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# Scientism and scientific fundamentalism: what science can learn from mainstream religion

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## ABSTRACT

An increasing number of scientists, philosophers, and popular science writers claim that science is the measure of all. They assert that science can answer all questions, that there are no limits to science, or that only science provides reliable knowledge, either in a particular realm, such as morality, or about any subject matter whatsoever. This view is often referred to as 'scientism'. But what exactly is scientism? What is to be said in favour of it and against it? This paper suggests, after a careful evaluation of the arguments for and against scientism, that a helpful way to think of scientism is as of a variety of fundamentalism. It turns out that scientism meets nearly all conditions formulated in family resemblance accounts of fundamentalism. Finally, it is suggested that science and scientists can learn much from religion when it comes to how to deal with scientific fundamentalism.

## KEYWORDS

Scientism; fundamentalism; religion; common sense; fanaticism; free will; belief in God; debunking explanations

## 1. Introduction

Science has been incredibly successful. And few doubt that science is highly valuable. Yet, some scientists or scholars more generally and even various people beyond science go an important step further: they claim that there are, in principle, no limits to science. They add that only science, rather than common sense moral intuitions, religious beliefs, and metaphysical reasoning, provides knowledge about reality. With many others I call this view 'scientism'.

Now, when they talk about 'science', these authors have particularly the *natural* and *life* sciences and their methods in mind: biology, physics, chemistry, earth science, and astronomy. These are to be contrasted with the social sciences (sociology, economics, management science, political science, psychology, anthropology) and the humanities (linguistics, history, archeology, and philosophy).

The following quote from the American historian of science William Provine illustrates what scientism can amount to:

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Modern science directly implies that the world is organized strictly in accordance with mechanistic principles. There are no purposive principles whatsoever in nature. There are no gods and no designing forces that are rationally detectable. ... modern science directly implies that there are no inherent moral or ethical laws, no absolute guiding principles for human society. ... human beings are marvelously complex machines. ... when we die, we die and that is the end of us. ... Free will as it is traditionally conceived – the freedom to make uncoerced and unpredictable choices among alternative possible courses of action – simply does not exist. ... There is no ultimate meaning for humans. (Provine 1988, 27–29)

There is a lot to be said about this quote, even apart from the rather outdated mechanistic approach to science. Most importantly the idea seems to be that science rebuts core tenets of common sense: it entails there are no purposive principles in nature, no gods, no moral laws, no guiding principles, no free will, no ultimate meaning, and no life after death. Science is the arbiter of truth, other alleged sources of knowledge are unreliable. Why should we embrace such scientism? What is to be said for and against it? And how we should deal with it when we encounter it? These are the questions that this paper aims to answer.<sup>1</sup>

The article is structured as follows. First, I spell out in some more detail what scientism says and give some examples. I then give reasons that have been provided for scientism or that might be taken to lend support to scientism. Subsequently, I present what I take to be three decisive reasons to reject scientism and explore whether a recently proposed revised version of scientism is more tenable. After that, I move on to fundamentalism. I first lay out how fundamentalism can properly be construed. I suggest that it is best understood in terms of a family resemblance: it is a reactionary modern movement with a grand, Manicheistic narrative about the world. I then show that scientism can indeed be rightly understood as a variety of fundamentalism, albeit not a core case but rather a boundary case. Finally, I explain in detail what science can learn from religion in one particular regard. After all, mainstream religions have always had to deal with extremist and fanaticist branches and since the early twentieth century with fundamentalism. Science can learn from religion how to unmask scientific fundamentalism and avoid its harms and pitfalls.

## 2. What is scientism?

In this paper, I will distinguish between *weak* and *strong* scientism. Weak scientism says that only science provides knowledge *in a particular realm of life*. Examples are meta-physical intuition (for example, Ross, Ladyman, Spurrett 2007, 1–65), introspection (for example, Dennett 1991), and morality (for example, Harris 2010). Weaker or stronger scientific claims are made by philosophers, but also by scientists. Here are some examples. According to British ethologist and popular atheist Richard Dawkins,

[w]e no longer have to resort to superstition when faced with the deep problems: Is there a meaning to life? What are we for? What is man? After posing the last of these questions, the eminent zoologist G.G. Simpson put it thus: ‘The point I want to make now is that all attempts to answer that question before 1859 are worthless and that we will be better off if we ignore them completely.’ (Dawkins 1989, 1)

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<sup>1</sup>Some of these ideas can also be found in chapter 3 of my forthcoming book, Peels (2023a).

