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What Matters in (Naturalized) Metaphysics?

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Abstract

Can metaphysics ever really be compatible with science? In this paper, I investigate the implications of the methodological approach to metaphysical theorizing known as naturalized metaphysics. In the past, metaphysics has been rejected entirely by empirically-minded philosophers as being too open to speculation and for relying on methods which are not conducive to truth. But naturalized metaphysics aims to be a less radical solution to these difficulties, treating metaphysical theorizing as being continuous with science and restricting metaphysical methods to empirically respectable ones. I investigate a significant difficulty for naturalized metaphysics: that it lacks the methodological resources to comparatively evaluate competing ontological theories, or even to distinguish adequately between them. This objection is more acute when applied to robust realist versions of naturalized metaphysics, since the realist should be able to say which theory is true of the objective world. If this objection holds, then it seems that the commitment to naturalized metaphysics, or to robust realism about the categories and processes in metaphysics, will have to be relaxed.

Introduction

The aim of this paper is to examine the prospects for a recently popular conception of metaphysical theorizing known as naturalized metaphysics. In particular, I aim to highlight the incompatibility of naturalized metaphysics with realism about the entities of metaphysical theories, an incompatibility which arises because naturalized metaphysics lacks the methodological resources to choose which metaphysical theory is the one that picks out the entities of the actual world. I will then briefly investigate some of the implications of this conclusion, focusing upon the question of whether one could simply accept the ontological plurality which naturalized metaphysics permits and yet retain some realist commitment. This is a view I will call 'metaphysical structuralism' and I will briefly consider two ways in which it might be understood.

In the first section, I will discuss what exactly I take naturalized metaphysics to be. In the second, I will present the outline of an argument that the conjunction of robust realism

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and naturalized metaphysics entails a plurality of ontological positions between which there is no basis for the naturalist metaphysician to make a principled choice. In the third and fourth sections, I will defend two of the more contentious premises of that argument: in Section 3, establishing that there are cases of ontological plurality; and, in Section 4, that there is no way in which to choose between these ontological alternatives using a method which is acceptable within naturalized metaphysics. In the final section I will consider the conclusions which one might draw from the incompatibility of robust realism and naturalized metaphysics, and whether a reconciliation is possible.

1. What is Naturalized Metaphysics?

Put simply, metaphysics is the study of which entities and processes exist, and what their ontological status is; that is, whether they are real or not.[1] In this paper, I will restrict myself to considering the metaphysics of the natural world[2], the study of ontology which one would hope could help to explain (or explain away) phenomena such as causation, regularity, qualitative similarity and difference, and so on.

One can distinguish between two conceptions of the nature of metaphysics and metaphysical theorizing: naturalized metaphysics; and autonomous, or 'a priori', metaphysics.[3] While the latter regards metaphysical theorizing as being independent from empirical investigation, the former considers metaphysics to be continuous with, or a branch of science. This continuity of metaphysics with empirical investigation results in the second defining characteristic of naturalized metaphysics: that metaphysics shares its methodology with science (whatever the methodology of science may be). Naturalized metaphysical theories are only open to revision on logical grounds or upon those which are naturalistically or empirically acceptable. Thirdly, methods of justification which do not meet these standards are excluded from use as methodological tools in metaphysical theorizing. So, for example, there can be no appeal to substantive, non-logical a priori claims, nor appeals to common-sense intuition, if these cannot be accounted for naturalistically.

Of course, it would be philosophically contentious to say that a particular method of justification cannot be accounted for naturalistically, and I will have more to say about such issues later on. So, for this reason, I am leaving the characterization of naturalized metaphysics deliberately vague; the range of justification which is acceptable to empirical investigation—and thus to the naturalist metaphysician—cannot be delineated a priori into a specific, unrevisable list.

For similar reasons, I will not adopt another popular tactic of defining naturalized metaphysics as metaphysics that simply restricts the use of a priori reasoning, or aims to avoid it altogether. Although some such constraint is often placed upon theorizing in

naturalized metaphysics, and the avoidance of a priori ontological speculation is one of the primary motivations for its being proposed, the avoidance of a priori reasoning makes for a poor defining characteristic for two reasons. First, as I mentioned above, it is not clear which types of a priori reasoning are naturalistically unacceptable in the sense that a naturalistic account of them cannot be given; second, it is not clear that the a priori/a posteriori distinction coincides with the empirical/non-empirical one (see Goldman 2007; Ahlstrom 2009, 19). Natural science is prone to the extensive employment of reasoning which is not empirically acceptable by the standards I am setting, usually on the proviso that it eventually yields empirically testable hypotheses, and whether such reasoning is to be considered to be a priori, or as a posteriori and non-empirical, is at least partially a terminological debate in which there is no need to become entangled at this stage. The simple restriction of permissible a priori metaphysical reasoning to logical or mathematical reasoning is too crude to ensure the continuity of metaphysics with science, and most probably too conceptually impoverished to produce useful metaphysical results.[4] Thus, the commonly drawn contrast between 'naturalized' and 'a priori' metaphysics is somewhat misleading from a terminological point of view, and I will leave scare quotes around 'a priori' in this context.

The three defining features distinguishing naturalized metaphysics which I have discussed concern the permissible methodology of metaphysics, and consequently affect the epistemic status of metaphysical claims, which they are intended to bring into line with those of science. Furthermore, they restrict the permissible content of metaphysical theories by restricting the methods by which they might be justified. Thus, although the distinction between 'a priori' and naturalized metaphysics begins as a methodological, or meta-philosophical one, it has consequences for the epistemic status of metaphysics, and the content and scope of metaphysical enquiry.

In addition to the above considerations, some naturalistic metaphysicians also add a fourth constraint upon the permissible content of metaphysical theorizing, requiring that it be driven by, inspired by, or motivated by, or close to empirical science (for example, Ladyman and Ross 2007).[5] However, I will not treat this as a defining feature of naturalized metaphysics in this paper, although some of its proponents would take it to be so, rather I will treat it an important means by which a metaphysical theory might be developed. One reason for this, is that it is not really clear what is meant by the idea of metaphysical content being 'driven' or 'motivated by' that of science, or in what sense metaphysical theorizing must be 'close to' that of science, with the consequence that those who support this defining purpose of metaphysical theorizing can appear rather equivocal about what they take the relationship between empirical and metaphysical content to be. However, this equivocation need not delay the current investigation since the adoption of such constraint is independent of the acceptance of the other defining features of naturalized metaphysics detailed above; the requisite clarification need not be conducted in order to characterize naturalized metaphysics and to permit the discussion to

commence. Nevertheless, in Section 4, I will very briefly consider whether restricting the remit of metaphysics in this way can remedy the predicament of ontological plurality that I will argue that naturalized metaphysics faces.

2. The Conflict between Realism and Naturalized Metaphysics

One can summarize the main argument in this paper as arising from the conflict between the following premises:

> More than one ontological theory fulfils the same explanatory aims.

> If robust realism is true, then one of these theories is the correct, or true one.

> If one takes a naturalistic approach to metaphysics, then there is no method of choosing between theories which: (a) is naturalistically acceptable; (b) does not presuppose the existence of some of the very ontology postulated by the theory.

> If there is no basis for choice, then any decision between theories would be arbitrary, which is not acceptable from the point of view of realism (nor, perhaps, in general).

