

Eclectic realism—the proof of the pudding: a reply to Busch

Juha Saatsi

13th July 2008

Wordcount: 2912

Abstract

Eclectic realism is defended against the criticism in Busch (2007) by clarifying its terminological and conceptual basis, and by comparing it with structural and semirealism.

1 Introduction

Eclectic realism advocates a novel conceptual framework for approximate (or ‘partial’) truth in response to pessimistic induction over historical theory-shifts. The position is motivated by the intuition that the realist’s notion of approximate truth needs to be in a certain sense explanatory of the theoretical successes of false past theories. Saatsi (2005) attempted to spell out this motivation, and to articulate the framework by carefully working through a well-rehearsed case-study. In the absence of a lucid formulation from the first principles, some aspects of the framework remain ambiguous. Busch’s (2007) critical discussion usefully reflects on certain key issues to be sharpened in the first instance.

Saatsi (2005) charts new conceptual terrain between structure-oriented realism and entity-oriented realism. Eclectic realism focuses on properties that theories attribute to unobservable reality, and on the non-causal relationships of these properties; it can be well termed, as French (2006) does, *property-oriented* realism. In mapping out the framework I made use of some concepts that, although well-entrenched outside the scientific realism debate, are riddled with unfortunate terminological ambiguities. To clarify my position I will first attend to these ambiguities, and the respective misinterpretations evident in Busch’s discussion (§2). After that I will address the worries raised by Busch (§§3 and 4).

Three worries can be distilled from Busch’s critique. (1) The eclectic realist’s commitment to properties identified by ‘roles’ is not up to the required explanatory work. (2) My use of ‘multiple realisability of theoretical properties’ just amounts to the familiar idea of underdetermination by evidence, and instead of achieving a novel perspective on this, it is misleading at best. (3) In as far as eclectic real-

ism can be seen to differ from semirealism it collapses into (epistemic) structural realism. I maintain that all of these worries are idle.

2 Terminological preamble: roles, realisers, levels

There are three senses in which a property can be said to be ‘higher-order’. The first two senses are purely metaphysical, and *not* the senses I operate with in the present context. Firstly, we can speak of properties *of* properties, and so on. It should be clear that this sense is not meant by my usage of ‘higher-order’. In the second sense a higher-order (or ‘second-order’) property is the property of *having a (first-order) property such-and-such*, where *such-and-such* is typically specified functionally-cum-causally. This is the sense that Busch mistakenly attributes to me. A third sense of ‘higher-order property’ just taps into the phenomenon of multiple realisability. This sense is metaphysically neutral, and the sense I implied. Most property ascriptions, whether in science or everyday life, are multiply realisable in the simple sense that there is more than one way that the object of predication can be—more than one lower-level property that can be instantiated—so as to make the predication true by virtue of the lower-level property instantiated.¹ All determinables are higher-order properties in this sense, and so are all dispositions that are multiply realisable by their bases. And so are, I argued, the properties that Fresnel’s theorising got right. To make it explicit that we are not talking here about either properties *of* properties, or about second-order properties in the second sense (viz. ascribing existential generalisation), perhaps it is better to call multiply realisable properties in this third sense *higher-level* properties. I will use this from now

¹Different metaphysical frameworks will, of course, tell different stories about what ‘true predication of a higher-order property’ ultimately amounts to.

on.

My use of ‘higher-level’ vs. ‘lower-level property’ is metaphysically neutral. For example, I don’t take a stand here on whether dispositions are related to their bases as ‘role-functionalism’ would have it (Jackson et al., 1982), as opposed to how ‘realiser-functionalism’ would have it (Armstrong, 1973, pp. 14–16). Or perhaps some other way (Mumford, 1998).² Whichever way we construe dispositions metaphysically, we acknowledge that *being soluble* is multiply realisable in the above sense by different molecular structures, and hence it is in my sense a higher-level property realised by different lower-level properties. My use of ‘role’, ‘realiser’, etc. is correspondingly metaphysically neutral, and just taps into this undeniable multiple realisability of properties.

With this terminological preamble out of the way, let me now address Busch’s concerns about eclectic realism.