British molecular biologist Francis Crick (1994, 3) claims: ‘You, your joys and your sorrows, your memories and your ambitions, your sense of personal identity and free will, are in fact no more than the behavior of a vast assembly of nerve cells and their associated molecules’. And the Dutch neuroscientist Dick Swaab (2014, 327, 328) boldly asserts: ‘Our current knowledge of neurobiology makes it clear that there’s no such thing as absolute freedom ... the only individuals who are still free to a degree (apart from their genetic limitations) are fetuses in the early stages of gestation’.

Strong (rather than weak) scientism says that only science provides knowledge in *any* realm, including all the above realms. That is also how the American philosopher of science Massimo Pigliucci (2013, 144) understands the term ‘scientism’: it is ‘a totalizing attitude that regards science as the ultimate standard and arbiter of all interesting questions; or alternatively that seeks to expand the very definition and scope of science to encompass all aspects of human knowledge and understanding’.

One might think that this is an absurd view that no one accepts. But several scientists and philosophers call themselves adherents of scientism and explicitly embrace this view. An example is the American philosopher Alex Rosenberg, who describes scientism as.

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 scientific just means treating science as our exclusive guide to reality, to nature – both our own nature and everything else’s. (Rosenberg 2011, 6–8)<sup>2</sup>

Scientism in a stronger or weaker form is rampant in contemporary intellectual culture: it is assumed and endorsed inside and outside academia by influential scientists and philosophers writing about evolutionary theory, genetics, morality, belief in god, brain science, psychology, and philosophy.<sup>3</sup> From there, scientism also wields influence on various social and professional practices, such as medicine, law, education, religion, and child rearing.<sup>4</sup>

### 3. Six arguments for scientism

In this section, I briefly consider six arguments that adherents of scientism do or can put forward when they defend or at least spell out a weaker or stronger version of scientism.<sup>5</sup>

*Argument 1: Science is highly successful.* Science has discovered many truths (1) that we would have not unearthed without science, (2) that are sometimes extremely complex and detailed, and (3) that are in various cases in a way grand and unifying, giving us insight into a wide variety of phenomena. Examples are quantum mechanics and general relativity. According to Alex Rosenberg (2011, 25), for instance, ‘the phenomenal accuracy of its prediction, ... and the breathtaking extent and detail of its explanations are powerful reasons to believe that physics is the whole truth about reality’. We can be brief here: this argument for scientism is unconvincing. The fact, if it is a fact, that beliefs based on scientific research are usually true, rational, and instances of knowledge, does *as such* not count against the truth or rationality of beliefs from *other* sources, such

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<sup>2</sup>For a similar claim, see Atkins (1995).

<sup>3</sup>For a description of its influence, see Hughes (2012).

<sup>4</sup>I’ve spelled out the varieties of scientism and the relations between them in much more detail in Peels (2018a).

<sup>5</sup>Elsewhere, I have addressed these and other reasons in more detail; see Peels (2017).

as common-sense morality or religious experience. This is not to deny that many scientific truths may be more detailed and more encompassing than many common-sense beliefs. The issue under consideration, though, is whether science is our only guide to reality and this first argument does not count in favour of that thesis. Of course, it may be that a scientific discovery counts not only for a scientific theory but also against a common sense belief, possibly against its truth, possibly against its rationality. However, we then have a different kind of objection, one to which I return below.

*Argument 2. The applications of science are everywhere.* Science has deeply affected our lives by radically changing transportation, medicine, agriculture, and so on. It is hard not to be impressed with the pervasiveness of science's applications in our society. Again, though, the fact that science has a wide range of implications does not mean that it has no limits or that only science provides knowledge.

*Argument 3. Many scientific results are counter-intuitive.* Many of the things discovered by science are highly counter-intuitive, such as curved spacetime or the bilocation of electrons. According to the South-African born biologist Lewis Wolpert, for instance:

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. (Wolpert 1992, 1, 11)<sup>6</sup>

The idea, then, is that many scientific discoveries are so counter-intuitive that we can no longer trust our intuitions and other common sense beliefs, even if in those cases there is not (yet) scientific evidence concerning them.

I think this claim about counter-intuitiveness is true for macro and micro levels that differ significantly from the daily life level. Electrons can have multiple locations at the same time, yes, and space can be curved. Note, though, that these are not the levels with which common sense is concerned. Common sense does not come with beliefs about the bi-location of electrons or on whether space could be curved. It comes with such beliefs as that a tree cannot be at two locations at the same time, or that the shortest distance from my door to the supermarket is a straight line. All that follows from scientific discoveries that are counter-intuitive is that we should be careful not to make intuitive judgments on levels that are really different from the levels involved in our daily lives. This does not count against religious belief (the transcendent level, after all, is something that people engage in on a daily basis), morality, free will, ordinary-size objects, consciousness, and so on.

