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Ten reasons to embrace scientism

Rik Peels

Philosophy Department, Vrije Universiteit Amsterdam, De Boelelaan 1105, 1081 HV Amsterdam, The Netherlands

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ABSTRACT

A strong version of scientism, such as that of Alex Rosenberg, says, roughly, that natural science reliably delivers rational belief or knowledge, whereas common sense sources of belief, such as moral intuition, memory, and introspection, do not. In this paper I discuss ten reasons that adherents of scientism have or might put forward in defence of scientism. The aim is to show which considerations could plausibly count in favour of scientism and what this implies for the way scientism ought to be formulated. I argue that only three out of these ten reasons potentially hold water and that the evidential weight is, therefore, on their shoulders. These three reasons for embracing scientism are, respectively, particular empirical arguments to the effect that there are good debunking explanations for certain common sense beliefs, that there are incoherences and biases in the doxastic outputs of certain common sense sources of belief, and that beliefs that issue from certain common sense doxastic sources are illusory. From what I argue, it follows that only a version of scientism that is significantly weaker than many versions of scientism that we find in the literature is potentially tenable. I conclude the paper by stating what such a significantly weaker version of scientism could amount to.

> "If we're going to be scientistic, then we have to attain our view of reality from what physics tells us about it. Actually, we'll have to do more than that: we'll have to embrace physics as *the whole truth about reality*. (…) We trust science as the only way to acquire knowledge."
>
> (Alex Rosenberg)

> "What, after all, have we to show for non-scientific or pre-scientific good judgment, or common sense, or the insights gained through personal experience? It is science or nothing."
>
> (B.F. Skinner)[1]

Introduction

This paper provides an assessment of ten reasons that might be given for embracing scientism. It discards seven reasons as providing insufficient or no support and identifies three reasons that potentially count in favour of scientism.

Scientism has recently become increasingly popular among scientists, philosophers, and popular science writers.[2] It can be construed as a thesis, an attitude, or a stance. Susan Haack, for instance, defines it as a particular attitude and uses 'scientism' as a pejorative term:

> Scientism is an exaggerated kind of deference towards science, an excessive readiness to accept as authoritative any claim made by the sciences, and to dismiss every kind of criticism of science or its practitioners as anti-scientific prejudice.[3]

In this paper, for two reasons, I treat scientism as a *thesis* rather than an attitude or a stance. First, as evidenced by the quotations and references I give in this paper, scientism as a thesis is, if not ubiquitous, certainly frequently found in the writings of scientists and philosophers. Second, it seems that every attitude, affection, or stance, at least if it is to be rational and if it is to be up for debate,[4] can be translated into a thesis, such as the thesis that *we should have* that affection, attitude, or stance, or the thesis that it is

E-mail address: mail@rikpeels.nl.

[1] Rosenberg, 2011, p. 20; Skinner, 1971, pp. 152–153.

[2] For some garden-varieties of scientism, see the overview in De Ridder, 2014.

[3] Haack, 2007, pp. 17–18.

[4] Thus, attitudes such as my preference of film over musical theater does *not* count as a relevant sort of attitude, since it is not meant as a general and rational attitude that I take to be normative—I do *not* think that everyone ought to prefer milk chocolate over dark chocolate. Scientism clearly *does* count as such an attitude, since the adherent of scientism takes it that scientism is a good attitude that everyone ought to adopt. At least, this is clearly what adherents of scientism such as Rosenberg and Ladyman have in mind.

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permissible to have that affection, attitude, or stance. Thus, no matter how one understands 'scientism', it will always imply some scientistic thesis or other. It seems, therefore, entirely warranted to treat scientism as a thesis.

Also, in opposition to Haack, I will use the term 'scientism' *non-pejoratively*. True, the term 'scientism' is often used negatively, but it need not be. For instance, James Ladyman and Don Ross in their book *Every Thing Must Go* explicitly say that they adhere to scientism and go on to defend it in detail.[5] Thus, to say that something is an instance of scientism is *not* thereby to take a positive or negative stance towards the claim in question.

Construed as a thesis, scientism can be interpreted, among others, as a methodological, existential, ontological, or epistemological claim.[6] Elsewhere, I have argued that virtually all varieties of scientism imply some kind of scientistic *epistemological* thesis.[7] The thesis is usually that the natural sciences, such as biology, chemistry, and particularly physics, provide rational belief or knowledge and do so *reliably*, whereas common sense doxastic sources – sources of belief – do not. In this article, I focus on the claim that only natural science provides *rational belief* or *knowledge*.

One might think that this view is implausibly strong. Do the humanities, such as history and philosophy, for instance, not deliver any rational belief or knowledge? Surprisingly, though, a fair number of adherents of scientism *do* indeed embrace a strong view on which only the *natural* sciences deliver rational belief and knowledge. Alex Rosenberg is quite explicit that the humanities certainly do *not* do so:

> When it comes to real understanding, the humanities are nothing we have to take seriously, except as symptoms. But they are everything we need to take seriously when it comes to entertainment, enjoyment, and psychological satisfaction. Just don't treat them as knowledge or wisdom.[8]

Other adherents of scientism do not explicitly use the word 'knowledge' or the phrase 'rational belief', but make claims that are conceptually highly similar to this and that can easily be understood along these lines. According to Daniel Dennett, for instance, "when it comes to fact, and explanations of facts, science is the only game in town."[9] Some might be willing to count, say, philosophy among the sciences, but many adherents of scientism *expressis verbis* reject this option. The renowned physicist Stephen Hawking famously declared at the 2011 Google Zeitgeist Conference that "philosophy is dead" and that "scientists have become the bearers of the torch of discovery in our quest for knowledge."[10]

We find echoes of such scientistic approaches in philosophy as well, such as W.V.O. Quine's defence of the idea that epistemology needs to be naturalized. As Susan Haack explains in detail, Quine's naturalism is ambiguous between at least three mutually incompatible kinds of naturalism, but each version implies at least that many traditional epistemological questions ought to be abandoned in favour of or replaced by the sciences, where sometimes 'sciences' is understood broadly by Quine, whereas at other times he clearly has only natural science in mind.[11] To give an example of the latter, in "The Nature of Natural Knowledge", Quine says: "Epistemology is best looked on, then, as an enterprise within natural science."[12] Another example from philosophy is Stephen Stich's and Patricia Churchland's claim that neuroscience tells us that there are no such things as beliefs, so that folk psychology – which is usually cashed out in terms of belief-desire pairs – is radically misguided.[13]

Of course, there are also academic disciplines that count neither as humanities nor as natural sciences, such as social science and economics. Some adherents of scientism are explicit that even those sciences do not deliver knowledge. According to E.O. Wilson, "[i]t may not be too much to say that sociology and the other social sciences, as well as the humanities, are the last branches of biology waiting to be included in the Modern Synthesis."[14] His idea seems to be that *all* academic disciplines should be reduced to the natural sciences, especially to biology. Francis Crick claims that everything can be explained by physics and chemistry[15] and Alex Rosenberg defends the view that physics is the whole truth about reality.[16]

Paradigmatic cases of scientism, then, claim that only the natural sciences can deliver rational belief or knowledge. There are also slightly weaker versions of scientism, on which, say, psychology and sociobiology can deliver rational belief and knowledge. I consider these theses close enough to the paradigmatic cases to also count as versions of scientism. I will, therefore, at several junctures in the paper pay attention to them as well.

