

ABSTRACT

Fine-tuning in Light of Multiverse Confirmation

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Fine-tuning for life is extraordinarily unlikely given random chance but substantially more likely given the existence of a God. The fine-tuning argument framed in Bayesian probability, claims that because fine-tuning for life is more likely given the existence of God, the existence of God receives relative confirmation over atheism. The multiverse theory decreases the strength of the fine-tuning argument for the existence of God by explaining the unlikely evidence of fine-tuning. Hacking (1987) and White (2000) responded to the multiverse objection by claiming that confirmation for the multiverse theory was an inverse gambler's fallacy. Isaacs, Hawthorne, and Russell (2022) respond to Hacking and White and offer a compelling argument that fine-tuning for life provides relative confirmation for a multiverse given any standard method for updating priors on self-locating evidence. In this paper, I show that fine-tuning still provides relative confirmation for theism over single universe atheism. Furthermore, I show that under at least one of the leading theories of self-locating epistemology, fine-tuning in multiple universe atheism also confirms a massive sprawling multiverse that introduces skeptical concerns for atheism.

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CHAPTER ONE

Framing the Argument

Our universe has fine-tuned initial conditions that are necessary for the existence of life. Both theism and the multiverse theory set higher prior probabilities for the existence of fine-tuning parameters than does single universe atheism. If a theory predicts the existence of some evidence, then that theory receives confirmation upon observing the evidence, over theories that do not predict the evidence. The evidence of fine-tuning makes both the existence of God and the multiverse more likely. In this paper, I will present the fine-tuning argument, the multiverse objection, and multiverse confirmation. I will then consider what it would take to deny multiverse confirmation. I argue that Isaacs, Hawthorne, and Russell's findings in their paper, "Multiple Universes and Self Locating Evidence," limit the theistic confirmation of the finetuning argument over atheism but that the damage to theism is not insurmountable.¹

I am primarily interested in analyzing how the fine-tuning argument for the existence of God fares in light of multiverse confirmation on self-locating evidence. I argue that neither denying evidential parity nor constructing a novel self-locating epistemology provide an adequate response to Isaacs, Hawthorne, and Russell's multiverse confirmation, but the theological consequences are not dire due to the possibility for favorable theistic priors, the remaining confirmation over single universe atheism, and the skeptical concerns introduced by a large multiverse.²

¹ Isaacs, Hawthorne, and Sanford Russell, "Multiple Universes and Self-Locating Evidence."

² Isaacs, Hawthorne, and Sanford Russell.

In Chapter One, I give a historical background of the fine-tuning argument including Aristotle, Lucretius, Aquinas, and Paley on the origin of arguments from design. I present the fine-tuning argument with the Triple Alpha problem, the Higgs Boson mass, and the Cosmological constant as evidence. I then consider and respond to dismissive objections to the fine-tuning argument before providing the strongest objection to the fine-tuning argument, the multiverse objection. In Chapter Two, I explain the Inverse Gambler's fallacy argument from Hacking and White and then examine the argument from Isaacs, Hawthorne, and Russell for multiverse confirmation. I include an explanation of the three leading theories of self-locating epistemology and demonstrate their limitations. In Chapter Three, I examine Isaacs, Hawthorne, and Russell's idealizing assumptions and explore what it would take to deny one of their premises, evidential parity. I offer a thick evidence objection and attempt to offer a self-locating epistemology escape from multiverse confirmation. I then demonstrate that, without relying on unreasonable assumption, objections to multiverse confirmation fail. In Chapter Four, I explore the effect on the fine-tuning argument for the existence of God considering Isaacs, Hawthorne, and Russell's multiverse confirmation. I then argue that theism maintains reasons to assign priors favorable theism, confirmation over single universe atheism, and theistic solutions to skeptical concerns introduced by a large multiverse.

In this chapter, I will give a historical background for the fine-tuning argument including Aristotle, Lucretius, Aquinas, and Paley on the origins of arguments from intelligent design. I will then lay out the fine-tuning argument with the Triple Alpha problem, the Higgs Boson mass, and the Cosmological constant as evidence. I will then

consider and dismiss objections to the fine-tuning argument. Finally, I will provide the multiverse objection to fine-tuning.

Historical Background

In this subsection I discuss Aristotle, Lucretius, Aquinas, and Paley on intelligent design and provide a review of the Bayesian framework for the fine-tuning argument. Before examining the fine-tuning argument and its objections, I will consider the historical predecessor to the fine-tuning argument. The fine-tuning argument is an argument from design. Arguments from design use an element of the physical world, that would be unlikely given random chance, as evidence that the world has been designed. Evidence of design is evidence for a designer. Arguments from design originated from the understanding that natural phenomena require explanation. While there were certainly philosophers, prior to Aristotle, who recognized the need for explanations of natural occurrences, Aristotle not only devised an early general theoretic framework in his *Physics*, but he also argued for “the existence of the unmoved mover of the universe, a supra-physical entity, without which the physical domain could not remain in existence.”³ In book 12 of the *Metaphysics*, Aristotle makes an argument similar to a design argument. He claims that if, “there is a constant cycle, something must always remain.”⁴ The “constant cycle” refers to the constant movement of the heavens. Aristotle observes movement in the world and from this natural phenomenon, he derives that “since there is something which moves while itself unmoved, [...] the first mover, then, exists of

³ Bodnar, “Aristotle’s Natural Philosophy.”

⁴ Aristotle, *The Basic Works of Aristotle*. 1072a.

necessity.”⁵ He considered that everything that moves is moved by something else and so to avoid an infinite regression there must be a first mover or first cause. While Aristotle certainly relied on a cosmological argument in his unmoved mover passage, he also references the specific evidence of the movement of the night sky to argue from the unlikely evidence of design.

When Aristotle was writing, only a few philosophers had seriously considered that natural phenomena were governed by random chance. Democritus, a presocratic Greek philosopher, proposed that the world is composed of atoms that are always in motion colliding without purpose.⁶ Aristotle responded to Democritus in his *Physics* writing that, “Democritus reduces the causes that explain nature to the fact that things happened in the past in the same way as they happen now: but he does not think fit to seek for a first principle to explain this ‘always’.”⁷ Democritus recognized that totally random movement of atoms could not account for the ordered world and so derived the ‘like to like’ principle that established a predetermined way in which atoms would move.⁸ Democritus was one of the first to articulate that the physical world might occur by necessity but without purpose.⁹

The Roman philosopher, Lucretius was a follower of the atomist Epicurus who was heavily influenced by the philosophy of Democritus. Democritus laid the groundwork for things occurring without purpose, but Lucretius additionally removed the Greek understanding of things occurring from necessity. He proposed a fully naturalist

⁵ Aristotle. 1072b.

⁶ Berryman, “Democritus.”

⁷ Aristotle, *The Basic Works of Aristotle*. 252a-b.

⁸ Berryman, “Democritus.”

