The primitivist response to the inference problem

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Forthcoming in *dialectica*

Abstract

While the inference problem is widely thought to be one of the most serious problems facing non-Humean accounts of laws, Jonathan Schaffer has argued that a primitivist response straightforwardly dissolves the problem. On this basis, he claims that the inference problem is really a pseudo-problem. Here I clarify the prospects of a primitivist response to the inference problem and their implications for the philosophical significance of the problem. I argue both that it is a substantial question whether this sort of response ought to be accepted and that the inference problem, contra Schaffer, remains a significant problem with important implications for the non-Humean position. I also argue that this discussion indicates grounds to be wary about applying the Schaffer-style strategy of straightforwardly dissolving problems by stipulation to other philosophical problems.

Keywords: Inference problem; Governing laws; Laws of nature; Non-Humean laws; Primitives

Acknowledgements I would like to thank three referees for *dialectica* for very extensive and helpful comments that greatly improved the paper.

Jonathan Schaffer (2016a)[1] has argued that taking it to be axiomatic that non-Humean laws entail regularities "immediately dissolves" (580) the well-known inference problem for the non-Humean conception of the laws of nature. In a slogan, the non-Humean should simply stipulate that "it is the business of laws to govern" (577). On this basis, Schaffer (579) claims that the inference problem is "no problem whatsoever" and that "whatever problems the non-Humean about laws might have, the Inference Problem is not among them".

There are two parts to Schaffer's proposal. The first is the idea that non-Humeans ought to respond to the inference problem by taking the entailment between laws and regularities to be primitive. The second is that this primitivist response straightforwardly dissolves the inference problem with no significant implications or costs for the non-Humean. So, Schaffer thinks both that the non-Humean should give a primitivist response to the inference problem and that doing so shows that the problem is really a pseudo-problem.

I argue here that, while there are potential primitivist responses to the inference problem, contra Schaffer, these responses come with substantial metaphysical commitments and argumentative burdens. This argument has important implications for both the prospects of primitivist responses to the inference problem and the philosophical significance of the problem. Regarding the former, it shows that it is a substantial question whether these responses can succeed and whether they are preferable to more traditional explanatory responses. Regarding the latter, it shows that the inference problem remains a serious philosophical problem that has important lessons to teach us about the implications of the non-Humean view.

I also draw some general lessons from this discussion for primitivist responses to philosophical problems in general. Schaffer (586–587) thinks that his stipulative dissolution of the inference problem can be generalised to other philosophical problems, such as Bradley's regress. My

[1] Unless otherwise indicated, all further references to Schaffer are to this paper.

argument here, though, indicates grounds for thinking that this strategy may often simply ignore the motivation for philosophical problems and, in so doing, obscure the lessons we ought to learn from those problems. Primitivist responses to philosophical problems, then, ought to proceed only with careful attention to the initial motivation for the problems and how that motivation might complicate any such response.

In sections 1 and 2 I outline Schaffer's proposed strategy and argue that it is based on a misinterpretation of the inference problem. In section 3, though, I outline an alternative primitivist strategy that avoids this problem. I then argue, in section 4, that this strategy comes with a substantial argumentative and theoretical burden and so does not simply dissolve the inference problem. In sections 5 and 6 I consider some potential objections to my argument and, in the process, identify a second potential primitivist strategy. Like the first strategy, though, this strategy involves substantial commitments and does not simply dissolve the inference problem. The result is that, while there are potential primitivist strategies for responding to the inference problem, they do not dissolve the problem and it is a substantial question whether they succeed. In section 7, I argue that this result also indicates general grounds to be wary of attempts to dissolve philosophical problems via stipulation.

1) Schaffer's stipulative response

Non-Humeans about the laws of nature hold that laws are distinct from regularities but, nonetheless, entail regularities. The inference problem, basically, is the problem of making good sense of this entailment. While it has generally been assumed that an adequate response to this problem would consist in a plausible explanation of the entailment, Schaffer defends a stipulative response to the problem on which the entailment is axiomatized rather than explained. In effect, Schaffer's recommendation is that non-Humeans take it as a primitive fact that laws entail regularities.

Schaffer bases his proposal on the point that any theory is entitled to primitives that do sufficient theoretical work to pay their way. In the case of primitive governing laws, the non-Humean can justify this posit by appealing to the standard motivation for non-Humean laws, on which such laws provide the best explanation of nomic regularities (§4.1). Schaffer, then, thinks that the inference problem is really "no problem whatsoever", because it can be dissolved by simply saying that "it is the business of laws" to govern (579). So, Schaffer's proposal is to dissolve the inference problem by taking the entailment between laws and regularities to be primitive rather than attempting to explain it.

It will be helpful, though, to say more about the sense in which taking the entailment to be primitive avoids the need to explain it. Benovsky (2020) has recently proposed that metaphysical primitives are, in general, unexplained specifically in the sense that they are *ungrounded*. A theory's primitives, then, are those entities or facts that the theory takes to be fundamental. This idea fits well with Schaffer's (581; 582; 583) repeated description of primitive laws as "fundamental posits" or "fundamental laws". It also provides a plausible account of explanatory responses to the inference problem as attempts to specify the grounds for the entailment from laws to regularities. Tooley's (1987) "speculative" response, for example, looks like an attempt to show that the entailment can be grounded in facts about conjunctive universals.

