On Unexplained (Modal) Patterns

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The aim of this paper is to give a simple argument against certain views of modality and then to explore a slightly more complicated response.

The argument is based on the idea that some views of modality leave modal patterns unexplained, in a way that is inappropriate. These modal patterns *call out for explanation* and that's a problem for theories that take them to be unexplained. The argument targets certain versions of modal primitivism, but also some non-primitivist views of modality, like Lewisian modal realism.

In order to respond we have to deny that the modal patterns call out for explanation – their being unexplained is not a problem for the theory. This requires considering when patterns can reasonably be left unexplained and when they can't. This is an extremely complicated question to answer in full generality, but, I argue, the answer depends upon the conception of explanation that we accept.

In particular, if we accept a *pattern-subsumption* conception of explanation where we explain things by fitting them into more general patterns, then this motivates taking certain patterns as unexplained.

The upshot is that defending those views of modality involves being pushed towards the pattern-subsumption conception of explanation. To be clear, I am not arguing that modal primitivism or Lewisian modal realism or any other view that leaves modal patterns unexplained is untenable. Rather, the claim is that defending those views requires some substantial, and controversial, commitments about the nature of explanation. So how you evaluate those views will depend upon how you evaluate the commitments about explanation.

This discussion will raise some analogous issues about when and how non-modal patterns can be left unexplained. This issue is important in the debate over *Humeanism* — roughly, the view that the world, at it's fundamental level, is just a mosaic of events spread out across spacetime with no necessary connections between the events. So, as we go I will discuss these issues with Humeanism in passing. But the focus will be on the modal case.

1 AGAINST UNEXPLAINED PATTERNS

But let's start in a somewhat different place.

Imagine that, over the course of a few months you see, in different locations, three ravens. You notice something interesting — all those ravens are black. You don't know anything about ornithology, so you weren't expecting this. In fact, you weren't expecting anything at all. But now that you've noticed that all these ravens were black you wonder what the explanation is, or whether there is no explanation and it's just a coincidence.

This pattern continues — you keep seeing ravens and they are all black. So now you've seen twenty black ravens. Now, you think, it's unlikely that this is a fluke or a coincidence — there's some explanation here.

Later you (somehow) learn the universal generalization that *all ravens are black*. Now, you think, surely this can't be a fluke — this pattern really needs explaining. If someone told you that there was no explanation of the universal generalization – that it was just a fluke – you would find it very hard to believe them.

One way to put the point of this story is using the locution of facts 'calling out for explanation'. The pattern of three ravens being black perhaps calls out for explanation. Twenty ravens all being black clearly calls out for explanation. And all ravens being black calls out for explanation *even more*.

1.1   CALLING OUT FOR EXPLANATION

However, there are a few things I could mean by 'calling out for explanation' so before we discuss the story about the ravens any further we should take some time to clarify this notion.

When I say that twenty ravens being black calls out for explanation I don't mean anything psychological, even though the way that I told the story above might have suggested a psychological reading. I don't, for example, mean that I, or you, or the average person would be *surprised* when they notice the pattern. Neither do I mean anything to do with *curiosity* or whether people are disposed to investigate further. Rather I mean something epistemic. When a fact calls out for explanation it a mark against a theory, or a belief set, that says that the fact is has no explanation. I mean this notion to be graded — a fact can call out for explanation more or less. When a fact calls out for explanation to a large degree then it should count as a significant mark against a theory which says that it is just a fluke. Surprise, or curiosity, may well go along with recognizing a fact that calls out for explanation (and not currently having such an explanation to hand) but they are not what it means to call out for explanation (as I am using the term).

Here are some examples. Consider the tides coming in and out at regular(-ish) intervals. Of course, we know the explanation. But even before the explanation was discovered we should, I think, have thought that there is some explanation — the regularity of the tides is not a fluke or coincidence, even if we had little idea of what the explanation was. Consequently, any theory that says that it really is a fluke seems unlikely – that fact that the theory says that the regularity of the tides is a fluke is a good reason for us to reject it. That is to say, the regularity of the tides very much calls out for explanation.

Similarly, imagine your friend starts tossing what looks like a regular quarter and it lands heads 50 times in a row. It's certainly not impossible that this is a fluke. Perhaps ultimately, it is a fluke and upon further investigation it will be rational to believe that it's a fluke. But when we see the pattern we should be suspicious of the theory that this is a fair coin tossed normally and the pattern we've observed

is a fluke. The coin landing heads 50 times in a row is a mark against the theory. So this regularity calls out for explanation too, but not to the same degree as the tides regularity.

