

# Fine-Tuning and Confirmation Theory: Some Complications

David Manley, University of Michigan

There are some significant problems with the standard Bayesian argument for the existence of God from Fine-Tuning. Some of these have to do with the *scientific* premise that the universe is ‘fine-tuned’ in relevant sense. I will not concern myself with those. I will be interested instead with the form of the argument, and with relevant issues in the application of Bayesian reasoning to this case.

Some of the issues that arise are tricky but ultimately unproblematic—such as the fact that the existence of life is *old evidence*, and that we have to employ something like *hypothetical priors* to assess the relevant probabilities. But there are more worrisome issues, such as the fact that there is no way around assigning a hypothetical likelihood to God’s having created a finely-tuned universe, and there are very natural probability functions on which this is low enough that the fine-tuning facts turn out not to support theism. Another critical concern is whether we are in any position at all to reasonably assess priors like this, especially if we otherwise hew towards ‘skeptical theism’ when asked to assess the probability of various features of the universe given the existence of God.

As will become clear, these issues are intended to apply directly to the Bayesian version of the Fine-Tuning argument that Bill sent along in his materials. They also touch on the connection between his approach to Fine-Tuning and his approach to other pieces of evidence that are brought to bear in debates about the existence of God. I will also include a brief appendix addressing Dembski’s explanatory filter approach— but the details on that will have to wait.

## I. The argument and initial complications

The fine-tuning argument is a probabilistic argument to the conclusion that Fragility is “genuine evidence of the following fact: that God is real, and/or there are many and varied universes” (John Leslie). The key scientific premise is:

**Fragility:** A ‘very small’ change in the value of any one of (intrinsic force strengths, masses of particles, initial entropy level, speed of expansion...) would have given rise to a universe with no life.

That is: the structure of the universe’s laws and parameters is finicky when it comes to life!

Briefly: concerns about whether Fragility is even true:

- Constants not so finely tuned?

- Uncountably many possible settings: measure problem
- Might there be a unified theory disallowing such changes?

Crucial premise: given Fragility, life is vastly more probable given God than given no God. Or:  $p(\text{Life} \mid \text{Fragility} \ \& \ \text{God}) > p(\text{Life} \mid \text{Fragility} \ \& \ \sim \text{God})$ .

And since this discrepancy is greater than that between our previous credences in Life|God and Life|no God, discovering *Fragility* increases our posterior credence in God. This may be the case even though  $p(\text{Life} \mid \text{Fragility} \ \& \ \text{MU}) > p(\text{Life} \mid \text{Fragility} \ \& \ \sim \text{MU})$ . Hence ‘and/or there are many and varied universes’— in particular, *and*.

Two initial complications with this way of putting things:

- Life is old evidence
- Hard to assess the relevant priors

## 1. Life is a bowl of old evidence

This argument treats Life as new evidence, not Fragility. But we knew Life first! The *change* we are considering is diachronic: it is a response to evidence. The updating rule for evidence is *diachronic conditionalization*, which tells us how to update our other credences when getting a new piece of evidence:

$$p_{\text{new}}(H) = p_{\text{old}}(H \mid E) \text{ i.e. } \frac{p_{\text{old}}(H \ \& \ E)}{p_{\text{old}}(E)} \text{ i.e. } \frac{p_{\text{old}}(H) \ p_{\text{old}}(E \mid H)}{p_{\text{old}}(H) \ p_{\text{old}}(E \mid H) + p_{\text{old}}(\sim H) \ p_{\text{old}}(E \mid \sim H)}$$

The most helpful expansion of the rule in this context tells us that our new credence in a given hypothesis given some evidence is a function of our prior unconditional credence in that hypothesis, as well as two prior conditional credences: that of the evidence given the hypothesis, and that of the evidence given the negation of the hypothesis.

But as a matter of fact our credence in Life has always been 1 (certainty) for us. There is no  $p_{\text{new}}$  and  $p_{\text{old}}$  for us when it comes to life, and  $p(E \mid H)$  is 1 for any H! What actually happened is that while certain of Life, we learned Fragility.

Suppose we model the argument treating *Fragility* as the new evidence. Then we have to ask after things like  $p_{\text{old}}(\text{Fragility} \mid \text{God} \ \& \ \text{Life} \ \& \dots)$  and  $p_{\text{old}}(\text{Fragility} \mid \sim \text{God} \ \& \ \text{Life} \ \& \dots)$ . That is, given that we already knew that the universe contained life (and all our other background knowledge upon discovering Fragility), how likely was it we’d find the universe fine-tuned, given God (and  $\sim \text{God}$ )?

This seems impossible to assess absent asking ourselves how likely Life is given God (and  $\sim \text{God}$ ), that is, without treating Life as the evidence. Consider this analogy. I know I was conceived on my parents’ first year. One fine day I learn the following fact:

NEWS: Before having sex, my parents flipped a coin. Iff heads came up, they would use birth control throughout their first year together.

In theory I should be assessing:

$$p_{\text{old}}(\text{News} \mid \text{Heads} \ \& \ \text{I'm alive} \ \& \dots) \text{ and } p_{\text{old}}(\text{News} \mid \text{Tails} \ \& \ \text{I'm alive} \ \& \dots)$$

But this seems impossible to assess. When I try to do it, I end up trying to assess something like this

$$p(\text{I'm alive} \mid \text{Heads}) \text{ and } p(\text{I'm alive} \mid \text{Tails})$$

using some probability function ‘prior’ to knowledge of my own existence (such as that had by a bystander). Even if I did have a prior for hearing the news, it would be based on reasoning like this: I am unlikely to hear that news given that there was such a coin toss and tails came up, because I’d be unlikely to have existed in the first case!

That is, want to integrate the initial chance of heads (.5) with a very low conditional probability of my existing given heads. But I’ve always known that I exist, and there’s no way for me to literally update on a piece of evidence I’ve always known. In other words, it’s *old evidence*.

Because of cases like this, I’m going to assume that good sense can be made of the idea that we can use something like Howson and Urbach’s ‘hypothetical priors’--roughly what my priors would have been in the absence of the old evidence. And sometimes the evidence I have to bracket is my existence itself. [Brief discussion of claims to the contrary: Sober, Pust.]

So let’s use ‘ $p^*$ ’ to denote the hypothetical prior. We can then assess  $p^*(\text{Life} \mid \text{Fragility} \ \& \ \text{God})$ , and  $p^*(\text{Life} \mid \text{Fragility} \ \& \ \text{no God})$ .

## 2. What to expect when you’re hypothetically expecting

So now we use a rule for updating with one that replaces ‘ $p_{\text{old}}$ ’ with ‘ $p^*$ ’. But it’s hard to see how we’d assess the elements of the more compressed versions of this rule without cashing them out fully. What fine-tuning does is specify a new value for  $p^*(E \mid H)$  and  $p^*(E \mid \sim H)$ , where ‘H’ is ‘God exists’ and we treat Fragility as background knowledge:

$$p_{\text{new}}(H) = \frac{p^*(H) p^*(E \mid H)}{p^*(H) p^*(E \mid H) + p^*(\sim H) p^*(E \mid \sim H)}$$

But this appears to require us to assess  $p^*(\text{God})$  and  $p^*(\text{no God})$ ? This is notoriously difficult. How do we go about assigning a hypothetical ‘ur-prior’ on the existence of God, not even taking into account our knowledge of our own existence? It appears we have to rely on aprioristic criteria of theory choice that are hard to pin down, like ‘simplicity’, ‘elegance’ and so on.

(Possible side-discussion about the value of  $p^*(\text{God})$  and the simplicity of the theistic hypothesis. Swinburne and others, including Craig, have argued

that  $p^*(\text{God})$  should be fairly high due to God's metaphysical simplicity.<sup>1</sup> But it's not obvious that metaphysical simplicity is tied to theoretical simplicity: consider, for example, the hypothesis that all of my experiences are being fed to me by an evil demon who for whatever reason wants my experiences to be exactly like this. In explaining my experiences, this hypothesis trades the ontological complexity of realism about the external world for a highly complex and unlikely set of inner states in the evil demon. Positing in addition that the demon is metaphysically simple does not seem to help at all.)

In addition, there is a trade-off between specificity and simplicity: very simple/general forms of theism can increase  $p^*(\text{God})$  but will tend to lower  $p^*(\text{Life} | \text{God})$ , and indeed  $p^*(\text{X} | \text{God})$ , where X is any observed phenomenon—as contrasted with more specific forms of theism whose features are sensitive to observation.

