Does Anything Explain the Regularity of the World?

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Abstract

What explains why the world is regular, rather than chaotic? Metaphysical views that deny necessary connections between distinct existences – 'Humean' views – seem to imply that the answer is: Nothing. This looks like a major problem for those views.

I argue that it is correct that the Humean cannot explain the regularity of the world. But, for the Humean, this is not a problem because it is appropriate that the regularity of the world is not explained – the regularity of the world does not *call out for explanation*.

The interest of this discussion goes beyond the dispute about whether there are necessary connections between distinct existences. It sheds light, more generally, on the issue of what are legitimate starting points in our theorizing about the world.

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Here's a striking fact about the world — it is, broadly speaking, regular. For example, objects act in the broadly same way regardless of where they are in space and time. If I throw a ball in New York in 2021 it will fly in basically the same way as a ball in Delhi in 1802. Of course, if I throw the same ball on the moon it will fly differently, but, nevertheless, there are underlying principles about how the ball flies that are the same in these different situations. Perhaps the development of physics may tell us that these principles are not totally unrestricted – that they break down in certain parts of the universe. But, nevertheless, there is a very striking degree of regularity in the movement of projectiles. In this way, and in many others, the world doesn't seem to be random or chaotic (though there might be randomness or chaos in parts of the world). But why is this? What explains why the world is regular?

A very natural answer is that there are universal laws of nature that govern the world and enforce such regularity – making the ball in New York fly just like the one in Delhi. Another natural answer is that it is part of the essence or nature of the relevant objects — material objects like balls — that they obey certain regularities.

But what about views which deny the existence of such governing laws and deny that it essential to material objects that they obey regularities? More generally, what about the vast tradition of metaphysical views that deny that there is any 'glue' holding the world together — views which say, following Hume, that there are no necessary connections between distinct existences. How can such Humean views explain the regularity of the world?

I'm going to argue that the Humean can't explain the regularity of the world. But, I claim, they don't have to. The Humean can say that nothing explains the regularity of the world and, if they are careful, still have an attractive, defensible view.

The interest of this discussion goes beyond the dispute about whether there are necessary connections between distinct existences. It sheds light, more generally, on the issue of what are legitimate starting points in our theorizing about the world.

In section 1 I'll start by laying out the problem for Humean views. In section 2 I'll consider, and criticize, suggestions for how the Humean can explain the regularity of the world. In section 3 I'll criticize one version of the view that nothing explains the regularity, before defending a different version. Section 4 concludes.

1 The Problem

The world seems to be, broadly speaking, regular, or uniform. The future seems to resemble the past; goings on in one part of the world seem to accord with the same basic principles as goings in another part. At very least, the world doesn't seem to be chaotic or totally random. Of course, when described at a certain grain, parts of the world might seem chaotic. And certain phenomena might

genuinely be chaotic. But, overall, there is striking regularity — when one billiard ball hits another the second tends to move, rather than transforming into a llama.

It might be difficult to give a precise account of what this regularity consists in – one way of understanding Goodman's [1955] New Riddle of induction is as asking what it is for the world to be regular. But we don't need to get into these details right now.[1] For our purposes it's enough that we have an intuitive grip on the phenomenon of regularity.

Let Humeanism be the view that there are no necessary connections between distinct existences. The necessary connection between a whole and its parts — for example, that necessarily if there are atoms arranged in a certain configuration then there is a table — doesn't violate Humeanism. Similarly, the necessary connection between redness and scarletness — necessarily if something is scarlet then it is red – doesn't violate Humeanism because redness and scarletness are not distinct existences. But a necessary connection between mass and charge, for example, would seem to violate Humeanism since those properties are, presumably, distinct existences.

A common way to make precise the denial of necessary connections is to appeal to principles of recombination. The intuitive idea is that any logically consistent distribution of the fundamental objects and properties across spacetime is genuinely possible — we can 'cut and paste' parts of our world, recombine them however we want, and the resulting situation is possible (see, e.g., Bricker [2017] and Wilson [2014] for detailed discussion). If there were some constraints on how two particular fundamental objects, for example, could be combined with each other, that would constitute a necessary connection between distinct existences.

This denial of necessary connections is consistent with a range of positive metaphysical views, but the most common version of the view says that the world, at its fundamental level, consists in local events spread out across spacetime. A little more precisely, it says that the world, fundamentally, consists in the *Humean mosaic*: the intrinsic physical state of each space time point (or pointlike object) and the spatiotemporal relations between these points.

[1] Though related issues will come up in section 2.2.

For definiteness I'll work with this version of Humeanism going forward, though my argument could be applied to other Humean metaphysical views.

