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Moving Beyond Unification and Modeling: A Reconsideration of Radically Naturalized Metaphysics

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Sommaire

Ontic structural realists Ladyman and Ross (2007) endorse the view that the only metaphysical tasks worth pursuing are to unify the sciences and model the objective structure of reality. This form of radically naturalized metaphysics, however, depends upon the principle of naturalistic closure. In this paper I argue that the principle of naturalistic closure is at odds with radically naturalized metaphysics since it is a non-naturalized metaphysical principle, claiming that radically naturalized metaphysics is not the only form of metaphysics worth doing. In particular, the principle of naturalistic closure requires that a metaphysical claim M at t be of service to some scientific hypothesis H. The principle, however, does not state when M must be of service to H. It is possible for a metaphysical claim at t to be of service to a scientific hypothesis at t+n. Furthermore, the principle of naturalistic closure is not a direct result of scientific inquiry. Yet, as I argue, the principle of naturalistic closure is a metaphysical claim. Thus, motivating the position that metaphysics is not restricted to the tasks of unifying the sciences and modeling the objective structure of reality, but more importantly that it should not be.

Key words: structural realism, naturalism, metametaphysics

1 – Introduction

Philosophers of science have typically come in two stripes: Scientific realists endorse the thesis that science is capable of providing an accurate description of the unobservable world. Anti-realists, on the other hand, state that science aids our interests, but that we should not go any further in thinking that science's description of the world is true. Both camps, however, face intractable problems. First, traditional scientific realism has come under scrutiny of the pessimistic meta-induction since most of the entities appealed to in previous scientific theories have been rejected. Second, although anti-realists adopt the lesson of the pessimistic meta-induction, they are unable to provide an adequate explanation for why science has enjoyed such experimental success. There is a third position, structural realism, which has attempted to overcome these challenges.

Worrall's (1989) essay serves as the catalyst for the structural realist movement, although elements of the theory can be found in Poincaré (2001) and even Kant (1989). Worrall acknowledges that the pessimistic meta-induction poses serious obstacles for the scientific realist. Yet, he does not want to endorse either anti-realism or instrumentalism, since it would have to be something like a "miracle" for science to be as successful as it has been if either is true. Instead of understanding the task of science involving the development of descriptions of unobservable entities, the structural realist understands science as aiming to provide an accurate description of its structure.

Although the change in theories requires a shift in our understanding of what entities exist (e.g., the aether), the mathematical structure of scientific theories remains mostly intact. In cases such as these, Demopoulos and Friedman (1985), Morganti (2004), Poincaré (2001), Russell (1927), Votsis (2005), and Worrall (1989) endorse epistemic structural realism, which states that at most we can *know* the structure of the world even though there is more to reality than structures. Epistemic structural realism is to be contrasted with the ontic structural realist position held by French (2014) and Ladyman and Ross (2007), which states that all that *exists* are structures. This paper focuses on the ontic structural realist position that Ladyman and Ross advocate and their endorsement of *radically naturalized metaphysics*. In particular, this paper aims to understand how ontic structural realists benefit from non-radically naturalized forms of metaphysics.

The discussion unfolds as follows: Section 1 provides a brief discussion of the formulation of radically naturalized metaphysics defended by Ladyman and Ross, which has as its tasks unifying the sciences and modeling the objective structure of reality; Section 2 outlines two key regulative principles for radically naturalized metaphysics: *the principle of natu-*

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ralistic closure and *primacy of physics constraint*; Section 3 takes into consideration some implications of these regulative principles for the purposes of unifying the sciences and modeling the objective structure of reality; I then conclude with a brief discussion of why ontic structural realists should be sympathetic to the pursuance of other metaphysical approaches. Although for different reasons, Hawley makes a similar point regarding analytic metaphysics' abilities to contribute to Ladyman and Ross' project (Stanford et al. 2010).