One might wonder how scientism relates to naturalism. In order to answer this question, we should note that the term 'naturalism' is used in a variety of ways. Many define 'naturalism' as the view that only natural entities exist or that only natural, as opposed to supernatural or spiritual, forces operate in the world. For example, Michael Ruse says: "What do we mean by 'naturalism'? I presume that it is something set off against 'supernaturalism', and that this latter refers to a God or gods and their intervention in this world of ours."[17] This means that, even though no strict implication holds between scientism and naturalism (scientism is an epistemological principle, whereas naturalism is usually understood as an ontological thesis), virtually all varieties of scientism come with naturalism: only the natural sciences deliver knowledge or rational belief, because there is no knowledge to be had by moral intuition, revelation, or some such thing (since there is no moral or supernatural reality that corresponds to it). On this definition of 'naturalism', scientism is significantly stronger than naturalism, though—many adherents of naturalism would even consider scientism, thus understood, as naturalism gone overboard. This is because scientism also claims that *only natural science* provides rational belief or knowledge, whereas other adherents of naturalism, understood along these lines, can also admit other sources of rational belief and knowledge, such as introspection, memory, and various other academic disciplines, including the humanities.

On other definitions of 'naturalism', naturalism and scientism are even closer to each other. John Post, for instance, defines 'naturalism' as "the twofold view that (1) everything is composed of natural entities – those studied in the sciences (on some versions, the natural sciences) – (…) (2) acceptable methods of justification and explanation are continuous, in some sense, with those in

[5] See Ross, Ladyman, & Spurrett, 2007. Alex Rosenberg also describes himself as an adherent of scientism. See Rosenberg, 2011, p. 6.

[6] See Stenmark, 2001.

[7] See Peels, 2018.

[8] See Rosenberg, 2011, p. 307.

[9] Interview by Sholto Byrnes in the *New Statesman*, April 10th, 2006.

[10] See Matt Warman, "Stephen Hawking Tells Google 'Philosophy Is Dead'", *The Telegraph*, May 11th, 2011. He makes the same point in almost the same words in Hawking and Mlodinow 2010, p. 5.

[11] The ambiguity is clearly found in Quine, 1969 and spelled out in detail by Haack, 2009, pp. 167–189. See also Kim, 2008.

[12] Quine, 1975, p. 68.

[13] See Churchland, 1987, and Stich, 1983. For a detailed criticism, see Haack, 2009, pp. 213–238.

[14] Wilson, 1975, p. 4.

[15] See Crick, 1966, pp. 14, 98.

[16] See Rosenberg, 2011, p. 25.

[17] See Ruse, 2013, p. 383.

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science."[18] On this definition of 'naturalism', scientism and naturalism are even closer related to each other, because the sciences are central to this definition of 'naturalism'. Yet, even on these definitions, they are *not* identical, for, again, on naturalism, thus understood, non-scientific knowledge about the natural entities acknowledged by science may be possible.

Adherents of scientism trust the deliverances of science as opposed to the deliverances of sources of belief that are not scientific and that do *not* closely resemble scientific belief sources. I will refer to these doxastic sources as 'common sense sources of belief' and to their products as 'common sense beliefs'. I use the term 'common sense' rather than 'rational intuition'. After all, many non-scientific sources of belief that are often considered to be sufficiently reliable to deliver rational belief and knowledge, such as memory, are not based on *rational intuition*. Also, I use the term 'common sense' rather than '*a priori* reasoning' since there is much *a priori* reasoning in natural science (in theoretical physics, for instance). Finally, I use the term 'common sense' rather than 'revelation or divine inspiration', since 'common sense' is much broader and, therefore, captures many beliefs, such as moral beliefs and beliefs based on introspection, that are widely considered to be rational and instances of knowledge. Moreover, many adherents of scientism and opponents of scientism alike reject revelation or divine inspiration as a reliable source of knowledge. The bone of contention is really these other alleged sources of rational belief and knowledge, such as moral intuition, introspection, memory, and so forth, so that using the term 'common sense' is more helpful for the issue under consideration.

Now, the term 'common sense' is used in a wide variety of ways in the philosophical literature. For the purposes of this paper, let me specify the types of belief that I take to issue from common sense doxastic sources by way of the following four conditions that I take – stipulatively, in the case of (iii) – to be individually necessary and jointly sufficient for something to be a common sense belief. Common sense beliefs are:

(i) *not* based on scientific research;
(ii) *not* the product of elaborate lines of reasoning, such as the kinds of reasoning we find in journalistic inquiry and criminal investigation;
(iii) *not* the direct deliverances of one or more of the senses;
(iv) the kinds of beliefs that many people have.

Other philosophers have specified similar conditions as necessary for some belief to count as a *common sense* belief.[19] Let me briefly explain why I take these four conditions to be individually necessary and jointly sufficient for something to count as a common sense belief.

Condition (i) seems necessary by definition, at least in the context of the present discussion, for adherents of scientism reject common sense beliefs in favour of beliefs based on science.

Condition (ii) seems also necessary, for it is plausible that if beliefs based on scientific research are often rational and count as knowledge, then beliefs based on other kinds of detailed research will often also be rational, since the research involved by employing those other methods is often as careful and meticulous as scientific investigation. One might even think that some journalistic, criminal, and legal investigation so closely resembles what is done in natural science, that the deliverances of these kinds of investigation will have to count as rational as well, but I will not delve into that. Rather, for the sake of argument, I will *not* count these beliefs as common sense beliefs, in order to focus on the basic beliefs sources that adherents of scientism explicitly reject, such as moral intuition, memory, and introspection. (I *do* believe, though, that defining 'common sense' in this way also squares well with how various defenders of the common sense traditions define 'common sense': they would say beliefs on the basis of, say, criminal investigation are based on common sense beliefs, *not* that they are themselves common sense beliefs.)