One answer: we don't need to assign any value to  $p^*(\text{God})$  in order to conclude that (assuming Fragility) the existence of life counts as some confirmation for the existence of God. This follows from a general principle about likelihoods that is a consequence of the updating rule:

**PL:** If  $p_{\text{old}}(E | H) > p_{\text{old}}(E | \sim H)$ , then E supports H.

From these two values we can tell that our new credence in H is higher than before—but not whether it will be higher than a given alternative!

In particular, it seems that  $p^*(\text{Life} | \text{Fragility} \ \& \ \text{God}) \gg p^*(\text{Life} | \text{Fragility} \ \& \ \text{no God})$ . So treating Fragility as background knowledge, the fact that life is far more likely given God means that Life supports God.

Two issues with this response:

a) How helpful is this really? Suppose Jones wins the lottery. Should we think the lottery was rigged for Jones?

$p_{\text{old}}(\text{Jones wins} | \text{Rigged for Jones}) \gg p_{\text{old}}(\text{Jones wins} | \text{Chance})$

But usually we don't take this very seriously. The crucial factor is  $p_{\text{old}}(\text{rigged for Jones})$ ! Analogously, to know how seriously we should take this argument in terms of our final credence in the existence of God, we need at least to have a sense of  $p^*(\text{God})$ .

---

<sup>1</sup> Craig writes: As an unembodied mind, God is a remarkably simple entity. As a non-physical entity, a mind is not composed of parts, and its salient properties, like self-consciousness, rationality, and volition, are essential to it. In contrast to the contingent and variegated universe with all its inexplicable quantities and constants, a divine mind is startlingly simple... Therefore, postulating a divine mind behind the universe most definitely does represent an advance in simplicity, for whatever that is worth." <http://www.reasonablefaith.org/richard-dawkins-argument-for-atheism-in-the-god-delusion#ixzz3dB2vuf71>

In particular, to compare  $p_{\text{new}}(\text{God})$  with  $p_{\text{new}}(\text{Many Universes})$ , we would need to assess  $p^*(\text{God})$  and  $p^*(\text{Many Universes})$ . So this leaves us once again assigning values to these hypothetical unconditional priors.

**b)** Presumably, of course, the hypothetical probability of Life given God is already higher than that of Life given no God, even before taking Fragility into account. So if treating Fragility as background makes Life even *further* support God, it had better make this difference more dramatic. That is, we need:

$$\textbf{Greater Differential: } p^*(\text{Life} | \text{God} \ \& \ \text{Fragility}) - p^*(\text{Life} | \text{no God} \ \& \ \text{Fragility}) > p^*(\text{Life} | \text{God}) - p^*(\text{Life} | \text{no God})$$

The theistic hypothesis usually builds into the idea of God some feature which makes life probable, and this feature would seem to be independent from Fragility, so we can assume that  $p^*(\text{Life} | \text{God} \ \& \ \text{Fragility}) \approx p^*(\text{Life} | \text{God})$ . Evaluating  $p^*(\text{Life} | \text{no God})$  requires us to assess things like  $p^*(\text{Many Universes} | \text{no God})$ , as well as the hypothetical probability of life on a given universe. But what we really need for Greater Differential is simply that  $p^*(\text{Life} | \text{no God})$  is much higher than  $p^*(\text{Life} | \text{no God} \ \& \ \text{Fragility})$ . And the idea is that, however unlikely Life is relative to no background information at all except that God doesn't exist, it's even more unlikely given Fragility.

## II. On Fragility & Life | God

So much for the minor complications; here is a major one. (See Weisberg, Holverson MS, Howson 2011.)

### 1. How we have been cheating

What we've done with Greater Differential is a bit of a cheat. Even if Life more strongly supports God when we assume Fragility than it does when we do not, it does not follow that Fragility & Life together better support God than Life does on its own! In particular, if  $p^*(\text{Fragility} | \text{God})$  is very low, this kind of inference can be blocked.

Consider this analogy. Suppose we learn that a child gets better after being very sick. We may treat this as evidence for the existence of God if we have priors like this:

$$p_{\text{old}}(\text{ gets well } | \text{ God } ) > p_{\text{old}}(\text{ gets well } | \text{ no God } )$$

We then learn that the child had a horrible form of cancer C that almost no one survives. Taking this as background knowledge, this differential gets even more extreme:

$$p_{\text{old}}(\text{ gets well } | \text{ C} \ \& \ \text{God } ) \gg p_{\text{old}}(\text{ gets well } | \text{ C} \ \& \ \text{no God } )$$

But *even given* these priors, learning about C may not have the effect of making us more confident in the existence of God. In short, it might be that

$$p_{\text{old}}(\text{ C} \ \& \ \text{ gets well } | \text{ God } ) \not> p_{\text{old}}(\text{ C} \ \& \ \text{ gets well } | \text{ no God } )$$

This point applies more generally to cases where the avoidance of some very bad outcome is unlikely: a home survives a killer tornado, a family survives a car accident. But even if our priors are such that the outcome supports theism when we *hold fixed the conditions that make the good outcome unlikely*, the outcome may not support theism when we do not hold those conditions fixed. When we ask whether theism *predicts those very conditions*, we may find that taking all our evidence into account does not support theism after all.

Here is an example that more closely fits Fragility. Suppose again that I was conceived during my parents' first year together— but this time there was no coin toss. Instead, I am trying to assess whether my parents used a fertility drug during their first year (Drug). I do this by integrating a hypothetical prior about their using such a drug with the old evidence of the fact that they got pregnant.<sup>2</sup> But I can tell that Life will support Drug without actually having to assess the value of  $p^*(\text{Drug})$ , as long as I know that:

$$G1. p^*(\text{Life} | \text{Drug}) > p^*(\text{Life} | \text{no Drug}).$$

This is just an application of principle about likelihoods we encountered earlier (PL).

Now for the interesting part. Consider a variation on this story:

a) I now learn that, completely unknown to them, my parents had a very rare condition that makes the likelihood of their conceiving unaided extremely low. But this condition is reversed completely by the fertility drug: if they had been taking a fertility drug, they would be just as likely to conceive as any other couple taking that drug.

In this case it seems clear that this new fact should make me even more confident that my parents took fertility drugs. And it might be tempting to think that this is because, whatever the disparity in G1, it is even greater in G2:

$$G2. p^*(\text{Life} | \text{Condition} \ \& \ \text{Drug}) > p^*(\text{Life} | \text{Condition} \ \& \ \text{no Drug}).$$

But this greater disparity is not by itself sufficient to reach that conclusion. Consider a second variation on the story:

b) I now learn that my parents took birth control all through their first year together. But the birth control would be reversed completely if they also took a fertility drug: indeed, they would be just as likely to conceive as any other couple taking that drug.

In this case, again, the new information makes the emergence of unaided life less likely. And treating this fact as background knowledge makes the difference between the probability of getting pregnant with and without the

---

<sup>2</sup> So letting 'Life' refer to the fact that they created me during their first year:

$$p_{\text{new}}(\text{Drug}) = \frac{p^*(\text{Drug}) p^*(\text{Life} | \text{Drug})}{p^*(\text{Drug}) p^*(\text{Life} | \text{Drug}) + p^*(\sim\text{Drug}) p^*(\text{Life} | \sim\text{Drug})}$$

drug much more dramatic than before taking it into account. That is, the analog of Greater Disparity holds as well—the disparity in G3 is greater than that in G1:

$$G2. p^*(\text{Life} \mid \text{Birth Control} \ \& \ \text{Drug}) > p^*(\text{Life} \mid \text{Birth Control} \ \& \ \text{no Drug}).$$

But learning Birth Control may well not make me more confident in Drug! Indeed, it may actually constitute evidence *against* Drug. This is because the prior for Drug|Birth Control seems much lower than the baseline prior probability of Drug. After all, who takes fertility drugs and birth control at the same time?<sup>3</sup>

This shows that we can't simply shove the relevant life-obstructing fact into the background and ask about its effects on the probability of Life. In order to find out whether X supports Drug beyond the degree that Life already did, we also need to assess whether there is a greater differential between

$$p^*(\text{Life} \ \& \ \text{X} \mid \text{Drug}) \text{ and } p^*(\text{Life} \ \& \ \text{X} \mid \text{no Drug})$$

than there is between between

$$p^*(\text{Life} \mid \text{Drug}) \text{ and } p^*(\text{Life} \mid \text{no Drug})$$

And, in particular, if  $p^*(\text{BC} \mid \text{Drug})$  is low enough, this will counteract the fact that  $p^*(\text{Life} \ \& \ \text{BC} \mid \text{no Drug})$  is very low.