2 – Radically Naturalized Metaphysics

At first glance, ontic structural realists might be thought to be entirely hostile towards metaphysics since there are many commonalities between logical positivism and ontic structural realism. The statements "The criteria of adequacy for metaphysical systems have clearly come apart from anything to do with the truth. Rather they are internal and peculiar to philosophy, they are semi-aesthetic, and they have more in common with the virtues of story-writing than with science" (Ladyman and Ross 2007, p.13) and "We think that [Neo-Scholastic metaphysicians] are indeed doing nothing but revealing properties of themselves and don't usually realize it" are reminiscent of Ayer's remark that "it is fashionable to speak of the metaphysician as a misplaced poet. As his statements have no literal meaning, they are not subject to any criteria of truth or falsehood: but they may still serve to express, or arouse, emotion, and thus be subject to ethical or aesthetic standards" (Ayer 1946, p.44).

These similarities illustrate some of the motivation behind the ontic structural realists' hostility towards much of contemporary analytic metaphysics, but many positivists would be resistant to the ontic structural realist's slogan that *all that exists is structure* since it is neither a tautology nor is empirically verifiable. So, even though ontic structural realists in many ways revive the spirit of positivism, they are engaged in different projects.

There have been many attempts at offering a naturalized metaphysics. As Macarthur (2010, p.124) indicates, naturalism has been defended by the likes of Armstrong (1980), Devitt (1984), Dretske (1995), and Papineau (1993). Although generally understood as being advocates for a radically naturalized metaphysics, Ladyman and Ross do not clearly distinguish radically naturalistic metaphysics from other forms of naturalistic metaphysics, since they take their construal to be the correct formulation. In Ladyman and Ross's formulation, radically naturalized metaphysics has the task of unifying the sciences and is the only kind of metaphysics suited to model the objective structure of reality. These tasks are further elucidated by two regulative principles: the *primacy of physics constraint* and *the principle of naturalistic closure*.

3 – Regulative principles

First, the *primacy of physics constraint* (hereafter 'PPC'), states that any metaphysics or special science that is at odds with our best contemporary physics "should automatically be rejected for that reason alone. Fundamental physical hypotheses are not symmetrically hostage to the conclusions of the special sciences" (Ladyman and Ross 2007, p.44). The PPC serves as a constraint on how radically naturalized metaphysics should unify the sciences and model the objective structure of reality by appealing to our best contemporary physics. Furthermore, PPC supports ontic structural realism in its claim that all that exists is structure. By adopting our best contemporary physics, which Ladyman and Ross claim is quantum field theory, we then begin to accept an ontology not of things but of structures. For this reason, the appeal to quantum field theory begins to undermine the very project of constructing an ontology, properly understood as studying things, which indicates that there are other ways of doing metaphysics.[1] French (1998) makes a similar point.

Second, the PPC functions in tandem with the principle of naturalistic closure (hereafter 'PNC'), which states that

> [a]ny new metaphysical claim that is to be taken seriously at time *t* should be motivated by, and only by, the service it would perform, if true, in showing how two or more specific scientific hypotheses, at least one of which is drawn from fundamental physics, jointly explain more than the sum of what is explained by the two hypotheses taken separately, where this is interpreted by reference to the following terminological stipulations:
>
> Stipulation: A 'scientific hypothesis' is understood as an hypothesis that is taken seriously by institutionally *bona fide* science at *t*.
>
> Stipulation: A 'specific scientific hypothesis' is one that has been directly investigated and confirmed by institutionally *bona fide* scientific activity prior to *t* or is one that might be investigated at or after *t*, in the absence of constraints resulting from engineering, physiological, or economic restrictions or their combination, as the primary object of attempted verification, falsification, or quantitative refinement, where this activity is part of an objective research project fundable by a *bona fide* scientific research funding body.
>
> Stipulation: An 'objective research project' has the primary purpose of establishing objective facts about nature that would, if accepted on the basis of the project, be expected to continue to be accepted by inquirers aiming to maximize their stock of true beliefs, notwithstanding shifts in the inquirers' practical, commercial, or ideological preferences. (Ladyman and Ross 2007,

1 - Thanks to Alex Levine for bringing this point to my attention.
2 - I quote here at length since the specific stipulations will play a significant role in my criticism of limiting metaphysics in the way that Ladyman and Ross recommend.

