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ANTHROPIC OBSERVATION SELECTION EFFECTS AND THE DESIGN ARGUMENT

Ira M. Schnall

The Argument from Fine-Tuning, a relatively new version of the Design Argument, has given rise to an objection, based on what is known as the Anthropic Principle. It is alleged that the argument is fallacious in that it involves an observation selection effect—that given the existence of intelligent living observers, the observation that the universe is fine-tuned for the existence of intelligent life is not surprising. Many find this objection puzzling, or at least easily refutable. My main contribution to the discussion is to offer an analysis of what is wrong (and what is right) in the objection.

1. Introduction

In the latter part of the twentieth century, the traditional theological argument from design (DA) was given a new twist, based on discoveries in physics and cosmology. It was discovered that several apparently mutually independent physical constants have just the precise values that allow for the existence of life, and in particular, of intelligent life, in the universe. Had the value of any of these constants been even slightly different, or had the initial conditions present at the forming of the universe been even slightly other than they actually were, the development of intelligent life would have been impossible, given the fundamental laws of nature. It is argued that such a precise, delicate balance of mutually independent factors, resulting in an outcome as striking as intelligent life—such *fine-tuning*, as it is called—must be due to conscious, intelligent, purposeful design. Hence this new version of DA is called ‘the argument from fine-tuning.’¹

This new version of DA has an advantage over traditional versions, which were based primarily on the “curious adapting of means to ends”² that is exhibited by biological organisms: Darwin’s theory of evolution by random mutation and natural selection provided a naturalistic explanation of biological adaptation of means to ends, so that the supernaturalistic design hypothesis was rendered unnecessary; but Darwin’s theory is not straightforwardly applicable to the cosmic fine-tuning which serves

¹See, for example, Neil A. Manson, “Introduction,” in *God and Design*, ed. Neil A. Manson (London: Routledge, 2003), especially pp. 3–4.

²The phrase is from David Hume, *Dialogues Concerning Natural Religion*, Part II; in the Nelson Pike edition (Indianapolis, IN: Bobbs-Merrill, 1970), p. 22.



as the basis of the new version, and so it is argued that this fine-tuning supports the hypothesis of intelligent design over all available naturalistic alternatives.³

However, this new version of DA has given rise to a new sort of objection, based on what is called 'the anthropic principle' (AP): "given our presence in the universe as observers, it necessarily follows that the requisite conditions for intelligent life have been met; therefore we should not be surprised that we observe a universe with initial conditions, laws, and constants that allow for intelligent life."⁴ The fact that we should not be surprised by the fine-tuning of the universe is supposed to undermine the fine-tuning version of DA. (Henceforth I will use 'DA' exclusively for the fine-tuning version, unless otherwise specified.) Precisely how AP undermines DA is far from clear. Proponents of DA tend to find the AP objection, as we may call it, puzzling; counterexamples, in the form of logical analogies, have been offered to show that the AP objection is not a serious threat to DA.⁵

Elliott Sober has presented the AP objection to DA and has defended it vigorously.⁶ However, I find his defense ultimately unsuccessful. My aim in this paper is to examine and analyze the AP objection, as elaborated and defended by Sober. I will claim that though it is more serious than proponents of DA generally think it is, nevertheless it does not undermine DA, if DA is understood, or construed, in a particular way—the way I believe proponents of DA generally do implicitly, and sometimes explicitly, construe it. I must admit that I still find the AP objection somewhat puzzling. I only hope that my analysis will prompt others to respond in a way that will allay the puzzlement.

2. The AP Objection and Some Responses

Sober construes DA as a *likelihood argument*: the fine-tuning of the universe, or the fact that the constants are, and initial conditions were, just right for the eventual existence of intelligent life—call this fact 'R'—is claimed to be more likely on the hypothesis of intelligent design (HD) than on the

³See Manson, "Introduction," pp. 2–3.

⁴This formulation is taken from *Philosophy and Faith: A Philosophy of Religion Reader*, ed. David Shatz (New York: McGraw-Hill, 2002), p. 554, glossary entry "Anthropic Principle." Shatz notes that there is a different, and in a sense opposite, claim that has been referred to as 'the anthropic principle': it is the very claim that is the basis of the fine-tuning argument, i.e., that "the initial conditions, laws, and constants of the universe are fine-tuned for the creation of human life, which suggests an intelligent God who designed the universe."

⁵See, e.g., John Leslie, *Universes* (London: Routledge, 1989), pp. 13–14, and 107–108.

⁶Elliott Sober, "The Design Argument," in Manson, pp. 27–54; see 43–49. This survey article appears also in *The Blackwell Guide to the Philosophy of Religion*, ed. William E. Mann (Oxford: Blackwell, 2005), pp. 117–147; see 133–140. An earlier presentation of the objection can be found in John D. Barrow and Frank J. Tipler, *The Anthropic Cosmological Principle* (Oxford: Oxford University Press, 1986); see, e.g., pp. 1–2. Barrow and Tipler, as well as Sober, cite Brandon Carter, "Large Number Coincidences and the Anthropic Principle in Cosmology," in *Confrontation of Cosmological Theories with Observation*, ed. M. S. Longair (Dordrecht: Reidel, 1974).

hypothesis of “mindless natural processes” (HM) [i.e., $P(R \mid HD) > P(R \mid HM)$]; therefore R favors HD over HM. On this construal of DA, the conclusion is weaker than that of most presentations of the argument. For it is not claimed that HD is true, or even probably true, or even more worthy of acceptance than HM; rather all that is claimed is that, *all else being equal*, R (i.e., the fine-tuning of the universe for life) supports HD over HM. Sober argues, however, that this construal of DA is more defensible than stronger, more standard construals—e.g., as an argument by analogy or as an inference to the best explanation. (We will examine below some of his arguments for this claim.) DA, on this weak construal, could still play a role in the theistic debate by contributing to a cumulative case for accepting HD, and ultimately a full-blown theism; or, as I will suggest below, it may significantly enhance the (subjective) plausibility of HD or of theism for some people, given their background assumptions.

