

Darwin, Design and Dawkins' Dilemma

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Abstract

Richard Dawkins has a dilemma when it comes to design arguments. On the one hand, he maintains that it was Darwin who killed off design and so implies that his rejection of design depends upon the findings of modern science. On the other hand, he follows Hume when he claims that appealing to a designer does not explain anything and so implies that rejection of design need not be based on the findings of modern science. These contrasting approaches lead to the following dilemma: if he claims that Darwinism is necessary for rejecting design, he has no satisfactory response to design arguments based on the order in the laws of physics or the fine-tuning of the physical constants; alternatively, if Humean arguments are doing most of the work, this would undermine one of his main contentions, that atheism is justified by science and especially by evolution. In any case, his Humean arguments do not provide a more secure basis for his atheism because they are seriously flawed. A particular problem is that his argument for the improbability of theism rests on a highly questionable application of probability theory since, even if it were sound, it would only establish that the *prior* probability of God's existence is low, a conclusion which is compatible with the *posterior* probability of God's existence being high.

Key words: design argument, probability, evolution, fine-tuning, Darwin, Hume.

Introduction

Richard Dawkins and other prominent new atheists such as Daniel Dennett, Sam Harris and Christopher Hitchens maintain not only that belief in God is irrational, but also that their atheism is vindicated by science. Perhaps it was reasonable for people to believe in God before the advent of modern science, but the new atheists claim that such belief has become increasingly difficult to sustain. The basic idea is straightforward enough. In the past people were not aware of natural explanations for various phenomena such as thunder and lightning and so they attributed them to God. As science progresses it provides explanations of more and more of these otherwise mysterious phenomena, leaving less and less need for God. In his book *The God Delusion*, Dawkins puts it like this:

Historically, religion aspired to *explain* our own existence and the nature of the universe in which we find ourselves. In this role it is now completely superseded by science. (Dawkins 2006, p. 347)

This attitude is particularly striking when it comes to the design argument. According to Dawkins, as far as arguments for God's existence are concerned, only the design argument merits serious consideration. He summarily dismisses the other traditional arguments, claiming to have pointed out well-known and obvious flaws. However, in the case of the design argument, it is not a logical fallacy that deals the fatal blow, but a scientific theory – Darwinism. After briefly discussing the first four of Aquinas' Five Ways, Dawkins says:

The argument from design is the only one still in regular use today, and it still sounds to many like the ultimate knockdown argument. The young Darwin was impressed by it when, as a Cambridge undergraduate, he read it in William Paley's *Natural Theology*. Unfortunately for Paley, the mature Darwin blew it out of the water. There has probably never been a more devastating rout of popular belief by clever reasoning than Charles Darwin's destruction of the argument from design. (Dawkins 2006, p. 79)

In his book *Breaking the Spell*, Dennett likewise seems to think that apart from the design argument the other arguments are "intellectual conjuring tricks or puzzles rather than serious scientific proposals" (Dennett 2006, p.

241). And once again it is Darwin who finished off the design argument as Dennett (1995) made clear in his earlier book appropriately entitled *Darwin's Dangerous Idea*.

Interestingly, many philosophers who reject the design argument do so not on the basis of the claim that Darwinism provides a better explanation than design, but on the basis of arguments such as those offered by Hume. According to this way of thinking, Darwinism has little or no relevance to the design argument: Darwinism has given us an explanation of how complex life forms could arise from simpler life forms, but even in the absence of such an explanation, the complexity found in the natural world would not constitute a good reason for believing in God.

This latter response to the design argument has obvious attractions for the atheist since it is much more robust than the Darwinian response of the new atheists. The Darwinian response, obviously enough, is not directly applicable in non-biological contexts such as in design arguments that appeal to order in the laws of nature or to the fine-tuning of the physical constants. Thus, it appears that the Darwinian response to the design argument is incomplete and so needs to be supplemented. By contrast, Humean responses are intended to be generally applicable since they claim to identify a fundamental flaw in design arguments. If such an approach is correct, it is *always* inappropriate to infer the existence of God based on design arguments irrespective of the context.

Given the advantages of Humean responses to design arguments, it is perhaps not surprising that Dawkins and some of the other new atheists supplement their Darwinian response with a response of this kind. In particular, Dawkins maintains that God is not a good explanation of organised complexity found in nature because God would possess organised complexity himself and to an even greater degree. In fact, he further asserts that such unexplained organised complexity in God is sufficient to show that God almost certainly does not exist.

Other authors have drawn attention to the Humean nature of Dawkins' arguments and have presented criticisms of them (Richmond 2007; Wielenberg 2009). The current paper makes two main contributions. First, it claims that the way in which Dawkins appeals to Humean and Darwinian arguments leads to the following dilemma: if he adopts only a Darwinian argument against design, he would have no satisfactory response to design arguments based on fine-tuning; alternatively, if he also appeals to Humean arguments his claim that the Darwinian response is necessary to defeat design cannot be maintained and so one of his main contentions, that atheism is justified by science and especially by evolution, is undermined. This would be a great price to pay for Dawkins, but perhaps it would be worth it if it made his atheism more secure. This leads to the second main contribution since it is argued that not only are his Humean arguments based on highly questionable premises as others have pointed out, but his claim that God's existence is highly improbable is based on an extremely problematic application of probability theory. The problem lies in the fact that Dawkins' improbability argument, even if it were sound, would only establish that the *prior* probability of God's existence, before relevant evidence is taken into account, is low, but not that the *posterior* probability is also low. Indeed, in many scenarios an hypothesis with a low prior probability can have a high posterior probability. Of course, Dawkins claims that there is no relevant evidence which would support God's existence, but this claim is also problematic as we shall see.

The rest of the paper is as follows. After contrasting Humean and Darwinian responses to design, I show that Dawkins appeals to both kinds of response. I then draw attention to a number of key pronouncements made by Dawkins and claim that these are compatible with his Darwinian, but not his Humean, response to design. In the rest of the paper, I present an evaluation of Dawkins' Darwinian and Humean arguments before drawing some conclusions.

Hume versus Darwin

In his *Dialogues Concerning Natural Religion*, David Hume (1779) presented a number of objections to the design argument. In particular, he criticised the argument on the grounds that it depends on a dubious analogy, that it is a flawed inductive argument since it is based on the evidence of a single universe, and that it does not establish the characteristics of the designer. He also raised the objection that if an explanation is required to account for the order in the universe, an explanation would also be required to account for the order in the mind of the designer. Hume's character Philo claims that "... a mental world or universe of ideas requires a cause as much as does a material world or universe of objects, and, if similar in its arrangement, must require a similar cause." (Hume 1779, p. 33)

Hume's objections are not based on the findings of modern science, but on more general considerations which purport to show that the design argument is flawed. Thus, if Hume's objections are valid, it is not necessary to have a scientific explanation of order in the universe to reject design and so there was no need to infer design even before Darwin. By contrast, the Darwinian response to design is not satisfied with the philosophical arguments of Hume, but is only confident in rejecting design when a scientific explanation of the order in question is in place. The philosopher of science Elliott Sober contrasts the two approaches as follows:

Philosophers who now criticize the organismic design argument often believe that the argument was dealt its death blow by Hume. ... the design argument after Hume was merely a corpse that could be propped up and paraded. Hume had taken the life out of it.

Biologists often take a different view. For them, Hume's skeptical attack was not the decisive moment; rather, it was Darwin's development and confirmation of a substantive scientific explanation of the adaptive features of organisms that really undermined the design argument (at least in its organismic formulation). Philosophers who believe that a theory can't be rejected until a better theory is developed to take its place often sympathize with this point of view. (Sober 2004, p. 15)¹

Sober himself rejects many of Hume's criticisms of design, but nevertheless his rejection of design does not depend on "seeing the merits of Darwinian theory" (Sober 2004, p. 15).