For the sake of the argument, I have included condition (iii) – that the beliefs in question are *not* the direct deliverances of one or more of the five senses – among the four necessary conditions. This is because it seems natural science cannot even get started without making use of evidence provided by the senses: science is *based on* the evidence of the senses. If the senses were among the belief sources that adherents of scientism reject, they could not rationally embrace scientific results and they would, thus, have to reject science itself. The main reason for this is that it seems that one *cannot* do science without, at least at some points, trusting the deliverances of the senses, such as beliefs based on visual perception. If the senses were considered unreliable and the beliefs they give rise to as irrational, science could not get off the ground. Science itself could, therefore, not deliver rational beliefs either. Elsewhere, I have defended this argument in more detail.[20] The evidence of the senses is a demilitarized zone for proponents and opponents of scientism: they agree that beliefs directly based on the senses are usually rational and instances of knowledge. This is not to deny that there may be some differences on how they treat the senses: adherents of scientism may claim that sensory evidence needs to be processed, quantified, analysed, and regimented in certain ways in order to provide a secure basis for our beliefs. But I leave these details for another occasion.

It is important to stress that I take this third condition to be necessary for common sense belief, because sometimes the deliverances of the senses *are* considered as common sense beliefs, such as in the debate on external world scepticism. For instance, G.E. Moore's conviction that he has hands is often referred to as a common sense belief.[21] Thus, I would like to emphasize that I use the expression 'common sense' somewhat differently than it is sometimes used in philosophy. My definition is to some extent stipulative, in order to isolate the class of beliefs that the adherent of scientism rejects as irrational.

Finally, (iv) is another condition that seems necessary for something to be a common sense belief. For, kinds of beliefs that very few people hold are not infrequently irrational. Here, we can think of such beliefs as sectarian beliefs about upcoming apocalyptic events. Such beliefs are widely discarded as irrational and should not be taken to bear on the issue of whether or not common sense can be sufficiently trusted (is sufficiently reliable) and whether its deliverances can, therefore, be rationally embraced.

Examples of common sense beliefs as I have just defined the term are moral beliefs, memorial beliefs, beliefs about one's reasons for doing something, some religious beliefs, basic mathematical beliefs, basic logical beliefs, beliefs about whether or not one performed an action freely or not, beliefs regarding the truth of falsehood of certain metaphysical principles, and beliefs issuing from introspection.

According to adherents of a strong version of scientism, *all* common sense sources of beliefs are unreliable – that is, produce

[18] Post, 2015, p. 699. For a similar definition, see Danto, 1967, p. 448.

[19] Lemos, 2004, pp. 1–13, for instance, specifies two conditions that he takes to be necessary for beliefs to count as common sense beliefs that are close to conditions (ii) and (iv). First, common sense beliefs are not based on arguments, and, second, these beliefs are widely and deeply held.

[20] Peels, 2017.

[21] Moore himself does so as well. See Moore, 1925.

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false beliefs in the preponderance of cases – and, given that we know this, they cannot be held rationally. And, obviously, the same applies to the doxastic deliverables of academic disciplines that to a large extent rely on these kinds of belief, such as theology, hermeneutics, metaphysics, literary criticism, ethics, and psychology that uses introspective methods. Only natural science produces rational belief. For instance, according to Alex Rosenberg, who is among the most strong-voiced advocates of scientism in our times, scientism:

> (…) is the conviction that the methods of science are the only reliable ways to secure knowledge of anything; that science's description of the world is correct in its fundamentals (…) Science provides all the significant truths about reality, and knowing such truths is what real understanding is all about. (…) Being scientistic just means treating science as our exclusive guide to reality, to nature—both our own nature and everything else's.[22,23]

Weaker versions of scientism discard only *some* common sense sources of belief. Otto Neurath, James Ladyman, Don Ross, and David Spurrett, for example, adopt a weaker version of scientism when they discard metaphysical intuition as unreliable in favour of scientific knowledge.[24] Daniel Dennett and Eric Schwitzgebel embrace another weak version of scientism, for they claim that introspection is untrustworthy and that we should rely only on natural science when it comes to beliefs about ourselves.[25] Both metaphysical intuition and introspection are *common sense* sources of belief, because, say, the belief that backward causation is impossible and the belief that I intend to finish reading a particular book today are *not* based on scientific research, elaborate lines of reasoning, or one of the senses, and they are the kinds of beliefs many people have.

The aim of this paper is to explore the main reasons for embracing scientism. There is much that, intuitively, counts in favour of scientism, but, as we shall see, little that holds up to careful scrutiny—at least to the extent that it is taken to count in favour of scientism. I will consider ten reasons for embracing scientism:[26]

1. Science is highly successful
2. The applications of science are everywhere
3. Beliefs based on science can be tested or corroborated
4. Many scientific results are counter-intuitive
5. Science has safety mechanisms
6. We understand the genesis of scientific knowledge
7. Common sense beliefs display vast disagreement
8. Science provides debunking explanations of common sense beliefs
9. Science shows common sense to be permeated with biases
10. Science demonstrates that many common sense beliefs are illusory

I do *not* claim that this list is exhaustive; there might be further reasons to embrace scientism. The selection of these ten reasons is based on defences of scientism that we find in the literature – we shall encounter several examples below – and on personal conversations I have had with several philosophers and scientists who champion scientism. When I say that I will *explore* these reasons, I mean that I will investigate (a) what these reasons amount to, (b) to what extent, if these reasons are correct, they count in favour of scientism, and (c) what evidential work needs to be done with regard to these reasons in order to build a plausible case for scientism. The nature of this paper is, therefore, exploratory, and the main purpose is to identify where the evidential weight for scientism is to be found—that is, which arguments carry sufficient weight to potentially provide good reason to embrace scientism. My discussion of several reasons will, therefore, be relatively brief.

Below, I argue that only *three* of these reasons are potentially good reasons to embrace scientism. It will turn out that whether or not scientism is tenable depends on (evolutionary) debunking explanations of religious and moral beliefs, empirical research allegedly showing that there is widespread and reliability undermining bias in our logical and statistical reasoning, and scientific research that shows that our metaphysical views about such things as acting for reasons and free will are illusory.

1. Science is highly successful

Unnecessary to say, science has been highly successful in that it has unearthed countless truths about the world—at least, that is what (most) scientists and non-scientists alike believe. Science is epistemically speaking an enormous achievement. Importantly, science has discovered many truths (1) that we would have not discovered without science, (2) that are not infrequently extremely complex and detailed, and (3) that are sometimes in a way grand and unifying, giving us insight into a wide variety of phenomena by way of a single theory. For example, without science we would have known nothing about the subatomic realm; general relativity theory and special relativity theory are both highly complex and detailed; and the theory of monogenetic evolution by random mutation and natural selection gives us a deep and unifying understanding of what explains the biodiversity in the world around us.

