Philosophy of Science (2024), **91**, 1306–1315
doi:10.1017/psa.2023.141

PSA PHILOSOPHY OF SCIENCE ASSOCIATION

PHILOSOPHY OF SCIENCE

SYMPOSIA PAPER

Resolving Debates about Scientific Realism: The Challenge from Stances

Anjan Chakravartty

Department of Philosophy, University of Miami, Coral Gables, Florida, USA
Email: chakravartty@miami.edu; https://anjanchakravartty.com

(Received 20 April 2023; revised 02 October 2023; accepted 05 October 2023; first published online 20 October 2023)

Abstract

Epistemic stances are collections of attitudes, values, aims, and policies relevant to assessing evidence, eventuating in belief or agnosticism regarding the output of scientific investigations. If, in some cases, conflicting stances promoting scientific realism and antirealism, respectively, are rationally permissible, this would seem to undermine the possibility of resolving certain debates between realists and antirealists. In this article I reply to two concerns about this conception of stances, to the effect that: (1) a stance underlying realism is, in fact, rationally obligatory for realists, given certain natural assumptions; and (2) this sort of permissivism would validate pseudoscience and science denialism.

1. Scientific realism versus antirealism: Perennial in principle?

In recent decades, running parallel to substantial developments in debates between scientific realists and antirealists, a number of authors have offered metaphilosophical reasons for thinking that the question of realism versus antirealism is ultimately irresolvable, in principle. Though they take different routes to this conclusion, all of these contentions share the thought that when all is said and done and the dust of trenchant argument settles, there are no conclusive arguments to be found. For every challenge—say, from the history of theory change over time targeting realism, or from the supposed absence of substantive explanations of the success of science targeting antirealism—there are responses that are persuasive to the defenders of these views if not their critics. Differences in underlying commitments that seem to account for this failure of a meeting of the minds, such as conflicting principles and intuitions regarding how best to evaluate evidence and form beliefs concerning the epistemic upshot of scientific investigations, are robust and seemingly indefeasible.[1]

[1] Compare, e.g., Wylie (1986, 287), on "incommensurable modes of philosophical practice"; van Fraassen (1989, 170–76), on the rationality of both realism and antirealism; and Worrall (2000, 230), on assumptions that have "prejudged the issue."

© The Author(s), 2023. Published by Cambridge University Press on behalf of the Philosophy of Science Association. This is an Open Access article, distributed under the terms of the Creative Commons Attribution licence (http://creativecommons.org/licenses/by/4.0/), which permits unrestricted re-use, distribution and reproduction, provided the original article is properly cited.

https://doi.org/10.1017/psa.2023.141 Published online by Cambridge University Press

In recent work I have endorsed this general contention and have attempted to provide a more systematic explication of what these underlying commitments are, how they function to produce different epistemic assessments of scientific inquiry, and why, in at least some cases, disagreements between those who assess theories and models differently are likely not amenable to resolution (see Chakravartty 2017a for a detailed discussion). At the heart of this account are two ideas: the notion of *epistemic stances*, which comprise the relevant, variable, underlying commitments; and a defense of a permissive account of epistemic rationality, according to which under certain fairly minimal conditions, different stances may be rational even if conflicting. Among a number of aspects of this picture one might contest, the account of rationality on which it depends is perhaps most controversial. In this article I consider two recent, distinct but related concerns that focus attention here specifically. The first, due to Christopher Pincock (2023), raises questions about whether epistemic agents such as scientific realists are, in fact, rationally *obligated* to hold the beliefs they do about the output of scientific work. The second, due to Stathis Psillos (2021) and Ragnar van der Merwe (2022), raises questions about whether failing to recognize such obligations courts science denialism, often in the form of pseudoscience.

