Humeans are out of this World[1]

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I.   Introduction

I defend the following argument in this paper:

1. Laws of nature are intrinsic to the universe.
2. Humeanism maintains that laws of nature are extrinsic to the universe.
C. Humeanism is false.

This argument is inspired by John Hawthorne's (2004) argument in "Humeans are out of their Minds". My argument differs from his; Hawthorne focuses on Humean views of causation and how they interact with judgments about consciousness. He thinks Humeans are forced to treat certain mental properties (insofar as they involve causal features) as extrinsic to conscious minds. I do not discuss causation or consciousness here. Instead, I focus on Humean accounts of laws. I argue that Humean laws are extrinsic to the entire universe. As such, Humeans are not just out of their minds; they are out of this world.

I aim to show that premises 1 and 2 are well-supported and that denying either of them comes at a cost. Nevertheless, some Humeans may prefer to reject 1 or 2 rather than give up Humeanism. Even if the Humean takes one of these routes, the argument above has philosophical import: it shows that Humeanism involves surprising commitments.

II.   Preliminaries

A. Laws as Features of the Universe

Humeans maintain that laws derive from the particular matters of fact comprising the Humean mosaic. We can think of the Humean mosaic as the "spatiotemporal distribution of local properties".[2] Popular Humean accounts take laws to be generalizations capturing regularities found in the mosaic. While we can characterize Humeanism in various ways, what's important for

[2] This is Lewis (1994, 473). For discussion and defense of Humean accounts of laws, see for example Lewis [1973], [1999], Beebee [2000], Schrenk [2006], Cohen and Callender [2009], Loewer [2012], Miller [2015], Bhogal and Perry [2016]), Dorst (2017), and Hicks (2017).

our purposes is that the Humean believes that the fundamental base consists of the objects found in the Humean mosaic, their physical properties, and the spatiotemporal relations they stand in to one another.

We will focus on whether the Humean's laws are extrinsic to the universe, but first we clarify what it is for a law to be extrinsic. We commonly take intrinsicality to apply to properties and relations. Intrinsic properties are those like *having a proper part*, and extrinsic properties are those like *standing next to McDonalds*. Since we do not typically take laws to be properties/relations,[3] we must specify how to assess the intrinsicality of laws. Where 'F' and 'G' are predicates picking out fundamental physical properties, a Humean law will have the form of a generalization, like $(\forall x)(Fx \supset Gx)$. The Humean's generalizations are supposed to be true propositions, not properties.

Despite this, we can think of laws as properties of the universe. We focus on Humeans who subscribe to the Best-Systems Account (BSA) of laws. Popularized by David Lewis (1983b), the BSA takes laws to be the true generalizations that are axioms of the best system, where the best system best balances simplicity and informativeness. Elizabeth Miller (2015) nicely captures the nature of the BSA as follows: "[According to the BSA] some proper subset of all the facts, or true propositions, about the mosaic will stand out insofar as its members jointly pin down the features of things more efficiently than the members of any other subset, optimally balancing simplicity and informativeness. The generalizations within this special subset are the laws." (1313). Supposing that $(\forall x)(Fx \supset Gx)$ is one such generalization, it will be a law of the BSA. The predicate '$(\forall x)(Fx \supset Gx)$ is an axiom of the system that best balances simplicity and informativeness' corresponds to the following property possessed by the universe:

Q: *being such that* $(\forall x)(Fx \supset Gx)$ *is an axiom of the system that best balances simplicity and informativeness.*

Where 'u' picks out the universe, we can now say:

$(\forall x)(Fx \supset Gx)$ is a law of the actual world iff Qu.[4]

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[3] One class of exceptions would be Armstrong [1983], Dretske [1977], and Tooley's [1977] accounts of laws, where laws are certain relations holding between universals.

[4] One may question this test for the intrinsicality of a law. Perhaps we should forget about Q entirely. Instead we could maintain that $(\forall x)(Fx \supset Gx)$ is intrinsic to a system S when the predicates appearing in it pick out properties that are intrinsic to S.

The problem is that this is not an adequate test for intrinsicality in general. This is easiest to recognize when assessing the intrinsicality of other universal generalizations. Suppose a fact is intrinsic to a system S iff all the predicates appearing in that fact are intrinsic to S. We will get the result that the following is an intrinsic fact of the universe:

$(\forall x)(x$ is part of u)

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If $(\forall x)(Fx \supset Gx)$ is a law, then every part of the universe (including the universe itself) has Q. Other properties are similarly possessed, like *being such that 2 + 2 = 4* and *being such that the Eiffel Tower is in Paris.* Every object in the universe, including the universe itself, has these properties as well.

B. What do we mean by "the universe"?

I take the universe to be the fusion of all spacetime and the concrete entities within spacetime. Entities' standing in spatiotemporal relations to one another is sufficient for their being parts of the same universe. If standing in spatiotemporal relations to one another is also necessary for being part of the same universe, then we can think of the universe as the fusion of entities, including spacetime points/regions, all of which stand in spatiotemporal relations to each other (although I will not assume that entities need to stand in spatiotemporal relations to one another in order to count as parts of the same universe).[5]

While the universe is concrete, I will not take a stand on the nature of possible worlds. If possible worlds are concrete entities, we may identify u with the actual world @ and other possible universes u', u", etc. with distinct possible worlds, w', w". But I am not committed to this. Perhaps possible worlds are abstract entities, fictional entities, linguistic entities, or something of that ilk.

III.   Supporting 1: Does it matter whether laws are intrinsic to the universe?

I motivate Premise 1 via three routes. First, I argue that, on the basis of an intrinsicality inheritance principle, someone with Humean motivations should expect laws to be intrinsic to the universe. Second, it is desirable to have intrinsic scientific explanations, and laws must be intrinsic to the universe to be parts of intrinsic scientific explanations. Third, taking laws to be intrinsic to the universe aids in certain modal judgments. So as to remain neutral in this

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Which intuitively captures the fact: "The universe is the entirety of what exists," i.e. everything is a part (improper or proper) of the universe u.