Some philosophers and scientists take such considerations to provide a reason for embracing scientism. According to Alex Rosenberg, for instance, "[t]he phenomenal accuracy of its prediction, (…) and the breath-taking extent and detail of its explanations are powerful reasons to believe that physics is the whole truth about reality."[27] Don Ross, James Ladyman, and David Spurrett also appeal to the success of science in their defence of scientism and their rejection of non-naturalistic metaphysics.[28]

Does this consideration provide a good reason to embrace scientism? No, it does not. The fact, if it is a fact, that beliefs from one belief source or set of beliefs sources (science in this case) are usually true, does *as such* not count against the truth or rationality of beliefs from *other* sources, such as common sense. This is not to deny that many scientific truths (true beliefs) may be more detailed and more encompassing than many common sense beliefs. The issue under consideration, though, is whether or not this first reason is a good reason to think that beliefs from common sense sources are *not* rational because they are unreliably produced. And a theory on which a belief is rational only if it is highly detailed and encompassing would, obviously, be implausible.

[22] Rosenberg, 2011, pp. 6–8. For a similar claim, see Atkins, 1995.

[23] This is also how people who do *not* endorse scientism often understand the term. For example, Allan Bullock and Stephen Trombley take scientism to be "the view that the characteristic inductive methods of the natural sciences are the only source of genuine factual knowledge and, in particular, that they alone can yield true knowledge about man and society." (Bullock and Trombley 1999, p. 775).

[24] See Neurath, 1987, pp. 7–11; Ross et al., 2007.

[25] See Dennett, 1991; 2003; Schwitzgebel, 2011. I have discussed their arguments for their restricted version of scientism elsewhere. See Peels, 2016.

[26] The order in which I discuss them is more or less arbitrary. I have put the three reasons that I take to potentially count in favour of scientism at the end of the list.

[27] Rosenberg, 2011.

[28] See Ross et al., 2007, p. 7.

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This first reason may be a good reason to be impressed by science, to have respect for science, and to accept many beliefs that are based on scientific research. It may, in conjunction with some further argumentation, even be a good reason to think that most of our beliefs based on scientific research – or maybe certain kinds of scientific results – are rational.[29] However, it is as such *not* a good reason to embrace scientism.

2. The applications of science are everywhere

A second reason for embracing scientism is its great powers of application. Science has deeply affected our lives by radically changing transportation, medicine, agriculture, and virtually any other area of our lives. One reason to think that it has been so impressively practically successful is its *epistemic* success that I discussed in the previous section. This argument in favour of scientism is not *identical* to the one discussed in the previous section, though, for another explanation that one might embrace for the successful applications of science is that science is somehow empirically adequate, whether or not it is also largely true. In any case, it is hard not to be impressed with the pervasiveness of science's applications in our society and one might think that this is a good reason to embrace scientism.

Again, though, this gives us no reason to think scientism is true. First, obviously, the fact that beliefs from a particular source or set of sources *A* are extremely useful and can be applied in all sorts of ways, does as such not mean that beliefs from another source or set of sources *B* are *not* useful and can*not* be applied in all sorts of ways. In fact, it seems that we apply common sense beliefs all the time. We eat because we notice that we are hungry and set up a court because we believe that justice ought to be done. Of course, many common sense beliefs, as I defined them above, do not lead to *technological* applications and are, therefore, not *technologically* useful, but why would that count against them?

Second, even if common sense beliefs were in no way applicable or useful, that as such would *not* count against their *rationality*. There is no reason whatsoever to think that a belief is rational – epistemically rational – only if it can in some way be applied. In fact, much fundamental scientific research, such as research on what happened in the first few miliseconds after the big bang, has never had and may never lead to applications. Clearly, that does not render it irrational or beyond the realm of rationality.

Thus, the fact that the applications of natural science are everywhere gives us good reason to treat natural science with due respect, but *not* to reject common sense sources of belief as unreliable and their deliverances as irrational or non-rational.

3. Beliefs based on science can be tested or corroborated

A third reason to embrace scientism is that the deliverances of science – beliefs based on natural scientific research – can be tested or corroborated. The idea is that one can in principle set up an experiment in order to check for oneself whether the belief in question is true. In this regard, one might suggest, beliefs based on scientific research differ radically from common sense beliefs. After all, if someone believes that she intends to finish reading a particular book today, it cannot be tested whether or corroborated that she indeed has that intention—even though it could be tested whether she displays the relevant behaviour (but that is, of course, not identical to having the intention). *Mutatis mutandis* the same applies to other common sense beliefs, such as moral beliefs and religious beliefs. We cannot test or corroborate that torturing someone for the fun of it is morally apprehensible, even though we *can* test whether people *believe* or *intuit* (or, at least, assert) that doing so is morally apprehensible. And we cannot test or corroborate that God has answered one's prayer, even though we *can* often test whether the state of affairs one prayed for did in fact obtain.

At least two things need to be said in reply. First, a substantial number of common sense beliefs *can* be tested or corroborated. For example, I can check a belief based on memory by revisiting my memory. Doing so sometimes leads to belief revision. I can also check the belief by asking other people about how they remember the things I think I remember, look things up online, or consult another source that does not rely primarily on my own memory. One might reply that science has specific ways of checking one's beliefs that common sense lacks, namely safety mechanisms such as anonymous peer review, that other people can employ and that give us good reason to discard common sense in favour of beliefs based on scientific research. I return to this idea below (in Section 5).

Second, it is not at all clear why we should think that a belief is rational only if it can be tested or corroborated. Testing or corroborating may *increase* the reliability of belief formation, but, obviously, it does not follow that without testing or corroborating there is insufficient reason to think that the belief was reliably formed and that the belief, therefore, does not count as rational. In fact, as I have argued elsewhere, science is *based on* beliefs that usually are not and sometimes cannot be corroborated, such as certain introspective and memorial beliefs.[30]

4. Many scientific results are counter-intuitive

A fourth reason to buy into scientism is that many scientific results are counter-intuitive and seem to contradict common sense. Here, we can think of such things as curved space-time, the bilocation of electrons, and other bizarre phenomena in the natural world.

Adherents of scientism explicitly appeal to this fact in defending scientism. For instance, according to Lewis Wolpert, in his book *The Unnatural Nature of Science*, "both the ideas that science generates and the way in which science is carried out are entirely counter-intuitive and against common sense—by which I mean that scientific ideas cannot be acquired by simple inspection of phenomena and that they are very often outside everyday experience (…) I would almost contend that if something fits with common sense it almost certainly isn't science."[31] Ross, Ladyman, and Spurrett claim that "[a]ttaching epistemic significance to metaphysical intuitions is anti-naturalist (…) it requires ignoring the fact that science, especially physics, has shown us that the universe is very strange to our inherited conception of what it is like."[32] And, according to Rosenberg, "[s]cience – especially physics and biology – reveals that reality is completely different from what most people think. It's not just different from what credulous religious believers think. Science reveals that reality is stranger than even many atheists

[29] Whether it does so will in part also rely on the track record of science. If Thomas Kuhn (1970), for instance, is right that natural science displays a change from one paradigm to another without one paradigm (or the theories within that paradigm) being more true than another, then we have no reason to think that beliefs based on scientific research are rational—at least not rational in a sense that transcends particular paradigms.