For the same reason, when reasoning about fine-tuning, we can't just shove Fragility in the background and ask about its effects on the probability of Life. What we really need to assess is:

$$p^*(\text{God} \mid \text{Life} \ \& \ \text{Fragility}) \text{ vs. } p^*(\text{God} \mid \text{Life})$$

In other words, the question is how much evidence we get for God upon learning Life & Fragility together, relative to our hypothetical ur-priors. And then we need to compare that to how much evidence we'd get for God upon learning Life (without learning Fragility). Using Bayes's theorem, we can flesh the first of these out as:

$$\frac{p^*(\text{God}) \ p^*(\text{Fragility} \ \& \ \text{Life} \mid \text{God})}{p^*(\text{God}) \ p^*(\text{Fragility} \ \& \ \text{Life} \mid \text{God}) + p^*(\text{no God}) \ p^*(\text{Fragility} \ \& \ \text{Life} \mid \text{no God})}$$

Now, how to evaluate  $p^*(\text{Fragility} \ \& \ \text{Life} \mid \text{God})$ ? Assuming that we can expect God to create life with certainty, it's equivalent to  $p^*(\text{Fragility} \mid \text{God}) \times p^*(\text{Life} \mid \text{Fragility} \ \& \ \text{God})$ . And here's the rub. From the point of view of ur-priors, how likely is Fragility given that God exists? The answer to this depends on our expectations about the kind of universe God is likely to create; we will turn to that in a moment.

---

<sup>3</sup> In contrast, because the medication condition in the first variation was completely unknown to them, the probability of my parents taking fertility drugs in their first year given that they had such a condition should match the baseline probability that they would take fertility drugs in their first year together.

## 2. How probable is Life | God, hypothetically?

But first— what about that assumption that God would create Life with certainty? The type of life we have been considering, which is unlikely given no God and Fragility, is *biological life*. It is in fact not obvious why God would create biological life, even assuming the preference for ‘fellowship’ built into the standard theistic picture. After all, it is given theism, minds can be entirely immaterial, so no physical universe is necessary— and even given a physical manifestation of minds, the psychophysical laws could presumably have been far more lax. (See Sinhababu, forthcoming). They might also have avoided the destruction of personality through physical deterioration, such as Alzheimer’s, but let’s pack that evidence in with the Problem of Evil.) So what is the prior probability that God would create biological life? O

One might argue that this is the sort of value for which we can offer no reasonable assessment, if one were at all adverse to divine psychologizing. Converging with strains of apophaticism in Judeo-Christian traditions, some ‘skeptical theists’ have argued that suffering (in its actual magnitude and distribution) provides no evidence against theism, because we are not in a position to assign a value to the probability of that suffering given God (e.g. Bergmann 2009; see also also Van Inwagen 1995, Wykstra 1984, Bergman 2001, and Craig in various debates). On this view, we simply do not know what to expect from a divinely created world when it comes to the magnitude and distribution of evil. For some, this is because we should not trust our modal intuitions at all when it comes to such out-of-the-ordinary things as counterfactuals about divine action; others call for modesty in particular about our insight into the workings of the divine mind.

Given this, one might wonder whether we should be at all confident about probability judgments for  $p^*(\text{Life} | \text{God})$ . If this is the case, of course, the Fine-Tuning Argument will collapse because  $p^*(\text{Fragility} \ \& \ \text{Life} | \text{God})$  is undefined. But this option is not open to theistic evidentialists who wish to use anything like Bayesian reasoning to update on the evidence we encounter. Note also that skeptical theists of the sort just discussed should find it difficult to mount evidential arguments of this sort in favor of theism, precisely because values to things like  $p^*(\text{Life} | \text{God})$  seems to require just the sort of speculation about divine psychology that they eschew in assigning a value to  $p^*(\text{Actual Suffering} | \text{God})$ .

## 2. How probable is Fragility, hypothetically?

We will turn in a moment to the question of how to assign values to  $p^*(\text{Fragility} | \text{God})$ . But before we consider the various options, let’s ask what we should expect about Fragility independently of theism.

When we learned Fragility, it was considered to be an unexpected discovery. Presumably the thought was that, before knowing how finicky these parameters



are for life, we'd expect them to have been not particularly finicky. We expected to find ourselves in a universe whose parameters were more friendly towards life— even resiliently friendly, where many nearby possibilities still contain life. (If we are in the business of modeling things in terms of ur-priors, it's natural to understand this intuition as based on the idea that Life|Fragility is much lower than Life. From this it follows that, what ever the ur-prior for Fragility ( $<0$ ), taking Life into account should decrease our expectation of discovering Fragility.)

Instead, we are told, we find ourselves on a kind of knife's edge with no life in the vast majority of the 'close' possibilities that would have arisen had the initial parameters or conditions been every so slightly different.

Imagine the space of possibilities for our laws and constants, with an axis for every factor we are treating as variable. There are regions that are friendly towards life, and regions that are more hostile. In a sense of 'more' tied to epistemic probability, there are *more* possibilities with life in the friendly regions than in the hostile regions. So, by treating ourselves as a kind of random sample among observers from this possibility space, we would naturally assume that we'd find ourselves in a friendlier region.

According to Fragility, the probability of arriving at a universe with life, given some random slight change to a parameter in our extremely finicky universe, is extremely tiny. In this probabilistic sense of 'many', there are not many ways a universe could be with parameters like ours and still give rise to life.<sup>4</sup> At the other end of the spectrum are universes where even 'big' changes to a given parameter will still very often give rise to life. Had the universe turned out to be like that, there would be *lots* of possibilities in which very similar universes have slightly different parameters but life still arises.

How finicky exactly does a universe need to be about life to count as having fragile parameters? Well, for purposes of illustration let's say that a universe  $u$  is fragile simpliciter if the probability that a given universe set up very much like  $u$  (i.e. by changing a parameter 'slightly') is at most one in a million. We can then define a million hypotheses, one for each precise degree of fragility, as follows:

D<sub>1</sub>: the parameters are fragile to degree  $d$  where  $d < .000001$

---

<sup>4</sup> Let me be clear that by cashing out the sort of evidence provided by models that tweak parameters in terms of the probability of a given universe giving rise to life, I am simply following the strategy of the proponents of the Fine-Tuning Argument. There are, of course, issues about how to interpret this kind of talk. (In particular: how can we even begin to provide a measure over the various ways the universe might have been with very different laws?) The Fine-Tuning argument itself assumes a measure of possible universes that offers a meaningful comparison of expectations for life given Fragility and  $\sim$ Fragility: the idea being that a *given universe* with parameters like ours is very *unlikely* to have life in it, because *very small changes* in our parameters would produce *mostly* universes without life.

D<sub>2</sub>: the parameters are fragile to degree  $d$  where  $.000001 < d < .000002$

...

D<sub>1,000,000</sub>: the parameters are fragile to degree  $d$  where  $.999999 < d < 1$

Here D<sub>1</sub> = Fragility. With this in hand as a toy model one might treat the ur-prior for each of these hypotheses, without taking Life into account, as one in a million.

But discovering D<sub>1</sub> was supposed to be particularly unexpected. This is because, when we take Life into account, we find ourselves favoring the more fertile hypotheses. The fact that D<sub>1</sub> is particularly surprising encodes the idea that hypotheses lower on the scale are less likely given our knowledge of life—precisely because the ur-prior for Life & D<sub>n</sub> is lower for lower values of  $n$ . And so our prior expectation for (D<sub>1</sub> | Life) would be much lower than one in a million.<sup>5</sup>

### 3. The divine selection function

We come now to views about what kind of universe to expect if theism is true.

a) *We can have no reasonable expectations about how fragile a universe God would create.*

The ‘skeptical theist’ approach is at least as tempting here as it is in the case of  $p^*(\text{Life} | \text{God})$ . If one has any proclivities against divine psychologizing, the question of how God would go about picking among various degrees of fragility for the universe seems just the sort of thing one would be hesitant to assign any priors to. Combining the hypotheses Life&Fragility simply compounds the effects of any such modesty in the face of the divine mind. But without a reasonable prior for  $p^*(\text{Fragility} \ \& \ \text{Life} | \text{God})$ , no Bayesian Fine-Tuning argument can get off the ground.

b) *Our expectations of God are indifferent across ways of creating a life-bearing universe.*

Suppose we set aside such skepticism and boldly make conjectures about what God might do. As we saw in section 2 above, there are more ways the universe could contain life in ‘friendly’ regions of possibility space. If God is going to create a universe with life, he is in effect selecting from the possible ways for the universe to contain life. If there are more such ways in friendly regions, it seems natural to think it’s more likely that God would pick a universe from those regions. On this approach, the prior probability of D<sub>1</sub> | God is less than the prior probability of D<sub>2</sub> | God and so on. And in particular the prior

---

<sup>5</sup> There are a million segments in the partition, and in segment D<sub>1</sub> only 1 in a million ways the universe could have been are fertile. In the others, on average, half are fertile. Treating each fertile ‘way’ as having equal prior probability given Life,  $p^*(\text{D}_1 | \text{Life})$  is 1 in  $5 \times 10^{11}$ .

probability of  $D_1 | \text{God}$  is far less than one in a million, and is lower the more impressively fragile one takes our universe to be.