This will be an intrinsic fact of the universe as long as *is part of* is an internal relation that x stands in to u. And plausibly *is part of* is an internal relation. But this is the wrong result; the universal generalization above captures the fact that the universe has the property of being *lonely* and *loneliness* is an extrinsic property. The lesson, I think, is that we can't just look at the predicates/properties appearing within the universal generalization to determine whether the universal generalization is intrinsic to a system S. This is why I first "convert" the law into a property Q. I will later use two established accounts of intrinsicality to test whether that property Q is intrinsic to the universe. Thanks to an anonymous reviewer for very helpful discussion here.

[5] If abstract objects exist, like numbers, we can include them as components of the universe as well—perhaps ones that are spatiotemporally isolated from concrete entities.

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section, I do not assume a particular account of intrinsicality. I discuss specific accounts of intrinsicality in section IV.

A. Intrinsicality is Inherited.

A property P is intrinsic to an object x if x has P solely in virtue of x and its parts.[6] Laws ought to be intrinsic to the universe: they should hold solely in virtue of the universe and its parts. This is well-motivated for the Humean if we take the universe to be the fusion of parts of the Humean mosaic. The Humean maintains that, fundamentally, all that exists is the Humean mosaic. Thus, everything should derive from the Humean mosaic—the laws too. Let's start to unpack this idea with the following principle:

The Intrinsicality Inheritance Principle (P1*): If Px holds solely and ultimately in virtue of intrinsic facts of x, then P is intrinsic to x.

If P is extrinsic to x and Px holds in virtue of further facts, then Px should hold in virtue of some facts extrinsic to x. If Px holds solely and ultimately in virtue of intrinsic features of x, then there is no room for the extrinsicality to creep in. The Intrinsicality Inheritance Principle (IIP) accords well with our intuitive understanding of intrinsicality.

By "solely and ultimately", I mean that all the fundamental facts that Px holds in virtue of must be intrinsic facts of x.[7] "In virtue of" is a metaphysical notion that is typically used to back metaphysical explanation, but I'm not committed to any particular understanding of the "in virtue of" locution here.[8] We can define an "intrinsic fact of x" as follows: Φ is an intrinsic fact of x iff the property 'being such that Φ' is an intrinsic property of x.

Let's see how to deploy this principle. The Empire State building has its intrinsic (rest) mass solely virtue of the masses of its ultimate microphysical constituents.[9] The Empire State Building also has the extrinsic, non-fundamental property of *being located on 35th street in Manhattan* in virtue of facts involving entities distinct from it and its parts: the grid system of New York City. The IIP delivers the intuitively correct results.

The Humean should also accept P2*:

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[6] For use of this "in virtue of" locution in this context, see Lewis [1983a, 111-112] [1986, 61], Sider [1996, 3], and Weatherson and Marshall [2012], Witmer, Butchard, Trogdon [2005].
[7] For simplicity, I assume the existence of a fundamental base instead of a "gunky" descent of more and more fundamental properties/relations/facts.
[8] I do not take a stand on whether we should understand "in virtue of" modally or rather in terms of hyperintensional notions like Ground or other, per Wilson's (2014) locution, "small-g" grounding relations.
[9] For the purposes of discussion, I assume rest mass is intrinsic. But some philosophers (see Dasgupta 2013) disagree.

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P2*. Qu holds solely and ultimately in virtue of intrinsic facts of the universe.

The Humean thinks the universe has Q solely and ultimately in virtue of intrinsic facts of the universe. This is because all that exists, fundamentally speaking for the Humean, are the parts of the Humean mosaic, their intrinsic physical properties, and the spatiotemporal relations holding among them. (we will examine a way for the Humean to resist this thought in section V.B.1).

Philosophers discussing Humeanism often emphasize the that the Humean mosaic fundamentally consists solely of objects instantiating physical properties and standing in spatiotemporal relations and that the laws derive solely from the mosaic.

Harjit Bhogal (forthcoming):

"Humeanism about laws of nature to be the view that the laws of nature reduce to the Humean Mosaic — that is, the intrinsic physical state of each spacetime point (or each pointlike object) and the spatio-temporal relations between those points — and that the Humean Mosaic is not further reduced to anything else." (1)

Brian Weatherson (2015):

"All the facts about a world supervene on facts about which individuals instantiate which fundamental properties and relations [and]… The only fundamental relations that are actually instantiated are spatio-temporal, and all fundamental properties are properties of points or point-sized occupants of points." (101)

David Lewis (1994):

"The whole truth about a world like ours supervenes on the spatiotemporal distribution of local qualities." (473)

Given that the spatiotemporal distribution of local qualities is intrinsic to the universe, the Humean should treat the fundamental facts as intrinsic to the Humean mosaic and take the laws to hold in virtue of them.[10] Since a law of the form $(\forall x)(Fx \supset Gx)$ holds in virtue of fundamental facts capturing

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[10] While the spatiotemporal relations are extrinsic to the points/objects standing in them, the fact that points/objects stand in these relations is still intrinsic to the universe. Let's spell this out: suppose that point a is 5 meters from point b. This relation is extrinsic/external to points a and b: a and b do not stand in this relation in virtue of their intrinsic properties. Nevertheless, the property *being such that a is 5 meters from b* is intrinsic to the universe u. u has this property solely in virtue of facts involving its parts (a and b) and the relations (5 meters from) they stand in to each other.

patterns in the mosaic, Qu should obtain solely and ultimately in virtue of intrinsic facts of the universe.

We now have an argument for treating laws as intrinsic to the universe:

P1*: If Px holds solely and ultimately in virtue of intrinsic facts of x, then P is intrinsic to x. (*Intrinsicality Inheritance Principle*)

P2*. Qu holds solely and ultimately in virtue of intrinsic facts of the universe.

C*. Q is an intrinsic property of the universe.[11]

Before proceeding to additional motivations for taking Humean laws to be intrinsic, we should note that a generalized version of this argument is problematic for Humeanism. Q is not special above. Given that all of the Humean´s fundamental facts are intrinsic facts of the universe, and everything else is supposed to obtain solely and ultimately in virtue of these fundamental facts, it seems *every* property should be intrinsic to the universe on the Humean's account. But this strikes us as false: there are extrinsic properties of the universe as well.[12]

As the IIP seems compelling, I suspect that the best option for countenancing extrinsic properties of the universe is to deny that extrinsic facts of the universe hold solely and ultimately in virtue of intrinsic ones. Perhaps there are fundamental extrinsic facts of the universe after all. And, in that case, perhaps we can also have non-fundamental extrinsic facts of the universe; they would hold at least partially in virtue of those fundamental extrinsic facts.[13] The Humean could then acknowledge extrinsic facts of the universe.