3 Clarifying the conceptual machinery

The eclectic realist is committed to realism about certain higher-level properties identified by their causal-nomological roles. These are properties that crucially feature in a theoretical derivation of some novel empirical result. On the other hand, the eclectic realist need not be committed to realism about some other, lower-level properties that may figure in a theory, namely those properties hypothesised

²Busch erroneously frames Saatsi (2005) as advocating the standard (second-order property) view of dispositions. Incidentally, his challenge to me, and ipso facto to the standard view itself—‘how are causally impotent dispositions classified by their causal role’—is reminiscent of Mumford’s worry of the standard view (1998, p. 142). This worry gets nicely clearer up in Hawthorne & Manley (2005, pp. 187–188).

as realising those roles.³ In order to represent *substantial* realist commitment, the eclectic realist's talk of properties-identified-by-their-roles must fulfil at least the following two desiderata: they must (a) stand for some objective facet of the unobservable reality, and (b) be explanatory, in some sense.

Busch is apprehensive about both desiderata. Regarding (a), Busch worries that it is not clear 'in what sense Saatsi's realist position is different from an anti-realist characterisation of science' (2007, p. xxx), and even if eclectic realism doesn't collapse into anti-realism, it is not clear 'how Saatsi has managed to produce anything other than a version of epistemic structural realism' (2007, p. xxx). Regarding (b), Busch worries that the proposed characterisation of realist commitments is not up to the required explanatory work. I will address (b) in this section, and (a) in the next one.

The worry about the explanatory credentials of higher-level properties derives from well-known puzzles about the causal efficacy, and hence about the explanatory relevance of higher-level properties in general. These puzzles are best known in the context of philosophy of mind, and of dispositions more generally. Did my mental state of wanting to write a response to Busch (or some underlying microphysical state) *cause* the keys of my keyboard being pressed? ('downward causation') Can we causally *explain* the keys of the keyboard being pressed by this mental state (as opposed to some underlying microphysical state)? These and related questions have generated a gargantuan literature, but nothing like a consensus. Furthermore, such puzzles regarding causal and explanatory status of higher-level

³Some presentations of the theoretical assumptions involved might make more explicit reference to the lower-level properties, and less explicit reference to the higher-level properties that the lower-level property ascriptions entail. The realist is encouraged to carefully filter out those properties that are effectively operative in the (typically at least in part mathematical) derivation.

properties go well beyond psychological properties and dispositions, and they arise *regardless* of how higher-level properties are construed metaphysically! (Jackson & Pettit, 1990) But how relevant is this for my proposal? Exactly what kind of explanatory work must be accomplished by higher-level properties in the present context?

There are couple of reasons why general worries about causal and explanatory impotence of higher-level properties do not get much purchase here. Firstly, and most importantly, we must bear in mind that ‘explanatory’ in ‘explanatory approximate truth’ refers to *realist explanations* of the success of science. These are *philosophical* explanations, not scientific ones, and not naturally construed as causal explanations at all.⁴ If the concept of higher and lower-level properties latches onto a feature of reality—which is something all parties presumably agree on—then the concept may play a useful role in philosophical analysis and explanation. Secondly, there are plenty of cogent and *prima facie* undeniable explanations in science and everyday life that correspond to higher-level regularities in the world. (Jackson & Pettit, 1990) Putnam’s geometrical explanation of why a certain round peg does not fit in a certain square hole is still one of the best, intuitively most pulling examples (1975, pp. 295–297). This explanation latches onto geometrical properties that are naturally construed as higher-level properties, realised by innumerable lower-level physical configurations each one which is causally explanatory. Jackson and Pettit (1990) argue that *most* of our everyday and scientific explanations are such ‘program explanations’; they then put forward a general perspective to accommodate

⁴For example, Worrall’s structural realist position has not been challenged, and should not be challenged, on the basis of *structure* potentially not being causally-cum-scientifically explanatory. Rather, it has been challenged by questioning whether the structural realist explanation of the success of past theories is a good one.

our strong intuition that such explanations really are explanatory.⁵ Furthermore, to clear any lingering whiff of question begging here, I simply deny that the onus is on the eclectic realist to account for these data regarding our explanatory practices. A natural conceptual framework can be legitimately employed to solve one philosophical problem, prior to solving all the other puzzles relating to that conceptual framework.

There is a related issue regarding how my notion of multiple realisability compares with the notion typically found in the literature on philosophy of mind and metaphysics. Busch worries that I have illegitimately appealed to the notion of multiple realisability, when I'm really just trading on (a kind of) underdetermination.

