

Probability in Fine-tuning Design Arguments

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Abstract: This paper examines probabilistic versions of the fine-tuning argument for design (FTA), with an emphasis on the interpretation of the probability statements involved in such arguments. Three categories of probability are considered: physical, epistemic, and logical. Of the three possibilities, I argue that only logical probability could possibly support a cogent probabilistic FTA. However, within that framework, the premises of the argument require a level of justification that has not been met, and, it is reasonable to believe, will not be met anytime soon.

1 Introduction

A fine-tuning argument for design (FTA) begins with the observation that certain physical parameters or initial conditions have values that could not differ very much without rendering human life impossible. FTAs infer from this observation that the universe is a product of a designing intelligence whose purpose it was in creating the universe to bring about or allow for human life. Contemporary FTAs often take the form of probabilistic arguments. It is the aim of this paper to explore the difficulties that probabilistic FTAs run into when formulated within any of the main interpretive approaches to probability. I conclude that the only framework that could support a cogent probabilistic FTA is logical probability, but that significant obstacles stand in the way of realizing such a possibility.

I begin in sections two and three with a characterization of fine-tuning, and a sketch of the Bayesian version of the probabilistic FTA. The bulk of the argument is presented in section four, where I consider the three main interpretive approaches to probability, viz., physical, epistemic, and logical probabilities. I explain why FTAs cannot be formulated in any cogent way in terms

of physical probabilities – a point that does not seem to be seriously in dispute. I then turn to epistemic probabilities and show that such formulations run into a debilitating version of the problem of old evidence. This leaves logical probability. I argue that logical probability is the only prospect for formulating a cogent probabilistic FTA, but that the burden of justification for the premises in a logical probability formulation of FTA is so great that its prospects for this approach are not bright. At any rate the premises have not yet been justified. In section five I respond to anticipated objections.

2 Fine-tuning

Suppose X denotes some feature of the universe, and that a quantity Q , either a parameter in a correct theory or a measurement of some “initial condition,” takes the value R . Furthermore, suppose that for some possible changes δR in the value of Q , where $\delta R/R$ is very small, the fact that X is a feature of the universe is incompatible with either $Q \geq R + \delta R$ or $Q \leq R - \delta R$ (or both). We shall then say that the universe is *fine-tuned for X* .¹

FTAs variously appeal to the claims that the existence of human life, or of intelligent creatures, or of biological organisms, or of matter organized in any very complex manner, depends on a large number of facts about the universe. Most of these facts are further dependent on a few fundamental facts of physics, viz., the masses and lifetimes of the elementary particles, the strengths, both absolute and relative, of the four fundamental forces. Many of these latter dependences meet the fine-tuning criteria.

3 Probabilistic Formulations of FTAs

Consider a schematic formulation of a probabilistic FTA using Bayes’s theorem. In what follows, it will be assumed that $Pr(\cdot|\cdot)$ is a probability function. Let CR represent the hypothesis that the universe was created by a God whose purpose it was to allow or bring about human life. $\{CR, J_1, J_2, \dots, J_n\}$ are an exhaustive set of mutually exclusive hypotheses about the origin of the universe. b represents “background knowledge,” and should be taken to include LR : The universe having feature X is a prerequisite for human life (intelligent creatures, etc.).

¹This account is a modified version of that given by Sherry Roush in an especially lucid essay [13].

FT: Physical parameter Q is fine-tuned for X , in virtue of its having the value R .

HP: $Pr(FT|CR \wedge b) = r$, such that $r > k$, where k is some threshold value for a “high” probability.

LP: $Pr(FT|b) = [Pr(FT|CR \wedge b) \cdot Pr(CR|b)] + \sum_{i=1}^n [Pr(FT|J_i \wedge b) \cdot Pr(J_i|b)] = s$, such that $s \ll r$.

By Bayes’s theorem, $Pr(CR|FT \wedge b) = Pr(CR|b) \cdot [Pr(FT|CR \wedge b)/Pr(FT|b)] = Pr(CR|b) \cdot (r/s)$.