Understanding primitives just in terms of grounding, though, may be too narrow. On some views, there are forms of metaphysical explanation other than grounding. To take a view that I discuss further in section 6, Glazier (2017) thinks that "essentialist explanation" is a form of metaphysical explanation distinct from grounding. Essentialist explanations explain the fact that *a is F* in terms of the fact that *a is essentially F*. For instance, the fact that *Socrates is essentially human* can explain the fact that Socrates is human. If the fact that Socrates is human is explained in this way, though, then it is surely not a primitive.

To accommodate these sorts of cases, I am going to understand explanation here in terms of the broader notion of metaphysical explanation rather than grounding. Traditional explanatory responses to the inference problem, then, are attempts to metaphysically explain how laws entail regularities. Schaffer's primitivist proposal, on the other hand, is to take the entailment to be a metaphysically unexplained, fundamental posit. This interpretation is, of course, consistent with the idea that axiomatizing the entailment provides a kind of epistemic explanation for the entailment by, for instance, clarifying its place in a theoretical system.

Schaffer's proposal, then, is based on the idea that the following sort of argument drives the inference problem:

1. If governing laws involve a metaphysically unexplained connection between laws and regularities, then there are no governing laws.
2. Governing laws involve a metaphysically unexplained connection between laws and regularities.
3. Therefore, there are no governing laws.[2]

Given this motivation for the inference problem, the problem, as ordinarily understood, consists in showing that (2) is false by metaphysically explaining the relevant connection. Schaffer's argument, though, is based on the fact that (2) only counts against non-Humean laws once (1) is accepted. Given this point, Schaffer thinks that the problem can easily be blocked by taking the connection between laws and regularities to be primitive and, on that basis, rejecting (1).

[2] A referee has pointed out that this presentation of the inference problem in terms of an argument is unusual. The problem is generally presented as a problem of *how* governing laws entail regularities rather than as an argument. Nonetheless, discussions of the problem generally take place against the backdrop of an implicit argument that failure to solve the problem provides grounds to reject the non-Humean view. The argument given in the main text is a reconstruction of Schaffer's apparent interpretation of that argument.

Schaffer's approach, then, entails that the motivation for the inference problem depends on overlooking the mundane point that theories are, in general, entitled to invoke well-motivated primitives. Indeed, Schaffer makes this claim quite explicitly at various points in the paper. For instance, in discussing Lewis's claim that Armstrong's account of laws founders on the inference problem, Schaffer says that Lewis "has not understood that Armstrong can and should stipulate that N is a relation" (580) for which the law to regularity entailment holds. Similarly, in his concluding paragraph, he writes (587): "It is a bad question – albeit one that has tempted excellent philosophers from Bradley through to van Fraassen and Lewis – to ask how a posit can do what its axioms say, for that work is simply the business of the posit. End of story." At these points, Schaffer explicitly ascribes the motivation for the inference problem to a simple failure to understand that theories are entitled to posit primitives that do specified theoretical work.

At face value, though, it seems implausible that the inference problem could have been so widely taken to be a serious problem just on the basis of such a basic error. The details of Lewis's presentation of the problem do not make this interpretation any more plausible. Lewis's (1983: 366) objection to Armstrong's theory is: "I find its necessary connections unintelligible. Whatever N may be, I cannot see how it could be absolutely impossible to have *N(F,G)* and *Fa* without *Ga*. (Unless N just *is* constant conjunction, or constant conjunction plus something else, in which case Armstrong's theory turns into a form of the regularity theory he rejects.)"

On Schaffer's interpretation, Lewis's objection to the claim that N(F,G) entails that F*a* only if G*a* is premised just on an implicit rejection of primitives in general. As Lewis's objection is that the entailment is unintelligible, Schaffer's reading implies that Lewis is actually relying on the implicit claim that primitives are *unintelligible*. On this reading, Lewis accepts (1) just because he implicitly endorses:

4. Any primitive is unintelligible.

It seems hard to believe that Lewis would be arguing, either explicitly or implicitly, on the basis of anything as implausible as (4). Indeed, as Schaffer (footnote 2) notes, in an earlier section of the same paper, Lewis (1983: 352) himself points out that one way for any theory to accommodate a fact is by taking it to be primitive. Schaffer's reading, then, requires that Lewis, in the same paper, moves from this explicit defence of primitives to the unsupported assumption that unexplained facts are *unintelligible*. Charity demands that we look for an alternative reading.

2) Understanding the inference problem

In expanding on his concern, Lewis (1983: 366) says:

> I am tempted to complain in Humean fashion of alleged necessary connections between distinct existences, especially when first-order states of affairs in the past supposedly join with second-order states of affairs to necessitate first-order states of affairs in the future. That complaint is not clearly right: the sharing of Universals detracts from the distinctness of the necessitating and the necessitated states of affairs. But I am not appeased. I conclude that necessary connections can be unintelligible even when they are supposed to obtain between existences that are not clearly and wholly distinct.

What drives Lewis's reasoning here is not an out-of-hand rejection of primitives, but rather general considerations about the sorts of necessary connections that are intelligible. Lewis's concern is that the Armstrongian law and the first-order state of affairs intuitively are not connected in a way that allows any two entities to stand in a necessitation relation. While Lewis is not clear on whether the putative entailment violates "Hume's dictum",[3] he clearly thinks that it violates some closely related intuition or principle.

