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INTRODUCTION: SCIENTIFIC REALISM AND COMMONSENSE

1. SCIENTIFIC REALISM

Scientific realism involves two key claims. First, science aims primarily at truth. Second, we can justifiably believe that our successful scientific theories achieve, or at least approximate, this aim. The contemporary scientific realism debate turns on the acceptability of these claims. To acquire a more robust picture of scientific realism, let us identify some of the related theses on which these key claims rest.

In opposition to, say, solipsists, the scientific realist insists that there exists an 'external' world with which we interact. Contra social constructivists, the scientific realist holds that this world includes events, processes, and/or entities that are not contingent on our beliefs. Scientific realists take truth to be objective and to express a correspondence relation between statements and the world. Such a conception of truth is often juxtaposed against those conceptions espoused by internal realists (e.g., Hilary Putnam, Brian Ellis).¹ Opposing idealists such as Berkeley, the scientific realist maintains further that we can be justified in believing that the objects we observe exist and that our basic claims about their observable properties are true. In contrast to classical instrumentalists, such as Ernst Mach, positivists (e.g., Moritz Schlick, Rudolph Carnap), as well as fictionalists, operationalists, and phenomenologists, the scientific realist construes scientific theories literally; most terms contained in scientific theories are intended to refer to real entities.² Scientific realists hold that, in general, theory change in science has been rational and progressive. Moreover, scientific realists tend to espouse the view that progress in science is determined by the extent to which its primary aim is achieved (or approximated).

These tenets of scientific realism collectively serve to provide a framework within which the *contemporary* debate on scientific realism takes place. Most prominent contemporary opponents of scientific realism

— such as Bas van Fraassen and Larry Laudan — do not criticize this framework. Rather, the *contemporary debate* on scientific realism hinges primarily on the axiological and epistemological claims noted above. These can be made more explicit:

Axiological (Scientific) Realism: science aims, primarily, to express true statements about the world.

Epistemic (Scientific) Realism: we can be justified in believing that successful scientific theories are (approximately) true.

The majority of philosophers involved in the scientific realism debate assume that axiological realism rests on epistemic realism. In fact, so long as we take science to be successful, progressive, and rational, and so long as progress is determined by the achievement of (or the degree to which we approximate) our primary aim, truth, a defence of epistemic realism is required of any scientific realist. For this reason, the contemporary debate on scientific realism is, by and large, played out in the arena of epistemic realism.

So long as we interpret scientific theories literally, as the scientific realist advises, epistemic realism entails the claim that we are justified in believing that unobservable entities postulated by our successful theories exist. The type of inference that scientific realists usually put forward to support such a claim can be expressed as follows: The existence of an unobservable entity, U, (e.g., the electron) is the best explanation for the observable phenomena, O (e.g. observed electrical phenomena); therefore, we are justified in believing that U (e.g. the electron) exists. An argument of this sort is called an *inference to the best explanation* (IBE). It is generally thought to be the mode of inference that grounds or provides justification for epistemic realism.

Although IBE is employed to support our belief in the existence of unobservables, scientific realists maintain that it is not an ‘exotic’ mode of inference, utilized only by philosophers. They contend that scientists themselves employ IBE. In fact, realists tell us, IBE plays an integral role in our commonsense reasoning. Bas van Fraassen (though a non-realist) provides a nice example:

I hear scratching in the wall, the patter of little feet at midnight, my cheese disappears — and I infer that a mouse has come to live with me. Not merely that these apparent signs of mousely presence will continue, not merely that all the observable phenomena will be as if there is a mouse; but that there really is a mouse. (van Fraassen 1980, pp. 19-20)

Scientific realists seek to justify belief not merely in the existence of particular entities but in the (approximate) truth of our scientific theories. Toward this end, they typically apply a robust version of IBE. This is the ‘no-miracles argument’, made famous by Putnam (1975) — also known as the ‘miracle argument’, the ‘success argument’ and the ‘ultimate argument’ — if our successful scientific theories were not at least approximately true, then their success would be a miracle. In other words, so long as we do not accept miracles as explanatory,³ the *only* (and thus the best) explanation for a theory’s success is that the world is as the theory says it is. If we accept this argument, we appear to be led to epistemic realism. And since the belief that our theory is (approximately) true entails the belief that the entities postulated by the theory exist, the no-miracles argument justifies the latter in so far as it justifies the former. Thus the no-miracles argument warrants a far greater range of beliefs than would be warranted by any specific inference to the existence of an unobservable entity.