For the purposes of this paper, I shall consider *Humean responses* to the design argument to be those which, like Sober's, do not depend on 'seeing the merits of Darwinian theory' and contrast them with the *Darwinian response*, which considers Humean responses to be inadequate. It is clear that the two types of responses are incompatible since the latter claims that Darwinism is *necessary* for rejecting design while the former claims that it is not. Of course, there would be no incompatibility involved in adopting Humean responses and also claiming that Darwinism provides an independent reason for rejecting design, but someone who takes this view is not adopting the Darwinian response since Darwinism is not considered to be necessary for rejecting design. As we shall see, Dawkins espouses the Darwinian response, but in reality he seems to reject it in favour of Humean responses. In fact, his main argument against design closely follows Hume's concerning the need for an explanation of the mind of the designer.

Dawkins' Arguments against Design

In a chapter of *The God Delusion* entitled 'Why there almost certainly is no God', Richard Dawkins presents a response to the design argument based on the complexity and hence improbability of God. The core idea is that "any God capable of designing a universe ... must be a supremely complex and improbable entity who needs an even bigger explanation than the one he is supposed to provide" (Dawkins 2006, p. 147). To put it another way, he says:

the designer hypothesis immediately raises the larger problem of who designed the designer. The whole problem we started out with was the problem of explaining statistical improbability. It is obviously no solution to postulate something even more improbable. (Dawkins 2006, p. 158)

The starting point for this version of the design argument is that organised complexity requires explanation and, if this is correct, such organised complexity in God would also seem to require explanation. As Dawkins puts it:

A designer God cannot be used to explain organized complexity because any God capable of designing anything would have to be complex enough to demand the same kind of explanation in his own right. (Dawkins 2006, p. 109)

In numerous places in *The God Delusion*, Dawkins draws attention to the importance of Darwin in undermining the design argument, but sometimes it is difficult to see just what the argument is. Patrick Richmond (2007), who has provided a detailed analysis and response to Dawkins' argument, summarises it as follows:

1. It is extremely improbable that organised complexity should exist unexplained.
2. Atheistic Darwinism is able to explain how organised complexity arises from simple, physical ultimates.

¹ The quotation is taken from an expanded version of this paper which is available at <http://philosophy.wisc.edu/sober/design%20argument%2011%202004.pdf> (accessed on 14 January 2011) and to which the page numbers refer. Interestingly, in the original version of this text Sober cites Dawkins as an example of the Darwinian position. As we shall see, however, Dawkins also appeals to Humean arguments.

3. God is useless as an explanation of organised complexity since a) he must have organised complexity, the very same property we want to explain, only more so, and b) God's organised complexity would exist unexplained.
4. So, God is both unnecessary and useless as an explanation of organised complexity and extremely improbable in his own right. There is almost certainly no God.

In Richmond's formulation, Darwinism plays an insignificant role as can be seen from the fact that point 2 could be dropped without impacting the argument. If God is useless as an explanation because of his organised complexity, then organised complexity provides no support for God's existence irrespective of whether an alternative explanation is in place. Perhaps Darwinism has a psychological role to play since, as Dawkins points out, "[t]he natural temptation is to attribute the appearance of design to actual design itself" (Dawkins 2006, p. 157). If so, Darwinism might help us to resist the temptation, but if Richmond's construal of Dawkins' argument is sound, then Darwinism is not needed to show that the appearance of design should not be attributed to actual design.

However, Darwinism seems to play a more significant role for Dawkins than Richmond's formulation suggests. In fact, Dawkins seems to offer several different responses (although two of them are closely related) to the design argument. These can be expressed as follows:

Argument 1: Who designed the designer

1. It is extremely improbable that organised complexity should exist unexplained.
 2. If God exists, he must have organised complexity, the very same property we want to explain, only more so.
- And so,
3. God's organised complexity would be even more in need of explanation than that found in nature. (Or equivalently, according to Dawkins, God is not a good ultimate explanation of organised complexity in nature.)

Argument 2: Improbability of God

(This argument follows on as an extension to the argument above.)

But,

4. God's organised complexity would exist unexplained.

And so,

5. It is extremely improbable that God exists.

Argument 3: Darwinian argument

1. The design argument depends on the claim that 'nothing that we know looks designed unless it is designed'.
2. Darwinism explains apparent design in the living world and so shows that the claim noted in 1 is false.

And so,

3. The design argument is flawed and hence provides no basis for belief in God.

From Dawkins' writing it seems clear that he would defend all three arguments. Arguments 1 and 2 are similar to Richmond's formulation (excluding the Darwinian component) and summarise the key arguments presented by Dawkins in chapter 4 of *The God Delusion*. Argument 3 is the response given to the design argument in chapter 3 of the same book (Dawkins 2006, p. 79) as we shall see later. Clearly, arguments 1 and 2 are closely related and are also compatible with each other, although it would be possible to accept 1 without accepting 2. In a recent paper, Erik Wielenberg (2009) provides another formulation of Dawkins' argument that relates to arguments 1 and 2, although his focus is primarily on Dawkins' claim that God's existence is improbable. Interestingly, even though Dawkins claims that Darwinism has a central role to play in his improbability argument, Wielenberg's formulation does not make any appeals to Darwinism at all and he sees it as a Humean argument. In another paper, Gregory Ganssle (2008) discusses what he calls Dawkins' favourite argument which corresponds to argument 1 above. We will consider Wielenberg's and Ganssle's responses later.

Note the all-encompassing nature of arguments 1 and 2 for, if they are sound, they show that no matter what degree of organised complexity is found in the universe, it would still be inappropriate to appeal to God as an explanation. This reveals the Humean, as opposed to Darwinian, nature of these arguments since they are not dependent on the truth of Darwinism. In fact, argument 1 is very similar to Hume's argument as noted earlier and so in no way depends on the findings of modern science. Dennett confirms that Dawkins is really just using Hume's argument, describing it as:

an un rebuttable refutation, as devastating today as it was when Philo used it to trounce Cleanthes in Hume's *Dialogues* two centuries earlier. (Dennett 1995, p. 155)²

In argument 3, premise 2 essentially amounts to saying that Darwinism provides an alternative to design as an explanation of organised complexity. And since Darwinism is well-established, there is no need to appeal to God to account for it as well. It is important to note how different this argument is from arguments 1 and 2. First, it is based on a scientific theory, namely Darwinism. Second, it is a more modest argument in that it does not purport to show that God probably does not exist, but just that the evidence cited in design arguments does not provide a good reason for believing in his existence. In other words, it purports to show that Darwinism undermines the design argument.

Given these differences between the Humean arguments (arguments 1 and 2) on one hand and the Darwinian argument (argument 3) on the other, a tension arises between them for arguments 1 and 2 render 3 unnecessary. This is because arguments 1 and 2 have stronger conclusions. In fact, someone who accepted the conclusion of argument 1 or argument 2, would have good reason to reject design even if he also rejected Darwinism. Dawkins, for example, seems to think that arguments such as 1 and 2 are sufficient to establish that God cannot be an explanation of organised complexity and that God's existence is extremely improbable, but these conclusions in no way depend on Darwinism. If arguments 1 and 2 are valid, these conclusions follow solely from certain claims about complexity and the kind of being God would be; Darwinism is simply irrelevant from a logical point of view.

Now, of course, Dawkins is quite entitled to put forward all three arguments. From the fact that the Humean arguments make the Darwinian argument unnecessary, it does not follow that it is unsound or that it cannot be proposed as an independent argument. Dawkins could take the attitude that his opponents might be persuaded by the Darwinian argument if they are not persuaded by the Humean arguments (or vice versa). This parallels the approach adopted by some theists of proposing both *a priori* and *a posteriori* arguments for the existence of God. What Dawkins is not entitled to do is to defend the Humean arguments while also maintaining that Darwinism is *necessary* for rejecting design and so imply that Humean responses are inadequate on their own. This gives rise to a dilemma for Dawkins: should he adopt Humean arguments like 1 and 2 above, and so maintain that Darwinism is not necessary for rejecting design; or should he reject arguments 1 and 2 and place all his emphasis on the Darwinian argument instead. Before evaluating the arguments, we shall first consider which horn of the dilemma is more consistent with other claims made by Dawkins.