In fact, in our toy model,  $p^*(\text{Fragility} | \text{Life} \ \& \ \text{God})$  is 1 in half a trillion, but so is  $p^*(\text{Fragility} | \text{Life} \ \& \ \text{no God})$ . And this shows very quickly that Fragility won't be evidence for the existence of God after we've taking Life into account. In other words, however much evidence we got for God (relative to our ur-priors) upon taking into account the existence of life, we get no more evidence when we learn Fragility.

[Here is another way to see this. Suppose we assigned 1 to  $p^*(\text{Life} | \text{God})$  and  $1/100$  to there being any universe at all given no God. Then when we learn Life by itself, this gives us a posterior for God of:

$$\frac{p^*(\text{God}) p^*(\text{Life} | \text{God})}{p^*(\text{God}) p^*(\text{Life} | \text{God}) + p^*(\text{no God}) p^*(\text{Life} | \text{no God})}$$

On our model of the ur-space of possibilities for universes,  $(\text{Life} | \text{no God})$  is .005. (Given no God, we have a hypothetical prior of .01 that there's any universe at all, and a prior of .5 that a given universe would have life in it.) So where  $p^*(\text{God}) = n$  the equation above gives us the following values:

$$\frac{n \times 1}{n \times 1 + (1 - n) \times .005}$$

As expected, given our model, this means that Life pretty strongly supports God even in the absence of Fragility. Of course, whether it pushes the posterior for God past .5 hangs on the value of  $n$ .

Now, when we consider  $p^*(\text{Fragility} \ \& \ \text{Life} | \text{God})$  and  $p^*(\text{Fragility} \ \& \ \text{Life} | \text{no God})$  respectively in place of  $p^*(\text{Life} | \text{God})$  and  $p^*(\text{Life} | \text{no God})$ , all that happens is that the numerator and denominator get divided by half a trillion—and that number cancels out.

$$\frac{n \times \frac{1}{.5 \times 10^{12}}}{n \times \frac{1}{.5 \times 10^{12}} + (1 - n) \times \frac{1}{10^{14}}}$$

$p^*(\text{Fragility} \ \& \ \text{Life} | \text{God})$  is equivalent to  $p^*(\text{Life} | \text{God}) \times p^*(\text{Fragility} | \text{Life} \ \& \ \text{God})$ , which on our model are 1 and 1 in half a trillion. Meanwhile  $p^*(\text{Fragility} \ \& \ \text{Life} | \text{no God})$  is equivalent to  $p^*(\text{Fragility} | \text{no God}) \times p^*(\text{Life} | \text{Fragility} \ \& \ \text{no God})$ . We have assigned a probability of .01 to there being a universe at all, and a function that is indifferent across the ways for a universe to be would yield one in a hundred million for  $p^*(\text{Fragility} | \text{no God})$ . Given Fragility and no God, the probability of life is 1 in a million in our model, giving us 1 in a hundred trillion.]

c) *Our expectations of God are indifferent across degrees of fragility.*

One might instead partition God's options differently— for example, God might be indifferent across the ranges of  $d$  given above. In that case we might treat the probability of the universe being fragile, given that God decides to create a universe with life, as merely one in a million. Meanwhile the probability of Fragility given Life and no God will still be far lower—so on this way of distributing credences over God's options, Fragility significantly supports God beyond the degree to which Life does.

But, suppose that instead of Fragility we had discovered:

**Resilience:** The relevant parameters are set up so that the universe would produce life even for pretty large changes to the values of a given parameter.

Suppose in fact that the parameters are *far* more resilient than we would have expected given our ur-priors. If our expectations of God are really indifferent across degrees of fragility, it would follow that Resilience is evidence *against* God. After all, given atheism, the fact that we exist is evidence that the parameters are not fragile. But given theism we should expect life no matter how fragile the parameters are, and on the present view we should be indifferent across degrees of fragility. So the evidence that the relevant parameters are resilient would be more predicted by atheism.<sup>6</sup>

At this point it is critical for theists to consider how they would really treat the discovery that the universe is far more resilient for the emergence of life than we would have predicted. It does not take much imagination to recognize that many would not only reject the conclusion that this is evidence against the existence of God, but they would treat this as evidence *for* the existence of God. The scientists tell us that they are blown away: no matter how they tweak these parameters, they still get life arising in their models. It's almost as though the functional structure of the universe were set up to resiliently favor the emergence of life! If this would not have been evidence against the existence of God, this should give us pause. <sup>7</sup> Because after all, it is the *opposite* evidence from Fragility!

---

<sup>6</sup> Likewise, one of the facts that Craig sometimes points to as evidence for theism is the low probability of the evolution of highly intelligent life given the emergence of the first self-replicating organism. But suppose instead we had run models of mutation and natural selection and discovered that:

**Resilient Evolution:** The initial conditions of evolution were somehow structured so that the probability of highly intelligent life is essentially guaranteed.

That is, the initial conditions are apparently amazingly rigged so that conscious life is inevitable— would this have been recognized as evidence *against* the existence of God — or construed as further evidence *for* the existence of God?

<sup>7</sup> For example, John Polkinghorne preemptively responds to the potential discovery of a Grand Unified Theory that gives rise to many universes: “That possibility itself requires that the laws of nature (now referring to the Grand Unified Theory thought to lie behind presently observed forces) would have had to take a particular form. One anthropic condition has been replaced by another. There is, it seems to me, bound to be something specifically necessary to provide the basis of fertility. The universe does not have *a priori* to... provide all that was necessary for life's evolution.” (86). In other words, whatever set of conditions would give rise to life, they would look pretty specific and unlikely *a priori*. But now we are back to  $p^*(\text{Life} | \text{no God})$  and Fragility is out of the picture. Polkinghorne is not clear whether he'd admit that  $\sim\text{Fragility}$  is evidence against God.

This seems quite bad. But there is a way out for the proponent of the Fine-Tuning Argument.

*d) We expect God to have a preference for fragile universes—and also perhaps resilient universes—for signaling reasons*

Perhaps God is more likely to create a universe whose parameters are balanced on a knife's edge than a universe that met our expectations for Fragility, precisely in order to provide us with evidence of God's existence. This is also consistent with the idea that God is likely to create a universe that is far more *resilient* for life than we would have expected— again as a kind of sign to us.

Three points are worth noting about this idea.

First, God would presumably only use Fragility as a sign if it were reasonable for us to treat it as one. But *is* it reasonable for us to treat it as one? If so, why? We cannot simply appeal to the claim that Fragility counts as evidence for the existence of God, since that itself depends on our expectations for the Divine Selection Function.<sup>8</sup> In contrast, if tomorrow God clearly shaped the perceived stars into a message that read 'John 3:16', it would be right to take this as a sign because there is an independent convention about the significance of those shapes.

Second, even if it is reasonable for us to treat Fragility as the sort of thing God might use as a sign, we must ask after the prior probability that God would use this in particular as a sign. Consider this example. It has sometimes been argued that we should take the fact that the moon and sun appear to be very nearly the same size as viewed from the earth to be a sign of God.<sup>9</sup> But even supposing it would be reasonable for us to take the apparent match between the sizes of the sun and moon as a sign, it doesn't follow that that  $p^*(\text{Match} \mid \text{God}) > p(\text{Match} \mid \text{no God})$ . Given that God gives very few signs, we

---

<sup>8</sup> If our reason is that God would take us to reasonably treat it as a sign, we seem to be faced with a vicious circle in which each of the following is justified by the next, and the last by the first:

1. It is reasonable for us to treat Fragility as a sign, because
2. It is the sort of thing God would use as a sign, because
3. God knows it is reasonable for us to treat it as a sign, because...

One might say that Fragility is 'specified' because it is the sort of thing that one might unthinkingly treat as a sign— and given common knowledge of this by us and God, the reasonableness of the interpretation and the aptness of the use of Fragility can arise together with no vicious circularity. This might be true; but the reliance of this whole process on the reactions of those who would simplemindedly treat Fragility as a sign seems especially implausible in the context of a sign whose discovery involves highly esoteric theorizing.

