



Between the Placement Problem and the Reconciliation Problem. Philosophical Naturalism Today

Mario De Caro^{1,2}

Accepted: 1 March 2023 / Published online: 2 May 2023
© The Author(s) 2023

Abstract

Scientific naturalism—the conception according to which the natural sciences, and possibly physics alone, set the limits of ontology and epistemology—is characterized by a strong monistic tendency. For this reason, all versions of scientific naturalism face the so-called “placement problem”, which concerns the features of the ordinary view of the world that, at least *prima facie*, do not fit into the scientific view of the world (think of consciousness, moral properties, free will, and intentionality). To address this problem, scientific naturalists use three strategies: reductionism, eliminativism, and mysterianism—none of which, it is argued, produces satisfying results. Liberal naturalism opts instead for a pluralistic attitude in both ontology and epistemology but accepts a constraint according to which one should accept no entity or explanation that is incompatible with the scientific worldview. Liberal naturalism faces the “reconciliation problem”, which concerns the relationship between the scientific and the ordinary views of the world once one denies ontological and epistemological priority to either of them. Three strategies for addressing this problem are presented: according to the first, the ordinary worldview and the scientific world are categorically distinct; according to the second, the former emerges from the latter; according to the third, between them there is a relation of global supervenience. Other objections to liberal naturalism are finally presented and addressed.

Keywords Liberal naturalism · Scientific naturalism · Placement problem · Reconciliation problem

I. Scientific naturalism and the placement problem

Scientific naturalism—the conception according to which the natural sciences, and possibly physics alone, set the limits of both ontology and epistemology—is characterized by a strong monistic tendency. So writes, for example, **Alex Rosenberg**:

What is the world like? It's fermions and bosons, and everything that can be made up of them, and nothing that can't be made up of them. All the facts about fermions and bosons determine or 'fix' all the other facts about reality and what exists in this universe or any other if, as physics may end up showing, there

are other ones. In effect, scientism's metaphysics is, to more than a first approximation, given by what physics tells us about the universe. The reason we trust physics to be scientism's metaphysics is its track record of fantastically powerful explanation, prediction and technological application. If what physics says about reality doesn't go, that track record would be a totally inexplicable mystery or coincidence.¹

The same Rosenberg boldly draws the consequences of such a strict view:

Science forces upon us a very disillusioned 'take' on reality. It forces us to say 'No' in response to many questions to which most everyone hopes the answers are 'Yes'. These are the questions about purpose in nature, the meaning of life, the grounds of morality, the significance of consciousness, the character of thought, the freedom of the will, the limits of human

✉ Mario De Caro
Mario.decaro@uniroma3.it

¹ Department of Philosophy, Roma Tre University, via Ostiense 234, 00146 Rome, Italy

² Department of Philosophy, Tufts University, Miner Hall, Medford, MA 02155, USA

¹ It is interesting that to describe his view Rosenberg (2009) employs the term “scientism”, which is traditionally used with derogatory connotations.

self-understanding, and the trajectory of human history.

Other, less strict, scientific naturalists (such as John Searle) believe that the natural sciences taken as a whole have ontological and epistemological primacy, while some natural sciences (i.e., biology) are in principle irreducible to physics. All versions of scientific naturalism, however, face the so-called “placement problem” that concerns the features of the ordinary view of the world that, at least *prima facie*, do not fit into the scientific view of the world (think of consciousness, moral properties, free will, and intentionality). This is how Huw Price introduces this problem:

If all reality is ultimately natural reality, how are we to ‘place’ moral facts, mathematical facts, meaning facts, and so on? How are we to locate topics of these kinds within a naturalistic framework, thus conceived? (Price 2004)

John Searle makes an analogous point:

How can we square a conception of ourselves as mindful, meaning-creating, free, rational, etc. agents with a universe that consists entirely of mindless, meaningless, unfree, nonrational, brute physical particles? (Searle 2007)

Scientific naturalist appeal to three strategies for addressing this problem. First, they try *reductionism*, according to which the recalcitrant features of the ordinary view of the world can be reduced to scientifically acceptable elements (examples of this approach are the moral reductionism of the Cornell school and Michigan school (Boyd 1988; Darwall et al. 1992; Copp 2017; FitzPatrick 2014); Penelope Maddy’s “naturalized Platonism” regarding mathematical properties (Maddy 2005); the attempts of the advocates of neuroaesthetics (Zeki 2008); the revival of the “type-identity theory” regarding the mind–body problem (Kim 2007; Gozvano and Hill 2012). However, even though many scientific naturalists agree that reductionism is the right approach to the placement problem, no concrete proposal of reduction has won enough success (if any at all) (Horst 2007).