Broadly speaking, three alternative conclusions can be drawn from this contradictory set:

> Conclusion 1: Robust realism is false: realism should be relaxed or abandoned in favour of another way of regarding the relationship between our theories and the world.

> Conclusion 2: Naturalized metaphysics cannot be sustained in its current form.

> Conclusion 3: One of the above premises is false.

In order to establish that the third conclusion is the least likely and leave the way open for one, or both, of the other two—that robust realism is false, or that naturalized metaphysics should be abandoned—I will now investigate the basis for holding the above statements true. I will begin by attempting to establish the first statement: that there are many ontological theories which fulfil the same explanatory aims, and between which there is no obvious grounds for choice specific to the theories themselves. This premise is not particularly contentious, but it may not be an obvious claim to all, so I will elaborate

further in the next section. Premise (2) is true by definition, since the robust form of realism with which I am concerned makes the ontological claim that there is a way the natural world is. In most cases, an epistemological claim is added to the ontological one, stating that we can know (by means of our best scientific theories) the way the world is. (It is not incoherent to suppose that there is a particular way the world is, and yet that we do not have epistemic access to this natural order. However, within the confines of naturalized metaphysics, this attitude would be quite odd, since it would open an epistemic gulf between the entities and processes in empirical theories and the postulated entities and processes of the real natural world.) Thus, the robust realism with which I am concerned represents the conjunction of metaphysical realism (or alternative realist ontological theories) with scientific realism, a conjunction which is quite commonly held in metaphysics and the philosophy of science.[6] Premise (3) is the hardest to establish, and impossible to do so completely, but I will attempt to establish its likelihood in Section 4 by discussing ways in which metaphysical theories might be justified and compared, and then assessing whether these methods are acceptable from a naturalistic perspective.

If the premises of the above argument are correct, as I will argue that they are in the next two sections, then I will have established that ontological plurality is an inevitable consequence of naturalized metaphysics, a feature which brings it into conflict with robust realism about the entities which our ontological theories say that the natural world contains. From there, a variety of responses follow which I have broadly classified as Conclusions 1 and 2, and I will then examine these in greater detail.

3. Ontological Plurality

A brief examination of the literature in metaphysics will reveal that many theories are proffered with the promise of their explaining the same questions about fundamental phenomena. But, actual variety does not imply that each ontological variant is worthy of serious philosophical consideration, nor that it will turn out that there is nothing to choose between the options, so I will argue for Premise (1) by illustrating how certain key questions in metaphysics can be dealt with by different ontological accounts. By this strategy, I hope to show that there are several prima facie different ways in which to achieve the same explanatory aims when it comes to providing an account of the fundamental ontology of the natural world and thus establish the plausibility of Premise (1).

The first metaphysical question I will consider concerns how we should account for objective similarity and difference in nature. We are prone to noticing, judging or simply accepting that spatio-temporally distinct entities are Indian elephants, or are sky blue, or are spiral galaxies, or are electrons, or have a mass of one kilogram; that is, that spatio-temporally distinct entities are qualitatively the same as each other. Presuming, as I will

in this discussion, that such similarities and differences are real, and that the distinctions between them have an ontological basis in the natural world, rather than their being partially or entirely ontologically grounded in predicates or in other features of our language or theory, then what is the ontological basis in question?[7]

One can argue that properties, tropes, resemblance classes, universals and nominalist sets of objects, or sets of possibilia all successfully fulfil the function of grounding the notion of objective similarity and difference of spatio-temporally distinct individuals. (For a range of alternatives, see Achinstein 1974; Armstrong 1978; Armstrong 1980; Armstrong 1992; Bacon 1995; Campbell 1981; Campbell 1990; Lewis 1983; Lewis 1986; Mellor 1993; Rodriguez-Pereyra 2002; Schaffer 2001; Shoemaker 1980; Simons 1994; Williams 1953; Williams 1959.[8]) These alternative theories initially appear to be quite different from each other, both in their respective motivations and the ontology they postulate as a result. For instance, one of the main motivations for the development of trope theory, which distinguishes it from other accounts of similarity and difference, is that trope theory regards qualities as unrepeatable abstract particulars, rather than instances of repeatable entities; the individuality of qualities, particularized in each of their occurrences, is emphasised. However, this individuality comes at a price, as David Armstrong made much of in his early work (Armstrong 1978), since the individual tropes do not, by definition, have any ontological features which could account for their varying similarity or difference from each other. But without these relations, tropes are both in danger of simply being an ontology of bare particulars, and of failing their explanatory purpose to ground objective similarity and difference. The individual qualities instantiated by the sky on a cloudless summer's day, the light emitted by a particular indium gallium nitride LED, Elvis Presley's suede shoes, and a particular Yves Klein painting (IKB 191, say)—all of which are blue—are no more similar to each other than they are to instances of a traditional London bus, a litre of H2O, or a photon; nor, given that tropes are particularized qualities, do they possess any ontological resource in virtue of which such resemblances might hold. In view of this, contemporary trope theorists have stipulated their way around the problem by postulating some kind of primitive meta-relations between tropes which relate the individuals by qualitative resemblance, compresence (so that tropes 'bundle' into unified objects) and temporal sequence. These rid trope theory of the accusations about bare particulars, and provide the trope theory with sufficient ontological resources to do the job for which tropes were intended; namely, to provide an ontological account of the natural world. But these revisions come at the price of reducing trope theory's attraction as an ontology of true individuals: tropes are individual qualities, but they are fundamentally related to each other too. Meanwhile, the theory of universals appears to offer something ontologically different, at least at first blush: different instances of blue such as those in the example above, are instances of one repeatable entity, a universal, which on some accounts is an abstract entity, and on others an immanent one in the sense that it is nothing more than the totality of its instances.[9] A third alternative is offered by property theories, which may like David Lewis's famous

nominalism be grounded in a set-theoretic structure with set membership eligible to actual and possible entities, with a hierarchy which is ultimately grounded on a sparse ontology of perfectly natural properties; or which may simply presume that properties are fundamentally-existing attributes instantiated by objects, entities for which no further ontological explanation is required.

In addition to these ontological alternatives, there is an orthogonal debate about the extent to which properties possess or consist in intrinsic qualitative features (instantiated by objects, or compresent bundles of tropes, most usually[10]), or if their natures are entirely determined by the causal or structural relations in which they partake. On the one hand, intrinsic qualities, quiddities or categorical properties possess a qualitative nature over and above what they can cause or otherwise determine, for example by supervenience. On the other, properties are what they can do and nothing more: they are entirely determined by their extrinsic relations. Between these extremes lie a number of views, such as that which treats properties as intrinsic and yet inherently dispositional (see Chakravartty 2003, among others), or those which regard some properties as being categorical, possessing a quiddity or internal nature, and some as being extrinsically determined.

Despite the differences in theoretical formulation between these options—and some theories requiring more ontological baggage than others, such as the modal realist presupposition of the existence of possible worlds in the same sense as the actual one— the understanding of qualities such as redness, or charge, or mass is not enhanced by the adoption of one theory over another. The reason for this explanatory equivalence is that such alternative ontological theories are forced into equilibrium by the requirement that they provide solutions to the same explanatory demands, which restricts any interesting individuality of a particular theory to the initial stages of its formulation. Thus, as noted above, early versions of trope theory gave way to less particularized qualities, while some universals theorists shunned the abstract existence of universals in favour of an ontology of immanent entities, wholly present in each of their instances. On stepping aside from the details of the ontological debate, it appears that one ontological theory could be swapped for another with only minor, mainly terminological, changes to the wider philosophical debates in which such entities appear. Similarly, it is not obvious how the outcome of the debate about quiddities would influence one's philosophical debates, especially from a naturalized metaphysics, since quiddities do not do anything observable (even in principle) which properties lacking quiddities do not.