*Argument 4. There is vast disagreement on numerous common-sense beliefs.* Another reason one might put forward to embrace strong scientism is that there is massive disagreement on moral, religious, and metaphysical issues, whereas one might think there

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<sup>6</sup>And according to Rosenberg (2011, ix): 'Science – 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 recognize.' See also Ross, Ladyman, Spurrett (2007, 16): '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.'

is consensus or at least convergence toward consensus in science. In response, let me point out that many moral, religious, and metaphysical beliefs are not common-sense beliefs. They are embraced only by a limited number of people, or they are based on various kinds of reasoning, and so on. Moreover, there is much *agreement* on core morality, as recent empirical research shows: virtually all cultures value helping one's kin and the group one belongs to, reciprocating goods, deferring to superiors when needed, being brave, dividing resources that are disputed, and respecting prior possessions (see Curry, Mullins, Whitehouse 2019). There is also much agreement on core religious beliefs, such as that there is more than just the material cosmos, that there is life after death, that humans have a soul, and that the universe was made by a god. On the other hand, there is much *disagreement* in science, both synchronically (say, right now) and especially diachronically (in the course of the history of science). Moreover, disagreement is a hotly debated topic in philosophy nowadays and many philosophers embrace the view that peer disagreement does not undermine the rationality of one's beliefs (see several of the essays in Feldman and Warfield 2011).

*Argument 5. Science provides evolutionary debunking explanations of common-sense beliefs.* Another, I would say more interesting argument is that common sense beliefs, especially in the realms of morality and religion, have been evolutionarily advantageous, but are *not* truth-oriented. Evolutionary explanations of religious belief, for instance, are taken to suggest that we are innately predisposed to attribute mental states to allegedly supernatural entities because of certain deficits in our cognitive mechanisms (see Bering 2011). And Sharon Street (2006) has argued that the shaping force of evolutionary history on our moral beliefs undermines belief in objective moral values. I think at least three things need to be done in order for these arguments to lend significant support to scientism: (1) the explanations in question must truly explain common-sense moral and religious beliefs, (2) they must meet the criteria of good scientific hypotheses: they must *not* be ad hoc, they must have some predictive power, and so on, and (3) they should be truly *debunking*, that is, undermine the rationality of these common-sense beliefs. Each of these issues is hotly debated nowadays, and it seems to me the prospects for these arguments are dim.<sup>7</sup>

*Argument 6. Science demonstrates that many common-sense beliefs are illusory.* Here, we should think especially of beliefs about free will and beliefs about acting for reasons. Some empirical experiments, for instance, have been taken to show that the brain prepares allegedly free actions well before we are consciously aware of the intention to execute them. On this basis, it is claimed that free will does not exist, and that we need to revise our concept of moral responsibility (see Libet 1985 and Pereboom 2001). Some studies on decision-making allegedly demonstrate that the explanations we provide for our actions are in fact nothing more than *post-hoc* rationalizations, because our actions actually stem from causes of which we are completely unaware (see, e.g. Wegner 2002). The idea here, then, is that science provides not just an undercutting but also a rebutting defeater: it removes not merely our evidence for thinking that these common-sense beliefs are true, but it also provides positive evidence for thinking they are illusory or false in another way. Again, whether or not these arguments show

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<sup>7</sup>See, for instance, Barrett (2012) for a discussion on whether or not contemporary evolutionary explanations of religious beliefs are truly debunking.

that a particular form of weak scientism is true needs critical evaluation, both from an empirical and from a philosophical point of view. This is where the real action should be.

We saw that arguments 1–4 do not hold water, so that it comes down to arguments 5 and 6. We should note, though, that these arguments each establish scientism only in a rather restricted realm, such as common-sense morality, belief in free will, belief in God, or something along those lines. We can thus safely assume that stronger versions of scientism are unwarranted; at most weaker versions of scientism can be justified.

#### 4. Three arguments against scientism

The conclusion with which we ended the previous section can be further reinforced by considering general objections *against* stronger versions of scientism. In this section, I give three such arguments against strong scientism.<sup>8</sup> We will also consider a revised version of scientism that is meant to escape these objections.