Sober begins his presentation of the AP objection with a well-known example due to Sir Arthur Eddington. A fisherman casts his net in a lake many times and collects a large sample of fish. Noting that all the fish in his sample are at least ten inches long, the fisherman infers that all the fish in the lake are at least ten inches long. However, his net is made in such a way that any fish that is less than ten inches long cannot be caught by it. Clearly, then, his inference is not well-founded; for his sample was biased, due to his method of collecting it. What is wrong with the fisherman’s procedure is that it involves what is known as an ‘observation (or observational) selection effect’ (OSE). Generally, an OSE consists in the fact that one’s observed evidence is affected, or limited, by the method of observation, or even by the very act of observation; in the most extreme case, the act or method of observation precludes observing any data other than what supports a particular hypothesis or conclusion. In assessing the plausibility, based on evidence, of a given hypothesis, we must take into account all the relevant factors, including any OSE that might be involved. (Perhaps a simpler example of the fallacy of ignoring an OSE is that of someone whose roommate has accused her of snoring, and she denies the accusation, arguing that she stayed up all last night and observed that she did not snore.)

In order to see the analogy between DA and the fisherman case, we first need to construe the fisherman’s inference as a likelihood argument: he argues that his evidence O, that is, his observing only fish that are at least ten inches long, is more likely on the hypothesis (HB—for big fish) that all the fish in the lake are at least ten inches long than on the hypothesis (HL—for little fish) that the lake contains fish that are less than ten inches long [i.e., $P(O \mid HB) > P(O \mid HL)$]; so O favors HB over HL. This argument fails to take into account the OSE consisting in the fact that he observed only fish caught in his net, and the net could not catch fish less than ten inches long. Taking the OSE into account means comparing the likelihood of O, given HB plus the proposition that the OSE was present [i.e., $P(O \mid HB \ \& \ OSE)$], with the likelihood of O, given HL plus the proposition that the OSE was present [i.e., $P(O \mid HL \ \& \ OSE)$]. But since $P(O \mid OSE) = 1$, it follows that $P(O \mid HB \ \& \ OSE) = P(O \mid HL \ \& \ OSE) = 1$, so that O does not really favor either of the hypotheses in question.

Sober claims that DA also involves an OSE. He argues that the data R that form the basis of DA could not have been otherwise, given that

they were gathered by human observers. Human observers, who are examples of intelligent life, could not have observed that the constants etc. were *not* right for the existence of intelligent life. This is a straightforward consequence of AP. Once we take this OSE into account, as we must if we want to reason cogently, we find that the likelihood of the constants' being right is 100%, on any hypothesis, and so their being right does not favor any hypothesis over any other. Thus, though the cosmic fine-tuning, R, would *prima facie* seem to support HD over HM, nevertheless, in light of the OSE, we see that it does not. Schematically: we might initially think that $P(R|HD) > P(R|HM)$, and so R favors HD over HM; but that would be only because we fail to take into account the OSE. Once we explicitly take the OSE into account, we get the result that $P(R|HD \& OSE) = P(R|HM \& OSE) = 1$. This, then, is the AP objection to DA.

John Leslie, followed by Richard Swinburne and others, proposed an example to counter the claim that DA is undermined by an OSE. Here is my version of the example: Suppose a prisoner, Jones, is standing before a firing squad of sharpshooters, the order is given to fire, and each member of the squad fires several shots in Jones's direction; but after the shooting has stopped, Jones finds himself still alive with nary a bullet hole in him. He asks himself whether his survival is the result of a stupendous coincidence—i.e., that every one of the sharpshooters in the firing squad happened to miss the intended target (Jones) with every shot—or whether it is the result of design—i.e., it was a fake execution, and the members of the firing squad purposely missed Jones. And suppose, as seems reasonable, he figures that his survival is much more likely on the hypothesis of design than on the hypothesis of coincidence, or accident; and so his survival favors the former hypothesis over the latter. Now according to the reasoning behind the AP objection to DA, Jones should not ask the question, and he is not justified in adopting his answer, because his data involve an OSE; that is, since he must be alive if he is to make observations, he could not possibly have observed, after the shooting, any alternative to what he in fact observed, namely, that the firing squad failed to kill him. However, it seems obvious, first of all, that it is perfectly appropriate for Jones to think about this question—after all, his surviving the firing squad cries out for explanation—and, secondly, that he is justified in concluding that his survival favors the hypothesis of design over the hypothesis of chance, since it is much more likely that the sharpshooters missed him because they intended to than that they missed him by chance even though they tried to kill him. So there must be something wrong with the reasoning behind the AP objection.⁷

Sober bites the bullet (so to speak) and maintains that indeed Jones in the example is *not* entitled to say that his surviving the firing squad is more likely on the hypothesis (HF) of a fake execution than on the hypothesis (HR) of a real attempted execution which happened to go wrong, and to infer that therefore his survival favors the former hypothesis over the latter; and the reason is that his saying so would involve overlooking the

⁷Sober, "The Design Argument," in Mann, p. 137; and in Manson, p. 46; John Leslie, *Universes*, pp. 13–14, 107–108; Richard Swinburne, "Argument from the Fine-Tuning of the Universe," in *Physical Cosmology and Philosophy*, ed. J. Leslie (New York: Macmillan, 1990), p. 171.

OSE in the case.⁸ Why, then, does it seem so obvious that Jones would be justified in inferring that his survival favors HF over HR? Sober suggests two possible explanations. First, unlike Jones himself, a bystander who witnessed the event could very well inquire as to why Jones survived, and would be justified in concluding that Jones's survival (S) favors HF over HR. What misleads Leslie, Swinburne, and those of us who fall for this proposed counterexample may be our confusing Jones's standpoint with that of the bystander.⁹ Second, it is specifically a likelihood argument that is illegitimate for Jones; Jones would indeed be justified in constructing, instead, a *probability* argument concluding that his survival renders HF more probable than it would otherwise have been [i.e., that $P(\text{HF} \mid \text{S}) > P(\text{HF})$]. As for DA, Sober goes on to argue that, unlike Jones's inference, DA cannot be interpreted as a probability argument, due to the absence of relevant background data on which to base the assignments of the prior probability of HD [i.e., $P(\text{HD})$] and the conditional probability of HD on R [i.e., $P(\text{HD} \mid \text{R})$].¹⁰

Now Sober's first suggested explanation seems somewhat bizarre.¹¹ After all, one would think that whether evidence favors one hypothesis