⁹ Berryman.

explanation of the world, that everything occurs because of the random collision of particles.¹⁰ Lucretius added a rather novel understanding that the happenings of the natural world are not only random but unlikely and unexplainable, as he “reconstructs the blind process of atomic conglomeration that gave rise to our world”.¹¹ Lucretius established the basis for a strong objection to design arguments, when he wrote, “Neither by counsel did the primal germs / ‘Stablish themselves, as by keen act of mind, / Each in its proper place; nor did they make, / a compact how each germ should move; / But, lo, because primordials of things, / Many in many modes.”¹² Relying on the principle of plenitude, Lucretius argues that through many configurations of primal germs, or atoms, across many modes and indefinite time, the world was established.¹³ Given enough time, random movement of atoms will produce anything possible. Lucretius rejects both the Aristotelean notion that there is an orchestrator of the natural world, offering counsel to created matter, and Democritus’ necessity argument, that atoms move in a predetermined manner. Lucretius explains the natural world without the need for prime movers and so provided a fully atheistic account of the natural world.

St. Thomas Aquinas renewed the Aristotelian argument that there must be a first mover as the first of his ‘five ways’ to know the existence of God.¹⁴ Aquinas formulates his prime mover argument as a cosmological argument that because motion exists at all, there must be a prime mover that began all movement. His fifth and final way to know the existence of God was based on the order found in the world.¹⁵ Aquinas does not cite

¹⁰ “Lucretius (Stanford Encyclopedia of Philosophy).”

¹¹ “Lucretius (Stanford Encyclopedia of Philosophy).”

¹² Lucretius, *Of the Nature of Things*. 204.

¹³ “Lucretius (Stanford Encyclopedia of Philosophy).”

¹⁴ Ratzsch and Koperski, “Teleological Arguments for God’s Existence.”

¹⁵ Ratzsch and Koperski.

the unlikeliness of a specific natural phenomenon as evidence for the existence of God but rather argues that the existence of any order in the natural world requires a God to order it.¹⁶ Aquinas laid the groundwork for modern intelligent design arguments that more heavily rely on specific natural phenomena.

In 1802, William Paley offered one of the strongest formulations of the argument from intelligent design in his book, *Natural Theology*. He proposed a watch maker analogy in which an observer happens to find a stone and supposes that it was made at random.¹⁷ In the same way the observer then encounters and examines closely a watch of immense complexity.¹⁸ The observer reasons that the watch must have been designed by an intelligent watchmaker and not created by random chance like the stone.¹⁹ Paley anticipates the objection that the observer only knows the watch is designed because the observer has seen a watch before.²⁰ He claims that we would still recognize the marks of design and that, “ignorance of this kind exalts our opinion of the unseen and unknown artist’s skill, [...] but raises no doubt in our minds of the existence and agency of such an artist.”²¹ Paley further anticipates the objections that the assertion of design would be diminished if the watch were to malfunction, have incomprehensible parts, or be attributed to a natural cause.²² He responds that, “it is not necessary that a machine be perfect in order to show with what design it was made: still less necessary where the only question is whether it were made with any design at all.”²³ Paley’s argument rested on the

¹⁶ Ratzsch and Koperski.

¹⁷ Paley et al., *Paley’s Natural Theology*. 37.

¹⁸ Paley et al. 37.

¹⁹ Paley et al. 38.

²⁰ Paley et al. 40.

²¹ Paley et al. 40.

²² Paley et al. 40-42.

²³ Paley et al. 40.

principle that natural processes can never produce outcomes that bear the marks of designed order. In the same way that encountering a complex watch, one knows that it bears the marks of intelligent design, the natural world also bears the marks of design. Paley then examines evidence from biology such as the design of different eyes to show that the world bears the marks of design.²⁴

Paley's argument was considered compelling and strong until Darwin was able to establish a naturalist explanation for Paley's evidence of intelligent design. Darwin showed that natural processes could lead to systems that matched the complexity of design. Shanks and Dawkins note that "in getting away from the idea that organisms are deliberately designed machines, fitting their niches like cogs in nature's grand mechanism, [Darwin] saw a need for a radical reappraisal of what we are."²⁵ Darwin's response to Paley is a response to an entire way of conceiving of nature.²⁶

After Darwin, the intelligent design argument struggled to respond. Some authors, such as Michael Behe, continued to offer arguments from design using bacterial flagellum or other biological evidence in an attempt resurrect the intelligent design argument from Darwinian evolution.²⁷ The vast majority of modern biology supports that attempts to invalidate the Darwinian evolution through irreducible complexity fall flat and rely on improper scientific conclusions.²⁸ Intelligent design arguments rest on the merits of their evidence for design. Modern design arguments from biology have not been accurate or effective but this does not mean that there is not a strong argument from

²⁴ Paley et al. 50.

²⁵ Shanks, "The Evolution of Intelligent Design Arguments." 40.

²⁶ Shanks. 40.

²⁷ Behe, "Irreducible Complexity." 3

²⁸ Friederich, "Fine-Tuning."

design to be made for the existence of God. The most compelling modern design, the fine-tuning argument, relies on evidence from fundamental physics rather than biology.

The Fine-Tuning argument is an argument for the existence of God and so I ought to define what is meant by God. For this paper, God is simply an agent or group of agents that designed the fundamental features of the universe. Theism will simply mean the existence of a universe designer and atheism will mean the nonexistence of such a universe designer. Although typically paired together, the creation of the universe is separable from the design of the universe. For this paper, it is the design of the universe to select for certain characteristics, rather than the creation of the universe, that is critical to the argument for theism.²⁹

I will now review the Bayesian framework of the fine-tuning argument. The fine-tuning argument is a probabilistic argument for relative confirmation. It is best considered through the lens of Bayesian probability.³⁰ Bayesian probability functions by assigning prior probabilities in accordance with personal credence to all possible answers to a given question. Then evidence that rules out a possible answer is considered, and the posterior probabilities are updated.³¹ Bayesian probability updates on evidence by assigning zero probability to possibilities that are ruled out by evidence and then assigning additional probability to the possibilities that were not ruled out in proportion to their priors so that they sum to 1. For example, assuming crows can only be black or white, I may randomly assign the probability for the coloration of all crows as follows:

All crows are black. 25%	Some crows are white and Some crows are black. 50%	All crows are white. 25%
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²⁹ Hawthorne and Isaacs, 3.

³⁰ Hawthorne and Isaacs, 1.

³¹ Hawthorne and Isaacs, 1.

While there are arguments to be made about how to properly assign the prior probabilities, a benefit of Bayesian reasoning is that it allows for results regardless of how priors are assigned. I then learn that there is a predator that successfully killed off all white birds in my city meaning that while crows might still be white in other places, I will not see one in my city. I then see a black crow on a telephone wire in my city. My evidence cannot be explained by the possible world in which there are only white crows and so the probability of ‘All crows are white’ is updated to 0 on my evidence. The other two possible worlds are not ruled out by my evidence and so they remain valid options. The probability is updated and renormalized as follows:

All crows are black. 33%	Some crows are white and some crows are black. 66%
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Regardless of how the priors are assigned the likelihood that ‘all crows are black’ and that ‘some crows are white and some crows are black’ receives relative confirmation on the evidence that there exists a black crow.