Since $r \gg s$,

$$Pr(CR|FT \wedge b) \gg Pr(CR|b). \quad (1)$$

In other words, *FT* greatly increases the probability of the hypothesis that the universe was created by a God whose purpose it was to allow or bring about human life.

3.1 Likelihood Version

A variant of this probabilistic version of the argument is an argument that appeals to likelihoods rather than probabilities of hypotheses. Elliott Sober has argued that design arguments in general are best understood as likelihood arguments [15], and the “Fine-tuning Design Argument” offered by Robin Collins [3] is an example of a formulation in these terms.

Here the term ‘likelihood’ is used in the following technical sense: the *likelihood* of a hypothesis H on observation O is defined as, $\mathbb{L}(H|O) \equiv Pr(O|H)$. Advocates of likelihood methods in scientific reasoning endorse a principle according to which, when an observation O has a well-defined probability under each of a number of competing hypotheses H_1, H_2, \dots , O should be taken to support the hypothesis with greatest likelihood on O , i.e., O supports the hypothesis H_i such that $\mathbb{L}(H_i|O) > \mathbb{L}(H_j|O)$ for any $j \neq i$ [14].

The likelihood version of the fine-tuning argument, then, is similar to the Bayesian version in that it relies on variants of the premises *HP* and *LP*, although the conclusion is stated differently:

HP': $\mathbb{L}(CR|FT \wedge b) = r$, such that $r > k$, where k is some threshold value for a “high” probability.

LP': For every $i = 1, 2, \dots, n : \mathbb{L}(J_i|FT \wedge b) \ll r$.

Therefore, *FT* supports *CR* over any competing hypothesis.

4 Interpretations of Probabilities in FTAs

In this section I canvass the main interpretive approaches to probability and discuss the prospects for formulating a probabilistic FTA within these approaches. I will not concern myself with the relative merits of each approach, but will assume for the sake of argument that each is an otherwise viable approach to interpreting probability statements.

4.1 Physical probability

Statements of physical probability directly describe the objects, events, and such to which they pertain. They do not describe or prescribe the beliefs of the inquirer, nor do they describe properties of or relations between propositions about the subjects of inquiry. The most prominent accounts of physical probability treat them either as long-run relative *frequencies* of outcomes of a specified event (such as the tossing of a coin) or as *propensities*, i.e., dispositional properties of an individual experimental setup that describe that setup's tendency toward a certain outcome.

Only the likelihood version of an FTA can be based on physical probabilities, since physical probabilities cannot generally be attributed to hypotheses, as required in the Bayesian argument. This will not affect the discussion here, as the relevant points can be made entirely by discussing the premise *LP*, which has an analogue in the likelihood version.

Crucially, physical probability statements are positive descriptions of (possibly hypothetical) states of affairs, not expressions of ignorance. They either attribute some relative frequency of outcomes to a sequence of events, or they attribute some physical property to a state of affairs. Now clearly *LP* cannot be interpreted as a statement about relative frequency. No advocate of any version of the fine-tuning argument has claimed to be able enumerate the competing hypotheses $\{J_i\}$, which would be a minimum requirement for making justified statements about the physical probability of any outcomes under those hypotheses. Presumably each hypothesis J_i would describe a universe-generating mechanism that would determine values for the physical parameters of any universe it generated. We have no present knowledge of the possible mechanisms that might qualify, and no knowledge of the physical probabilities appropriate to these hypothetical mechanisms (see also [9]).

Typically the hypotheses with which *CR* is compared in fine-tuning arguments are referred

to as “the chance hypothesis” or “non-theistic creation.” These expressions fail utterly to identify any probability distribution in frequency or propensity terms with regard to different values, but could apply indifferently to mechanisms with wildly different probability profiles. We thus have no grounds for making justified claims about the physical probability of such outcomes under the alternative hypotheses $\{J_i\}$.