But given the explicit statements by Bhogal, Weatherson, and Lewis above, the Humean cannot accept this. If they are correct, the Humean is committed to claiming that all of the fundamental facts are intrinsic to the universe. As I will assume that the Humean wants to retain this commitment, there is still an

[11] It is unclear whether the Anti-Humean will find a variant of this argument compelling. There are three relevant points of difference between the Humean and the Anti-Humean: A. If the Anti-Humean denies that laws are universal generalizations, they will take law properties to have a different form than Q (see section IV). B. It is not an explicit tenet of Anti-Humeanism to take all fundamental facts to be intrinsic to the universe. And 3. Even if the Anti-Humean takes all fundamental facts to be intrinsic to the universe, she will likely think the universe includes more elements than the Humean accepts, such as universals, primitive powers/dispositions, and/or primitive modal properties.

[12] For instance, the universe may have the extrinsic property of *being all that exists*.

[13] Fundamental extrinsic properties are controversial. The accounts of intrinsicality we discuss in the next section assume that fundamental properties are intrinsic. However, I offer a modification of one of the accounts of intrinsicality (see footnote 25) that allows for extrinsic fundamental properties. For the possibility of fundamental extrinsic properties, see Bricker (1993), Yablo (1999), and Weatherson (2006). An anonymous reviewer provided very helpful insights here.

outstanding problem of whether and how the Humean should countenance extrinsic properties of the universe.

We can think of what follows as exploring just one facet of this more general issue. As we will see, we are pressured (given our leading accounts of intrinsicality, section IV) to treat Humean laws as extrinsic to the universe. But given the Humean's commitments here (as well as the considerations in subsections b and c), we would expect laws to be intrinsic to the universe. The aim will be to figure out whether the Humean can ease this tension.

B. We want intrinsic explanations

Let's examine another source of motivation for P1. When we explain something about a system S we want our explanation to be intrinsic to S. This idea descends from Eddon (2014), Field (1980), Milne's (1986) discussion of intrinsic explanations in the context of scientific explanations. Field puts the thought as follows: "underlying every good extrinsic explanation there is an intrinsic explanation." If we explain the structure of spacetime by appealing to spacetime points and the relations they stand in, for instance, we would presumably have an intrinsic explanation. However, if we attempt to explain the structure of spacetime by appeal to mathematical facts invoking abstract objects like numbers, this would yield an extrinsic explanation of spatiotemporal phenomena.[14] Appealing to mathematical objects and properties in a scientific explanation renders the explanation extrinsic.

While perhaps not all scientific explanations invoke laws, many do. Both Humeans and Anti-Humeans take laws of nature to play an explanatory role. Realists about laws typically appeal to laws in order to explain particular matters of fact. If we want scientific explanations to be intrinsic generally, then we should want nomological explanations to be intrinsic.[15]

How do we define an intrinsic explanation? According to Eddon (substituting 'properties' for 'predicates' for uniformity's sake), an explanation is an *intrinsic explanation* iff it only involves intrinsic facts and intrinsic [properties]." (271). To clarify, the properties in an intrinsic explanation should not just be intrinsic but intrinsic to the system in question. Just as we want the properties featured in explanatory facts and laws to be intrinsic to the system, we should want the laws themselves to be intrinsic to the system. I refer to the conception of an

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[14] See Field [1980], Melia [1998], Baker [2009] for discussion.

[15] This may not be the only concern about intrinsic explanations impacting the Humean. Humean explanations involve explaining instances like Gb in terms of Fb and $(\forall x)(Fx \supset Gx)$. Some philosophers have worried that, by invoking the regularity, the explanation contains information that isn't relevant to b itself. (See Bird 2007 86-90). Can we understand this notion of irrelevance to b (at least partially) in terms of extrinsicality to b? This is a worthwhile question to investigate. Thanks to an anonymous reviewer for bringing this to my attention.

intrinsic law from above: A Humean law $(\forall x)(Fx \supset Gx)$ is intrinsic to the universe just in case the property, Q, *being such that $(\forall x)(Fx \supset Gx)$ is an axiom of the best system* is intrinsic to the universe. This is our criterion from section III.A. To clarify, we shouldn't expect the property Q or the proposition/fact Qu to appear in nomological scientific explanations. Instead, the law itself— the universal generalization—appears in the scientific explanation.[16] We only refer to Q to assess whether the law in question is intrinsic to the universe. Equipped with this conception of an intrinsic law, we claim that an intrinsic explanation of a phenomenon of system S involves only the intrinsic properties, facts, and laws of S. If the system in question is the universe, we should want the explanatory properties, facts, and laws to be intrinsic to the universe.

Pausing here, what is bad about an extrinsic explanation? One bad-making feature of extrinsic explanations—which Field and Eddon focus on—is that they often involve entities that are causally or spatiotemporally unrelated to the phenomena being explained, mathematical objects in the above example. The Humean's extrinsic laws do not necessarily generate extrinsic explanations in this sense (although see section V.B.1 for a possibility along these lines). I will not argue that Humean laws depend on abstract numbers or invisible spaghetti monsters, for instance. If that were the case, Humean laws would generate extrinsic explanations in the worst sense because the laws would depend (at least partially) on objects that exist but are somehow not part of the universe.

A nomological explanation is extrinsic to the universe u *in the worst sense* iff it invokes laws that involve—or hold at least partially in virtue of—objects that exist but are somehow not part of the universe. I will show that Humean nomological explanations are extrinsic to u in another sense, in a moderate sense: A nomological explanation is extrinsic to the universe u *in a moderate sense* iff it invokes law(s) that obtain partially but not wholly in virtue of the universe's parts.