Although the proponents of these alternatives (naturally) urge us to accept one account rather than another, their differences in formulation do not show up beyond metaphysical discussions: it matters not that one is discussing universals rather than tropes (say) in the philosophy of mind or science, since both ontologies do their explanatory job without interesting consequences for the theories that use them. (This fact is so by design, as I

mentioned above, since individual theoretical quirks are regarded as undesirable in fundamental ontological theories and much thought goes into stamping them out.) Of course, traditional, 'a priori' metaphysicians do find grounds upon which to decide between theories, and so reduce the choice,[11] so I will have more to say about how one might distinguish between these different views in Section 4, and a lot more to say about whether such means are open to the supporters of naturalized metaphysics. But, at this point in the discussion, it is enough to note that the various theories of properties, tropes, universals and the rest do the explanatory job of explaining similarity and difference, and perhaps also the causal behaviour of entities, with closely comparable success, to the extent that it is not obvious which theory is the best one to choose.

A comparable embarrassment of explanatory riches awaits in the second example that I will use, which concerns questions about causation and the appearance of regularities; that is, how and why some things or events (or types of things or events) give rise to other things or events (or types of things or events). More formally, such theories are intended to explicate the relationship between qualitative similarity of entities and causality (or other dependency relations), or, as such accounts might more commonly be described, between properties and causal laws. From one perspective, one can choose to use a theory of properties, universals or tropes—whichever metaphysical account is favoured for such entities—as a foundation for what happens causally in the natural world. What kinds of entities there are, what properties are instantiated, determines what will happen, perhaps given the instantiation of other properties. Moreover, such a system also provides an in-built modal element: the properties instantiated do not simply determine what does and will happen, but what would occur were the world different in certain ways (where this difference is usually determined by the presence or absence of other properties within it). Causal relations are entirely determined by which properties there are and, furthermore, the generality inherent in the conception of a property ensures that such causal relations are essentially lawlike[12]; singular causal instances are instances of causal laws or nomological relations which govern what happens causally in the natural world.

In addition to causation, some theories would also allow for other, atemporal dependency relations such as supervenience or realisation. However, since these dependency relations can be dealt with as atemporal analogues of causation, I will restrict myself to talking about causation or nomological relations in this discussion. The latter terminology of nomological relations is more general, and is intended to cover supervenience and the like, and also to satisfy those who would prefer that talk of causation be dropped in favour of nomological relations or laws. The question of whether there is such a phenomenon of causation, over and above the process which instantiates nomological connections between properties, is a vexed one and will not be solved here. However, if there is such a distinct process over and above the general nomological relations causation instantiates, it could either be thought of as a general, temporally asymmetric

determination relation, or, be treated analogously to the quiddities which some metaphysicians ascribe to properties, as the essential and individual qualitative, determining factor in each individual causal instance. The former conception would suit those who regard causation as something more than simple nomologicality, while the latter might suit those who do not regard causation as an essentially general relation, but as a category of processes consisting of a collection of singular instances (see Anscombe 1971; Ducasse 1926; Davidson 1967). Moreover, despite initial appearances to the contrary, even this latter particularized conception of causation might be accounted for entirely in terms of the instantiation of properties, since the singularity of every causal instance could be determined by the kind of properties possessing quiddities: the individuality of the properties could underpin the individuality of the causal instances, while the repeatable aspect of the properties would underpin the causal laws. Once again, one can provide an ontology of what happens in the world solely in terms of properties of one species or another.[13]

On the other hand, one might prefer to reverse the direction of ontological dependence from the above family of ontological theories, in which causal and other nomological relations are determined by kinds of entities (the properties, or whatever you prefer), and characterize kinds as being ontologically dependent upon which relations there are. This, perhaps less popular, view is exemplified by some versions of ontic structural realism which regard the modal or nomological structure of the world as being ontologically fundamental, determining the appearance, or the derivative existence, of both properties and things (see, for example, James Ladyman 1998; Ladyman and Ross 2007).[14] Which things there are, and which properties they instantiate, is entirely determined by the nomological relations in which such entities or, apparent entities, stand. The eliminativist versions of this view, which reject the existence of objects and properties entirely, are difficult to articulate without seemingly begging the question: relations require the existence of relata and yet the objectively existing nomological structure of Ladyman's ontic structural realism lacks relata (see Psillos 2001; Chakravartty 1998). However, it is unclear whether this difficulty marks a genuine ontological restriction or merely one that is a result of the conceptual limitations of most (or all) human languages. I will not attempt to resolve this objection definitively, although I think that the eliminativists might be able to justify their claim that the coherence of their ontology requires a radical change of perspective and so that accusations of their begging the question are unfounded and unfair. Even if the eliminativists eventually lose this argument, conceptual space remains for a relations-based characterization of the ontology of the natural world that treats properties and objects as derivative entities, and this ontology could provide an ontological background theory which is explanatorily equivalent to the accounts of causation and laws based on properties outlined above.

In addition to these two ontologically opposed alternatives to account for causation and laws, there is a third that incorporates the fundamental ontology of both, in which

properties enter into nomological relations with each other. Once again, a range of alternative conceptions of properties and nomological relations can be sustained within this general ontological picture: members of either or both of the fundamental ontological categories could involve quiddity, or some primitive individual nature, without this feature impinging upon, or adding to, the explanatory efficacy of the specific ontological account in comparison to others. Although one might argue that this third option is not as parsimonious as the two alternatives already given, it is not yet clear whether parsimony is required, or even advisable, in this context, nor whether it will help a realist decide which ontological theory best accounts for the natural world. I will postpone discussion of parsimony and other theoretical virtues until later when I consider the scope of their applicability, and implications in naturalized metaphysics.

Thus, in the case of properties and nomological relations, we have another example of seemingly dissimilar ontological theories fulfilling the same explanatory aims: if one subscribes to robust realism, a means of making an ontological choice between these theories is required.

The third example of ontological plurality which I will present in support of Premise 1 arises as part of an answer to the question of what things, or objects, are, and concerns those ontological theories which include objects as fundamental and those which do not. On one hand, one can treat things or objects as individuals, as self-subsistent entities which can exist independently of any other category of entities; or, on the other, one can maintain that what we commonly take to be individuals are bundles of property-instances, or tropes, or other instances of repeatable entities. (Once again, for this task one can use any of the conceptions of properties and the like discussed in the first example of ontological plurality above, except those which require the existence of objects to explicate objective similarity and difference.) Although the differences between these two ontological views are contested in metaphysical circles, they are as good as each other at explaining our intuitions, our experiences (both common-sense and empirical) and providing an ontological backdrop for philosophical discussions concerning persistence and change. In addition to these two, a third option for the characterization of objects suggests itself in which objects are treated as derivative entities within a fundamentally structural ontology, such as that of non-eliminativist ontic structural realism. On this view, properties can be treated as derivative too, their natures determined by the fundamental nomological relations or structure, and in turn objects exist derivatively as bundles of property-instances. Objects are not self-subsistent individuals on this account, but are derived from entities which are themselves derived from the fundamental relational ontology of the world.