The fine-tuning argument employs this same kind of reasoning. Hawthorne and Isaacs in their paper, “Fine-tuning Fine-tuning” argue that Bayesian framework provides a more robust insight than a qualitative explanation-theoretic framework.³² They explain that Bayesian epistemology, at its core, involves rational agents assigning probabilities to possible worlds with values between 0 and 1 and with all the prior probabilities summing to 1.³³ Upon encountering evidence that invalidates a previously considered possible world, this world is updated to 0 probability, in light of the inconsistent evidence, and the

³² Isaacs, *Fine-Tuning Fine-Tuning*. 1.

³³ Isaacs. 3.

remaining worlds are renormalized so that their posterior probabilities add up to 1.³⁴ The strength of the relative confirmation on some encountered evidence is determined by the ratio of how likely the evidence is given one hypothesis over the other.³⁵

The Fine-Tuning Argument

In this subsection I will present the finetuning argument and examine the Triple Alpha process, Higgs Boson mass, and Cosmological Constant as evidence for finetuning. The fine-tuning argument like arguments from design, relies on evidence from the physical world that would be unlikely given random chance, to argue that the universe is finely tuned. A fine-tuned universe is more likely given a fine tuner than given random chance. So, the fine-tuning argument asserts that the existence of God is more likely given the extremely unlikely, but necessary for life, physical attributes of the universe as evidence. Just given chance, the odds of getting a universe with life-supporting parameters is agreed upon by top physicists to be somewhere in the realm of 1 in 10^{120} .³⁶ To illustrate the incomprehensibly small prior chance of fine-tuned life given atheism, Hawthorne and Isaacs note that guessing a specific atom at random from the known universe is 1 in 10^{80} which is massively more likely than the universe containing fine-tuned life by chance.³⁷

We have strong reason to believe that the odds of a universe with fine-tuned life are substantially higher given the existence of God, than the odds of the universe containing life by chance. The existence of God does not necessarily provide a reason to

³⁴ Isaacs. 3.

³⁵ Isaacs. 3.

³⁶ Friederich, "Fine-Tuning."

³⁷ Isaacs, *Fine-Tuning Fine-Tuning*. 18.

think that the odds of fine-tuned life are particularly high but certainly gives us reason to think that life would be more likely than 1 in 10^{120} . While it may be unlikely that a God would design life and that a God would use fine-tuned laws to do so, it would be strange to think that the odds of fine-tuned life given theism are less than 1 in 10^{120} . Such a claim would require that we know that God is deeply averse to the proposition of creating fine-tuned life. The prior probability for the existence of finetuned life can be assigned as anything other than astronomically unlikely given theism for theism to still receive enormous confirmation relative to atheism, due to the immense unlikelihood of finetuned life without a God. The fine-tuning argument claims that theism predicts a higher likelihood for the unlikely evidence of a universe that supports life, while atheism does not. Therefore, theism is relatively confirmed given the evidence of fine-tuning for life. Theism is confirmed in direct proportion to the unlikelihood of life, and so theism receives overwhelming confirmation over atheism.

Argument from design should be considered on the merits of its evidence and so I will now consider the evidence that life is fine tuned. I will present three of the strongest pieces of evidence for the fine-tuning of the universe although there is a plethora of fine-tuning evidence ranging in degrees of strength. For a piece of evidence to be strong evidence for fine-tuning it must be exceedingly unlikely given random chance. Evidence for finetuning is often that a physical attribute of the universe falls within an improbable parameter value. It is worth noting that the probability that the universe has some attribute is the range of the parameter values that would support the attribute in question divided by the total range of possible values.³⁸ Hawthorne and Isaacs use the idea of a

³⁸ Isaacs. 5.

continuous dart board to demonstrate that while the probability of hitting any maximally specific point on the dart board is 0, the odds of hitting a specific region is the proportion of the size of the region to the size of the whole board.³⁹ In the same way, the odds of an initial condition of the universe being within a certain range of parameters is the determined by the size of the favorable parameter range compared to all possible values for the parameter.⁴⁰

The Triple Alpha problem is a strong example of fine-tuning. Within the stars, Hydrogen and Helium particles collide in solar nucleosynthesis.⁴¹ When two Hydrogen collide, Helium is formed. When two Helium nuclei collide, an unstable Beryllium nucleus is created with an incredibly short half-life.⁴² It is only when three Helium alpha particles collide simultaneously at a particular range of resonance levels that carbon is formed.⁴³ There is substantially more carbon in our universe than we would expect given the age of the universe and how rarely the conditions naturally occur that allow for triple alpha collisions to create carbon.⁴⁴ Either the universe is far older than we thought, the collisions between three alpha particles are more likely, there is less carbon that we think, or fine-tuning maintains favorable resonance levels for the creation of carbon. The age of the universe and the amount of carbon are empirically verifiable. The likelihood of the triple alpha collision was further explained by Fred Hoyle who discovered the resonance value of the carbon nucleus required for the Triple Alpha process.⁴⁵ The universe is either fine-tuned or extremely lucky because the odds of getting carbon and oxygen from

³⁹ Isaacs. 5.

⁴⁰ Isaacs. 5.

⁴¹ Adams, "Possible Solution to the Triple Alpha Fine-Tuning Problem." 1.

⁴² Adams. 1.

⁴³ Adams. 1.

⁴⁴ Adams. 1.

⁴⁵ Adams. 6.

random chance in the Triple Alpha process are somewhere in the range of 1 in 100,000,000.⁴⁶ This example of fine-tuning is strong evidence for a fine tuner.

The Higgs Boson mass is another example of fine-tuning.⁴⁷ The Higgs Boson mass has been empirically shown to be 125 GeV. The Planck scale is around 10^{19} GeV.⁴⁸ The value for the Higgs Boson physical mass is unlikely because “the effect of vacuum fluctuations would have to cancel each other out to about 34 orders of magnitude in order to result in a physical Higgs mass of 125 GeV.”⁴⁹ It is still unknown why “the bare mass should be in such a delicately balance with the effects from the vacuum fluctuations” and attempts to offer a natural explanation for the seemingly fine-tuned balance of the Higgs Boson mass have been “disfavoured by more recent experimental results, notably from the Large Hadron Collider.”⁵⁰ The Higgs Boson mass is substantially smaller than the value projected by the Standard Model.⁵¹ Assuming naturalness and the validity of the Standard Model we would expect the Higgs Mass to be of the same order of magnitude as its vacuum contributions, in the range of 10^{19} .⁵² The extremely unlikely evidence that the Higgs Boson mass is so small relative to its contributing parameters provides evidence of fine-tuning. A theory that predicts the unlikely fine-tuning of the Higgs Boson mass to make life possible receives relative confirmation over theories that do not predict fine-tuning. Because the likelihood of the small value of the physical Higgs Boson mass given random chance is 1 in 10^{34} , the relative confirmation at stake is incredibly large.

⁴⁶ Adams. 6.

⁴⁷ Friederich, “Fine-Tuning.”

⁴⁸ Friederich.

⁴⁹ Friederich.

⁵⁰ Friederich.

⁵¹ Friederich.

⁵² Friederich.