The Humean should deny that nomological explanations are extrinsic even in the moderate sense. The reasoning for this descends from the considerations in the previous subsection: The intrinsic facts of the Humean mosaic seem to be all the Humean has at the fundamental level. If the facts/properties/laws appearing in explanations of physical events are fundamental or hold in virtue of fundamental facts of the universe, then they too should be intrinsic to the universe. Thus, explanations of physical events should be in terms of the intrinsic facts/properties/laws of the universe. The internal workings of at least one physical system, the universe, should suffice for nomologically

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[16] It is important that it is the universal generalization, not Qu, which appears in scientific explanations. This is because the Humean desires to maintain a logical inference from the laws (and initial/boundary conditions) to particular matters of fact. For example, we can logically deduce that a is G from the fact $(\forall x)(Fx \supset Gx)$ and Fa. This is an advantage that Humeans often take their explanations to have over Anti-Humean nomological explanations. Thanks to an anonymous reviewer for highlighting and emphasizing this.

explaining physical events.[17]

C. Taking laws to be intrinsic to the universe has added benefits.

In a final consideration for P1, we should note that the intrinsic/extrinsic distinction has philosophical utility. Intrinsic properties help establish genuine similarity between objects, more so than extrinsic properties oftentimes. For instance, two spheres' sharing their intrinsic shape and mass properties makes for greater similarity than their sharing the property of *being 5 meters from a McDonald's* or *being thrown.* And taking laws to be intrinsic to the universe should lead one to take two universes with the same laws to be similar in an important respect. Possible worlds with the same laws are more similar to ours (generally) than possible worlds with different laws.

The Humean is often confronted with the question of how Humean laws, if they are regularities over the actual Humean mosaic, support counterfactuals. Why do nearby possible worlds share the same laws? Not all Humeans think they have a problem answering this question.[18] Yet if the laws are intrinsic to the universe, we have an additional response to the question of why laws support counterfactuals. Worlds with the same laws are nearer to ours than worlds with different laws because worlds sharing the same laws share an intrinsic property—they are genuinely similar to one another in an important respect. If laws are extrinsic to the universe, we cannot appeal to this rationale.

While this does not require us to posit intrinsic laws, it highlights an attractive consequence of taking laws to be intrinsic to the universe. If sharing intrinsic properties makes for genuine similarity, it makes sense that worlds with the same laws would be genuinely similar in at least some respects. And if similar worlds are "closer" to one another in modal space, we should not be surprised that worlds with the same laws typically reside in the same modal neighborhoods.

IV.   Supporting P2: Humean laws are extrinsic

I will examine two accounts of intrinsicality and show that property Q (*being such that* $(\forall x)(Fx \supset Gx)$ *is an axiom of the best system*) is extrinsic to the universe on both of them. The first account is Lewis's classic Duplication Account of intrinsicality. The second is a more recently developed, hyperintensional account of intrinsicality, "The Analysis Account" (inspired by Skow (2007) and

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[17] It's important to distinguish the metaphysical notion of "in virtue of" from the notion of a scientific explanation here: If all the premises/explanans of a *scientific* explanation of E hold solely *metaphysically* in virtue of facts intrinsic to u, then the explanans (of the scientific explanation) should be intrinsic to u.

[18] For example, see Loewer (2007), 321.

Marshall (2015)). The Analysis Account aims for greater generality than the Duplication Account.

A. The Duplication Account

David Lewis (1983b) popularized The Duplication Account of intrinsicality, which maintains that a property P is intrinsic if and only if all duplicates have P or all duplicates lack P. Objects x and y are duplicates when their parts stand in a one-to-one correspondence, and their parts share all of their perfectly fundamental properties and stand in the same perfectly fundamental relations. Objects can have duplicates in the actual world as well as in other possible worlds. Fundamental properties, for Lewis, are the ones that carve nature at its joints. They make for objective similarity, causal powers, and they include ones found in our best physical theories of the world. If our best theories discuss determinate mass and charge, then these properties will count as fundamental.[19]

To show that laws are extrinsic to the universe on the Duplication Account, we must assume the following:

The Possibility of Expansion: while the concrete universe (u) is not a proper part of any concrete entity in the actual world, it (or its counterpart) is the proper part of a concrete entity in at least one possible world.

To clarify, there are other possible worlds where u (or a counterpart of u) exists, but where it is not what inhabitants of that world would call "the universe". In those worlds, u is a proper part of a larger whole, u'. If u' is not a proper part of any concrete object, u' would earn the title of "the universe" in that possible world. Many metaphysicians take on board the Possibility of Expansion in the midst of their metaphysical theorizing.[20] However, we do not need this assumption to show that Humean laws are extrinsic to the universe on every conception of intrinsicality. The next conception of intrinsicality we explore does not require it.[21]

Given the possibility of expansion, there are pairs of duplicates where one member has Q and the other lacks Q. The universe itself has such a duplicate. Suppose that the universe (u) actually has Q, i.e. it is such that $(\forall x)(Fx \supset Gx)$ is an axiom of the best-system. We can consider another possible world w'

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[19] Lewis preferred locution is 'naturalness' rather than 'fundamentality', but I will continue to appeal to fundamentality.

[20] See, for example, Schaffer's (2010, 318) discussion of the possibility of expansion in Russell (1985) and Parson's (2006) views.

[21] Aaron Segal (2015) also discusses the possibility of expansion and how adopting it can render the Humean's laws extrinsic under the Duplication Account. My discussion differs from Segal's. First, I show that we do not need to accept the possibility of expansion to show that the Humean's laws are extrinsic. Second, Segal does not raise the possibility of extrinsicality as an issue for the Humean about laws. Instead, he is interested in comparing the intrinsicality of Humean accounts of laws with those of causation.

containing a duplicate of u, u*: the parts of u and those of u* stand in a one-to-one correspondence, and all of u and u* parts have the same fundamental properties and stand in the same fundamental relations to one another. However, in w', u* does not comprise the entire universe. u* is a proper part of a greater whole, u'. In w', we posit that there are many additional F's—none of which are Gs. These additional Fs are not found within u*, but in a distinct part of u'. As such, it is not the case that u* is such that all $(\forall x)(Fx \supset Gx)$ is an axiom of the best system. $(\forall x)(Fx \supset Gx)$ is not even true in w'. So u* lacks Q even though it is a duplicate of u. Q is extrinsic on the Duplication Account.