For most theists, the statement *HP* would also seem to be problematic if regarded as a statement in terms of physical probabilities. Even setting aside the apparent attribution of physical properties to God as a by-product of terminology, *HP* would have to be regarded as stating either that were God to create an endless sequence of universes God would sometimes create them one way and sometimes another, or that God inherently has both a disposition to create a world suitable for human life and a (weaker) disposition not to do so. I do not know whether these constitute absurdities, but I suspect they will fit at best awkwardly into most theist views. These problems could of course be avoided by insisting that *CR* does not merely make *FT* probable but in fact entails that *FT* is true. (Note that, at least on the relative frequency view, setting $Pr(FT|CR \wedge b) = 1$ is not sufficient by itself to avoid the problem, as this is compatible with God creating any number of universes in which *FT* is false.) However, advocates of probabilistic fine-tuning arguments have not in general taken this approach, which in any case would not solve the problems encountered by *LP*.

4.2 Epistemic probability

Epistemic probabilities do not characterize directly the subjects about which we inquire, but characterize instead our beliefs about those subjects, by quantifying either the degree to which a person does or should believe some proposition or the degree to which it is rational for a person to believe some proposition. Furthermore, on this view, Bayes’s theorem tells us how we ought to modify such beliefs in response to new information. (The present argument applies equally to both “personalist” and “objective” epistemic probabilities, so their disagreements will not concern us.)²

²Monton [12] has argued that the fine-tuning argument is strongest when formulated in terms of subjective probability. My approach shares with Monton’s an emphasis on clarifying the interpretation of probability employed in probabilistic FTAs, as well the employment of the old evidence problem as an analytic device. Nonetheless, we reach quite different conclusions, as will be seen.

As before, we can begin by considering *LP*. In terms of epistemic probabilities, such a statement can be taken to mean that, supposing a person to have *b* as background knowledge, that person should have very little belief in *FT* (or that there is very little reason to believe *FT*). The FTA, thus understood, runs into a problem arising from one version of the so-called “anthropic principle” (see, e.g., [1] [2][6] [13] [15]).

Elliott Sober’s version of this objection holds that the probabilities assessed in either the Bayesian or likelihood versions of the FTA must be conditionalized on the proposition *AP* (for “anthropic principle”): We exist and if we exist, then *FT* must be true. This, of course, has the consequence that $Pr(FT|CR \wedge AP \wedge b) = Pr(FT|J_i \wedge AP \wedge b) = 1$, for any $i = 1, 2, \dots, n$, rendering fine-tuning evidentially irrelevant [15]. The application of the anthropic principle is controversial, however, as various objections have been raised against Sober’s treatment of such “observation selection effects” (e.g., [19] [12]).

I will argue that a similar objection can be made against probabilistic FTAs employing epistemic probabilities in a way that does not invite the kinds of criticisms that have been invoked by Sober’s use of the anthropic principle. As Bradley Monton has pointed out [12], the problem is essentially similar to what Clark Glymour introduced as the “old evidence” problem for Bayesian inference [7]: If *E* represents a fact already known to be true by person *S*, then *S* will already have a full belief in *E*, i.e., $Pr_S(E|b) = 1$ for whatever background knowledge *S* possesses. This has the consequence that conditionalizing on *E* cannot raise the probability of any hypothesis for *S*, i.e., for every *H*, $Pr_S(H|E \wedge b) = Pr(H|b)$. This result seems to be at odds both with the history of science and with common sense. One common response has been to insist that in such situations, we evaluate hypotheses using “counterfactual” epistemic probabilities: Supposing that we did not already know *E* to be true, the appropriate epistemic probability for *E* based on our *other* background knowledge would be the value that we should employ in applying Bayes’s theorem.

I claim that advocates of FTAs using epistemic probability can neither accept nor reject this solution without invalidating either *LP* or *HP*. Seeing the problem requires examining the role played by the background knowledge *LR*.