Dawkins and Darwin

There are a number of prominent themes in Dawkins' atheism that strongly suggest he should opt for the Darwinian response to design *rather than* Humean responses such as the *who designed the designer* and the *improbability of God* arguments discussed in the previous section. A number of such themes will now be considered.

Darwinism undermines design

Dawkins places a lot of emphasis on the idea that it was Darwin who defeated the design argument. As noted in the introduction, he refers to "Charles Darwin's destruction of the argument from design". He summarises the design argument as follows:

Things in the world, especially living things, look as though they have been designed. Nothing that we know looks designed unless it is designed. Therefore there must have been a designer, and we call him God.
(Dawkins 2006, p. 79)

² Furthermore, Dawkins (2006, p. 157) seems to accept that his argument is no different from Hume's, and so presumably no more dependent on science, since he quotes these remarks of Dennett with approval. Dennett points out that Hume could not think of an alternative explanation and so in the end he "caved in" to the design argument, but the clear implication is that Hume's arguments had shown that the design argument was flawed and so his caving in was a failure of nerve on Hume's part that was not grounded on rational considerations.

He later adds that “[t]hanks to Darwin, it is no longer true to say that nothing that we know looks designed unless it is designed” (Dawkins 2006, p. 79). This passage clearly indicates that Dawkins accepts argument 3. But note also that it supports the stronger claim that it is only because of Darwin that the design argument can be rejected. Thanks are due to Darwin, not Hume. Later on he makes essentially the same argument, but in a slightly different way. He claims that:

Creationist ‘logic’ is always the same. Some natural phenomenon is too statistically improbable, too complex, too beautiful, too awe-inspiring to have come into existence by chance. Design is the only alternative to chance that the authors can imagine. Therefore a designer must have done it. And science’s answer to this faulty logic is always the same. Design is not the only alternative to chance. Natural selection is a better alternative. (Dawkins 2006, p. 121)

Once again it is the fact that Darwinism provides an alternative explanation to design (and chance) that is crucial. However, he goes on in the next sentence to claim that design is not a real alternative because it raises the bigger question as to who designed the designer and so he moves in a Humean direction. Nevertheless, it seems clear that he considers Darwinism to play a fundamental role in undermining design. This is consistent with his views expressed in his earlier book *The Blind Watchmaker*, where he clearly emphasises the importance of Darwin over Hume in defeating design:

I feel more in common with the Reverend William Paley than I do with the distinguished modern philosopher, a well-known atheist, with whom I once discussed the matter at dinner. I said that I could not imagine being an atheist at any time before 1859, when Darwin’s *Origin of Species* was published. ... although atheism might have been *logically* tenable before Darwin, Darwin made it possible to be an intellectually fulfilled atheist. (Dawkins 1986, pp. 5-6)

Despite Dawkins’ advocacy of the idea that Darwinism is central to the rejection of the design argument, there is a tension between the Darwinian and Humean approaches in *The God Delusion*. On the one hand he seems to want to say that it is Darwin’s alternative explanation that enables us to reject design, but on the other, according to Dawkins’ arguments 1 and 2, it is not necessary to have an alternative explanation for the living world to see that the design argument fails. If these arguments are sound, God does not provide an explanation at all and his existence is even more improbable than just accepting organised complexity in nature as a brute fact, so the design argument provides *no reason to believe in God at all* irrespective of whether we have an alternative explanation. If this is correct, Darwinism provides a gloss to the argument, but it has no substantial role to play in undermining design. Darwinism may give rise to suspicion of design, but if Humean arguments have countered the logical force of design it seems that Darwinism’s role is purely psychological.³ This claim is clearly consistent with Dawkins’ arguments 1 and 2, but not with the idea that Darwinism is necessary for rejecting design.

Thus, there appears to be an ambiguity in Dawkins regarding the relevance of Darwinism to design, but if his bold assertions about Darwinism undermining design are to have much substance he should adopt the Darwinian response to design (and so place all his emphasis on argument 3) rather than his Humean responses (arguments 1 and 2).

Not enough evidence

Dawkins’ attitude to evidence for God can be summarised by the view expressed by the philosopher Bertrand Russell in a story to which Dawkins alludes. Russell was asked what he would say if, after death, God asked him why he had not believed, to which he replied ‘Not enough evidence, God, not enough evidence’. Strictly speaking, however, Russell’s response is a bit weak for Dawkins since he believes that there is not just insufficient evidence, but none at all. Dawkins, for example, claims that “there is no evidence to favour the God Hypothesis” (Dawkins 2006, p. 59).

It is important here to consider what ‘evidence’ means. What Dawkins seems to have in mind is that something would count as evidence for God’s existence if God’s existence provided a better explanation for it than

³ Dawkins’ discussion of natural selection as a consciousness-raiser (Dawkins 2006, pp. 114-119) seems consistent with it having a psychological rather than logical role.

non-theistic explanations, and if so, this is a fairly standard understanding of 'evidence'.⁴ There is a potential problem for Dawkins here, however, because of his views on whether God could be a good explanation of *anything*. Although argument 1, even if sound, would only establish the conclusion that God would not be a good ultimate explanation of *organised complexity*, at times Dawkins appears to want to rule out God as an explanation *in toto*. In an earlier article, he states:

The hypothesis of God offers no worthwhile explanation for anything, for it simply postulates what we are trying to explain. It postulates the difficult to explain, and leaves it at that.⁵

Since this comment is also found in a discussion about organised complexity and the improbability of God, perhaps it could be argued that he just means that God could not provide an explanation of organised complexity and so does not rule out the possibility that God could provide a good explanation in other contexts. However, I am not aware of him giving any account of the kind of circumstances in which God would provide a good explanation. Furthermore, his reason for ruling out God as an explanation of organised complexity would seem to apply to God as an explanation of other kinds of evidence as well. He reasons that because God, if he exists, would be complex, "[h]is existence is going to need a mammoth explanation in its own right" (Dawkins 2006, p. 149). This suggests that he thinks God's complexity would preclude God from being a good terminating point for explanation in general and not just as an explanation of organised complexity.

The problem is that if God could not be an explanation of anything, then nothing could count as evidence for God even in principle. And if this is Dawkins' view, it sheds a very different light on his claim about there not being enough evidence. When he makes that claim, it is natural to assume that he intends it as an empirical claim; that there could be evidence for God, but that as an empirical matter of fact there is not. His claim appears rather hollow if he believes that no *conceivable* evidence could count in favour of God's existence. Similarly, there seems little point in trying to meet his demand for evidence for God if he is simply going to respond by saying that God cannot be an explanation no matter what evidence is offered.

To be taken seriously, Dawkins' claim that there is no evidence for God would amount to the claim that there are better alternative explanations of evidence that might otherwise be thought to count in favour of God. In other words, he would not be ruling out the possibility of God as an explanation, but just claiming that there are better alternative explanations. This is in keeping with the Darwinian argument which amounts to the claim that Darwinism provides a better explanation of organised complexity in the living world. Alternatively, if Dawkins is claiming that God cannot provide an explanation of anything, this is much more in keeping with the conclusion of argument 1 that God cannot provide a good explanation of organised complexity. Thus, if Dawkins' claim about lack of evidence for God's existence is to be understood as an empirical claim, as it surely must, it is much more consistent with his Darwinian argument than his Humean arguments.

God as a scientific hypothesis

Given the foregoing discussion, it is ironic that Dawkins expresses very clearly the view that evidence is relevant to the question of God's existence. He claims:

... a universe with a supernaturally intelligent creator is a very different kind of universe from one without. The difference between the two hypothetical universes could hardly be more fundamental in principle, even if it is not easy to test in practice. ... The presence or absence of a creative super-intelligence is unequivocally a scientific question, even if it is not in practice – or not yet – a decided one. (Dawkins 2006, pp. 58-59)

What would it be like to live in a universe that is the creation of a supernatural being? Since Dawkins thinks it would be very different from a universe that was not so created, it seems clear that there would be features of the world that would count as evidence for God's existence. But if we did (or do) live in such a world and if Dawkins holds to the view discussed above, that God cannot explain anything, then he would be committed to the view that the feature in question would not really be evidence for God's existence after all.