Arguably, these failures are not a coincidence. Several philosophers have argued (convincingly, in my view) that normative properties are in principle irreducible to non-normative ones (Wedgewood 2007; Parfit 2011; Scanlon 2015; Heathwood 2015; Spiegel 2023). Moreover, a potentially fatal weakness has been identified in the reductionist project as such. This project presupposes two claims: that philosophy should only—or at least mainly—utilize scientific methodology and that the search for reductions is one

of the most important components of scientific methodology.² However, if the former assumption is—as we will see shortly—controversial, the second is arguably false. It is not true, that is, that scientists look for reductions as one of their privileged goals and, above all, it is not true that in science there are many examples of successful reductions.

Among the many failed attempts at reducing scientific theories to more fundamental ones, we can mention those of thermodynamics/statistical mechanics to quantum mechanics, of chemistry to quantum mechanics, of classical mechanics to quantum mechanics, of molecular biology to classical genetics (Horst 2007). Along the same lines, Weisberg et al. claim that there is an “anti-reductionist consensus in the philosophy of chemistry” (and the alleged reduction of chemistry to microphysics has always been one the favorite examples offered by the reductionists to advertise their view!) (Weisberg et al. 2019). Also, there are good reasons to think that even the much advertised reduction of thermodynamic laws to statistical mechanics does not really succeed (Garfinkel 1991).

Thus other scientific naturalists have explored an alternative strategy, that of *eliminativism*, according to which the phenomena of the ordinary view of the world are constitutively intractable by the natural sciences and, consequently, should be eliminated from our ontology, as in past eras it happened with the phlogiston and the epicycles of Ptolemaic astronomy (in this regard think of Rosenberg’s view mentioned above; of Patricia Churchland (2013) and Paul Churchland (1996, 2007) proposal of eliminating the items of folk psychology; of Pereboom’s (2014) and Caruso’s (2013) eliminativist view of free will; and Mackie’s (1997) and Joyce’s (2005) moral fictionalism).

However, eliminativism is a very radical strategy since it leaves us without the capacity to conceptualize fundamental areas of our experience. In this light, arguments have been presented according to which this view is self-refuting and accepting it immediately raises what Lynne Baker called the “threat of cognitive suicide” (Baker 1987; Boghossian 1990, 1991). Among the (many) philosophers that find eliminativism unacceptable there are some scientific naturalists who also deny the feasibility of reductionism: in this light, they pursue a third strategy for addressing the placement problem, the so-called “mysterianism”. According to this view—advocated by Noam Chomsky (1988), Colin McGinn (1993), and, in several areas of philosophy, by Nagel (1985) and van Inwagen (2017)—because of our cognitive limitations, for us the problems of placing, say, free will, moral properties, and consciousness in the scientific worldview will always remain a mystery—for the same reason that dogs, lacking the necessary conceptual resources, will always be unable to demonstrate the Pythagoras theorem. Most philosophers, however, are convinced that mysterianism has a dogmatic attitude as long as it assumes that the problems that we

² A manifesto of this view was Oppenheim and Putnam (1958).

cannot solve today will remain unsolvable forever. For this reason, it is tempting to read this view as a *reductio* of scientific naturalism in general. Mysterianism brings scientific naturalism to its extreme consequences by admitting that both reductionism and eliminativism are unsuccessful and, consequently, the only remaining strategy for that view is to see the most important phenomena of our lives as incomprehensible mysteries. However, in this regard a quotation by the late Lynne Baker comes to mind: “We should not lend faith to metaphysics that render ordinary but significant phenomena unintelligible” (Baker 2013). And once this very plausible opinion is accepted, why should we not conclude that scientific naturalism is a deeply unsatisfactory view and should be abandoned?

II. Liberal naturalism and the reconciliation problem

One may ask what causes the deep difficulties that scientific naturalism faces. One possible answer comes from John Dupré (2004), who maintains that all forms of scientific naturalism adopt a very questionable perspective that he labels the “myth of monism”. In fact, as hinted above, the monistic attitude of scientific naturalism has both an ontological and an epistemological face: the natural sciences (if not physics alone) are our only genuine source of knowledge; therefore, they have the last word on all ontological questions. In the background of this view is the thesis that the natural is nothing more than the stuff that in principle can be studied by the natural sciences. This is a radical change from some of the versions of naturalism that were developed in previous ages. In this regard, for example, about a century ago John Dewey (1929) wrote:

Mind and matter [are] different characters of natural events, in which matter expresses their sequential order, and mind the order of their meanings in their logical connections and dependencies.

Dewey had a much broader view of nature than that of scientific naturalists today. For him, in addition to being the object of the natural sciences, nature expands to the normative components of the ordinary view of the world; and this implies a form of constitutive pluralism, according to which there are different and mutually irreducible ways of understanding a reality that, in itself, is irreducibly varied.