*Argument 1: Strong scientism is self-refuting.* Strong scientism is self-refuting, since scientism itself is not supported by science. As Dutch philosopher Jeroen de Ridder points out: ‘scientism suffers from self-referential problems. Not being a scientific claim itself, it would seem scientism cannot be known by anyone. This raises the question of why anyone should assert or believe it in the first place’ (De Ridder 2014).<sup>9</sup>

It seems to me the argument has two crucial premises that one would need to spell out in detail for a full-fledged version of the argument. The first is that the adherent of scientism is committed to the view that he or she *knows* or at least *rationaly* believes that scientism is true. This seems plausible if the adherent of scientism wants to avoid one’s acceptance of scientism’s being arbitrary.<sup>10</sup> The second premise is that we *cannot* rationally believe or know scientism on the basis of scientific research. The motivation for this is rather simple: scientism is *not* some empirical truth that we can find out by way of setting up an experiment or doing statistical research. Nor does it seem to be an *a priori* truth that can be deduced by mathematical or logical methods from elementary truths that we know *a priori*. Rather, it seems to be an *epistemic* principle that needs to be backed up by philosophical argumentation. And whatever philosophy is, it is widely considered *not* to be one of the sciences.

I think an argument to the effect that scientism is self-refuting is promising. In the *Theaetetus*, Socrates already uses an argument from self-referential incoherence against Protagoras’ claim that humans are the measure of all things (Plato 1977, 57–58, 171a–c). Various authors in the tradition of logical positivism have levelled arguments of self-referential incoherence against the so-called verification criterion. On this

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<sup>8</sup>Again, I rely on earlier work of mine here; see Peels (2018b, 2019).

<sup>9</sup>And according to the Swedish philosopher Mikael Stenmark (2001, 22–23):

how do you set up a scientific experiment to demonstrate that science or a particular scientific method gives an exhaustive account of reality? I cannot see how this could be done in a non-question begging way. What we want to know is whether science sets the limits for reality. The problem is that since we can only obtain knowledge about reality by means of scientific methods (that is T1 [scientism; RP]), we must use those methods whose scope is in question to determine the scope of these very same methods. If we used *non*-scientific methods we could never come to *know* the answer to our question, because there is according to scientific faith no knowledge outside science. We are therefore forced to admit either that we cannot avoid arguing in a circle or that the acceptance of T1 is a matter of superstition or blind faith.

<sup>10</sup>Also, a substantial number of philosophers have argued that knowledge is the norm of assertion. See, for instance, Turri (2011).

criterion, only those statements are meaningful that can be empirically verified or that are analytic (they are, in a sense, tautologies). The verification criterion, however, clearly does not meet the verification criterion itself and is, therefore, self-refuting. Among them were Alfred Ayer, Rudolf Carnap, Moritz Schlick, Friedrich Waismann, and Otto Neurath. In the 1960s, the criticism has been echoed by William Alston (2003), Alvin Plantinga (1967, 156–168) and others who worked to rejuvenate the philosophy of religion. Similar things can and have been said about the post-modern claim that everything is relative. Thus, if one argues that scientism is self-referentially incoherent, one joins a venerable philosophical tradition of a particular kind of argumentative strategy.

According to the British chemist Peter Atkins (1995, 97), there are no boundaries to the competence of science. But if this first argument is sound, there is at least one boundary to the competence of science: science is incompetent to motivate strong scientism, that is, to provide sufficient scientific support for making belief in scientism rational.<sup>11</sup>

*Argument 2: Science itself is based on common sense.* In other words, if you reject common sense, you'll have to reject science as well. We find a short formulation of the argument in the writings of the British ethicist Mary Midgley:

Science cannot stand alone. We cannot believe its propositions without first believing in a great many other [...] things, such as the existence of the external world, the reliability of our senses, memory and informants, and the validity of logic. If we do believe in these things, we already have a world far wider than that of science. (Midgley 1992, 108)<sup>12</sup>

And we find another brief characterization of this argument in an article by the Dutch philosopher René van Woudenberg:

Another response [...] might be to bite the bullet and deny that extra-scientific beliefs ever amount to knowledge. This, however, would be deeply problematic. For scientific knowledge depends in many ways on extra-scientific knowledge, for instance, on what we know through perception, such as that the thermometer now reads 118 degrees Fahrenheit. Without such extra-scientific knowledge it is hard to see how science could even get started. (Van Woudenberg 2013, 26; see also Van Woudenberg 2011)

Thus, in order for science to even get started, our common sense beliefs, like our memory beliefs, beliefs based on visual perception, metaphysical beliefs on a daily life scale, and, according to some, even our beliefs based on introspection,<sup>13</sup> must usually be reliable.<sup>14</sup>

*Argument 3. The constituents of science are not themselves based on science.* Principles that are constitutive of science or of the way one does science are not themselves based on science. Here, we can think of such things as the aim of science: is it truth, or knowledge, or empirical adequacy, etc.? We can also think of criteria for theory selection: explanatory scope, explanatory power, predictive power, coherence with background knowledge, internal consistency, simplicity, elegance, etc., and their relative weight in comparison with each other. We can think of such principles as the uniformity of nature. All of these are constitutive of science, but not themselves based on science. That is another limit of science and something that cannot be known on the basis of science.