The strongest evidence, however, for the fine-tuning of the universe is the cosmological constant. The cosmological constant measures the energy density of the vacuum and is the sum of over two dozen physical constants.⁵³ When adding and subtracting many independent massive numbers the probability that the result would be a small number is very small. To demonstrate this Hawthorne and Isaacs, in their paper, “Misapprehensions about the Fine-Tuning Argument,” use the example of a billionaire entrepreneur and philanthropist making tens of thousands of large transactions over the course of a year.⁵⁴ Any shift in the stock market, results in massive changes in the billionaire’s net value because of the scale of their investments. Throughout the year the billionaire’s net worth is likely to experience large changes simply from inflation alone. It would be exceptionally unlikely that when summed, the tens of thousands of large shifts in net worth, amounted to less than a nickel gained over the course of a year.⁵⁵ Adding and subtracting million-dollar transactions is much more likely to lead to a sum of a similar magnitude. If the sum of many massive numbers was zero, then there would be some evidence that the physical parameters have a relationship that causes them to cancel out, but the cosmological constant is an extremely small but definitively nonzero number. The cosmological constant is evidence for fine-tuning because after adding several dozen massive positive and negative numbers, the value of the cosmological constant is neither huge and negative nor huge and positive. It is astonishingly unlikely that these massive independent numbers would cancel out to an incredibly small number rather than a number of a scale similar to its component parts. If the cosmological constant was

⁵³ Friederich.

⁵⁴ Hawthorne and Isaacs, “Misapprehensions about the Fine-Tuning Argument.” 15.

⁵⁵ Hawthorne and Isaacs. 15.

negative and of a magnitude like its contributions, then the universe would have collapsed in on itself mere moments after beginning.⁵⁶ If it was positive and large, the universe would have expanded so rapidly that matter would not have gathered together into life-supporting planets.⁵⁷ The odds of the universe randomly having a cosmological constant that can support life is 1 in 10^{120} .⁵⁸ Thus, theism which provides a plausible explanation for why the universe might be endowed or designed to have such an unlikely but necessary for life initial condition, receives massive relative confirmation against atheism on the evidence that there is fine-tuned life.

Objections to The Fine-Tuning Argument

In this subsection I will consider some weak objections to the fine-tuning argument to show that atheism must put more stock in its strongest objection to fine-tuning. The multiverse objection stands out from a plethora of weak objections and thus receives more weight from atheism.

There are a handful of objections to the fine-tuning argument that I argue do not detract much from the strength of the argument. In their paper, “Fine-tuning Fine-tuning”, Hawthorne and Isaacs enumerate and dispatch a number of these dismissive objections. I will review a few of these objections and illustrate how they failed to substantially affect the fine-tuning argument before considering the multiverse objection.

One might argue that the same reasoning of the fine-tuning argument from the existence of life applies to fine-tuning arguments from the existence of any other specific attribute of the universe. Hawthorne and Isaacs use the existence of tungsten as an

⁵⁶ Isaacs, *Fine-Tuning Fine-Tuning*. 164.

⁵⁷ Isaacs. 164.

⁵⁸ Friederich, “Fine-Tuning.”

example of a specific attribute of our universe that is dependent on the fine-tuning of the universe's initial conditions. Because tungsten is extremely unlikely given random chance but more likely given the existence of God, tungsten serves as evidence that there is a God who desires to create tungsten.⁵⁹ The objection argues that because a God who particularly loves tungsten and fine tunes the universe to contain tungsten seems absurd, fine-tuning reasoning must be flawed.⁶⁰

There could very well be good reasons that God would love tungsten, however. The existence of tungsten could be a random byproduct of finetuning the universe to support life.⁶¹ The fine-tuning argument provides relative confirmation rather than absolute confirmation. While a tungsten loving God who fine-tuned the universe for tungsten to exist is more likely given the existence of tungsten, the rather strange hypotheses is not confirmed in an absolute sense. Standard credence would likely assign a tungsten tolerant God higher prior probability than a God that loves tungsten.⁶² Any naturally occurring phenomenon whose existence is contingent on the fine-tuning of the universe and which is reasonably assumed tolerable to God, provides relative confirmation for theism.⁶³ Hawthorne and Isaacs argue that "Thus a fine-tuning argument does not need to assume divine predilection towards the fine-tuned phenomenon underlying it."⁶⁴ The fine-tuning argument is strong, then, for a philosophical understanding of God as every fine-tuned natural thing that is reasonably tolerable to God is some evidence that God exists. The theological implications of the fine-tuning

⁵⁹ Isaacs, *Fine-Tuning Fine-Tuning*. 13.

⁶⁰ Isaacs. 13.

⁶¹ Isaacs. 13.

⁶² Isaacs. 24.

⁶³ Isaacs. 24.

⁶⁴ Isaacs. 24.

argument are weakened by this objection, however, because the evidence that there exists fine-tuned life supports the existence of a God who need only be tolerant of life.⁶⁵ The theology of a caring God is not confirmed by fine-tuning over a God who passively permits life.⁶⁶

Bostrom famously articulated an anthropic objection to the multiverse.⁶⁷ The evidence for the fine-tuning argument is that we observe that we exist in a world fine-tuned for life. One anthropic objection claims that the observation that we exist can never be evidence for the fine-tuning argument because if we did not exist, then we could not observe that we do not exist.⁶⁸ This anthropic objection relies on the principle that evidence from observation cannot support a hypothesis if the opposite evidence is impossible to observe. A proposition is evidence for a hypothesis if its negation is evidence for the negation of the hypothesis, regardless of whether it is possible to 'have as evidence' the negation of the evidence.⁶⁹ The evidence for fine-tuning is not only that we exist. It is that we exist in a finely tuned universe. Scientist expected to find that we exist in a universe that was very likely to include life but instead found the opposite.⁷⁰ Bayesian probability applies just the same when we are observers. Hawthorne and Isaacs use the example of learning that five years ago someone flipped a coin to determine whether to lethally poison you.⁷¹ You being alive today is strong evidence to suggest that the coin landed on the favorable outcome regardless of whether you would be around had

⁶⁵ Isaacs. 24.

⁶⁶ Isaacs. 24.

⁶⁷ Bostrom, *Anthropic Bias*.

⁶⁸ Isaacs, *Fine-Tuning Fine-Tuning*. 15.

⁶⁹ Isaacs. 17.

⁷⁰ Isaacs. 16.

⁷¹ Isaacs. 16.

the coin landed the other way.⁷² Standard probabilistic reasoning does not take the ability to actually be held as evidence into account, just the evidence itself.⁷³

Some, like Jonathan Weisberg, have claimed that the probability of fine-tuned life given theism is equally low to the probability of fine-tuned life given atheism.⁷⁴ To claim that the probability of fine-tuned life is equally low given theism or atheism is to claim that God is overwhelmingly unlikely to create life. We should not presume to understand whether God is overwhelmingly likely or unlikely to do anything. Others have claimed that we should not even consider the probability of anything involving God. While we certainly should not pretend to have a distinct notion about the divine psyche, we also should not simply apply skepticism indiscriminately. If there is a God, we have strong probabilistic reasons to know some things about them. Hawthorne and Isaacs use the example of knowing God's single favorite integer.⁷⁵ While we should be skeptical that we could know God's favorite integer, we can probabilistically know that any specific number is overwhelmingly not likely to be God's favorite integer.⁷⁶ However just as we should not blindly posit that we know God's favorite integer is 42, we should acknowledge that it is just as likely that 42 is God's favorite integer as any other integer. In the same way, we do not need to assert apriori that God definitively abhors or strongly desires to create a world fine-tuned for life because if there is a reasonable distribution of probability across the divine desire to create fine-tuned world, the fine-tuning argument holds.⁷⁷

⁷² Isaacs. 17.