A clearly pluralist attitude such as Dewey’s is central to contemporary liberal naturalism (De Caro and Macarthur 2004, 2010, 2022). The latter view can be defined by the following three theses:

1. Some real entities are irreducible, but not incompatible with, the entities that are part of the domain of a science-based ontology.
2. Some legitimate forms of understanding (e.g., a priori reasoning, conceptual analysis, and introspection) are neither reducible to scientific understanding nor incompatible with it.
3. There are issues with respect to which philosophy is not continuous with science in terms of content, method, and purpose, although it should not be at odds with it (De Caro 2022).

Considering these three theses, evidently liberal naturalism, as opposed to scientific naturalism, does not face the Placement problem: there is nothing to be “placed” in the world studied by the natural sciences, i.e., nothing to be legitimized—not free will, not consciousness, nor intentionality, nor morality—because the characteristics of the ordinary worldview do not need any legitimization. That said, liberal naturalism encounters a different problem, which can be called “reconciliation problem” (De Caro 2020). This concerns the relationship between the phenomena of the ordinary view of the world and those of the scientific view, as well as the way of evaluating and solving the conflicts that frequently occur between these two views.

Let us consider the case of moral properties: what is the relationship between human beings when they are judged through normative statements (“You must do this!” “One shouldn’t lie!” “I was wrong to make that choice”) compared to cases where they are described in biological terms? In general, based on McDowell’s distinction (McDowell 1994, 1998), the question to ask is, “What is the relationship between the space of reasons and the space of natural laws?”.

Proponents of liberal naturalism have developed various answers to this question, but three are the main ones. The first—which has Kant’s, the pragmatists’, and Wittgenstein’s philosophies as sources of inspiration—³ postulates a categorical distinction between the ordinary and the scientific view of the world such that they are totally heterogeneous (Strawson 1985; Bilgrami 2006; Macarthur 2019). According to this conception, human beings can be looked at from two different perspectives, based on completely different conceptual apparatuses that identify real but unrelated features of the world. The advantage of this position is that the ordinary view and the scientific view can be understood according to their own criteria, without questioning their

³ It should be noticed that the Kantian inspiration for this group of liberal naturalists does not include Kant’s reference to the noumena; that Wittgenstein’s influence is more linked to his later reflection than to the *Tractatus*; and that the pragmatist descent comes especially from Dewey and, in part, from James.

relationship: hence the reconciliation problem does not even arise. The disadvantage, however, is that the gap between the conceptual apparatuses of these views becomes unbridgeable, and the entities to which they respectively appeal seem to belong to parallel dimensions. Therefore, the main challenge for the proponents of this view is to show that the very plausible idea that the ordinary view and the scientific view refer to the *same* world does not entirely vanish.

The liberal naturalist's second response to the reconciliation problem appeals to emergentism, the view according to which every organic complex is characterized by "emergent" properties (Dupré 1995). These properties are supposed to depend on the occurrence of specific physical and chemical conditions but cannot be predicted or explained by the properties of the parts that constitute the organic complex. In short, as the worn-out slogan goes, "the whole is greater than the sum of the parts", that is, the characteristics of the higher ontological levels are unpredictable and inexplicable from the characteristics of the lower levels, even though the former depends on the latter for their existence. In this way, the problem of the relationship between the two worldviews—i.e., the placement problem—is solved: while the scientific view is concerned with the more fundamental properties, the ordinary view is concerned with higher-level emergent properties. Also in this case, however, there is a relevant conceptual difficulty, in virtue of which many philosophers believe that the notion of emergence is obscure and does not explain what needs to be explained. This is because, once one has assumed this perspective, it remains completely impenetrable why in nature there are "leaps" that make it impossible to account for the properties of higher-level entities in the terms of the lower-level entities that constitute them. To put it another way: emergentism merely points to a fundamental phenomenon of nature (that of emergence), but without explaining at all why that phenomenon exists and, in essence, what its nature is. To this criticism, emergentists respond by stating that the emergence of certain features over others is a "brute phenomenon," namely, it is inexplicable. This response, however, appears unsatisfactory because

it merely acknowledges the existence of the phenomenon rather than illuminating it.⁴