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<sup>11</sup>For a more detailed version of this argument, see Peels (2018a).

<sup>12</sup>Similar thoughts can be found in Stenmark (2001, 26–28).

<sup>13</sup>See many of the contributions in Jack and Roepstorff (2003).

<sup>14</sup>I've developed this argument in much more detail in Peels (2018b).

In response to such objections against strong scientism, various authors have defended weaker versions of scientism that are still somewhat strong in that they intend to go beyond a particular, restricted domain. Among them is Moti Mizrahi's (2017) scientism, which he defines as the view that 'of all the knowledge we have, scientific knowledge is the *best* knowledge'. Clearly, this view is radically different from strong scientism. Strong scientism, after all, denies knowledge outside of the sciences, whereas Mizrahi's scientism is perfectly compatible with there being religious knowledge by way of experience and revelation, there being moral knowledge by way of moral intuition and common-sense reasoning, and so on. Straight away, then, scientism loses much of its bite. But even apart from that, there are substantial worries about this revised version of scientism. After all, *exactly* in what sense is science supposed to provide *the best* knowledge? Is that knowledge better than my knowledge that there is an external world, that I exist, that  $2 + 2 = 4$ , and other things I believe on non-scientific bases? That seems wildly implausible; much scientific knowledge is significantly more provisional than such common-sense knowledge.

The claim seems implausible, then, for knowledge from common sense. What about the humanities? Mizrahi points out that scientific publications are much more numerous and have a higher impact than much of what is published in the humanities. That is true and that is partly just because much more money goes into the sciences, given the practical applications they often have. Mizrahi also claims that scientific knowledge is qualitatively better in that it has more explanatory power, instrumental success, and predictive power. This seems right for many sciences and many disciplines in the humanities, even though I hasten to add that some disciplines in the humanities, such as linguistics, have tremendous explanatory power and great instrumental success. In any case, what follows from the difference in this regard between the sciences and the humanities? The humanities are concerned with really challenging objects, such as moral goodness and badness, or the distant past. It may well be in the very nature of the humanities that knowledge of these objects is often much harder to get than in the sciences. So what? If this does not prevent the humanities from delivering knowledge, scientism has become a trivial and uninteresting claim.

## 5. Fundamentalism

It is now time to turn to a comparison between scientism and fundamentalism. In order to see whether there is an important relation (possibly that of identity) between the two, let us first explore in more detail what fundamentalism actually is.

One preliminary comment: should we even use the term 'fundamentalism'? Is it not pejorative? In other words, isn't the tacit assumption in using the term that the fundamentalist is dogmatic, estranged from modern life, unwilling to have an open-minded conversation? I agree that it often has such connotations in common parlance. The term is widespread in the academic literature, though, and I have no doubt that it is not going away. The account that I provide in this section will not provide any pejorative elements – in fact, it will not contain any normative elements whatsoever. Rather than trying to do away with a concept that is going to stay anyway, let me be as lucid as I can on how I use the term, so that we can be attentive to potential pitfalls and biases.

As George Marsden (1980; 1991) and others have shown in detail, the origins of the term ‘fundamentalism’ can clearly be identified. The term was first used to describe various conservative and somewhat strident Protestant movement in the early twentieth century in the US and the United Kingdom. They considered certain modern developments a threat to their faith, things such as evolutionary theory, liberal ethics, and historical-biblical criticism. Consequently, they formulated what they considered to be indubitable truths, so-called Fundamentals. Among them were the divinity of Christ, the inerrancy of the holy scriptures, and Christ’s substitutionary atonement. Some of these fundamentals were laid out in detail in the 1917 collection of essays *The Fundamentals: A Testimony to the Truth*, edited by Torrey, Dixon, and Meyer.

Some scholars, such as Ninian Smart (1989) have suggested that we should stick to this rather narrow understanding of ‘fundamentalism’, but most have gone on to identify various other religious movements as fundamentalist, such as Haredi Judaism, various kinds of Salafism and Wahhabism, TULIP Calvinism, and so on. Some movements that are a blend of religion and nationalism are often also included, such as the Rashtriya Swayamsevak Sangh (RSS) in Hinduism and nationalist Sinhala Buddhists in Buddhism (e.g. Marty and Appleby 1991-1995). In fact, the list has become even much longer by including various kinds of secular fundamentalisms, like neo-Nazism, radical environmentalism, communism, feminist fundamentalism, gender fundamentalism, and pedagogical fundamentalism. It is only natural to wonder what the boundaries of the concept are and whether there is a principled way of using the term.