[30] Peels, 2018. For another argument against scientism, see my "Scientism and the Argument from Self-Referential Incoherence", *unpublished manuscript*.

[31] See Wolpert, 1992, pp. 1, 11.

[32] Ross et al., 2007, p. 10.

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recognize."[33] Wolpert, Ross, Ladyman, Spurrett and Rosenberg take the counter-intuitiveness of science to be a good reason to doubt that common sense beliefs are rational (either in general or in the realm of metaphysics).

Even though many results from natural science are indeed counter-intuitive, it seems to me that this is *not* a convincing argument in favour of scientism. What the 'unnatural nature' of science, as Wolpert calls it, shows is that humans should be reluctant to form substantial physical or metaphysical *a priori* common sense beliefs about phenomena that we find on a level far lower or far higher than the level of things that we deal with in daily life. Common sense beliefs about the nature of space-time or the movements of subatomic particles are unlikely to be reliably formed and since we (now) know that, we cannot rationally hold such beliefs. However, it seems to me that people hardly hold any common sense beliefs about such issues—and I pointed out in the Introduction that beliefs count as common sense beliefs only if they are the kinds of beliefs that are widely held. People may have the disposition to form certain beliefs about such things, upon some reflection but since they have never even remotely considered these issues, on most accounts of belief, they would not count as holding beliefs on these matters. Moreover, many cases in which people *do* form beliefs about these things fail to meet condition (iii) of common sense beliefs: they are *not* the kinds of beliefs many people have. Thus, some students in class may be surprised or even disbelieve certain truths from transfinite cardinal arithmetic, such as that $\aleph_0 + \aleph_0 = \aleph_0$, and that $\aleph_0 \cdot \aleph_0 = \aleph_0$. But since these are not the kinds of beliefs *many* people have, they do not count as common sense beliefs and their falsehood does, therefore, not count against the reliability of common sense. Finally, it seems many people, upon being asked about these things, have certain *expectations* or *hunches* with regard to these matters, but that is rather different from full-fledged beliefs. An exception to this may be some philosophers. As Ross, Ladyman, and Spurrett rightly point out:

> Philosophers have often regarded as impossible states of affairs that science has come to entertain. For example, metaphysicians confidently pronounced that non-Euclidean geometry is impossible as a model of physical space, that it is impossible that there not be deterministic causation, that non-absolute time is impossible, and so on. Physicists learned to be comfortable with each of these ideas, along with others that confound the expectations of common sense more profoundly.[34]

This is a point worthwhile to make. However, for at least three reasons it does not count in favour of scientism. First, many of these beliefs philosophers hold are based on some kind of argument and to the extent that they are, they will no longer count as *common sense* beliefs, as I defined them in the Introduction to this paper. Second, what this point implies is that *certain philosophers* should be more modest when it comes to their metaphysical judgements. But then many philosophers *are* modest when it comes to their *a priori* judgements about such things as the possibility of non-Euclidean geometry, and, to the extent that they defend theses in these areas, they are reluctant to ascribe full-fledged rational belief on these matters to themselves. Finally, most people are *not* philosophers and do not hold any beliefs about these things; many of them will not even have considered such matters.

Of course, some kinds of common sense beliefs, such as religious and moral common sense beliefs, concern things that in a sense exceed the scale of the things that we deal with in daily life. After all, God, if he exists, is infinite and perfect in all regards (at least, that is true on the Anselmian conception of God that most philosophers of religion endorse), and moral truths are often taken to be necessarily true. However, the unnatural nature of science clearly does *not* count against these kinds of common sense beliefs, since science has not produced any results that count against *the truth* of such beliefs.[35] One might think that there are nonetheless good *debunking* explanations for these beliefs, that is, good reasons to think that these beliefs are unreliably formed. Since this consideration seems to be rather different from the thought that the results of science are counter-intuitive, I will treat it separately below, in Section 8.

5. Science has safety mechanisms

Science, in the course of its history, has learned to build in all sorts of mechanisms and practices that are meant to increase its reliability by making it as much as possible immune to all sorts of subjective preferences and other non-alethic considerations that might deviate from the path that leads to truth. Here, we can think, for instance, of the detailed exposition of the experimental set-up, the methods that were employed, and the resulting data that is more or less standard in contemporary publications, the anonymous peer review practiced by virtually all academic journals nowadays, and the double blindness that is constitutive of Randomized Controlled Trials for new drugs. This point is, clearly, close to the third reason to embrace scientism—the idea that much of science can be tested or corroborated. The point under consideration is slightly different, though, for here, we are talking about the *safety mechanisms* that are built into regular research, not about the ways research that has already been carried out – so, the results of research already done – can be tested or corroborated. Common sense has no such safety mechanisms and one might take this to be a good reason to accept scientism, for one might take it to imply that common sense is insufficiently reliable. In defending scientism, Rosenberg, for instance, says:

> In science, nothing is taken for granted. Every significant new claim, and a lot of insignificant ones, are sooner or later checked and almost never completely replicated. More often, they are corrected, refined, and improved on—assuming the claims aren't refuted altogether. Because of this *error-reducing process*, the further back you go from the research frontier, the more the claims have been refined, reformulated, tested, and grounded."[36]

This argument in favour of scientism fails for three reasons. First, it is simply false that common sense has no safety mechanisms. Of course, it does not have double blind clinical trials or anonymous peer review—that would in fact turn common sense into something much closer to science. But it *does* have other safety mechanisms. There is reconsidering the issue in question, discussing the matter with those who disagree, comparing the belief in question with the deliverances of other common sense faculties, and so forth.

Second, even if the above kinds of mechanisms and procedures make science *more reliable than it would otherwise have been*, that as

[33] Rosenberg, 2011.

[34] Ross et al., 2007, p. 16.

[35] This is *not* to say that science has not unearthed certain facts that count against *specific* religious views or stories, such as a particular alleged miraculous healings or the historical accuracy of certain alleged revelations. Such views, however, do not count as common sense beliefs as I defined them above, since such beliefs do not meet condition (iv) that I identified in the Introduction.

[36] Rosenberg, 2011, p. 20; italics are mine.