<sup>9</sup> Sources on the ground are easy to find: e.g. [http://www.arguingwithatheists.com/pages/Vital\\_Moon.htm](http://www.arguingwithatheists.com/pages/Vital_Moon.htm)

must also ask about the probability that God would use this, in particular, as a sign. It should be something like:

$$\frac{\textit{number of signs we would expect}}{\textit{number of things God could do as a sign}}$$

This does not seem very promising. What certainly *does* get supported by the sun-moon confluence is the very specific hypothesis that God is the sort of God who prefers to give precisely this sort of sign. But the prior on *that* specific hypothesis is presumably tiny.

This leads us to the third point. The idea that God would be likely to publicly self-reveal in precisely this way (and few others) involves a highly specific hypothesis about the ways in which God prefers to self-reveal. It is not as though the world does not provide more straightforward opportunities to do so. And the kind of evidence at issue is a highly theoretical fact on which even experts feel they have a very tenuous grip. It's extremely *recherché*, available only through the conjectures of theoretical physics combined with difficult philosophical ideas.

The hypothesis that God does indeed prefer to self-reveal in just this way (as opposed to various other options) can appear plausible in retrospect, but we must tread with caution. It is important to avoid the pitfall of adjusting the details of the theistic hypothesis as necessary when we encounter relevant evidence. We can replace the God hypothesis with the more specific hypothesis God\*, which builds in facts about divine psychology on which he would prefer to self-reveal by creating a fragile universe. But we need to make a fair corresponding adjustment to the prior probability of the theistic hypothesis. In short, we need to avoid:

**Retconning:** Modifying a hypothesis to predict some piece of evidence without a correspondingly adequate reduction of the prior probability<sup>10</sup>

As we will see in the next section, it is both easy to retcon without knowing it, and easy to charge an opponent with retconning. But it is hard to make the charge stick.

It is critical to recall that for *every* speculation about how God might communicate through signs, there is a corresponding hypothesis that specifies that God is likely to communicate in that way. And taking all of our evidence into account, we are constantly getting evidence for some of these hypotheses and against others. For every event that might have yielded a miraculous coincidence but did not, we get evidence against the very specific view that God is likely to use *that* event as a sign. We also have a cumulative case against the hypothesis that God prefers to self-reveal to everyone in unmistakable ways. When we rule out these hypotheses and renormalize as required by the

---

<sup>10</sup> Thanks to Jonathan Weisberg for suggesting the name.

updating rule, *every* hypothesis that survives becomes more probable. If I don't hear God speaking out of the sky, but my toaster leaves a Jesus-like image on a slice slice of bread, these experiences provide evidence in the existence of a God who prefers to send signs through toast. But it does not follow that the toast supports theism more generally.

Midway between general theism and very specific hypotheses about moons and toast is the theory that God prefers to self-reveal in cryptic ways. Because of its generality, this hypothesis will have a higher prior probability than its more specific variants. But on the other hand it will less strongly predict the particular coincidence at hand rather than another. Otherwise we would be getting a constant barrage of evidence for such a deity from *every* highly unlikely event that occurs. But that's absurd. We must consider all the missed opportunities for cryptic self-revelation and ask ourselves whether the proportion of strange coincidences to other events is greater or less than we would have expected given the non-existence of any deity. Even in a world devoid of divine signs we should expect to experience many coincidences that trigger our apophenia. If we think God self-reveals in cryptic ways about as often as we would expect strange coincidences anyway, we should wonder why *genuine* coincidences never occur!<sup>11</sup>

### III. No Retconning!

We have seen that a fine-tuning argument requires assigning values to priors about the probability of Life and Fragility given God and no God, where these values are not literally our prior credences. To do so we must, as it were, set aside our knowledge of Life and try to arrive at hypothetical expectations by bringing to bear the same epistemic ideals and proclivities that guide our actual expectations. And I have argued that this sort of thing is unavoidable because of the problem of old evidence. But it also makes us especially susceptible to the epistemic sin of retconning, a Bayesian diagnosis for what we think of as ad hoc hypothesis modification. Retconning is pervasive, and indeed I think it's the best Bayesian explanation for why scientists prefer prospective studies.<sup>12</sup>

---

<sup>11</sup> Compare the practice of interpreting all highly unlikely recoveries from disease as matters of divine intervention (though not all highly unlikely onsets of disease).

<sup>12</sup> Suppose researchers find no effect of a drug on subjects with liver cancer. They then analyze 20 subgroups, and find one for which the drug's effects are stat sig. It might be 'men named Bob', or 'people with cirrhosis of the liver'. Regardless of the plausibility of the hypothesis that the drug works only for this subgroup, a further prospective study would be required for FDA compliance. After all, we should *expect* this much data-mining to find one such subgroup. For a Bayesian, the solution is that a low p-value does not guarantee plausibility. Realistic priors for each subgroup would yield very low priors for most, and would differentiate the 'Bob' and 'cirrhosis' subgroups. But in this kind of setting, priors are too hard to quantify and too easy to manipulate, so the system uses the cost of prospective studies as a kind of proxy for high priors.

Here is what I mean by *retconning*, more formally than before,

**Retconning:** For some general hypothesis  $H$  and a more specific hypothesis  $H^*$  that better predicts evidence  $E$ , treat the relevant prior as  $p(H)$  and the relevant likelihood as  $p(E|H^*)$ . Then blur the distinction between  $H$  and  $H^*$  when stating the outcome.

## 1. Ad hocery

*Example 1.* A classic example of ad hoc modification is that of Galileo's opponent, Lodovico delle Colombe, who held to the traditional view that the moon was perfectly spherical and resisted Galileo's evidence to the contrary:

Constrained to allow the evidence of the sensible inequalities of the moon's surface, [he] attempted to reconcile the old doctrine with the new observations, by asserting, that every part of the moon, which to the terrestrial observer appeared hollow and sunken, was in fact entirely and exactly filled up with a clear crystal substance, perfectly imperceptible by the senses, which restored to the moon her accurately spherical and smooth surface.<sup>13</sup>

Colombo's hypothesis is, of course, just as consistent with Galileo's evidence as the hypothesis that the moon's surface is irregular.

It is, of course, 'post hoc' in the sense of being developed after the relevant evidence, and 'ad hoc' in the sense of being crafted specifically to explain the evidence. But theory of natural selection is 'ad hoc' in this sense, as is the big bang theory and practically every historical hypothesis. In such cases, we were not in a position to form a hypothesis prior to being aware of (at least some of) the relevant evidence. We have an old evidence problem, so we need to craft hypotheses and ask how well they predict the evidence using something like hypothetical priors. So what is the problem, in particular, with Colombe's ad hoc modification?

I think the answer is this. The hypothesis is intrinsically implausible, but Colombe failed to see this because he was not forced to consider the full range of related hypotheses. He came up with a single hypothesis that explained the evidence and treated it as though it were as plausible as the simple and general hypothesis that the moon is spherical—or perhaps as plausible as the moderately simple hypothesis that the moon has a covering surface of some kind. But in fact his hypothesis was *far* more specific than either of these. It therefore cannot 'inherit' the high prior probability of the hypothesis that the moon is spherical, just because it is the only version of that hypothesis that is consistent with the evidence. Proper updating requires renormalizing proportionally over all hypotheses that are not ruled out by the evidence.

In a Bayesian framework, Colombe's reasoning can be modeled as follows. First, the hypothesis that the moon is spherical has high prior probability. From

---

<sup>13</sup> "Galileo met the argument in the manner most fitting, according to one of Aristotle's own maxims, that "it is foolish to refute absurd opinions with too much curiosity.'" (Bethune 106)



Galileo's evidence, we learn that if the moon is spherical, it must be covered in invisible crystal. And this hypothesis is perfectly consistent with Galileo's evidence; indeed  $p^*(\text{Evidence}|\text{Spherical})$  is just as high as  $p^*(\text{Evidence}|\text{not Spherical})$ . But pretty obviously this is playing a shell game between two hypotheses. For purposes of evaluating its prior probability, we consider the simple hypothesis that the moon is spherical. But when evaluating the likelihood of the evidence, we consider a much more complex hypothesis.

