

Observation Selection Effects and the Fine-Tuning Argument for Cosmic Design¹

Jonathan Lipps

Introduction

Historically, the so-called Design Argument for the existence of an Intelligent Designer has been put forward in two scientific fields: biology and cosmology. This fact is, of course, unsurprising, because the domains of these fields include study of the origins of life and of the universe, and traditional conceptions of God (who seems to be the character usually hiding behind the phrase ‘Intelligent Designer’) suppose him to have been heavily, or solely, involved in these events. Elliott Sober has rightly criticized arguments for Design (in “The Design Argument,” 2004, and *Philosophy of Biology*, 2000, ch. 4) for having some serious logical defects, mainly in understandings of likelihood and probability, which I will not discuss except peripherally.

In addition to his other critiques, Sober notes (2004) that, while cosmological design arguments fall prey to all of the same objections as biological design arguments, there appears to be a further and more serious flaw peculiar to them. This flaw is the presence of an Observational Selection Effect (OSE) in certain likelihood arguments that purport to show that the precision of the physical constants of the universe confers evidential support on the Design Hypothesis—the hypothesis that the constants are precisely correct because a Designer made them that way. Without this precision, it is argued, life as we know it would be impossible, and such an observation should cause us to weigh origin-of-the-universe hypotheses that involve an Intelligent Designer more heavily than those which do not. Such arguments are examples of the Fine-Tuning Argument (FTA), and Sober thinks they fail, if anything, *more* soundly than their counterparts in biology.

In this article I will take issue with Sober’s claim regarding OSEs. However, I hasten to add that I do not plan to rescue any form of the Design Argument from all the *other* critiques which Sober thinks apply to them in addition to the supposed existence of an OSE. Organismic arguments, like Paley’s Watchmaker argument, have their own problems, and I will not speak about them. What I want is to suggest that the cosmological FTA is not, in principle, any worse off than other sorts

¹ This is a revised version of a paper written in a graduate course on the philosophy of biology in 2004 at Stanford University, taught by Dr Elliott Sober.

of the Design Argument. Since it may be true that not very much hangs on this result, I will also discuss a useful side-effect: the consequence that certain example cases, such as the Firing Squad scenario (to be discussed), turn out to accord better with our intuitions than they do on Sober's view.

Now, let us begin with a brief examination of the FTA itself, and then move on to Sober's critique of it via the concept of an OSE. After such a review, I will introduce my own way out of Sober's OSE dilemma, which I call the 'Imaginary Bystander Argument' (IBA), and attempt to show that this solution treats the various standard cases appropriately. Finally, I will consider the FTA in the context of the IBA, and attempt to tackle the challenges posed by integrating the two.

The Fine-Tuning Argument

The FTA usually runs something like this:

(1) There are certain facts about the universe that cry out for an explanation, among them the observation that the universe appears to be fine-tuned. Its physical constants are such that small differences in any one of them (the strong and weak nuclear forces, the electromagnetic force, the charge of the electron, and so on) would have drastic effects on the nature of the universe. In particular, only a very narrow range of values of these constants allows for life as we know it.

(2) The facts about the physical constants being right for human existence are better explained on the hypothesis that a designer caused them to be that way than on the hypothesis that they "just happened" to be that way (and here it is implied that to say that all values of the constants were more or less equiprobable and we got lucky in a game of cosmic roulette is not a satisfactory response).

(3) Therefore, the facts about the nature of the universe are evidence for an Intelligent Designer.

Note that I have construed the argument, not as concluding that there is an Intelligent Designer, but only that, *ceteris paribus*, the observations under consideration tell more strongly for the design hypothesis than against it. This strategy follows from the idea behind the argument, which uses the Likelihood Principle. Briefly, the Likelihood Principle states that, again *ceteris paribus*, if hypothesis $H1$ assigns a higher probability to observation O than competing hypothesis $H2$ does, then actually observing O counts as confirming $H1$ over $H2$. These probability assignments are called 'likelihoods'. The *likelihood* that a hypothesis H has in the light of evidence O is a different quantity than the *probability* that H has in the light of O (Sober 2000). In Bayesian terms, the 'likelihood' would be $\Pr(O | H)$ (the probability that hypothesis H assigns to observation O), whereas the 'probability' would be $\Pr(H | O)$ (the conditional probability of H given O).