I think there is. Various authors over the last two decades or so have suggested that we should treat fundamentalism as a family resemblance concept (e.g. Almond et al. 2003; Ruthven 2004). The idea of a family resemblance, as formulated out by Ludwig Wittgenstein (1953/2001), is that the phenomenon in question does not have a series of individually necessary and jointly sufficient conditions, but that it is constituted by stereotypical properties. If something has *enough of* those properties, it counts as the thing in question (say, a game), it does not need to have all of them. Let me present what, on the basis of a scoping literature review (Kindermann et al., unpublished manuscript) I consider to be the three main classes of stereotypical properties of fundamentalism.

The first class of properties concerns the fact that fundamentalists are *reactionary or reactive*: they respond to modern, what they consider to be threatening developments rather than being a freestanding, sovereign movement. Among such developments are liberal ethics, like the propagation of the rights of homosexuals, scientific developments in evolutionary biology and cosmology, individualism, and so on. Fundamentalisms, therefore, are time-indexed: they respond to modern developments, particularly those to be found ever since the early twentieth century.

The second cluster of properties has to do with the fact that, paradoxically, fundamentalist movements are themselves highly modern: *they seek certainty and control* in an uncertain world (Krüger 2006, 886). They do so by ascribing a particular status, such as being literally and historically inerrant and infallible, to various holy scriptures, such as the Qur’an, the Shari’a, the Old and New Testaments, the halakha, the Talmud, or the Granth Sahib. They are also highly modern in employing particularly modern ends to reach people with their message, such as public debates, internet, and social media.

Third and finally, there is the class of properties that have to do with the fact that fundamentalisms embrace a grand, overarching narrative about the world. Often, the basic idea is that there once was a paradisaical state, that that state was lost due to human fault, and that we now need to restore the original, perfect state. Humans, then, have a special place in this world picture. Another part of the story is some kind of cosmic dualism, sometimes called Manicheism. Here, the idea is that good and evil are the only two forces in the world, that they are constantly at war, and that one is either on the good side or on the bad side.<sup>15</sup>

Since fundamentalism should be understood in terms of a family resemblance, none of the above properties are necessary for fundamentalism. Nor are they sufficient. Thus, one can embrace cosmic dualism without being a fundamentalist. And one can be a fundamentalist even if one does not believe that there was once a perfect, paradisaical state. All that is needed is that a movement exemplifies *enough* of these properties. This means that there are core or paradigm cases – those that satisfy all the criteria – and boundary cases – those that meet only some criteria. We should also note that being violent or having a disposition to violence is not one of the stereotypical properties of fundamentalism. Of course, some fundamentalists are violent. But that is usually because they are *also* extremists or even terrorists. Millions of Muslims, conservative Protestants, and so on, are fundamentalist without being violent toward others. They may do some othering, that is, regard outgroup members as deficient in various ways, but that is of course rather different from employing violence.

A family resemblance account also explains – and that is a virtue – why some people embrace a narrow understanding of ‘fundamentalism,’ whereas others work with a broader understanding.<sup>16</sup> They either mistakenly think that all the stereotypical properties are necessary for fundamentalism (which leads to a narrow understanding) or they just disagree on exactly how many properties should count as ‘sufficient.’ And that is understandable: there seems no theoretically neutral way to decide on the issue.

Some scholars in the field have defined ‘fundamentalism’ as a belief, a set of beliefs, or a belief-system (e.g. Barton 2009, 439; Baurmann 2007, 157). Let me be explicit that I consider this to be a mistake. Of course, fundamentalisms come with beliefs, but they also come with affections (anger, fear, grievances), conative states like hopes and desires, actions, and various practical things such as symbols, rituals, and objects.

## 6. Is scientism scientific fundamentalism?

Now, in the past, I have been hesitant to describe scientism as a particular variety of fundamentalism. But since delving more deeply into family resemblance analyses of fundamentalism and of specific religious and secular fundamentalist movements, I have changed my mind on this. I now believe that scientism can rightly be regarded as a variety of secular fundamentalism. It may not be a core or stereotypical case of fundamentalism, but it clearly exemplifies many of the stereotypical properties of fundamentalism – enough to count as a variety of fundamentalism. In order to see why this is so, let

<sup>15</sup>For more on each of these properties, see Peels 2022.

<sup>16</sup>For this variety, see the essays in Wood and Watt (2014). Some authors in this volume express worries about use of the term ‘fundamentalism’ that I cannot address here, namely that it is Western-centric, biased and leading to biases, denigrating, and so on. I reply to these worries in my forthcoming book (Peels 2023b).

us consider the three kinds of stereotypical properties that I presented in the previous section and explore how they could play out for scientism.