⁸Sober has changed his mind about this. See his "Absence of Evidence and Evidence of Absence," an unpublished paper available on Sober's website: <http://philosophy.wisc.edu/sober/Absence%20of%20Evidence%20and%20Ev%20of%20Abs%20aug%202%202008.pdf>. He now would admit that Jones is justified in constructing a likelihood argument to the effect that his survival favors the hypothesis (HF) that the marksmen intentionally missed over the hypothesis (HR) that they tried to kill him but missed due to chance. He now meets the challenge posed by the counterexample by analyzing it as being relevantly different from DA (see "Absence of Evidence and Evidence of Absence," pp. 33–34). But he does not tell us what arguments convinced him to change his mind; hence I state, here and in what follows, his earlier position along with arguments of my own that I think played some part in changing his mind. As for his new analysis of the "difference" between the firing-squad case and DA, he basically makes two points: (1) that the evidence should be not just that the constants are right (R), but the fact that we observe that the constants are right [O(R)]; and (2) that we should time-index the various events involved in both the evidence and the hypotheses. On (1), see below in the text, where I argue that it makes no difference whether we deal with R or O(R). As for (2), I do not see how Sober's time-indexing succeeds in distinguishing between the firing-squad case and DA in the relevant way. To be somewhat more specific, I think he chooses an event in the firing-squad case that does not really correspond to its intended analogue in DA; inserting an event that does correspond renders the case essentially the same as DA.

⁹Sober, "The Design Argument," p. 138; and in Mann, p. 137; and in Manson, p. 47.

¹⁰*Ibid.*, in Mann, pp. 139–140; and in Manson, pp. 48–49. But it seems to me that to the extent that we have no background information on which to base the assignments of the probabilities $P(\text{HD})$ and $P(\text{HD} \mid \text{R})$, we similarly do not have the background data on which to base the assignments of the probabilities $P(\text{R} \mid \text{HD})$ and $P(\text{R} \mid \text{HM})$. For example, just as we can have no data as to what percentage of fine-tuned universes have been designed, so also we can have no data as to what percentage of designed universes have been fine-tuned.

¹¹See Jonathan Weisberg, "Firing Squads and Fine-Tuning: Sober on the Design Argument," *British Journal of Philosophy of Science* 56 (2005), pp. 809–821, esp. 814–815.

over another should not depend essentially on who is drawing the inference. If the bystander is justified in inferring that the evidence *S* favors HF over HR, then so is anyone else, including Jones. Presumably Jones would construct an argument just like one that an intelligent bystander would have constructed. After all, you don't have to be a rocket scientist to figure out that all the sharpshooters' repeatedly missing Jones, from normal firing-squad range, is more likely if they intend to miss him than if they intend to hit him. There is no reason to think that Jones' argument need be less likely to lead to a true conclusion than the very same argument constructed by a bystander, just because Jones, rather than the bystander, did the work. I therefore see no sense in which it should be inappropriate or "illegitimate" for Jones to construct and accept the argument. So it seems to me that Sober would do better to admit that Jones is justified in concluding that the evidence favors HF over HR, and to try to distinguish between Jones's inference and DA. Perhaps (though I have my doubts) a relevant distinction could be worked out on the basis of the fact that in the case of DA *no one*, or at least no one who is a biological organism, is in a position to justifiably draw the conclusion in question, whereas in the case of Jones and the firing squad, others are in a position to justifiably draw the relevant conclusion (and therefore so is Jones).

As for Sober's saying that the likelihood argument is illegitimate for Jones, but the probability argument is legitimate, I find this difficult to maintain. By 'probability argument' Sober seems to mean an argument that HF is more probable, given Jones's survival (*S*), than it otherwise would have been [i.e., $P(\text{HF}|\text{S}) > P(\text{HF})$]. But it seems to me that such a probability argument also requires that HF renders *S* more likely than it would otherwise have been [i.e., that $P(\text{S}|\text{HF}) > P(\text{S})$]. For at least part of what makes HF more likely, given *S*, than it otherwise would have been seems to be the fact that HF renders *S* more likely than it would otherwise be. At least according to Bayes' theorem, the probability of HF given *S* [i.e., $P(\text{HF}|\text{S})$] is greater than the prior probability of HF [i.e., $P(\text{HF})$] only if *S* is more likely on HF than it otherwise would be. [I.e., $P(\text{HF}|\text{S}) > P(\text{HF})$ if and only if $P(\text{S}|\text{HF}) > P(\text{S})$.] That is, according to Bayes' theorem, $P(\text{HF}|\text{S}) = [P(\text{HF}) \times P(\text{S}|\text{HF}) / P(\text{S})]$; so $P(\text{HF}|\text{S})$ is related to $P(\text{HF})$ by a factor of $P(\text{S}|\text{HF}) / P(\text{S})$. Therefore, if $P(\text{S}|\text{HF}) < P(\text{S})$, then $P(\text{HF}|\text{S}) < P(\text{HF})$; and in particular, if $P(\text{S}|\text{HF}) = P(\text{S})$, then $P(\text{HF}|\text{S}) = P(\text{HF})$. Thus if *S* is no more likely on HF than otherwise, then HF cannot be rendered more probable by *S* than it would otherwise have been. Therefore, if we are forced to say that, given the OSE involved, the likelihood of *S*, whether or not HF is given, is 100% [i.e., that $P(\text{S}) = P(\text{S}|\text{HF}) = 1$], then $P(\text{HF}|\text{S})$ is no greater than $P(\text{HF})$, and so the probability argument gets us no further than the likelihood argument. Thus the reasoning behind the AP objection to DA would undermine the probability argument as well as the likelihood argument.¹²

¹²Ibid., pp. 812–813, seems to interpret Sober as saying that the inference that Jones is justified in making is that the conditional probability of HF (fake execution) is greater than that of HR (real execution), i.e., that $P(\text{HF}|\text{S}) > P(\text{HR}|\text{S})$. He therefore presents a somewhat different counterexample, which he credits to Frank Arntzenius, in which, he claims, no such conditionalization argument is available. I do not think that the conditionalization argument is what Sober had in mind. But it doesn't really matter; for this conditionalization argument also is dependent

Thus it seems that neither of Sober's attempts to explain away the persuasiveness of Leslie's and Swinburne's counterexample is successful. However, a counterexample does not in itself analyze, or explain, what is wrong with the position that it (apparently) refutes. Jonathan Weisberg has offered an analysis that purports to explain why OSE undermines neither Jones's argument nor DA.¹³ Weisberg suggests that Jones does not know that he will observe that he has survived the firing-squad; if he did, he "would not have to worry about being shot!" All Jones knows is that *if* he will observe *whether* he has survived, he will observe that he *has* survived. But this latter conditional statement does *not* entail the evidence in question (i.e., Jones's survival, or his observation of his having survived), and so does not undermine Jones's argument.