On the Humean view the world is just a series of local events, pushed up against each other in space-time with nothing gluing them together. The anti-Humean, on the other hand, accepts that there are necessary connections that glue together the events. Again, there are different metaphysical implementations of this — the anti-Humean could accept primitive laws (e.g. Carroll [1994], Maudlin [2007]), primitive dispositions (e.g. Swoyer [1982], Bird [2007]), necessitation relations between universals, (e.g. Armstrong [1983], Dretske [1977], Tooley [1977]) and so on.

The problem for the Humean is that they apparently can't explain why the world is regular (see, e.g., Foster [2004], Strawson [1989, p. 25-29] for versions of this objection). If the world is, fundamentally, just local events pushed together in space time then it seems like there is nothing enforcing regularity in those events. In fact, on the Humean view, there cannot be anything that guarantees regularity across distinct events because that would imply that there are necessary connections between distinct existences. So it's hard to see how the Humean could explain why the world is regular rather than chaotic.

The anti-Humean, on the other hand, seems to be able to appeal to their primitive laws, or necessitation relations, or other anti-Humean whatnots in order to explain the regularity.

(There's a related concern for the Humean that is not about explanation but rather about probability. The thought is that most possible Humean mosaics are chaotic — events have to be configured in very special ways to be regular so chaos is easier to come by. Therefore, it's very unlikely that the world is regular. Humeanism, then, has the bad implication that this very unlikely thing occurred (see Foster [2004], Hildebrand [2016], Filomeno [forthcoming]). The Humean, though, can respond by putting pressure on the idea that regularity is unlikely. Given standard Humean accounts of objective chance (e.g. Lewis [1994]) the regularity does not have a low objective chance. Perhaps the thought instead is that we should have a low credence in the regularity (prior to our observations)? This seems to rely on the idea that we should have the same credence in each possible mosaic, which

in turn relies on some version of the principle of indifference. Such principles though, are highly controversial and open for the Humean to reject. There's a lot more to say about these issues (see Filomeno [forthcoming] and Segal [2020] for detailed discussion) but it's important to be clear that my focus is on worries that the Humean cannot *explain* the regularity, not on these issues about probability.)

If the Humean cannot explain the regularity of the world then this looks like a major problem because the regularity of the world seems to be the type of thing that needs explanation. Imagine I observe regularity in a multiple choice test that I give to my 150 student class — perhaps all my students chose option C on question 18, or perhaps a large group of my students chose exactly the same answers for each question. When such regularity in the answers is widespread we assume that there must be an explanation – it's implausible to claim that the regularity was just a fluke. Maybe that group of students got all the same answers because those were the correct answers, and the test was easy. Or perhaps they were cheating. Either way, there needs to be a reason why there is regularity in the answers. Regularity is the type of thing that calls out for explanation.

And if it's implausible to say that regularity in the answers to my test have no explanation, then it seems even more implausible to say that regularity in the *whole world* has no explanation. It seems like we cannot say that the regularity of the world is just an unexplained fluke.

Strawson [1989] makes the point extremely forcefully. Given the Humean view, he says:

> One is presented with all these massy physical objects, out there in space-time, behaving in perfectly regular ways, and then one is told that there is, quite definitely, no reason at all for this regularity; absolutely nothing about the nature of reality which is the reason why it continues to be regular in the particular way in which it is regular, moment after moment, aeon after aeon. It is, in that clear sense, a pure fluke. It is, at every instant, and as a matter of objective fact, a pure fluke that state n of the world bears precisely the relation to the previous state of the world that one would expect, in line with the previous pattern of regularity. [p. 30]

This, he says, is 'wonderfully absurd'. And it's easy enough, I think, to feel this intuition. How can the Humean respond?

2 Something Explains the Regularity

Perhaps the Humean can respond by saying that they do, in fact, have an explanation of the regularity of the world. In this section I'll consider two possible options for such a response. The Humean could say that (i) the regularity of the world is explained in the normal way that most facts are explained on their view, or (ii) that there is some special way in which the regularity of the world is explained.

Let's start by considering the first option.

2.1 Normal Explanations

The first question to ask, when considering this option, is how does the Humean explain *anything*, let alone the regularity of the world? After all, if there's nothing gluing the world together — if there's nothing making each element of the mosaic what it is — then how can particular events in the mosaic be explained? The standard Humean response is that even if there is nothing that is standing behind the mosaic making it what it is, still, particular parts of the mosaic can be explained. In particular, they can be explained by other parts of the mosaic.