B. **The Analysis Account**

Some philosophers argue that the Duplication Account is the wrong account of intrinsicality. Robert Francescotti (1999), Maya Eddon (2011), and Ralf Bader (2013) forcefully argue that an account of intrinsicality should account for hyperintensional distinctions, which a modal account of intrinsicality—like the Duplication Account—cannot. The Duplication Account treats all necessarily instantiated properties as intrinsic. Avoiding this concern for the Duplication Account, some philosophers instead appeal to hyperintensional resources in order to characterize intrinsicality. For example, Rosen (2010) and Bader (2013) use ground. Skow (2007) and Marshall (2015), appeal to a notion of metaphysical analysis to characterize intrinsicality.[22]

I will show how Q is extrinsic to u on a hyperintensional account using metaphysical analysis.[23] The Analysis Account I present here is similar to ones advocated by Skow (2007) and Marshall (2015). Like the Duplication Account, this account will also treat Q as an extrinsic property of u.

Analysis Intrinsicality: A property P is intrinsic to an object x just in case, where 'x' is a name referring to object x, and 'P' is a predicate picking out property P, if 'x is P' has a metaphysical analysis, there is at least one metaphysical analysis of 'x is P' wherein:

(1) Every (first-order) quantifier in the metaphysical analysis of 'x is P' is restricted to x's parts.

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[22] There are also similarities between analysis accounts and Francescotti's [2014] relationist account of intrinsicality.

[23] I opt for a metaphysical analysis account over a grounding account because I think Analysis Accounts can avoid some of the problems for a grounding account raised by Marshall [2015] and [ms]. In particular, grounding accounts of intrinsicality have trouble accommodating the extrinsicality of certain properties related to loneliness. See Bader [2013] for criticism of Rosen's [2010] account in this respect. See Shumener [ms.] for criticism of Bader's account on related issues.

(2) The only (object) names in the metaphysical analysis name x's parts.[24]

I follow Skow (2007) in taking a metaphysical analysis of 'x is P' to state what it is for x to have P in terms of perfectly fundamental or "joint-carving" predicates standing for properties and relations. If P is a fundamental property an object x possesses P fundamentally, then 'Px' would receive no metaphysical analysis. Thus, the account above treats P as intrinsic to x when Px is fundamental; although, we may wish to modify the account if this is an undesirable result.[25] Metaphysical analyses relate sentences to other sentences.[26]

Here are some examples of metaphysical analyses (assuming that hydrogen and oxygen, microphysical mass are fundamental properties for the time being): we analyze 'x is water' as 'x is H_2O'. We analyze 'o has 2kg of mass' as 'b is part of o & b is 1.7×10^{-27} kg & c is part of o & c is 9.1×10^{-31} kg . . . & $(\forall x)$(x is part of o $\supset$ x = b $\vee$ x = c, . . .)'.

The quantifiers in a metaphysical analysis are restricted to an object t and its parts when the quantified statements in the analysis take one of the following forms:

$(\forall x)$(x is part of t $\supset$…)

Or,

$(\exists x)$(x is part of t &...)

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[24] Further refinements of this account are needed to accommodate the intrinsicality of relations, higher-order properties, and situations where no fundamental properties are available. See Shumener [ms] for discussion.

[25] As written above, the proposal treats fundamental properties as intrinsic. This is because if x possesses P fundamentally, 'Px' will have no metaphysical analysis. But this may not be acceptable if we think that some fundamental properties can be extrinsic to their bearers. See footnote 13 for discussion. To allow for the possibility of fundamental extrinsic properties, we can accept an alternative treatment of fundamental properties on the Metaphysical Analysis proposal. We can attach an addendum to the criterion above:

(1) If 'Px' has no metaphysical analysis, then P is intrinsic to x when every (first-order) quantifier in 'x is P' is restricted to x's parts. And the only (object) names in 'x is P' name x's parts.

In other words, even though 'x is P' doesn't have a further metaphysical analysis, we can still look at the quantificational structure, predicates, and names appearing in 'x is P' to determine whether P is intrinsic to x.

[26] Metaphysical analyses are somewhat similar to Sider's [2011] "metaphysical semantics." We have a choice between representing metaphysical analysis as a relation, *metaphysically analyzes*, holding among facts or propositions. But we can also represent "metaphysically analyzes" as a sentential operator. I opt for the latter alternative.

Q is extrinsic to u on this account because the analysis of 'Qu' contains quantifiers which are not restricted to parts of the universe. To find the perfectly fundamental analysis of 'Qu', we need to analyze 'u is such that $(\forall x)(Fx \supset Gx)$ is an axiom of the best system' in terms of a distribution of perfectly fundamental properties and relations. For simplicity, let's continue to suppose that F and G are perfectly fundamental properties. '$(\forall x)(Fx \supset Gx)$' thus already involves only perfectly fundamental predicates. It is less clear what distribution of perfectly fundamental properties and relations 'is an axiom of the best system' corresponds to, but no matter for our purposes. We know already that a metaphysical analysis of 'Qu' will contain a quantifier that is not restricted to parts of the universe. This is because the universal quantifier in $(\forall x)(Fx \supset Gx)$ is not restricted to the universe's parts. If it were, it would read $(\forall x)(x$ is part of u & Fx $\supset$ Gx). So Q is extrinsic to u according the Analysis Account as well. Properties involving both lawlike and "accidental" universal generalizations will count as extrinsic on this account. The extrinsicality of Q arises from the fact that it involves an unrestricted universal generalization. Furthermore, the extrinsicality of Q does not here depend on the possibility of expansion.

V. Resisting Premise 2.

A. The Wrong Law Properties?

You may reject Premise 2 by resisting taking Q to be the Humean's law property. You may instead think the relevant law property should more akin to Q' than Q:

Q': *being such that $(\forall x)(x$ is part of u and Fx $\supset$ Gx) is an axiom of the best-system of u).*[27]

The universal quantifier in Q is unrestricted while the one in Q' is restricted to u's parts. Q' also explicitly requires that the generalization be an axiom of the best system of u instead of the best system at whatever possible world possesses Q. It is important for my argument that Q is the Humean's relevant law property and not Q' since Q' does appear to be an intrinsic property of u on both accounts of intrinsicality above.