While there is nothing magical about assigning priors before encountering the relevant evidence, it does keep one from playing this shell-game (whether knowingly or not.) If Colombe had been forced to assign priors to the various more specific ways in which the moon could have turned out to be spherical, he would have been forced to recognize how low a prior credence his crazy hypothesis deserved. In addition to the two simple hypotheses that the moon has an uncovered spherical or irregular opaque surface, there are *many* hypotheses in which it is covered with yet another surface, one for every way of combining these variables:<sup>14</sup>

1. the underlying surface is a) spherical b) irregular
2. the covering surface is a) spherical b) irregular
3. the covering surface is made of a) liquid b) ice c) crystal d) etc...
4. the covering surface is a) opaque c) translucent d) imperceptible

This way of carving the options treats the perfect sphere as special shape rather than one out of very many nearly-spherical shapes, the rest of which are irregular. Even still—and even setting aside particularly implausible cases like a surface of imperceptible cheese—we still get dozens of ‘covering-surface’ hypotheses.

Faced with all these hypotheses, it seems crazy to assign much prior credence to the combination **b-a-c-d** in particular, however much credence one might assign to the general covering-surface hypothesis. But since Colombe tailored his hypothesis to Galileo's evidence, he probably did not even *consider* the other options. Even if he did, it would have been hard for him in retrospect to avoid the illusion that **b-a-c-d** stands out as especially plausible. So **b-a-c-d** illicitly soaked in much of the prior probability that he otherwise would have had to distribute among the other hypotheses.

This is *defensive retconning*—in defending a general hypothesis H, it uses a shell game between the prior probability of H, and the likelihood of the evidence given a much more specific hypothesis H\*.

---

<sup>14</sup> As Galileo mocked: “I am perfectly ready to believe [your theory] provided that with equal courtesy, I may be allowed to raise upon your smooth surface, crystal mountains (which nobody can perceive) ten times higher than those which I have actually seen and measured” (Bethune 106).

*Example 2.* Whatever our priors for ESP, we surely get further evidence against it when those who claim to have ESP repeatedly fail to prove that they do when placed under experimental conditions. A common reply is that there may be a factor that makes ESP fail to operate under experimental conditions. If *that* were true, we'd expect exactly the evidence we get! The experiments don't provide evidence against that hypothesis, so they don't provide evidence against ESP!

This is defensive retconning again. It's true that this specific hypothesis—that ESP is real but only works under 'friendly conditions'—perfectly predicts the evidence. And it's strongly confirmed by the experiments! When we rule out that ESP is both real and works under experimental conditions, we are obliged to renormalize and increase our credence *both* in the hypothesis that ESP is not real *and* in the hypothesis that ESP only works under friendly conditions. But on any reasonable assignment of priors, the former hypothesis had a much larger share of one's epistemic space to begin with. And since renormalization involves increasing the probability of the surviving hypotheses *proportionally*, the experiments *do* disconfirm ESP.

The easiest way to see that the defense of ESP is illegitimate is to notice that the opposite outcome—the experiments indicate ESP is real!—would surely have constituted evidence *for* ESP. But if that's true, there's no escaping that the negative finding is evidence *against* ESP. The principle PL actually has a corollary—if it's good for the goose, its negation is bad for the goose!

**Goose:** If  $p_{\text{old}}(E | H) > p_{\text{old}}(E | \sim H)$ , then E supports H *and*  $\sim E$  supports  $\sim H$ .

*Example 3.* Suppose my prior that a particular lottery will be rigged is 1 in a hundred. Then a perfectly ordinary person named Jones wins the lottery. I have no special reason to think there's foul play. Still, the fact that Jones won is quite a lot of evidence that the lottery was rigged for Jones. After all,  $p_{\text{old}}(\text{Jones wins} | \text{Rigged for Jones})$  is much higher than  $p_{\text{old}}(\text{Jones wins} | \text{Fair lottery})$ ! Let's say it's a million times higher. Given this much evidence that the lottery was rigged for Jones, and with only a one in a hundred prior probability against the lottery being rigged, shouldn't I at least increase my credence that the lottery was rigged?

This is *offensive retconning*—in arguing for a general hypothesis H, it uses a shell game between the prior probability H, and the likelihood of the evidence given a much more *specific* hypothesis H\*. Jones's winning very strongly supports (Rigged for Jones). Indeed with a million participants in the lottery, my credence that the lottery is rigged for Jones goes up by a factor of a million. But it does this entirely by ruling out all the other rigged-for-X hypotheses. After all my prior probability of Rigged for Jones was only *one in a hundred million*. Given my new evidence, it expands to the point where it completely fills the region of my epistemic space given over to Rigged—namely one percent of it. I get zero evidence for Rigged.

## 2. Some theistic examples

From a Bayesian point of view, it should make no difference in principle whether a hypothesis was specified as the purpose of the study in advance. This is true in an ideal setting. But psychologically, constructing hypothetical priors in retrospect can make certain hypotheses far more salient because they are still live options, and make it too easy to forget about the options that are no longer live.

Inevitably, something similar will happen when we try to assign values to  $p^*(X | \text{God})$  even though we already know that  $X$  is true.

*Example 1.* Consider this exchange about the problem of evil.

A: Surely the magnitude and apparently capricious distribution of suffering is evidence against the existence of God.

B: But if there were a God who has good reasons to allow this very magnitude and distribution of suffering, then we would expect to experience exactly what we do experience! You don't get evidence against that hypothesis, so you don't get evidence against the existence of God!

This is obviously defensive retconning again. The point only holds if in advance one were certain that God *would* have good reasons to allow this very magnitude and distribution of evil. Everything hinges, of course, on the prior probability of that hypothesis given the more general God hypothesis.

*Example 2:*

A: Among the things that constitute at least *some* evidence against the existence of God is the fact that species came into being through evolution. The vast majority of hundreds of millions of species have come and gone, and the whole process requires for its very success the birth of too many young, and the death of less fit siblings by hunger, cold, predators and disease before they propagate. What's surprising given theism is the "tremendous wastefulness of it, the tremendous cruelty of it, the tremendous caprice of it, the tremendous tinkering and incompetence of it" (Hitchens).

B: Not at all! "The theory of biological evolution is simply irrelevant to the truth of Christian theism" because theism is perfectly consistent with evolution (Craig, Hitchens debate). We have simply learned from evolutionary biology that God chose to create life slowly and deliberately. Being eternal, it's not as though God was in a hurry.

A: 'Consistent' is not a useful word when we are dealing with probabilities between 0 and 1. The question is: to what degree would we have expected to discover something like evolution, given theism? And to what degree would we have expected it, given atheism? It seems to me that given

atheism something like evolution pretty much *had* to be the case, at least once we knew that biological life has not been around forever. Not so for theism.

B: But there is a *version* of theism, one on which God prefers to create slowly and deliberately, on which we would expect something like evolution to be the case. Evolution is no evidence at all against such a version of theism. Therefore evolution is no evidence at all against theism.

A: That's *retconning*. Your 'therefore' only follows if we could be sure in advance that God would create slowly and deliberately— that is if  $p^*(\text{Slow God} | \text{God})$  was certainty.

B: Well, I find it quite plausible that God would create slowly. There's no special reason to think God would create instantaneously.

A: But the hypothetical probability that God would create like this can't be *too* high. After all, if paleontologists had discovered that all living species popped into existence simultaneously and fully formed, *surely* that would have been evidence for the existence of God. But it would *not* have been evidence for the existence of God if in advance we were pretty sure God would create slowly and deliberately. If discovering sudden emergence of species supports theism, then discovering gradual emergence of species supports atheism— by the goose principle.

B: Ok, but none of this shows that evolution is anything more than *minimal* evidence against theism.

A: That's why I said "at least *some*"!

*Example 3:* This is from a discussion between Tim Maudlin and Gary Gutting in *The New York Times*' blog 'The Stone'.

TM: No one looking at the vast extent of the universe and the completely random location of homo sapiens within it (in both space and time) could seriously maintain that the whole thing was intentionally created for us...

GG: I don't see why the extent of the universe and our nonprivileged spatio-temporal position within it says anything about whether we have some special role in the universe.

Notice that both Maudlin and Gutting are being pretty unclear about the *stakes* — exactly how much or little evidence they are claiming is at issue. Maudlin's remark suggests that he thinks our location in the universe is *extremely strong* evidence against theism. And Gutting says he doesn't see why our location in the universe 'says anything about whether we have some special role', suggesting that he thinks it is *no evidence at all*. Gutting goes on:

GG: I think we need to distinguish different sorts of theism. There are versions of theism that, like a literal reading of Genesis, are inconsistent with what we know about cosmology. But there are also versions that don't require any specific story about the extent of the physical universe or our location in it. For example, there's a basic theism that merely asserts that there's an intelligent being that created the entire universe. It says nothing about what the purpose of God's creation was, beyond simply making a universe. So I don't see why every version of theism is refuted by scientific cosmology.