How does this work? Which other parts of the mosaic are relevant? Well, the standard Humean view is that the laws of nature play a central role. Of course, for the Humean the laws of nature cannot be distinct entities that govern the mosaic. Rather, they are just patterns within the mosaic. On the dominant *best system* approach to Humean laws the laws of nature are, very roughly, the patterns that best balance simplicity and informativeness about the mosaic [Lewis, 1983, pp. 365-368]. So, for example, it might be a law that F=MA because that law is simple and also tells us a huge amount about specific events in the mosaic. The best system approach can be developed in many different

ways but the basic idea is that the laws are these very general, informative patterns.[2]

These laws of nature play a central role in explanation for the Humean — these big, general, patterns in the mosaic can explain smaller parts of the mosaic. The trajectory of a particular ball, for example, is explained by the Newtonian laws — that is, by the general Newtonian patterns, like F=MA. (Or at least, it would be if Newtonian Mechanics was true.) Humean explanations, then, are broadly unificatory or pattern-subsumptionist. Particular events in the mosaic are explained by fitting them into broader patterns of events.[3]

This conception of explanation has a long tradition in the philosophy of science. For example, Hempel [1966, p. 488] claims that 'The understanding [an explanation] conveys lies…in the insight that the explanandum fits into, or can be subsumed under, a system of uniformities represented by empirical laws or theoretical principles'. See, also, Kneale [1949], Friedman [1974], Kitcher [1981] among others.

And Humeans like Loewer [1996, p. 113], Smart [2013], Miller [2015, section 4] and Bhogal [fort., section 2.1] are explicit that Humean explanation works in this pattern-subsumptionist or unificationist way. Of course, these pattern-subsumptionist ideas are very controversial, but from a Humean point of view where the laws of nature are general patterns that explain particular events, it's very natural.[4]

Now we have a grip on how standard Humean explanation works we can ask: Could the Humean

[2] For variants of the BSA see, among many others Loewer [2012], Hicks [2018], Dorst [2019a], Jaag and Loew [fort.], Hall [2012], Cohen and Callender [2009], Braddon-Mitchell [2001], Schrenk [2006].

[3] Even on Humean views, like that of Hicks [fort.] where the laws of nature strictly speaking don't explain particular facts, but rather it is in virtue of these laws that certain causal explanations hold, the explanations still have a pattern-subsumptionist core.

[4] The Humean view that that general patterns can explain particular events in the mosaic leads to a common criticism of Humeanism – that it involves *explanatory circularity* (e.g. Armstrong [1983, p. 40], Maudlin [2007, p. 172]).

However, in recent years the Humean has developed some plausible responses (e.g. Loewer [2012], Miller [2015], Hicks [fort.], Bhogal [fort.], Dorst [2019b]). There a lot more to say here, but the focus of this paper is not on these issues about circularity.

explain the regularity of the world in the same way that they explain ordinary events in the mosaic? That is, could they use the laws of nature — these general patterns in the Humean mosaic — to explain the regularity of the world? Say, for example, we live in a Newtonian world. Could Humeans then appeal to the Newtonian laws in order to explain the regularity of the world?

This putative explanation seems unsatisfying, for a couple of reasons. Firstly, this explanation in effect purports to explain why the world contains regular patterns by appealing to the *particular* regular patterns that the world contains. This just seems deeply unexplanatory. Citing the specific Newtonian patterns in the mosaic doesn't give us any additional understanding about why the world exhibits regular patterns rather than being chaotic. Secondly, this putative explanation doesn't fit with the pattern-subsumption framework for Humean explanation. Explaining the regularity of the world by citing the Newtonian patterns isn't an explanation that fits a specific event into a more general pattern. In fact, this case point towards the limits of the pattern-subsumption approach. Small parts of the mosaic can be explained by being subsumed to more general patterns, but when the phenomenon to be explained is sufficiently general and large scale, then we can't subsume that to a more general pattern.

The strategy of explaining the regularity of the world as the Humean would explain ordinary facts is, for these reasons, not promising.

2.2 Novel Explanations

What about the strategy of explaining the regularity of the world in a way that is different from ordinary Humean explanations? There's only one approach of this kind that I can think of (though of course, there might be others that I cannot think of). Here's what I have in mind:

If we start with some pre-identified set of properties then it is, perhaps, rather surprising for the Humean that the world would exhibit regularities in terms of those properties. If we start by considering the property mass, for example, then it might be surprising that there are regularities about mass, when there is nothing that is standing behind those regularities making them hold.

But, as is very familiar to metaphysicians nowadays, properties, at least on the *abundant* conception of properties, are easy to come by. As well as properties like mass and charge there is *grue* and *bleen* and an infinity of other properties corresponding to predicates we can define in complicated ways.

In fact, there are so many properties that, whatever the Humean mosaic happens to be, there will be some simple regularities we can state in terms of some property or other. For example, Lewis [1983, p. 367] discusses the *predicate F*, which is defined such that F holds of all and only the objects in the actual world. So, $\forall x F(x)$ would be a very simple regularity about the world. Clearly, we can generate such regularities whatever the mosaic is.