The third answer that liberal naturalism can offer to the reconciliation problem is based on the notion of "global supervenience".⁵ This is a weaker ontological dependence relation than the reduction relation (which is advocated by many scientific naturalists). In its basic version, global supervenience is a covariance relation whereby, if two worlds are identical in terms of their subvenient features (e.g., physical features), they are also identical in terms of their supervenient features (e.g., those of ordinary view). For example, if two subjects differ in terms of their mental characteristics, then they must also differ in terms of the physical characteristics of their two respective worlds (in the subject's head and/or in the external environments with which they causally interact). Instead, a difference in physical characteristics need not correspond to a difference in mental characteristics. Let's consider an example. The mental property of believing that $5 + 7 = 12$ and the mental property of believing that the table in front of me is elegant necessarily correspond to two different physical configurations; moreover, each of these two mental properties can in turn correspond to different physical configurations; finally, two identical physical characteristics necessarily correspond to the same mental property. In short, global supervenience is a many-to-one relation: different subvenient characteristics (those of the lower level, which is represented by the whole physical world) may correspond to the same supervenient characteristics (those of the mental level), while different supervenient characteristics will always correspond to different subvenient characteristics. Identical physical worlds will therefore also be identical in terms of their supervenient features.

By appealing to global supervenience, the ontological nexus between different levels of features is guaranteed. However, such nexus does not imply that higher properties are reducible to lower ones. Indeed, there is no way to determine once and for all the set of physical features to which a mental feature corresponds because that set is open-ended: there can always be, for example, a new physical configuration underlying the mental property of believing that $5 + 7 = 12$. (In this regard, one may note that, since the subvenient bases of higher-level phenomena are potentially represented by the entire physical world, appealing to the notion of emergence—which requires that the complexity of the internal organization of the specific components of a whole be so complex as to produce an ontological leap—does not carry any explanatory value).

Against this view, scientific naturalists object that, from an ontological point of view, global supervenience is too weak a notion because it fails to account for the unity of the world. This objection, however, does not bother liberal naturalists at all, because it is nothing more than a reformulation

⁴ Among the different directions that the advocates of the emergentist version of liberal naturalism are trying to explore for addressing this problem, two seem more promising. First, as noted by Crane (2001, p. 222), "we should not say a priori when we should take the facts of nature [including brute emergence, if it exists] to require further explanation" (cf. also Wyss 2018, pp. 213–233). Second, according to some authors, looking at emergent properties not from a synchronic point of view but from a diachronic one may "alleviate the problems with novelty"—that is, with brute emergence (cf. Wyss 2023). I am grateful to an anonymous referee for the latter suggestion.

⁵ McLaughlin and Bennett (2018). Because of the externalist determination of mental content, global supervenience is a more adequate notion than local supervenience to account for the relationship between semantic properties and physical properties.

of a thesis that they emphatically reject, namely, that there is an ontological hierarchy that runs from the bottom to the top of reality, and everything must be integrally traced back to the lower levels. At any rate, for a liberal naturalist, the lower levels are necessary for the existence of the higher levels, and any change in the higher levels presupposes a difference in the lower levels, but this by no means that the lower levels exhaust the ontological value of the higher levels. Moreover, as convincingly argued by Kovacs (2019), there are two ways of interpreting the term “explanatory” regarding the charge that supervenience is not an explanatory relation. In a restrictive interpretation of the term, supervenience is indeed unexplanatory, but this is also true for other relations that are commonly accepted in philosophy (such as causation, grounding, and realization); in a wider interpretation of “explanatory”, one sees no reason to deny that supervenience is explanatory.

Some proponents of liberal naturalism—those who see the ordinary and the scientific worldviews as categorically different—refuse to appeal to supervenience for several reasons. First, in their view, this appeal would be a dangerous concession to scientific naturalism. As John McDowell has noted, however, even non-naturalists, such as Moore (1922), can resort to supervenience in accounting for the relationship between values and non-normative facts: thus, this objection misses its target. Another objection comes from John Dupré (1995), who argued that the supervenience thesis is empirically vacuous. That objection, however, is valid only if one agrees with Dupré’s very strong empiricist assumption that all beliefs must be based on empirical facts. Finally, other liberal naturalists argue that the supervenience view cannot solve the reconciliation problem because the attempt to relate evaluative facts to non-evaluative facts is based on a categorical error. However, as McDowell (2006) and Putnam (2008) note, if one appeals to the notion of global supervenience in the right way, one will notice that it is not philosophically problematic: “Given an action that we consider despicable and another that is exactly similar in all non-evaluative respects, the second action must be equally despicable”; and this statement, McDowell (2006, 71) convincingly argues, is a “harmless statement”.