On the first of these views of objects, self-subsistent individuals may be thought to involve some primitive unity or haecceity which prima facie cannot be accounted for by the ontologies which treat objects as derivative entities. But, these latter accounts might

be able provide analogous features which could underpin the appearance of such object-individuality. If such a phenomenon of individual quirkiness turns out to be required by an ontological theory of objects, it might be possible to provide the requisite extra 'something' by other ontological means; namely, by properties or their instances having quiddities (in the second option above), or by relations or their instances involving an analogous feature which guarantees their essential nature, and bestows apparent quiddity or haecceity on entities of categories which are ontologically derived from them. Thus, the appearance of individuality accorded to an object (if any) could be explicated by the individual qualitative natures of the entities making up the bundle of which it is constituted.[15]

On the basis of these three examples, it seems that metaphysicians have a prima facie choice about which ontological theories they adopt concerning the nature of qualitative similarity and difference, the relationship between properties and causation or laws, and what, ontologically speaking, objects are. While there is more to say about the formulation, and near explanatory equivalence, of these theoretical alternatives outside metaphysics, their further examination strays outside the scope of this paper. So I will now look at how one might go about choosing between these different ontological options, and whether the grounds for making such choices are available to the supporter of naturalized metaphysics.

4. Ontological Choice, and Ontological Choice for Naturalized Metaphysics

How does one choose between competing metaphysical theories? And, how does one make such a choice on naturalistic grounds? Within traditional, autonomous metaphysics there are several ways in which competing alternative theories may be distinguished and evaluated, and although these do not facilitate an uncontroversial decision between them, they do permit individual philosophers to claim to have made a principled choice. However, in the course of this section, I will argue that the methods which are acceptable within naturalized metaphysics are not sufficient to make a choice, and the methods which do allow one to make a choice between ontological theories are not acceptable within the methodology of naturalized metaphysics. Thus, the naturalized metaphysician lacks the resources with which to determine (or even approximate) which ontological theory is the correct one, and thereby fails to fulfil the requirement of robust realism that we can know about the objectively-existing ontology of the mind-independent[16] natural world.

The criteria upon which one can choose between competing metaphysical theories can be summarized by the following list which I will then consider in turn:

> a) Logical Considerations;

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b) Theoretical Virtues;

c) Intuition;

d) A Posteriori Considerations (or, the Appeal to Science).

The first, logical criterion is unproblematically acceptable within naturalized metaphysics, since the application of logic is uncontroversial within science too: purely formal considerations do not, for the most part, rely upon any presuppositions about meaning, and thus potentially about the nature of the world. Although logical theorems have occasionally been brought into question within scientific investigation, such as with the controversy surrounding the truth of the law of the excluded middle (Reichenbach 1944) or the principle of distributivity in quantum theory (Putnam 1968, although Putnam no longer subscribes to this view), any divergence from classical logic is not usually taken to indicate that classical logic is not applicable to the formulation of our metaphysical theories. One could, I suppose, make a principled case for a shift from classical logic to an alternative in this context. However, this would not damage the utility of logic as a criterion in naturalized metaphysics: the acceptability of such a criterion within naturalized metaphysics is not based upon the fact that logic is true or unrevisable, but because it is formal and also acceptable within empirical investigation.[17]

However, logical considerations alone are insufficient to determine which metaphysical theory is the right one. Moreover, in general, such constraints have already been brought to bear in order to determine the range of competing ontological candidates in the first place. Internal consistency, for example, is a necessary condition for a theory being a viable candidate to describe the ontology of the world, but it is not sufficient. The array of alternative ontological theories given in Section 3 are all (most probably) internally consistent, since inconsistent theories would have been ruled out as candidates at an earlier stage. Thus, logic does very little to help decide between them.

One might also include mathematical considerations with the logical ones, since these are also empirically uncontroversial despite the fact that empiricist philosophers disagree about the correct metaphysical account of the nature of mathematics.[18] However, although some set theoretic considerations might find their way into metaphysical discussions, there is not much call for mathematics in ontological investigations even though its use would be countenanced. I will take it therefore that, like logic, the accordance with mathematical principles is a necessary condition of the adequacy of an ontological theory, but not sufficient to provide a criterion to choose between rival candidates.

The second source of potential justification of one ontological theory over another comes

from the set of theoretical desiderata, known as 'theoretical virtues' although they may not deserve the name. These include simplicity, parsimony, elegance, economy, explanatory power, theoretical unity and so on, and these are often be cited by the champions of one or other of the competing ontological theories in Section 3 as deciding factors in the acceptance of their favoured theory at the expense of the others. For instance, one might use simplicity or parsimony to urge the rejection of trope theory, since trope theory requires the presupposition of primitive meta-relations between tropes, thereby adding to and complicating the fundamental trope ontology merely to ensure that it fulfils its explanatory purpose of providing an account of qualitative similarity and difference, apparent objecthood and temporal or causal order. Or, a partial resolution might be offered in the second example of ontological plurality, concerning the relationship between properties and nomological relations, by rejecting the least parsimonious ontological option that postulates both ontological categories as fundamental. (I cite these as examples, without the intention of endorsing such claims.) Such virtues find similar use in the development of scientific theories, where one may prefer a theory which unifies disparate areas of science over one which does not, or the theory which postulates fewer entities over the theory populated by a range of as-yet-undetected kinds. The application of these virtues may also intersect, in both science and metaphysics, with the application of the aforementioned logical and mathematical constraints: a theory may be rejected (or side-lined) in favour of alternatives if it presents an obstacle to future unification with other, well-confirmed theories, even though it may be in no way obvious how this unification might be implemented. For example, certain interpretations of quantum theory, such as Bohmian mechanics, and GRW collapse theories, are regarded as less viable than their rivals as candidates for explaining the quantum realm because in their respective current forms, they conflict with General Relativity.[19]

However, despite the widespread use of theoretical virtues, and the explanatory success which has resulted from their application in science, there are two key problems with their being utilized in order to decide which ontological account of the natural world is correct. The first issue concerns their status: are the more simple theories (say) more desirable because the world is simple, or is simplicity just a pragmatically useful tool in the development of theories (both metaphysical and empirical)? If the latter is the case, then adherence to such virtues is neither necessary, nor even desirable to resolve the question of which theory is objectively true: theoretical virtues do not help to establish realism about the entities in a theory. On the other hand, it is notoriously difficult to justify the former claim that the world is simple (say) without begging the question in favour of the type of realism which requires objective simplicity to establish its own truth. Furthermore, even if one were in a position to make a well-founded claim that the objective world is simple, it is not clear how this notion of objective simplicity measures up to our conception of simplicity, and thus whether the theories that we consider to be the more simple ones would be more simple ones objectively speaking. For a traditional

'a priori' metaphysician, it might be possible to solve this problem by stipulation and simply presuppose that such features in our theories match those of the objective world somehow;[20] but for the follower of naturalized metaphysics, such a priori stipulation is not an option. Whatever our guiding principles in theoretical development, the world may turn out to be complex, or the theories that we consider to be simple may not be simple in objective terms: the naturalized metaphysician is cannot stipulate his way out of the problem and simply rule these possibilities out.[21]

The second problem facing the use of theoretical virtues to choose between competing theories concerns the difficulty of weighing up incommensurate virtues: is a simple theory which is less parsimonious better than a theory which postulates more entities and has fewer equations (say)? Even those theorists who recommend the ramseyfication of theories—that is, the conversion of theoretical sentences into Ramsey sentences (Lewis 1970)—are faced with this problem since two orthogonal aspects of simplicity and parsimony are still associated with theories in such a form. Such interplay between virtues complicates the issues raised in the first objection to their use to facilitate the theory choice: since such virtues conflict, even the realist about them must admit that some virtues must be pragmatic while others arise from the nature of the objective world, but it may be impossible to find out which virtue is an indicator of objective truth. For 'a priori' metaphysicians, it is difficult to establish that a theory's conformity with any one or more of the theoretical virtues is an indication of that theory's greater plausibility compared to its rivals, nor that it is a sign of objective truth, but for the supporter of naturalized metaphysics it is impossible; conforming with theoretical virtues does not provide a basis for the naturalist metaphysician to decide which ontological theory is the correct one.