In order to understand Weisberg's application of the above point to the AP objection to DA, we must note that a distinction has been made between the weak anthropic principle (WAP) and various stronger anthropic principles. WAP says that "what we can expect to observe must be restricted by the conditions necessary for our presence as observers"¹⁴; in other words, we cannot (correctly) observe that any necessary conditions of our existence have not been satisfied. A stronger anthropic principle would add that our existence as observers *explains* the fact that all necessary conditions of our existence have been satisfied. Sober apparently claims that WAP is sufficient to undermine DA.¹⁵ Weisberg argues that WAP does *not* entitle us to claim that we will observe a fine-tuned universe; "at best," it entitles us to claim only that *if* we observe *whether* the universe is fine-tuned, we will observe that it *is* fine-tuned. Again, the latter conditional statement does *not* entail the evidence (i.e., the fine-tuning, or our observation of the fine-tuning), and so does not undermine DA. As for stronger anthropic principles, these do not apply to the case of DA.

Now with respect to the firing-squad case, it seems that Weisberg is assuming that in order for some fact to function as an OSE for a given person, it must be something that the person was aware of *before* the evidence in question came to the person's attention. He gives no argument for this

on the likelihood argument: If we assume that HF and HR have the same initial probability, then Bayes' theorem yields: $P(HF|S) > P(HR|S)$ if and only if $P(S|HF) > P(S|HR)$. But again, if $P(S) = 1$, then $P(S|HF) = P(S|HR) = 1$; so again we get nowhere. And even if we factor in the initial probabilities of HF and HR, we get a similar result. For presumably real executions are more common than fake executions, so $P(HR) > P(HF)$. Yet intuitively Jones's survival seems to make the fake-execution hypothesis more likely than the (failed) real-execution hypothesis, i.e., $P(HF|S) > P(HR|S)$; again according to Bayes' theorem, this means that $[P(S|HF) \times P(HF)] > [P(S|HR) \times P(HR)]$, and since $P(HR) > P(HF)$, again $P(S|HF)$ must be greater (this time, much greater) than $P(S|HR)$. So if we insist that the likelihood of survival, on any hypothesis, is always 100%, we cannot infer that S renders HF more probable than it renders HR, any more than we can infer that S renders HF more probable than HF would otherwise have been.

¹³Ibid., pp. 816–819.

¹⁴Carter, "Large Number Coincidences," 291; quoted by Sober, "The Design Argument," in Mann, p. 135, and in Manson, pp. 44–45.

¹⁵See Sober, "The Design Argument," in Mann, p. 135, and note 16 on p. 143; and in Manson, pp. 44–45, and note 14 on pp. 51–52.

assumption, as far as I can see. But in any event, that assumption, *per se*, is irrelevant to DA; for we did know, long before anyone investigated the cosmic constants and initial conditions, that intelligent life exists, and that therefore all necessary conditions of the existence of intelligent life must be satisfied. As for Weisberg's argument about what WAP entitles us to claim, I think that Sober can simply sidestep this argument by saying that his objection to DA does not rest essentially on what WAP does or does not entitle us to claim. Rather it rests on the general requirement of inductive logic that we consider the total evidence available to us. WAP merely serves the heuristic function of pointing toward a relevant bit of background evidence: we know that we are intelligent biological organisms; our existence as intelligent biological organisms entails that all necessary conditions of the existence of intelligent life must have been satisfied—in particular, it entails that the constants and the initial conditions must have been right for the existence of intelligent life. Taking these background facts into account entails that the evidence in question cannot favor any hypothesis over any other via a likelihood argument. And that is enough to undermine DA.¹⁶ Therefore, if we think that the AP objection goes wrong, we should look for an alternative analysis of how, or why, it goes wrong.

William Lane Craig has suggested that the fallacy in the AP objection is as follows: "An observer who has evolved within a universe should regard it as highly probable that he will find the basic conditions of that universe fine-tuned for his existence; but he should not infer that it is therefore highly probable that such a fine-tuned universe exists."¹⁷ I find this and others of Craig's statements rather cryptic, but he seems to be saying that although *given* that we are intelligent life forms, the fine-tuning of the universe for intelligent life is not surprising nevertheless, *in itself*—i.e., if it is *not* given that we are intelligent life forms—the fine-tuning of the universe, along with the consequent existence of intelligent life, *is* surprising. But if that is what he means, then Sober can simply appeal to the principle of total evidence, and insist that we *must* take into account the fact that we are intelligent life forms, and so (given this fact) the fine-tuning of the universe must be considered unsurprising.

Another interpretation that the text of Craig's argument might bear is as follows: The proponent of the AP objection is confused about what constitutes the evidence in DA—about whether it is the fine-tuning R itself or the fact that *we observe* the fine-tuning O(R). Whereas our existence as intelligent biological organisms renders O(R) unsurprising, it does not render R unsurprising; and it is R, not O(R), that constitutes the evidence in DA. R is surprising, but is less so on HD than on HM; therefore, R favors HD over HM, as DA requires. If this is what he means, then it seems that Sober would simply insist that, in accordance with the principle of total evidence, we must consider O(R), and not merely R, as our evidence.¹⁸ And since, as

¹⁶Sober, in a personal communication, as well as in "Absence of Evidence and Evidence of Absence," agrees with me.

¹⁷William Lane Craig, "Design and the Anthropic Fine-Tuning of the Universe," in Manson, pp. 169–170.

¹⁸See Sober, "Absence of Evidence and Evidence of Absence" (pp. 20ff. in the most recent version I've seen).

Craig admits, $O(R)$ is unsurprising, and presumably equally unsurprising whether on HD or on HM, the AP objection succeeds in undermining DA.