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such does not make it more reliable than common sense. Whether it does depends, of course, also on how reliable common sense and science are in the first place, independently of the application of any safety mechanisms. And it is up for debate how reliable common sense is. According to many philosophers, for instance, one cannot be mistaken about which phenomenal states one is in.[37] Introspection of phenomenal states, then, would be 100 percent reliable. Of course, the fact that there is significant disagreement in, say, the religious and ethical realms, indicates that beliefs from these sources are not at all perfectly reliably formed. But then there is also substantial disagreement in science, so science, like common sense, is far from perfectly reliable.

Third, even if the kinds of safety mechanisms and procedures mentioned above make science *more reliable* than common sense, that as such does not render common sense *unreliable* and, therefore, does not provide us with a reason to think that common sense's deliverances cannot be rationally held. For, common sense doxastic sources might still be *sufficiently* reliable to rationally embrace their deliverances.

6. We understand the genesis of scientific knowledge

Subsequently, one might claim that, for many kinds of common sense beliefs, we have no idea how they are supposed to constitute knowledge. How, for instance, would humans be able to grasp moral or metaphysical truths? One might think that beliefs based on scientific research face no such difficulties, because there is an evolutionary story to be told about how survival generally selects for true beliefs: if one holds false beliefs, about, say, the presence of tigers or the risks in descending a dangerous cliff, or the location of food, one is significantly less likely to survive. Scientific research often simply consists in the repeated and rigorous use of the senses.[38]

Let me stress that the point of this sixth reason for scientism is *not* that we know that p only if we *know how we know* that p. An epistemological view along those lines would lead to all sorts of difficulties, such as infinite regresses—e.g., in order to know how we know that p, we would have to know how we know that we know that p, and so on, until one reaches a proposition that one is required to know in order to know that p but that is simply too complex for one to grasp. The point is rather that one can rationally believe, let alone know, that p, only if there is a plausible story to be told about how one knows that p. The claim under consideration is that there is no such story to be told for many common sense beliefs, such as moral beliefs understood along realist lines—i.e., beliefs with regard to actions and omissions to the effect they are morally right or morally wrong *objectively*, that is, independently of what humans think about them.

This consideration is not even close to being a good reason for embracing scientism. First, the literature displays all sorts of accounts as to how we can rationally believe and even know certain, say, moral and religious beliefs. If theism, for instance, is true, it is *not* that hard to see how humans could in principle rationally believe certain moral propositions, say, based on a revelation or a built-in moral consciousness, and, of course, there are also all sorts of naturalistic accounts to be found in the literature as to how we can know and, hence, rationally believe moral truths.[39] So, this objection fails to take seriously the fact that the literature provides detailed and sophisticated accounts of how religious, moral, and other common sense beliefs could be rational. Second, science is also based on certain common sense beliefs, such as memorial beliefs. We use beliefs based on memory: we believe it was *us* who gathered the data on, say, the genetic profile of a particular sample of twins, and on that basis we believe that data have been gathered in a reliable way. We rely on basic logical intuitions, such as the intuition that *modus tollens* is valid, whereas an *ex consequentia* is not. We trust our basic mathematical intuitions, such as that $2 + 3 = 5$ and that $1 \times 2 = 2$. And so forth. If we had to discard all common sense beliefs, then the project of science itself would have to be abandoned. Hence, this consideration counts at most against moral and religious beliefs, beliefs that seem to play no role in scientific research. Third, science relies on all sorts of beliefs that have the same features as the common sense beliefs under consideration. It is hard, for instance, if not downright mysterious, to see how humans can have complex mathematical knowledge. If they can grasp and know such abstract truths as certain mathematical theorems, it is hard to see why they would be unable to grasp and know certain metaphysical or moral abstract truths.

Many adherents of scientism agree that this is an enormous challenge and are working on accounts of how mathematical knowledge is possible or how natural science can do without mathematics.[40] Until such accounts have been developed, however, it is unclear how we could ever have mathematical knowledge without also having various kinds of metaphysical knowledge or, in the extreme case, how natural science could do without mathematics.

7. Common sense beliefs display vast disagreement

A seventh reason to embrace scientism is that there is vast disagreement on common sense beliefs – or, more specifically, on those topics those common sense beliefs are about – whereas there is much less disagreement when it comes to beliefs based on scientific research. As Jesse Prinz has shown, there is considerable disagreement among different cultures and even among people within a single culture on moral propositions, both diachronically and synchronically.[41] Some eighty to eighty-five percent of humanity may be religious, but there is fierce disagreement on the number of gods, their nature, whether and, if so, how they interact with humans, and so on. Many people do not discuss their metaphysical beliefs with others, but in those contexts in which they become explicit, such as philosophical debates, it is clear that metaphysical views widely differ among people. For example, some people think that only elementary particles and living entities exist, whereas others believe that further objects, such as tables and chairs, exist as well.[42] It would be easy to give a long list of such examples. One might think science is different in this regard and that this provides a good reason to embrace scientism.

At least three things need to be said in response. First, it is not clear that there is more disagreement in common sense than in science. On the one hand, there is much disagreement in science, such as on why there is far more matter than antimatter in the observable universe or how it can be proven that there are Bose-Einstein condensates for general interacting systems. On the other hand, there is much agreement when it comes to common

[37] See, for instance, Price, 1954, p. 3; Chalmers, 2003.

[38] There has been some discussion about whether evolution normally selects for true beliefs; see Beilby 2002. However, here I will assume with (virtually) all adherents of scientism that evolution does indeed do so.

[39] See, for instance, Shafer-Landau, 2003; Wedgwood, 2007.

[40] See Rosenberg, "Philosophical Challenges for Scientism (and How to Meet Them?)", *unpublished manuscript*.

[41] See Prinz, 2007.

[42] See, respectively, for instance, Tallant, 2014 on the one hand and Sider, 2013 and Van Inwagen, 1990, pp. 72–97, on the other.

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sense beliefs. If disagreement undermines rationality, then it is not clear that it does so more often in common sense than in science.

Second, the epistemic ramifications of disagreement have been given substantial philosophical attention lately. One problem is that virtually all philosophers who discussed the matter agree that disagreement defeats rationality only if disagreeing people are each other's *epistemic peers*—that is, if they have roughly the same cognitive capacities and the same evidence base. But it is not at all clear that people are each other's epistemic peers when it comes to, say, religious or moral beliefs. For, there is no reason to think that they have the same evidence base. There is often simply not enough similarity when it comes to moral intuitions about specific cases and general principles and when it comes to religious experiences or the lack thereof.

Third, this seventh consideration says that we can no longer rationally believe that *p* in the face of peer disagreement on *p*. But this is a highly controversial view in the literature of peer disagreement.[43] This view is called the *equal weight view* or the *conciliatory view*. It says that what one should do in cases of peer disagreement is suspend judgement on the proposition in question. However, on the main rival position, the so-called *steadfast view*, it is perfectly epistemically legitimate in cases of peer disagreement to maintain one's view on the proposition in question. In fact, on several varieties of the equal weight view, all that peer disagreement requires is that one *lower one's confidence* in the proposition in question, and that is, of course, clearly compatible with continuing to believe the proposition in question and to do so rationally.