Along with Alan Musgrave (1988), one could consider the no-miracles argument, as stated thus far, to be more akin to a slogan than an argument. Noting this, we are prompted to explicate it more precisely. Scientific realists typically claim that IBE is abductive, abduction being a form of reasoning famously articulated and advocated by C.S. Peirce (1958). Peirce construes abductive reasoning in the following way. We begin with a ‘surprising’ observation, (Q). A state of affairs is postulated, and that postulate, (P), would render (Q) ‘a matter of course’. We conclude that ‘we have reason to suspect’ that (P) obtains (1958, p. 189).

While scientific realists often tip their hats to Peirce, when presenting the no-miracles argument, the way in which it is to be expressed as a Peircian abduction is neither obvious nor generally explicated. We can begin by inserting the central realist claims into Peirce’s argument. The scientific realist wants to direct our attention to the ‘surprising fact,’ (Q), that we have successful scientific theories. According to scientific realists, if our theories were (approximately) true, (P), then (Q) would be ‘a matter of course.’ The epistemic realist draws a bolder conclusion than that drawn by Peirce. The epistemic realist infers, not merely that ‘we have reason to suspect’ (P), but that we *are justified in believing* (P). This extra step might be legitimised if the epistemic realist can show that (P) is probable. But on what grounds does the epistemic realist base such a claim? Namely, her assertion that, aside from (P), the only state of affairs that could bring about (Q) would be a miracle. With this key premise of the no-miracles argument, we are closer to formulating that argument as an abduction. However, at least a few more hidden premises must be made salient.

- 1: Our theories are successful, (Q)
- 2: If our theories were (approximately) true, (P), then their success, (Q), would be a matter of course
- 3: The relationship expressed in (2) shows that the (approximate) truth of our theories, (P), provides an explanation of their success, (Q)
- 4: In fact, the (approximate) truth of our theories, (P), provides a *good* explanation of success, (Q)
- 5: To say that success, (Q), occurs due to a miracle is to provide no explanation at all
- 6: Aside from the (approximate) truth of our theories, (P), there is no other explanation available for their success, (Q)

Therefore, (probably) our theories are (approximately) true, (P)

Therefore, epistemic realism: we are *justified in believing* that our successful theories are (approximately) true, (P).

Though it is a start, this modified abductive argument does not exhaust the list of presuppositions involved in the no-miracles argument. Premises (3), (4), and (6) surely need further clarification and support. And even including our new premises and their requisite support, the full set of premises would *entail* neither the initial, nor the subsequent, conclusion. We are not *logically compelled* to infer from a phenomenon to its explanation, even if that explanation is the only one available. The argument, as a whole, is not deductively valid.⁴ The scientific realist will grant this and will remind us that certainty about the world of experience is an unattainable demand. The argument is only meant to ground epistemic realism. It doesn't tell us what we can be certain of, but only what we can be justified in believing. And again, says the scientific realist, it receives its legitimacy from its use, not only in science, but in everyday life.