[3] Wilson (2010: 595) gives a standard contemporary statement of Hume's dictum as 'there are no metaphysically necessary connections between distinct, intrinsically typed, entities'. See Stoljar (2008) and Wilson (2010) for discussion of how to interpret the principle.

This interpretation of Lewis's objection sheds light on his earlier claim that he can understand the entailment only if N "just is constant conjunction, or constant conjunction plus something else". If N(F,G) were identical with the fact that all Fs are Gs or had this fact as a constituent, then the two facts would plausibly be connected in a way that, in general, allows one fact to entail another. As Lewis points out, though, the facts cannot be connected in this way, because, if they were, Armstrong's theory would collapse into a Humean regularity theory.

Given these points, Lewis's argument can be reconstructed as follows:

5. An entity, ϕ, necessitates an entity, ψ, only if ϕ stands in the sort of connection with ψ that is necessary for any entity to necessitate another.

6. Governing laws do not stand in the sort of connection with regularities that is necessary for any entity to necessitate another.[4]

7. Therefore, governing laws do not necessitate regularities.

The key premise here is clearly (6). While Lewis is less clear than might be hoped about this, the intuition supporting (6) appears to be that, even if governing laws are not fully distinct from regularities, they are too distinct or different for the putative necessary connection between the two to be intelligible.

I think that this interpretation of Lewis is clearly preferable to the interpretation that follows from Schaffer's response to the inference problem. It is clearly the more charitable interpretation, as it avoids ascribing anything as implausible as (4) to Lewis and avoids the inconsistency that (4) would

[4] Proponents of governing laws, of course, claim that such laws are not only necessary but also sufficient for a necessitation relation to obtain. However, showing that governing laws fail to satisfy some necessary condition for such a relation to obtain would show that they do not suffice for such a relation. I take it that this is the idea underlying Lewis's argument and, as I argue below, other influential discussions of the inference problem. Thanks to a referee for pushing me to clarify this point.

entail in Lewis's own views. Instead of, rather oddly, premising his argument on an unmotivated dismissal of theoretical primitives, Lewis is arguing on the basis of intuitions about the kinds of modal connections that make sense. This interpretation also makes sense of Lewis's appeal to general considerations about which necessary connections are intelligible, while Schaffer's interpretation ignores this part of Lewis's argument.[5]

A similar argument can be made for van Fraassen's (1989) discussion of the inference problem. Far from ignoring the possibility of a stipulative response to the problem, van Fraassen (1989: 97) explicitly argues against such a response. Like Lewis, his argument is based on the point that the regularity cannot be constitutive of the non-Humean law. The problem, then, is how non-Humean laws can entail regularities, given that they are "so distinctly different" (1989: 97) from each other. It is this point that van Fraassen appears to think rules out the stipulative response and motivates the demand – which he ultimately thinks cannot be met – for an explanatory response.

So, like Lewis, van Fraassen's presentation of the inference problem is not premised on an unmotivated rejection of primitives. Instead, also like Lewis, his argument is based on the idea that non-Humean laws and regularities are too distinct or different for the laws to entail the regularities, at least without a compelling explanation of the entailment. I take it, then, that the interpretation

[5] My interpretation also fits well with Lewis's well-known, closely related discussion of chance, which Schaffer (586–587) gives as another example of an unmotivated rejection of working primitives. Lewis writes, "I don't begin to see[…]how knowledge that two universals stand in a special relation *N** could constrain rational credence about the future coinstantiation of those universals. Unless, of course, you can convince me that this special relation is a chancemaking relation: that the fact that *N*(J,K)* makes it so, for instance, that each *J* has 50% chance of being *K*." On my interpretation, what underlies Lewis's discussion here is his conviction that the facts that *N*(J,K)* and "that each *J* has 50% chance of being *K*" are too different to stand in a necessitation relation.

developed in this section does a better job than Schaffer's interpretation of capturing van Fraassen's reasoning in addition to Lewis's reasoning.

The interpretation also makes sense of Tooley's early "speculative" response to the inference problem, which puzzles Schaffer (585). Schaffer is confused that Tooley (1987) feels the need to go beyond his own stipulative response and propose a speculative response that involves substantial claims about the metaphysics of universals.

To see how the current proposal dispels this confusion, we can begin with Tooley's interpretation of the inference problem. Tooley (1987: 110-111) understands the problem as follows:

> how, exactly, are we to think of the relationship which purportedly obtains, on the present account of laws, between statements asserting that universals stand in certain nomological relations, and corresponding generalizations about the properties and/or relations of first-order particulars? The relation is to be one of logical entailment. But is it a formal relation, or does one have to postulate de re relations between distinct states of affairs?

The concern here is clearly whether the entailment from laws to regularities requires accepting necessary connections between distinct entities. Indeed, I think no other discussion of the inference problem is so explicitly cast in terms of a concern over Hume's dictum.

Tooley is equally explicit about what his speculative theory might offer to a solution to the inference problem. He says "it may provide an answer to the question…of whether the present account of laws commits one to holding that there can be logical relations between distinct states of affairs" (1987: 123). He goes on to argue that his speculative theory provides a way to avoid this commitment (1987: 128-129).