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pp. 37-8)[2]

The initial formulation of the PNC indicates the conditions that are needed if we are to endorse a metaphysical claim. It is in the third stipulation, though, that we see how the PNC supports radically naturalized metaphysics. The aim of the PNC is to determine which metaphysical claims are about the nature of the world as described by science. Furthermore, since those metaphysical claims would have been acquired through scientific processes,which Ladyman and Ross claim are the most reliable "epistemic filters" (2007, p.37), the resulting "stock of true beliefs" will itself be unified. Since those beliefs are the result of scientific processes, the unification of those beliefs will offer insight as to how we can unify the sciences. It is not immediately clear, though, how the metaphysical projects that are determined by the PNC also lead to a formulation of ontic structural realism, since ontic structural realism primarily has as its motivation the problems that befall scientific realism. Ladyman and Ross argue that ontic structural realism is not an *ad hoc* response to theory change, but is a result of our best physics (Ladyman and Ross 2007, p.67). More work should be done to show why they believe this argument succeeds, but it is not immediately relevant. So, I will table it for the present discussion.

The second stipulation of the PNC requires additional clarification as to how the PNC is to go about restricting metaphysics, since, although the PNC requires that a metaphysical claim M at t be of service to some scientific hypothesis H, the PNC does not state *when* M must be of service to H. For this reason, there is the lingering possibility that M at t be of service to some H at t_{+n}. To make this more precise: The PNC states that for a metaphysical claim to be taken seriously when it is proposed at t that it should be motivated by "and only by" the role it would serve in making two or more scientific hypotheses more explanatorily powerful. Yet, the scientific hypotheses that would justify the employment of a metaphysical claim do not need to be presently investigated or confirmed at t. Instead, the stipulation only requires that the scientific hypothesis be a candidate for investigation (and not confirmation) at a later time t_{+n}.

As I will show in the next section, this will have significant implications for the claim that metaphysicians should only engage in radically naturalized metaphysics. Rather than being restrictive as to which forms of metaphysics should be endorsed, the PNC (as formulated) leads to the endorsement of multiple metaphysical projects that Ladyman and Ross would not endorse. This claim has the further implication that the ontic structural realist should not be too quick to reject other forms of metaphysics, and that the possibility of justifying other forms of metaphysics will be a positive, albeit resisted, result.

4 – Unification and Modeling

Assuming that radically naturalized metaphysics is the only adequate form of metaphysics set to the task of unifying the sciences and modeling the objective structure of reality, there are reasons that we should not believe that radically naturalized metaphysics is the only kind of metaphysics worth doing.

I am also assuming that Ladyman and Ross are correct in their characterization of radically naturalized metaphysics. This assumption makes the present argument stronger—*even if* radically naturalized metaphysics is the only form of metaphysics capable of x, it is not the only sort of metaphysics worth doing. The projects that radically naturalized metaphysics is concerned with accomplishing are worthwhile projects, but the justification for the claim that such metaphysics is possible is not found in radically naturalized metaphysics itself. The justification will be found in some other metaphysical hypothesis which is itself not restrained by the PNC, thereby suggesting that the PNC is not sufficient for radically naturalized metaphysics. I am, however, assuming that the PNC is at least necessary for radically naturalized metaphysics.

Radically naturalized metaphysics requires the presupposition that the sciences are capable of unification for the metaphysician to be justifiably set to the task of unifying the sciences. This presupposition, however, is not explanatorily significant when combined with scientific hypotheses—indicating that it is not immediately endorsed by the PNC. Given two hypotheses H_1 and H_2, where H_2 is derived from fundamental physics, and given the claim C that the sciences are unified, we find that there is no additional service had by the conjunction H_1 & H_2 & C that H_1 & H_2 on its own does not provide. A case in which C adds any additional explanatory force is if the specific why-question under consideration is *why do two hypotheses about the world from two different sciences aid us in an explanation?*