We have thus far been considering rather basic formulations of epistemic realism and the no-miracles argument. We can now note that scientific realists have introduced a number of variations of this inferential package. Some appeal to *truth* as the explanation of success (e.g., Wilfred Sellars (1962); André Kukla (1997)), while others appeal to *approximate truth* (e.g., Hilary Putnam (1975); Richard Boyd (1973)). Some claim that truth (or approximate truth) is the *only* possible or available explanation for success (e.g., J. J. C. Smart (1968); Putnam (1975)). Others (most contemporary scientific realists) claim the truth or approximate truth of our

theories to be the *best* explanation of success. Some scientific realists understand that which is being explained as *the success of a given theory* (e.g., Smart (1968); Musgrave (1985); Peter Lipton (1993), (1994)), while others see that which needs to be explained as being *the success of science in general* (e.g., Putnam (1975)). Some appeal to *general predictive success* (e.g. Putnam (1975); Boyd (1973); W. H. Newton-Smith (1981)), while others emphasize *novel success* (e.g., William Whewell (1840); Musgrave (1985), (1988); Lipton (1993), (1994); Stathis Psillos (1999); Howard Sankey (2001)). Some say we are justified in believing theories as wholes, while others focus on certain constituents of those theories (e.g., Philip Kitcher (1993), Psillos (1999); Sankey (2001)).

It is noteworthy that many scientific realists see their philosophy to be an 'overarching empirical hypothesis.' Scientific realism is taken to be an empirically testable position that shares the virtues of a scientific theory. Acknowledging this, we can clarify epistemic realism further. Epistemic realism is the thesis that we can be justified in believing the *hypothesis* that our successful scientific theories are (approximately) true.

With a framework in hand for understanding the position of scientific realism let us identify three important contemporary objections to that position. One is directed at the no-miracles argument specifically. Some non-realists contend that the scientific realist has put forward a false dichotomy. In seeking an explanation for the success of scientific theories, we need not make a choice between appealing to miracles and inferring that our theories are (approximately) true. Alternative explanations are available (challenging premise 6 above). For example, van Fraassen (1980) presents a Darwinian alternative: success is a requirement for a theory's survival; we simply wouldn't have retained our theories were they not successful. Other alternatives are offered by Laudan (1985), Rescher (1987), Fine (1984), Lyons (this volume), Worrall (1989), and Carrier (1991); (1993). Such alternative explanations deflate the motivation for inferring the epistemic realist hypothesis. They thus cut at the heart of epistemic realism. In reply, the epistemic realist often claims that (approximate) truth provides a *better* explanation than the non-realist contenders. Or she draws attention to a new 'surprising fact' (e.g., to novel success) and denies the non-realist's ability to explain it.

Another non-realist argument is the argument from the underdetermination of theories by data (Duhem (1906), Quine (1975), van Fraassen (1980)). In its basic formulation, this argument proceeds as follows. Any successful theory will have a high (if not infinite) number of empirically equivalent, yet incompatible, rivals. Since each of these rivals will share the empirical success of our preferred theory, we cannot be justified in

believing one theory over the others. So, despite the success of our preferred theory, we cannot be justified in believing that it is true. In response, some scientific realists deny that we can generate empirically equivalent rivals for every theory. The debate on this matter continues (see, for instance, Kukla (1997)). Another realist strategy is to argue that empirical success is not the only epistemically relevant virtue. We can still select among our theories by appeal to supra-empirical virtues such as simplicity. Non-realists challenge the assumption that these supra-empirical virtues bear on truth (e.g., van Fraassen, (1980)), thus questioning whether they can be legitimately employed as a justification for belief.

A third important non-realist argument is historical. This argument takes seriously the claim that scientific realism provides an empirically testable hypothesis. It begins with a list of successful theories that cannot, by present lights, be construed as true, or even approximately true. The most commonly discussed version of this argument is known as the pessimistic meta-induction: we have had many successful theories that have now turned out to be false; so our present-day theories will be likely to turn out to be false as well (Putnam (1984); Rescher (1987); Laudan (1977)). A second version involves employing the list, not as fuel for an induction toward the falsity of our theories, but as a set of empirical data that directly counters scientific realism. (See Laudan (1981), as interpreted by Lyons (this volume).)