The third means by which one might choose between competing theories involves the use of philosophical or common-sense intuition. However, although this constraint is popular among contemporary metaphysicians, it is immediately problematic in naturalized metaphysics. In naturalized metaphysics, the use of intuition cannot simply be an appeal to the 'common-sense', pretheoretical intuitions of the kind which G E Moore famously espoused, and which were enthusiastically taken on board by David Armstrong and David Lewis, the problem being that it is not clear how or whether such a faculty is supposed to be understood if the methodology of metaphysics is continuous with that of science. Scientific researchers distrust what we might take to be everyday common-sense claims about middle-sized objects and our understanding of concepts, and question whether a consistent and coherent body of such intuitive knowledge exists at all.[22] Moreover, for the empirical researcher, the denial of 'common-sense' claims is not in any way problematic if experimental evidence supports such a denial, thus the rejection of a theory as being 'counter-intuitive' would not be justified. For the supporters of naturalized metaphysics, such empirically-grounded hostility arising from both scientific practice and research findings makes the troubles for the use of intuition more serious

than for those who do not subscribe to the naturalized conception. Furthermore, for some champions of naturalized metaphysics (for example, Ladyman and Ross 2007, 1.2), the use of intuition is diagnosed as being the source of myriad problems in metaphysics, which their metaphysical methodology is intended to solve: intuition is regarded as nothing more than unfettered armchair speculation, and, as such, is an anathema to science.

In the face of such hostility, it may seem that there is obviously no place for intuition in naturalized metaphysics; but such a verdict might be too quick. It may be possible, for instance, to provide a naturalistically acceptable account of intuition in order to countenance its use in metaphysical theory choice. For such an account to work, it would be necessary to say why the use of intuition is epistemically reliable, and to do so from a broadly empiricist perspective. Furthermore, in the current context of ontological theory choice, such a putative naturalistic account of intuition must be broad enough to apply to intuitions about ontology and, more specifically, if possible, the ontology of the natural world, without begging the question about the nature of that ontology. To do this is a tall order, as I am about to explain, and I think that these restrictions are such that the supporter of naturalized metaphysics has good reason to be pessimistic that such a project will ever be successful. To attempt to establish this point, I will briefly consider some of the putative naturalistic accounts of intuition available.[23]

Broadly speaking, the role of intuitions in philosophical methodology is two-fold: the first is to discover the range of possibilities available for the definition or analysis of a concept, or formulation of a philosophical system; and the second involves the justification of one account, definition or set of necessary and sufficient conditions over others. For those looking for a naturalistic account, the second justificatory role is the harder to explain in the light of empirical evidence, whereas the former process of discovery of philosophical options by means of reflection is more apt to be explicable in a way which is in keeping with the methodology of natural science. After all, within empirical science there is the need to generate novel hypotheses or conceptual connections, and such as-yet-untested principles are frequently the products of processes which are rather epistemically suspect (via hunches, daydreams, dreams and lucky guesses, for instance, including Kekulé's famous account of his conceptualizing the benzene ring), so the use of such reflection in metaphysics is should not trouble the naturalistic metaphysician unduly. In scientific investigation, however, these candidate hypotheses and concepts are falsified or confirmed by experimental investigation—thus removing the need for the justificatory role of intuitions—but it is unclear whether such empirical investigation could provide the requisite justification for a particular metaphysical theory over others (a matter I will consider further below).

Hilary Kornblith (2002; 2007) suggests a naturalized account of intuition which embraces this role of discovery, casting certain concepts as natural kinds and thus treating

conceptual analysis, or investigation of intuitions about a concept, as being analogous to the collection of natural kind samples in sciences such as geology or biology. (Also see Ahlstrom 2009 for another application of intuition in epistemology.) Intuitive investigations are intended, on this view, to demarcate the extension of a concept and the manifestations that its instantiations may take, by means of non-empirical reasoning. However, for this understanding of intuition to be useful, one must be able to regard to the concepts under investigation as natural kinds (or suitably analogous to them, if that is different). Kornblith is specifically concerned with intuitions about the concept of knowledge, which he argues is a natural kind, and in cases (such as the Gettier cases) which form the basis of intuitive judgments about whether a someone has knowledge or not. Examination of such cases can determine what does, and does not, count as knowledge; and, as in the case of the kinds in some natural sciences, there need be no particular demand for exactness in such assessments. However, even if Kornblith has given a plausible naturalistic account of the applicability of intuitive judgments in epistemology about whether cases belong to the category of being knowledge, his account does not seem to extend to the justification of one account of knowledge over another, nor to the existence of knowledge at all. Therein lies the primary problem with the applicability of this account of intuition to the comparative justification of ontological theories under discussion. Although something like Kornblith's account of discovery has already been brought to bear in the generation of the different, competing ontological theories in Section 3, the realist naturalistic metaphysician is interested in which categories of entities and processes actually exist in the natural world, and this evaluation would require intuitive judgments to be used in their justificatory role, not simply to decide questions of about the category membership of entities or which theories or metaphysical systems one might adopt. Moreover, the use of ontological categories such as that of natural kinds in the course of Kornblith's account presents another serious difficulty for the application of his naturalistic account of intuitions to ontological theories, since it requires a significant ontological category to be explicated in the first place. The range of ontological theories on offer do not all countenance the existence of entities like natural kinds as Kornblith understands them, and it would be question-begging to require their existence (even pre-theoretically). Thus, it seems that Kornblith's account cannot be utilized in the case of ontological questions.

Alvin Goldman also tries to rehabilitate intuitions for the naturalist, with limited success (Goldman 1998; Goldman 2007). Although the naturalist commonly worries that intuitions are fallible, that their reliability cannot be determined, and that they conflict from person to person, he argues that this does not prevent the consultation of intuitive judgments in certain cases. For example, he maintains that the difficulties noted above do not preclude the use of intuition for the investigation of personal, psychological concepts: intuitions can tell us about our own mental entities or concepts, and perhaps the relations between them. Epistemic warrant in such cases arises from, or is supervenient upon the psychological processes that are causally responsible for belief. Furthermore, Goldman

suggests that some shared, interpersonal concepts might be susceptible to such treatment in addition to the intrapersonal ones. However, although this account may help naturalize some applications of intuition, giving epistemic warrant to intuitive reasoning methods and conceptual judgments which might be important in the study of the mind, consciousness and cognition, it does not lend itself to making intuitive judgments about the nature of the objectively-existing, mind-independent natural world. Intuition gives access to mental entities (some of which are perhaps shared with other people), not the extra-mental world in which the naturalistic metaphysician is interested.