Thus, just as in the previous case, Dawkins' claim is undermined by his appeal to Humean arguments.

⁴ An alternative way would be to say that something counts as evidence for God's existence if it would be more probable given God's existence than it would be if God does not exist. As far as I am aware Dawkins does not address this conception of evidence, which is based on confirmation theory.

⁵ From 'Lecture from 'The Nullifidian' (Dec 94)' which is available at <http://richarddawkins.net/articles/89> (last accessed 5/07/10).

Science supports atheism

Related to the previous three points is Dawkins' claim that science provides justification for atheism. As noted in the introduction, he holds that scientific progress makes belief in God unnecessary as an explanation; with the progress of science there is simply less and less for God to explain. The problem is that if God cannot be an explanation of anything or if God is highly improbable (as argument 2 purports to show), then scientific progress is irrelevant since these arguments would undermine belief in God as an explanation for any phenomenon irrespective of whether science could offer an explanation. Of course, having a scientific explanation would be a bonus for the atheist since otherwise the phenomenon in question would be inexplicable, but it would be unnecessary for rejecting belief in God. Belief in God would have been just as irrational in the sixteenth century as it is today for anyone who had thought of, and accepted, Dawkins' arguments.

Once again, Dawkins' claim makes much more sense from the point of view of his Darwinian response to design. If arguments 1 and 2 are rejected, God's existence cannot be ruled out, but if argument 3 is accepted, then a scientific theory can undermine belief in God and this opens up the possibility that other developments in science might also undermine theistic belief.

Dawkins: an atheistic Darwinian?

The intention in this section has been to show that a number of prominent pronouncements made by Dawkins are consistent with a *Darwinian response* to the design argument, but are undermined by his *who designed the designer argument* (argument 1) and *improbability of God argument* (argument 2). These pronouncements are centred on the idea that it is science rather than philosophy that undermines theism and supports atheism, yet when investigated more closely it becomes evident that it is Humean factors that are doing most of the work in Dawkins' arguments. He wishes to retain his atheistic Darwinian cake, but can't resist eating it with Humean arguments.

Evaluating the Darwinian Argument against Design

So far our focus has been on identifying the arguments that Dawkins employs against design and on determining which of these arguments is most consistent with other claims he makes. This, however, leaves unanswered the question as to whether they are good arguments. This question will now be addressed. The Humean arguments (arguments 1 and 2) will be considered together since they are closely related, but first we consider the Darwinian argument against design (argument 3).

The basic point of this argument is that Darwinism explains the existence of apparent design in the living world. In doing so it falsifies a key premise of the design argument, that apparent design (by which Dawkins means organised complexity) requires actual design. Essentially, it renders design unnecessary as an explanation of organised complexity. How might the proponent of design address this response?

Let us focus first on premise 2 of the argument. One way to reject this premise would be to show that Darwinism is false. This approach is, of course, one that Dawkins relishes, especially given that he has written extensively about Darwinism. Furthermore, this approach is rejected by many theists, including many who are also advocates of design arguments. For these reasons, this approach will not be considered further here.

It is one thing to accept Darwinism, but quite another to say that it makes design redundant as an explanation of organised complexity even in biology as premise 2 claims. If I understand Dawkins correctly, he does not claim that Darwinism and design are logically incompatible, but rather that they offer two possible explanations of organised complexity (setting aside his Humean arguments for the moment). However, if one of these explanations is known to be true, i.e. Darwinism, there is no longer any need to invoke the other explanation. Or to put it another way, there is no need to infer two explanations when one will do. Is this reasoning sound? In certain scenarios, it is. For example, when I learn that my children were playing in the living room, the hypothesis that there has been a burglary becomes redundant as an explanation for the untidiness. In general, however, there is a question as to when one explanation is good enough to render the other redundant.

Given the laws of physics and the initial state of the early universe, does Darwinism give a sufficiently good account of organised complexity to make design unnecessary? I have argued elsewhere that it is not at all obvious that it does (Glass 2011). There are a number of hurdles that suggest the probability of complex life arising in the universe is very low even when Darwinism is taken into account. Even Dawkins acknowledges that certain steps in the development of complex life are statistically improbable. He refers to the "initial stroke of luck" (Dawkins 2006, p. 140) in the origin of life and goes on to say that "it may be that the origin of life is not the only major gap in the evolutionary story that is bridged by sheer luck, anthropically justified" (Dawkins 2006, p.140). He suggests two further hurdles as well:

Mark Ridley ... has suggested that the origin of the eucaryotic cell ... was an even more momentous, difficult and statistically improbable step than the origin of life. The origin of consciousness might be another major gap whose bridging was the same order of improbability. (Dawkins 2006, p. 140)

Dawkins' point is well made. He appeals to the anthropic principle and considerations about the size of the universe and number of possible planets in an attempt to lessen the force of these factors, but ultimately he reverts back to a Humean response:

[Natural selection] needs some luck to get started, and the 'billions of planets' anthropic principle grants it that luck. Maybe a few later gaps in the evolutionary story also need major infusions of luck, with anthropic justification. But whatever else we may say, *design* certainly does not work as an explanation for life, because design is ultimately not cumulative and it therefore raises bigger questions than it answers – it takes us straight back along the Ultimate 747 regress. (Dawkins 2006, p. 141)

Note that by ruling out design as an explanation it is Dawkins' Humean arguments (arguments 1 and 2) that are really doing the work here and not his Darwinian argument.

However, by turning our attention to premise 1 of the Darwinian argument we can see that there is a much more fundamental objection to Dawkins' Darwinian argument. The problem is that, contrary to Dawkins' assertion, design arguments need not, and generally do not, depend on the claim that 'nothing that we know looks designed unless it is designed'. A common strategy in design arguments is to argue that certain features of the universe are best explained by design or are more probable given design than non-design (see for example Swinburne 2004). But this does not mean that everything that has an appearance of design must be attributed to design. It depends whether design can explain the feature in question and, if so, whether it is a better explanation than any rival explanations. For example, as a leading advocate of the design argument, Richard Swinburne does not appeal to design to explain biological complexity that can be explained in evolutionary terms. Of course, Dawkins would argue that design is never a good explanation, but that is based on his Humean arguments whereas here we are considering the merits of his Darwinian argument.

Thus, even if Darwinism undermines design in biology, it certainly does not follow that all design arguments fail. Dawkins' idea that Darwinism raises our consciousness so that we should be more cautious about inferring design in other contexts seems more plausible. But this falls a long way short of establishing that Darwinism destroyed the argument from design. At most it might establish the following conclusion:

Darwinism defeats design as an explanation in biology and we should be cautious about invoking design as an explanation in other contexts.

But this is a much more modest conclusion and would not provide any support for the grandiose claims Dawkins makes for atheism. Indeed, it is quite compatible with the view that there is evidence that counts in favour of God's existence even if not overwhelmingly so.

The point is that if Darwinism undermines design in biology, it does so by providing an explanation that does not appeal to design. But how could Darwinism undermine design in the context of fine-tuning, for example, without giving an explanation of fine-tuning? Merely appealing to Darwinism as a consciousness-raiser does not seem good enough. Instead, what would be required would be an alternative explanation of fine-tuning that was at least as convincing as an explanation of fine-tuning as Darwinism is for organised complexity in biology. And, if there is no such explanation of fine-tuning that is sufficiently convincing, why should design still be ruled out, especially given the incredible degree of fine-tuning? Dawkins' view seems to be a bit like saying that no-one should ever be convicted of murder because some people in the past have been wrongly convicted. Of course, the fact that innocent people have been convicted of murder should make us cautious about convicting someone on insufficient evidence. But if the evidence is overwhelming in a particular case, it would be a huge mistake *not* to convict.