The reason a likelihood argument is formulated by the creationist, as opposed to a probability argument, is that quantities like $\Pr(H | O)$ are notoriously hard to calculate. Bayes' Theorem helps by redefining the conditional probability in terms of likelihoods and prior probabilities; in the case of the Design Argument, however, the prior probabilities of the two competing hypotheses (chance and

design) are supposed to be inscrutable. If they are indeed inscrutable, it looks like the only confirmatory resources available to the FTA are likelihood inequalities.

So, the FTA, as I've set it up (and of course, independently of how creationists might actually use it), is interested in showing that, the rest of our knowledge aside, the evidence favors the design hypothesis over chance. The *ceteris paribus* assumption is important, because it is well-known (Sober 2000) that hypotheses with high likelihoods can have extremely low probabilities. It is always possible for the FTA to go through and to be completely useless in establishing the existence of an Intelligent Designer. That discussion, however, is not relevant to my current aims, and so, along with Sober's OSE critique, let us adopt the *prima facie* assumption that the likelihood of the design hypothesis in light of the fine-tuning evidence is higher than the likelihood of the chance hypothesis. Now to the OSE critique itself.

Observation Selection Effects and the FTA

An 'Observational Selection Effect' (OSE) (Sober 2004) occurs in a likelihood argument when something about the way the evidence (O above) was gathered, or the very fact that it was gathered, completely deflates the force of the argument. Technically, this effect happens when some 'extra information' about the collection of the evidence O actually *entails* O . To see how this works, let's set up the likelihood inequality for which the FTA argues. If we take R to be the evidence "The constants are right for human existence," and D and C to be the design and chance hypotheses, respectively, then the inequality is as follows:

$$\Pr(R \mid D) > \Pr(R \mid C)$$

There are certain facts about the methods of discerning those likelihoods which, on Sober's view, ought to be taken into account in the Bayesian formalism. The most relevant of these facts is M : "I have made the observation that R ." M could even be, "I am trying to figure out this likelihood inequality." Now, we have already said that my existence logically (not causally) entails that the physical constants are conducive to it—indeed, this fact is what the FTA says requires a Designer to explain. But such cosmic compatibility is just our observation R . Therefore, according to Sober, what we should have written as our likelihood comparison was:

$$\Pr(R \mid D \ \& \ M) = \Pr(R \mid C \ \& \ M) = 1$$

Since the entailment $M \rightarrow R$ collapses the conditional probability to 1, both hypotheses, conjoined with this certain other fact M , end up assigning the same probability to R . This equalization of the probabilities is the OSE, and it should be apparent why it is a problem for the FTA. If the mere fact that I exist makes it impossible for me to determine a difference in likelihood between C and D (the

competing chance and design hypotheses), I am apparently blocked from touting the design hypothesis's greater likelihood as evidence for it.

It is important to note, with respect to the addition of M into the Bayesian calculus, that not just *any* facts are candidates; appropriate facts concern the means or methods by which the data was collected. No doubt there are many facts which entail R . That acceleration due to gravity on the surface of a far-off extra-solar planet is $-5.7m/s^2$, for example, may very well logically entail that the cosmic constants are what they are. But, since this fact did not affect the way we gathered data about the constants, it is not an appropriate candidate for an OSE-introducing M . Likewise, R itself, while clearly entailing R , should for obvious reasons not be conjoined with the hypotheses.

In sum, if there is such an appropriate fact M , the resulting OSE prevents us from discriminating between D and C on the basis of the evidence R . Sober would be quick to point out, I am sure, that this limitation does not mean there is no evidence that could in principle help us discriminate. In the case of the FTA, however, the situation continues to look grim. Uncovering any evidence R which produces the desired likelihood inequality, while simultaneously not being entailed by something like M (the fact of our existence), appears nigh impossible. Our intuitions are no strong help—the fine-tuning data is indeed surprising and cries out for an explanation, but on the other hand, it is true that if the data were different, we would not be around to comment on or record it.

Given the obvious difficulty in trying to find a new observation for the FTA, some have created various thought experiments, supposedly analogical to our observation of the cosmic constants, and intended to give our intuitions some guidance.