So, in this sense, it's deeply unsurprising that the world is regular — in the sense that there are regularities in terms of some property or other.

But, intuitively, the phenomenon in question — the world being regular — is not just about there being regularities in terms of some property or other. Regularities in terms of weird, gerrymandered, unnatural properties aren't relevant. Rather, it's about there being regularities in terms of the *special*, *sparse*, *natural* properties. (There is a huge literature on the distinction between this sparse, natural, sense of properties and the abundant sense, stemming from Lewis [1983, 1986] and Armstrong [1978].)

So, perhaps we could explain the regularity of the world by appealing to some account of the sparse, natural properties. If, for example, we give an account of the natural properties where it's built into the account that there are regularities about those properties then that could give us an explanation of why there are regularities in terms of the natural properties – and, perhaps, an explanation of why the world is regular.

The particular account of natural properties I have in mind is Loewer's [1996, 2007] package deal account (PDA) of laws and natural properties. His account is a variant of the Humean BSA that we mentioned above, however, the best system procedure doesn't just output the laws, it also outputs the natural properties. Very roughly, the laws are the axioms that best balance simplicity and informativeness about the mosaic and the natural properties are the properties referred to by those

axioms. What it is for something to be a natural property is, extremely roughly, for the most simple, informative regularities in the world to be about those properties. Consequently, the world is guaranteed to be regular in terms of the natural properties.

One possible issue with such an strategy for explaining the regularity of the world is that it's extremely unclear how the PDA can work. In particular, it's not clear how the PDA can get intuitive results about what the natural properties are in our world — as we noted, $\forall x F(x)$ is a very simple and general regularity about the world. So, it's not clear how the PDA can avoid saying that intuitively gerrymandered properties like F count as natural properties. Loewer [1996, 2007] is, of course, aware of this point and much of the development of the PDA is about avoiding such problem. As such the issue is too complicated to discuss in detail here. But I'm not optimistic about the prospects for the PDA.

More importantly, though, such an account of why the world is regular will have the result that in many possible mosaics properties that seem to us to be intuitively extremely gerrymandered will count as natural. And the issue here isn't just about the account getting strange results for what properties count as natural and what do not. Rather it points to a way in which this explanation of the regularity of the world is too strong. This PDA strategy *guarantees* that there will be regularities in terms of the natural properties, whatever the mosaic is. So, it appears to guarantee that the world will be regular, whatever the mosaic is. But this isn't right, when we are trying to explain the regularity of the world we are trying to explain something that is strikingly contingent — the world could have failed to be regular. If the PDA strategy purports to explain the regularity of the world by saying that it is guaranteed, then it's pretty clear that whatever the PDA is explaining, it's not the intuitive notion of the world being regular that we started out with.

So I don't think this strategy for explaining the regularity works. Perhaps there are other plausible strategies that the Humean could develop, but as it stands, it looks like the Humean cannot explain the regularity of the world.

3 Nothing Explains the Regularity

The other option for the Humean, then, is to argue that their view is defensible, even though they don't explain the regularity of the world.

3.1 Tu Quoque

The first version of this strategy involves the Humean going on the attack. The idea is to accept that it's a bad-making feature of Humeanism that it cannot explain the regularity of the world, but to claim that the anti-Humean can't explain the regularity either.

Why think that the anti-Humean cannot explain the regularity of the world? The issue isn't, I take it, that there is some special difficulty that the anti-Humean has with explaining the regularity of the world as opposed to other facts. Rather, it's a general concern with the nature of anti-Humean explanation. Some Humeans think that anti-Humean laws, even if they were to exist, would not be explanatory. For example, Loewer [1996, p. 197] claims that postulating Armstrong-style anti-Humean laws — that is, where the laws consist in the holding of a 'necessitation relation' between universals — 'adds nothing to our scientific understanding'.

And this thought is very closely related to Lewis's influential claim that, even if we postulate an Armstrong-style necessitation relation N between the universals F and G he 'cannot see how it could be absolutely impossible to have N(F,G) and Fa without Ga' [Lewis, 1983, p. 366].