In addition to the two options just discussed from Kornblith and Goldman, some naturalists might suggest that we can use some form of reflective equilibrium to accept and amend theories in a similar manner to the way in which Nelson Goodman suggests that rules of deductive and inductive inference (and other strictly 'unprovable' principles) can be adopted (Goodman 1955, Chapter III, Section 2).[24] For example, we can choose an intuitively satisfactory ontological theory, adopt it for the purposes of philosophical reasoning, and then amend that theory if it turns out to have counter-intuitive consequences for empirical investigation, or else it conflicts with general principles which we take to be more important. The revised theory can then be treated in the same manner and adjusted as required. However, there are two problems with the adoption of this reflective equilibrium approach to intuitions about inference or ontology. First, the empirical evidence suggests that which rules of inference and theories we find intuitively compelling are often fallacious, and that human reasoning and reflection does not pick up on this fact; reflective equilibrium does not seem to work very well. As Stephen Stich points out, 'reflective equilibrium is not a reliable, rational, coherent method of belief formation' (Stich 1988). The second problem with reflective equilibrium lies with its not being conducive to robust realism: the theory which we happen to accept, which works, which fits with our concepts and does not run up against other difficulties when faced with exposure to empirical and philosophical practice is not guaranteed, or even likely, to be the one which is objectively true of the natural world. There seems to be no point at which a theory chosen in this manner puts us in better epistemic contact with the ontology of the natural world than any of the rejected candidate theories do; there seems to be no reason why intuition would happen to begin with knowledge about the objective nature of the world, or else why this systematized reflection should result in such knowledge. If it works at all in ontological theory choice, reflective equilibrium supports a form of pragmatism or internal realism about the ontology of our best theory: we are at liberty to treat the entities of our theories as being real (whatever that means), but we have no warrant to assert that such entities constitute the natural world.[25]

These examples do not give much cause for optimism that it will be possible to marshal intuitive judgments and reasoning to the rescue in order to maintain a version of robust realism in naturalized metaphysics; that is, in order to choose which ontological theory is the correct one. Although intuition may find roughly the same kind of role in both science

and metaphysics, its utility arises much earlier, in the formative stages of theoretical development or hypothesis formation when the range of potential candidates is being developed and improved, rather than at the point where the correct theory is being selected. Of course, since the examples I have considered are only a sample from the literature on intuition, there may yet be a successful proposal for a naturalistic account of intuition which can act as a basis for theory choice, but the persisting difficulty for naturalist realists is that, given the empirical findings about intuition, how could our intuitions tell us about the nature of the natural world? There may yet be reasons to overcome this pessimistic outlook, but I have yet to find an account of naturalized intuitive judgments that is up to the job.

The fourth and final option for choosing between competing ontological theories is the scientistic claim that science will ultimately answer our ontological questions about the objective world. There are two aspects to this strategy: first, one might constrain the content of our metaphysical theories by developing them in such a way that metaphysics is 'driven by' science, or motivated by the aim of unifying previously problematic areas of scientific discourse; second, one might rely upon scientific investigation to tell us which categories the world contains. There is much to be said in response to these suggestions, but I will minimize my remarks, having discussed them in some detail elsewhere.[26] On the first point, it is not clear how restricting metaphysics to sorting out, or unifying, difficulties within current scientific theories would help to reduce or to remedy the problem of ontological plurality. Such a move might work, if one could support an additional assumption that there is only one correct theory of the world, and that theory is at least suggested by (or being converged upon) by the disparate theories of our current science. However, such an assumption both begs the question that one's favoured ontological background to current science is the one privileged by the natural world (rather than the world being best described by another ontological theory), and goes against the spirit of naturalized metaphysics. Furthermore, on the second point, epistemic access to the objectively existing ontology of the world does not appear to be a likely product of scientific endeavour. Committed naturalist realists admit that science should be able to tell us which metaphysical categories there are, especially if our naturalized metaphysical theories are derived from or inspired by science. However, there is yet to be any good reason to believe that this claim is true, as Ladyman admits (Ladyman 2007). Scientific enquiry is adept at predicting and explaining, but it does so from within a theoretical framework, already presupposing some basic ontological categories and largely oblivious to alternative metaphysical accounts which would also ground the science just as well. Science has yet to answer any metaphysical questions, and it is not clear why one should believe that it will do so in the future (other than out of optimistic faith in the naturalistic realist endeavour).

On the basis of this survey of the four options, I am led to the pessimistic conclusion that Premise (3) is most probably true and the supporter of naturalized metaphysics has no

way in which to choose which of the candidate ontological theories is the best one, or the one true of the natural world. While this is the weakest of all the premises, since I have not shown that there is no such way; however, I can currently offer no further viable suggestions for how one might make such a choice, even though a method may exist. Having attempted to establish premises (1)-(4), it is now time to draw conclusions from the incompatibility of naturalized metaphysics with a commitment to robust realism about the entities in metaphysical theories.

5. Conclusions and Implications

Naturalized metaphysics lacks the methodological resources to make a choice between alternative ontological theories, and thereby fails to satisfy a requirement of realism. From this, as I noted previously, one can draw two, alternative conclusions, which are not mutually exclusive: either the naturalist about metaphysics must compromise on his methodology; or, a retreat from robust realism is required.

The first conclusion involves admitting that the methodology permitted by naturalized metaphysics is inadequate if one wishes to maintain realism, and allowing use of some extra methodological ammunition to deal with the problem of theory choice, even when such methodology goes against the tenets of scientific enquiry. Metaphysics, on this view, might be closely allied with science, but not methodologically continuous with it: one might still require that such methodology, and the metaphysics which results from its use, does not openly conflict with science, for example. Perhaps one way to achieve this aim would be to permit substantive a priori reasoning about ontology—that is, to permit metaphysical theorizing and conceptual analysis over and above that which would be employed in empirical theorizing—on condition that the resulting theories do not conflict with science, or restrict which of our current scientific hypotheses could turn out to be true. This extra resource would aim to constrain metaphysical theorizing to the physically possible (to the extent that this can be determined),[27] and sideline those theories that are physically impossible, however intuitively compelling they may be.[28] Thus, the close relationship between science and metaphysics to which the naturalistic metaphysicians aspired would be partially maintained.

The second route one might take in light of the conflict between naturalized metaphysics and robust realism is to find fault with the latter. One might, for instance, decide to reject the robust realist's claim that the ontology of our theories provides an accurate inventory and structure of the objectively-existing entities of the natural world in favour of a view which permits greater epistemic slack between theoretical ontology (or terminology) and the world. There would be a choice of options about how much reality one might wish to accord theoretical entities: one might favour an internal realism which treated the entities of our best current ontology as 'real', but that would run the risk of descending into

ontological relativity given the on-going disagreement about which ontological theory is best. Or, one might embrace ontological relativity, or some variety of instrumentalism or pragmatism, stepping back from the question of which entities to count as real and which not. Such views open the way to choosing ontological theories in the light of scientific considerations, or on the basis of methods which aim for reflective equilibrium between empirical and non-empirical considerations.