This edited collection contains a number of papers that engage in contemporary debates about scientific realism in one way or another. Some participants in debates about scientific realism have sought compromises between scientific realism and full-blown antirealism. One possible compromise is to adopt realism about the existence of some of the entities described in scientific theories, without grounding that realism in realism about the truth of scientific theories. This form of compromise is known as entity realism. Entity realism is typically grounded in an epistemology that privileges truth claims that are based on experimental manipulation. Robert Nola considers two explanationist arguments toward such a realism: a variation of the no-miracles argument and an inference to the most probable cause. Nola seeks, however, to extend realism further, arguing that we are justified in believing in the existence of some non-manipulated entities. He contends that, while explanationist arguments may prove inadequate in respect to such entities, there remains a strong probabilistic argument that will, in the appropriate circumstances, lead us to realism about both manipulated and non-manipulated entities. While other entity realists, such as Nancy Cartwright (1983), have considered themselves to be opponents of scientific realism, Nola offers us a means to bridge the gap between entity

realism and theory realism. Along with Cartwright (1983), Steve Clarke (2001) defends an entity realism about manipulated entities while rejecting realism about fundamental scientific theories. Here he continues to make a case for an entity realism, which remains unreconciled with scientific realism, defending Nancy Cartwright's account of entity realism in the face of criticisms of it due to Alan Chalmers.

Harold Kincaid argues that both sides of the realist debate employ, at least tacitly, the following assumptions: the rules of scientific inference are global and the justification for these rules is philosophical. He challenges these assumptions by way of an in-depth adjudication between Bayesians and error-statisticians: He contends that both statistical approaches require the case-by-case assessment of empirical factors, the relevance of which has been largely unacknowledged. Drawing on his findings here, he proposes, an alternative form of scientific realism that is contextualised to particular domains and requires domain-specific empirical data.

Timothy Lyons criticises a variety of truth-based formulations of scientific realism. He clarifies the nature of the threatening historical argument against realism and makes explicit the implications that hold at each level of realism. He shows that numerous novel successes have come from false theories, thus that the realist's frequent appeal to novel success does not solve the historical problem. He also considers an alternative explanation for success, and challenges the key explanatory premise of the realist's argument, as it stands once the realist retreats to approximate truth. Strengthening the evidence for the historical argument against realism, Keith Hutchison undertakes an in-depth case study of W. J. M. Rankine's oft neglected, yet surprisingly successful, 19th century vortex theory of heat. Against a sophisticated form of the no-miracles argument, he contends that Rankine's theory contains a number of false theoretical claims that were centrally employed in the derivation of its successful predictions.

Putnam's no-miracles argument, in its full formulation, is carefully unpacked by Michel Ghins. Preferring a philosophically grounded realism, Ghins argues against realists, such as Putnam, who construe their position to be scientifically or naturalistically grounded. Realism does not have the status of a scientific theory; for, among other problems, according to Ghins, truth is not explanatory. John Wright identifies three surprising features of science that seem to call for explanation: the surprising novel successes of our theories; the true descriptions of parts of the world that were, at the time described, unobserved; and the extended empirical success of theories that are initially preferred for their a priori preferable properties. He works his way through a series of proposals that have been, or might be, put forward to explain these phenomena, and he contends that none are suited to the

task. Brian Ellis articulates a metaphysics for a specific type of scientific realism, which he calls a causal process entity realism. Along the way, he employs his own version of the no-miracles argument to justify the view that the world has a natural kind structure. Our discussion of the papers in this volume will be continued below.

We have seen above that, underlying the scientific realism debate, are a number of foundational tenets. Some of these are essential to our commonsense conception of reality, for instance, the thesis that we interact with an 'external' world and that our basic beliefs about observable entities are warranted. Also, we have seen that the scientific realist draws on commonsense in her attempt to legitimise abduction, the mode of reasoning on which her position rests. We now attend more directly to commonsense.

2. SCIENCE AND COMMONSENSE

We can understand commonsense as the conceptual framework that ordinary people share. It is the set of, often implicit, assumptions that the majority utilise when they interpret the world and the behaviour of their fellows. We do not believe that everyone has commonsense, but nor do we believe that commonsense is in short supply. Commonsense has two main components.⁵ First, it involves a strident form of naive realism. If we see and feel a wooden table in front of us, then it is plain commonsense to believe that a wooden table exists, which we are seeing and feeling. Second, commonsense involves the acceptance and utilisation of the psychology of rational agency, both for self-description and for the interpretation of the behaviour of others. It is commonsensical to believe that people's behaviour is, in the main, goal oriented and that the structure of an individual's beliefs and desires can be appealed to in order to explain why they do what they do. The belief that newspapers can be purchased at newsagencies and the desire to have a newspaper are appealed to by commonsense to explain why a person went to a newsagency and bought a newspaper.