The Firing Squad Example

One of these thought experiments, the 'Firing Squad' scenario, is sometimes used by proponents of the FTA to show how reasonable it is to think that D is conferred confirmation by R , even in light of an OSE. Sober (2004) quotes the example from Swinburne (1990a), who apparently took it from Leslie (1989). Briefly, the story is this: there is a prisoner (whom I will call P) scheduled for an execution by firing squad. The day comes and the firing squad lines up in front of the prisoner. In Swinburne's example, there are 12 marksmen, each of whom shoots 12 rounds at P , for a total of 144 bullets. The actual numbers are not important here; what is important is the fact that every single bullet misses P !

We are told that, according to the OSE considerations, P should not think anything strange has happened, because, after all, if the firing squad had missed him, he would not be around to wonder about the intentionality of their actions! Of course, this response seems absurd. It is just intuitively the case that P 's not being killed more strongly supports the hypothesis that the squad, for whatever reason, tried to miss him, than the hypothesis that they did so accidentally. So the FTA proponent could, it is implied, say that something has gone wrong with this whole OSE idea, if it leads to such silly conclusions.

Sober's response is to give us a dilemma that, at the same time, (a) consistently upholds the application of the OSE, and (b) offers us a way out of the above absurdity (albeit at a price). The dilemma is in the method of P's inference to the intentionality of the firing squad's action. Either he reasons by means of a likelihood argument, or by means of a probability argument. If we assume that P is using a likelihood argument (saying that the conditional probability of his survival on the 'design' hypothesis is greater than that on the 'chance' hypothesis), Sober will stand firm; he will maintain that, if P is making a likelihood argument, P is certainly subject to an OSE.

However, he happily concedes that P can set up another argument, a probability argument, taking into account the prior probability of the 'design' hypothesis as regards the firing squad. If we say, as with the FTA, that R is the observation of the bullets missing P, D is the 'design' hypothesis, and C is the 'chance' hypothesis, then the probability argument would look like:

$$\Pr(D | R) > \Pr(C | R)$$

Sober thinks this is a valid way for P to come to conclude that he was spared intentionally, but that such a strategy is of no use in the FTA. To see that this is the case, we have simply to rewrite $\Pr(D | R)$ and $\Pr(C | R)$ using Bayes' Theorem, as we would surely be forced to do, given that it is not at all clear how to determine those conditional probabilities:

$$[[\Pr(R | D) \times \Pr(D)] / \Pr(R)] > [[\Pr(R | C) \times \Pr(C)] / \Pr(R)]$$

We have already said that $\Pr(D)$ and $\Pr(C)$ are inscrutable, so holding the inequality becomes problematic. It appears, then, that the FTA has the defect of only being characterizable by a likelihood argument, whereas in the firing squad example, we can get out of the OSE via a probability consideration.

I agree with this treatment of the case by Sober. It is worth noting, however, the price we pay by allowing ourselves only the resources of a probability argument in the firing squad scenario. Sober informs us that here the prior probabilities for D and C are not inscrutable—the probability inequality can still do its work. It seems possible, however, to imagine a scenario where P cannot determine the prior probabilities of the hypotheses. Perhaps the execution is set up in such an ingenious way that it is not even clear to (a fully cognizant) P that it is taking place, and even afterwards, he is not sure what the chances are that someone would have wanted to try to end his life. In this case, Sober would be forced to conclude that P really cannot argue for D , despite the shocking result of all the bullets having missed him.

In light of the undesirability of this conclusion, along with the fact that, as we have seen, a probability argument does not transfer to the FTA, I would like to propose a way out of the dilemma. This third option, I claim, both allows P to garner evidence for the intentional character of the firing squad's actions, and is

translatable after a fashion into the FTA. In other words, it provides a way around the existence of an OSE for the prisoner in the firing squad case, as well as for ourselves with respect to our cosmic situation.

A Bystander in the Firing Squad Example

For the argument I will eventually make, I will use the idea of a bystander—someone observing an event but not participating in it. Since we will be working at first in the firing squad world, let us give the bystander a one-letter name: B. B has the following characteristics:

- (1) B observes the failed execution of P.
- (2) B is a rational human being, according to whatever normal standards of rationality might be proposed. She is not, to be sure, necessarily *perfectly* rational. Nor does she have any kind of omniscience. Most importantly, she does not have any further knowledge of the firing squad, beyond what P himself has.
- (3) B is honest, such that when asked a question, she reliably responds with what she believes to be true.