Accepting the counterfactual solution to the old evidence problem requires that one must remove *FT* from the background knowledge *b*. This is essentially the approach taken by Monton

[12], who argues that within a subjective probability framework, an FTA can be probative, provided that Bayesian conditionalization takes place with respect, not to the agents actual probability function, but rather an “ur-probability” function that is generated by stipulating that the agent lacks full belief in the proposition that the universe is life-sustaining. Of course, “lacking full belief” in a proposition is insufficient by itself to determine this ur-probability, and, as Monton notes (ibid., 420), there is no accepted approach for doing so. Nonetheless, I will not pursue that problem here. The more fundamental problem is that any attempt to implement the strategy for an FTA in terms of epistemic probability will leave the argument without any persuasive force.

Removing FT from b will be insufficient to solve the problem if there remains in b any set of propositions that *entail* FT . I wish to claim that LR together with background knowledge (of the relevant physics or biology, for example) entails FT .

The entailment holds because the possession of any background knowledge at all entails the existence of the knower. Lest the point be misunderstood, I do not claim that the conjunction of LR with the content of any statement derived from physics or biology entails FT , but rather that LR , in combination with the *knowledge* of physics or biology (or anything else) entails FT . In the absence of any knower, such statements might be true, but could not be treated as (background) knowledge. But treating them as knowledge is essential to the deployment of epistemic probabilities, insofar as these probabilities are intended to characterize actual or (in this case) hypothetical beliefs of the epistemic agent under the supposition that the agent possesses specified background knowledge. Thus the entailment proceeds: FT is a necessary condition for the existence of knowing creatures. I possess background knowledge b . I am therefore a knowing creature. So FT is true.

As a consequence, the old evidence problem persists unless we also delete LR from b when we evaluate the evidential weight of FT based on the calculation of $Pr(FT|b)$ and $Pr(FT|CR \wedge b)$. But in that case it is no longer apparent why $Pr(FT|CR \wedge b)$ should be higher than $Pr(FT|J_i \wedge b)$ for any $i = 1, 2, \dots, n$. If we do not know that feature X is a prerequisite for human life, then we have no grounds for thinking that the hypothesis that the universe was created by a God whose purpose it was to bring about human life makes it more likely that the universe is fine-tuned for X .

Suppose we reject the counterfactual solution, so that LR is included in b . In that case $Pr(FT|b) = Pr(FT|CR \wedge b) = 1$, and FT is evidentially worthless. If we do know that feature

X is a prerequisite for human life, then a background theory that tells us X can obtain only in a fine-tuned way allows us to infer that the universe must be fine-tuned for X , regardless of any explanatory hypothesis.

If the feature X in question is human life itself, then the piece of background knowledge at issue would not be LR , but whatever theoretical knowledge entails that human life is incompatible with values of the allegedly fine-tuned parameter that differ greatly from its actual value. The problem remains.

4.3 Logical probability

As a means of avoiding these difficulties, it might seem promising to consider probabilities as abstracted from the actual or prescribed beliefs of epistemic agents, characterizing directly relations between propositions.³

In Richard Swinburne’s account, every proposition has an intrinsic probability equal to its probability conditional on a bare tautology. Intrinsic probabilities are greater for propositions with greater simplicity, and lesser for propositions with large scope (and are of course equal to 1 and 0 for logical truths and contradictions, respectively). A conditional probability such as $Pr(H|E)$ measures “how much reason $[E]$ provides for believing” H to be true ([16], 62). This statement should *not* be taken as implicitly relativized to any epistemic agent. The probability statements describes a relation between proposition that exists independently of the beliefs or capacities of any epistemic agent.

Consequently, Swinburne is not concerned in his FTA with anyone’s background knowledge. Instead, he argues that, as an objective matter, the fact of fine-tuning provides inductive support for fine-tuning in the sense that, in the absence of any background information other than a tautology k and the existence of an orderly universe O , $Pr(CR|FT \wedge O \wedge k) \gg Pr(CR|O \wedge k)$, where this is one stage in a cumulative argument for the probable truth of theism on the basis of numerous relevant considerations [17] [18].⁴ Of course, estimating $Pr(CR|FT \wedge O \wedge k)$ requires consideration

³This semantic characterization of logical probability, as a describing relations between propositions, rather than ‘physical’ or doxastic states, allows for logical probability to be characterized independently of any particular methodology for determining probability functions, such as the Principle of Indifference.