First, scientism is undoubtedly a *reactionary* movement. It responds to various societal developments that it considers dangerous or harmful, both epistemically and morally. Here, we can think especially of the societal influence of the major religions, including Christianity. What also comes to mind is the spread of conservative Islam in the West, partly due to migration. We can think of anthroposophy and other science-sceptical movements. In the United States, an important event that elicited scientific response was the Intelligent Design movement which sought public recognition and desired space for intelligent design to be taught in high schools.

Second, scientism is itself a particularly modern development. It seeks certainty in an uncertain and constantly changing world. The only certainty to be achieved is to be had by way of scientific inquiry. All other sources cannot provide knowledge or be an intellectual guide in this world. Undoubtedly, adherents of scientism have actively used particularly modern media to reach their audiences: public debates, social media, lectures on YouTube, podcasts, and so on. Of course, scientism does not consider certain holy scriptures as infallible. But it clearly regards science as the very best we have. An autobiography by Richard Dawkins is tellingly titled *Brief Candle in the Dark: My Life in Science* and the cosmologist Carl Sagan uses the same metaphor in the title of his book *The Demon-Haunted World: Science as a Candle in the Dark*.

Third, scientism clearly provides a fundamentalist overarching narrative. The main difference with other fundamentalist stories is that in this story there never was a paradisaical state. Humans have been living in darkness from the very beginning. At most, the darkness was deepened by things like institutional religion. Redemption is to be had by intellectual Enlightenment and such enlightenment is to be found in the sciences. Only these can break the spell of religion, common sense morality, illusions like those of free will and consciousness, and so on. Scientism also comes with Manicheism or, as I would prefer to call it, moral dualism. There are the blind and evil forces of religion, folk stupidity, tradition, and other sources that impede intellectual flourishing on the one hand. On the other hand, there is the torch of reason which can help us navigate this dangerous world.

## 7. What science can learn from mainstream religions

Now, religions have had to deal with extremist, fanaticist, and even terrorist movements. Religions, ever since the birth of fundamentalism in the early twentieth century, have also had to deal with fundamentalism in its many varieties. It seems to me that scientists, scientific institutions, and various people and bodies beyond science, such as media outlets, can learn from religions in how to deal with scientific fundamentalism.

1. Mainstream religions have wisely opted not to meddle in scientific affairs. Religion is not about finding out scientific truths. We can leave that to the scientists. In fact, mainstream religions have lauded the scientific endeavour and gladly welcomed its achievements.

Similarly, scientists and scientific institutions should encourage scientists to stick to their expertise. As an expert in evolutionary biology, it is perfectly fine for Richard Dawkins to inform the larger public on various biological issues, as he does in some of his more public books, such as much of his *The Greatest Show on Earth*, which presents the evidence for evolutionary theory. It is *not* fine for him to protrude into the moral and social effects of religion, into explanations of why people are religious, into the tenability of various God conceptions. That is: unless, he deeply delves into all the literature that is required for being an expert in these fields, such as the sociological literature on the societal effects of religion, the so-called Cognitive Science of Religion, and various systematic-theological works on the doctrine of God, anthropology, and the theory of revelation.

2. Many mainstream religions have learned to live with a lot of uncertainty. They consider the Old and New Testaments, the Halakha, the Talmud, or the Granth Sahib as divinely inspired holy scriptures. In some cases they even think of them as more holy and more inspired than the writings found in other religions. Yet, mainstream religions do *not* assert that these holy scriptures are *literally*, *entirely historically*, and *infallibly* true (I will leave the way Islam treats the Qur'an aside here, since it is a complex issue). They have resisted the particularly modern urge to seek and find certainty and control in an uncertain and scary world by conferring an inerrant status to these documents. Rather, they have suggested that God's word can be found in these writings and that that requires interpretation. Being a person of faith, then, is a matter of having hope, trust, commitment, belief, maybe even rational belief and knowledge, but it is not required that one is *certain*.

Similarly, science and scientific institutions should not seek certainty or infallibility in science. Science provides rational belief and knowledge, as do many other doxastic sources. Science should propagate and cultivate systematic doubt rather than certainty, as the American sociologist Robert K. Merton already argued.