Now, when P formulated the likelihood version of the argument for the hypothesis that the firing squad missed him intentionally, he did so in the following way:

$$\Pr(R \mid D) > \Pr(R \mid C)$$

R is the observation, “The bullets all missed me,” D the hypothesis that P was spared intentionally, and C the hypothesis that his survival was accidental. We decided that there was an OSE here in the addition to the calculus of $M =$ “I am evaluating whether D or C ,” because M entails R , and M is true in the case of P, thus equalizing the probabilities in the familiar way.

A suitable question to ask is whether or not there is an OSE for B in the same manner as there is for P. We would formulate the inequality in exactly the same way, except replacing R with the sentence “The bullets all missed P.” Then, we must ask if there is some appropriate M such that M entails R for B. If so, then B is also subject to an OSE. I take it that, though there are many propositions that entail R , all of which B knows (for example, the fact that P is walking around unhurt), none of them are of the right sort to be introduced into the inequality. Remember, we said that members of the class of propositions which are allowed to be conjoined with the hypotheses are selected because they concern the way the evidence is gathered, or the fact that the evidence is gathered, and so on.

It seems clear that nothing about B’s existence, or B’s watching the failed execution, entails R . For all B knew, P was supposed to have been shot dead! Nothing about B’s data-gathering ruled out that possibility. I conclude, therefore, that in the firing squad example where we have an appropriately-defined bystander

B, there is someone (namely B) who can gain evidence for D on the basis of a likelihood consideration, even though P himself cannot.

A Discussion with the Bystander

An interesting event to consider, given the inclusion of a bystander B in the firing squad scenario, is an interaction between P and B, subsequent to the bullets being fired. We could ask if it is possible for P to benefit epistemologically from a talk with B, in terms of the likelihood argument P was blocked from making because of the OSE.

Thus far, we have established that B can garner some evidence for the ‘design’ hypothesis D via a likelihood argument, though P is stuck behind an OSE while following the same argument. The important question now is whether P can receive any insight from B. Let us assume for the moment that the question P poses to B is, “Does the fact that the bullets all missed me count as evidence for D , evidence for C , or neither?” There are a range of possible responses here, but we’ll just look at the cases where the response comes back as “It counts as evidence for D .” Remember, B actually, and rationally, believes this sentence on the basis of her likelihood argument, and furthermore we have set things up so that B is honest and forthcoming—so this response is the only real option.

That B believes D to be confirmed over C is now an observation made by P. Let us imagine that P wonders if this observation, not about bullets but about a belief of B’s, confers evidential support on D ; in other words, P sets up another likelihood argument, where B’s belief that D is confirmed is called observation S :

$$\Pr(S \mid D) > \Pr(S \mid C)$$

Now, we said that S (P’s observation of B’s belief in D being confirmed over C) comes about because of a likelihood argument (on the part of B), not a probability consideration. Therefore, if P can successfully make the above likelihood argument involving S (not R), he will have evidence that discriminates between D and C , and without resorting to the use of a probability argument. The question to answer, of course, is whether there might be an OSE lurking in the depths of this new likelihood inequality that would block such a move.

We know there is such an OSE for P if and only if there is some appropriately-chosen M that entails S (B’s belief). The most likely candidate is $M =$ “I am asking B a question,” because M entails “I am alive,” which in turn entails (translating for B) “The bullets all missed the prisoner.” Given our assumptions about B’s abilities involving likelihoods, along with her reliability, we must conclude that this entailment chain certainly includes B’s belief that D is confirmed over C . It is a torturous route, but it looks like the logical entailment $M \rightarrow S$ holds.

Still, is there an OSE? It is hard to decide. M looks like it satisfies the appropriateness conditions, so we are tempted to say the OSE holds. However, given B’s stipulated reliability, one crucial link in the $M \rightarrow S$ chain involves the truth of the likelihood inequality B used, namely $\Pr(R \mid D) > \Pr(R \mid C)$. But if we

assume this inequality holds, we have already reached our conclusion! There is no need for more argumentation— D has been confirmed over C . If we assume, on the other hand, that the inequality does not hold, the entailment breaks down and M does not generate an OSE. Granted, “ R ” in the case of P and B were slightly different sentences, but only indexically so—they pointed at the same observation in the world; it is intuitive that if P knows the validity of a likelihood inequality involving one, he knows the validity of the same inequality involving the other.

Because there might be some lingering doubts about this unraveling of the OSE when P uses B ’s observational resources, I propose that there is an even simpler way for P to get evidence for D from B . It is not a likelihood argument, but a rather more deductive one, using various other assumptions about ways of coming to rational belief.