In the following section I briefly review the key features of my conception of stances and rationality and the implications it has for debates about realism and antirealism, which constitute the focus of these recent critiques. Next, in section 3, I consider the idea that realists must view their own epistemic stances as rationally obligatory on pain of incoherence, and argue that this concern is sustained by two conflations: one of beliefs with underlying stances, and another of rational choice with rational obligation. Once these distinctions are clarified, the objection, though instructive, loses its force. Finally, in section 4, I consider the charge that to accept that conflicting epistemic stances may be rational has the unwelcome consequence that forms of science denialism are also rational. I argue that this consequence does not follow from the account of stances and rationality proposed. Recognizing this, however, is sadly no antidote to science denialism, which is often driven by stances that are not (or not merely) epistemic as such, and which represents a pressing concern for anyone who is serious about science whatever their stances or conceptions of rationality may be.

2. Scientific ontology and underlying epistemic stances

Debates about scientific realism concern how we should interpret the results of scientific investigation. What do our best theories and models tell us about the world? Realists contend that they give us credible descriptions of a mind-independent reality, extending across a full range of subject matters including objects, events, processes, and properties that cannot be detected by the unaided senses, or that are otherwise distant from us in time or space. Antirealists, in various ways, deny this interpretation of our best science. Debates in this sphere have often been framed in terms of the (approximate) truth of theories and the successful reference of theoretical terms, as per foundational discussions in the 1970s and 1980s. Arguably, however, the broadness of these formulations is out of step with more recent, finer-grained emphasis on the details of scientific practice, and a growing diversity of more

https://doi.org/10.1017/psa.2023.141 Published online by Cambridge University Press

and less restrictive forms of realism and antirealism.[2] With respect to practice, studies of modeling and associated techniques of abstraction, idealization, and approximation suggest the appropriateness of some refinement in thinking about aspects of one and the same theory that may or may not be plausibly sanctioned by realism. With respect to diversity, many accounts of realism and antirealism are now "selective," picking out particular aspects of theories (such as descriptions of certain properties, entities, and structures) for realist endorsement or lack thereof.

The moral of these developments is that today, the relevant units of analysis for discussions of realism and antirealism are typically more specific than a traditional focus on theories *simpliciter* may suggest, and with this in mind, I aim to recast these discussions by focusing on competing assessments of the plausible extent of scientific *ontology*: the study of what things and kinds of things exist, what they are like, and how they behave. This switch readily allows for discriminations between cases in which there is and is not warrant for belief in finer-grained ways, cutting across what might otherwise be characterized more coarsely as realism or antirealism "about science" or about a given theory—thus facilitating finer-grained articulations of both realism *and* antirealism (the latter including, e.g., Stanford 2006 and Rowbottom 2019b). These discriminations can be analyzed in terms of assessments of "epistemic risk," generally by means of reflection on the evidential weight of what I call "empirical vulnerability" and "explanatory power" (Chakravartty 2017a). Let me touch on each of these notions briefly, to establish a basis for the objections to follow.

Epistemic risk is understood in terms of an agent's confidence in judging that an ontological claim is true or false. One may, upon reflection on evidence, feel that one cannot assign a truth value to the claim that there is dark energy, or that therapod dinosaurs had lips; in such cases one suspends judgment and is agnostic. Alternatively, one might feel that the evidence supports a verdict one way or the other and believes accordingly. Greater and lesser epistemic risk is assessed in these two scenarios, respectively. Often, a crucial factor in these assessments is empirical vulnerability, or the susceptibility of a hypothesis to confirmation on the basis of empirical evidence. Another is explanatory power, which is a function of the quality of an explanation of something we seek to understand (including the data constituting evidence itself). Setting aside important questions about how, precisely, empirical vulnerability and explanatory power are evaluated (*op. cit.*, 83–96), a key point underpinning the view is that both admit of degrees, and there is often no consensus regarding how empirically vulnerable an ontological claim is, or how compelling an explanation is, such that epistemic risk is sufficiently low to warrant belief. Different perceptions of epistemic risk are exactly what is at stake in debates about scientific ontology, and this brings us to the notion of epistemic stances.