⁷³ Isaacs. 17.

⁷⁴ Weisberg, "A Note on Design."

⁷⁵ Isaacs, *Fine-Tuning Fine-Tuning*. 22.

⁷⁶ Isaacs. 22.

⁷⁷ Isaacs. 22.

A final weak objection to fine-tuning is a form of pessimistic induction. While it does not affect the fine-tuning argument much, pessimistic induction leads to an interesting question about the relative epistemic position of the fine-tuning. One might argue from pessimistic induction as Herman Philipse proposes in his book, *God in the Age of Science?: A Critique of Religious Reason*, that because arguments from design in the past have failed, the fine-tuning argument, a kind of argument from design is likely to fail as well.⁷⁸ Philipse reasons that often religious explanations for phenomena have been accepted until a more specific and satisfactory scientific explanation renders the religious explanation obsolete.⁷⁹ Because other arguments from design have failed in the past, the fine-tuning argument is also likely to be rendered obsolete as naturalism finds an adequate explanation for fine-tuning. Even if we assume that the finetuning argument keeps bad company, there are strong reasons to dismiss a pessimistic induction objection.⁸⁰

As Hawthorne and Isaacs note in their paper, “Misapprehensions about the Fine-Tuning Argument”, a bad company argument is an argument from induction which is questionably frame dependent.⁸¹ The history of the search for evidence for God can be construed to appear as a series of arguments that are successively disproven, or it can be construed as the refining process of creating increasingly strong arguments for God.⁸² Likewise, the history of the search for a naturalist explanation can be construed as a series of failed explanations for the natural processes in the world or as the project of

⁷⁸ Philipse, *God in the Age of Science?*

⁷⁹ Philipse.

⁸⁰ Hawthorne and Isaacs, “Misapprehensions about the Fine-Tuning Argument.” 4.

⁸¹ Hawthorne and Isaacs. 4.

⁸² Hawthorne and Isaacs. 4.

refining naturalist theory.⁸³ Arguments stand or fall on their own independent merits not the merits of their peer arguments. Otherwise, one could presumably weaken an argument by crafting a slew of bad arguments for the same conclusion to weaken the company of the argument. The argument against fine-tuning from pessimistic induction fails to evaluate the merits of the finetuning argument and instead relies on its association to the widely rejected intelligent design arguments.

It is worth considering whether the Fine-Tuning argument is in the same epistemic position as Paley's argument from design prior to Darwin. If the fine-tuning argument is simply poised to be dismissed by an upcoming revolutionary scientific theory that naturalistically explains fine-tuned evidence, then it is in the same epistemic position as Paley's argument from design prior to Darwin. Fine-tuning bears some similarities to Paley's design argument, but it has some important differences. Paley's argument was respectable and considered strong in its time until Darwin's scientific discovery undermined one of its central premises.⁸⁴ Richard Dawkins even wrote that he could not imagine being an atheist any time before the publication of Darwin's *Origin of Species* because, "Darwin made it possible to be an intellectually fulfilled atheist."⁸⁵ Paley relied on the premise that natural processes could never lead to results bearing the mark of design.⁸⁶ This premise is in absolute terms and so Darwin discovering a single example of a natural process that led to results bearing the mark of design, refuted Paley's argument. The fine-tuning argument is in a different epistemic position because it does not rely on such an absolute premise. Instead, the fine-tuning argument merely holds it

⁸³ Hawthorne and Isaacs. 4.

⁸⁴ Van Inwagen, *Metaphysics*.

⁸⁵ Richard Dawkins, *The Blind Watchmaker*. 5,6.

⁸⁶ Paley et al., *Paley's Natural Theology*. 40.

unlikely, but not impossible, for a life supporting universe to arise from pure chance. The likelihood that life arose from pure chance is exceedingly small but the fine-tuning argument accounts for it.

Fine-tuning evidence is evidence about the physical initial conditions of the universe while intelligent design evidence is seemingly unexplainable origins of a specific biological mechanism or anomaly. To maintain that there is one universe, but that life is likely, would require a complete rework of fundamental physics. Darwinian evolution certainly revolutionized biology but I argue that the complete overhaul of fundamental physics that would be required to invalidate the evidence of fine-tuning would far surpass the impact of evolution. If the fine-tuning argument can only assert that either theism is relatively confirmed or most of fundamental physics is incorrect, then it is a strong argument. The argument from fine-tuning can only be evaluated on our current evidence. We should not prematurely discard it just because we might find definitive evidence that life does not depend on fine-tuning after all.

Even assuming the existence of God, it may seem unlikely that God would choose to use fine-tuning to design a life permitting universe. God could have created a universe without life or used non-fine-tuned parameters. The prior probability that God would choose to create fine-tuned life may be unlikely but is certainly more likely than life arising by chance. Even if we give some credence to the chance that the fundamental physics underlying fine-tuning are incorrect, or that there is some other plausible rejoinder that atheism has not yet raised, the unlikeliness of fine-tuned life given atheism is so great that theism is still confirmed when updating on the existence of fine-tuned life.

There is some chance that an upcoming scientific discovery will show that the cosmological constant and other fine-tuned parameters of the universe are life supporting at nearly every possible value. There is some chance that an upcoming scientific discovery will show that some other physical process renders necessary the seemingly fine-tuned aspects of the universe. There is some reason to think that most of the world's leading physicists are part of a theistic cabal that lies to the world about the likelihood of life given random chance to provide evidence for the fine-tuning argument.⁸⁷ There is some reason to think that we live in a multiverse. All four of these hypotheses would weaken the fine-tuning argument. If any of the first three hypotheses are true, we would expect to have some evidence that at least heightens the hypotheses' plausibility. However, the first three hypotheses have been empirically tested and remain implausible. The multiverse hypotheses, by its nature, is unverifiable and presents the strongest objection to the fine-tuning argument.

Darwin explained what was previously considered evidence of intelligent design by claiming that enough random cell mutations can explain biological complexity. The multiverse objection to the fine-tuning argument relies on a similar principle to the multiple mutations of Darwinian explanation as applied to multiple universes with varied initial conditions. The multiverse objection responds to the fine-tuning argument by denying the premise that atheism does not predict the fine-tuning initial conditions necessary for life. If atheism claimed that the universe would support life only if one specific result was rolled on a single 10^{120} sided die, then atheism would not predict life.

⁸⁷ Isaacs, *Fine-Tuning Fine-Tuning*. 34.

However, the multiverse objection claims that if 10^{500} dice are rolled, we would expect to get at least one result that supports life.