There are plenty of other examples we can give too. Baras (fort, section 2) surveys many uses of the notion of calling out for explanation within philosophy, e.g. the correlation between the mathematical truths and our mathematical beliefs may call out for explanation. And Bhogal (fort) considers some scientific examples, e.g. the fact that every year between 1629 and 1710 more males were born than females in London calls out for explanation. It's easy enough, I think, for the reader to come up with examples of their own.

The coin toss case, though, illustrates how of the notion of calling out for explanation is rather complicated. Any sequence of 50 tosses of a fair coin has the same probability as the fair coin landing heads 50 times in a row — $1/2^{50}$. But, your friend tossing the coin and arriving at some random looking sequence — e.g. HHTHTTTHTHTHH…— is not a mark against the theory that that it's a fair coin tossed normally. We are perfectly happy to say that this sequence is a fluke. So, an account of what it is for a fact to call out for explanation would have to say why only one of these patterns of coin tosses calls out for explanation, even though the theory that we currently accept assigns them the same probability.

But, I'm not giving an account of when something calls out for explanation.[1] Rather, I'm going to start by *using* the notion of calling out for explanation. We have, I hope, enough of a grip on the notion to continue. (Later, I'm going to discuss how the account of explanation we hold can affect what calls out for explanation. But again, this doesn't amount to an account of calling out for explanation.)

Here's another complicated issue, one I've been skirting so far. When some fact calls out for explanation what types of explanations are appropriate for answering that call? One natural answer is 'All of them' — any explanation of the fact counts as answering the call for explanation. But there are, perhaps, certain explanations that would not satisfy a call for explanation; ones that would make the fact still seem like a fluke.

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[1]At least not here, I explore the issue in other work.

For example, consider again the 50 coin tosses landing heads. There is an explanation of why the first landed heads — one that cites the exact microphysical details of how the coin was tossed (the velocity, the spin, etc.) and the physical laws. And there's a similar explanation for the 49 other coin tosses. Perhaps if we conjoin all these explanations that counts as an explanation of the 50 coin tosses all landing heads. But, even in light of this conjunctive explanation the pattern still appears flukish, or coincidental. If the best explanation that a theory could give of the pattern was this type of conjunctive one, then we would still take the pattern to be a mark against that theory. So, this conjunctive explanation doesn't properly answer the call for explanation. (Perhaps, ultimately, this is reason to say that this conjunctive explanation is really no explanation at all.)

Exactly why the conjunctive explanation doesn't properly answer the call for explanation and what features makes something properly answer the call is, again, a difficult issue.[2] But luckily we don't have to address that further here, since the cases that will be relevant to us are ones where there is very clearly no explanation of a certain regularity — not even a conjunctive one.

1.2   Back to the Ravens

So now we have this notion of a fact calling out for explanation in hand, we can see the point of the raven story. The pattern of three ravens being black perhaps calls out for explanation. Twenty ravens all being black really clearly calls out for explanation. And all ravens being black calls out for explanation even more — it calls out for explanation so much that any theory that says that there is no explanation, that it is just a fluke, is unacceptable. (To be clear, many theories could be silent on whether there is an explanation of *all ravens are black*. Others could imply that there is an explanation, but not tell us anything about what the explanation is. These theories are not necessarily unacceptable — they don't tell us that the raven pattern is a fluke or coincidence.)

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[2]See Lando (2017) and Bhogal (fort) for discussion of this issue.

The key point is that *generalizing a pattern makes it call out for explanation more*. Going from three ravens are black to twenty ravens are black to all ravens are black increases the need for explanation.

With that in mind, we can extend the story to the modal case. Some time after you find out that all ravens are black you learn (somehow) that *necessarily, all ravens are black* — that is, you learn that *in all possible worlds, all ravens are black*. (Of course, this isn't actually true, but let's stick with the fiction. We will see some realistic cases soon.) Now, it looks like the pattern is even more general. Not only are all ravens black in this world, but in all other worlds too! And so, it seems, this fact calls out for explanation even more. A theory which says that this fact has no explanation, then, is really unacceptable — even more than the theory which says that all ravens are black has no explanation.

(You might resist here and say that *necessarily, all ravens are black* is not a generalization of *all ravens are black* — it's very different from the way that the twenty raven pattern is more general than the three raven pattern. This is a perfectly reasonable place to resist and I'll consider it in section 2.)