There is one final point to consider before finishing this discussion, and that concerns the extent to which one can distinguish between ontological options, such as those discussed in Premise (1) within the context of naturalized metaphysics. If there is (most probably) no way in which to choose between these ontological options for the naturalistic metaphysician, perhaps one might argue that there is no difference, despite the prima facie differences between them. The initial inclination of most metaphysicians would be to object that this could not be the case: the alternative theories contain different categories of entities and processes, or combine in different ways. They treat different entities as fundamental and as derived, thus distinguishing themselves from each other, and cannot be run together in the way which I am suggesting. But it is not clear whether these objections are well-founded when it comes to the naturalist's streamlined armoury of methods. In 'a priori' metaphysics, the ontological alternatives are clearly different theories: an ontology in which properties are entirely determined by causal or nomic relations is very different from one in which nomic relations are entirely determined by an ontology of properties.

However, it is not clear that one can make sense of such notions of fundamental and derivative entities within naturalized metaphysics, leaving it open to question whether there is any difference between these theories at all. Although such terms as 'fundamental', 'derived', 'eliminated' and the like are frequently employed in metaphysical discourse, they are rarely defined nor the scope of their application set out. (Indeed, it is often merely assumed that the reader knows what is meant by them; for example by Ainsworth 2010, 56.) In fairness to those who use them, it is reasonably intuitively clear what the first and third terms mean: fundamental entities or processes are just that, the most basic or primitive which exist from whence the rest arise somehow; and eliminated entities are those which do not exist (usually those which we commonly presume do exist, or else their non-existence would not be worthy of note). But one might mean one of several things by calling a category of entities 'derived', although in the case of entities or processes the term cannot retain its original meaning of logical derivation. So I will venture some tentative definitions here.

Entities of category A exist as derived entities in a schema S if and only if:

> (i) the constitutive identity and individuation criteria of elements of A are wholly determined by entities of categories which are members of S;

(ii) entities of category A exist in virtue of the existence of entities of categories which are members of S;

(iii) entities of category A are constituted by entities of categories which are members of S;

(iv) entities of category A are supervenient on entities of categories which are members of S;

(v) entities of category A are realised by entities of categories which are members of S.

For naturalist metaphysicians there might also be a further option such that:
(vi) Entities of category A exist as derived entities in a schema S if and only if at least one of (i) – (v) hold, except that the intrinsic natures of entities of category A are not entirely determined by categories which are members of S, however whatever extra something exists is functionally or explanatorily irrelevant to the workings of the overall system S.

I will not pause to evaluate each of these definitions in detail here[29], since the pursuit of a priori metaphysics is not the current topic of this paper, but what seems clear is that whichever conception of what it is to be a derived entity is adopted, the naturalist metaphysician will at a loss to decide whether a category of entities is derived, rather than being fundamental to a realist ontological account of the natural world. Derived entities simply appear in the ontology alongside fundamental ones, and the order of ontological priority is not something which is on empirical show. It seems plausible to suppose that such information is simply not empirically available, nor does it creep by some other means into our scientific theories such that we can unambiguously determine which metaphysical categories of entities are fundamental and which derived.

Furthermore, the difficulties with spelling out the notion of derivative entities complicates ontological accounts which claim to eliminate entities from the ontology, especially for naturalistic metaphysicians: one can eliminate entities simpliciter by rejecting the existence of a category of entities which is ontologically independent from other categories in the system, but it is not clear that one can eliminate a category of entities which is derivable in the system. Derivative entities turn up for free given the existence of those entities which ground them, just as certain sentences are entailed by others whether we like it or not. Of course, one can refuse to call a category of entities by their common name: for instance, trope theorists need not call the bundles of tropes related by compresence 'objects' rather than 'bundles of tropes', but their theory then only bears a terminological difference from someone who does call those derived individual bundles 'objects'. Of course, if one is prepared to go against the spirit of

naturalistic metaphysics, one can declare such derivative categories eliminated (simply because one needs no names for them); but, even when pursuing metaphysics as an a priori autonomous discipline, this eliminativism is tendentious in comparison to that which dispenses with an ontologically independent category of entities. The implication of not being able to explicate ontological priority in naturalized metaphysics would result in the ontological alternatives discussed in Section 3 being only terminologically different. If this is the case, then what should the supporter of naturalized metaphysics do now?

One strategy, in such circumstances, would be to embrace a form of structuralism about metaphysical theories, similar to the earlier versions of structuralism in the philosophy of mathematics, or science, and to embrace the conclusion that is not necessary to make a choice between competing ontological theories: either because of our epistemic limitations we are unable to make such a choice, or because there is no such choice to be made. The former conception of structuralism, which one might call 'Weak' or 'Epistemic Metaphysical Structuralism' would treat the failure of naturalized metaphysics to distinguish between alternative ontological theories as an epistemic problem; one or another of the ontological theories we have might be true of the objective world, but we cannot tell which one that is. On the other hand, the latter conception, which could be called 'Strong' or 'Ontic Metaphysical Structuralism' would diagnose the failure to detect a difference between theories as being evidence for the fact that there is no objective difference between ontological theories, the structure is all that there is. This strong version of structuralism opens the door once more to robust realism in naturalized metaphysics, albeit in a new and intriguing way, since Premise (4) of the argument which asserts that the realist metaphysician must make a decision between competing ontological theories (which has hitherto been uncontested) no longer holds. One could be a realist about the shared ontological structure—whatever that is—of all the explanatorily equivalent ontological theories, maintaining that this structure is or represents the ontological structure of the objective natural world.

One or other of these conceptions of metaphysical structuralism may be useful in naturalized metaphysics, resolving as it does the arguments between alternative ontological views which seemed insoluble in Section 4. Furthermore, its adoption might be in keeping with the other commitments to structuralism in science which finds much favour with some supporters of naturalized metaphysics. As such, I propose that the tenability of this view of ontology is worthy of further exploration, while being mindful that philosophical caution is required: a view which seems initially plausible might lead to a metaphysical dead end.

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[1]Metaphysics is sometimes described as the study of ontology and causation. I do not disagree with this definition, however I take causation—whatever that is—to be included in the ontology, most usually as a process of some kind.

[2]'Natural world' is meant in a very broad sense here. For example, it could include the entire Everettian multi-verse, were one of the Many Worlds interpretations the most favoured in quantum theory, or else it could allow for the existence of spatiotemporal regions distinct from the one we inhabit were our cosmology to countenance multiple Big Bangs. It is difficult for naturalists to justify either of these options in physical theory, but this need not be of concern here.

[3]The label 'autonomous' is used by Ladyman (2007, 181) and the conception of metaphysics broadly supported by Ladyman and Ross 2007, especially Ch. 1; Esfeld 2004; Esfeld 2009; Maudlin 2007 among others. The reason for the scare quotes in ''a priori'' metaphysics' will be explained below.

[4]Thus, as Chakravartty (manuscript) has noted, the ontological accounts proposed by certain well-known supporters of naturalized metaphysics frequently do not satisfy their own restrictions on a priori speculation nor maintain the requisite proximity to empirical enquiry.

[5]For example, Ladyman and Ross state 'the raison d'être of a useful metaphysics is to show how the separately developed and justified pieces of science (at a given time) can be fitted together to compose a unified worldview' (2007, 45) and stress 'the need for an ontology apt for contemporary physics, and a way of dissolving some of the metaphysical conundrums it presents' (2007, 131).