An epistemic stance is an orientation, a collection of attitudes, values, aims, and other commitments relevant to thinking about scientific ontology, including policies or guidelines for the production of putatively factual beliefs, such as those mentioned in the preceding example of claims that have emerged in relatively recent physics and paleontology. Stances underwrite our judgments about how far we should go, along a

[2] For extensive surveys of these developments, see Ladyman (2014), Chakravartty (2017b), Liston (2016), and Rowbottom (2019a).

https://doi.org/10.1017/psa.2023.141 Published online by Cambridge University Press

spectrum of epistemic risk, in making ontological commitments, and thus shape our interpretations of the epistemic upshot of our best science. In contrast to whatever beliefs may result, whose content may be thought of as propositions describing various targets of investigation, a stance is not a claim about the world. Stances are not believed so much as *adopted* and exemplified in assessments of evidence, producing interpretations of scientific work that yield claims about scientific ontology, and claims regarding matters about which it would be better to be agnostic instead.

In earlier work (*op. cit.*, 207–14), I consider families of stances that seem especially influential in disputes about where to draw such lines between belief and agnosticism. Those sympathetic to deflationary stances, for instance, are generally wary of aspiring to describe a mind-independent world, which they may view as conceptually problematic or otherwise naïve; this leads to redescriptions of the project of scientific ontology in different terms and rejections of traditionally realist conceptions of truth and reference, as found in a variety of neo-Kantian, pragmatist, and quietist approaches to science. Empiricist stances also suggest a wariness of the more fulsome endorsements of scientific ontology associated with realism, questioning the necessity of acceding to demands for explanation of observable phenomena (or some other subset of scientific phenomena, closely linked to observation in some way) in terms of further, less immediately accessible phenomena, thereby resisting the idea that theorizing about things beyond the observable (etc.) need or should be regarded as a basis for warranted belief. More metaphysically inclined stances, in contrast with both deflationary and empiricist ones, suggest more optimistic takes on the efficacy of scientific methods and the force of explanation for warranting beliefs in more expansive ontologies of things inhabiting a mind-independent world.

This leads, finally, to perhaps the most controversial thesis in the analysis, namely, that these different stances, whose adoption produces such different consequences for interpreting the results of scientific investigations, are all rationally permissible, subject to some minimal constraints of internal consistency and coherence (I will return to these conditions in section 4). If compelling, this immediately yields both an explanation of and an argument for the likely irresolvability of debates about realism and antirealism. The explanation stems from the adoption of conflicting stances by different epistemic agents; the argument stems from an inability to resolve such conflicts by appeal to strictures of epistemic rationality. The associated inability to establish the superior credentials of realist-type views of scientific ontology solely based on epistemic rationality is what drives the objections to which I will now turn. The first, in section 3, contends that a stance underlying scientific realism is not merely rational but in some sense rationally *obligatory* for realists. The second objection, in section 4, contends that failing to acknowledge this sort of rational compulsion has dire consequences for any reasonable hope of combatting pseudoscience and science denialism.

3. Realism or bust? Rational choice versus rational obligation

To begin, then, let us focus first on the assertion that scientific realism is not simply one among a number of otherwise rational options one might take with respect to scientific ontology; rather, realism is compelled by plausible canons of rationality.

https://doi.org/10.1017/psa.2023.141 Published online by Cambridge University Press

Sentiment to this effect is discernible in the incredulity realists sometimes express when confronting the fact that antirealists are generally, wholly unmoved in their assessments of various aspects of theories and models that are, arguably, especially well confirmed by impressive quantities of seemingly strong evidence. In recent work, Pincock (2023) goes significantly beyond this sort of reflex reaction, taking pains instead to offer an argument for rational obligation in the case of realism.