This reasoning is clearly not distinctive to the ravens — we can extend it to pretty much any modal pattern. For example, consider the modal pattern that, necessarily, for all objects, if they have a mass of x kg they do not also have a mass of y kg where x and y are different. (This is an instance of *determinate exclusion* – necessarily an object can only instantiate one determinate of any determinable.) Or, the fact that necessarily, any change in the moral features of a situation go along with changes in the non-moral features of the situation. Or, the fact that necessarily, for all spacetime points a, b, and c, if a is x meters from b, b is y meters from c, and a is z meters from c then $x + y \geq z$. (This is a formulation of the *triangle inequality*.)

Such modal patterns call out for explanation in the same way as the raven pattern. If we observe that, in the actual world cases we have seen, changes in the moral status of a situation go along with changes in the physical features of the situation then this pattern needs explaining. The line of argument we have developed suggests that this need for explanation just increases as we see that the pattern generalizes to hold in all possible worlds. So, this is a problem with theories that take such modal patterns as

unexplained.

What we have is a very simple argument against taking modal patterns as unexplained. Those patterns call out for explanation and that looks like a problem with theories that say that those patterns are unexplained. But, again, I don't mean to say that this argument is conclusive. Rather, I'm going to consider what commitments a theory has to take on in order to avoid this argument.

1.3 Who is Targeted?

But before that, we need to consider what theories are targeted by this argument? What theories leave modal patterns — like *necessarily, all ravens are black* or *necessarily, for all objects, if they have a mass of x kg they do not also have a mass of y kg where x and y are different* — unexplained?

Most obviously, some versions of modal primitivism — understood as the view that modal notions aren't reduced to non-modal notions — leave some modal regularities unexplained. For example, Wang's (2013) primitivist view takes as basic and unexplained certain regularities about which properties are compatible with each other and which are not — regularities like *necessarily, for all objects, if they have a mass of 5 kg they do not also have a mass of 6 kg*.[3] Other modal primitivist views, e.g. Forbes (1989) and Peacocke (2002) are even more throughgoing about leaving modal patterns unexplained.

However, not all versions of modal primitivism are targeted by the argument — for example, Wilsch (2015) develops a primitivist view where every particular modal fact is explained in non-modal terms, even though modal notions aren't reduced to the non-modal. (This is roughly analogous to how a certain type of non-reductive physicalist about mind might take every particular fact about mental states to be explained by physical facts, even without reducing the mental to the physical.)

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[3]Wang presents her view slightly differently, introducing a 'incompatibility relation' between properties (section 7-8). But, I take it, this relation is merely meant to represent modal patterns like the one just mentioned. If, this is incorrect and the incompatibility relation is posited as an entity in the world that *explains* the modal patterns, then Wang's position isn't one targeted by the section 1 view.

Further, there are views, like that of Armstrong (1989), which aim to reduce modal notions to the non-modal via combinatorial principles – e.g. the principle that any way of recombining the fundamental objects and properties is possible. Such views may also be targeted by this argument, but only to the extent that their view fails to be fully reductive and ends up having to have primitivist components. In particular, Wang argues – developing objections that are discussed in Armstrong (1989, Chapter 6) and are very closely related to the 'color-exclusion problem' that faced Wittgenstein in the Tractatus (1921, 6.375) – that combinatorialism gives an extensionally inadequate account of modality, unless it takes as basic certain principles for how determinable properties can combine (like the necessity of determinate exclusion) and for how spatio-temporal properties relate (like the necessity of the triangle inequality). Taking such modal patterns as unexplained would lead combinatorialism to be targeted by the argument.

But the argument doesn't just target modal primitivism and views with primitivist components. Even views that reduce modal concepts to non-modal ones may leave the relevant patterns unexplained. Take, for example, Lewisian modal realism. The view is not primitivist about modal notions — necessity and possibility are defined in terms of the concrete possible worlds. But the patterns across these worlds are not explained — they are taken as basic, since the structure of the possible worlds is taken as basic. So, any regularity across these worlds, like in *all possible worlds all ravens are black* is left unexplained.[4] (For Lewis, these patterns across possible worlds aren't exactly *modal* patterns, since the reduction of modal concepts to possible worlds is supposed to be reduction to the non-modal. However, this doesn't affect our argument that patterns across possible worlds call out for explanation.)

In fact, any view where the space of possible worlds is taken as basic seems to face the argument in the same way as Lewis's view — regardless of whether those worlds are concrete. For example, views where possible worlds are understood as properties (e.g. Stalnaker (1976)), or state of affairs (e.g.Plantinga

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[4]Lewis accepts a principle of recombination, the intuitive idea of which is that "patching together parts of different possible worlds yields another possible world" (1986b, pp. 87-88). But this principle doesn't generate the possible worlds — the worlds are just concrete things that are out there — and so it doesn't explain why in all possible worlds all ravens are black.