Why might Ladyman and Ross, then, be concerned with the project of unification? They appear to be taking a lead from Kitcher's own account of explanation (Ladyman and Ross 2007, p. 32 and 261). Kitcher argues that we are able to identify the unified causal structure of the world, since "to explain is to fit the phenomena into a unified picture insofar as we can" (Kitcher 1989, p.500). This is not a claim about the unification of the sciences; it is an attempt to describe the relationship between causation and explanation by "critically elucidating consilience networks across the sciences" (Ladyman and Ross 2007, 27). The claim that the world is causally unified in a way such that our explanations can offer insights to that causal structure may offer some motivation for radically naturalized metaphysics, but identifying networked consilience networks is not the same as unifying the sciences—doing so only aids in identifying consistencies among the

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sciences. Furthermore, the claim that the world is unified is not to be found in the PNC itself and, more importantly, appears to be in violation of the PPC since fundamental physics does not tell us that the world is unified.

As Dupré (1993) and Cartwright (1999) have been at pains to argue, our understanding of the world, if we are to understand the world through the lens of science, is to see a "dappled world, a world rich in different things, with different natures, behaving in different ways" (Cartwright 1999, p.1). Their arguments further illustrate the contentiousness of the thesis that it is possible to identify networked consilience relationships in a way that results in thinking that unification is possible. Ladyman and Ross are aware of the arguments offered by Dupré and Cartwright (Ladyman and Ross 2007, p. 6). Their rejection of the dappled view, however, is not accomplished by disputing the specific arguments, but attempted by critiquing the motivations for endorsing a non-unified account. The arguments offered by Cartwright and Dupré are much more sophisticated than Ladyman and Ross suggest—there is much more work needed to show why Dupré and Cartwright are mistaken. My own view is that Dupré's and Cartwright's arguments indicate why we should not look to science to offer a unified account of nature. Instead, I take the presuppositions underlying the unified view to be metaphysical—presuppositions that provide a valuable service to the sciences. To clarify, the presupposition that nature is unified is a metaphysical thesis and not a scientific one.

Furthermore, not all scientists agree that unification is itself a serious scientific hypothesis. Although some scientists (e.g., Weinberg (1993) and Greene (2011)) do argue that unification is the project of science and is a serious hypothesis worthy of scientific pursuit, there are others (e.g., Woit (2006) and Smolin (2006)) who appear skeptical of the enterprise of unifying the sciences. The contentiousness surrounding the possibility of unification makes it unclear if unification is a scientific hypothesis in the same sense as what scientists mean by 'scientific hypothesis' or if unification is a scientific hypothesis because some scientists believe that unification is possible.

It appears to be the latter since there does not appear to be substantial evidence to warrant the belief that the sciences are unifiable. Furthermore, there does not appear to be any way we would be able to falsify or confirm the claim that the sciences are unified. At any point at which we might believe that the sciences have been unified, if we are capable of recognizing such a state, there may be other phenomena that have yet to be discovered requiring another science that is not part of the unified picture. As things currently stand, Ladyman and Ross require additional evidence to substantiate the claim that one of the main tasks of metaphysics is the unification of the sciences and that such unification is possible.
An additional worry for the project of unification is that many previous attempts at unification have been inadequate to the task. In many cases, the more attempts we make at unification, the more difficult the project becomes. For example, the project of unification, at least in physics, appeared to have only required finding a connection between general relativity and quantum mechanics. Now, since quantum mechanics has itself become further diversified into such areas as quantum loop theory, quantum gravity, and quantum field theory (which has itself been diversified into quantum electrodynamics and quantum chromodynamics), we need to first unify these fields before attempting to unify quantum mechanics with general relativity. The project, though, of interpreting these different fields in a way that will assist us in determining which formulation provides accurate models is itself problematic.

I am not arguing that all attempts at unification are inadequate. Some accounts of unifying quantum mechanics and molecular chemistry are promising (Bishop 2005).[3] A complete account of unification of the kind that Ladyman and Ross endorse, however, requires more instances of unification than are currently available to establish the PNC. The lesson to be gained is that the PNC is not sufficient for establishing radically naturalized metaphysics.