The multiverse theory claims that the universe we inhabit is one of a multitude of universes each with varying fundamental initial conditions. Many of these other universes collapsed in on themselves moments after forming, while others expanded so rapidly that complex matter never formed. The multiverse can alternatively be conceptualized as a string of universes that are created and ended in a succession of big bangs and big collapses one after another with each universe varying in its initial conditions.⁸⁸ A minimum of one universe happened, by chance, to have the fundamental constants necessary to support life. If there are numerous universes with varying initial conditions, it is likely that some universe will support life. Under this theory, life is predicted without a God and so, on the evidence of life, both theism and the multiverse become more likely, over theories that do not predict the unlikely existence of life. The multiverse objection does not directly refute or contradict the fine-tuning argument for the existence of God. Rather the multiverse response provides an explanation for fine-tuning without God. Prior to the multiverse response, theism receives relative confirmation over atheism in light of fine-tuning evidence because single universe atheism does not predict fine-tuning for life. The multiverse provides a plausible atheistic response to fine-tuning so that the relative confirmation for theism is not guaranteed. Theism may still be confirmed over atheism if a multiverse is unlikely given atheism. Because both the multiverse and the existence of God are relatively confirmed by the existence of fine-tuning for life, the fine-tuning of the universe is evidence not only for theism but also for a multiverse.

⁸⁸ Hacking, "The Inverse Gambler's Fallacy."

CHAPTER TWO

Multiverse Confirmation

In this Chapter, I will explain the Inverse Gambler's fallacy argument from Hacking and White. I will then examine a response to Hacking and White and the argument for multiverse confirmation from Isaacs, Hawthorne, and Russell. I will provide an explanation of the three leading theories of self-locating epistemology and demonstrate issues with all three.

Hacking and White

Ian Hacking (1987) took issue with the multiverse objection to fine-tuning. Hacking claims that the multiverse theory is an example of the Inverse Gambler's fallacy. Hacking describes a gambler walking up to a table where two dice have just been rolled and being asked whether he believes that the dice have been rolled many times or just once. The gambler asks to see the current die roll and observes a double six. He reasons that because a double six is an unlikely roll, the dice must have been rolled many times before.⁸⁹ Hacking is responding to Wheeler's concept of the multiverse as a temporal series of universes with different initial conditions. He argues that just as the gambler sees only the one die roll, we are only privy to the initial conditions of this cycle of the universe. It is fallacious for the gambler to assume that just because the die result is unlikely that there had been previous rolls. Hacking notes that, "a fair die does not remember how it fell last time. Likewise, Wheeler universes have no memories."⁹⁰

⁸⁹ Hacking. 333-335.

⁹⁰ Hacking. 338.

Therefore, it is also fallacious to claim that this universe unexpectedly supports life, so there must have been many more, because “our present orderly universe is not made more probable on the assumption of many previous universes spontaneously forming by chance.”⁹¹ Hacking argues that even assuming a multiverse, we can only claim that this universe exists by chance. We cannot claim that this universe containing life, “arose inevitably because the world of universes has been running for so long that we were bound to turn up.”⁹² Hacking argues that the multiverse theory holds no explanatory power for the existence of fine-tuned life in our universe and so the fine-tuning argument for the existence of God does not lose ground to the multiverse objection.

White agrees with Hacking that whether there are other universes does not affect the likelihood that there is fine-tuned life in this universe.⁹³ White acknowledges that if there are more universes, it is more likely that *some* universe supports life because, “the crucial feature of the various multiple-universe theories is that those physical parameters on which inhabitability depends are understood to be assigned randomly for each universe.”^{94,95} However, White argues that we cannot set aside our more specific evidence that *this* universe supports life in favor of more general evidence that *some* universe supports life.⁹⁶ White argues that “the fact that our universe is fine-tuned gives us no further reason to suppose that there are universes other than ours.”⁹⁷

Over the past few decades, there has been an extended exchange of analogies for the multiverse highlighting our different intuitions about our existence in a multiverse.

⁹¹ Hacking. 334, 338.

⁹² Hacking. 340.

⁹³ White, “Fine-Tuning and Multiple Universes.” 230.

⁹⁴ White. 230.

⁹⁵ White. 244.

⁹⁶ White. 233.

⁹⁷ White. 230.

Proponents of the multiverse objection like McGrath, Whitaker, and Leslie proposed analogies objecting to Hacking featuring more casinos, dice, and a firing squad.⁹⁸

Defenders of Hacking's assessment of the multiverse objection like Rota and Leeds have used other analogies with more dice or the location of your parents' house in New York.⁹⁹ White clarifies a common disconnect among many of the competing analogies for the multiverse. Leslie, Whitaker, and McGrath each propose analogies that assume the odds of each additional universe are dependent in some way on the odds that the previous universes did not contain the favorable outcome. The defenders of Hacking's rejection of the Multiverse objection use analogies in which the odds of each additional universe are independent.

To demonstrate this, disconnect in many of the analogies, I will examine two cases based on McGrath and White.¹⁰⁰ Consider a woman asleep in her car outside a casino. Before entering the casino to gamble, her friend tells her that he will stop gambling and wake her after he rolls a 6 on a fair die. The woman is woken up by her friend and he asks her to guess if he rolled the die many times or only once. She reasons that because rolling a 6 is more likely given many rolls than given one roll, her boyfriend rolling the 6 that caused him to wake her is evidence that he rolled many dice.

Alternatively, consider another woman who enters the casino looking for her friend. She finds him and asks how many times he has already rolled the die. He does not answer but instead shows her that the current roll is a 6. She is not able to conclude from the current results of the die roll whether the die has been rolled before. One analogy assumes that

⁹⁸ McGrath, "The Inverse Gambler's Fallacy and Cosmology--A Reply to Hacking"; Leslie, "No Inverse Gambler's Fallacy in Cosmology."

⁹⁹ Rota, "Multiple Universes and the Fine-Tuning Argument."; Leeds, "Juhl on Many Worlds."

¹⁰⁰ McGrath, "The Inverse Gambler's Fallacy and Cosmology--A Reply to Hacking."

the probability of the favorable result is affected by the number of previous rolls while the other posits independent odds. These competing analogies demonstrate that our intuitions are not straight forward about probabilistic reasoning with a multiverse and that a more robust method of reasoning is required.¹⁰¹

In their paper, “Multiple Universes and Self-locating evidence,” Isaacs, Hawthorne, and Russell agree with Hacking and White that, “our relevant evidence is not just the general evidence that there is fine-tuned life in some universe or other: rather, we know the more specific fact that there is fine-tuned life in *this* universe, *our* universe.”¹⁰² Isaacs, Hawthorne, and Russell take issue with the ambiguous use of the term ‘this universe’ because it can carry two different meanings, one indexical and one purely qualitative. With sufficiently detailed qualitative description, and with the assumption that there is a limited number of observers in a limited world, we can describe the observer of the double six roll in purely qualitative terms that do not implicate self-location. We must assume that no agents are experiencing evidentially equivalent situations and that the pool of total observers is small enough that we can accurately indicate one specific observer with qualitative description alone. For example, the evidence that ‘this roll of the die is a double six’ could mean that on April 28th, 2023, a bald man of height 6’3” with a watch that reads 5:05pm stands on planet earth in the only casino located in Waco, Texas and sees two dice rolled both with a result of 6. The evidence that one specific gambler sees a certain die roll is not evidence that there were more die rolls that preceded the observed roll. Assuming there are not multiple outcomes fitting any maximally specific qualitative description, Hacking and White’s argument

¹⁰¹ Isaacs, Hawthorne, and Sanford Russell, “Multiple Universes and Self-Locating Evidence.” 243.