To state the argument as it is presented, let me clarify some terminology. In what follows I will use terms such as "the empiricist stance" and "the metaphysical stance" in the singular, for convenience, understanding that these are actually generic headings admitting of more specific variations. There are many ways, for example, that one might qualify as operating with a metaphysical stance, reflecting different tolerances for epistemic risk exhibited by those who nonetheless fall within that broad category. Also, and most importantly, I characterize the adoption of epistemic stances as reflecting a kind of "choice" (2017a, 214–22), in the following sense. Assuming that one's stance is rational, and that there are, in fact, other rational options, there would seem to be other ways one might have gone. In other words, so far as epistemic rationality is concerned, one might have "chosen" differently. This will prove contentious in what follows, but for immediate, terminological purposes, let me simply note that this particular notion of choice is identified here with the term "voluntarism," in line with the idea that the adoption of stances is a function of the philosophical temperament, or the will, of those adopting them.[3]

Perhaps the most obvious progenitor here is William James (1956), who argued that there are different paths one might take between the excessive risks of believing too much, thus courting false beliefs, and believing too little, thus spurning true beliefs—and that one's values are, *inter alia*, appropriate determinants of how one should proceed. Any theory of epistemic rationality that is compatible with the spirit of this guidance is bound to be controversial, as witnessed by contemporary debates about "uniqueness" and "permissiveness," concerning whether there are any cases in which, given a proposition and a body of evidence, more than one doxastic attitude is compatible with defensible principles of rationality (see, e.g., Feldman and Warfield 2010). Pincock focuses specifically on scientific realism, which he favors: If voluntarism is correct and, as a consequence, the realism one may endorse in any given domain is not, in fact, rationally required, is this not sufficient to undermine realism *tout court*? As I will now contend, the force of this question rests on certain conflations regarding the *form* of voluntarism at issue and, relatedly, on what precisely one views as rationally obligatory in this case. Once this is understood, it should be clear that realism is far from undermined.

In an opening salvo Pincock targets voluntarism directly, invoking Bernard Williams (1973, 148) with approval: "If I could acquire a belief at will ... it is unclear that ... I could seriously think of it as a belief, i.e. as something purporting to represent reality." Indeed, the idea that one might simply believe at will, in ways conflicting with what is readily apparent (e.g., in perception) or in ways that are

[3] Voluntarism in epistemology has a storied history and hints of the view appear without explicit mention in a number of discussions of the nature of belief in scientific contexts. Its explicit use here is traceable to van Fraassen (2002). My own restriction to "epistemic stances" suggests a somewhat narrower use, which will be relevant in relation to issues discussed in section 4.

https://doi.org/10.1017/psa.2023.141 Published online by Cambridge University Press

insulated from active considerations of evidence (e.g., in the sciences)—by "flipping a switch," as it were, internally—and thereby change one's doxastic attitude from belief, disbelief, or agnosticism to another such attitude on that basis alone, does seem problematic. To imagine this would be to imagine severing links to evidence that are crucial, presumably, to any genuine attempt to "represent reality." What, then, if we were to add evidence back into the equation, say, scientific evidence of the sort taken seriously in debates about realism? In that case the issue is more contentious: there is a substantive question here as to whether evidence all by itself yields uniquely rational doxastic attitudes toward scientific claims, hypotheses, and theories, contested (for instance) in debates about the underdetermination of theory by data.

All of this said, we need not go so far as to settle these debates to diffuse the present concern about voluntarist epistemology. Let us grant for the sake of argument that voluntarism is contentious in the sort of case identified by Pincock and Williams, namely, where it pertains to belief: *doxastic* voluntarism. This is not, I take it, what is at issue in debates concerning scientific ontology, where voluntarism pertains to the adoption of underlying epistemic stances; let us call this *stance* voluntarism. Here, there is no question of choice per se regarding what to believe, and certainly not in any way that severs connections to and considerations of evidence. A stance, recall, is an orientation comprising attitudes and policies relevant to *assessing* evidence; stances are thus at a remove from, or "upstream" from, the doxastic attitudes one may form regarding aspects of theories and models. Because the primary function of a stance is to distinguish domains of inquiry in which agents think evidence licenses belief from those where agnosticism seems more appropriate, adopting a stance suggests a much more innocent sense of "choice": one reflecting an agent's tolerances for epistemic risk. "Choice" in this context merely signals a recognition of the fact that there are rationally permissible alternatives, not that one can flip a switch and believe what one likes. Clarifying the distinction between doxastic and stance voluntarism thus dissolves, in this context at least, Williams's concern about engaging with reality in a serious way.