The ontic structural realist can accommodate this lesson by taking into account the second stipulation of the PNC by suggesting that the scientific hypotheses we are concerned with are those that *might* be investigated later than the time at which the metaphysical claim is under consideration. Rather than the metaphysician stating that her projects are entirely detached from science and that they do not bear on each other in any significant way, the metaphysician would be in a better position to state that although her findings or theories may not be informative to any current scientific hypothesis, there may be one that will be investigated later that might be related. French and McKenzie (2012) make a similar observation regarding metaphysical theories of laws and modality being applicable to contemporary physics. Furthermore, since the scientific hypotheses that we are concerned with are only those that *might* be investigated, the hypotheses do not *actually* need to be investigated to vindicate the metaphysical claim in question. For this reason, it is only the possibility of there being a scientific hypothesis that would be investigated that warrants the consideration of the metaphysical claim. For example, Heraclides Ponticus' proposal that the earth rotates and Aristarchus of Samos' geometric formulation of heliocentrism were both at odds with the received views of that time (i.e., Aristotelian physics and geocentrism), but both proved useful in the development of contemporary cosmology.[4]

To rephrase the metaphysician's position in a way that is in accordance with the PNC: Metaphysicians can proceed *a priori* in the investigation of matters upon which they claim sci-

3 - Thanks to a referee for bringing this point to my attention.

4- Thanks to Doug Jesseph for providing me with these examples.

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ence does not [yet] bear. This formulation includes two senses of '*a priori*'—a type of thinking and our abilities to address metaphysical issues before they occur in scientific contexts.[5] This weakens the sense in which metaphysics ought to be directly dependent upon science if it is only dependent upon the possibility of scientific hypotheses being investigated and strengthens the extent to which science is dependent upon metaphysics since the possibility of scientific hypotheses will be justified by metaphysical theories about the nature of the world and what the future might be like given the present scientific data.

The way(s) in which science is dependent upon metaphysics is elucidated by the way(s) in which ontic structural realism is itself dependent upon metaphysical theses. By showing how a view of the philosophy of science is dependent upon metaphysical theses we can then infer how science is itself dependent upon those same theses. This outcome is due to the philosophy of science having as one of its roles the justification of methodological approaches to science, in which case the metaphysical theses that justify the methods employed in the philosophy of science, in turn, justify the methodological approaches to science.

There are at least two ways in which ontic structural realism is dependent upon metaphysical projects that are not directly aimed at the unification of the sciences or modeling the objective structure of reality. First, part of the justification for ontic structural realism arises from the PNC itself. Radically naturalized metaphysics, however, is a result of the PNC—not the other way around. The PNC determines what is a metaphysically worthwhile project by determining the metaphysical claims we ought to accept—namely, those that result in the unification of the sciences or the modeling of the objective structure of reality.

Furthermore, the PNC is itself not justified by only looking at science. The PNC is concerned with which metaphysical claims should be entertained, not which scientific claims should be justified or how to go about practicing science. In other words, the PNC is *about* metaphysics—or to use the contemporary phrase, the PNC is a claim in the domain of *metametaphysics*. Metametaphysics, however, is metaphysics. Metaphysics is the field of inquiry concerned with fundamental aspects of reality. Among these aspects are the kinds of statements we should adopt in our metaphysics and the way to go about investigating reality.

Similarly to scientists, metaphysicians should have a good understanding of their tools and methods. Developing such an understanding is to be ensnared in metaphysical activities. For this reason, a discussion of which metaphysical claims ought to be entertained or considered relevant, as determined by the PNC, is still itself a metaphysical project—even though it happens to be a project that is not directly in line with radically naturalized metaphysics. More importantly, determining which metaphysical claims we should take seriously is a *worthwhile* metaphysical project, which is itself not directly aimed at the unification of the sciences or the modeling of the objective structure of reality. Granted, the result of establishing the PNC provides support for a radically naturalized metaphysics, but the establishment of the PNC is on its own a worthwhile endeavor. This result suggests that there is room for metaphysics that does not directly concern itself with projects as set forward by radically naturalized metaphysics. Furthermore, since radically naturalized metaphysics depends upon the PNC and Ladyman and Ross defend a radically naturalized metaphysics, they should not seek to restrict the very forms of metaphysics that have led to the establishment of the regulative principles upon which radically naturalized metaphysics depends.