Scientific naturalists can mount another attack against liberal naturalists by arguing that their naturalistic constrain—i.e., that one cannot accept views or entities that are incompatible with the scientific worldview—is too vague for granting the coveted naturalistic credentials. To give an example: from a logical point of view, both ontological dualism *à la* Descartes and creationism—two conceptions that no one today would call naturalistic—are in fact logically compatible with the scientific worldview (if they were true, no scientific law would be violated). However, this

objection is not well-grounded. The notion of compatibility between philosophy and science to which liberal naturalism appeals should not be understood in a strictly logical sense, but in a broader one. The point is not only that we should not accept philosophical conceptions that openly contradict our best scientific theories, but also that we should not accept conceptions that expand our ontology into areas that are already well accounted for by the explanations and entities postulated by science alone. The theory of “intelligent design”—according to which biological evolution is guided by a higher intelligence—is a very good example in this regard. Logically, this theory is compatible with the neo-Darwinian theory of evolution, whose alleged shortcomings it would (according to its proponents) fill. However, if the first part of this statement is correct, the second part is not. To explain biological evolution, there is no need to postulate the role of a superior intelligence because the process of natural selection discovered by Darwin, together with genetic mechanisms, has no dramatic shortcomings and actually offers an excellent account of the evolution of species—a thesis, by the way, that is also shared by many religious scientists (Dennett 2006). Therefore, even liberal naturalists, like radical naturalists, can easily reject intelligent design, with its antinaturalistic ontological implications.

An important difference between scientific and liberal naturalists concerns what one should do when there is a conflict between philosophy and science. Scientific naturalists do not have doubts that philosophy should always let science go ahead. Huw Price, for example, writes that,

To be a philosophical naturalist is to believe that philosophy is not simply a different enterprise from science, and that philosophy properly defers to science, where the concerns of the two disciplines coincide (Price 2011).

This is not a view that liberal naturalists may share. In many cases, philosophical doubts and questions have been raised regarding scientific theories, hypotheses, and experimental evidence, which could not be answered by merely appealing to scientific concepts and methods because they involve philosophical categories. As Daniel Dennett wrote once, “There is no such thing as philosophy-free science, there is only science whose philosophical baggage is taken on board without examination” (Dennett 1995). Philosophical questions and doubts are not philosophical in character because only professional philosophers raise them; in fact, scientists can raise them as well, and often do (and this happens in other fields as well, of course).

There are many examples of philosophical questions raised by both philosophers and scientists, the reflection on which greatly contributed to the progress of science. The debate on the nature of light was deeply permeated by philosophical ideas (regarding the possibility of the vacuum and atoms, for example). Einstein's reaction against quantum mechanics was largely due to his metaphysical preference for determinism over indeterminism. And it was because of the metaphysical presupposition that from a geometrical point of view the world is as simple as possible ("*Simplex sigillum veri*," "Simplicity is the seal of truth", was a famous Medieval adage) that Galileo accepted the Copernican system.⁶ And it was for the same metaphysical reason (the preference of geometrical simplicity over complexity) that he wrongly refused the view regarding the elliptical nature of planetary orbits, which had been discovered by his friend Kepler. Other examples of the relevance of philosophical questions or doubts for science are the contemporary discussions on the interpretation of quantum mechanics (Putnam 2021; Maudlin 2019) or on how scientifically legitimate string theory is, considering that it has no empirical applications (Smolin 2007; Dawid 2013). Finally, another interesting case is offered by the application of cognitive neuroscience to the study of agency, consciousness, freedom, and moral responsibility. In discussing all these issues, the role of philosophy is central, in particular because a sound conceptual analysis is indispensable for understanding the issues at stake and the role the findings of neuroscience can offer for their clarification (Roskies 2021).

Unlike scientific naturalists, moreover, liberal naturalists believe that traditional philosophical methods may be legitimate even when they are irreducible to the methods of the natural sciences, as long as they are not incompatible with them (in the broad sense of compatibility discussed before). Thus, for the liberal naturalist, mystical intuition—being incompatible with the scientific worldview, in the broad sense of "compatibility"—is not epistemologically legitimate, while first-person insights, conceptual analysis, and the transcendental method are. In fact, the latter methods are essential to the philosophical enterprise and characterize it as an autonomous domain. In this light, if the famous Heideggerian dictum that "science does not think" is to be rejected as misguided and ideological, so is the attitude of scientific naturalists according to which, in essence, only science thinks (with the corollary that philosophy can "think" only insofar as it imitates science). That said, we can return to the issue of the relationship between science and philosophy when they come into conflict with respect to some issue.

⁶ Only later in his career, Galileo presented a positive argument for Copernicanism—the occurrence of tides—, which by the way was wrong.

According to liberal naturalists, then, science does not necessarily have the last word (although this is often the case). Indeed, there are cases where philosophy can clarify some aspects of scientific inquiry and sometimes even help resolve some controversies between scientists (conversely, there are also cases where science can contribute to philosophical discussions). As evidence of this, one may think of cases in which it is the scientists themselves who reflect with philosophical tools: this has happened in the past with discussions on infinitesimal calculus and set theory and, more recently, as seen, with debates on interpretations of quantum mechanics or string theory, or even with investigations on the neurophysiological basis of mental phenomena. In these fields, philosophical reflection and scientific inquiry can—and in some cases must—contribute to each other.