To begin, P would ask B the question, “Did the likelihood inequality $\Pr(R | D) > \Pr(R | C)$, as you formulated it, come out true?” If B says, “Yes” (and we are assuming she does), then P has the ability to make the following argument:

“I cannot decide, because of the existence of an OSE when I formulate a likelihood argument, whether the bullets missing me constitutes evidence for D or C . However, there is someone who *can* conclude that the likelihood argument for D is valid— B . Moreover, B has come to this belief as a result of rational, unobjectionable processes. Therefore, I shall adopt B ’s view.”

Again, P is not making a likelihood argument (though he crucially uses the result of one). Rather, he is recognizing, just as we have ourselves done, that though the likelihood argument he would make fails due to an OSE, there is a way to reliably determine the ‘objective’ result of the likelihood calculation, via the resources of observer B who is not herself subject to an OSE on the matter. Most importantly, although P is acknowledging the lacuna in his epistemological ability, he is still aware that, via B , it is the observation R which is doing the heavy lifting. Even though R only shows up in an embedded capacity in P ’s argument, *it is still only because of R* that P ends up being able to conclude that D is confirmed over C . This result, I claim, is exactly what our intuitions were hoping for—and it seems P has achieved it completely rationally.

Of course, we have not yet said anything particularly useful as regards the FTA. I take it for granted that finding a cosmic bystander, able to tell us the ‘objective’ result of the cosmological likelihood inequality, is impossible. Therefore, even though we have escaped Sober’s dilemma of using either a strict likelihood or a strict probability argument, there is quite a bit of work to do before we can attempt to maneuver around the OSE in the case of the FTA.

The Imaginary Bystander in the Firing Squad Example

Given that a real bystander, if there are any such, fails to step forward and relate to us the intimate details of creation, I want to suggest that an *imaginary* one

will do just as well (hence my ‘Imaginary Bystander Argument’, or IBA). I will first apply the IBA to the firing squad case, since we are by now very familiar with it (and furthermore we have already seen how my argument goes with a real bystander in that case), and then move to the FTA. The added insight of the IBA is simply that, since there was nothing particularly special about our real bystander B, and most of the process occurred in P’s head anyway, it is unnecessary to require that B be actual.

I will now lay out the set of assumptions and considerations needed for the argument to work. To begin, let us assume we are working with the same two individuals as before in the firing squad story: P and B. Only, this time, B is a *doppelganger* of P. What I mean by this is that P and B share all properties except spatial location (and thereby any other properties that are necessarily not shared because of the difference in location). The properties they share would include, for example, most (but all relevant) mental states, most (but all relevant) knowledge about the external world, workings of their rational engines, beliefs, desires, and so on... (they should probably also now share gender). One important property they do not share is that of having been shot at by a firing squad! But let us assume that, until this incident, all events that happened to P happened to B.

Essentially, I am telling a story where the only difference between P and B is the one fact *M* that, for P, generates the OSE in the original likelihood argument. I will assume that this is *prima facie* possible. We will also have to assume, for obvious reasons, that P (and thereby B) have the properties we initially took B to have, i.e., they are reliable, they are more or less rational, and so on.

Now we can get to business. We concluded in the previous section that, one way or another, P would be able to add to his set of beliefs a discrimination between *D* and *C* on the grounds of a certain observation *R* and given the resources of the bystander B. I take it that this is still the case after we stipulate that B is a double of P, since the only relevant facts about B before were his reliability, his not having been fired at, and so on. All we have done is to make some additional, seemingly irrelevant, assumptions about B’s properties. So if we agreed with my earlier conclusion, we should also agree with the same conclusion in the modified, doppelgangerized example.

But, in the new situation where B is a doppelganger, it seems intuitive that P must *already* have all the ‘resources’ (observational, computational, etc...) of B he could ever possibly need! In particular, P must be able to know, even before asking B, what the result of B’s likelihood analysis will be. This suggestion might seem paradoxical, because we have accepted all along that P is subject to an OSE on this very likelihood analysis. How then could he have any way of knowing what the result would be for anyone at all, without asking? The answer is simple: likelihood calculations can always be made without the OSE-inducing assumption conjoined to the hypotheses. It is once we realize that there *are* such OSE-inducing assumptions that we are forced to say that we cannot know if the inequality is actually true *for us*, because of the way we gathered our evidence; but, if we wanted, we could still say with confidence, “if there were no OSE here,

such-and-such would be the result.” In other words, it is always open to us to calculate the supposed, ‘objective’ likelihoods.