Because commonsense involves a commitment to the mind-independent reality of objects in the world it is most directly opposed to skeptical and idealist antirealisms. The best known advocates of commonsense in the history of philosophy, Thomas Reid (1710-1796) and G. E. Moore (1873-1958), are also mostly concerned to oppose idealist and skeptical arguments. Reid and his followers, the Scottish Commonsense School, develop arguments to buttress the metaphysical stance of commonsense, and to expose the weaknesses of Humean skepticism and Berkeleyan idealism. Moore, who was most directly opposed to the idealism of Bradley and other

British idealists, did not so much elaborate the naive realism of commonsense, as exemplify the force of appeals to commonsense and the concomitant weakness of philosophical arguments that opposed commonsense. Famously, Moore's method of refuting skepticism was to hold up his hand and say 'here is a hand'. In effect, Moore argued that we are more confident that we are in possession of hands, when we see and feel them, than we could be confident of the force of any possible philosophical argument that defies our commonsensical judgement that we have hands.

Science conceptualises the ordinary objects and agents of the world very differently from commonsense. Where commonsense assures us that there is a solid wooden table in front of us, physicists tell us there exists a lattice of microscopic particles, punctuated by comparatively large areas of empty space. Where commonsense tells us that rational agents act on their beliefs and desires, science tells us that brain events take place that cause their actions. Philosophical defenders of commonsense do not dismiss science in the same way that they dismiss anti-realist metaphysics. They typically argue for the compatibility of science and commonsense, insisting that the table of commonsense is, despite appearances, identical with the table of physics. But even a cursory knowledge of current science ought to make us aware that this compatibility is far from unproblematic. Physicists tell us that the fundamental particles of physics are not the small, solid, enduring, spatio-temporally located particles of commonsense, but are in fact a mixture of particles and waves vaguely distributed through a region. It is not obvious that this scientific conception of matter can be fully reconciled with the commonsense conception of matter.

Wilfrid Sellars is one philosopher who doubted that commonsense and science could be fully reconciled. He suggested that commonsense should give way to science in so far as the two prove to be incompatible. The argument is to be found in his highly influential essay, 'Philosophy and the Scientific Image of Man' (Sellars 1962). There he argues that we possess two unreconciled 'images' of man-in-the-world. These are the 'manifest image', and the 'scientific image'. Sellars deliberately chose the word 'image' because it is 'usefully ambiguous' (1962, p. 41). However, since he holds that the aim of philosophy is to '... understand how things in the broadest possible sense of the term hang together in the broadest possible sense of the term.' (1962, p. 37), it would seem that an understanding of the two images as world-views, or explanatory frameworks, cannot be too far from what he intends.

Sellars' manifest image is not commonsense itself, but the refinement of commonsense that philosophers and other intellectuals have developed over the centuries. Sellars regards most philosophy as being in the business of

refining the commonsense view of the world. He nominates the work of analytic philosophers influenced by the later Wittgenstein as being the philosophy that has 'increasingly succeeded in isolating [the manifest image] in something like its pure form' (1962, p. 51). If the manifest image were to have to be modified or discarded due to the influence of science, then, because the manifest image is a refinement of commonsense, it appears that we would have to modify or discard commonsense along with it.