[6]Adherents to this robust realism about the entities of our scientific theories include metaphysical realists, such as Armstrong 1978; Devitt 1984; Devitt 1999; Devitt 2005; Devit 2010; those who maintain that most of our scientific predicates genuinely refer, including Boyd 1984, 41-2; Fales 1988, 253-4; Jennings 1989, 240; Matheson 1989; Papineau 1979, 126; those who maintain science justifies belief in the mind-independent existence of the entities in our theories including Kukla 1998, 10; Psillos 1999, xix-xxi. In addition, some of the more ardent realist supporters of naturalized metaphysics propose an essentially structural ontology, such as that found in versions of Ontic Structural Realism. See Ladyman 1998 and *passim*; Ladyman and Ross 2007; Ainsworth 2010; Esfeld 2004; Esfeld 2009; Esfeld and Lam 2008; French 2006; French 2009; French and Ladyman 2003; Redhead 1999; Saunders 2003.

[7]The ontology required to ground qualitative similarity may not be entirely mind-independent, but I will

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presume here that it is, since my primary interest is in the fortunes of realist ontological theories when they are combined with naturalism. However, even according to these realist theories of qualitative similarity, is not required that *all* such apparent cases of similarity have an objective basis, merely that some of them do.

[8]Not all of these philosophers subscribe to naturalized metaphysics, and so some are personally immune to the complaints raised in the current paper. Their ontological views are compatible with naturalized metaphysics, however, and may be adopted in conjunction with it.

[9]The former are associated with Plato, the latter Armstrong (*passim*). For simplicity, I will leave aside the issue about whether blue, or any of my other examples would actually be genuine objectively-existing mind independent universals.

[10]The distinction between these will be discussed in greater detail below.

[11]Although traditional 'a priori' metaphysical views can avoid the problem of ontological choice which, I argue, afflicts naturalized metaphysics, I have argued elsewhere that these metaphysical theories face a further sceptical challenge when they are conjoined with realism about classification within ontological categories; that is, *which* properties, or which tropes, or which universals (and so on) exist (see Allen 2002). The naturalized metaphysician faces sceptical problem with both ontological categories *and* classification within these categories.

[12]This would be true on any of the property theories suitable to account of qualitative similarity and difference, since such entities must be essentially general or repeatable, whether or not they also possess individual natures or quiddities.

[13]Although one could conceive of the causal efficacy of a property being manifested by its individual qualitative nature (or the individual qualitative nature of each of its instances) in this way, such a view is open to the objection that it is not clear whether one would also be able to account for the causal generality evident over different instances of the same property. Thus, it appears that each property instance would be required to have contrasting qualitative aspects—or even an internal structure—to account for both causal individuality and causal generality, a conception which goes against the conception of individual qualities offered thus far. Bearing this problem in mind, the preferred ontology for those who support singularist conceptions of causality is more likely to be one of concrete particulars such as Davidsonian events (Davidson 1969; Davidson 1985), thereby permitting different (although perhaps not strictly individuable) qualitative aspects to be manifested by the same particular.

[14]There are other versions of ontic structural realism which do not include their eliminativism about ontological categories other than relations (including Esfeld 2004; Esfeld 2009; Ainsworth 2010), indeed Ladyman and Ross sometimes seem to equivocate about this point. Contrast: 'There are no things. Structure is all there is.' (Ladyman and Ross 2007, 130) with an immediate softening of this view which permits objects as long as they are not self-subsistent individuals (2007, 131); that is, objects exist derivatively, as they do in many other ontological theories such as some forms of trope theory, for example. As will become clear, however, supporters of naturalized metaphysics are not in a position to make much of these subtle ontological differences.

[15]I do not wish to imply here that such haecceity is required by any account of objects, merely to suggest that should it be thought desirable, the ontological theories in which objects are derivative would be able to account for the appearances of such a feature.

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[16]The term 'mind-independent', although conventional, is slightly confusing since minds might be part of the natural world if physicalism is correct. Furthermore, they could (arguably) exist mind-independently in the sense that the existence of a mind does not require a mind to conceive it as such. Nothing in this discussion is meant to preclude minds being physical or otherwise part of the natural objective world.

[17]Realist proponents of naturalized metaphysics might run up against the problems raised in Dummett 1978 were they to consider such logical revisions, but I shall not discuss the matter further here.

[18]There are very different characterisations of mathematics and mathematical knowledge supported by those who embrace a largely empiricist, naturalistically inclined, account of the nature of the natural world, which I cannot consider in detail here. However, such disagreements rarely, if ever, impinge upon the mathematical practice of scientists and mathematicians.

[19]This is not the sole reason for their lack of popularity. However, there are ongoing attempts to provide relativistic versions of collapse theories (see Tumulka 2006a; Tumulka 2006b).

[20]Lewis (1983, 218-227, especially 226), for instance, makes the assumption that our understanding of the natural world corresponds to the objective nature of reality. I have argued elsewhere (Allen 2002) that Lewis's presupposition is poorly justified, but I will not pursue this point here as such a move would clearly be excluded within naturalized metaphysics.

[21]A notable example of the discovery of unwanted complexity in scientific investigation occurred with the discovery of the second and third families of fundamental particles, starting with the muon in 1936 (to which Isidor Rabi famously responded 'Who ordered that?').

[22]Well known evidence from cognitive psychology counts against at least two aspects of the use of intuition in philosophical theorizing: the formulation of necessary and sufficient conditions for the definition of a concept, and the use of intuitive rules of inference. In the former case, the psychological demarcation of concepts has been found to be less exact or well-delineated than philosophers would traditionally aim for, as well as being socially determined in a way which is problematic for philosophy's general 'universal' claims. (See, for example, Rips 1975; Rosch 1978; Rosch and Mervis 1975; Smith and Medin 1981.) In research concerning the latter, human subjects have been shown to find all sorts of fallacious reasoning patterns to be intuitively acceptable, and to continue to do so *after* reflection, thereby undermining the notion that reasoning or reflective equilibrium, can provide a rational and coherent methodology for belief formation. (See Nisbett and Ross 1980; Kahneman, Slovic and Tversky 1982).

[23]There have been important attempts to rehabilitate intuition in the face of the empirical charges against it, but these are not in keeping with the naturalistic methodology required by the conception of metaphysics under discussion. See Bealer 1996, against which see Feltz 2008. In particular, Bealer treats metaphysics as being autonomous and able to have authority over science.

[24]Goodman does not use the term 'reflective equilibrium'; the name appears in Rawls 1971.

[25]It is worth noting that Goodman was not attempting to sustain realism with his suggestion, rather to explain the pragmatic way in which our entrenched rules and concepts can be refined. Moreover, by his later career he had decided that worrying about what was real and what was not made no sense. (Goodman 1978, especially Ch. VI)

[26]See Allen, unpublished for further discussion concerning the relationship between science and

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metaphysics in naturalized metaphysics. Also, see Allen 2002. All the counterarguments to the scientific realists' strategies to find out which natural properties objectively exist also apply to attempts to discover which ontological categories there are.

[27]I have previously suggested this constraint before within the context of an argument that many 'a priori' metaphysical theories give ontological accounts of the natural world which contradict current science, in the sense that they pre-determine the truth values of current hypotheses (usually rendering them false). See Allen, 2007. I will not consider here whether theories of naturalized metaphysics also fail in this regard.

[28]It is important to note here that hypotheses which are not physically possible from our current epistemic perspective would not be entirely ruled out on this view, for fear of prejudging later empirical and theoretical developments.

[29]It is likely that this list is not exhaustive and also that some of the options run together on further examination. Furthermore, although I could imagine them being presented as serious suggestions for characterizing derived entities (and they intuitively do that), it would go outside the scope of this paper to investigate fully whether or not they work.