Tooley, then, interprets the inference problem as the problem of how laws can entail regularities *without violating Hume's dictum*, and his speculative response is intended to show how this is possible. This interpretation and response are clearly in line with my interpretation of the inference

problem, on which the problem is how laws can entail regularities without violating general modal principles. So, Schaffer's confusion at Tooley's proposed response is ultimately driven by Schaffer's failure to note how these general modal considerations motivate the problem.

My interpretation of the inference problem, then, fits better with the original presentations and discussions of the problem than Schaffer's interpretation. While general modal principles play a central role in these discussions, Schaffer's interpretation simply ignores this aspect of the discussions. I have argued that, as a consequence, he gives uncharitable and unconvincing interpretations of Lewis and van Fraassen and fails to make good sense of Tooley's discussion.

My interpretation, on the other hand, makes better sense of each of these discussions by accommodating the central role that general modal considerations play in them. Given this interpretation, the inference problem arises specifically as the need to show that (6) is false by showing that governing laws and regularities *are* connected in the manner required to stand in a necessitation relation. The motivation for the problem, then, comes from the kinds of general modal considerations that drive Lewis, van Fraassen and Tooley's discussions rather than from an unmotivated rejection of primitives.

3) The genuine primitivist alternative

The interpretation of the inference problem that I just defended entails not only that Schaffer's interpretation of the problem is misguided but also that his response to the problem is misguided. If Schaffer were right that the inference problem is motivated just by a general rejection of theoretical primitives, then he would be right that it could be solved by simply stipulating that non-Humean laws necessitate regularities. Given the interpretation of the problem that I just defended, though, this response begs the question. If the problem is motivated by the concern that non-Humean laws necessitating regularities has unacceptable modal implications, then stipulating that non-Humean laws *do* necessitate regularities simply assumes that those concerns are misguided.

This point can also be put in terms of general considerations about primitives. While any theory is entitled to invoke primitives to do theoretical work, certain primitives may be independently problematic. While positing a primitive always comes at some theoretical cost, positing such primitives comes at an inflated cost. Indeed, if the posit is sufficiently problematic, it may be unacceptable regardless of the work that it does.

On the interpretation I have defended, though, the inference problem is motivated by the idea that the entailment between non-Humean laws and regularities – at least in the absence of a plausible explanation of the entailment – violates general principles or intuitions about necessary connections. This idea, however, also implies that the entailment is a problematic primitive that would either come at an inflated theoretical cost or actually be untenable. On Lewis's view, the general intuition that counts against the entailment renders it unintelligible, and, so, clearly entails that it is an *unacceptable* primitive.

The motivation for the inference problem, then, is also motivation for thinking that the entailment between non-Humean laws and regularities is an unacceptable or, at least, a problematic primitive. So, responding to the inference problem by simply positing this entailment as a primitive fails to address the problem. One does not show that the entailment is an acceptable primitive by positing it as a primitive.

Against this backdrop, it is also clear how a successful explanatory response to the inference problem would do the necessary work. As I proposed in section 1, the kind of explanation involved in attempted explanatory responses is metaphysical explanation. A successful explanatory response, then, would work by identifying metaphysical grounds – or some other metaphysical explanantia – for the entailment that do not violate the relevant general modal principles. In so doing, such an account would show how non-Humean laws respect the relevant principles in a way that simply stipulating that non-Humean laws entail regularities clearly does not.

This result, though, does not show that no primitivist response to the inference problem could succeed. Instead, it shows that such a response would have to come with an argument that the motivation for the inference problem does not, in fact, show that the entailment is an unacceptable primitive. Specifically, the response would have to be supported by an argument that general modal considerations actually fail to support (6). Given such an argument, rejecting (6) without explaining how laws entail regularities would be legitimate rather than simply begging the question.

So, the genuine primitivist alternative to explanatory responses to the inference problem is to argue that, even without an explanation of how non-Humean laws necessitate regularities, general considerations about modality do not motivate (6). When made explicit, this line of reasoning might look quite plausible. At least given Lewis's relatively inchoate appeal to intuition, it seems that the non-Humean may quite reasonably deny the motivation for (6). This approach might be bolstered by arguing that the intuition in question is distinctively Humean, and, so, begs the question against the non-Humean.

To the degree that (6) is motivated specifically by Hume's dictum both the idea that the motivation is unconvincing and the idea that it begs the question against the non-Humean may look particularly plausible. Hume's dictum is generally thought to be a distinctively Humean principle and recently significant questions have been raised about whether there are any good grounds to accept the principle (Wilson 2010).

4) The prospects of the primitivist response

On closer inspection, though, I think that widespread intuitions and significant modal principles provide non-circular support for (6). The consequence is not that a primitivist response to the inference problem is *impossible* but rather that such a response comes with a significant theoretical and argumentative burden.

In the first place, even if (6) is motivated by a distinctively Humean intuition, there would still be significant dialectical reasons for non-Humeans to attempt to adequately address it. A non-Humean

who could make good sense of laws in a way that is consistent with as many Humean commitments or intuitions as possible would, after all, be in a better dialectical position. So, even if the motivation for the inference problem were, in important respects, based on Humean intuitions, there would still be substantial grounds for non-Humeans to attempt to avoid violating those intuitions.