⁴The presence of O here simply reflects the fact that the first stage in this cumulative argument is to show that the orderliness of the universe is evidence for theism, i.e., that $Pr(CR|O \wedge k) \gg Pr(CR|k)$. Nothing here turns on

of $Pr(FT|O \wedge k)$, but unlike the epistemic interpretation, the probability interpretation regards this latter quantity as characterizing directly a relation between FT and $O \wedge k$. The question of background knowledge does not arise here, because one is only seeking to establish the existence of the relation in question.

So it would seem that if a successful probabilistic FTA is to be mounted, then logical probabilities must be used. Such an approach has been criticized. In two independently developed arguments [11] [4], the point has been made that the argument depends on highly problematic probability distributions. If the fine-tuned parameters are considered to have ranges of logically possible values that have at least no upper bound, and the principle of indifference is applied, then the resulting distribution is non-normalizable. Yet the choice of any other distribution, though it might be normalizable, would seem to be arbitrary. This would seem to be a damning criticism, though it seems to invite the response that the critics are “making too much of a technical issue in probability theory” ([12], 410). Furthermore, the technical issue may lend itself to resolution through innovative approaches to probability such as the use of infinitesimals, as Swinburne has suggested ([18], 178n).

So let us suppose that this problem can be somehow resolved. Although I do not argue, under this supposition, that an FTA in terms of logical probability *cannot* succeed, I do argue that no advocate of such an argument has thus far provided the justification of *LP* needed for such an argument to succeed, and that the prospects are not promising.

Whatever justification *LP* might seem to have depends rather strongly on a kind of intuitive appeal that really only works for epistemic – in fact, subjective – probability. That appeal works something like this: Suppose that the universe is not the work of a Creator whose purpose it is to bring about the conditions in which life is possible. Would you then expect fine-tuning to obtain? Many people find it natural to say that under those circumstances they would not expect fine-tuning, so that a low probability seems correct. This could work (if the problems in the previous section could be somehow solved), since it is, after all, simply a question of what one thinks (this is the key to Monton’s argument that subjective probabilities make the strongest FTAs).

Versions of the argument resting on logical probability cannot be so sanguine about this intuition. If we are using logical probabilities, expectations have no direct bearing on the assignment

this feature of the argument.

of probabilities whatsoever. Logical probabilities are an objective measure of support relationships, and thus have to be defended in some other way. This means that *LP* has to be defended as a statement describing objective support relationships between *FT* and all competing hypotheses whether or not we have thought of them.

More precisely, the condition for *FT* to increase the probability of *CR* is:⁵

$$Pr(FT|CR)[1 - Pr(CR)] > \sum_{i=1}^n [Pr(FT|J_i) \cdot Pr(J_i)] \quad (2)$$

This is merely the condition for *FT* to be at all positively relevant for *CR*, not for making *CR* highly probable, or even more probably true than false. Nonetheless, it is far from clear what grounds we have for believing the condition to be satisfied. Of particular importance is how little we know about the *J_i*s. Is there a highly plausible alternative to *CR* that renders *FT* probable? Are there numerous somewhat plausible alternatives that do the same? Remember that “alternatives” here does not refer to theories we can think of, but to all possible alternatives to *CR*, including those beyond our ability to grasp, let alone invent. To be justified in asserting *LP*, understood as a statement about logical probabilities, we must take ourselves to be justified in answering no to these questions. Perhaps we would be so justified if it were true that, were such plausible alternative theories to exist, we would have thought of them – but I cannot think of any good reason to assume that this is true. I suspect that it is in fact false.

Swinburne, with characteristic thoroughness, is one advocate of a probabilistic FTA who has attempted to defend the premise *LP* in terms of logical probabilities. The crux of his argument is that the “intrinsic” probability of any proposition is determined by the factors of scope and simplicity. Greater scope means lower probability, while greater simplicity means higher probability.⁶ Swinburne claims to be able to state, of any theory that is a competitor to *CR* for explaining *FT*, that it will either be too simple to yield *FT* as an outcome (life requiring a certain degree of complexity in terms of kinds of particles and forces between them), or too complicated to have any considerable intrinsic probability.