In his book *Metaphysics*, Peter van Inwagen presents an argument which might seem to support the idea that Darwinism as a consciousness-raiser should not only make us cautious about inferring design, but can be used to undermine design arguments outside a biological context. He expresses the general applicability of Darwinism as follows:

Darwin showed how it was possible, in certain circumstances, for chance to produce results that one might be initially tempted to ascribe to the purposive action of rational beings; some of the ideas on which this

demonstration rests are so simple and general that they can be lifted out of the biological context in which Darwin applied them and applied to the apparent design exhibited by the cosmos. (van Inwagen 1993, p. 139)

Van Inwagen applies this approach to the design argument based on the fine-tuning of the physical constants. He argues that just as the interplay between chance and necessity in Darwinism defeat design in biology so the interplay between chance and an observational selection effect can defeat the fine-tuning argument. Central to his argument is an appeal to a multiverse, according to which our universe is only one of a vast number, a few of which are suitable for life. He claims that the multiverse hypothesis and the hypothesis that there is just a single universe which has been designed are equally probable and so the fine-tuning argument fails. Whatever the merits of van Inwagen's argument, it is important to note that it depends crucially on the plausibility of the multiverse hypothesis. It would not do to simply appeal to Darwinism having undermined design in biology and conclude that there may well be some alternative to design in the context of fine-tuning too; an alternative explanation must be offered. And, equally, it would not be sufficient to propose an alternative explanation that is a bare logical possibility because in that case one might just as easily appeal to blind chance as an alternative to design. Hence, if van Inwagen's argument works at all, it does so not because of Darwinism but because of the merits of the multiverse hypothesis. But does his argument work? There are two main problems with it. First, he simply states without argument that the two hypotheses (design and multiverse) must be regarded as equally probable which is highly questionable (see Swinburne 2004). Second, it seems likely that the multiverse hypothesis itself requires design. Van Inwagen refers to one or more cosmos-producing machines with a randomising device to ensure universes which vary widely in terms of their physical constants. Robin Collins argues that the physics involved in possible mechanisms to generate such a large number of diverse universes would provide the basis for a very strong design argument (Collins 2007).

It is instructive to consider Dawkins' response to the fine-tuning argument. Dawkins also appeals to a multiverse to account for fine-tuning and addresses the claim that this is no more satisfactory than design as follows:

People who think that have not had their consciousness raised by natural selection. The key difference between the genuinely extravagant God hypothesis and the apparently extravagant multiverse hypothesis is one of statistical improbability. The multiverse, for all that it is extravagant, is simple. God, or any intelligent, decision-taking, calculating agent, would have to be highly improbable in the very same statistical sense as the entities he is supposed to explain. (Dawkins 2006, pp. 146-147)

Here Dawkins appeals to natural selection as a consciousness-raiser, but he is not content to rest his case on the Darwinian response. He appears not to be entirely convinced of the alternative multiverse explanation in this case, but nevertheless thinks it is to be preferred to design. What is the reason for this? Clearly, Dawkins has reverted to his Humean arguments by claiming that God is too improbable to be a satisfactory explanation. It is not just that one should be cautious about inferring design, but that design should never be considered as a legitimate explanation. This clearly goes far beyond anything that Darwinism as a consciousness-raiser could establish.

Another example is found in design arguments that appeal to the order in the universe as described in the laws of physics (see for example Swinburne 2004). Once again, the Darwinian argument would be inadequate and so it seems likely that Dawkins would revert to a Humean response in this case as well. Gregory Ganssle (2008) also appeals to order as one of four features of the universe which he uses to undermine what he refers to as Dawkins' best argument, an argument which is also found in *The God Delusion*. This is Dawkins' argument that the universe fits better with atheism than with theism and so atheism is more likely to be true. Clearly, there is some overlap between this argument and the Darwinian argument against design because evolution is one of Dawkins' main reasons for believing that the universe fits better with atheism than theism. There is also some overlap between the response offered by Ganssle and the response here, although the details differ considerably. Ganssle concedes that the process of Darwinian evolution does in fact fit better with atheism than theism, but argues that overall there is no good reason to think that the evidence fits atheism better since there are various other features of the universe that arguably fit better with theism. Similarly, I have argued that even if Darwinism undermines design in biology, it does not undermine it in other contexts.

Overall, the Darwinian argument against design is extremely weak and so the Humean arguments are left to carry all the weight. Whether they can do so will now be considered.

Evaluating the Humean Arguments against Design

Let us recall that these arguments are Dawkins' *who designed the designer argument* (argument 1) and the *improbability of God argument* (argument 2) which were presented earlier. To start with, I will consider a common

but inadequate reply to argument 1. I will then summarise responses by other authors which show that these arguments are unsound because key premises are highly questionable. Finally, I will argue that even if the arguments were sound they would still not present a problem to the theist because Dawkins' use of probability is extremely dubious.

An inadequate reply to Dawkins

The *who designed the designer argument* concludes that God's organised complexity would be even more in need of explanation than that found in nature. For this reason, Dawkins rejects God as an explanation of organised complexity in nature. It is often pointed out in reply that *something can be an explanation even if it is more complex than what it explains*. At first glance this seems like a promising approach since there are many cases where we explain relatively simple phenomena in terms of something much more complex. For example, if I arrive home and discover a short message with my wife's name at the end of it, I reasonably explain the message by the action of my wife even though the message is much simpler than a human being. In fact, we routinely explain relatively simple phenomena in terms of the action of humans. Dawkins, of course, does not object to such explanations, but his opponent will argue that there is then no need to exclude God as an explanation of complexity in nature even if God is more complex.

One reply that Dawkins could make is that we can explain where humans came from in terms of evolutionary theory, but we have no explanation for God's existence. However, his opponent can then counter that explanations in terms of human agency would be perfectly legitimate even if we had no explanation for human origins and, indeed, as they were before Darwin. Furthermore, suppose we found compelling evidence for the existence of alien intelligence. It would surely be legitimate to explain the evidence by reference to the aliens even if we could not explain how they came into existence in the first place. Hence, *something can be an explanation without itself being explained*. Again, I think Dawkins would agree in these cases. And I think he could respond by saying that these are not *ultimate* explanations and so it is entirely reasonable to seek further explanations in these cases. God, by contrast, would be an ultimate explanation and so there can be no further explanation in his case. If we accept that organised complexity requires explanation, as seems plausible because it is the starting point for the design argument that Dawkins' opponent is trying to defend, and also that God has organised complexity, then Dawkins' opponent faces a difficulty: an explanation for God's existence is required but none is possible.

Now, of course, there are various ways in which Dawkins' opponent can strengthen his reply. For example, perhaps he can argue that organised complexity usually requires explanation but it does not in God's case or perhaps he can deny that God has organised complexity. As we shall see, these claims (along with others) provide plausible replies to Dawkins. However, the key point here is that the straightforward idea that *something can be an explanation even if it is more complex than what it explains* is inadequate *on its own* to defeat Dawkins' argument and so needs to be supplemented in some other way.

Dawkins' dubious premises

In responding to Dawkins' Humean arguments (1 and 2), Gregory Ganssle and Erik Wielenberg both think that the theist can avoid Dawkins' conclusions by appealing to the idea that God is a necessary being. As we saw earlier, Ganssle's discussion of what he calls Dawkins' favourite argument corresponds with the *who designed the designer argument* (argument 1). He argues that the necessity of God's existence means that "God, if he exists, is simply not the sort of being who needs external explanation" (Ganssle 2008, p. 44). This is closely related to premise 1 of argument 1:

1. It is extremely improbable that organised complexity should exist unexplained.

Essentially Dawkins is claiming that organised complexity requires explanation because otherwise it would be highly unlikely to occur, whereas Ganssle is claiming that this does not apply to necessary beings. Hence, even if God has organised complexity, there is no reason to accept the conclusion of the argument.⁶

As discussed earlier, Wielenberg's version of Dawkins' argument treats the *who designed the designer argument* (argument 1) and the *improbability of God argument* (argument 2) together and focuses on the conclusion of the latter, but again the weakness is found to lie with premise 1. However, having appealed to God's necessity to

⁶ Actually, this is not quite right. Ganssle formulates Dawkins' argument in terms of God requiring an explanation *outside himself*. Hence, God's necessity would not rule out premise 1 as I have formulated it or even the conclusion of the argument. However, now there would be an explanation for God's complexity in terms of it being a necessary attribute of God (if Dawkins is right that God would possess organised complexity) and the necessity of God's existence. Hence, argument 1 would lose its force and premise 4 in argument 2 would be false.

defeat Dawkins' gambit, Wielenberg argues that the theist is vulnerable to another Humean argument, which he calls Cleanthes' gambit, the idea that the universe might exist necessarily. Wielenberg asks, "If God can exist necessarily despite His existence not being self-evident to us, why may not the same be true of the natural universe?" (Wielenberg 2009, p. 120). He then goes on to consider divine simplicity as another way of undercutting Dawkins' arguments, by enabling the theist to reject premise 2, i.e. that God, if he exists would have organised complexity. He claims that in this way the theist could avoid both Dawkins' and Cleanthes' gambits, but he objects to the notion of divine simplicity on the grounds that it makes the idea of God obscure and of little use as an explanation.