This is *retconning*— at least taken as an argument that the relevant evidence does not ‘say anything at all’ about theism in the sense of not providing any evidence one way or the other. The fact that there are ‘versions of theism’ that predict our cosmological evidence is irrelevant. The question is about how that evidence bears on theism in general.

To see the point, suppose that what C.S. Lewis calls the ‘discarded image’, the cosmological picture of late antiquity and of the first millennium of Christendom, had been borne out by scientific inquiry. On this picture all the heavenly bodies revolving around the Earth, the most distant being the stellatum, a great black and star-studded sphere concentric with the Earth. The whole thing resembles a kind of mechanical Faberge Egg, and the cosmic significance of earthly life is embodied in its very structure. (At the same time, of course, the Aristotelian laws of physics entailed that all this motion would slow down and stop unless an unmoved mover were turning the crank.) Surely the truth of this cosmic picture would have been evidence for the existence of a Designer, relative to merely hypothetical priors. Indeed the assumption that it was true was widely taken by early theists to constitute such evidence.

But perhaps Gutting would want to deny that the early apologists were right to take our apparently privileged position as evidence for theism:

T.M.: Theism, as religious people typically hold it, does not merely state that some entity created the universe, but that the universe was created specifically with humans in mind as the most important part of creation. If we have any understanding at all of how an intelligent agent capable of creating the material universe would act if it had such an intention, we would say it would not create the huge structure we see, most of it completely irrelevant for life on Earth, with the Earth in such a seemingly random location, and with humans appearing only after a long and rather random course of evolution.

G.G.: Maybe, but that conclusion doesn’t follow from scientific cosmology; it’s based on further assumptions about what a creator would want — and how the creator would go about achieving it.

This suggests another possible move, namely the analog of skeptical theism for cosmological evidence. On this view we really have no good way to assign a value to  $p^*(\text{Vast empty spatiotemporal regions} | \text{God})$ . Given PL\*, this would require him to respond in the very same way to early Christian apologists using our privileged cosmic position as evidence for theism: that’s no evidence at all because we have no way to know what kind of universe to expect from God. It also precludes the use of anything like a Fine-Tuning Argument, since we would likewise have no way to assess  $p^*(\text{Fragility given} | \text{God})$ .

### 3. The upshot

If we are going to use the hypothetical Bayesian approach to assessing evidence for the existence of God, we must start by being very clear about what the God hypothesis amounts to, and how probable it makes various potential bits of evidence. In the case of Fragility—as well as those of evolution and cosmology— we are dealing with evidence that is neither strictly inconsistent

with nor strictly entailed by either atheism or theism. As a result there will trivially be God-hypotheses that the evidence supports, as well as God-hypotheses that the evidence undermines. And we cannot get away with avoiding the question how probable those more specific hypotheses are conditional on theism in general.

A good heuristic to avoid retconning with respect to some evidence E and hypothesis H is to ask how one would have treated the discovery that not-E. For example, a theist might ask how would she have reacted if it had been discovered that the universe was *not* fragile? Would I have said: well, it's far more likely to have been not-fragile if atheism were true, so it's evidence *against* the existence of God. Or would I have thought that there's no special reason to think God would have preferred fragility as opposed to being indifferent among ways of creating the universe? Would I perhaps have gone so far as to say we should be skeptical as to our ability to assign reasonable priors as to what God would have done? If the first, then for that set of hypothetical priors Fragility really is evidence for theism, even significant evidence.

At the same time we must also allow similar questions about other 'discoveries' about the universe—facts that must be updated on relative to whatever value we assign to  $p^*(\text{God})$  based purely on intrinsic theoretical virtues like simplicity and elegance. In particular just consider

*Evil*: the magnitude of suffering is unimaginably large; and it seems to be distributed entirely capriciously.

*Chaos*: the vast reaches of spacetime are empty and cold; life arose from billions of years of stunningly messy and apparently wasteful evolution.

Again, it is almost trivially true that there is *a version* of theism perfectly consistent with all of these facts. We have to eradicate our prior knowledge of these facts from the evaluation of  $p^*(X|\text{God})$ , lest that version of theism seem particularly plausible in advance because of its retrospective salience.

Here we can turn to the heuristic of asking ourselves what our reaction would have been if we discovered the negations of Evil and Chaos. Would the negations of these facts, if true, have been construed as neutral with respect to the question of whether God existed? Would apologists have taken the line that one can't reasonably assign any values to  $p^*(\text{Suffering}|\text{God})$  and  $p^*(\text{Chaos}|\text{God})$ , if the evidence had gone the other way?

Surely not. The negations of these facts—the truth of the Discarded Image—would rightly have been treated as evidence *for* the existence of God. Anyone who would have treated the negations of vil One especially contorted position would be the idea that, when it comes to  $X|\text{God}$ , we can't possibly assign a reasonable prior in the case of *Evil* and *Chaos*, but we can easily do so when it comes to *Fragility* | God. Consider Craig's response to the problem of evil in one of his debates:

[T]he atheist has to claim that if God did exist then it is improbable that he would permit the evil and suffering in the world. And how could the atheist possibly know that? How could the atheist know that God would not, if He existed, permit the evil and suffering in the world? ... So the atheist would have to show that there is a possible world that's feasible for God which God could've created that would have just as much salvation and eternal life and knowledge of God as the actual world but with less suffering. And how could the atheist prove such a thing? It's sheer speculation. So the problem is that, as an argument, the Problem of Evil makes probability judgements which are very, very ambitious and which we are simply not in a position to make with any kind of confidence." [from a debate with Hitchens].

Maybe this is right, we really should hold back from these sorts of probability judgments. We might also offer the following response to the fine-tuning argument (as offered by Craig, for example) along the very same lines:

Craig has to claim that if God did exist then God would have a certain preference distribution over how fragile the universe's parameters are. And how could Craig possibly know that? How could Craig know that God would not, if He existed, have no concern at all for how fragile the parameters are?... So Craig has to show that there is no possible world that's feasible for God which God could've created that would have just as much salvation and eternal life and knowledge of God as the actual world but with less fragile parameters. And how could Craig prove such a thing? It's sheer speculation. So the problem is that, as an argument, the Fine-Tuning Argument makes probability judgements which are very, very ambitious and which we are simply not in a position to make with any kind of confidence.

Now, there are some glaring problems with this argument, which I expect Craig would recognize immediately. Most obviously it confuses the reasonable assignment of credences with something like *knowledge of objective probability*. The result is a kind of burden shifting. Having a subjective conditional credence of N is quite a different matter from claiming knowledge that the objective probability of a conditional proposition is N! One isn't claiming to *know* anything about probability, does not have to *show* or *prove* anything about what would be the case in various counterfactual scenarios, and is not making 'very very ambitious' probability judgments.

So— let us agree that this is a bad response to the fine-tuning argument. To offer such an argument one needn't claim to *know* anything about what God would do. In assessing cosmic evidence for theism, there's no avoiding speculation about how probable various aspects of the world are, assuming theism and atheism. *Of course* this practice is speculative; we are after all dealing with subjective Bayesian probabilities assigned in the hypothetical absence of any evidence. Asking ourselves how likely the evidence is given competing hypotheses is really all we have to go on.

But, to be fair, all of these points apply to Craig's response to the probabilistic argument from evil as well. The atheist needn't claim to *know* that God would not permit such evil. She doesn't have to *show* or *prove* there's a possible world with just as much salvation but less suffering. Are her credence

assignments ‘just speculation’? ‘Very very ambitious probability judgments?’ It would be too convenient to use these labels for expectations about how much evil God would allow, while basing an argument for theism on the claim that God’s preferences for the nature of the universe’s parameters are likely to peak at both ends of the fragility scale.<sup>15</sup>

#### IV. Fine-Tuning and The Existential Selection Effect

Setting aside the foregoing concerns, there is an additional complication for the Fine-Tuning Argument, one that can’t be described without first providing considerable theoretical background. The relevant background can be found in *On Being a Random Sample* ([link](#)) (see especially sections 5 and 13). I will present some of this material at the seminar. But I will briefly sketch the upshot here.

There are several well-known puzzles in confirmation theory, collectively known under the rubric of the ‘problem of self-locating evidence’. The puzzles include Sleeping Beauty, Dr. Evil, Doomsday, and Shangri-La. There are also several different theories of how best to assign probabilities in these cases, not all of which have the same outcome when it comes to the issue of Fine-Tuning, Many Universes, and Design. In particular, in *On Being a Random Sample* argues that the standard approach—adopted by Nick Bostrom and taken for granted by various others—may well not be the best option.