¹⁰² Isaacs, Hawthorne, and Sanford Russell. 244.

against the multiverse objection stands. When it comes to specific people on planet earth, it is possible to specify in third personal qualifiers which person is having a certain unlikely experience. However, in a multiverse, qualitatively specifying which universe is fine tuned for life without relying on indexical, first personal qualifiers is not feasible. When limiting the sample size to the planet earth, assuming every person has a unique qualifier is sound. When considering a multiverse however, there could be intrinsically duplicate universes. The likelihood that any maximally specific result would occur will be more likely if there are intrinsically duplicated attempts.

To illustrate the problems with using ‘this universe’, Isaacs, Hawthorne, and Russell consider an example similar to the following, in which there can be two worlds, W1 and W2.¹⁰³ The name “this” refers to W1 if W1 contains life, or if there is just one world. If W1 does not contain life and there are two worlds, then “this” refers to W2. The probability of the world called “this” containing life is mistakenly overinflated, as it becomes the probability that either W1 or W2 contains life. The probability that “this” world contains life is greater than both the probability that W1 contains life and the probability that W2 contains life. “This” can only refer to either W1 or W2 but “this” fails to qualitatively distinguish between the two worlds.¹⁰⁴ If there are ten horses racing, each with a probability of 1 in 10 of winning, but we name whichever horse wins, “Lucky”, then “Lucky” is guaranteed to win the race, with probability 1, despite each horse having a 1 in 10 chance of winning.¹⁰⁵ *This* universe similarly does not comport with our intuitions and over inflates the expected probability for life.

¹⁰³ Isaacs, Hawthorne, and Sanford Russell. 246.

¹⁰⁴ Isaacs, Hawthorne, and Sanford Russell. 247.

¹⁰⁵ Isaacs, Hawthorne, and Sanford Russell. 247.

For this reason, Isaacs, Hawthorne, and Russell advocate for the more indexical interpretation of the term ‘this universe’ to mean ‘our universe’.¹⁰⁶ They claim that, “Hacking and White call our attention to other evidence we have besides general qualitative facts: evidence not just about the existence of a certain sort of universe, but about our own universe, and about ourselves.”¹⁰⁷ Using ‘our universe’ is subject to other concerns, however, because ‘our universe’ implicates self-locating epistemology, an unsettled field of epistemology in which even the best leading theories are fraught with serious errors. Before considering self-locating epistemology however, I will first present multiverse confirmation from specific objective evidence.

Isaacs, Hawthorne, and Russell

There is good reason to think that every sufficiently specific qualitative attribute of the universe is evidence for a multiverse. The odds that the grass would be arranged with one specific blade over another or that the clouds would take one exact shape rather than another possible shape are higher if there are multiple universes. If there are more clouds, then the odds that *some* cloud would take a specific shape is higher than if there are fewer clouds. If there is more grass then the odds are higher that *some* grass will be in a specific arrangement. There would be more clouds and grass in a sufficiently large multiverse than in a single universe. Observing the grass arranged in a specific way and the clouds taking a specific shape offers overwhelming confirmation for a multiverse.

Isaacs, Hawthorne, and Russell point out that our evidence is not that *some* grass is arranged in some way but that *our* grass, or the grass we observe, is arranged in a

¹⁰⁶ Isaacs, Hawthorne, and Sanford Russell. 246, 247.

¹⁰⁷ Isaacs, Hawthorne, and Sanford Russell. 243.

particular way.¹⁰⁸ While the multiverse receives confirmation on any specific third personal evidence, updating on self-locating evidence such as, our universe has fine-tuned life, rather than some universe has fine-tuned life, may yield a different result. Isaacs, Hawthorne, and Russell turn to self-locating epistemology in hopes of avoiding the massive multiverse confirmation of qualitative third personal evidence.¹⁰⁹ They claim that self-locating evidence, “‘*might*—as Hacking and White claim—screen off the qualitative evidence from multiverse hypotheses [...] but self-locating evidence is our most plausible hope for avoiding the overwhelming confirmation of extravagant hypotheses.”¹¹⁰ Self-locating epistemology is unsettled but I will offer a definition of self-locating epistemology and present the three leading theories for updating on self-locating evidence, before demonstrating their flaws.

Self-locating epistemologies are systems for updating prior probabilities on self-locating evidence. Self-locating evidence is evidence that takes the form of “I am now experiencing a qualitative property.”¹¹¹ The self-locating evidence in question here is, “I am now existing in a world containing life.”¹¹² Updating on this evidence behaves differently than updating on the evidence that someone is in a world containing life.¹¹³ Before examining three different methods of updating on self-locating evidence, we ought to establish example priors. Consider the following model based on one established by Isaacs, Hawthorne, and Russell:¹¹⁴

¹⁰⁸ Isaacs, Hawthorne, and Sanford Russell. 251.

¹⁰⁹ Isaacs, Hawthorne, and Sanford Russell. 251.



¹¹⁰ Isaacs, Hawthorne, and Sanford Russell. 251.

¹¹¹ Isaacs, Hawthorne, and Sanford Russell. 252.

¹¹² Isaacs, Hawthorne, and Sanford Russell. 252.

¹¹³ Isaacs, Hawthorne, and Sanford Russell. 252.

¹¹⁴ Isaacs, Hawthorne, and Sanford Russell. 254-258.

Universe - .5	
.4	
.05	
.05	









Multiverse - .5		
.32		
.08		
.08		
.005		
.01		
.005		

Table 1: Prior Probabilities

The prior probabilities for a single universe and a multiverse are set at .5 each. The prior probability's that an agent's mundane local evidence would black and blue are both set at .5. The odds that a universe would contain life is set at .2 with a .8 chance that a universe is lifeless. In this model, the rows are worlds which are composed of one of more universes. Each universe is a square with empty squares representing universes with no life. The circles represent centers with an agent experiencing some local mundane evidence. The blue circles represent evidentially identical centers in which the only evidence of the single, contained agent is, "I am existing in a blue room." The black circles represent centers in which there is an agent whose entire self-locating evidence is that they are in a black room. The odds that a room would be blue versus black are independent from the probability that there would be an agent existing in a center. Qualitative mundane evidence is independent from the likelihood of life because the qualitative aspects of our world that are necessary to support life are included in the probability that life exists instead of in the probability that a world would contain some

arbitrary mundane evidence. The order of worlds in a multiverse does not matter since the isolated agents have no evidence for being the “right” or “left” universe. A multiverse with only two universes simplifies the example but Isaacs, Hawthorne, and Russell show that the results hold with larger multiverses.¹¹⁵