(1974)) are targeted by the argument if the structure of, and thus the regularities across, the possible worlds is left unexplained.

So, a variety of views leave at least some modal patterns unexplained and thus are targeted by the argument. What views are not targeted? Well, it's views on which all modal patterns are explained. One class of such views takes modal patterns to be mere symptoms of underlying facts about grounding, essence, metaphysical law, or something similar (see, for example, Schaffer (2009, p. 364), Kim (1993, p. 167), Wilsch (2017, section 3) for expression of this idea). Kit Fine's (1994) view where all modal facts are explained by facts about essence is an example of this class as is the Wilsch (2017) view mentioned earlier.

But this is not the only class of views that take all modal patterns to be explained. Modal patterns could perhaps be explained by facts about conventions. For example, Ted Sider's (2011, Chapter 12) view is naturally interpreted as one where facts about convention are part of the explanation of why certain facts hold in all possible worlds. The fact that necessarily $2 + 2 = 4$ is explained by whatever makes $2 + 2 = 4$ in the actual world, in combination with facts about convention that make it the case that $2 + 2 = 4$ is the kind of fact that we take to necessary, if it is true. Alternatively modal patterns could be explained in terms of facts about dispositions (e.g. Ellis (2007); Mumford (2004); Vetter (2015)). I'm not going to survey all the options here. But, again, the key point is that the argument developed is an argument against any view which leaves some modal patterns as unexplained.

1.4   HUMEANISM AND UNEXPLAINED PATTERNS

One final thing about this argument before we consider responses. We can see this argument as closely related to a classic argument against *Humeanism*. Formulating Humeanism precisely is somewhat complicated, but for our purposes we can take it to be the view that the view that the world, at it's fundamental level, is just a mosaic of events spread out across spacetime with no necessary connections between the events. This mosaic of events is basic and unexplained. So, it seems, certain basic regulari-

ties in the mosaic – for example, the fact that in all interactions energy is conserved – look like they are unexplained. Consequently, Humeanism takes those regularities to be a 'cosmic coincidence' (Foster, 1982; Strawson, 1989).

Clearly, the argument I have given is similar in spirit, though I have formulated the argument using the notion of facts 'calling out for explanation' and I have applied this idea to modal patterns. There's a lot to say about this argument against Humeanism, in particular, some deny that Humeanism does leave those regularities unexplained, though I'm not going to discuss it in detail here. But it will be useful to keep the analogy with the Humean argument in mind, since it will come up again later.[5]

2 Generalizing to the Modal

Here is a natural response to the argument developed in the last section: Sure, generalizing a pattern makes it call out for explanation more — all ravens being black calls out for explanation more than twenty ravens being black — but that idea doesn't apply to the modal patterns, since modal regularities are not, in any sense, a generalization of non-modal regularities. It's not the case, for example, that *necessarily all ravens are black* is a generalization of *all ravens are black*. So it's wrong to think that *necessarily all ravens are black* calls out for explanation more than *all ravens are black*.

This, I think, isn't the right thing for Lewisian modal realists to say, but for defenders of some other views of modality it's a perfectly reasonable line of thought. Why isn't it the right thing for modal realists to say? Because, on the Lewisian view, other possible worlds are just the same type of thing as the actual world. Patterns across possible worlds are almost identical in nature to patterns within worlds — they are patterns in the concrete stuff that is out there. So it's very natural for the Lewisian to think

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[5]I'm using the term 'Humeanism' to refer to a view about the nature of the actual world. Sometimes the term is used to describe certain views of modality – but there isn't a lot of consistency in how it's used and how it relates to the non-modal version of Humeanism. So I'm not going to use 'Humeanism' to describe any views about modality, and I don't think we should there to be any simple analogies between views of modality that might be describes as Humean and Humeanism about the actual world.

of modal patterns as generalizations of non-modal patterns – they are just more of the same.

But if you are not a modal realist then you may think that modal regularities are just a different type of thing to actual world regularities. And if this is right then perhaps it doesn't make sense to think of one as a generalization of the other.

However, this response doesn't seem to fully solve the problem. Saying that in all possible worlds all ravens are black is not a generalization of all ravens are black allows us to deny part of the argument of the last section — we can deny that the modal pattern is more in need of explanation than the actual world pattern.

But merely denying this isn't a complete response. Notice that the actual world pattern, that all ravens are black, *still calls out for explanation* — it's substantial mark against any theory which says that it doesn't have an explanation. If the modal pattern calls out for explanation *to the same degree* as the actual world pattern that's still a major problem for views that say that this, and other, modal patterns are unexplained.