Perhaps more significantly, though, it is not at all clear that the relevant intuition is distinctively Humean. At least some non-Humeans appear to endorse the concern that an unexplained necessary connection between laws and regularities would be highly problematic. For instance, Armstrong (1997: 226) contrasts his explanatory response to the inference problem with the "profoundly mysterious doctrine" that "[u]niversals, whether instantiated or uninstantiated, stand above the flux and certain relations between the universals 'govern' their instances, lay down the law to their instances". Tugby (2016: 1156), in developing his own explanatory dispositionalist response to the problem, agrees that the position described here by Armstrong is "a difficult picture to comprehend".

Indeed, a plausible diagnosis for why so many non-Humeans have taken the inference problem to be a pressing problem is that they share this sort of intuition. There is certainly nothing obviously inconsistent about both thinking that there is important potential theoretical work for non-Humean laws, and being concerned that such laws involve a problematic necessary connection between laws and regularities.

Bird (2005; 2007: 91–97), moreover, has developed the inference problem against Armstrong specifically as the problem that N(F,G)'s entailing that all Fs are Gs violates Armstrong's *own* general modal commitments. In particular, he argues that the entailment is inconsistent with Armstrong's combinatorial approach to modality and his associated principle of INDEPENDENCE, on which there are no entailments between fully distinct states of affairs. In pursuing this argument, Bird argues, in a similar vein to Lewis and van Fraassen, that the Armstrongian law cannot have the regularity as a constituent.

So, Bird's presentation of the inference problem follows very closely the reconstruction that I gave in section 2. The idea is that, because N(F,G) cannot have *all Fs are Gs* as a constituent, general principles concerning necessary connections mean that N(F,G) cannot entail that all Fs are Gs. In this case, though, the argument is based on Armstrong's own quite precise modal claims, and, so, cannot be dismissed as being based on inchoate or distinctively Humean intuitions.

Furthermore, another precise and influential general modal principle that does not obviously beg the question against the non-Humean conception of laws straightforwardly rules out the primitivist approach. This is the principle that there are, in general, no brute necessary connections between entities.[6] While this principle is again consistent with thinking that there is important theoretical work for non-Humean laws to do, it is clearly inconsistent with taking the necessary connection between laws and regularities to be primitive. So, given this principle, the only way to block (6) is via a plausible account of how laws "do their stuff".[7]

It is also worth noting that Wilsch (2018: 808-809; 2021: 916) has recently pointed to grounds for rejecting brute necessities that may look especially compelling to the non-Humean. He argues that "[d]istribution patterns across possibilities cry out for explanations in the way distribution patterns in the actual world cry out for explanation" (2021: 916). The idea that non-Humean laws are necessary to explain actual distribution patterns, though, is central to the case for non-Humean

[6] Van Cleve (2018) provides a useful overview of the many different uses to which this principle has been put in recent metaphysics. Van Cleve's own conclusion is that it is a substantial question whether the principle ought to be accepted and whether the various uses to which it has been put are justified. The key point here, though, is that the principle is widely accepted and that denying it involves taking on a substantial general modal commitment.

[7] As Schaffer (585) notes, Sider (1992: 262) uses this expression in this context. Schaffer expresses puzzlement at the demand for this sort of account.

laws. So, if Wilsch is right, a non-Humean who takes it as primitive that laws necessitate regularities is in serious danger of undermining the original case for non-Humean laws.

The point of this section has been to show that widely accepted intuitions and principles about necessary connections support (6) without in any obvious way begging the question against the non-Humean. This conclusion, of course, does not rule out the possibility of a primitivist response to the inference problem. It remains possible to argue either that taking the entailment between laws and regularities to be primitive does not, in fact, violate significant modal principles or that, all things considered, any such violation is a price worth paying for non-Humean laws.

What the conclusion does indicate, though, is that a primitivist response to the inference problem cannot deliver a Schaffer-style stipulative response that "immediately dissolves" the problem and shows that it is "no problem at all". Instead, as the primitivist response assumes a substantial argumentative and theoretical burden, it leaves the inference problem in place as a significant problem that raises serious difficulties and potentially generates important commitments for the non-Humean.

Furthermore, in demonstrating the commitments and apparent costs that come with the primitivist response, the discussion here indicates that it is a substantial question whether the response can ultimately be made plausible or appealing. Certainly, the burden that attaches to this kind of response means that there remain significant initial grounds for favouring an explanatory response over such a response. So, my conclusion here is not only that the Schaffer-style stipulative dissolution of the inference problem fails but also that it is unclear how successful a more substantive primitivist response might be.

5) Non-Humean laws and general modal principles[8]

On the account of the inference problem that I have defended here, general modal considerations, such as Hume's dictum and the ban on brute necessities, are central to the problem. A resulting concern might be that the account simply collapses the inference problem into the distinct problem of whether these general modal principles ought to be accepted. Indeed, Hildebrand (2020: 6–7) has recently implied that the inference problem does disappear into these general modal questions. The idea is that, if these sorts of principles provide the only reason to deny that non-Humean laws primitively entail regularities, then the question really becomes whether we ought to accept these principles.