⁵This can be shown very easily by noting the result from Bayes’s theorem that, provided $Pr(FT) \neq 0$, $Pr(CR|FT) > Pr(CR)$ iff $Pr(FT|CR) > Pr(FT)$, and then applying the total probability theorem to the right hand side of the latter inequality in the form $Pr(FT) = Pr(FT|CR) \cdot Pr(CR) + \sum_{i=1}^n [Pr(FT|J_i) \cdot Pr(J_i)]$. Some simple algebraic manipulation then yields eq. (2)

⁶I will not here enter into a critique of Swinburne’s methodology for determining intrinsic probabilities. This should not be taken as indicating assent to its reasonableness for evidential evaluations.

Swinburne’s operative assumption here seems to be that for any theory other than CR , you only get a complex world if you have a complex theory. But Swinburne does not give us any reason for this assumption, or even seem to notice that he is assuming a fundamental ontology (apparently that of the current Standard Model) that is not the only one possible (and it is all *possible* theories, on this approach, that must be taken into account⁷). So even granting his criteria for determining intrinsic probabilities, the FTA using logical probability rests on an unjustified, even dubious, premise.

5 Objections and replies

I will consider two objections. The first concerns my analysis of the old evidence problem in the context of epistemic probability. The second objection is more general.

5.1 The possibility of disembodied intelligence

In my analysis of the FTA using epistemic probability I claimed that the old evidence problem resisted solution because the possession of any knowledge whatsoever would entail the truth FT . I claimed that having knowledge requires a knower, and hence the conditions must obtain that make the existence of knowers a possibility. I further claimed that these conditions include FT . However, it might be countered that FT is a requirement only of the existence of *embodied* knowers.

That possibility suggests the following strategy for implementing the counterfactual strategy for dealing with old evidence: I remove from my background knowledge any beliefs that entail that I exist as an embodied knower. (In the context of discussing the FTA we are committed already to taking the possible existence of disembodied intelligences seriously, since the creator would presumably be such [19].) This allows me to deploy my knowledge of the relevant science that establishes LR without getting the unwanted result that $Pr(FT|LR \wedge b) = Pr(FT|CR \wedge LR \wedge b) = 1$.

This looks promising, but there is one dubious aspect to it: It is not at all clear that one can coherently suppose simultaneously that one is perhaps disembodied while also claiming to hold onto one’s knowledge of a significant chunk of theoretical knowledge regarding physics, chemistry, and biology. Or, to put it differently, the kind of evidence that establishes such knowledge *as knowledge*

⁷In the context of Swinburne’s cumulative argument, it is all possible theories compatible with the “orderliness” of the universe that must be considered.

seems to depend to a large degree on the embodiment not just of myself, but of many others who have deployed material means to gather data on a large body of physical phenomena.

The point here is not that such an approach cannot work, but rather that it is very unclear just what the approach is going to demand of us. I might take myself to know the relevant science but without committing myself to any particular belief about how I know it. But then in what sense does this constitute knowledge for me? If I were to remove from my background information all beliefs about material procedures that connect my experiences to physical phenomena that serve as evidence for the relevant sciences, it would seem also to involve the elimination of my beliefs about those physical phenomena and hence the theories that explain them. This consideration is perhaps not conclusive, but the FTA advocate owes us a more detailed story here about how such an approach would work.