Rather, if we want to defend those views, we need some way to say that the modal patterns call out for explanation *less* than the actual world patterns, or, alternatively, that neither the actual world patterns nor the modal pattern call out for explanation.

In the next section I'm going to explore a response of this kind.

3   Patterns that are Appropriately Unexplained

They key idea of this response is that sometimes, in special cases, generalizing a pattern actually leads to it being *less* in need of explanation. If this idea is developed properly then it could allow us to capture the obvious truth that observing 20 ravens all being black does call out for explanation, while saying that *necessarily, all ravens are black* doesn't call out for explanation and so can appropriately be taken as unexplained.

This response isn't an easy one though. It involves some substantial commitments about the nature of explanation. To see how this response works let's take a step back for a second and consider a couple of different ways that you might think about explanation.

We can, in a very rough and unnuanced way, place most of the accounts of explanation into one of two categories. The first, and most populous, category is made up of views which say that to explain something we show what that thing *depends upon*. Causal accounts of explanation are obviously of this form. To explain an event we might cite the causes of the event, doing this shows what the event in question depends upon (e.g. Woodward (2003), Strevens (2008a)). But also law-based explanations, as given by people who believe laws govern particular events, have this form. It is common to think that laws, for example the law that F=MA, govern their instances and hence the law can explain the instances (see the discussion in Beebee (2000a) although she rejects the governing conception). Governing seems to be a species of dependence, and so this type of explanation fits into this category. Similarly, the influential 'mechanistic' approach to scientific explanation is based on the idea that explaining a phenomenon involves showing what mechanisms 'give rise to' the phenomenon (e.g. ?Craver, 2006). This 'giving rise to' relation seems to be a species of dependence relation. Plenty of other types of explanation are driven by a dependence intuition.

The other category, a small but forceful undercurrent in contemporary discussions of explanation, consists in views which take explanation to involve *pattern-subsumption* – fitting the event in question into a *larger pattern*. Unificationist views of scientific explanation, like those given by Kitcher (1981) and Friedman (1974), fit into this category. As does Hempel's version of the D-N account (at least on some interpretations), where he takes explanations to show how something follows from the laws, but where laws are merely general patterns. (In fact in some moods, e.g. Hempel (1965, p.488) explicitly commits to a pattern-subsumption conception.)

And perhaps law-based explanations given by Humeans about laws of nature fit into this category too. The Humean takes laws to reduce to the patterns in the mosaic of events. Consequently, when

those laws explain particular facts that's naturally interpreted in a pattern-subsumptionist way (see, for example, Loewer (1996, p.113)) .[6]

There's a lot more to be said about the pattern-subsumption approach. In particular, a good pattern-subsumption theory will not say that fitting things into *any* more general pattern is explanatory. There will have to be constraints on what general patterns are relevant. But, these details won't matter for our ends.

How does this distinction between dependence and pattern-subsumption conceptions of explanation help respond to the argument of section 1 though? The idea is that these two conceptions of explanation motivate different explanatory starting points — there are different facts that are taken as appropriately unexplained.

Start with the dependence approach, and take a particularly simple version of the approach. Imagine that we believe in primitive laws of nature (for example, along the lines of Maudlin (2007, ch. 1)) and our theory of scientific explanation is based on those laws — we explain by showing how something follows from the laws. Then it is natural for us to say that the laws, or at least the fundamental laws, have a different explanatory status from other facts. They are our explanatory starting points — they are the things doing the explaining and are not themselves explained. It's not problematic, one might think, that these laws are not explained — there's no coincidence, or anything like that here — rather these fundamental laws are appropriate starting points and are just not in need of explanation.

That is to say, the fundamental laws, on this approach, don't call out for explanation. As we noted earlier, if your friend tosses a coin and it lands heads 50 times in a row that calls out for explanation. And certainly if it happens 1000 times in a row it really calls out for explanation — we should think that there must be an explanation of this, that any theory that says that is no explanation is very implausible. But, we should react very differently, I take it, if someone holding the above conception of explanation

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[6]Of course, there is much more to say about this issue. It's controversial whether Humean law-based explanation explains via pattern-subsumption. And some Humeans, like for example,Lewis (1986a), give accounts of explanation where the laws don't play a central explanatory role. But since Humeanism isn't the main focus I'm not going to discuss these issues further.

told us that it's a primitive law that F=MA. That law doesn't call out for explanation in the same way — it's not being explained doesn't make the theory very implausible. Rather, it's the type of thing that is appropriately unexplained, given the conception of explanation.