We have good reason to take Q rather than Q' to be the Humean's law property. First, it is standard practice to take the laws to be unrestricted generalizations such as $(\forall x)(Fx \supset Gx)$. Taking the law property to have the form *being such that $(\forall x)(x$ is part of u $\supset$ (Fx $\supset$ Gx)) is an axiom of the best-system of*

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[27] Alternatively, if we want to appeal to possible worlds instead of the concrete universe, Q":
$(\forall x)($ (x is located at possible world w and Fx $\supset$ Gx) is an axiom of the best-system at w). The same problems will hold for Q" as for Q'.

u implies that the laws have a different structure than we normally take them to have: $(\forall x)(x \text{ is part of } u \supset (Fx \supset Gx))$ instead of $(\forall x)(Fx \supset Gx)$.

But more importantly, if we take Q' to be the law property, then we will lose the *modal robustness* of the laws. Laws should obtain in nearby possible worlds. On this suggestion, worlds which intuitively have the same laws as ours will now have different laws and law properties. Another universe v where $(\forall x)(Fx \supset Gx)$ holds but which contains different objects than u will thereby have a different law, $(\forall x)(x \text{ is part of } v \supset (Fx \supset Gx))$. Since v is distinct from u, the laws of the possible world containing v as its universe differ from the laws of the world containing universe u. Those worlds should share their laws, but on this suggestion, the two possible worlds have different laws.

Relatedly, the laws are not *counterfactually stable* on this proposal. When evaluating counterfactuals like:

If JFK hadn't been shot, then he would have completed his term.

If the Titanic had swerved around the iceberg, it would have remained afloat.

We intuitively keep the laws fixed.[28] If the content of the laws changes whenever the constituents of the universe change, then we cannot hold content of the laws fixed and maintain that laws are counterfactually stable. That is because universes where JFK is not shot and ones where the Titanic avoided the iceberg intuitively contain parts which are distinct from the actual universe's parts. Adopting Q' rather than Q leads us to deny that the same laws hold in those worlds.

B. The Wrong Universe?

The extrinsicality of Humean laws is related to the problem finding truthmakers for universal generalizations: the internal workings of the universe do not seem to suffice for the truth of universal generalizations. This is a familiar problem—and not one that impacts the Humean alone. Philosophers have long searched for truthmakers for universal generalizations/negative existentials. In this section, we will assess whether the resources from the truthmaker debate can help secure the intrinsicality of the Humean's laws.

1. The universe includes a totality state

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[28] Although, see Lewis (1981) for discussion of whether counterfactuals like these involve breaking the laws.

Another way to resist Premise 2 is to claim that the universe (u) is not *just* the fusion of spatiotemporal points and regions. Perhaps u also includes a more elusive object as a part: the primitive totality object or state of affairs (t). The totality object or state of affairs captures the fact that there are no spatiotemporal parts outside of u. We could then claim that there are no duplicates of u that contain Fs which are not Gs. Any duplicate of u will contain a part corresponding to t, which ensures there are no spatiotemporal regions outside of u. As such, Q will be intrinsic to u at least according the Duplication Account of intrinsicality.

This is problematic for a few reasons. First, t is a strange object to include as part of the Humean mosaic. t does not seem to be spatiotemporally located the way the other parts of u are. If we reject extrinsic explanations in the worst sense because they invoke causally or spatiotemporally unrelated phenomena (Section III), it would be odd for to posit that u contains as a part a mysterious entity like t in order to ensure the intrinsicality of the Humean's nomological explanations.

Second, including t as part of the universe causes issues for both accounts of intrinsicality discussed above. While Q is now intrinsic to the universe according to the Duplication Account, intuitively extrinsic properties of the universe are now rendered intrinsic. For example, *loneliness* is a quintessentially extrinsic property. An object o is lonely in w when everything in w is an improper or proper part of o. The fact that Jaegwon Kim's account of intrinsicality could not accommodate the extrinsicality of loneliness was part of the motivation for Lewis's Duplication Account.[29] But if u includes the totality object t as a part, then loneliness will be an intrinsic property of the universe. This is because every duplicate of the universe would include its totality state.

The Humean could respond that while loneliness is an intrinsic property of the universe, loneliness is still an extrinsic property of u-: the object that includes all the same parts as the universe except for the totality state. However, u- does not possess the property *loneliness* at all: u- is accompanied by the totality state. The Duplication Account is committed to taking loneliness to be an intrinsic property, full stop.

Turning to the Analysis Account of intrinsicality, taking t to be part of the universe does not secure the intrinsicality of Q to the universe. This is because, even if u includes a totality state, the property in the metaphysical analysis of Qu would be the same as it is above: it will still involve an unrestricted universal quantifier.

2. **The universe has the essential property of *being all there is.***

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[29] Lewis [1983a].

The Humean has another option in the vicinity. Perhaps we should claim that while u is the fusion of concrete spatiotemporal regions, there is another object u^ that has the better claim for the title "the universe". u^ is composed of exactly the same concrete spatiotemporal regions as u, but which—unlike u—has the essential property of *being all that there is*, where we treat this property as a primitive fundamental property of u^; it does not invoke a universal quantification like Q does above. The Humean's laws are not intrinsic to u; yet, they *are* intrinsic to u^, at least on the Duplication Account of intrinsicality. There are no duplicates of u^ which contain spatiotemporal objects distinct from u. And thus, there are no additional regions which contain Fs that are not Gs.

This alternative has advantages over the first attempt to appeal to totality states above. Here we do not posit a primitive totality object or state in addition to the spatiotemporally located entities in u. Instead, we posit an additional object that shares all and only the spatiotemporal parts of u (u^) where u and u^ differ only in their essential properties.

However, we should be uncomfortable with this approach. It requires us to posit fundamental properties over and above the physical properties and spatiotemporal relations instantiated by pieces of the Humean mosaic. Here we take the property of *being all there is* to be fundamental. For the same reasons that positing an object like t may undermine the Humean's objectives, positing primitive properties like *being all there is* may do so as well. And, more significantly, it does not seem that Q will be intrinsic to u^ on the Analysis Account of intrinsicality. The metaphysical analysis of 'u^ is such that $(\forall x)(Fx \supset Gx)$ is an axiom of the best system' will presumably still have an unrestricted universal generalization appearing in it.