The scientific image is not science itself, but our current conception of the world that science makes present to us. The scientific image is an image of a world of microscopic particles and fields and forces, obeying statistical laws. The scientific image accounts for the manifest image, but only to an extent. We can provide a scientific explanation for why the sun appears red when it sets: The light rays, which we observe, are emitted by the sun at particular frequencies; these are frequencies that are then affected by the Earth's atmosphere in different ways, depending on their particular angles relative to the Earth's surface. By accepting this explanation we appear to sacrifice our ability to provide an account of the phenomenal character of redness, as it is experienced by us, in terms that are unified with the terms used in our explanation of the behaviour of light. Similarly, an explanation of how mental activity is caused by brain events is not in itself an explanation of our own experiences of conscious deliberation. It seems that some of the most important qualities of the manifest image have no counterparts in the scientific image.

We might, as scientific realists often hope, be able to integrate the manifest and the scientific images, or we might reject one in favour of the other. Currently, though, we do neither of these things. Instead we flit back and forth between the two unintegrated images. When we look at a sunset we admire the beauty of its rich red hues. When we explain the appearance of the sunset we are satisfied to say that, for most people, redness happens to covary with a complex of particular frequencies of light. The manifest image and the scientific image observe an uneasy truce, but it is not obvious that this truce can last in the long term. As the scientific image comes to assume an ever greater importance to us, it becomes ever more tempting to reject those aspects of the manifest image with which it cannot be reconciled. Eliminativist philosophers, such as the Churchlands (1998), urge us to give in to this temptation. If commonsense talk of belief and desires has no apparent place in the scientific image, so much the worse for talk of beliefs and desires, according to eliminativists. Better, they maintain, that we retrain ourselves to describe our inner life in the scientific language

of brain science, than remain trapped by the archaic language of the manifest image.

In recent times the reputation of commonsense reasoning has been undermined, to an extent, by the investigations of psychologists. Reid assured us that the reliability of 'natural judgement' is self evident; however Tversky and Kahneman's examinations of lay judgments in statistics appear to demonstrate that, left to its own devices, natural judgement will lead to a disturbing variety of statistical errors. For example, natural judgement is guilty of continually overestimating the likelihood of conjunctive events and continually underestimating the likelihood of disjunctive events (Tversky and Kahneman, 1974). Social psychologists, such as Ross and Nisbett (1991) allege that our natural judgments about our fellows are systematically in error. We persistently suppose that the personalities of other people make a greater causal contribution to their behaviour than available evidence suggests. A third area in which natural judgement has been found wanting, by psychology, is in folk physics. Our natural judgement is that, if we impart a force on an object by tying it to a string and accelerating it in an arc, it will continue to move in an arc when we let go of the string (McCloskey 1983). It is no surprise that natural judgement does not accommodate the deep mysteries of quantum mechanics. However, it comes as something of a shock to discover that natural judgement has not even managed to accommodate itself to Newtonian mechanics, remaining partially in the grip of a naive impetus theory of motion.

Against those who charge that the natural judgment of commonsense is importantly defective, there are two main lines of defence. The first is to reject the coherence of the charge. Davidson (1984), and those influenced by him, argue that, in order to meaningfully interpret behaviour at all, we have no choice but to assume that others are substantially rational and that their beliefs are for-the-most-part true, as are our own. If Davidsonian views about interpretation are right then it seems that there is no possibility of consistently mounting an attack on the rationality of commonsense. We are trapped into believing that commonsense judgments are rational, on pain of undermining our own claims to be arguing rationally.⁶

The second line of defence, which has been pursued by Gigerenzer et. al. (1999), is to downplay the importance of the various experiments that purport to demonstrate significant failures of human reasoning. Our performance in solving some abstract problems has been shown to be poor, but the extent to which these failures are representative of human reasoning in situations that we actually encounter is an open question. It may be that our

failures in abstract experimental situations are the minor side effects of heuristics that enable us to succeed in solving real-life problems.

Science began as an extension of commonsense, and it retains strong continuities with commonsense reasoning. Scientists are typically not trained to practice methods that are at odds with commonsense. However, science gives us a platform from which to challenge our commonsense judgements. Perhaps commonsense will turn out to be a ladder that we discard once we fully embrace the scientific image. As science develops, so does the scientific image, and so do tensions between it and the manifest image. So too do threats to the reputation of commonsense psychology and to the plausibility of commonsense realism.