More generally, the thought is that the conception of explanation we hold motivates taking certain things as first explainers — those first explainers are appropriately unexplained and don't call out for explanation.

But now, this has implications for what the pattern-subsumptionist can take as appropriately unexplained. The pattern-subsumptionist thinks that explaining a fact involves fitting it into a more general pattern. But, of course, this procedure has to come to an end somewhere. There will be patterns that are the *most* general patterns — those that cannot be fit into any more general pattern. For the pattern-subsumptionist these most general patterns will be unexplained.

And further, given this conception of explanation it seems appropriate that the most general patterns are unexplained. If what explanation is about is fitting things into more general patterns then *of course* the most general patterns of the world will be unexplained. So, we might think, given the pattern-subsumption conception of explanation, it's not a mark against a theory if it leaves the most general patterns of the world unexplained — in just the same way as, given the version of the dependence view of explanation just discussed, it's not a mark against a theory if it leaves some fundamental laws as unexplained. So, on this view, the most general patterns of the world don't call out for explanation.

If this is right then sometimes generalizing a pattern reduces how much the pattern calls out for explanation. If we generalize a pattern so far that it becomes one of the most general patterns of the world then that leads to it being not in need of explanation. Of course, the pattern our main example, that all ravens are black — is obviously not one of the most general patterns of the world. A more plausible example might be *in every physical interaction energy is conserved*. A pattern-subsumptionist could plausibly say that such a pattern doesn't call out for explanation — it is appropriately unexplained.

This, I think, is a way that the Humean could respond to the objection that they take some of the regularities of the world as unexplained. They could embrace a pattern-subsumptionist conception of explanation and accept that the most general patterns of the world are unexplained, but they are appropriately unexplained and do not call out for explanation. And so their being unexplained isn't a mark against the theory.

But, our focus is on the modal case, not on Humeanism. And it's fairly easy to see how to adapt this strategy to to respond to the section 1 argument against views that take modal patterns as unexplained. The idea is that if we accept a kind of modal pattern-subsumptionism — that is, if we can explain facts by fitting them in to more general modal patterns — then that motivates taking the most general modal patterns as unexplained starting points. Those general modal patterns don't call out for explanation and so theories which do not explain them may well be acceptable.

For example, we might think that one of the most general modal patterns is that *necessarily, nothing can instantiate more than one determinate of the same determinable* and that we can explain facts like *nothing that I own is both under 5kg and over 10 kg* by subsuming them to this general modal pattern. This would motivate a modal primitivism in the spirit of Wang (2013) — taking general patterns about the incompatibility of determinate properties as unexplained.

This isn't an easy response to the argument of section 1. It involves substantial commitments about the nature of explanation. We need to accept these kind of modal pattern-subsumption explanations in order to say that the general modal patterns are appropriately taken as unexplained. But it really looks like a response of this kind is needed. The argument of section 1 shows us that we need a story about why modal patterns don't call out for explanation, if we want to hold the views that take certain modal patterns as unexplained. Perhaps there is some other way of arguing that those patterns don't call out for explanation, but it's hard to see what it could be.

So, here's the main point of the paper: if we want to have a view that takes modal patterns as unexplained, then we are pushed towards pattern-subsumptionism about explanation — and in particular

towards modal pattern-subsumptionism. If we reject that conception of explanation then it looks like we should accept views which take all modal patterns to be explained — for example, views takes modal patterns to be mere symptoms of underlying facts about grounding, essence, metaphysical law, or something similar.

I'm going to end this section by considering two, very closely related, objections to this conclusion. Now perhaps these aren't objections that people would make in light of the previous discussion, since my responses to the objections will involve reiterating parts of the discussion. However, these reiterations will help clarify the nature of my argument.

Objection: Surely it is possible to accept that modal patterns are unexplained without accepting the pattern-subsumption view or anything like that. After all, every theory needs to start from somewhere — they need to take some things as unexplained. So why can't I just choose to take certain modal regularities as unexplained parts of my theory, regardless of anything to do with pattern-subsumption or conceptions of explanation?

Answer: Of course, every theory needs its starting points — some facts need to be taken as unexplained — but not every starting point is on a par. It wasn't part of my argument that theories can't take facts as unexplained. And it wasn't part of my argument that theories should take *fewer* facts as unexplained. Rather, my argument was based on the idea that there are certain *types* of facts that theories should not take as unexplained — certain types of facts that call out for explanation. Some facts are not reasonable starting points because they are the wrong type of facts to be taken as unexplained.