As we have seen, liberal naturalism has the conceptual tools to reject supernaturalistic intrusions into the natural world. However, scientific naturalists could rephrase their critique, saying that liberal naturalism is still too inclusive from an epistemological point of view, insofar as it assumes that the natural sciences cannot explain all reality. The reason for this criticism is that liberal naturalism would have no way of countering conceptions that are clearly irreconcilable with naturalism, such as radical cultural relativism and postmodernism—that is, conceptions that substantially devalue the status of natural science, going so far as to proclaim the lack of objectivity of its theories. However, not even this accusation is well-grounded since, according to liberal naturalism, reality limits the legitimacy of our legitimate interpretations, insofar as it determines the truth conditions of the statements we make based on our various cognitive sources. It is obvious that all our judgments about the world are fallible and always will be. However, this does not mean that there are no objective canons of truth, as instead cultural relativism, postmodernism, and similar views claim (Boghossian 2006).

Another, more insidious critique of liberal naturalism acknowledges its conceptual legitimacy but declares its implausibility. This critique has been expressed in several ways. One of these ways is based on the "burden of proof argument": according to its advocates, scientific naturalism is the default naturalistic conception, and consequently the onus is on the liberal naturalist to prove that, in principle, the natural sciences cannot account for some aspect of reality. Put another way: it is up to the liberal naturalist to show that some of the real properties of the world will never be reducible to the properties accepted by the natural sciences (Macdonald 2006).

This argument, however, is not convincing. First, scientific naturalists, who by definition reject the possibility of non-empirical arguments, are not entitled to ask the liberal naturalist to show that in principle some properties of the world are irreducible to its scientific properties. Moreover,

by the same yardstick, the liberal naturalist could argue that the burden of proof falls on those who claim that phenomena such as free will, consciousness, and so on can be explained by the natural sciences (De Caro 2015).

Another charge of implausibility towards liberal naturalism is based on the so-called “argument of the great success of science”. According to this argument, since the XVII century, natural science has progressively explained, or explained away, a surprising number of phenomena that previously appeared indecipherable, making it possible to predict and control them. On this basis, many scientific naturalists infer that natural sciences can in principle also explain venerable philosophical enigmas such as, say, free will, consciousness, intentionality, and personal identity.

This argument, however, does not work either. First, it is based on a very problematic inductive inference: why should we infer that in principle is possible to explain phenomena in one domain with explanations that have worked in other domains? Moreover, as has been noted, it is unclear to which scientific theories the great success of science argument refers (Crane and Mellor 1990). Certainly, it cannot refer to current theories, since they are incapable of solving the problems of free will, consciousness, and so on. On the other hand, we really have no idea what kind of theories could explain such problems, even if they existed. Moreover, when employed against liberal naturalism, the great success of science argument does not appear epistemically sound. In fact, liberal naturalism presupposes that it is rational to believe that some important properties of the world are not reducible to the properties studied by the natural sciences. Proclaiming that such properties can in principle be explained by science because science is inherently capable of doing so closely resembles a *petitio principii*.

A final way of denying plausibility to liberal naturalism consists in insisting on the alleged indubitability of ontological monism (Churchland 1996; Schaffer 2018). From this point of view, all properties of the world that now appear to us to be ineliminable and irreducible to properties acceptable to the natural sciences would in fact necessarily be either eliminable or reducible. Sometimes the emphasis on monism can be justified as a methodological criterion; if, however, monism is regarded as an irrevocable ontological principle, it will not only be contrary to the ordinary worldview but also to common scientific practice. Today, pluralism is widely accepted even within the natural sciences (Ludwig and Ruphy 2021); and the monistic cause becomes even less promising when the humanities and social sciences are also taken into consideration. Indeed, the idea that pluralism poses a threat to the scientific worldview is anachronistic and it would be time to abandon it.

Funding Open access funding provided by Università degli Studi Roma Tre within the CRUI-CARE Agreement. This study was supported by PRIN 2017 (Grant No. 0000-0002-2160-8512), granted by the Italian Ministry of University and Research.

Data availability Author did not analyse or generate any datasets, because this work proceeds within a theoretical approach.

Open Access This article is licensed under a Creative Commons Attribution 4.0 International License, which permits use, sharing, adaptation, distribution and reproduction in any medium or format, as long as you give appropriate credit to the original author(s) and the source, provide a link to the Creative Commons licence, and indicate if changes were made. The images or other third party material in this article are included in the article's Creative Commons licence, unless indicated otherwise in a credit line to the material. If material is not included in the article's Creative Commons licence and your intended use is not permitted by statutory regulation or exceeds the permitted use, you will need to obtain permission directly from the copyright holder. To view a copy of this licence, visit <http://creativecommons.org/licenses/by/4.0/>.