However, I think the truth of the matter is that our existence as intelligent living beings *does* render R , and not just $O(R)$, unsurprising. That is, *given* our existence as intelligent living beings, it *is* unsurprising that the conditions were right for the existence of intelligent life; for if we exist, then *of course* the necessary conditions of our existence must have been satisfied. In fact, I think that it makes no difference, with respect to the AP objection to the likelihood version of DA, whether we take R or $O(R)$ as our evidence. Either way, DA is undermined essentially by our taking into account that the observers are intelligent living beings (our OSE). If we do not take the OSE into account, neither $O(R)$ nor R is very likely, and both $O(R)$ and R are more likely on HD than on HM. And if we do take the OSE into account, then $O(R)$ is just as likely on HD as on HM, and so is R ; and the likelihood of R , given the OSE, is effectively 100%. Schematically, $P[O(R) \mid \text{HD}] > P[O(R) \mid \text{HM}]$, just as $P[R \mid \text{HD}] > P[R \mid \text{HM}]$; but $P[O(R) \mid \text{HD} \ \& \ \text{OSE}] = P[O(R) \mid \text{HM} \ \& \ \text{OSE}]$, and $P[R \mid \text{HD} \ \& \ \text{OSE}] = P[R \mid \text{HM} \ \& \ \text{OSE}] = 1$. Thus, construing the evidence as $O(R)$ rather than R is neither necessary nor sufficient for the AP objection, whereas conditionalizing on our OSE is both necessary and sufficient.

One might attempt to analyze the flaw in the AP objection as follows: Though the observers' being intelligent living beings entails that the constants must be right for intelligent life, it does *not* entail that the constants and initial conditions had to be *fine-tuned* in order to enable intelligent life to exist. What physicists have discovered is not simply that the values of the constants and the nature of the initial conditions were such-and-such and that these actual circumstances enabled intelligent life to develop; rather the startling discovery here is that the values of the constants and the nature of the initial conditions all had to fall within an extremely narrow range in order to enable intelligent life to exist. It is not merely that the constants are right; it is that the constants are *just right*. What cries out for explanation, what seems initially so unlikely (and therefore leads us to search for a hypothesis on which it would be less unlikely), is the fact that there is such a delicate balance among so many mutually independent factors, that had any of these factors been even slightly otherwise—as, for all we know, they very well could have been—life would have been impossible. It is this delicate balance (B) that is rendered more likely by the design hypothesis (HD) than by the mindless-forces hypothesis (HM); and the fact that the discoverers of this balance are intelligent biological organisms makes no difference to the relative likelihoods. In other words, not only is $P(B \mid \text{HD}) > P(B \mid \text{HM})$, but equally $P(B \mid \text{HD} \ \& \ \text{OSE}) > P(B \mid \text{HM} \ \& \ \text{OSE})$.

But I think that the proponent of the AP objection has an effective response to this analysis: Though our existence (as intelligent living beings) does not in itself *logically* entail that there be such a delicate balance of independent physical factors, nevertheless, given the fundamental laws of nature, which together delimit the domain of the physically possible, we can say that our existence *physically, or nomologically, entails* that there be such a delicate balance. That is, given our existence, it is *physically necessary* that the initial conditions and the values of the constants should fall within the relevant limited range; for if the values had not fallen within that range,

our existence would have been impossible, according to the fundamental laws of physics. There does, therefore, seem to be an OSE-problem with saying that the fine-tuning of the universe for intelligent life is more likely on HD than on HM; for, given that the discoverers of the fine-tuning are intelligent living beings, and given the fundamental laws of nature, the likelihood of the fine-tuning is 100% on either hypothesis—that is, $P(B \mid HD \ \& \ OSE) = P(B \mid HM \ \& \ OSE) = 1$. (I did not explicitly refer to the fundamental laws of nature in these schemata, because these laws figure in virtually *every* probability, but are generally not explicitly referred to.)

3. Overcoming the Problem

So what, if anything, is really wrong with the AP objection? In this section, I will try to show that application of a rather well-known distinction can effectively explain away the objection. It is the fact that the distinction in question is so well-known that is the source of my puzzlement over the AP objection and over why as talented and sophisticated a philosopher as Sober thinks that the objection is significant.

I want to argue, first, that though the observers' being intelligent living beings (nomologically) *entails* that the conditions are right for intelligent life, it does not *explain why* the conditions are right for intelligent life, and, secondly, that this fact is the key to understanding how DA avoids invalidation by its involving an OSE.

The first point does not, I think, require much argument. The sense in which the observers' being intelligent living beings does not explain why the conditions are just right for the existence of intelligent life, if it is not obvious, can be made clear by considering a well-known example from the literature on scientific explanation.¹⁹ According to C. G. Hempel's model of explanation, a deduction of the proposition that a particular event *e* occurred, from laws of nature and propositions about other particular events, constitutes an explanation of *e*. More generally, if knowledge of certain particular facts and the relevant laws of nature would together lead us to expect a given event to have occurred, then that knowledge provides an explanation of that event.²⁰ Thus, for example, since we can deduce the length of a certain flagpole's shadow from the height of the flagpole plus the position of the sun and the laws governing the propagation of light, we have an explanation of the length of the shadow. The problem is that we can just as well deduce the height of the flagpole from the length of the shadow plus the position of the sun and the laws of the propagation of light; so according to Hempel's theory, the same facts and laws provide not only an explanation of the length of the shadow based on the height

¹⁹The example is due to Sylvain Bromberger, "Why-Questions," in *Mind and Cosmos: Essays in Contemporary Science and Philosophy*, ed. Robert G. Colodny (Pittsburgh, PA: University of Pittsburgh Press, 1966), pp. 86–111.

²⁰See Carl G. Hempel, "Aspects of Scientific Explanation" in *Aspects of Scientific Explanation and other Essays in the Philosophy of Science*, ed. Carl G. Hempel (New York: MacMillan, 1965). For a briefer presentation of the same basic ideas, see Hempel, *Philosophy of Natural Science* (Englewood Cliffs, NJ: Prentice-Hall, 1966), chap. 5.

of the flagpole, but also an explanation of the height of the flagpole based on the length of its shadow. However, though the height of the flagpole (given the position of the sun and the laws of light propagation) does explain the length of the shadow, nevertheless, intuitively at least, the length of the shadow (etc.) does *not* explain the height of the flagpole. Hempel himself apparently maintained that, despite our intuitions to the contrary, we really can explain the height of the flagpole in terms of the length of its shadow, as well as vice-versa.²¹ However, it seems clear that the height of the flagpole explains the length of its shadow in a way that the length of the shadow does not explain the height of the flagpole; we might say that the height of the flagpole is the basis of a *causal* explanation of the length of its shadow, whereas the length of the shadow is *not* the basis of a *causal* explanation of the height of the flagpole.