In summary, Wielenberg argues that the theist can appeal to the necessity of God's existence or the simplicity of his being to reject Dawkins' premises, but in both cases runs into other problems. Rather than addressing these concerns directly, it is worth returning to Dawkins' argument to see whether other responses are possible. Consider again premise 1. Why does Dawkins think this premise is true? To answer this, we must consider what he means by organised complexity in the first place. Basically, his idea is that a system has organised complexity if it is composed of a variety of parts arranged in a highly specific manner so that it is able to function (Dawkins 1986, chapter 1). Living organisms provide an obvious example as does a Boeing 747. The link with improbability is due to the fact that organised complexity is highly unlikely to arise by chance. Dawkins puts it like this:

The argument from improbability states that complex things could not have come about by chance. (Dawkins 2006, p. 114)

This statement seems straightforward enough. The vertebrate eye, for example, could not reasonably be attributed to chance and so an evolutionary explanation is better than chance. But this does little to establish premise 1. In fact, instead of premise 1, Dawkins has really only made a case for the following weaker claim:

1'. It is extremely improbable that organised complexity should come about by chance.

From this statement and the claim that God possesses organised complexity, it only follows that God is highly unlikely to have arisen by chance; few theists will be worried by this conclusion. In a footnote Wielenberg draws attention to the fact that God's eternal existence would enable the theist to avoid premise 1. Yet despite the fact that this seems to offer a less problematic response than appeals to the necessity of God's existence, he does not pursue this approach further. But even though Dawkins does not make the case for the truth of premise 1, perhaps there is a case to be made. Patrick Richmond points out that in the cosmological arguments of Aquinas and Leibniz the universe would require explanation even if it had always existed and in a similar way it might be thought that organised complexity would require explanation even in the case of a being who had always existed (Richmond 2007, pp. 108-109). So premise 1 does seem plausible, but arguably only to those who find corresponding plausibility in the premises of these cosmological arguments.

Let us now turn to the second premise of Dawkins' *who designed the designer argument* (argument 1):

2. If God exists, he must have organised complexity, the very same property we want to explain, only more so.

Here is what Dawkins has to say:

A God capable of continuously monitoring and controlling the individual status of every particle in the universe *cannot* be simple. (Dawkins 2006, p. 149)

And later he adds:

God may not have a brain made of neurones, or a CPU made of silicon, but if he has the powers attributed to him he must have something far more elaborately and non-randomly constructed than the largest brain or the largest computer we know. (Dawkins 2006, p. 154)

Here we must be careful about the words 'simple' and 'complex'. If 'simple' is taken to mean something like simple-minded or only capable of performing simple tasks, it is clear that God cannot be simple in this sense. And, of course, if 'complex' just means 'not simple', then clearly God is complex, but this does not even come close to

establishing that God is complex in the sense relevant for premise 2 of Dawkins' argument, i.e. organised complexity.

What is required for premise 2 is an argument to show not just that God, if he exists, would have complexity in some sense, but that he would have organised complexity since only this type of complexity can be linked with improbability. But what is Dawkins' argument that God would possess organised complexity? He seems to think that any being capable of doing the amazing things God is supposed to be able to do, must possess organised complexity. Recall that organised complexity requires an arrangement of parts in a highly specific way that enables the system to function. But why think that God must have such an arrangement of parts? In the biological case, organised complexity is due to highly specific arrangements of physical parts, but if God exists he is non-physical and so clearly his organised complexity cannot be of this type. Is there some reason for thinking that God, if he exists, must therefore have a highly specific arrangement of *non-physical* parts? What exactly is the argument for this? And what are these parts supposed to be anyway? Granted, humans have complex brains and perhaps all embodied intelligent agents must have complex brains of some sort, but it is not at all clear that an unembodied intelligence must have what effectively amounts to a non-physical brain.

Richmond (2007, p. 100) provides what is perhaps the most plausible construal of Dawkins' argument, which is to adopt the Humean approach of identifying the non-physical parts with ideas in God's mind (see also the section 'Hume versus Darwin'). Basically, the argument is that to explain the order in the natural world, the proponent of design appeals to God, but the order in God's mind is as much in need of explanation as the order in the natural world. The reason for this is that God's mind is to be understood as an arrangement of ideas. If so, Dawkins could identify the non-physical parts of God's mind that are arranged in a highly specific way with ideas. And so, perhaps God possesses organised complexity after all. Unfortunately for Dawkins, Hume's approach seems open to a fatal objection since a mind needs to be distinguished from an arrangement of ideas. As Richmond puts it:

we cannot make much sense of a conscious idea existing independently of a mind; ideas are not independent, separable entities like physical parts, but are logically inseparable from a mind. ... [Divine ideas] are all essential aspects of the single act of God's comprehension of his power, not independent entities. God's consciousness can be a non-composite, irreducible mental state. (Richmond 2007, p. 115)

Keith Ward adopts a very similar approach in his response to Dawkins:

God is not complex in the sense of being composed of separate and separable parts. The ideas in God's mind are not separately existing ideas that are added together to form the mind of God. They only exist as part of the mind of God, which is one consciousness. ... The mind comes first, and its ideas are parts that are inseparable from that mind. (Ward 2008, p. 48)

Both Richmond and Ward deny that God has organised complexity in Dawkins' sense. The main reason for this is that God's ideas are not independent, separable parts. Richmond gives the further reason that God's consciousness of all possibilities lacks "the sort of specificity that characterises organised complexity" (Richmond 2007, p. 114). However, Richmond and Ward also agree that God is complex in the sense of having an infinite number of ideas. In rejecting the idea that God has organised complexity, they have provided a way of rejecting premise 2 without having to appeal to the traditional notion of divine simplicity found in Aquinas and criticised by Wielenberg. In a footnote Wielenberg rejects the idea that "a version of the doctrine of simplicity less extreme than the Thomistic version ... could evade both Dawkins's Gambit and Cleanthes's Gambit" (Wielenberg 2009, p. 123). However, this seems to be because he links this viewpoint with the idea that God's existence is necessary, yet in rejecting premise 2 the theist need not be committed to this idea at all. Furthermore, in rejecting premise 2, the theist need not even claim that God is simple, but merely that he does not have *organised* complexity.

Even though Richmond and Ward explain God's complexity in the sense of an infinite number of ideas as the product of a single, unified mind, it might be objected that God's mind itself still requires explanation. Even though this may well be true, it must be emphasised that this does not help Dawkins' case because if organised complexity cannot be ascribed to God then arguments 1 and 2 both fail. And in any case there are at least two possible answers open to the theist. One would be to appeal to the necessity of God's existence as an explanation for God's mind. Another would be to note that all viewpoints, including atheism, must leave some things unexplained and argue that theism is the best overall explanation of reality (including organised complexity found in nature) even though God's existence itself is unexplained. Since there is no good reason to rule out God as an explanation of organised complexity in nature (due to the failure of argument 1) and there is no good reason to think that God's existence is

highly improbable (due to the failure of argument 2), there does not seem to be any good reason for ruling out this theistic strategy.