The Humean thought I'm considering is that merely postulating some anti-Humean whatnot — saying that there is some primitive law, or disposition, or necessitation relation or something similar — doesn't give us a satisfying explanation, or any genuine understanding, of the patterns that exist in the world. Why is this? Well, for Beebee [2006] the thought is that our lack of a clear grip on the nature of these anti-Humean laws is why they cannot explain the regularity of the world:

> Suppose we agree with Strawson's Hume that we can have no positively contentful conception of what it is that holds the universe together. Then we cannot explain why the

> universe is regular, since we cannot in principle provide any positive characterisation of the purported explanans. The most we can do is claim that there is something holding it all together - and that does not look like much of an explanation of why the universe is regular. (p. 524)

Beebee does, I take it, agree with 'Strawson's Hume' — that is, Galen Strawson's [1989] interpretation of Hume — that we can have no positively contentful conception of what it is that holds the universe together. That is, we can have no positively contentful conception of these anti-Humean whatnots that provide necessary connections between distinct existences, even if there actually are such necessary connections. The reason for thinking that we can't have such a positive conception are classic empiricist arguments about how we cannot directly perceive such necessary connections and how they are underdetermined by what we can directly perceive. (p.514)

It's reasonable to want more detail here about exactly what 'positively contentful conception' means, and what role this plays in the theory of explanation, but I think we can roughly see the idea that Beebee is getting at.

But there seems to just be a clash of intuitions here. Some Humeans have the intuition that explanations that appeal to anti-Humean whatnots don't give us any understanding, while anti-Humeans don't share that intuition.

So instead of trying to adjudicate between these intuitions I'm going to claim that even if existing anti-Humean views also fail to to explain the regularity of the world that's not enough to defend the Humean view. The basic idea is simple: When a problem with your view is sufficiently serious it's not typically enough just to note that certain other views face this problem too. Rather, what is needed is a substantial positive defense — an argument that the apparent bad-making feature of your theory doesn't, in fact, make your theory so bad.

In particular, Beebee [2006] accepts that there is no explanation of the regularity of the world. In fact, she accepts that 'the continued orderliness of nature is what Strawson calls an "outrageous run of luck"'. (p. 527) On the face of it this is a huge problem with the Humean view. Imagine a physical

theory which said that the fact that projectiles follow a parabolic path was an outrageous run of luck – that there is no general mechanism which leads to all the different projectiles taking such a path, but it just so happens that they do. This theory seems to be disastrously bad and we should reject it. The Humean saying that the continued regularity of the world is a fluke seems, at least on the face of it, to be a similarly bad problem.

The Humean could respond to this by claiming that they can, in fact, explain the regularity of the word (as we considered in the previous section). Or they could claim that there is something special about the case of the regularity of the world – it's a bad-making feature of a theory that it leaves the parabolic flight of projectiles unexplained, but not a bad-making feature of a theory that it leaves the regularity of the world unexplained (this is the type of response that I'm going to consider in the next subsection).

But neither of these are the strategy I'm considering in this section — the strategy that Beebee seems to accept. The strategy at issue is, again, one which accepts that it's a problem for the Humean that they cannot explain the regularity of the world, but which says that the anti-Humean faces a similar problem.[5]

This is analogous to a strategy which accepts that on your physical theory the parabolic flight of projectiles is an outrageous run of luck, but points to the difficulties some alternative theories have in explaining the phenomenon. Perhaps those alternative theories really are unsuccessful, but that doesn't mean that your theory should be accepted – both theories are extremely bad!

Rather, in such a situation we should look for different theories, or try to adapt the theories that we currently have, in order to explain the parabolic path. If that turns out to be unsuccessful then we should probably throw our hands up and say that we don't know what physical theory is true — all

[5] An interpretative note: A paragraph in Beebee [2006, p. 526] might, on some readings, suggest that she takes the Humean failure to explain regularity to not be a bad-making feature of the view. But, given the broader context – that the reasoning she gives is to do with the anti-Humean not being able to explain the regularity too – I think it's reasonable to take her to be implementing the *tu quoque* strategy discussed in this section.

our existing theories are bad and so we suspend judgement about what the true theory is.[6]

Similarly, perhaps the Humean is correct that existing anti-Humean theories don't properly explain the regularity of the world. But this shouldn't lead us to accept Humeanism. Rather it should make us look for different views — certain types of anti-realism, for example, are natural views that are distinct from both Humean and anti-Humean positions. Or we should try to adapt our existing views, for example, by showing how we can have enough of a conception of anti-Humean laws and how they govern the world for those laws to be explanatory (e.g. Hildebrand [2013], Wilsch [fort]). If this is unsuccessful then we should suspend judgement.

Of course, if the Humean could conclusively show that no other views could possibly explain the regularity of the world then we might ultimately accept that Humeanism is the best possible view, even if it comes with this very significant problem, and so we should believe it. But this is very far from the situation we are in. Rather, the Humean has merely cast doubt on existing anti-Humean views.

And, as I've argued, this attack on other views is just not enough. In order for it to be reasonable to accept Humeanism the Humean has to show that they can explain the regularity of the world, or that, contrary to initial appearances, it's not a bad-making feature of their view that that cannot explain the regularity. Accepting that their view has a big problem but that certain other views do too is not satisfactory.