These three considerations jointly undermine the epistemic weight of this seventh reason to embrace scientism.

8. Science provides evolutionary debunking explanations of common sense beliefs

The next reason to embrace scientism is that natural science allegedly provides debunking explanations of common sense beliefs. These explanations need not be *evolutionary* explanations – some take certain neuroscientific explanations of religious belief to be debunking explanations[44] – but they often are. Sharon Street, Richard Joyce, and others have argued that evolutionary explanations of our common sense realist moral beliefs provide a good defeater for them.[45] Jesse Bering, Pascal Boyer, and others have argued that there are good evolutionary explanations of belief in God, either because it is evolutionarily advantageous or it is a by-product of evolutionarily advantageous actions and traits.[46]

One might object that these explanations come in many varieties and that several of them are mutually exclusive. Religious belief for instance, has been explained by appeal to, among other things, a Hyperactive Agency Detection Device, fear for supernatural punishment, and psychological relief. Several of these accounts contradict each other—starting with those that explain religious belief as an evolutionarily advantageous adaptation and those that explain it as merely an evolutionary by-product. I would like to stress that I do *not* find this objection to this eighth argument convincing. If there are, say, nine evolutionary explanations of religious belief that are mutually exclusive and that each have probability 0.1, and there is good reason to think that they are good *debunking* explanations, it may not be reasonable to accept one particular evolutionary explanation out of these nine explanations, but it *will* be reasonable to believe that there is *a* good evolutionary debunking explanation of religious belief, given that the probability is at least 0.9, even though we are not sure which one it is at this stage.

Now, we need to note at least four things with regard to these scientific explanations of common sense moral and religious beliefs. First, if these explanations are to provide support for scientism, the definition of 'scientism' has to be broadened, for these evolutionary explanations of, say, moral beliefs and religious beliefs, clearly go beyond the regular natural sciences. They involve psychology and sociobiology.

Second, if a particular belief is a common sense belief and there is a good scientific explanation of that belief that fully explains why people hold that belief without any appeal to the truth of that belief, then that belief will be irrational *only if* one does *not* have independent evidence in favour of that belief. By 'independent evidence' I mean evidence that is *not* the output of the doxastic mechanism for which an evolutionary debunking explanation has been provided. For instance, if a religious belief is the product of a Hyperactive Agency Detection Device, then a good debunking explanation of that belief has been provided *only if* one's religious belief is *not* also the product of other mechanisms (for which no evolutionary or different kind of debunking explanation has been provided). Theism, for instance, may be based not only on hyperactive agency detection, but also on religious – say, mystical – experiences and complicated theistic arguments, such as the argument from fine-tuning and the cosmological argument.

Third, it is highly contested that what have been claimed to be evolutionary debunking explanations of, say, moral and religious beliefs are *good scientific* explanations. Thus, many have argued that these explanations lack too many of the intellectual virtues scientific theories should have, such as has having predictive power, or that they only work if we add controversial philosophical premises.[47]

Fourth, it is equally highly contested that, even if they are good scientific explanations of moral and religious belief, they are *debunking* explanations, that is, that they defeat the rationality of the beliefs in question. Many philosophers, naturalists included, have argued, for instance, that the evolutionary explanations of moral beliefs, even if they are good scientific explanations, do not *debunk* those beliefs.[48]

Thus, evolutionary explanations of common sense beliefs could provide support for scientism, but only if they are *good scientific* explanations *and* if they are truly *debunking* explanations. It would be a euphemism to say that it is not at all clear that we have reached a stage in which we can confidently assert that both criteria have been met. But what I have said *does* mean that evolutionary allegedly debunking explanations could potentially provide support for scientism with regard to at least *some* common sense beliefs, namely certain moral and certain religious common sense beliefs. We have, thus, found a first reason that could potentially count in favour of scientism.

9. Science shows common sense to be permeated with biases

Some natural science, but, to a larger extent, psychology and behavioural economics, have shown that we are prone to all sorts of cognitive biases, incoherences and fallacies when it comes to common sense beliefs. Here are a few examples of cognitive biases that many people have:

[43] See, for instance, several of the essays in Feldman and Warfield 2010.
[44] E.g. Boyer, 2003.
[45] See Joyce, 2006; Street, 2006.
[46] See Bering, 2011; Boyer, 2002.
[47] E.g. FitzPatrick, 2015.
[48] For an overview, see De Cruz & De Smedt, 2012.

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- *Prosecutor's fallacy*: in criminal investigations, many people assume that the probability of a random match is identical to the probability that the defendant is guilty.[49]
- *Denomination effect*: many people have a tendency to spend more money when it is denominated in small amounts, such as coins, rather than large amounts, such as bills.[50]
- *False consensus effect*: many people have a tendency to overestimate the degree to which others agree with them.[51]
- *Representativeness heuristic*: many people have a tendency to judge the likelihood or frequency of an occurrence by the extent to which the event resembles the typical case.[52]

It would not be difficult to add further examples to the list. We should note that this ninth reason for embracing scientism is *not* identical to the idea that science has safety mechanisms whereas common sense does not (the fifth reason I discussed above). They are distinct for at least two reasons. First, it is only *one among several tasks* of safety mechanisms to filter out cognitive biases from scientific practices; another would be, for instance, to remove perceptual mistakes, logically fallacious reasoning in general, and mistakes in copying certain data. Second, the idea here – with regard to this ninth reason – is that, even apart from these safety mechanisms, given science's careful and rigorous approach, and the fact that scientists are trained to double check their experiments, the results of science are significantly less likely to be distorted by these cognitive biases than the deliverances of common sense.

In response to this reason for embracing scientism, let me draw attention to three things. First, many cognitive biases do *not* count against the reliability of common sense sources of belief because they are not about *beliefs*. Thus, denomination effects are primarily about *behaviour* or *decision-making*. These cognitive biases do not clearly come with false beliefs—even though they *do* clearly come with behaviour that is in some sense irrational. But such cognitive biases count against the reliability of common sense only if they involve false beliefs.

Second, many cognitive biases do *not* count against the *reliability* of common sense sources of belief, but rather against their *scope*, that is, the number of truths they track (by issuing in a corresponding true belief). For instance, the so-called 'bizarreness-effect' in memory studies is that bizarre material is better remembered than common material.[53] That as such, however, does not count against the reliability of belief formation on the basis of memory, because it gives us no reason to think that the beliefs involved are (frequently) false, only that in many cases we fail to form true beliefs (we simply do not form any beliefs at all). *Mutatis mutandis*, the same is true for many other cognitive biases, such as the modality effect: the fact that memory recall is higher for the last items of a list when the items on the list were received via speech than if they were received through writing.[54]

Third, experiments that show that we have a particular cognitive bias demonstrate that the mechanism that produces the relevant beliefs is *not* perfectly reliable. However, that as such does not imply that it is *unreliable*; it might still deliver true beliefs in a sufficiently large portion of cases, and thus be sufficiently reliable not to undermine the rationality of the belief in question.