In the case of P, he is positioned epistemically to conclude that the inequality, while of an unknown truth value to him, is actually true for B. This follows from the fact that P can reason that B is not subject to any OSE on the matter in the same way that we reasoned B was not subject to an OSE; our position as philosophical observers was not privileged. (In addition, it seems obtuse to insist that this rational pathway is blocked merely in virtue of P and B standing a few meters apart.)

To put it another way: P says to himself, “if there were no OSE here, the inequality would be true. As it stands, I’m not allowed to conclude that it is, because of the OSE. But B—he’s not subject to an OSE. And since I know everything he knows, I know exactly how he would calculate the inequality: the same way I did, except he doesn’t have to add the OSE-introducing element. So B knows it is true.” Thus P can decide for himself what B will say about the likelihood inequality, without ever asking him.

In the next step of the argument, we ask how a bystander to whom P does not talk is at all different from a purely imaginary one. I submit that there is effectively no difference. Certainly the bare fact that a bystander saw the failed execution does not change the ‘objective’ truth about $\Pr(R | D) > \Pr(R | C)$, nor does it change P’s technique of reasoning what B would say about the inequality. The only distinction is that, before, P was reasoning about a *real* being with whom no interaction was required, and on the new supposition, P is reasoning about a *hypothetical* being with whom no interaction is required. Given that no interaction is required either way, there is no reason to say that the actuality of B is important to the case.

I should mention here that the class of ‘appropriate’ imaginary bystanders is, incidentally, undoubtedly larger than the class of doppelgangerized imaginary bystanders. That is, it is not necessary to stipulate that so many properties be held in common between P and imaginary bystander IB. P and IB must only be sufficiently similar to ensure that the imaginary question-and-answer session takes place without a hitch. The doppelganger is simply, for obvious reasons, the easiest, and philosophically safest, IB for P to imagine.

It appears that, given one of these appropriate imaginary bystanders IB, P can come to the same understanding about the likelihood inequality as he would if he were to talk to the real bystander B. Then, if we agree with the conclusion of the previous section (that a question answered by B is sufficient to sidestep the OSE), it is straightforward to say that the OSE can be reasoned away, even in the case where there is no actual bystander.

The Imaginary Bystander and the Fishing Case

Before we can move on to discussing the FTA in light of the Imaginary Bystander Argument I just formulated, I need to dispel a worry about it. The worry is that the IBA might be an indiscriminate sort of tool, claiming to sweep away any

OSE by way of a bit of painless hand-waving. If this is the case, it should indeed cast doubt on the IBA's success even in the firing squad case we examined. So, I want to apply the IBA to another example, from Sober (2000) (accredited to Eddington [1938]), where Sober and I both agree the OSE should block inferences involving the Likelihood Principle.

The story, in this case, involves fishing. Suppose I catch 50 fish from a lake, and they are all more than 10 inches long. Call this observation O . Then we want to see if O will distinguish between two hypotheses:

$F1$: All the fish in the lake are longer than 10 inches

$F2$: Only half the fish in the lake are longer than 10 inches

So the likelihood inequality we set up will be:

$$\Pr(O \mid F1) > \Pr(O \mid F2)$$

Given what we know of the case, this inequality is true. But then, we learn how it was that I caught the fish (call this information $A1$):

I caught the fish by using a net that (because of the size of its holes) can't catch fish smaller than 10 inches, and I left the net in the lake until there were 50 fish in it, knowing that there are at least 50 fish in the lake that are larger than 10 inches. (15)

So our new likelihoods collapse:

$$\Pr(O \mid F1 \ \& \ A1) = \Pr(O \mid F2 \ \& \ A1) = 1$$

$A1$, then, introduces an OSE and blocks us from concluding that $F1$ is confirmed. In this case, as opposed to the firing squad case, we think that this barrier is *good*; that is, it stops us from making a possibly-erroneous claim about the lake. But if the IBA is valid, why could we not hypothesize a bystander who is not subject to an OSE in order to get the conclusion that the original likelihood inequality holds nonetheless?