On my interpretation, though, the inference problem is not simply the problem of whether the relevant general principles ought to be accepted; rather, it is a problem that *presupposes* those principles. So, it is true that *one* possible response to the problem, the primitivist response, is to question the presupposition of those principles. However, a second possible response, the explanatory response, accepts the principles and attempts to show that non-Humean laws need not violate them.

Furthermore, as I argued in the previous section, while the primitivist response is a genuine option for the non-Humean, there is also significant initial motivation for pursuing the explanatory response. So, on my interpretation, one well-motivated response to the inference problem is to show how non-Humean laws can respect the relevant general modal principles. The interpretation, then, does not simply collapse the inference problem into the question of whether those modal principles ought to be accepted.

This point, though, leads to a second potential concern with my interpretation. In his recent survey article, Hildebrand (2020: 2) identifies non-Humean theories just as views that invoke modal

[8] I'd like to thank a referee for *dialectica* for raising the objections to my argument that I discuss in this section.

primitives in accounting for nomic necessity. If this is right, then it seems that, irrespective of considerations about the inference problem, non-Humean theories will in general violate both Hume's dictum and the ban on brute necessities. The concern, then, is that my interpretation renders the inference problem redundant, because non-Humean theories generally involve primitives that violate the relevant modal principles.

As I indicated earlier, though, prominent non-Humeans, like Armstrong and Tooley, endorse Hume's dictum and shun brute necessities. Furthermore, in their responses to the inference problem, both Tooley and Armstrong attempt to produce non-Humean theories that get by without modal primitives. This is especially clear in Tooley's case, as he says that his speculative theory is a view "according to which what laws of nature there are is capable of being unpacked simply in terms of what universals there are, together with part-whole relations between universals" (Tooley 1987: 123). His goal here is clearly to provide a theory that does *not* involve any modal primitives.

While just how to understand Armstrong's (1997: 224–230) response to the inference problem is less clear, a similar interpretation seems plausible. On Armstrong's view, while N only contingently relates F and G, where N(F,G) is the case it constitutes a structural universal (Armstrong 1997: 227). Armstrong's key idea appears to be that this fact ensures that, when *a* instantiates F, *a* also instantiates G. Whether this idea works is, I think, a substantial question, but the key point for now is that it does not appear to invoke modal primitives that violate Hume's dictum or involve brute necessities.

There are also more recent cases of non-Humeans explicitly rejecting brute necessities. In the previous section, I alluded to an argument by Wilsch against brute necessities that seems particularly appealing from an anti-Humean point of view. Wilsch (2021) proceeds to develop an anti-Humean view that eschews brute or fundamental necessities.[9] Kimpton-Nye (2021), in turn, has recently

[9] I discuss Wilsch's view further in the next section.

argued that invoking brute necessities fits poorly with dispositionalist views. Partly on this basis, he proposes a dispositionalist or power-theoretic view that grounds modal facts in instances of essentially qualitative properties.[10] As the modal facts in this theory are grounded in qualitative states of affairs, the theory does not appear to involve modal primitives or brute necessities.

There are, then, both prominent and recent cases of non-Humeans explicitly attempting to avoid any commitment to modal primitives that involve brute necessities. So, I do not think it should be assumed from the outset that non-Humeans are committed to these sorts of primitives. Given that the discussion in the previous section indicated significant initial reasons to be wary of such a commitment, this looks like good news for the non-Humean.

Non-Humean theories, then, should not simply be assumed to involve brute necessities or to violate Hume's dictum, nor should the inference problem be thought to collapse into the problem of whether the relevant general modal principles should be accepted. Instead, the inference problem turns on the substantial question of whether non-Humean accounts of the laws of nature can respect these sorts of principles. As I argued in the previous section, this question has bite because the non-Humean would incur a significant argumentative and theoretical burden by rejecting these principles.

6) The essentialist primitivist response

I have thus far interpreted the primitivist response to the inference problem as taking the necessitation between laws and regularities to be brute. Schaffer's understanding of the axioms with which primitive posits are outfitted, though, points to the possibility of an alternative interpretation. Schaffer (footnote 1) interprets these axioms as "meaning postulates and so…analytic to their

[10] This sort of theory has recently received a fair amount of attention. In addition to Kimpton-Nye, Coates (2021), Tugby (2021) and Azzano (2021) all discuss versions of it at length. Earlier discussions of a view along these lines are Jacobs (2011) and Tugby (2012).

terms", but he allows that they may also be thought of as essential truths. So, the entailment between laws and regularities is either analytic to the term "law" or essential to laws.

Both approaches might be thought to provide an explanation of the necessitation between laws and regularities rather than taking it to be brute. Given the analytic conception of axioms, the idea would be that laws entail regularities *because* doing so is part of what it *means* to be a law. Given the essentialist conception, on the other hand, the idea would be that laws entail regularities *because* doing so is part of what it is to *be* a law. In providing these explanations, though, these approaches might be thought to show how the non-Humean can reject (6) without violating general modal principles. The key idea would be that these explanations show how laws *are* related to regularities in the manner required for laws to entail regularities without violating these principles.[11]

While, as I just mentioned, Schaffer does suggest both the analytic and the essentialist interpretations of the axioms he proposes, I do not think that the strategy just outlined can be reasonably attributed to him. That is, I do not think he can reasonably be read as proposing that the axioms, in virtue of being analytic or essential to laws, can explain the entailment of regularities by non-Humean laws. Schaffer nowhere acknowledges the role that I have argued general modal considerations play in motivating the inference problem. Nor does he at any point allude to axioms, conceived either in the analytic or essentialist fashion, as being capable of explaining necessary facts. Instead, in line with my earlier interpretation of his proposal, he focuses on the *general* acceptability of axiomatizing rather than explaining facts, including in cases that do not involve any

[11] I would like to thank a referee for *dialectica* for raising this possibility.

concerns about brute necessities.[12] Nonetheless, the strategy just outlined provides an alternative primitivist approach that is worth considering.