It is not the case that the various roles are *actually* realised by different realisers; rather, the thought is that it is consistent with Fresnel's equations, for example, that they are realisable in different mediums. . . . That is not the same as suggesting that what realises the higher order explanatory properties is multiply realised. Rather, he should say that it is *underdetermined*. (Busch, 2007, p. xxx, my emphasis)

As far as I understand, the worry is that multiple realisability, properly construed, only applies to higher-level properties that are realisable by different lower-level properties in the *actual* world, and in the case of light, for example, only the lower-level properties of the electromagnetic field are *actual* realisers. Hence the lower-level properties of ether, as theorised by Fresnel, are not realisers *at all*.

⁵Incidentally, their perspective entails a response to Busch's specific worry that the standard (second-order property) view of dispositions—a view which originates in Jackson et al. (1982)—cannot accommodate explanatory use of disposition ascriptions.

Rather, all we have is a kind of underdetermination relative to the evidence that isn't enough to discern between the ether and the electromagnetic theories (i.e. evidence which takes into account neither the problems of the ether model, e.g. its inconsistency, nor the independent successes of the electromagnetic theory, etc.).

My use of multiple realisability indeed does not require (the nomological possibility of) different realisers in the *actual* world. Rather, it is enough that it is *epistemically possible* that a certain property is instantiated by virtue of some other properties being instantiated. Given the level of abstractness of the success-fuelling properties, there are several epistemically possible scenarios about the properties by virtue of which the success-fuelling properties are instantiated. But why isn't this a form of multiple realisability? There are many ways the world could be, for all we know (given certain evidence), that equally entail the instantiation of the success-fuelling properties.⁶ This is a form of underdetermination, of course, but I maintain that the conceptual framework of eclectic realism provides a useful novel perspective that doesn't hinder the debate but advances it.

4 The Charybdis of semirealism; the Scylla of structuralism

Let's now move on to the other desideratum on the proposed characterisation of realist commitments: multiply realised success-fuelling properties must stand for some objective facet of the unobservable reality. And they quite blatantly do! There

⁶An important point: the lower-level properties consistent with the success-fuelling properties are consistent *not only* with Fresnel's equations, but also with the logico-mathematical *derivation* Fresnel employed to arrive at these equations. We are talking about the explanatory approximate truth of Fresnel's theorising, not of the final product of his theorising.

are important properties of light that Fresnel's theorising got right, properties which are most certainly unobservable. The eclectic realist appeals to (some of) these properties in *philosophically* explaining Fresnel's success in the face of the various false assumptions he made. The eclectic realist is committed to other theories latching similarly onto reality: their novel predictive success is (at least by and large) down to this. No anti-realist could agree with this.

This leaves the question of whether there is anything novel to eclectic realism, apart from the name. Since I situated (and to an extent modelled) my position with respect to Chakravartty's semirealism and Worrall's structuralism, one can question whether eclectic realism represents a genuine alternative to both.⁷

In as far as Worrall's (1989, 1994) structural realism is concerned, the answer seems clear. Eclectic realism trades explicitly on properties and hierarchies of properties in particular. Structural realism does not. Eclectic realism carefully spells out (by looking at Fresnel's *derivation*) how the sense in which Fresnel's theory is approximately true is philosophically explanatory vis-à-vis Fresnel's predictive success. Structural realism does not. Only by completely ignoring these differences can it be 'very hard to see how Saatsi has managed to produce *anything other* than a version of epistemic structural realism.' (2007, p. xxx)

How about semirealism? Here things get more subtle, but again there is an unambiguous, crucial difference to be stressed. The key distinction for eclectic realism is between the explanatory, higher-level properties, on the one hand, and their realisers, on the other. This distinction has obvious affinity with Chakravartty's dis-

⁷It is a moot question whether my position represents "merely" *a way of articulating* and elaborating on the ambiguities of structuralism, say, as opposed to a position wholly incompatible with the intuitions and conceptions of the structuralist school. Ditto the terminological question whether eclectic realism 'is a *version* of structuralism'. After all, according to Chakravartty semirealism is a form of structuralism.

inction between *detection* and *auxiliary* properties, but the realist should resist the idea that explanatory properties necessarily tie in with causation and possibility of detection in the way that Chakravartty has it:

Detection properties are causal properties one has managed to detect; they are causally linked to the regular behaviours of our detectors. . . . Detection properties are . . . the properties in whose existence one most reasonably believes on the basis of our causal contact with the world. . . . An auxiliary property is one . . . regarding which one has insufficient grounds, on the basis of our detections, to determine its status. (2007, p. xxx)