The alternative approach tentatively defended there (‘Frequency’) complicates the Fine-Tuning argument by yielding the result that  $p^*(\text{Many Universes}|\text{Life})$  is extremely high compared with the unconditional prior  $p^*(\text{Many Universes})$ , regardless of theism. In short, on this view, our very existence is extremely strong evidence for Many Universes. (Note that this is a counterintuitive result of a view whose motivations lie elsewhere.) For many natural assignments to unconditional priors, this will have the result that Design is largely ‘screened off’ as an explanation for Fragility & Life.

Another consequence of Frequency is that the proliferation of Boltzmann Brains— at least those that have evidence of a different sort than we do— are no concern at all for a Many Universe hypothesis. Indeed the idea that we should have a preference for hypotheses where *most* observers are like us— rather than for hypotheses where there are *more* observers like us—leads to the absurd results discussed in sections 7, 8, and 9 of *On Being a Random Sample*. Whatever approach to self-locating evidence we end up preferring— and it may not be any of the ones discussed in detail in that paper— it should *not* yield this sort of result.

---

<sup>15</sup> I may be bringing the wrong values to bear if the question one is concerned with is not “Is theism true?” but rather “Even if I myself know personally on the basis of the Spirit’s witness that Christianity is true, how can I demonstrate to somebody else that what I believe is true?” (Craig, *Reasonable Faith*, 51). In that case selective use of skeptical theism may serve its purposes. YMMV.



There are two kinds of Boltzmann brains. First, there are those that have same evidence that we have (internalistically speaking). Don Page has these in mind when he writes the following on pg 41 of Craig's materials:

[T]here are models giving high probabilities for Boltzmann brain observations (which I think count strongly against such models) and other models giving low probabilities for them (which on this regard fits our ordered observations statistically).

The idea here is that we have 'ordered observations' that we can take as evidence, while Boltzmann brains do not. Insofar as Craig's argument hinges on a concern about the proliferation of Boltzmann Brains of this sort, it relies implicitly on a dubious principle about self-locating evidence— like the one called 'Proportion' in the random sample paper.

On the other hand, Craig may be appealing to Boltzmann Brains that are *like* us evidentially. Whether there are more such brains than ordinary observers turns not only on controversial premises in physics, but also on very difficult issues about how much of our experience, extended through time as it is, can be treated as evidence at a given time. (This turns on very hard questions about whether our evidence is internal, and whether it is only momentary or also inherited from past time-slices of ourselves.)

Setting all this aside, there is a dialectical problem with Craig's argument, construed as having to do with Boltzmann Brains of the second sort. He appears to be arguing that we can reject the Many Universes hypothesis on the following grounds:

We know somehow (in a Moorean fashion?) that we are not Boltzmann Brains. But if MU were true, we would have to hold that we are probably Boltzmann Brains. So MU is not true.

As a matter of epistemology, I wonder how we can assume we are not Boltzmann Brains of the second sort— perhaps it is a basic belief. But let us suppose this is a cogent argument. Note also that there are models of MU on which the proliferation of Boltzmann Brains is not entailed, such as those alluded to by Don Page above. Call the conjunction of those hypotheses 'MU−' and the conjunction of the remaining MU hypotheses 'MU+'. Perhaps the latter models are more elegant or whatever.

But however we know this, one might wonder why the argument above does not go as follows instead:

We know somehow that we are not Boltzmann Brains. But if MU+ were true, we would have to hold that we are probably Boltzmann Brains. So if MU is true, then MU− is true.

It is at best unclear how Craig could leverage our Moorean knowledge that we are not Boltzmann Brains to conclude that MU is probably false.<sup>16</sup>

### **Appendix: Dembski's version of the argument.**

The Bayesian approach assumes that each legitimate judgment in favor of design against mere chance involves a comparison of likelihoods (the prior probability of the evidence given the hypothesis). But Dembski has argued that no comparison is necessary between a "design hypothesis" and various "chance hypotheses" to eliminate chance (Dembski 1998, 68). Instead, the principle we use to infer design is simply that specified events of small probability do not occur by chance (5). To eliminate chance as an explanation, we must i) determine that the event in question would be unlikely if it were a chance event; ii) determine that it is not due to regularity; and iii) determine that it is specified (i.e., it conforms to a pattern that is not linked to the event itself).

But Dembski's method overgenerates. For instance, suppose that in a baseball game the batter hits a home run, and just as the ball goes over the fence, it hits and kills a pigeon. There are two hypotheses: the chance hypothesis on which this was an utter coincidence, and the design hypothesis on which the batter intended to kill the pigeon. This is as 'specified' as you like: if it had been a hunter with a rifle we would instantly assume that he had intended to kill the pigeon. But in the case of the batter, we certainly can't rule out the chance hypothesis.

However, Dembski's method gets this kind of case wrong. This is because he avoids comparing the probability of the evidence given the rival hypotheses.<sup>17</sup> The hunter case suggests a simple alternate hypothesis for comparison with chance while the batter's case doesn't, since the chances that anyone would try to hit a pigeon with a baseball are very small, and the chances that anyone would succeed even if he tried is infinitesimal. The probability of the design hypothesis is at least as low as the probability of the chance hypothesis: hence, no neat alternative explanation is "cried out for." But we can only see this by assessing the probability of the design hypothesis. So much for eliminating chance without a comparison of likelihoods.

---

<sup>16</sup> In discovering that we are not Boltzmann Brains, and thereby getting evidence against MU-, don't we also get at least some evidence against MU? There are two problems with this. First, many of the sorts of models that predict that Boltzmann Brains would predominate in many-universe scenarios also predict that they would predominate in a given one-universe scenario. Even if we were 'getting the evidence' that we are not Boltzmann Brains, this would be equally be evidence against one-universe and many-universe versions of such models. And second, ruling something out on Moorean grounds is a very different process from getting evidence against it and then updating.

<sup>17</sup> As a thorough critique of Dembski has pointed out, "you need to ask how well both hypotheses fit the data" (Fitelson et. al. 1999, 478).

Or consider the lottery example given above, and make the odds of winning as low as you like. Dembski claims that our level of certainty regarding the elimination of chance simply increases as the probability of the specified event given the chance hypothesis decreases (192). But this is simply inadequate: to compare the probability that the batter killed the pigeon, we surely must take into account how likely the batter is to try to kill the pigeon and how likely he is to succeed. Likewise in assessing whether or not the lottery is rigged (in the example given above), we must take into consideration the prior probability that the lottery is rigged for Jones. If Jones has no connection to the lottery organizers, that probability is roughly one over the number of entries. If Jones is the cousin of the lottery's organizer, things are a little different. Being 'specified' is not an on-or-off phenomenon.

Dembski thinks cases like this are "best left unexplained and regarded as... sterile coincidence," since "we haven't a clue how to submit them to the Explanatory Filter." But this means precisely that his approach is inadequate to distinguishing "fecund" and "sterile coincidences"—that is, useless in the present context.

### Works Cited

- Bergmann, Michael, 2001, Skeptical Theism and Rowe's New Evidential Argument from Evil, *Noûs*, 35: 278–296.
- Bergmann, Michael, 2009, Skeptical Theism and the Problem of Evil, in Flint, Thomas and Rea, Michael, *Oxford Handbook of Philosophical Theology*, Oxford: Oxford University Press, 375–399.
- Bethune, John Elliot Drinkwater, 1830. *The life of Galileo Galilei, with illustrations of the advancement of experimental philosophy*. Boston: William Hyde & Co.
- Dembski, William. 1998. *The Design Inference*. Cambridge: Cambridge UP.
- Fitelson, Brandon et. al. 1999. "How Not to Detect Design" *Philosophy of Science*, 66: 472-488, pg. 478.
- Halvorson, Hans. Pre-print. A probability problem in the fine-tuning argument. Phil Sci Archive. <http://philsci-archive.pitt.edu/11004/>
- Sinhababu, forthcoming. Divine Fine-Tuning vs. Electrons in Love. *American Philosophical Quarterly*.
- van Inwagen, Peter, 1995. *God, Knowledge, and Mystery*. Ithaca: Cornell University Press.

- Weisberg, Jonathan 2010. A note on design: What's fine-tuning got to do with it? *Analysis* 70 (3): 431-438
- Weisberg, Jonathan 2012. The argument from divine indifference. *Analysis* 72 (4): 707-714
- Wykstra, Stephen, 1984, The human obstacle to evidential arguments from suffering: on avoiding the evils of 'appearance,' *International Journal for Philosophy of Religion*, 16: 73-94.