Scientists frequently say things like: 'everything is a matter of random mutation and natural selection', 'we are our brains', 'matter is all there is', 'all our ideas are social constructions', etc. Such things make sense to some extent with particular disciplines. For instance, one can study the brain but not the soul in a neuroscientific way. Unsurprisingly, neuroscientists have a tendency, then, to treat the human mind and human soul as if they are reducible to the brain. If what I have argued is right, there is a wide variety of belief sources that provide knowledge. We should remind ourselves of this fact and be conscious of the boundaries of our own academic discipline.<sup>17</sup>

3. Many mainstream religions have learned to some extent to tolerate fundamentalist movements rather than expel them and to keep the conversation going with them rather than simply avoid them. Of course, fundamentalist movements often split from mainstream denominations and shut off the conversation themselves, partly

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<sup>17</sup>A further case could be made that scientists should be aware of the limitations regarding the *epistemic weight* of their research, since science uses a wide variety of methods and criteria for theory selection that lead to results with different degrees of certainty.

by so-called othering of members of the mainstream religion. But vice versa leaders of, say, the Roman Catholic Church or the Anglican church, have learned to keep talking to those who reject the wider church's policy, for instance, for being too liberal, for pursuing equal rights for men and women, for pursuing nuanced hermeneutics of holy scriptures, and so on.

Similarly, science and scientific institutions should not reject or fire adherents of scientism nor shut down the conversation with them. Rather, they should continue to work with them and continuously keep a critical conversation going about their scientism – about the philosophical tenability, about the evidential underpinning, about its harmful effects for science and society.

4. In response to fundamentalist movements, mainstream religions have upheld other sources of knowledge even beyond their own religion and alleged revelation. Christianity, for instance, has always been a fertile ground for rigorous academic thinking. This was partly theological: on Christianity, the world is created by an intelligent God and thus structured, nature is believed to be non-sacred and thus the object of proper scrutiny, humans are created *imago Dei* (in the image of God) and are therefore properly equipped to study and understand the world, Christians are called to love God with all their minds (Luke 10:27), and so on. As a result, mainstream Christianity – mainstream Protestantism, Roman Catholicism, and the Orthodox church – have always emphasized the value of serious academic scholarship, even if such scholarship seemed to conflict at some level with religious truths, as was the case for cosmology and evolutionary theory. Rather than straight out rejecting these branches of science, as fundamentalisms did, they developed various models as to how the two can go well together.

Similarly, science should acknowledge sources of knowledge beyond science. Of course, it is not primarily concerned with those sources (unless as object of academic inquiry) but that is of course different from discarding them. It should confirm the value of science, but also acknowledge its limitations and thereby avoid scientism.

## 8. Epilogue

In this paper, I have argued that strong scientism is untenable. Claims to the effect that only science provides knowledge, that science can answer all questions, or that science is our only guide to reality are demonstrably false. There is nothing wrong with science – on the contrary, the scientific endeavour is one of the greatest achievements of humankind – but such grand assertions should be rejected; not only because they are harmful to society and science itself, but also because they are clearly mistaken. Scientism can work at most in specific areas of life, such as free will, morality, belief in God, acting for reasons, metaphysical intuition, and so on. Whether it does is to be judged by the arguments provided in that realm, but things don't look good for scientism so far. In order to show that these weaker versions are mistaken, we need theologians, in order to evaluate claims about religious beliefs and experiences, we need philosophers, in order to assess the logical validity and assumptions of these scientific arguments, and we need scientists, in order to weigh

the empirical evidence and judge the extent to which the hypotheses meet the criteria for good scientific theory selection.

Also, the revised version of scientism which says that science provides the *best* knowledge that we have is in trouble: either it is demonstrably false or it is trivial and uninteresting, because other sources, such as religious experience and moral intuition, could then still provide rational belief and knowledge. Our discussion of scientism, particularly the so-called Fundamental Argument, also gave us reason to think that the senses, memory, logical reasoning, metaphysical beliefs, and so forth, are all needed to do science. It seems perfectly reasonable to accept such beliefs, then, unless one can show that there is something wrong with them. Thus: our perceptual and common sense beliefs are innocent until proven guilty rather than guilty until proven innocent (here I follow the Scottish philosopher Thomas Reid [1997]).

As things stand, science gives us no substantial knowledge of moral truths, truths about God, introspective truths, and basic metaphysical truths, especially those that are constitutive of science (thus also Rescher 1984). We should remain open-minded, though, toward the possibility, that science undermines some of our common-sense beliefs on these issues or that science *does* provide knowledge on these issues. We should continue taking the arguments on this point seriously and engage in the debate, especially regarding various undercutting and rebutting defeaters.

In this paper, I have also gone beyond an analysis of scientism by asking whether we can properly label and treat scientism as a variety of fundamentalism. I have argued on the basis of a family-resemblance account of ‘fundamentalism’, informed by a scoping review of the literature on defining fundamentalism over the last twenty-five years, that this is indeed the case. Fortunately, religions have built up much experience and wisdom as to how to deal with fundamentalisms and science can learn from religion in this regard in how to deal with scientific fundamentalism.<sup>18</sup>

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No potential conflict of interest was reported by the author(s).

## Notes on contributor

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