Let's consider Fresnel's theory, again. What are Chakravartty's detection properties exactly, and what are the relevant causal links and detections? Chakravartty (2007) focuses purely on Fresnel's famous equations (completely ignoring the various equations that Fresnel employed in his derivation of these) which he interprets as describing relations between dispositions. Detection properties, says Chakravartty, are those dispositions required to give a 'minimal interpretation' of these equations; namely 'intensities and directions of propagation' (2007, p. xxx). That is, from Fresnel's equations we can read off various dispositions that light has: suitably prepared (i.e. directed, intensity-adjusted) polarised light at a spatial location x has the disposition to cause such-and-such detections (vis-à-vis directions and intensities) at a spatial point y , if x and y are spatially related in such-and-such way to an interface of two transparent media.

If these dispositions are all the commitments the semirealist recommends to Fresnel, then semirealism is a rather diluted form of realism indeed! So pre-

cious little is said of the detection dispositions that it is hard to see why an empiricist could not simply follow suit (offering an empiricist understanding of ‘disposition’, ‘direction’, and ‘intensity’, of course). If the continuity between Fresnel and Maxwell—the continuity that is arguably explanatory of Fresnel’s predictive success—boils down to this, then I don’t see what there is to recommend a metaphysically-laden semirealist reading over an empiricist one. Too little is said of the properties that underlie the phenomenon to give us a realist understanding of Fresnel’s predictive success.

By comparison, eclectic realism recommends Fresnel more substantive commitments. The crucial, explanatory properties of light vis-à-vis Fresnel’s theorising are identified in part by the non-causal continuity/symmetry constraints that Fresnel so effectively employed, and these properties *cannot* be read off from Fresnel’s equations. Eclectic realism looks at Fresnel’s theorising over and above Fresnel’s equations, and finds explanatory correlates which do not conform to Chakravartty’s mould of causal, detection-related properties. Hence eclectic realism, committed to *explanatory* approximate truth properly understood, cannot accord with Chakravartty’s characterisation of realist commitments:

The realist should expect to retain only those structures required to give a minimal interpretation of the mathematical equations used to describe well-established practices of detection, intervention, manipulation, and so on. (2007, p. xxx)

In general, there is no reason why causal connections cannot play a role in the identification of explanatory properties, but they clearly don’t have to play such an exclusive role.

5 Conclusion

Admittedly more case-studies are needed to complete the picture of the benefits and potential limits of the framework defended here. Ideally, the key concepts would also be articulated from the first principles. But I firmly maintain that as far as the Fresnel-Maxwell theory-shift is concerned, eclectic realism makes the best realist sense of the subtle theoretical details involved. The proof of the pudding is in the eating.

References

- Armstrong, D. (1973). *Belief, Truth and Knowledge*. Cambridge University Press, Cambridge.
- Busch, J. (2007). Eclectic realism – a cake less filling. *Studies in History and Philosophy of Science*, this issue.
- Chakravartty, A. (1998). Semirealism. *Studies in History and Philosophy of Science*, 29A(3):391–408.
- Chakravartty, A. (2007). *A Metaphysics for Scientific Realism*. Cambridge University Press, Cambridge.
- French, S. (2006). Structure as a weapon of the realist. *Proceedings of the Aristotelian Society*, 106:1–19.
- Hawthorne, J. and Manley, D. (2005). Critical review of s. mumford's dispositions. *Noûs*, 39:179–195.
- Jackson, F. and Pettit, P. (1990). Program Explanation: A General Perspective. *Analysis*, 50:107–117.
- Mumford, S. (1998). *Dispositions*. Oxford University Press, Oxford.
- Prior, E., Pargetter, R., and Jackson, F. (1982). Three Theses About Dispositions. *American Philosophical Quarterly*, 19:251–257.

- Saatsi, J. T. (2005). Reconsidering the Fresnel-Maxwell case study. *Studies in History and Philosophy of Science*, 36:509–538.
- Worrall, J. (1989). Structural Realism: The Best Of Both Worlds? *Dialectica*, 43:99–124.
- Worrall, J. (1994). How to Remain (Reasonably) Optimistic: Scientific Realism and the “Luminiferous Ether”. In Hull, D. and Forbes, M., editors, *PSA 1994*, volume 1, pages 334–342. Philosophy of Science Association, East Lansing.