Similarly, in the case of the AP objection to DA, though the observers' being intelligent living organisms (given the fundamental laws of nature) entails the constants' being just right for the existence of intelligent life, nevertheless their being intelligent living organisms does *not* form the basis of a *causal* explanation of the constants' being right for the existence of intelligent life; rather the causality is the other way around.²²

I suggest that the relevant difference between DA and Eddington's fisherman case—that is, what makes the latter, but not the former, a case of fallacious reasoning—is just this difference between entailing and causally explaining. In the fisherman case, the circumstances of observation or data-gathering (in particular, the nature of the fisherman's net) not only entail, but also might very well explain why, the gathered data are as they are (i.e., why all the observed fish are all at least ten inches long); but in the case of DA, the circumstances of observation (in particular, the fact that the observers are alive) entail, but do *not* explain why, the data are as they are (i.e., why the conditions are just right for life). Thus it may very well be that all the fish in the sample gathered by the fisherman are at least ten inches long *because* the holes in the net used to gather the sample are large enough that any fish less than ten inches long will slip through. But the constants cannot be said to be right for the existence of intelligent life *because* those who discovered them are biological organisms; if anything, it is the other way around—it is because the constants are right for the existence of intelligent life that the biological organisms who discovered that fact could exist. Similarly, in Leslie's example of the firing squad, the survival of the prisoner (Jones) entails, but does not causally explain, the marksmen's not hitting him. So we cannot say that they missed him *because* he survived, and therefore his inference that they missed, and consequently he survived, *because* the execution was fake is not fallacious.²³

²¹See Hempel, *Aspects*, pp. 352–354; and see Peter Godfrey-Smith, *Theory and Reality: An Introduction to the Philosophy of Science* (Chicago: University of Chicago Press, 2003), p. 194.

²²See Sober, "The Design Argument," in Mann, p. 135; and in Manson, pp. 44–45.

²³See Stephen T. Davis, "Fine-Tuning: The New Design Arguments," in *Philosophy and Faith*, ed. Shatz, p. 227. This is an excerpt from Davis, *God, Reason, and Theistic Proof* (Grand Rapids, MI: Wm. B. Eerdmans Publishing Co., 1997).

This last point requires some clarification, since there are at least two different uses of 'because' (or contexts of its use). What I have said about 'because' in the preceding paragraph is true on only one of these uses of the word. Consider the following example (with apologies to Daniel Defoe): Imagine Robinson Crusoe, marooned on a desert island. One day he sees footprints in the sand, and he knows that they are not his; so he says aloud, 'Aha, there is someone else on this island, because there are footprints here that are not mine.' But then someone (who will eventually be known as 'Friday') taps him on the shoulder and says, 'Excuse me, but you have it exactly backwards. There are footprints here that are not yours, because there is someone else besides you on this island.' If we like, we can imagine them conducting a protracted debate over the issue of which one of them is right. But of course, both are right. Crusoe is using his 'because'-sentence to indicate the direction of his inference, or *epistemic* direction—his *knowledge* of the presence of someone else on the island was brought about by his *knowledge* of the footprints, and not vice-versa. Friday, on the other hand, is using *his* 'because'-sentence to indicate the direction of *causality* between the *facts* about which Crusoe was thinking—the (actual) footprints were caused, or brought about, by the (actual) presence of someone else on the island, and not vice-versa. Similarly, it would not be incorrect to say 'Conditions are right for the existence of intelligent life, because we are intelligent living organisms', as long as the sentence is meant to indicate epistemic direction or the direction of entailment, and not the direction of causality between the facts we are talking about; if we wanted to indicate the latter direction, we should say something like 'We exist as intelligent living organisms (only) because the conditions were right for the existence of intelligent life.' Just as the footprints indicate, but did not bring about, the presence of a person, so also the observers' being alive entails, but did not bring about, the constants' being right for life.

The above considerations seem to be leading toward construing DA as an inference to the best causal explanation of the fact that the constants are just right. But this is somewhat problematic for proponents of DA, since any supernaturalistic explanation starts out with two strikes against it. That is, the initial probability of any supernaturalistic hypothesis is extremely low (at least for some people—see below), since it appeals to factors that are different from anything in our ordinary or scientific experience. Therefore I propose construing DA as a particular kind of comparative likelihood argument, in which we limit ourselves to causal explanatory, or generative, considerations. That is, we should compare the hypotheses HD and HM, viewed as possible stories of how it came about that the values of the physical constants and the nature of the initial conditions fell within the narrow ranges that enabled the development of intelligent life; and the comparison should be based on the question: which of the hypotheses posits antecedent conditions that would have been more likely to result in the constants' being right, given only the facts at the times that the stories supposedly took place? At least part of what makes one hypothesis H1 a better causal explanation (or part of a better causal explanation) of the data E than another hypothesis H2 is the following: If we, so to speak, place ourselves back in time, before E came to be, then our believing H1 at that time would lead us to expect with greater confidence that E would

come to exist than would our believing H2 at that time. In the case of DA, the question is: would we have expected, with greater confidence, that the various conditions would be perfectly balanced for the future existence of intelligent life if we believed that those conditions were being determined by an intelligent designer (HD) or if we believed that they were being determined by mindless natural processes (HM)? I think that, given how many mutually independent factors have to coincide, and with what degree of precision, in order to make intelligent life possible, we would have been more confident in our expectation, in this sense, if we believed HD; and so the evidence constituted by the fine-tuning favors HD over HM.

4. So What?

As was noted early on in this paper, a likelihood argument is a relatively weak argument. This is true also of my “generative” likelihood argument. That is, the conclusion of my likelihood argument is that the evidence R favors HD over HM, viewed as competing causal, or generative, explanatory hypotheses; but that does not mean that HD is true, or worthy of acceptance, or even that it is preferable to HM. Though R favors HD over HM, nevertheless HM may be, overall, more worthy of acceptance than HD. Two questions arise: first, can we enhance DA, or construct a different version of it, so as to establish a more significant conclusion? And second, if we cannot so enhance it, what is its value?

