, where the various components of this structure are their constituents. (See, for example, his extended use of the "layercake" versus "blob" analogy in Armstrong [1989].) But we need not equate *having internal structure in terms of various constituents* with *having constituents that are prior*. Consider an analogy to Schaffer's (2010) priority monism according to which the whole is more fundamental than its parts. Each Armstrongian state of affairs might be like that. Indeed, Raven's version of the argument derives a contradiction by explicitly including a constituency principle according to which constituents are prior to that which they jointly compose. As he points out, Armstrong could reject the principle and accept its intuitive costs.

For our purposes, it doesn't matter whether this reply to Armstrong is successful. My interest is not in refuting the objections of Barnes, Bennett, and Raven, but in exposing important differences between their objection and my objection. The crucial difference is this: because their objection aims for a smaller explanatory circle, it requires the additional constitutivity principle.²² Thus, although I am sympathetic toward their argument, it proceeds differently from mine and is to be settled on different grounds. Finally, I'll note that the implications of my objection discussed in section 5 remain the same even if their objection is successful.

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²²I happen to accept the constituency principle. I even appealed to a version of it to help support my claim that universals are prior to laws. However, I also provided independent support for the priority of universals. If laws are prior to both universals and states of affairs, they're incompatible with naturalism. If states of affairs are prior to both laws and universals (so that there is no priority relation between laws and universals), laws don't govern.

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