References

- Baker LR (1987) Saving belief: a critique of physicalism. Princeton University Press, Princeton
- Baker LR (2013) Naturalism and the first-person perspective. Oxford University Press, Oxford
- Bilgrami A (2006) Self-knowledge and resentment. Harvard University Press, Cambridge
- Boghossian P (1990) The status of content. *Philos Rev* 99:157–184
- Boghossian P (1991) The status of content revisited. *Pac Philos Q* 71:264–278
- Boghossian P (2006) Fear of knowledge: against relativism and constructivism. Oxford University Press, Oxford
- Boyd R (1988) How to be a moral realist. In: Sayre-McCord G (ed) *Essays on moral realism*. Cornell University Press, Ithaca, pp 181–228
- Caruso G (2013) Free will and consciousness: a determinist account of the illusion of free will. Lexington Books, Lanham
- Chomsky N (1988) Language and problems of knowledge. MIT Press, Cambridge
- Churchland PM (1996) The engine of reason, the seat of the soul. MIT Press, Cambridge
- Churchland PM (2007) Neurophilosophy at work. MIT Press, Cambridge
- Churchland PS (2013) Touching a nerve: the self as brain. W.W. Norton & Company, New York
- Copp D (2017) Normative naturalism and normative nihilism. Parfit's dilemma for naturalism. In: Kirchin S (ed) *Reading Parfit. On what matters*. Routledge, London, pp 28–53
- Crane T (2001) The significance of emergence. In: Gillett C, Loewer B (eds) *Physicalism and its discontents*. Cambridge University Press, Cambridge
- Crane T, Mellor DH (1990) There is no question of physicalism. *Mind* 99:185–206
- Darwall S, Gibbard A, Railton P (1992) Toward fin de siècle ethics: some trends. *Philos Rev* 101:115–189
- Dawid R (2013) String theory and the scientific method. Cambridge University Press, Cambridge
- De Caro M (2015) Realism, common sense, and science. *Monist* 98(2):197–214
- De Caro M (2020) The indispensability of the manifest image. *Philos Soc Criticism* 46(2):162–172