Finally, there is a long list of cognitive biases that a large number of people have. However, that as such does not show that common sense sources of belief are unreliable. That follows only if we add the premise that these biases are sufficiently representative for common sense belief formation. And that is, of course, highly controversial. The history of science – and this also applies to each of its subdisciplines – displays enormous amounts of false beliefs, misguided experiments, and deficient control mechanisms, but it does not follow from that that science is an unreliable enterprise. Thus, this ninth reason to embrace scientism is a good reason only if one can also make a plausible argument that cognitive biases along the lines of those mentioned above are representative for common sense—that is, occur sufficiently often to make common sense sources of belief unreliable.

10. Science demonstrates that many common sense beliefs are illusory

The final reason to embrace scientism is that there is empirical research that is sometimes taken to show that certain things that we (firmly) believe on the basis of common sense are *illusory*. This differs from the eighth reason that I discussed above in that debunking explanations provide reasons to think that a particular belief was produced by a mechanism that is unreliable or not truth-oriented. Thus, whether or not God exists and whether or not there are moral truths, we have good reason to think that the mechanism that produced the belief that God exists is *not* reliable when it comes to detecting supernatural agents and that the mechanism that produces beliefs about moral truths and moral falsehoods is not reliable when it comes to forming true moral beliefs about these issues. The point under consideration, however, is that there is good reason to think that certain kinds of common sense beliefs are *false*.[55]

This class of beliefs could potentially encompass a wide variety of different kinds of beliefs. Two crucially important kinds of beliefs are:

- *Beliefs about our reasons for our actions*: empirical research shows we sometimes believe that we performed a particular action *A* for reason *X* while what really motivated us in doing *A* was something different *Y*. Thus, the idea that we act for reasons that we are aware of is illusory.[56]
- *Beliefs about acting freely*: empirical research shows that we sometimes believe that we performed a particular action *A* freely, while in fact *A* was not a free action. This is, for instance, because we experience an event or a series of events as the result of our own intentions, whereas it was in fact caused by something or someone else.[57]

Now, empirical research along these lines and the philosophical reasoning on the basis of it that leads to the conclusion that acting for the reasons we think we act for is illusory and that acting freely is illusory have been hotly debated in the literature. For example, one might think that even if one's choices are in some way predictable, that tells us nothing about whether the action was performed out of (libertarian) free will, or that the concept of free will used in these examples is misguided, or that the kinds of actions performed in these examples are not the typical kinds of action that we consider to be under our control: the latter are rather actions

[49] For a detailed discussion of this fallacy, see Thompson & Schumann, 1987.
[50] See Raghubir & Srivastava, 2009.
[51] See Marks & Miller, 1987.
[52] For more on this bias, see Baumeister & Bushman, 2010, p. 141.
[53] See Iaccino & Sowa, 1989.
[54] See Gibbons, Velkey, & Partin, 2008.
[55] In terms widely used in contemporary epistemology: what we consider here is a potentially *rebutting* defeater for the rationality of certain common sense beliefs, whereas what we considered above was a potentially *undercutting* defeater (for this distinction, see, for instance, Pollock, 1984, p. 113).
[56] A landmark article on this issue is Nisbett & Wilson, 1977.
[57] E.g. Wegner, 2003.

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that require some detailed deliberation in the course of time, weighing evidence pro and contra the proposition in question.

In any case, even though much more work might have to be done here, this kind of reason, like the two previous reasons that I distinguished, could potentially be a good reason to embrace scientism in a particular realm.[58]

Conclusion

In this paper, I have discussed ten reasons to embrace scientism in order to identify where the potential evidence for scientism is.

I have argued that seven reasons to embrace scientism are unconvincing, namely that science is highly successful, that the applications of science are everywhere, that science can be tested and corroborated, that many scientific results are counter-intuitive, that science has safety mechanisms, that we understand the genesis of scientific knowledge, and that common sense beliefs display vast disagreement.

I have identified three reasons that *could* potentially be good reasons to embrace a weaker or stronger form of scientism:

- First, evolutionary debunking explanations could defeat the rationality of certain common sense moral and religious beliefs, provided three conditions are met: (i) there is no independent evidence for these moral and religious beliefs, (ii) these are *good scientific* explanations, and (iii) they are truly *debunking*, that is, they give us good reason to think that the common sense moral and religious beliefs in question are irrational.
- Second, science shows that there are biases and fallacies in our common sense. I argued that this provides a convincing reason to embrace certain varieties of scientism only if a plausible case is made that such biases are sufficiently widespread to make specific common sense sources unreliable.
- Third, science gives us reason to think that certain common sense beliefs, such as those about free will and consciousness, are illusory. This reason to embrace scientism potentially provides a good reason to consider some categories of common sense beliefs irrational.

These considerations can best be thought of as three kinds of arguments that jointly provide an all-things-considered inductive case for some kind of scientism.

This means, though, that a strong version of scientism, such as that of Alex Rosenberg, on which only natural science provides rational belief or knowledge is untenable. In order to be both strong (to make a challenging assertion) and plausible, the thesis of scientism needs support not only from natural science itself, but at least also from psychology, sociobiology, and behavioural economics. Even more importantly, scientism, if it is to be plausible, will have to take one of the following two forms (or a combination of these). First, it could say that in a *restricted domain*, such as the reasons for which people act, only science provides rational belief or knowledge: introspection of the alleged reasons does not. Second, it could say that science – in general or in a particular realm – is *more reliable* than common sense without suggesting that common sense is unreliable.[59] It is not entirely clear to me whether the latter thesis would still count as a version of scientism (if there is any truth about what is to count as scientism and what not), but it is at least a thesis that is up for debate. The purpose of this paper has *not* been to contribute to an assessment of such a version of scientism. Instead, the purpose has been to argue that such a restricted version of scientism rather than a stronger version should be the focus of the debate when advocates and opponents spell out and defend or criticize scientism.

[58] However, in order to provide convincing arguments to this effect, it will have to assume the reliability of other common sense sources of belief, such as the formation of certain metaphysical beliefs about what freedom is and what it requires. Therefore, these arguments justify at most a weaker form of scientism.

[59] For a thesis along these lines, see Mizrahi, 2017. He adopts a version that is still fairly strong, though: science is supposed to provide the *best* knowledge.

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