This leaves Pincock with a further and more specific argument that can, I think, be read as targeting *stance* voluntarism—in other words, as a criticism that is unaffected by what I have said thus far. The core assertion is that if a realist were to view stances that conflict with her own as rationally permissible, this would render her own incoherent and thus indefensible, premised on the following observation: "voluntarism about stances requires one to admit that there is no reason in favor of one's own stance. By 'no reason' here ... I mean that there is no rational obligation to adopt that stance."[4] Let me generalize this contention in a way that I believe Pincock would accept, by parity of reasoning: in this case (*ex hypothesi*), *no one* would have a reason to adopt their own or any other rational stance—the concern presumably applies across

[4] Pincock speaks of realist and antirealist stances and defends what he calls "the realist stance." This usage deviates from mine, in which stances (e.g., the deflationary, empiricist, and metaphysical stances) *underlie* realism and antirealism. The latter use is consonant with standard definitions of realism, noted in section 2, in terms of putatively factual claims about true theories, successful reference, and ontology, in contrast to the largely nonpropositional attitudes (etc.) comprising stances that shape how agents form realist and antirealist beliefs. The difference is substantial but can be set aside in what follows. I will understand Pincock's use of "the realist stance" as elliptical for my own description of stances underpinning realism.

https://doi.org/10.1017/psa.2023.141 Published online by Cambridge University Press

the board—because there is no rational obligation to go one way or another. Lacking rational obligations and recognizing the rationality of those with conflicting stances, it would be indefensible, incoherent even, to adopt *any* such option.

There is, I think, a way of understanding this argument that seems compelling, but this requires an illicit conflation—illicit in the sense that it begs the question against stance voluntarism. The argument runs together the idea of choosing a rational stance with that of choosing a stance that is rationally obligatory. But the very idea that a given stance must be rationally obligatory to be rationally chosen is precisely what stance voluntarism denies. Voluntarism, recall, rests on a permissive conception of epistemic rationality, according to which in at least some cases different options may be rational and thus permitted, thereby denying the uniqueness thesis, according to which only one option is rational, which entails that it is rationally obligatory. On the voluntarist view, rational choice and rational obligation are distinct concepts and cannot be run together. To argue in a non-question-begging way that only stances underpinning realism are rational (and thus obligatory), one would have to show that alternative stances are, as it turns out, *not* rational after all, but this would require something more than what has been provided: a compelling argument for an alternative theory of rationality in light of which such a demonstration could be given. This, however, is a tall order.

While Pincock does not establish an account of rationality that would yield the desired result, he does furnish something important in its own right: an explication of the rationality of a stance underlying a particular form of realism. While I cannot do this justice here, the basic idea is that *given* certain attitudes and epistemic policies regarding demands for and the evidential weight of explanations, a stance leading to realism is "mandatory." Note, however, the conditional nature of this prescription. "Obligation" here follows from the prior adoption of an underlying stance concerning evidence and explanation. Of course, given realist-friendly stances—at least some of which are surely internally consistent and coherent and thus rational—one ought to believe as realists do, but this has no implications for the rationality of stances generally. It is sufficient here, I submit, to note that different agents may adopt different but nonetheless rational stances, reflecting the sorts of things they value, epistemically, including certain kinds of information, evidence, and explanation, yielding different combinations of ontological commitment and agnosticism. We should not be expecting further resolution than this in debates about scientific ontology.

4. Reductio? Grappling with forces of science denialism

Even if the preceding casts doubt on the attempt to undermine stance voluntarism directly by establishing that some particular stance underlying realism (or antirealism) is rationally obligatory, indirect strategies remain. Perhaps most striking among recent attempts to go the indirect route are arguments to the effect that voluntarism in this sphere is self-undermining. My application of voluntarism focuses on what are commonly viewed as philosophically (and scientifically, as the history of science attests) "respectable" interpretations of the epistemic upshot of scientific inquiry. However, say these critics, a permissive conception of rationality opens the door to what are commonly viewed as disreputable practices of "inquiry"

https://doi.org/10.1017/psa.2023.141 Published online by Cambridge University Press

masquerading as science, that is, pseudoscience, which amounts to science denialism when it conflicts with or is used to undermine genuine science. According to proponents of this line of attack, this shows that there is something wrong with a voluntarist conception of epistemic stances. To put the concern in the form of a reductio, accepting stance voluntarism would entail that pseudoscience is rational; but this is surely an absurd consequence of what was supposed to be an account of scientific ontology.