- De Caro M (2022) Liberal naturalism: origins and prospects. In: De Caro M, Macarthur D (eds) *The Routledge handbook of liberal naturalism*. Routledge, Milton Park, pp 205–217
- De Caro M, Macarthur D (eds) (2004) *Naturalism in question*. Harvard University Press, Cambridge
- De Caro M, Macarthur D (eds) (2010) *Naturalism and normativity*. Columbia University Press, New York
- De Caro M, Macarthur D (eds) (2022) *The Routledge Handbook of Liberal Naturalism*. Routledge, London
- Dennett D (1995) *Darwin's dangerous idea*. Simon and Schuster, New York
- Dennett D (2006) The hoax of intelligent design and how it was perpetrated. In: Brockman J (ed) *Intelligent thought: science versus the intelligent design movement*. Vintage, New York, pp 33–49
- Dewey J (1929) *Experience and nature*. Allen and Unwin, London
- Dupré J (1995) *The disorder of things: metaphysical foundations of the disunity of science*. Harvard University Press, Cambridge
- Dupré J (2004) The miracle of monism. In: De Caro M, Macarthur D (eds) *Naturalism in question*. Harvard University Press, Cambridge, pp 36–58
- FitzPatrick S (2014) Moral realism, moral disagreement, and moral psychology. *Philos Pap* 43(2):161–190
- Garfinkel A (1991) Reductionism. In: Boyd R, Gaspar P, Trout JD (eds) *The philosophy of science*. MIT Press, Cambridge, pp 456–457
- Gozzano S, Hill C (eds) (2012) *New Perspectives on Type Identity. The Mental and the Physical*. Cambridge University Press, Cambridge
- Heathwood C (2015) Irreducibly normative properties. *Oxf Stud Metaethics* 10:216–244
- Horst S (2007) *Beyond reduction. Philosophy of mind and post-reductionist philosophy of science*. Oxford University Press, Oxford
- Joyce R (2005) Moral fictionalism. In: Kalderon ME (ed) *Fictionalism in metaphysics*. Oxford University Press, Oxford, pp 287–313
- Kim J (2007) *Physicalism, or something near enough*. Princeton University Press, Princeton
- Kovacs M (2019) The myth of the myth of supervenience. *Philos Stud* 176(201):1967–1989
- Ludwig D, Rupy S (2021) Scientific pluralism. In: Zalta EN (ed) *The Stanford encyclopedia of philosophy*. Stanford University, Stanford
- Macarthur D (2019) Liberal naturalism and the scientific image of the world. *Inquiry* 62:565–585
- Macdonald G (2006) The two natures: another dogma? In: Macdonald C, Macdonald G (eds) *McDowell and his critics*. Blackwell, Singapore, pp 222–234
- Mackie J (1977) *Ethics. Inventing right and wrong*. Penguin, London
- Maddy P (2005) Three forms of naturalism. In: Shapiro S (ed) *Oxford handbook of the philosophy of mathematics and logic*. Oxford University Press, Oxford, pp 437–459
- Maudlin T (2019) *Philosophy of physics: quantum theory*. Princeton foundations of contemporary philosophy. Princeton University Press, Princeton
- McDowell J (1988) Two sorts of naturalism. reprinted in id., *Mind, language, and reality*. Harvard University Press, Cambridge, pp 167–197
- McDowell J (1994) *Mind and world*. Harvard University Press, Cambridge
- McDowell J (2006) Response to Bilgrami. In: Macdonald C, Macdonald G (eds) *McDowell and his critics*. Blackwell, Oxford, pp 66–72
- McGinn C (1993) *Problems in philosophy*. Blackwell, Oxford
- McLaughlin B, Bennett K (2018) Supervenience. In: Zalta EN (ed) *The Stanford encyclopedia of philosophy*. Stanford University, Stanford. <https://plato.stanford.edu/entries/supervenience/>
- Moore GE (1922) The conception of intrinsic value. In: Moore GE (ed) *Philosophical studies*. Routledge, London, pp 253–275
- Nagel T (1985) *The view from nowhere*. Oxford University Press, Oxford
- Oppenheim P, Putnam H (1958) The unity of science as a working hypothesis. In: Feigl H et al (eds) *Minnesota studies in the philosophy of science*, vol 2. Minnesota University Press, Minneapolis, pp 3–36
- Parfit D (2011) *On what matters*. Oxford University Press, Oxford
- Pereboom D (2014) *Free will, agency, and meaning of life*. Oxford University Press, Oxford
- Price H (2004) Naturalism without representationalism. In: De Caro M, Macarthur D (eds) *Naturalism in question*. Harvard University Press, Cambridge, pp 71–105
- Price H (2011) *Naturalism without mirrors*. Oxford University Press, Oxford
- Putnam H (2008) Reply to Stephen White. *Eur J Anal Philos* 4(2):29–32
- Putnam H (2021) From quantum mechanics to ethics and back again. In: De Caro M, Macarthur D (eds) *Philosophy in an age of science*. Harvard University Press, Cambridge, pp 51–71
- Rosenberg A (2009) The disenchanted naturalist's guide to reality. <https://nationalhumanitiescenter.org/onthe-human/2009/11/the-disenchanted-naturalists-guide-to-reality/>
- Roskies A (2021) Neuroethics. In: Zalta EN (ed) *The Stanford encyclopedia of philosophy*. Stanford University, Stanford. <https://plato.stanford.edu/entries/neuroethics/>
- Scanlon T (2015) *Being realistic about reasons*. Oxford University Press, Oxford
- Schaffer J (2018) Monism. In: Zalta EN (ed) *The Stanford encyclopedia of philosophy*. Stanford University, Stanford. <https://plato.stanford.edu/entries/monism/>
- Searle J (2007) *Freedom and neurobiology. Reflections on free will, language, and political power*. Columbia University Press, New York, pp 4–5
- Smolin L (2007) *The troubles of physics. The rise of string theory, the fall of a science, and what comes next*. Mariner Books, Boston
- Spiegel TJ (2023) Normativity between naturalism and phenomenology. *Int J Philos Stud*. <https://doi.org/10.1080/09672559.2022.2160782>
- Strawson PF (1985) *Skepticism and naturalism: some varieties*. Columbia University Press, New York
- van Inwagen P (2017) *Thinking about free will*. Cambridge University Press, Cambridge
- Wedgwood R (2007) *The nature of normativity*. Clarendon Press, Oxford
- Weisberg M, Needham Paul P, Robin H (2019) Philosophy of chemistry. In: Zalta EN (ed) *Stanford encyclopedia of philosophy*. Stanford University, Stanford. <https://plato.stanford.edu/entries/chemistry/>
- Wyss P (2018) Emergence: inexplicable but explanatory. In: Vintiadis E, Mekios C (eds) *Brute facts*. Oxford University Press, Oxford, pp 213–233
- Wyss P (2023) Diachronic emergence as transubstantiation. *Philosophia*. <https://doi.org/10.1007/s11406-022-00605-w>
- Zeki S (2008) *Splendors and miseries of the brain. Love, creativity, and the quest for human happiness*. Blackwell, Oxford

Publisher's Note Springer Nature remains neutral with regard to jurisdictional claims in published maps and institutional affiliations.