In part, contemporary science is in conflict with commonsense. Because scientific realists seek to justify our belief in the claims of successful science, contemporary scientific realism also runs into conflict with commonsense. However, scientific realism is committed to the commonsensical view that there are mind-independent objects residing in an 'external' world; and the proponents of scientific realism appeal to commonsense practices to justify their use of abduction. So there is a tension in contemporary scientific realism. Scientific realism both conflicts with and relies on commonsense. It is becoming increasingly important for scientific realists to address this tension and clarify the extent to which they remain committed to the conceptual framework and inferential methods of commonsense.

The theme of the enduring place of commonsense reasoning in science, and indeed in debates about scientific realism, is exemplified in several of the papers in this collection. Harold Kincaid argues that the case for realism in given domains of scientific practice is one that is established contextually. This is because, he holds, scientific inference is empirical and social in ways that are not captured by the 'logic of science' ideal. If Kincaid is right that there is no universal logic of science, then it would appear that scientific inference cannot, in general, be sharply distinguished from commonsense reasoning.

Robert Nola defends the commonsensical appeal to manipulability as a mark of the real, as does Steve Clarke (2001). This appeal is at the heart of most cases for entity realism. Entity realism is commonly associated with Ian Hacking's (1983, p. 23) catchcry, 'if you can spray them then they are real', however its roots lie in the anti-theoretical traditions of pragmatism and in the commonsensical reaction to Berkeley's idealism made famous by Samuel Johnson. When Johnson manipulated a stone with his foot he at once affirmed that the stone was more than a mere theoretical construct and

that he was warranted in applying commonsense reasoning to affirm its existence.

We have already seen the tensions between science and commonsense expressed in Sellar's talk of the scientific and the manifest image. In the tradition of Peirce and Dewey, Herman De Regt takes a pragmatist point of view, regarding talk of the two images. He argues that the two images are reconciled in a scientific attitude properly understood as being grounded in commonsense. Brian Ellis seeks to recast talk of the two images in the terminology of the new essentialism, which he advocates (Ellis 2001). Ellis argues that the aspects of the manifest image, such as consciousness, that have traditionally been thought to be lost in the scientific image can be understood as part of the scientific image after all, when we adopt essentialism.

A general problem for defenders of commonsense is presented by the psychological evidence already discussed, which threatens to undermine the credibility of our everyday reasoning. A specific problem for the characterisation of a defensible version of commonsense psychology is presented by the phenomenon of delusion. Lisa Bortolotti argues that delusions are best understood as irrational beliefs involving resistance to contrary evidence and compartmentalisation. Her argument serves to narrow the gap between the epistemology of delusional and non-delusional believers. In doing so it contributes to the analysis of commonsense psychology.⁷

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NOTES

¹Although Putnam (1981) (1982a) (1982b) and Ellis (1990) (1996) advocate an epistemic notion of truth, they both consider themselves to be scientific realists.

²We use the term 'most' here to allow for exceptions such as 'perfectly reversible heat engines.'

³For an argument to the conclusion that appeals to the miraculous can be explanatory see Clarke (1997).

⁴In fact, non-realists, such as Laudan (1981), point out that if we treat the argument as a deduction it commits the fallacy of affirming the consequent: if (P), then (Q); (Q); therefore, (P). This can be seen most easily by focusing on 1 and 2 and reversing their order.

2: If our theories were (approximately) true, (P), then their success, (Q), would be a matter of course.

1: Our theories are successful, (Q)

Therefore, (probably) our theories are (approximately) true, (P).

Some say the argument can be made deductively valid (e.g., Musgrave, 1988), but this comes only at the cost of adding further contentious assumptions, e.g., a premise which states that we are justified in believing that the best explanation of a phenomenon is true.

⁵ Here we are following Ferguson, (1989, Chapter 1).

⁶The charge that attempts to identify widespread human irrationality must be self-undermining is further explored by Stein (1997).

⁷Thanks to Keith Horton for useful comments on draft material.