As to the first question, let us see if we can reconstruct DA as a Bayesian argument for the conclusion that R renders HD more probable than HM, i.e., that $P(\text{HD} \mid R) > P(\text{HM} \mid R)$. Now any proponent of DA would rather be able to establish the “Bayesian” conclusion that $P(\text{HD} \mid R) > P(\text{HM} \mid R)$ than merely the “likelihood” conclusion that $P(R \mid \text{HD}) > P(R \mid \text{HM})$. But there is an obstacle in the way. The Bayesian argument can be viewed as going beyond the likelihood argument by adding to it premises about the initial plausibility of HD and of HM. For according to Bayes’ Theorem, $P(\text{HD} \mid R) > P(\text{HM} \mid R)$ if and only if $[P(R \mid \text{HD}) \times P(\text{HD})] > [P(R \mid \text{HM}) \times P(\text{HM})]$. $P(\text{HD})$ is usually called the ‘prior probability’ of HD. Clearly, if $P(\text{HD})$ is sufficiently lower than $P(\text{HM})$, then even though $P(R \mid \text{HD}) > P(R \mid \text{HM})$, nevertheless $P(\text{HM} \mid R)$ can be greater than $P(\text{HD} \mid R)$. Well, what is the prior probability of HD, as compared with that of HM?

An argument of Hume’s—one of the many arguments which he puts into the mouth of the character Philo in his *Dialogues Concerning Natural Religion*—seems to lead to the conclusion that the prior probability of HD is extremely low. Philo insists that the intelligent designer posited in the design argument would be immensely different from anything in our experience; and he argues that the greater the difference between a hypothesized entity and anything in our experience, the less the plausibility of the hypothesis, all else being equal.²⁴ I think that Philo here exposes a significant weakness in most forms of the design argument.

²⁴In Part II of the *Dialogues*, Philo stresses the disanalogy between the *effects*—i.e., between the world and manmade machines. See, e.g., pp. 23–24 and 30–31 of the Pike edition. He broadens his attack to include the disanalogy between the *causes*—i.e., between God and human beings—in Part V, in which he goes on to argue that

We may apply Philo's point to our version of DA as follows: All the biological organisms, intelligent or otherwise, that we know of are such that, given their chemical make-up, they could not have existed were it not for the cosmic fine-tuning we find in the universe. If the intelligent designer posited in HD is supposed to be responsible for the fine-tuning that enabled such biological organisms to come into existence, then he himself presumably is not such a biological organism—i.e., his existence is not dependent on the fine-tuning. (Otherwise, DA would not explain what it is supposed to explain; it would be, to apply an analogy of Hume's/Philo's, like trying to explain why the earth doesn't fall by hypothesizing that it rests on the back of an elephant—which, of course, immediately raises the question of why the elephant doesn't fall.) Thus the posited intelligent designer must not be a biological organism; or if he is, he is radically unlike any biological organism—in fact, radically unlike anything—that we have ever observed. Given our experience—in particular, our experience of the dependence of intelligence on neurological function—it does not seem at all plausible that there is an intelligent being who is not a biological organism (or at least not a biological organism in the normal sense—henceforth understood).

I think that the reason why the likelihood version of DA is preferable to other versions—and perhaps Sober had this reason in mind—is that it is, so to speak, sensitive to this weakness. It purports to establish only that R favors HD over HM, not that, given R, HD is more probable than HM; and the reason for this limitation is precisely that HD has very little initial plausibility. What I am calling 'initial plausibility' can, I think, reasonably be taken as identical (or at least broadly proportional) to Bayesian prior probability in this context. Thus, given that HD posits an intelligent agent who is not a biological organism, and who therefore lacks (among other things) a brain, it seems that $P(\text{HD})$ is significantly less than $P(\text{HM})$. Therefore we may very well not be able to progress from the conclusion of the (generative) likelihood argument, i.e., that $P(\text{R} \mid \text{HD}) > P(\text{R} \mid \text{HM})$, to the stronger conclusion of the Bayesian argument, i.e., that $P(\text{HD} \mid \text{R}) > P(\text{HM} \mid \text{R})$.²⁵

But it does not follow that DA is useless. In order to understand how DA might still have value for a theist, note first that Sober has a more general, "in-principle" objection to the Bayesian argument than the one I have just given. His objection is that assignments of prior probabilities to HD and to HM would be subjective, differing from person to person, and therefore would be out of place in an argument that purports to establish an objective, logical relation between the evidence R and each of these two

the analogical design argument is stronger the more we make out the inferred designer, or designers, to be like human beings. See pp. 48ff. of the Pike edition.

²⁵Even the likelihood version of DA is itself based on the analogy between the world (especially the fine-tuning thereof) and manmade machines, and that between the hypothesized intelligent designer of the world and the intelligent human designers of machines. Without these analogies, we would have no reason to think that the fine-tuning is more likely due to design than to mindless processes. But the traditional argument-by-analogy form of the design argument purports to establish the stronger conclusion that probably there is (or at least was) an intelligent designer of the world; and this stronger conclusion is effectively countered by Philo's points about the disanalogies.

hypotheses.²⁶ This subjectivity is a general problem with Bayesian arguments, and Bayesians have suggested various solutions. But I think that, at least in the case of DA, the subjective nature of the prior probability of HD can be seen as an integral aspect of the argument. In fact, this kind of subjective aspect can be used to defend the Bayesian argument against the above Humean objection. Hume is right to insist that, from an empiricist perspective at least, the difference between the hypothesized intelligent designer and anything in our experience *should* make us feel that the hypothesis (HD) is initially implausible, or has a low prior probability. Nevertheless it may be that *in fact* some people feel more “at home” with the posited designer, and with the hypothesis that posits him, than others. That is, for some people, the idea of a disembodied intelligent creator is so familiar that it does not strike them as being nearly as odd as the idea of, say, the Loch Ness Monster or the Abominable Snowman or little green men from Mars—even though these latter are far more similar to things that we have actually observed than is the bodiless intelligent designer. William James, in his famous essay “The Will to Believe,” distinguished between ‘live’ and ‘dead’ hypotheses.²⁷ For some people, HD is a live hypothesis, that is, one that they think *might* very well be true. This could be due to their having been brought up in a religious environment, or to their previous metaphysical speculations, or to any number of other reasons. But given their relatively positive epistemic attitude toward HD, they will make the jump from the conclusion of the likelihood argument to that of the stronger Bayesian argument—i.e., from ‘ $P(R | HD) > P(R | HM)$ ’ to ‘ $P(HD | R) > P(HM | R)$ ’—because they assign a relatively high prior probability to HD. For others, perhaps due to a non-religious upbringing, or to an empiricist attitude, HD is a dead hypothesis, one that has no epistemic appeal to them whatsoever. Such people, even if they accept the likelihood version of DA, would not accept the related Bayesian argument, because for them, $P(HD)$ is too low. What I am suggesting is that *for people who take HD seriously*, it is proper to view DA as a Bayesian argument for the conclusion that R renders HD more probable than HM.²⁸