But, I argued, what types of facts these are depend upon our view of explanation. One way to put it is that there needs to be a kind of internal coherence of our theories — the elements of our theories that you take as unexplained should fit with our theory of explanation. And, taking modal patterns as unexplained fits with a pattern-subsumption conception of explanation, but not with others.

Objection: You say that if we reject the pattern-subsumption conception we shouldn't take modal

patterns as unexplained, and that a theory which explained all modal patterns in terms of ground or essence or something similar would do better. But don't the facts about essence or ground or whatever call out for explanation?

Answer: No, those facts about ground or essence don't call out for explanation, as long as they are combined with the relevant theories of explanation that fit with taking those facts as unexplained. Earlier in this section we discussed how, if you thought that explanation involves showing how things follow from the laws then that motivates taking some laws as explanatory starting points, and as not calling out for explanation. Similarly, if you have a conception of metaphysical explanation where metaphysical explanation involves showing how things follow from facts about essence, then this motivates taking certain facts about essence as unexplained.

Again, every theory will have unexplained starting points, but which facts don't call out for explanation and thus are appropriate starting points will depend upon the theory of explanation.

4 The Choice, and which Option to Take

Here's what I argued for: Views that take certain modal patterns as unexplained face a problem. It seems like those modal patterns call out for explanation — and that is a significant problem with theories that say that the patterns do not have an explanation. Defenders of those views have to find a way to deny that those patterns call out for explanation. I've suggested that the way that they can do this is by embracing a pattern-subsumption conception of explanation. What account of explanation we accept affects what we can appropriately take as unexplained — that is, it affects what types of facts call out for explanation. The pattern-subsumption conception allows us to say that certain general modal patterns do not call out for explanation. So, in effect, there is a choice between, on the one hand, holding the pattern-subsumption conception of explanation and consequently taking certain general patterns as unexplained, and, on the other hand, holding that all modal patterns are explained.

Along the way, we discussed there being an analogous choice in a non-modal setting. A Humean approach is naturally understood as taking certain non-modal patterns in the Humean mosaic are unexplained (though as we noted, this is somewhat controversial). In order to defend this, I suggested, we are pushed to a pattern-subsumption approach to explanation.

There is an interesting question, then, about how these two choices interact and which option to pick in both cases. So, I'm going to end by briefly looking at a couple of considerations about which options we should take. This is all rather exploratory though, nothing here will force us to take one option over another.

Taking the two choices together we have four options. Two 'pure' views where we make the same choice in the modal and the non-modal case, and two 'mixed' views where we make a different choice. The two pure views are:

(i) Accepting that all modal patterns need to be explained. And also that all actual patterns need to be explained. For example, this view is held people who are (a) anti-Humean and who think that actual world patterns are explained by, for example, primitive laws and (b) think that all modal patterns are symptoms of facts about ground or essence.

(ii) Accepting pattern-subsumption explanation about actual world facts — and consequently that the most general patterns of the actual world are basic and unexplained. And also accept pattern-subsumption explanation about modal patterns — and consequently say that the most general modal patterns are basic and unexplained. If we are extremely lax with our interpretative standard we might take this view to be in the spirit of Lewis, since he was a Humean and so took patterns in the Humean mosaic as unexplained (1986c, introduction) and also, as we discussed earlier, Lewisian modal realism takes patterns across possible worlds as unexplained. However, we can't ascribe this position to Lewis, because nothing he said about explanation suggests anything like the pattern-subsumption approach.

The two mixed views are:

(iii) Accepting that all actual patterns need to be explained — for example, by primitive laws. But accepting pattern-subsumptionist explanation about modal patterns — and consequently that the most general modal patterns are basic and unexplained.

(iv) Accepting that all modal patterns need to be explained — for example, by facts about ground or essence. But accepting pattern-subsumptionist explanation about actual patterns — and consequently that the most general actual patterns are basic and unexplained. This view is perhaps accepted by some modern Humeans who explicitly reject modal formulations of Humeanism in favor of formulations in terms of grounding (Loewer, 2012; Hall, 2010)

Out of these four options the two mixed views are somewhat strange. They require us to treat the explanation of modal patterns very differently from the explanation of actual patterns. This is particularly strange since many of the reasons to reject the pattern-subsumption view of explanation apply equally in the modal and the actual cases. So it's a little hard to see why we would accept the pattern-subsumption conception in one case but not the other. Let's look at a few such concerns with the pattern-subsumption conception.