3. We must consider the universe relative to a counterpart relation

We can extract a similar proposal from Rosen and Lewis's (2003) discussion truthmakers for negative existentials. It is notoriously difficult to find truthmakers for negative existentials like 'Unicorns do not exist' because the universe doesn't suffice for the truth of 'Unicorns don't exist'. Given the Possibility of Expansion, there are duplicates of the universe that nevertheless are parts of larger universes containing unicorns.

Rosen and Lewis suggest that the truthmaker for a negative existential like 'Unicorns don't exist' is not *just* the universe but the universe considered under a certain counterpart relation. The truthmaker would be the universe under the counterpart relation specifying that the universe is unaccompanied. We can import this proposal into our current discussion: perhaps the truthmaker for a law of the form $(\forall x)(Fx \supset Gx)$ is the universe under the counterpart relation of "being unaccompanied" or "there being no additional Fs." While the laws are not intrinsic to the universe simpliciter, they are intrinsic to the universe considered under certain counterpart relations. Any duplicate of the

universe considered under the counterpart relation of "containing no further Fs" or "being all there is" is one where $(\forall x)(Fx \supset Gx)$ obtains.

One advantage of this approach over the previous one is that it does not require that we posit multiple objects. We still only have one universe, and we consider it under different modal profiles. However, this approach is still problematic. Similar to the above proposals, it is not clear that Q will be intrinsic to the universe qua unaccompanied by further Fs whatever on the Analysis Account. The metaphysical analysis of 'u-qua unaccompanied by further Fs is such that $(\forall x)(Fx \supset Gx)$ is an axiom of the best system' will still have an unrestricted universal generalization appearing in its analysis.

Furthermore, it isn't clear that we should assess the intrinsicality of properties of objects relative to counterpart relations. It is too easy to secure the intrinsicality of any property relative to some counterpart relation. Even quintessentially extrinsic properties, like *being 5 feet from McDonalds* will be intrinsic to objects considered under some counterpart relations. For example, if a cat Felix, is 5 meters from Mcdonalds, *being 5 feet from McDonalds* will be intrinsic to Felix under the counterpart relation of being 5 feet from McDonalds. Taking counterpart relations into account undermines our intrinsicality judgments in general.

VI.   Hawthorne's original argument and Weatherson's response

My argument is inspired by John Hawthorne's (2004). Brian Weatherson (2007) responded to Hawthorne's argument alleging that Hawthorne's argument is invalid. In this section, I argue that Weatherson's response to Hawthorne's argument will not work for my argument.[30]

Hawthorne's original argument:

(1) An intrinsic duplicate of any region wholly containing me will contain a being with my conscious life.

(2) There are causal requirements on my conscious life.

C. Therefore, Humeanism is false. (Hawthorne 2004: 351-2)

According to Humeanism, "the causal facts pertaining to any subregion of the world are extrinsic to that region" because facts about causation supervene on the global distribution of "freely recombinable fundamental properties." (351) Thus, we cannot ensure that any duplicate of a region wholly containing Hawthorne will contain a being with Hawthorne's conscious life.

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[30] See Pallies (2019) for further discussion of Weatherson's response.

Weatherson maintains that Hawthorne's argument is invalid. He says:

> "What follows from (1) and (2) is that any region containing Hawthorne must possess some causal properties intrinsically. (As Hawthorne argues on page 356.) And what Humeanism entails is that causal properties are extrinsic properties of regions. But there is no incompatibility here, for it is possible that extrinsic properties are possessed intrinsically..." (2007, 2)

Weatherson distinguishes between a property's being extrinsic and its being possessed extrinsically. [31] Weatherson provides the following example: we think that *containing an uncle* is an extrinsic property of a spacetime region and its contents. There are duplicate spacetime regions where one region contains an uncle and the other does not. For example, suppose that Bob is in fact an uncle. There are possible duplicates of regions containing Bob where duplicate Bob's siblings never have offspring. Thus, *being an uncle* is extrinsic. However, if we look at *specific* spacetime regions, containing an uncle may be intrinsic to *them*. Let's look at the spacetime region encompassing the Earth and its contents (from the beginning of time). If Bob is an uncle, all duplicates of this larger spacetime region (and its contents) will contain an uncle as well. All duplicates of this larger region will contain duplicates of Bob, duplicates of Bob's siblings, and duplicates of his nieces and nephews: An extrinsic property is possessed intrinsically by the larger region encompassing Earth. Weatherson then argues that the Humean can allow that causal properties are extrinsic but that causal properties are sometimes possessed intrinsically by conscious beings.

Weatherson's response won't work in this context: We are only concerned with whether Q is an intrinsic property of the universe. Using Weatherson's locution, we are concerned with whether the universe has Q intrinsically. And while Lewis's original Duplication Account is not sensitive to the distinction between a property's being extrinsic versus being possessed extrinsically, here we focused specifically on duplicates *of u* and found that while u has Q some duplicates of u lack Q (namely u* from section IV). Thus, u has Q extrinsically in the sense that not all duplicates of u have Q nor do all duplicates of u lack Q. Q is extrinsic *to u*. We also assessed whether Q is intrinsic to u on another account of intrinsicality—The Analysis Account—which assessed whether Q is intrinsic to the universe. Thus, we were concerned from the outset with whether the specific object u possessed Q intrinsically or not in Weatherson's sense. We found u to have Q extrinsically on both accounts.

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[31] Some philosophers distinguish three varieties of intrinsicality, "a property P's being intrinsic", "a property's P's being intrinsic to x" and "x possessing a property P intrinsically". See Humberstone [1996] and Bader [2013]. The distinction between "Q being intrinsic/extrinsic to u" and "u possessing Q intrinsically/extrinsically" will not make a difference in this context.

Weatherson has another response available. Returning to our example from above, suppose that all Fs are Gs in a possible world w where the universe is u, and suppose there is another possible world, w' containing universe u' which has a duplicate of u, u*, as a proper part. u' also contains Fs which are not Gs. So it is not true that all Fs are Gs is true of u' as a whole.