Is a defense of stance voluntarism owed in reply to a charge that extends it beyond its intended domain? My own account (2017a) focuses on stances that take genuine science seriously and thereby pay significant attention to assessments of empirical vulnerability (see section 2; cf. Chakravartty 2021, 44–45). All recognized, philosophical accounts of scientific realism *and* antirealism are underwritten by epistemic stances that include this commitment. Thus, to the extent that pseudoscience does not take empirical evidence seriously or seriously enough, one might view the charge that stance voluntarism entails the rationality of pseudoscience as missing its target. Nevertheless, purveyors of pseudoscientific theories do typically *present* themselves as taking such evidence seriously. And thus, one might reasonably wonder whether voluntarism about epistemic stances has sufficient resources to respond, effectively, to scientific charlatanry and forces of science denial after all.

To sharpen the question at issue, let us note first that pseudoscientific theories—astrology, flat earth theory, homeopathy, and so forth—are not stances. They are bodies of putatively factual claims about the world. The target of concern *here*, in the first instance, is the epistemic stances *underlying* belief in such theories; the worry is that what we will find upon examination is that these stances pass the test of permissive rationality. Recall that according to permissivism, a stance is rational if it is consistent and coherent. Elaborating slightly, we may understand these constraints as having both logical and pragmatic dimensions: logical in the sense that a rational stance should not lead inexorably to forming beliefs that violate the probability calculus, and pragmatic in the sense that a rational stance should not lead inexorably to forming beliefs that are otherwise in tension with the attitudes, values, and other commitments constituting the stance. It is this standard that Psillos (2021, 27) has in mind when he asserts that "Creationism is not self-defeating," and that van der Merwe (2022, 1) has in mind when he asserts that stance voluntarism cannot "exclude epistemic stances that licence pseudo-scientific practices like those found in Scientology."

These are undeniably serious concerns, but I do not think they can be adduced to undermine stance voluntarism. As a preliminary, it is worth noting that the devil in the details of stances that are operative in underpinning pseudoscientific beliefs is likely to be considerable. Indeed, these details may be partially or even substantially opaque, even to those who embody them, and revealing them is not an exercise that can be glossed over *en passant*, on pain of failing to reveal what may reasonably be viewed as inconsistency or incoherence. For instance, while the focus here is *epistemic* stances—those whose function is to underwrite the production of (hopefully) warranted beliefs—in some cases it is plausible that other types of stances function to engender destructive interference. Someone who recognizes the importance of taking empirical evidence seriously, but who nonetheless overrides this policy whenever

https://doi.org/10.1017/psa.2023.141 Published online by Cambridge University Press

such evidence threatens to undermine a cherished religious dogma, such as creationism, has arguably fused their epistemic and religious stances. Something similar is apparently true of prominent advocates of Scientology, who appear to have fused their epistemic and economic stances. Such cases seem likely to exemplify failures of *epistemic* consistency and coherence, and thus rationality.

Be that as it may. Without granting that there are, in fact, plausible cases of pseudoscientific belief underwritten by (solely) epistemic stances satisfying voluntaristic constraints of rationality, let us at least imagine this possibility. What consequences would these imagined cases have for championing genuine science in the face of pseudoscience and science denial?