3.2 No Need for Explanation

In this section I'm going to defend a different Humean response. The claim is that there is no need for the Humean to explain the regularity of the world. Given the totality of the Humean picture — in particular, the Humean conception of explanation — it's not a problem with the Humean view that it doesn't explain the regularity. It's *appropriate* that the Humean doesn't explain the regularity

[6] Of course, this is consistent with continuing to use our current physical theories in certain scientific context, as long as we construe them instrumentally.

of the world while it's not appropriate that a physical theory doesn't explain the parabolic path of projectiles.

It's natural to be rather puzzled though. How could it be appropriate for the Humean to leave the regularity of the world unexplained? This will take a little time to answer. But the starting point is the idea not every fact needs to be explained — there are certain facts that it is acceptable for our theories to leave unexplained, while there are other fact that we feel must have an explanation. That is to say, some facts *call out for explanation* in a way that other facts do not.

For example, when I toss a coin 50 times and it lands heads every time that calls out for explanation. But if the sequence of 50 tosses was HHTHTTTHTHTHH…then that doesn't call out for explanation — we are happy to say that it's just a fluke. If a monkey with a typewriter manages to type the first line of *The Merchant of Venice* that really calls out for explanation, if they manage to type 'adrgasjknw mf. eakodhdf' then that does not call out for explanation — we are happy to say that it's a fluke that the monkey hit that precise sequence of characters.

To be clear, calling out for explanation, as I'm understanding it, is not a *psychological* notion. Rather, it's an *epistemic* one. The key idea is that a fact which calls out for explanation is a pro tanto reason to reject any theory which implies that it does not have an (appropriate) explanation. Or, to put it another way, a fact which calls out for explanation is a pro tanto reason to reject any theory which implies that it is just a fluke, or coincidence.

So, for example, the theory that it was a fair coin tossed normally implies that it was just a fluke that the coin landed head 50 times in a row. And this is a reason to be suspicious of the fair coin theory — it seems unlikely that it was just a fluke that the coin landed heads every time. The fair coin theory also implies that it would be a fluke if the sequence was HHTHTTTHTHTHH…but this is no reason to reject the fair coin theory. (Notice, as an aside, that the fair coin theory assigns the same probability to both sequences: $1/2^{50}$. So the difference between the two sequences doesn't consist in one being unlikely and the other being likely.)

(I said that a fact which calls out for explanation is a pro tanto reason to reject any theory which

implies that it does not have an (appropriate) explanation. The parenthetical about *appropriate* explanation is needed because there are certain explanations of facts like the 50 heads which still leave them seeming fluky or coincidental. For example, imagine if I explained why the first coin landed heads by citing the microphysical details of each of the coin tosses and the surroundings — the velocity of the toss, the spin, the movement of the air particles and so on — as well as the basic physical laws to show how that lead to the coin landing heads. And I conjoined this explanation with similar microphysical explanations of the 49 other coin tosses. The conjunctive explanation still makes the 50 heads sequence seem coincidental or flukish, it's not the type of explanation we are looking for. Similarly, someone might explain the 50 heads sequence by noting that it's constitutively explained by a certain lower-level configuration of atoms. Again, this is not the relevant type of explanation. All this is to say that when a fact calls out for explanation it calls out for an appropriate type of explanation, and such conjunctive or constitutive explanations are not appropriate. Precisely specifying which explanations are appropriate is a hard task (see White [2005], Lando [2017], Bhogal [2020]), but those details won't be important in the rest of the paper.)

This idea that some facts call out for explanation and others do not plays an important role in certain philosophical arguments — for example, those about the fine tuning of the universe and about moral 'debunking' arguments — and in scientific reasoning (see, Baras [fort.] and Bhogal [2020] for a discussion of such cases). Giving a full account of when facts call out for explanation is a very difficult task, one that I will not take on here. I will, though, develop some considerations about when facts call out for explanation in specific situations.

In particular, the suggestion is going to be that for the Humean, or at least a certain type of Humean, the regularity of the world does not call out for explanation — it is not a problem with the theory that it leaves the regularity unexplained. But again, how is this plausible? Projectiles taking a parabolic path calls out for explanation. And the regularities in the answers to my multiple choice test calls out for explanation. So why doesn't the regularity of the whole world?

The thought is that which facts call out for explanation is partially determined by the nature of

explanation. And the Humean conception of explanation motivates taking the regularity of the world as not calling out for explanation.

To see this, I want to take a step back from Humeanism and spend some time thinking about a very different type of view. Consider a view in the spirit of Maudlin's [2007] primitivism about laws. The picture is that laws are primitive, *sui generis* entities. These laws work temporally — they produce the next state of the world from the current state. Scientific explanation, on this view, involves showing how the event under investigation flows from, or is produced by, the laws and previous states. (This glosses over some complexities in Maudlin's view – the view we are considering is only Maudlin-*style*.) There's lots more we could say about such a view but this simple, intuitive, description is enough for our purposes.