Weatherson may employ the distinction between being intrinsic and being intrinsic to a region by appealing to a distinction between *local laws* and *global laws*.[32] In world w', some laws are *local* to spacetime regions. The law $(\forall x)(Fx \supset Gx)$ is local to region u* even though it is not a law holding throughout the entire universe u'; i.e. it is not a *global* law. In world w where u encompasses the entire universe, we didn't need to appeal to the local/global distinction. $(\forall x)(Fx \supset Gx)$ is a global law in w. Perhaps Q is an intrinsic property of u in the sense that all of u's duplicates have Q, though some may just possess Q as a local law property.

This response doesn't work for the same reason that the proposal in section V.A doesn't work. Even if we consider $(\forall x)(Fx \supset Gx)$ to be a local law of u (and u*), Q will not be instantiated by all duplicates of u. Q is the property *being such that all Fs are Gs.* Q is not instantiated by u* as Q builds in no restrictions to regions. u* does not instantiate Q because it is not true that all Fs are Gs in world w'.   Instead u* instantiates the restricted property *being such that $(\forall x)$(x is part of u* $\supset$ (Fx $\supset$ Gx)).* But as we have seen in section V.A., this is not a good candidate for a law property.[33]

Weatherson raises another issue for Hawthorne's original argument. He suggests that the Anti-Humean about causation may take causal properties and relations to be extrinsic as well. If so, then even if Hawthorne's argument is successful it may not raise a special problem for the Humean about causation. Similarly, if the Anti-Humean's laws are also extrinsic to the universe then perhaps extrinsic laws are not just the Humean's burden to bear.

VII.   Are the Anti-Humean's laws intrinsic to the universe?

So far, the argument has only focused on the Humean, but let's assume that the Anti-Humean also wants the laws to be intrinsic to the universe. Can she get this result? Anti-Humeans come in many varieties. They typically deny that laws are generalizations capturing regularities in the mosaic. Some Anti-Humeans take laws to be necessitation relations holding between universals, some take laws to arise from properties' dispositional profiles, others take laws

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[32] Thanks to an anonymous reviewer for helpful insights here.
[33] Would it help if local laws could be false universal generalizations? I´m not sure, but see Braddon-Mitchell (2001) for discussion of this idea.

to depend upon primitive counterfactual claims, and still others take laws to be primitive.[34]

I am not sure that every Anti-Humean can posit laws that are intrinsic to the universe, but I think that some of them can. Specifically, a version of the Dretske-Tooley-Armstrong (DTA) theory can posit laws of nature which are intrinsic to the universe. According to the DTA theory, laws are necessitation relations holding among universals. We focus on Armstrong's implementation of this view in what follows. For Armstrong, universals are spatiotemporally located. Let us pinpoint the relevant Anti-Humean law property of the universe. Supposing F and G are fundamental universals, and N is the fundamental nomic necessitation relation holding between them:

R: *being such that N(F, G).*

N(F, G) is a law of u iff u *is such that N(F, G).*

So, N(F, G) is a law of the actual world iff Ru.

We now examine whether R is intrinsic to u on the accounts of intrinsicality above. Fness and Gness are located wherever their instantiations are. If the universe includes as parts all entities that stand in spatiotemporal relations, universals should be parts of the universe. Since Fness and Gness stand in spatiotemporal relations (they are spatiotemporally located at regions), they are parts of u. Recall that being spatiotemporally related is a sufficient condition for being parts of the same universe.

R is intrinsic to u on the Duplication Account of intrinsicality. Any duplicate of u is an object whose parts stand in a one-to-one correspondence to those of u, and whose parts have all the same fundamental properties and stand in all the same fundamental relations as the parts of u. Given that Fness and Gness are parts of the universe, and they stand in the fundamental nomic necessitation relation (N) to one another, any duplicate of u should also have duplicates of Fness and Gness which stand in the fundamental nomic necessitation relation to one another.

Thus, I maintain that an Armstrongian law of the form N(F, G) is intrinsic to the universe on the Duplication Account. To be sure, in order to preserve the intrinsicality of R to u, this version of Anti-Humeanism must maintain that universals are parts of the universe. This may seem strange as the universe now has parts that are not objects. But this is not an extra posit we tack on to the Anti-Humean's theory. Given that the Armstrongian proponent of this version of Anti-Humeanism already accepts spatiotemporally located universals as concrete entities which themselves often have a compositional

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[34] For instance, see Dretske [1977], Tooley [1977], and Armstrong [1983] for universals-based accounts of laws. See Bird [2005] and Lange [2009] for dispositionalist and counterfactual accounts of laws. See Carroll [1994] and Maudlin [2007] for primitivist accounts.

structure[35], it should not be problematic to treat universals as part of the universe (u). While treating universals as parts of the universe may be strange to the Humean or to other varieties of Anti-Humeans, treating universals as parts of the universe should not be strange by the DTA theorist's own lights.

R is also intrinsic to u according to the analysis-account of intrinsicality. How should we analyze u's being such that N(F, G)? We should analyze u's *being such that N(F, G)* in terms of fundamental properties as follows: The metaphysical analysis of 'Ru' is just 'N (F, G)'. The analysis of 'Ru' neither quantifies over nor names objects that are distinct from u's parts. R is intrinsic to u. R is intrinsic to u. This version of Anti-Humeanism posits laws that are intrinsic to the universe on the Analysis Account as well.

VIII. Conclusion

I have argued we have reasons to expect the laws of nature to be intrinsic and that the Humean's laws are extrinsic to the universe, while (at least one version) of the Anti-Humean's laws are not. This provides pressure to reject Humeanism about laws of nature. I expect the Humean may retain Humeanism and reject Premise 1 or 2, and I did not argue that she cannot take this route. Nevertheless, to retain Humeanism about laws of nature, she must uphold at least one surprising commitment: The Humean either must accept that laws and the scientific explanations to which they belong are ultimately extrinsic, or she must adopt an alternative understanding of the character of the Humean laws or universe in order to preserve the intrinsicality of the laws.

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[35] See Armstrong [1986] for discussion of structural universals.

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