Given the analytic interpretation of axioms, though, the approach is not promising. In her discussion of Hume's dictum, Wilson (2010: 625) points out that the fact that a sentence is analytic does not answer the metaphysical question why the entities referred to in the sentence stand in a necessary relation. Using the example of the sentence "necessarily, anything that is scarlet is red", she points out that, while the truth of the sentence "may be established by attention to its constitutive words or concepts…[it remains an open question] what metaphysical facts about the entities at issue in…[the sentence] are such that expressions for or concepts applying to these entities incorporate their necessary connection" (2010: 625–626).

In the case of governing laws, there is no obstacle to defining the term "law" such that laws are distinct from, but entail, regularities. However, doing so provides no *metaphysical* explanation of how the entities, laws and regularities, are related to each other in such a way that the former necessitates the existence of the latter. So, if axiomatizing the entailment is simply a matter of defining "law" in a certain way, then it does not address the concerns about brute necessities or Hume's dictum.

The proposal in terms of essences, on the other hand, is more promising. On this approach, to axiomatize the governing role of laws is to posit that it is essential to governing laws that they entail regularities. As I noted in section 2, Glazier (2017) has recently argued that, in general, the fact that *a is essentially F* can metaphysically explain the fact that *a is F*. If this is right, though, then the fact

[12] In a particularly clear example, he (586) writes 'I am saying that everyone needs their fundamental posits, and every posit needs to be outfitted with axioms (or else it is idle). One never needs to do anything further to explain the nature of these inferences beyond saying that they are axiomatic, and one never needs to say anything further about how the posit does its stuff beyond saying that it is the business of the posit to do so.'

that *Law(φ) essentially entails φ* can explain the fact that *Law(φ) entails φ*. Indeed, Wilsch (2021: 917) has recently proposed employing Glazier's argument to make precisely this essentialist move in response to the inference problem.

If one accepts Glazier's general claims about essentialist explanation, this approach clearly avoids the concern that non-Humean laws involve brute necessities. The approach may also avoid violating Hume's dictum, as on one interpretation entities are not distinct in the sense relevant to the dictum if they are essentially connected (Stoljar 2008). So, this essentialist approach appears to provide a potential primitivist approach that, unlike the modal primitivist approach discussed in the previous sections, blocks (6) by showing that non-Humean laws are consistent with the relevant general modal principles.

The essentialist approach, though, comes with a significant commitment not only to essentialism but to a particularly robust essentialism, on which objects have non-modal essences that metaphysically explain their essential properties. Indeed, for just this reason, this approach is not one that could be endorsed by Schaffer who is a skeptic about essence (Schaffer 2016b: 83).

The essentialist view also appears to raise difficulties for the idea that laws ground regularities (Emery 2019). The problem is that, if regularities are essential to laws, then laws ontologically depend on regularities. However, if laws ground regularities, then regularities also ontologically depend on laws. The apparent result would be an objectionable circularity in relations of ontological dependence.[13]

Perhaps more significantly, though, the approach appears to be inconsistent with the Dretske-Tooley-Armstrong view (DTA). The obvious way to extend the approach to this view is to claim that it is essential to N that N(F, G) entails that all Fs are Gs. However, that N essentially stands in this non-

[13] Jaag (2014: 18) and Kimpton-Nye (2021: 3432) both raise closely related difficulties about dispositional-essentialist accounts of laws of nature.

trivial modal relation with distinct universals is inconsistent with the categoricalism about properties that is central to DTA.

I think, then, that the essentialist approach does provide a possible primitivist response to the inference problem. However, like the primitivist modal response, it comes with substantial metaphysical commitments and looks to be inconsistent with both a grounding conception of governing laws and DTA. So, this primitivist response also incurs a substantial burden and cannot deliver on Schaffer's straightforward dissolution of the inference problem.

7) Philosophical problems and the stipulative strategy

My primary goal here has been to clarify the prospects and implications of a primitivist response to the inference problem. I identified two genuine primitivist options that involve taking it as primitive, respectively, that laws entail regularities and that laws *essentially* entail regularities. I argued that, while both approaches represent open possibilities for at least some non-Humeans, they both come with significant commitments and complexities. In so doing, I hope to have cleared the way for further consideration of whether either of these approaches ought ultimately to be accepted, and, if so, what the implications are for non-Humean theories of laws.

Whatever the ultimate verdict on these primitivist responses, though, I have argued that they do not deliver on Schaffer's idea that a primitivist response to the inference problem can straightforwardly dissolve the problem. Instead, these primitivist approaches leave the inference problem in place as a significant philosophical problem that has important implications for the prospects and commitments of non-Humean theories of laws.