On the other hand, I can understand Sober’s insistence that we avoid subjective considerations in discussing and evaluating DA. I can even understand someone for whom HD is a live hypothesis refusing to proceed from the mere likelihood version of DA to the more committal Bayesian version. Though I think it would be reasonable for such a person to accept the Bayesian conclusion, as I suggested above, nevertheless I think it would also be reasonable for her to say, in effect, ‘I realize that my assigning a high prior probability to HD is not based on hard evidence, and so I will resist the urge to draw conclusions based on this assignment.’ All in all, I respect Sober’s preference for the likelihood argument over the

²⁶Sober, “The Design Argument,” in Mann, p. 120; and in Manson, p. 30.

²⁷William James, “The Will to Believe,” in *The Will to Believe and Other Essays in Popular Philosophy*, ed. William James (New York, 1897). The article is widely anthologized; for example, in Shatz [see above, note 4].

²⁸Furthermore, for most people who are likely to be interested in DA, the only live hypothesis that is in competition with HD is naturalism, or HM; so it is worthwhile to compare specifically these two hypotheses.

Bayesian argument. But I think that, practically speaking, people who are genuinely torn between believing in an intelligent designer of the world and adopting a thoroughgoing naturalism may be led by DA to believe in an intelligent designer; and I further believe, that if they do, they are within their epistemic rights. But to argue for this latter claim is (as I often say when I'm stumped) beyond the scope of this paper. I can only refer the reader to James's article, and generally to the literature on the epistemological propriety of beliefs not based on evidence.²⁹

5. Conclusion

The anthropic principle may very well point to an OSE that undermines DA construed as a straightforward likelihood argument. Our own existence entails that (short of a miracle) the necessary physical conditions for intelligent life, no matter how improbable in themselves, must have been satisfied—i.e., that the constants are just right (R). Therefore, $P(R|HD \& OSE) = P(R|HM \& OSE)$, and so R does not favor HD over HM.

What I have suggested here is that we view HD and HM as alternative causal, or generative, accounts of how the universe came to be fine-tuned for intelligent life; and that we ask which account posits antecedent conditions that, in themselves, would have rendered more likely the subsequent fine-tuning for intelligent life. The fact that we, who are asking, or who discovered the extent of the fine-tuning, are intelligent living beings is irrelevant to answering this question; and so is the fact that we know, and have known for a long time, that intelligent life exists. Explicitly adding our current existence to the picture has no bearing on the comparative plausibility of the competing generative accounts *as such*. The proponent of DA claims that our experience of how various forms of mundane fine-tuning, or adaptation of means to ends, generally come about—i.e., that it is imposed on inanimate matter by intelligent (human) designers—leads us to prefer the HD account to the HM account on this score; and that in so far forth, R favors HD over HM. Whatever other objections might be raised against this claim, the AP objection is not a problem for it.

It seems to me that many who have been attracted to DA have viewed DA, whether explicitly or implicitly, pretty much as I have described it—that is, as an inference as to which of two causal, or generative, accounts would render the fine-tuning of the universe antecedently more likely to emerge. (I suspect that Craig, among others, was thinking of DA in this way. And certainly the Leslie/Swinburne firing-squad example captures this aspect of the case.) The AP objection invokes considerations that are irrelevant to the question of what kind of earlier conditions brought about the fine-tuning. I suggest that it is for this reason that supporters of DA have tended to find the AP objection so puzzling; and that those who find the objection cogent and persuasive do so because they view DA in some other way. Perhaps defenders of the AP objection hold that if a given state of affairs is to have been expected, then there is no need for, and no room

²⁹See, for example, *Faith and Rationality: Reason and Belief in God*, ed. Alvin Plantinga and Nicholas Wolterstorff (Notre Dame, IN: University of Notre Dame Press, 1983); and chap. 7 in Shatz (ed.).

for, any further explanation of that state of affairs; and given our existence, plus the fundamental laws of nature, the fine-tuning that we find is to have been expected, and so is already fully explained. However, we are still left with a puzzle if we find it difficult to envisage antecedent conditions that could have yielded the data in question. In that case, there is still room for inquiring as to the antecedent conditions that could have yielded the data. I find it intuitively clear that whether or not our existence renders the cosmic fine-tuning unsurprising, and whether or not our existence, plus the fundamental laws of nature, can properly be said to 'explain' the cosmic fine-tuning, there is still a felt need for a causal, generative account of how the fine-tuning came about; and it is qua causal, generative account of how the fine-tuning came about that the design hypothesis is supported in DA.

However, as we have noted, my construal of DA, like Sober's, is relatively weak. It does not necessarily lead to the acceptance of HD. Whether HD is ultimately acceptable depends also on how plausible HD is overall, aside from its being favored by R. The overall plausibility of HD depends, at least to some extent, on its initial plausibility; and as we have noted, how plausible one initially finds HD may very well be a subjective matter, differing from person to person, and depending on non-evidential factors. I suggest that most defenders of DA (subjectively) assign more or less equal prior probability to HD and HM, and therefore may conclude that, since the fine-tuning is more likely the result of design than of mindless natural forces, the fine-tuning renders HD more probable than HM as an explanatory hypothesis.³⁰

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³⁰Actually, neither HD nor HM is a very detailed hypothesis. Both are best viewed as hypothesis-schemata, to be filled in with the details, either of the intentions and powers of the posited designer or of the nature of the relevant posited mindless natural processes, respectively. I think it is fair to draw on religious traditions to fill out HD. As for HM, I think that part of the problem for naturalists is that they currently have no way of filling out HM; scientists have no idea of what kind of naturalistic processes could have originally determined the values of the various constants or the initial conditions, so these constant-values and initial conditions are effectively viewed as matters of pure chance. As for the question of whether future scientific developments will enable the further articulation of HM, and whether this articulation will undermine DA, I think the best answer for now is: Let's wait and see.

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