If scientific explanation is about showing how things flow from the laws then it's totally appropriate that the laws — or at least some laws, the basic ones — are unexplained. Given what explanation is then of course there are going to be basic, unexplained laws. To demand that such laws be explained is just to make a mistake; to misunderstand the nature of explanation and wrongly think that scientific explanation is more than just showing how things flow from the laws.

This line of thought is importantly different from Dasgupta's [2014] argument that certain facts are not *apt* for explanation. Aptness for explanation is, for him, analogous to the way in which certain sentences are not *truth-apt*. Take, for example, imperatives like 'Shut the door'. It's just a mistake to ask whether it is true or false. Similarly, he claims, there some facts where it's just a mistake to ask what explains them. Importantly, I'm not saying that the basic laws are not apt for explanation. It's not a mistake to ask the question of what explains the basic laws on the Maudlin-style view. After all, there is a clear answer to that question: Nothing explains them. The mistake I'm talking about is to demand that there must be an explanation of those laws when the nature of explanation rules out one being available.

The thought, then, is that on a Maudlin-style view, the basic laws are appropriately unexplained – they do not call out for explanation. The reason they do not call out for explanation is because of

the role such laws play in being the fundamental explainer rather than being something that gets explained. Given the Maudlin-style view of explanation, then, certain parts of the ontology are appropriate explanatory starting points — those are the basic laws and the initial conditions.

3.2.1 A Detour — The Past Hypothesis

A very quick detour before we get back to Humeanism: The discussion here is reminiscent of the debate about whether the *Past Hypothesis* (PH) — the claim that the universe started out in a very special, extremely low-entropy, state — needs explanation.[7] Does my discussion suggest that the defender of a Maudlin-style view should take the PH to not need explanation because, on their view, the initial conditions are appropriate explanatory starting points? A detailed answer would require another paper, but some very brief comments might be useful.

In one sense, the answer is yes, on a Maudlin-style view the PH doesn't call out for explanation. This for much the same reasons as those discussed by Mellor [2003], Sklar [1993, pp. 309-313], Callender [2004] when considering the PH. Consider the much-discussed firing squad case. If a firing squad of 50 aims at you and shoots, but all miss, you should be extremely surprised and think that there has to be an explanation of this. But:

> now suppose there is no such mechanism. Imagine, as Russell [1927] did, that our universe …started five minutes ago, with these fifty bullets coming past you, but with no prior mechanism to give their trajectories any physical probability, high or low. Suppose in other words that these trajectories really were among the *initial* conditions of our universe. If you thought that, should you really be baffled and seek some further reason for your luck? [Mellor, 2003, p. 227]

Mellor and others think that there is no need to seek some further reason since there is no prior

[7] The PH is sometimes formulated as a claim about the early universe, rather than the initial conditions, but for our purposes let's take it as a claim about the initial conditions.

mechanism. And, further, that this is analogous to the PH, since the PH is a claim about the initial conditions of the universe, and such initial conditions don't have a prior mechanism.

Similarly, I think, the defender of a Maudlin-style account of explanation should agree that the PH doesn't call out for explanation – to demand that initial conditions like the PH are explained is to misunderstand the nature of explanation.

But we need to be extremely careful here, because the debate over the PH isn't just about whether it calls out for explanation in our sense of the term. (Baras and Shenker [forthcoming] discuss the great variety of senses in which phrases like 'calls out for explanation' are used in the literature on the PH.) Part of the debate is about whether the PH calls out for explanation, but there are lots of other complex issues involved, like whether the PH gives good explanations of other phenomena; whether we can legitimately assume that the PH is a claim about *initial* conditions; and whether we reasonably assume a temporal asymmetry in explanation. Consequently, our discussion does not have any simple implication for the debate about the PH, though there are complex interactions which would benefit from further investigation.

3.2.2 Back to Humeanism

Let's link this discussion of the Maudlin-style view back to Humeanism. The point of the previous discussion was that on this Maudlin-style view the basic laws and the initial conditions don't call out for explanation, because the nature of explanation itself rules out there being explanations here. In fact, Price [2004] notes that it is a traditional philosophical view that the initial conditions don't call out for explanation. Similarly, I think, on a Maudlin-style view the basic laws are appropriately unexplained.