Overall, it seems clear that Dawkins has provided no reason for believing that God, if he exists, would have the kind of organised complexity found in the natural world and so his Humean arguments fail.

So far we have been considering whether Dawkins' arguments establish the conclusions that God would be even more in need of explanation than what he is supposed to explain and that it is very improbable that God exists. Let us consider one further objection to Dawkins' Humean arguments against design. The problem is that if his Humean approach works, arguably it proves too much. As we saw earlier, for reasons similar to his Humean arguments, Dawkins gives the impression that God could not be an explanation of anything and so it seems that no evidence whatsoever could ever count in favour of God's existence. Now, of course, in one sense this might seem like the holy (or unholy perhaps) grail of atheism, but it would seem like a very unreasonable viewpoint for Dawkins to hold given his view of belief in God as a scientific hypothesis. If we find an atheist, who maintains that he forms his beliefs on the basis of the evidence, and yet, when asked what evidence would convince him that God exists, responds by saying that he would not believe in God no matter what the evidence, we would not be inclined to take him seriously.

In Hume's *Dialogues*, Cleanthes describes a scenario where a voice is heard from the clouds, a voice which is "much louder and more melodious" than any human voice, which speaks to each nation instantaneously in its own language to convey a message "worthy of a benevolent Being superior to mankind". Cleanthes claims that we would not hesitate to ascribe it to design (Hume 1779, p. 26). (If that isn't good enough evidence for design, you can make up a story with more impressive evidence.) How would Dawkins respond to such a scenario? If he really takes his Humean arguments seriously, it seems likely that he would respond by saying that this highly specific sequence of sounds is indeed an extreme example of organised complexity that cannot be explained by evolution or any other scientific theory and that it is far too improbable to have occurred by chance. But then he will point to the alternative explanation and say that no matter how improbable it is, a God capable of bringing this about would be even more complex and so even more improbable. In other words, it is difficult to see how any evidence that could count in favour of God's existence.⁷

The earlier discussion showed that Dawkins' Humean arguments against design were flawed in that Dawkins had failed to establish the relevant premises and hence also the conclusions. This latter objection goes further, however, in that it shows that if Dawkins denies that God could be an explanation of anything, then his position is unreasonable for anyone wishing to form their beliefs on the basis of the evidence. Something seems to have gone wrong, however. How could Dawkins, who claims that he bases his beliefs on the evidence, have managed to get into a position where no evidence could cause him to revise his beliefs? A probabilistic analysis will show that something has indeed gone wrong in Dawkins' reasoning.

Dawkins and probability theory

As we have seen, Dawkins tends to revert to Humean arguments whenever Darwinian arguments run into trouble. Furthermore, we have also seen that there are serious problems with his Humean arguments. But let's now assume for the sake of argument that somehow Dawkins can reinstate his Humean arguments. Should Dawkins then adopt the Humean approach? As pointed out above, there would be a significant price to pay for such a move since it would seem to require rejecting his claim that atheism has an evidential basis in modern science. Still, perhaps he should be willing to pay the price if it would really make his atheism secure. But would it? Certainly, it seems so since the conclusion of his *improbability of God argument* is that 'it is extremely improbable that God exists'. However, this conclusion should not worry the theist because it is based on a seriously problematic application of probability theory.

To see Dawkins' problem, we need to take a short detour into probability theory. What does Dawkins mean by talking about the probability of God? Clearly, God either exists or he does not. Shouldn't the probability of his existence be 1 if he exists and 0 if he does not? No, Dawkins adopts a mainstream Bayesian understanding of probability theory according to which probabilities represent rational degrees of belief and so it is entirely reasonable to have a probability for God's existence that lies between 0 and 1. But what probability should we assign to God's existence? Here we need to be careful because the question as it stands is ambiguous. Bayesians will distinguish between the *prior probability* of a belief before a piece of evidence has been considered and the

⁷ Interestingly, Philo is "a little embarrassed and confounded" and it is Demea who responds by essentially claiming Cleanthes' argument assumes an anthropomorphic view of God, whereas God is really incomprehensible. Needless to say, proponents of the design argument deny that God is incomprehensible. Irrespective of what view one takes on this, however, it is clearly incompatible with Dawkins' view of theism as a scientific hypothesis.

posterior probability, which is the updated probability after the evidence has been taken into account. Even these terms are ambiguous, however, because the prior probability will depend on what background knowledge has been taken into account and the posterior probability will depend on exactly what evidence is included before updating.⁸

Now we must ask what Dawkins means when he says that God’s existence is extremely improbable. Is this meant to be a prior of some kind or a posterior probability? It seems clear from Dawkins’ Humean arguments (arguments 1 and 2) that even if they were sound they would at best establish that the prior probability of God’s existence, before any specific evidence is taken into account, is extremely low. The reason for this is that they appeal to what God must be like if he exists, i.e. that he must have organised complexity, and that organised complexity is improbable if unexplained, etc. They do not appeal to any evidence which theists might appeal to as supporting belief in God. Now, here is Dawkins’ problem: *it is very common for a belief to have a very low prior probability and yet a very high posterior probability*. The following example illustrates the point.

Suppose my friend Tom enters the lottery every week. Suppose also that the winning numbers have just been announced in a particular week. What is the probability that Tom has hit the jackpot? Well, either he has or he hasn’t, but not knowing what numbers he selected it is very reasonable for me to assign an extremely low probability, 1 in 10,000,000 perhaps. However, the next day Tom arrives at my house, driving a new BMW, and he tells me that he hit the jackpot in the lottery the previous night. Initially, I am suspicious because Tom is a bit of a practical joker, but then he shows me a newspaper which has a picture of him receiving the cheque and later we see him on the local news on television which again confirms his story. What is the probability now? Although, the prior probability was low, the posterior probability after taking all the evidence into account is extremely high; in fact, I can be virtually certain that he hit the jackpot.

Could something similar be the case in terms of the probability of God’s existence? To investigate this, it is worth looking at how probabilities get updated. This is achieved via Bayesian conditionalisation, which is based on Bayes’ theorem. When considering the existence of God (G) and evidence E, which could include a number of pieces of evidence, Bayes’ theorem can be written as:

$$P(G | E) = \frac{P(E | G)}{P(E)} \times P(G), \quad (1)$$

where P(G) is the prior probability of God’s existence, P(G|E) is the posterior probability based on evidence E, P(E|G) is the probability of the evidence given that God exists, which is sometimes referred to as the likelihood, and P(E) is the overall probability of the evidence. We can assume that all these probabilities are considered with respect to some background knowledge which is not included in the notation. An alternative representation of Bayes’ theorem is:

$$P(G | E) = \frac{1}{1 + \frac{P(E | \neg G)}{P(E | G)} \times \frac{P(\neg G)}{P(G)}}, \quad (2)$$

provided P(E|G)P(G) ≠ 0, where P(¬G) is the prior probability that God does not exist and P(E|¬G) is the probability of the evidence given that God does not exist. Let’s put in some numbers just for illustrative purposes. Let’s suppose that Dawkins’ Humean arguments convince us that God’s existence is extremely improbable, even more improbable than winning the lottery, 1 in 100,000,000 say. Since P(¬G) = 1 – P(G), this means that P(¬G) is very close to 1. Now let’s take just one example of the fine-tuning of a physical constant. If the value of the gravitational constant had been very slightly different, life as we know it would have been impossible. Based on this fact, there is at the very least a *prima facie* case for saying that such extreme precision would have been very unlikely to occur if there was no God (let’s say 1 in 10¹² which arguably is not nearly improbable enough), while it is not all that improbable if there is a God (let’s say 1 in 100). Putting these values into equation (2) we find that the

⁸ Even taking into account the background knowledge, there is still a question as to whether it makes sense to ask what the prior probability of God’s existence is. The question assumes there is a single value, but this will be denied by subjective Bayesians who think that the probability values an individual assigns to his beliefs should only be constrained by the probability calculus and Bayesian rules for updating. Nevertheless, many reject this subjectivity and so Dawkins’ position here is mainstream.

prior probability of God's existence of just 1 in 100,000,000 gets updated to a *posterior* probability just above 0.99, so it becomes *almost certain that God does exist*. Now, of course, the precise numbers should not be taken too seriously, but they do illustrate the point.