The first concern with the pattern-subsumption view is that it makes explanation deeply non-local. Take some typical everyday explanation. Imagine I want to explain why the window broke. You might naturally think that such an explanation should be local, in the sense that it is about what is going on in the vicinity of the window-breaking. So, for example, I explain the window breaking by citing the fact that it was hit with a rock – this is a good explanation and is local in the relevant sense.

Of course, we might be able to extend the explanation so that it tells us about things that are not in the vicinity of the window. Perhaps the reason that the rock hit the window is because it was thrown by a protestor, and the reason that they threw the rock in protest might have to do with complex features of the global economy. But still, in this case there is a chain of local interactions that lead to the rock breaking the window.

Things work differently in a pattern-subsumption explanation. Imagine I explain the breaking of the window by appealing to the rock and also the the relevant general pattern of rocks hitting windows leading to breaking. I explain the breaking by subsuming it to this general pattern. What this means, though, is that the explanation is dependent upon this general pattern holding. So, for example, if events across the other side of the world, or events in the past or future, are such that the pattern does not hold then the explanation fails to hold. So, the explanation of the window breaking here is dependent upon windows and rocks that are very distant (and not via any intermediate steps, rather, there is a immediate, non-local dependence between those distant windows and this explanation).

This non-locality is, for many people, a deeply unattractive feature of the view. What's going on across the other side of the world or in the far future is intuitively just irrelevant for the explanation of the window breaking *here* and *now*.

Analogous things can be said about pattern-subsumption explanation in the modal case. Imagine we try to explain why all actual differences in ethical properties go along with actual differences in physical properties in a pattern-subsumption way, by fitting it into the more general pattern that differences in ethical properties necessarily go along with differences in physical properties. Again, there is a concern that the putative explanans is intuitively irrelevant to the explanandum — we are trying to explain an actual world phenomenon, what goes on in other possible worlds is just irrelevant. If we are concerned about non-locality of pattern-subsumption explanations in the non-modal case, then this concern seems even stronger in the modal case — what could be more non-local to us than distinct possible worlds?

A second worry with the pattern-subsumption conception is that it involves a strange kind of discontinuity. Fitting a phenomenon into a more general pattern doesn't explain unless the pattern is maximally general. So, for example, it doesn't explain why this raven is black to note that most ravens are black, or that all ravens close by are black. In fact, as we noted earlier, this just makes the situation seem even more coincidental. It is only when we appeal to the most general pattern, that all ravens are black, do we get an explanation. It's somewhat hard to see, though, why there should be this discontinuity —

why fitting a phenomenon into a more general pattern is not explanatory until it suddenly is.

A third worry, and perhaps the most forceful for some people, is simply that pattern-subsumption is not dependence. People's dependence intuitions run deep — how could anything that is not dependence genuinely be explanatory? Relatedly, it's common to object to pattern-subsumption or unification approaches that they might allow explanations that run contrary to the direction of dependence (e.g. Barnes (1992),Strevens (2008b, section 1.4.7)).

All these worries apply equally to the modal and the non-modal case. So, for those who feel the force of any of these worries taking either of the mixed views seems unattractive. And of course, if you feel the force of these worries then taking view (i) – that is, accepting pattern-subsumption in both the modal and the non-modal case – is unattractive too.

Of course, though, these are not the only considerations relevant to our choices. There are pressures away from dependence-based approaches to explanation and towards pattern-subsumption approaches. These pressures typically come from suspicion with the existence of the relevant dependence relations leading us to fall back on pattern-subsumption. For example, Humeans reject the existence of nomic dependence relations, things like primitive laws or causation, for metaphysical reasons — they think we can do without such strange additions to our ontology (e.g. Beebee (2000b)) — and for epistemic reasons — they worry about how detectable such parts of the ontology would be (e.g.Earman and Roberts (2005)).

There is no reason to think that these types of considerations against dependence structure are equally forceful in the modal and the non-modal case. So, if we take these considerations to have different weight in the two cases then we might reasonably accept one of the mixed views. And if we take them to be forceful in both cases then we can reasonably accept (i). So, I think, each of the views (i)-(iv) may well be viable — but clearly there is some more pressure on the two mixed views.

But in any case, I'm not going to adjudicate between these views any further. We have seen some relevant

considerations, and the reader can decide for themselves which way to go. Again, the key point is that if we want to hold a view — like certain types of modal primitivism, or Lewisian modal realism — which leaves some modal patterns as unexplained, then we need to give a story about why those patterns don't call out for explanation. And it looks, like the accepting a pattern-subsumption view of explanation is a way to do that. Whether this is a option we are willing to take depends upon how we weight the considerations we have just seen and whether are are willing to accept the pattern-subsumption approach.

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