I think the answer lies in the appropriateness conditions for the imaginary bystanders (IBs) that are considered, which I outlined briefly in the last section, but will now state more exactly:

- (1) The IB must have all of the relevant data (including observations and descriptions of how the observations were made) that the subject herself has.
- (2) The IB must not have any knowledge relevant to the case *beyond* what the subject herself has.

- (3) The rational processes of the IB must work in the same way as those of the subject, at least in terms of figuring out likelihoods.
- (4) The IB must not herself be subject to an OSE.

With these conditions in hand, we can analyze the fishing scenario and see whether it differs from the firing squad case. In order for the IBA to be vindicated, it must turn out that, while there is an appropriate IB in the firing squad case, there is not one in the fishing case. I have already shown that these conditions are satisfied in the firing squad scenario; indeed, the very reason I made B a doppelganger of P was so that conditions (1) – (3) would be satisfied automatically. Condition (4) is satisfied in virtue of the fact that no bystander is subject to an OSE (irrespective of doppelganger-ness). The question now, for the fishing case, is whether there is an IB that satisfies conditions (1) – (4).

I claim that any proposed IB in the fishing case will fail to satisfy one or more of the conditions. For example, if we suggest that the IB be a doppelganger of the fisher, conditions (1) – (3) will be satisfied, but condition (1) will ensure that the HB knows the information *A1*, and therefore condition (4) will not be satisfied, since the IB will be subject to the OSE as well, via *A1*. For a second try, we might assume that the IB is fishing with a different net, one with very small holes, and still gets the same assortment of fish as the fisher. However, while this will save the IB from failing condition (4), it will mean that she violates conditions (1) and (2), since the observation she uses will not technically be the same *O* as that of the subject, and since she will know some fact *A2*, involving her smaller-holed net and so on, which the subject does not know. It is for this same reason that we cannot postulate an IB that knows *F1* to be true right from the start, if the subject herself does not.

So, it looks as if there is nothing to worry about in the fishing case—the IBA does not, as we might have feared, allow the fisher to mount evidence for *F1*. More interestingly, it also appears that we have the beginnings of a principled distinction between two kinds of OSEs. Sober himself reports (2004) that there are different kinds of OSEs, and it looks as though my method is restricted to a certain class of them. Some OSEs hold, we might say, because the observation-generating process itself is ‘objectively’ too weak to discriminate between likelihoods (for instance, when using a net unsuitable for the purpose of determining average fish length). Other OSEs come about, not because of rational defects or imperfect measuring devices, but rather because of an unfortunate perspectival situation (for instance, being the person in front of a firing squad as opposed to the one watching from the side). It is this second sort of OSE that the IBA can address.

By my lights, the OSE appearing in the FTA is more analogous, in terms of its character and how it arises, to the one in the firing squad scenario than the one in the fishing story. If that is the case, then it should be possible to find an appropriate IB for the FTA, even though it was not possible in the fishing case.

The Imaginary Bystander Argument and the FTA

Finally, we are able to get to the main point of this paper, which is that the IBA does, in fact, assist the proponent of the FTA. I believe I have adequately shown what the sufficient conditions would be for coming to such a conclusion—we have simply to find an appropriate imaginary bystander IB in the case of the FTA, as we were able to do in the firing squad story (but were unable to do in the fishing example).

Unfortunately, defining IB in the case of the FTA is harder and less intuitive than with the firing squad. Suppose we follow the same strategy as before, and say that IB is a doppelganger of myself (that is, of the person attempting to use the FTA). In that case, IB is a human being. But clearly, if I am subject to an OSE in virtue of my existence depending on a certain arrangement of cosmic constants, then so are *all* human beings—even, unfortunately, IB.

So, stipulating that IB corresponds to some other human (or probably even alien) intelligence is of no use. In fact, it makes things worse for the IBA, because there are probably some humans (or aliens) who disagree even that the ‘objective’ values of $\Pr(R | D)$ and $\Pr(R | C)$ are related in the way required by the FTA. That is, “*D*” and “*C*” themselves are not necessarily well-defined hypotheses. If “*D*” is the hypothesis that the universe was created by an Intelligent Designer, we might be justified in asking questions like, “What *kind* of Designer?” On some conceptions of God, or whatever purported supreme Being, this Designer might not actually be inclined, according to the conception, to create life. All this is to say, we had better be sure, when selecting our IB, that she means the same things by the hypotheses under evaluation that we do.