It is important to stress that it is not part of my objection to Dawkins that there actually is evidence that makes God's existence extremely probable or even more probable than not. My only claim is that Dawkins' argument does not rule out this possibility and so his claim that his argument establishes that God's existence is extremely improbable is compatible with the claim that the posterior probability of God's existence given all the evidence is high. It might also be objected that I have only included evidence that seems to support God's existence in the above example. If evidence that seems to count against God's existence, such as the amount of suffering in the world, were also included perhaps the posterior probability would still be quite low. Perhaps it would, perhaps it wouldn't, but the only way to settle the issue is to consider all the evidence. When all the evidence is taken into account, the posterior probability could be greater than the prior, lower than the prior or unchanged. The point is that Dawkins' argument, even if it were sound, does not ensure that the posterior probability of God's existence will be low.

Perhaps Dawkins could respond that he has considered all the evidence and has discovered that there is no evidence that would count in favour of God's existence. The problem is that when we consider how Dawkins handles the evidence, it is clear that this response is inadequate. Consider the fine-tuning evidence as a case in point. As we saw earlier, Dawkins ultimately falls back on a Humean response: even if the atheist cannot offer a satisfactory explanation, God is not a good explanation because he would be even more complex and hence improbable. How does Dawkins' claim about God not being a good explanation relate to probability? Consider again the second version of Bayes' theorem, equation (2). There are three factors involved in determining the posterior probability of God's existence: $P(G)$, $P(E|G)$ and $P(E|\neg G)$. Dawkins seems willing to concede that $P(E|\neg G)$ may well be very low. And in this section we are granting that Dawkins' Humean arguments about God's complexity establish that $P(G)$ is very low (and so $P(\neg G)$ is very close to 1). But what about $P(E|G)$, the probability of the fine-tuning evidence given that God does exist? Can Dawkins' claims about God's organised complexity be taken as grounds for believing that $P(E|G)$ is also very low? Well, he would of course be entitled to argue for this but he does not do so. And indeed such an argument seems likely to fail for two reasons. First, we have already taken Dawkins' point about God's complexity into account in granting a low prior and so it would be double counting to take it into account again to establish a low value for $P(E|G)$. Second, and more importantly, it is intuitively false to say that $P(E|G)$ is very low. Consider again the story about my friend Tom. Even though it is highly improbable (in the sense of a low prior) that he won the lottery, nevertheless if he did win the lottery this fact would account for all the evidence (new BMW, etc.) very well. This means that the probability of the evidence given that Tom did win the lottery is not low at all. Similarly, even if the prior probability of God's existence is extremely low because of his complexity, it still seems perfectly plausible to reason as follows: let's suppose that God does actually exist (improbable as it might be), then his existence would account for the evidence of fine-tuning and so $P(E|G)$ is not very low. In fact, Dawkins implicitly seems to assume that if God existed his existence would explain the evidence of fine-tuning, it's just that he thinks it is very unlikely God exists in the first place. Hence his claim that God is not a good explanation is best understood in terms of a low prior, $P(G)$, not a low likelihood, $P(E|G)$.

Despite my generosity in this section of granting the success of his Humean arguments, it seems likely that Dawkins would respond by claiming that I have not been generous enough. In the illustration that used Bayes' theorem to show how evidence such as that from fine-tuning might in principle overturn a low prior probability for God's existence, perhaps the low prior of 1 in 100,000,000 was not low enough. This seems to be what Dawkins has in mind when he says:

However statistically improbable the entity you seek to explain by invoking a designer, the designer himself has got to be at least as improbable. (Dawkins 2006, p. 114)

As we have already seen, Dawkins' argument already runs into trouble in showing that a) God, if he exists, has organised complexity and b) such organised complexity in God's case can be linked with improbability in the way Dawkins claims. But even if we grant that Dawkins' argument does establish a low prior probability for God's existence, it is far from clear that it can bear the much greater burden now being placed on it: that God must be more improbable than any particular piece of evidence.

And in any case, even that would not be enough. Suppose that in the earlier example we grant that the prior probability of God's existence is lower than the probability that the gravitational constant would have the value it actually has if God did not exist. For example, let's suppose that the prior probability of God's existence is 1 in 10^{18} (compared to 1 in 10^{12} for the gravitational constant). The theist can now point to other examples of fine-tuning, however, such as the constant associated with the strong nuclear force. Let's represent it by E_2 and assign it the same

probabilities as the gravitational constant so that $P(E_2|\neg G) = 10^{-12}$ and $P(E_2|G) = 0.01$. If we assume that these two examples of fine-tuning provide independent evidence,⁹ then Bayes' theorem for the posterior probability of the existence of God given both pieces of evidence is:

$$P(G | E, E_2) = \frac{1}{1 + \frac{P(E | \neg G)}{P(E | G)} \times \frac{P(E_2 | \neg G)}{P(E_2 | G)} \times \frac{P(\neg G)}{P(G)}}, \quad (3)$$

provided $P(E|G)P(E_2|G)P(G) \neq 0$. Putting in all the values gives a posterior probability for the existence of God, which again is greater than 0.99. Now, of course, we could lower the prior further and then include more evidence and so on. So the question for Dawkins is: just how low is the prior probability for God's existence? Is it lower than 1 in 100,000,000? Or lower than 1 in 10^{20} ? Or 1 in 10^{40} ? Even at such low values, we might still wonder whether it would be low enough to prevent it from being overturned by evidence from fine-tuning. Perhaps he would like to simply say that it is low enough so that the posterior probability given all the actual evidence is still low. But such a claim would clearly be *ad hoc*. Or perhaps he would like to go further still and make it so low that *no* empirical evidence could overturn it even in principle. Since it is extremely doubtful that Dawkins' arguments support even a low prior probability for God's existence, it is abundantly clear that they do not support any of these more outlandish claims.

A number of reasons for rejecting the premises of Dawkins' Humean arguments have been presented in this section, but the problem lies with the conclusion and not just the premises. Even if his arguments were successful they would only establish that the *prior* probability of God's existence is low, but this is insufficient to establish that the *posterior* probability is also low. This is not to say that the posterior probability of God's existence is actually high, but simply to point out that Dawkins has not shown that it is low. In concluding this section, it is worth pointing out that the strategy of drawing on Humean arguments to make probabilistic claims about the supernatural is fraught with difficulties. The probabilistic failings of Humean approaches in the case of miracles, which to a large extent overlap with the issues raised here, have been clearly demonstrated by John Earman (2000) in his book *Hume's Abject Failure*.

Conclusion

Richard Dawkins is faced with a dilemma between Darwinian and Humean responses to the design argument. Dawkins wishes to give the impression of grasping the Darwinian horn of the dilemma as is clear from his direct claims about Darwin and his view that science justifies atheism because theism is a failed scientific hypothesis that lacks empirical support. However, despite his bold claims, it seems he is very much aware that the Darwinian response is exceedingly weak, particularly in light of the evidence from fine-tuning, and so he falls back on Humean arguments instead. In doing so, it is clear that Darwinism plays an insignificant role in his argument since it is the Humean arguments that are really doing the work. If he were to appeal only to the Darwinian response, his atheism would be of a much more modest variety, perhaps amounting to little more than the claim that one should exercise caution in design arguments.

Thus, in actual fact Dawkins is really grasping the Humean horn of the dilemma, which thoroughly discredits the idea that his atheism is based on the findings of modern science since the Humean approach is a philosophical rather than scientific response to design. Nevertheless, this would be a sensible move for Dawkins to make if his Humean arguments worked, but in actual fact there is good reason to think that they are flawed and, worse still, that his approach is unreasonable for anyone wishing to adopt an evidential approach to the question of God's existence.

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⁹ By independent I mean that they are conditionally independent given God's existence or non-existence. More formally, $P(E | G, E_2) = P(E | G)$ and $P(E | \neg G, E_2) = P(E | \neg G)$.

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