Even if the ontic structural realist is still willing to reject the suggestion that other forms of metaphysical projects are worthwhile, she would do well to observe in which ways the very possibility of unifying the sciences and the possibility of modeling the objective structure of reality are both dependent upon metaphysical developments outside of radically naturalized metaphysics. I have already discussed how the unification of science is itself not directly a result of our current best sciences. There is room, though, for a discussion of how the project of modeling the objective structure of reality is itself a metaphysical project.

To engage in the project of modeling the objective structure of reality requires the realist thesis that there is an objective reality and that reality has a structure capable of being modeled. If we look at the sciences, as the PNC recommends, and if we look specifically to fundamental physics, as recommended by the PPC, our best scientific theories do not say anything about there being an objective reality that possesses a structure. This claim is consistent with van Fraassen (1998, 2007, and 2008), who has argued that at best our scientific theories "save the phenomena" but do not go any further in describing reality itself. I am in agreement at this point that *if* we only look at science there is no reason to infer something about the structure of reality or that reality has a structure. I *do* believe that there is an objective structure to reality that science does help us understand, but this is due to metaphysical sympathies and not the result of understanding science. Similarly, the ontic structural realist should acknowledge that neither the PNC nor PPC, separately or jointly, can lead to the inference that the project of modeling the objective structure of reality is the proper subject matter of metaphysics.

5 – Summary

Given that we do not know which scientific theories are capable of vindicating our metaphysical claims, we should continue doing metaphysics in a way that is not always aimed

5 - Thanks to a referee for bringing this point to my attention.

at unifying the sciences or offering models of the objective structure of reality. Even the ontic structural realist has benefitted from metaphysics that is not in line with radically naturalized metaphysics in their claims that reality is comprised of "patterns all the way down" (Ladyman and Ross 2007, p. 228) and their more general attempts to develop *Rainforest Realism* (Ladyman and Ross 2007). In particular, ontic structural realism requires a form of metaphysics that is not itself radically naturalized, including analytic metaphysics that offers ontic structural realists techniques for explicating opposing positions (if to serve only as rhetorical foils) (Dorr 2010). It is obvious that metaphysics will not always be in line with science, but the cost of continuing to do metaphysics appears to be very low. Some believe that the potential cost is the taking away of bright minds from subjects that are perhaps more pressing; it is this issue that leads Ladyman and Ross to "urge them to come back and rejoin the great epistemic enterprise of the modern civilization" (Ladyman and Ross 2007, p. 310). We should remind Ladyman and Ross that many of the great scientific and mathematical insights were accomplished by those (e.g., Einstein and Gödel) who whole-heartedly adopted the metaphysical enterprise of the sort that Ladyman and Ross wish to reject.

6 – Conclusion

What I have set out to accomplish here is to show that ontic structural realists such as Ladyman and Ross have underappreciated some of the ways that their own project has benefitted from metaphysics, and that their attempt to formulate a regulative process for determining which metaphysical claims we should take seriously (in the form of the PNC) creates room for nearly any metaphysical project to be pursued given the possibility that it *might* aid some scientific hypothesis (if not in providing direct support for the hypothesis, then perhaps in helping us better understand which hypotheses we should not pursue). One might suggest that we drop 'might' from the stipulation. I believe this would undermine much of science, though. Much of science involves surprising routes and we would not want to undercut our future endeavors simply because we believe we have a good handle on what science will tell us in the future. For this reason, the 'might' clause allows room for science to continue its exploratory role.

Not all ontic structural realists endorse the idea that we should wait for science to tell us when a metaphysical claim will be useful. French (2014) invites us to "pillage" from metaphysics what we can make use of. This invitation indicates that verification is not our only source of vindication (a lesson to be adopted from the fall of logical positivism), but more work is needed to determine if this invitation is worth accepting.

To sum up: There are metaphysical projects that don't directly concern themselves with unifying the sciences or modeling the objective structure of reality. These metaphysical projects are still worthwhile. A method for distinguishing worthwhile metaphysics from others is still needed, something that I have not developed here. With these considerations, we come to realize that although radically naturalized metaphysics may not be the only kind of metaphysics worth doing, the allowance of other forms of metaphysics performs a greater service on its behalf.

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