Given that humans cannot be appropriate imaginary bystanders in the cosmic situation, we can begin to see a problem—if we start to postulate wild new forms of rationality not subject to the cosmological OSE in order to satisfy condition (4), we come into tension with the *other* appropriateness conditions for IB, namely (1) - (3). What if rationality in general, as some have implied, is predicated on a biological situatedness, a tethering to something like the grey matter in our skulls? If there can never be, even in principle, a likelihood calculation made which does not depend on a living being to make it, then it will be impossible to imagine an agent, not subject to the cosmic OSE, who has the resources required for the IBA to go through. In other words, if the Likelihood Principle itself cannot be sensibly formulated outside of the cosmological constants being precisely the way they are, we will be stymied in finding an adequate IB.

Fortunately, I think it is reasonable to assume that the philosophical insight of the Likelihood Principle transcends our particular, situated way of conceiving and translating it. That is, it does not seem tied in a principled way to human, Terran, or Solar forms of rationality alone. I can therefore imagine without contradiction a ‘bystander’ who understands and upholds $\Pr(R | D) > \Pr(R | C)$, while also (let’s say), not having an existence dependent on the cosmological constants the way ours are. Perhaps no there is no *biological* life form that would possibly fulfill this description, even in principle. But, unless we hold that

rationality is *necessarily* (not just actually, in our universe) predicated on biology, we should have no problem in allowing such a creature to populate one of our 'possible worlds', philosophically speaking.

From here, it should pose little difficulty to further specify the story such that conditions (1) - (3) above are satisfied. We have already supposed that our putative IB goes about likelihood arguments in the same way as we do. It is moreover easy to imagine that 'it' knows the details of the relationship of the nuclear forces, etc..., and finally does not have any extra, contravening data. Since condition (4) is fulfilled by imagining that the IB's existence is not of the sort that is predicated on the constants being right (in virtue of its intelligence being comprised, perhaps, by some configuration of elemental quantum particles that would be possible even given different cosmological constants), we have successfully found an imaginary bystander that satisfies all the appropriateness conditions.

Conclusion

Since it appears possible to avail ourselves of our imaginative resources to find an appropriate IB in the case of the FTA, I claim that the FTA should be regarded in the same light as the firing squad case (wherein we were able to counter the inference-blocking OSE and proceed with the likelihood argument), over against classifying it with the fishing case. This conclusion is not without price, however. There are two points in particular where, if a detractor decides to follow a different set of assumptions than I have made, I am forced to admit that my conclusion will not be straightforward.

First, there might be disagreement that, even with the *real* bystander B in the firing squad case, the subject experiencing the OSE can use B's resources to mount evidence for the 'design' hypothesis. I gave two arguments to support my point there. The first, a likelihood argument, has a weak point in that it involves the calculation of embedded probabilities, which is not necessarily straightforward. The second, a more-or-less deductive argument, I believe to be very strong, but it does involve some assumptions about valid ways of coming to rational belief, which, according to the way the epistemological winds are blowing, may or may not be judged acceptable. Still, I take it that any sensible epistemology should countenance such situations.

Second, it must be acknowledged that the imaginary bystander in the FTA will differ greatly, metaphysically and ontologically, from the one in the firing squad scenario. While I think it does not tax our ontologies overmuch to grant that an appropriate imaginary bystander can indeed be postulated, I admit that the most I can do here is to suggest. If, because of prior commitments, someone is unable to make this move, then my conclusion may indeed be cast into doubt. (However, these prior commitments would probably also rule out the possibility of a Designer in the first place, and so the FTA would have scant chance of succeeding in such a context, regardless of the success of the IBA.)

But, assuming these points are conceded, I think it safe to conclude that the Imaginary Bystander Argument I proposed does indeed deliver what was

promised—a way around a certain class of OSEs where the problem, we might say, is not so serious as misleading data, but merely comes as an unfortunate artifact of our causal history. This result can be used by the proponent of the Fine-Tuning Argument to respond to some of Sober’s objections to that argument. Of course, as I have already mentioned, we are not necessarily any closer to conceding the actual existence of an Intelligent Designer; for that, many and more serious objections must be faced. The FTA, however, is now seen to be on no worse footing than its biological siblings.

References

Sober, E. (2004): “The Design Argument”, from W. Mann, ed., *The Blackwell Guide to Philosophy of Religion*, 2004.

Sober, E. (2000): *Philosophy of Biology*. Boulder: Westview Press, pp. 27-57.