There is no challenge here for the permissivist that is not faced, in equal measure, by the impermissivist. In the final analysis, all anyone can do when confronted by conflict between epistemic stances is engage in a dialogue in which conflicting attitudes, values, aims, and policies relevant to assessing evidence can be revealed, compared, and considered. I submit that this is exactly what happens, ultimately, in debates between scientific realists and antirealists. It is what happens, ultimately, when experts testify in courts about the differences between teaching evolution and creationism in schools. To add to this dialogue the assurance that "I, not you, possess a uniquely rational epistemic stance" adds nothing of rhetorical or persuasive power. In contrast, to endeavor to elaborate, to explain, to scrutinize, and to understand the nature of opposing stances (to engage in what I call "collaborative epistemology" [2017a, 228])—and to encourage others, when our own stances appear to pass the tests of consistency and coherence, to see things our way, upon reflection—is to do our best. There is no insight into epistemic rationality to be gained by demanding more than this.

Acknowledgments. I am grateful to Chris Pincock for organizing the Symposium on Scientific Realism, Metaphysics, and Epistemic Stances at the 2022 edition of the Philosophy of Science Association biennial meeting, and to our enthusiastic audience for a stimulating discussion.

References

Chakravartty, Anjan. 2017a. *Scientific Ontology*. New York: Oxford University Press.

Chakravartty, Anjan. 2017b (2011). "Scientific Realism." In *The Stanford Encyclopedia of Philosophy*, edited by Edward N. Zalta. Stanford: Stanford University Press. https://plato.stanford.edu/entries/scientific-realism/

Chakravartty, Anjan. 2021. "Risk, Reward, and Scientific Ontology: Reply to Bryant, Psillos, and Slater." *Dialogue* 60(1):43–63. doi: 10.1017/S0012217320000311

Feldman, Richard, and Ted A. Warfield (eds.) 2010. *Disagreement*. Oxford: Oxford University Press.

James, William. 1956 (1897). "The Will to Believe." In *The Will to Believe, and Other Essays in Popular Philosophy*,
1–31. New York: Dover.

Ladyman, James. 2014 (2007). "Structural Realism." In *The Stanford Encyclopedia of Philosophy*, edited by Edward N. Zalta. Stanford: Stanford University Press. https://plato.stanford.edu/entries/structural-realism/

Liston, Michael. 2016. "Scientific Realism and Antirealism." In *Internet Encyclopedia of Philosophy*, edited by James Fieser and Bradley Dowden. https://iep.utm.edu/sci-real/

Pincock, Christopher. 2023. "Defending a Realist Stance." Unpublished manuscript.

Psillos, Stathis. 2021. "Scientific Ontology: Fact or Stance?" *Dialogue* 60(1):15–31. doi: 10.1017/S0012217320000360

https://doi.org/10.1017/psa.2023.141 Published online by Cambridge University Press

Rowbottom, Darrell. P. 2019a. "Scientific Realism: What It Is, the Contemporary Debate, and New Directions." *Synthese* 196(2):451–84. doi: 10.1007/s11229-017-1484-y
Rowbottom, Darrell. P. 2019b. *The Instrument of Science: Scientific Anti-Realism Revitalised*. New York: Routledge.
Stanford, P. Kyle. 2006. *Exceeding Our Grasp: Science, History, and the Problem of Unconceived Alternatives*. New York: Oxford University Press.
van der Merwe, Ragnar. 2022. "Stance Pluralism, Scientology, and the Problem of Relativism." *Foundations of Science*. doi: 10.1007/s10699-022-09882-w
van Fraassen, Bas C. 1989. *Laws and Symmetry*. Oxford: Clarendon.
van Fraassen, Bas C. 2002. *The Empirical Stance*. New Haven, CT: Yale University Press.
Williams, Bernard. 1973. "Deciding to Believe." In *Problems of the Self: Philosophical Papers 1956–1972*, 136–51. Cambridge: Cambridge University Press.
Worrall, John. 2000. "Tracking Track Records II." *Aristotelian Society* 74(1), 207–35.
Wylie, Alison. 1986. "Arguments for Scientific Realism: the Ascending Spiral." *American Philosophical Quarterly* 23(3):287–97.

Cite this article: Chakravartty, Anjan. 2024. "Resolving Debates about Scientific Realism: The Challenge from Stances." *Philosophy of Science* 91 (5):1306–1315. https://doi.org/10.1017/psa.2023.141

https://doi.org/10.1017/psa.2023.141 Published online by Cambridge University Press