I now want to clarify the implications of this result for Schaffer's attempt to generalise his stipulative strategy beyond the inference problem. Schaffer claims, for instance, that the strategy can be applied to Bradley's regress (§3.2), to the connection between chance and rational credence and to issues in the metaphysics of grounding (§5). In the case of Bradley's regress, he argues that the right response to the question of how relations relate is just to stipulate that "it is the business of

relations to relate" (586). My discussion thus far, though, indicates general grounds for being wary of this strategy.

To see why, it is useful to see how my account of the inference problem fits with Robert Nozick's account of the form of many central philosophical problems. According to Nozick (1983: 9), these problems have the form "how is one thing possible, given (or supposing) certain other things". Nozick refers to the "other things" here as "apparent excluders", as they are things that apparently exclude the possibility in question.

For instance, on Nozick's (1983: 8) interpretation, the problem of free will has the form:

> How is it possible for us to have free will, supposing that all actions are causally determined?

The problem is how we can have free will, *given that causal determinism appears to exclude free will*. Similarly, on my account, the inference problem has the form:

> How can governing laws necessitate regularities, *given that they do not appear to stand in the sort of general connection that is required for one thing to necessitate another*?

The problem is how laws can necessitate regularities, *given that general modal considerations appear to exclude this kind of necessitation*. As I have already argued, the response "laws *do* necessitate regularities" is no solution to this problem. Instead, an adequate response to the problem needs to show how the apparent excluder does not rule out the relevant necessitation. One could argue that the problem is entirely misguided by arguing that there is no reason to accept the excluder. However, simply ignoring the apparent excluder and stipulating that laws necessitate regularities is no response to the problem.

This result can be generalised. For any problem with the form:

> How is it possible that p, *given q*?

the simple stipulative response "p" is clearly unacceptable. An adequate response needs to acknowledge q as the motivation for the problem and attempt to show how q does not rule out p. This could be done by arguing against q or by arguing that p and q are, in fact, consistent. As I demonstrated in my discussion of the inference problem, these sorts of strategies are consistent with taking p to be primitive. However, simply ignoring q and stipulating p begs the question against the motivation for the problem rather than addressing it.

The general lesson here is that, prior to applying the Schaffer-style simple stipulative strategy to a philosophical problem, one ought to consider whether the problem is driven by apparent excluders that render that strategy misguided. In the case of Bradley's regress, for instance, one might think that the core problem is:

> How is it that R relates *a* to *b*, *given that it is possible for R, a and b to exist without R relating a to b*?[14]

On this interpretation, it is the apparent excluder that motivates the regress by indicating that *something more* than R, *a* and *b* is needed for R to relate *a* to *b*. Given this construal of the problem, an adequate response needs to give an account of what makes the difference between, on the one hand, R, *a* and *b* existing independently and, on the other hand, *a*R*b*. Simply stipulating that R *does* relate *a* to *b* does not solve this problem.

Nor does simply saying that "it is the business of relations to relate" clearly address the problem. Indeed, in this context it is not immediately clear what this claim would mean. It cannot mean that R necessarily, or essentially, relates *a* to *b*, because R might exist without relating *a* to *b*. It may mean that R cannot exist without relating *some* entities but, of course, this fact does not explain what distinguishes *a*R*b* from the independent existence of R, *a* and *b*.

[14] See Maurin (2011) for this kind of interpretation of the regress.

As Maurin (2011) has indicated, though, this line of reasoning appears to rely on the assumption that relations are universals rather than tropes. If relations are tropes, then it may be possible to hold that R essentially relates *a* and *b*, and, so, that R exists only if *a*R*b*. So, *if one accepts the significant metaphysical claim that relations are tropes*, then it may be possible to respond to Bradley's regress by stipulating that relations essentially relate certain particulars.

Indeed, this point seems implicit in Schaffer's own discussion. He writes (582), "What it is to be a relation between *a* and *b* is to relate *a* to *b*". Here Schaffer appears to be implicitly treating relations precisely as tropes that are individuated by relating particular objects rather than others. If this is right, then Schaffer's proposed primitivist response to Bradley's regress smuggles in a highly significant ontological commitment, and, consequently, fails to deliver the advertised innocent, straightforward dissolution of the problem.

The upshot is that the situation regarding a primitivist response to Bradley's regress looks very similar to the situation regarding a primitivist response to the inference problem. In both cases, clarifying the excluders that motivate the problem indicates that the straightforward stipulative dissolution of the problem fails to engage with the motivation for the problem. Furthermore, clarifying this motivation indicates that the genuine primitivist options in responding to the problems come with substantial metaphysical commitments. This result means both that it is an open question whether these primitivist approaches ought to be accepted and that they constitute substantive metaphysical proposals rather than straightforward dissolutions of problems.

The general lesson is that any application of the simple, Schaffer-style stipulative response to a philosophical problem ought to be preceded by careful consideration of whether the problem at hand has the form identified by Nozick. Where problems do have this form, the Schaffer-style response simply ignores the motivation for the problem. In these cases, a primitivist response to the problem ought, instead, to involve a substantive argument that the excluders do not, in fact, rule out

the primitivist approach. It is then an open question, to be addressed in each case, just how successful this argument is and which commitments come with it.

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