The general moral I want to take from this is that your conception of explanation – that is, what you think explanation is – motivates taking certain parts of the world as appropriately basic and unexplained — as not calling out for explanation. As we discussed earlier, the natural Humean conception of scientific explanation involves pattern-subsumption. There is nothing standing behind

the mosaic of events making them happen. Rather, smaller parts of the mosaic are explained by fitting them into more general patterns. (Of course, there is much more detail that is needed about exactly how this pattern-subsumption works — about, for example, which general patterns are explanatorily relevant — but that's not important here.)

This pattern-subsumption conception of explanation also motivates it's own explanatory starting points. If explanation involves fitting things into a more general pattern then the *most* general patterns of the world will not be explained — they will be the explanatory starting points. And, given this conception of explanation, the most general patterns seem appropriately unexplained. They have a similar status to the basic laws on a Maudlin-style view. If explanation is about pattern-subsumption then it's just a mistake to demand that the most general patterns be explained — it's a misunderstanding of the nature of explanation.

The thought, then, is that given the pattern subsumption view the most general patterns of the world don't call out for explanation — the basic regularities are our explanatory starting points. The Humean who accepts this pattern subsumption view does not face pressure to explain the general regularity of the world.

Now, of course, given a Maudlin-style view of explanation, the regularity of the world very much calls out for explanation. In fact, on most views of explanation the regularity of the world calls out for explanation. The difference with the pattern subsumption view is that it has distinctively holistic, top-down character. This is very different from more common, bottom-up conceptions of explanation where we start with the small, and explain the large patterns in terms of that.

So, for readers who are committed to this bottom-up conception of explanation it may seem baffling that the regularity of the world doesn't call out for explanation because, on the view that they are committed to, it does call out for explanation. But, I think, if you have fully internalized this top-down, pattern-subsumptionist or unificationist picture of explanation then it's natural to be unconcerned by the regularity of the world being unexplained, just as the anti-Humean is unconcerned about their particular anti-Humean whatnots being unexplained. So while it's right that it will be

extremely unintuitive to many that the regularity of the world doesn't call out for explanation, that doesn't tell against the claim that *given the pattern-subsumption view* the regularity doesn't call out for explanation.

Further, notice that this pattern-subsumptionist approach can say why the regularity of the world doesn't call out for explanation, even though patterns like projectiles flying in a parabolic path do. It's because the pattern of projectiles moving parabolically is the type of thing that can be subsumed to a more general pattern. The regularity of the world cannot — it has to be an explanatory starting point.

Here's a further objection to this line of thought though: I have argued that given the pattern subsumption view the regularity of the world doesn't call out for explanation. But couldn't one argue that this is intuitively implausible so we have a reason to reject the pattern subsumptionist view of explanation – and, therefore, to reject Humeanism? Yes, this is certainly a possible, and perhaps natural, reaction. I say that if you are a Humean and hold the pattern subsumption view then the regularity of the world doesn't call out for explanation. You reply that the consequent is obviously false so we should reject the antecedent. Whether this reply seems convincing depends on broader issues, for example, how committed you are Humeanism, that are beyond the scope of this paper. But the important point is that the committed Humean should respond to the objection that they can't explain the regularity of the world by saying that the regularity of the world doesn't call out for explanation. They have a good, well-motivated reason for saying this that flows from prior commitments about how explanation works. This makes the Humean view far more plausible and attractive.

Of course, committed anti-Humeans will still not be convinced, even by this improved Humean view. They will reject the prior commitments that lead the Humean to claim that the regularity doesn't call out for explanation. But that doesn't stop this being a good response to the objection that Humean can't explain the regularity of the world and so being an improvement to the Humean view.

4 Conclusion

It's a classic objection to Humeanism that it fails to explain why the world is regular rather than chaotic. I've argued that the Humean does indeed have problems if they try to explain the regularity. Instead the Humean should respond by considering very general issues about when facts need to be explained and when they don't, and what parts of the world are reasonable explanatory starting points. I've argued that these questions depend in part on what explanation is. And given a unificationist or pattern-subsumptionist view of explanation the Humean can legitimately say that nothing explains the regularity of the world.

One final point, about the dialectical situation that we have reached. My defense of the Humean here relies on the Humean disagreeing with the anti-Humean about the nature of explanation – the anti-Humean does not have a 'top-down', pattern-subsumption or unificationist conception of explanation. It might be somewhat strange to think that the disagreement between the Humean and the anti-Humean is, in part, a disagreement about the nature of explanation. Shouldn't the nature of explanation be a neutral point in the debate between different metaphysical views? But I don't think this is right – the debate between the Humean and the anti-Humean is such a deep and substantial dispute precisely because it gets to issues about the nature of explanation. What's more, I think that seeing that the Humean and the anti-Humean disagree about explanation makes sense of a variety of other disagreements between the positions and it makes sense of the way in which Humeans and anti-Humeans often seem baffled by each others views. But, obviously, giving that story is for another time.

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