Perhaps a more damning problem concerns the effect of abstracting out my awareness of my embodied status on the premise *HP*. Suppose that I consider myself as a possibly disembodied knower. Now if I consider how very special the conditions must be for there to be embodied knowers, and I ask myself whether I expect a creator to realize those conditions, it is hard to see just what reasons I would have for thinking this to be very probable. To think such an outcome very probable would seem to require some very substantive assumptions about the creator, such as that the creator wishes to create beings that are subject to physical forces. Most of the reasons I might entertain for making such assumptions would seem to derive from beliefs that already involve seeing myself as embodied, such as a belief that the experience of physical pain serves some ennobling purpose that lends greater dignity to human life. If I were not myself embodied, or at least had been at some time, would I believe this? Would I even know what it meant? Setting aside all beliefs that implicate my own physical existence seems to rob me of any basis for attributing to a creator an intention to bring about such physical existence.

5.2 Appeal to intuitions: the firing squad example

One example has circulated so widely in defense of FTAs that it deserves a separate comment [8] [5]. The example is supposed to be analogous to an FTA and to be intuitively obvious in its conclusions. If one is persuaded by this example, one might be inclined to think the difficulty lies with our interpretive options rather than with the argument itself. I wish to argue that intuitions

about the example are misleading because of a crucial disanalogy with the FTA.

Suppose you face a firing squad of 50 highly-trained sharpshooters. The order to fire is given, you hear a loud bang, and you find yourself completely unharmed. One hypothetical explanation is that the sharpshooters intended to miss. It is also possible that they did not intend to miss. Of course, either way it is certain that they did miss and that you are alive. Nonetheless, it would be absurd to think that, because it is maximally probable that you are alive (since you are here to think about it) your being alive is not evidence that the sharpshooters intended to miss. Likewise, it is absurd to think that, just because our background knowledge (assuming here that it includes *LR*) makes it certain that *FT* is true, *FT* is not evidentially relevant to *CR*.

The difficulty is that there is a crucial disanalogy with the FTA that is obscured by a tendency to trade on an ambiguity in formulating the example. Rejecting the evidential relevance of *FT* is sometimes equated with believing that *FT* is “not in need of explanation” or that it is “no surprise,” since, were *FT* false, we should not be present to observe whether it is true or false. This is then regarded as analogous to the view that the firing squad survivor should not seek an explanation of his survival, or should not be surprised to observe his having survived.

But surprise and the need for explanation are not really at issue.⁸ Obviously, surviving the firing squad is highly improbable in terms of physical probability, and *prior to the event*, given one’s knowledge of firing squad’s, etc., one would have to attach a very low epistemic probability to surviving the firing squad. *After the event*, it remains true that the event of survival had, in those circumstances, a very low probability, and one might use such a probability in drawing inferences about potential explanations of that event.⁹ In terms of epistemic probability, however, the situation has now entirely changed. However surprised we might be from a psychological standpoint, it would now be absurd to believe anything less than fully in one’s own survival, under any hypothesis.

⁸Although in discussing this example, William Lane Craig describes epistemic probability as “a measure of the degree to which we may rationally expect some proposition to be true” [5]. The use of “expect” as opposed to the more standard and neutral “believe” simply encourages the confusion here described.

⁹Sober seems to reject even this possibility in his analysis of both the firing squad example and the fine-tuning argument in terms of an “observer selection effect” Sober:2005a. Sober’s analysis has been criticized, however, by Jonathan Weisberg [19]. My analysis involves no appeal to observer selection effects and thus bypasses difficulties in figuring out how to take them into account.

Here is where the disanalogy becomes crucial. As far as epistemic probabilities are concerned, we never are in the position of the firing squad victim prior to the shooting. There is no viable sense of epistemic probability in which we are justified in giving less than full probability to our own existence at the time of our inquiry. Neither, as I argued above, can we justifiedly appeal to physical probabilities of fine-tuning, as we can in the firing squad example both before and after the shooting takes place. The firing squad example does not sufficiently resemble a probabilistic FTA for us to draw conclusions from the analogy.

6 Conclusion

I do not claim to have shown that no FTA can succeed. What I have shown is that the burden lies with advocates of probabilistic FTAs to articulate a conception of probability in terms of which a probative FTA can be formulated while avoiding the problems canvassed here. Alternatively, they might seek an argument that eschews probability entirely while remaining cogent. Whether such an approach could work remains to be seen.

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