The total of our self-locating evidence is that we exist in a blue room. A center is considered live if it contains an agent that shares our exact evidence. A center is considered dead if it contains an agent that does not have our self-locating evidence. The probability of a center being live is .1, which is the combination of the .2 probability of life and the .5 probability that a room is blue instead of black. The prior probabilities are shown on the left. I will now update these prior probabilities on self-locating evidence using the three self-locating epistemologies of Compartmentalized Conditionalization, Self Indication, and Self Sampling. Using Isaacs, Hawthorne, and Russell’s results I estimate the updated probabilities of a single universe and a multiverse on the evidence that ‘I am now existing in a blue room’ in the model below:

¹¹⁵ Isaacs, Hawthorne, and Sanford Russell. 274-282











Universe			Conditionalization	Self Indication	Self Sampling
.4			0	0	0
.05			.345	.333	.357
.05			0	0	0
Multiverse – Total			0.654	0.667	0.643
.32			0	0	0
.08			.552	.533	.571
.08			0	0	0
.005			.034	.067	.036
.01			.068	.067	.036
.005			0	0	0
Confirmation Factor			1.9	2	1.8

Table 2: Posterior Probabilities

The simplified rule for Compartmentalized Conditionalization is to assign to each live center the prior probability of its world divided by the number of live centers it contains.¹¹⁶ Then dead centers are given zero probability and the probabilities are renormalized to sum to 1. The formula for the multiverse confirmation factor on some self-locating evidence is $\frac{1-(1-pq)^n}{pq}$ for Compartmentalized Conditionalization, where p is the probability for life in a universe, q is the probability of an arbitrary agent experiencing one's self-locating evidence, and n is the number of universes in the

¹¹⁶ Isaacs, Hawthorne, and Sanford Russell. 254.

multiverse hypothesis.¹¹⁷ In this example, p is .2, q is .5, and n is 2. After assigning zero probability to the black circles the remaining prior probabilities sum to 0.145, which is then used to renormalize the probabilities to sum to 1.

Self Indication instructs that each center is assigned the probability of its containing world, then each dead center is updated to zero probability, and the results are renormalized to 1.¹¹⁸ Self Indication yields similar results to Compartmentalized Conditionalization because the two epistemologies differ only in how they treat the universes with duplicate live centers. Self Indication provides confirmation of the multiverse in direct proportion to n .¹¹⁹ In this example, Self Indication confirms the multiverse by a factor of 2 because there are two universes in the multiverse. Self Indication is not sensitive to the fine-tuning of life, p and treats the existence of life the same as mundane qualitative evidence.

Self Sampling instructs that each center, live or dead, receives an even split of the prior probability of its containing world.¹²⁰ Then dead centers are assigned probability zero and the probabilities are renormalized. Self Sampling provides multiverse confirmation of $\frac{1-(1-p)^n}{p}$.¹²¹ Interestingly, Self Sampling is not sensitive to q , the probability that some agent is experiencing one's self-locating evidence. In this example, using Compartmentalized Conditionalization, Self Indication, and Self Sampling the multiverse is about twice as likely as a single universe when updated on self-locating

¹¹⁷ Isaacs, Hawthorne, and Sanford Russell. 264.

¹¹⁸ Isaacs, Hawthorne, and Sanford Russell. 256.

¹¹⁹ Isaacs, Hawthorne, and Sanford Russell. 264.

¹²⁰ Isaacs, Hawthorne, and Sanford Russell. 258.

¹²¹ Isaacs, Hawthorne, and Sanford Russell. 264.

evidence and fine-tuned life. Given all three of the leading theories of how to update on self-locating evidence, the multiverse is more likely on the evidence that we exist.

All three of the leading self-locating epistemologies produce concerning results that do not follow reasonable intuitions. A problem with Compartmentalized Conditionalization is illustrated by the following thought experiment.¹²² Imagine that you and a hundred other participants will be sedated and then awakened alone in a pink or purple room at the same time. You know that a fair coin will be flipped once and, on a heads, 100 of the participants will be put into a purple room and 1 will be placed into a pink room. If the coin lands tails, the inverse will occur. You wake up in a purple room. It is intuitive that it is more likely that the coin landed heads, on your evidence of being in a purple room. Compartmentalized Conditionalization denies this intuition, however, and assert that you should believe there is a .5 probability that the coin landed heads. Each live center, purple rooms, receives the prior probability of its containing world, .5, divided by the number of live centers it contains.¹²³ Then dead centers, pink rooms, are given zero probability and the probabilities are renormalized to sum to 1. The lone purple room receives all .5 probability of its containing world in which the coin lands tails. The probability of being in any specific room of the 100 purple rooms is set to $.5/100$ so the aggregate probability of being in one of a 100 purple rooms is still .5. After updating on your evidence of existing in a purple room, according to Compartmentalized Conditionalization, you should have no reason to think the coin landed heads.

¹²² Weintraub, "Sleeping Beauty."

¹²³ Isaacs, Hawthorne, and Sanford Russell, "Multiple Universes and Self-Locating Evidence." 254.

Self Sampling also leads to rather unintuitive conclusions demonstrated by a thought experiment based on Carter's doomsday argument.¹²⁴ Suppose there is a 1 in a billion chance that a doomsday bomb goes off at some point in human history and ends the world. If the bomb goes off, then humanity will exist for shorter amount of time and if the bomb never goes off, then humanity will exist for a longer amount of time with a much larger total population. Suppose that your self-locating evidence is that you exist as a human with your DNA and your specific birthday. There is only one center that is compatible with your self-locating evidence assuming there are not any identical duplicate agents. In one possible world, the doomsday bomb does not go off and humanity exists for a long time. This means there will be more centers which are incompatible with your evidence due to the increased total of other humans that do not have your DNA and your birthday. If the bomb does go off and shortens the existence of humankind, there will be fewer incompatible centers.

According to Self Sampling, each center, regardless of compatibility with your evidence, receives an even split of the prior probability of its containing world.¹²⁵ The existence of substantially more dead centers in the possible world in which the bomb does not go off, drastically reduces the share of the total probability that your single live center receives compared to the share of the total probability that your single live center receives in the world in which the bomb does goes off. The bomb going off can eliminate trillions of dead centers and makes your single live center more likely. Thus, based on the evidence that you have your unique DNA and specific birthday, you should expect that a

¹²⁴ Carter, "The Anthropic Principle and Its Implications for Biological Evolution."

¹²⁵ Isaacs, Hawthorne, and Sanford Russell, "Multiple Universes and Self-Locating Evidence." 258.

doomsday bomb will end humanity any day now.¹²⁶ If humanity exists for a shorter time, there are fewer centuries in which to exist and so you are more likely to exist in any given century. According to Self Sampling then, on the evidence that you have your particular birthday in a particular century, you have strong evidence to believe that a doomsday bomb is going to go off and end humanity. In fact, the evidence that you exist now becomes more likely the sooner the bomb goes off, and so you should anticipate the bomb going off at every moment.

Because Self Indication assigns each center, dead or alive, the probability of its world, a world with more centers is confirmed over a world with fewer centers in proportion to the number of centers. There would be more live centers in a larger multiverse and so larger multiverse are confirmed over smaller multiverses. Consider Bostrom's presumptuous philosopher thought experiment in which there are two hypotheses that lead physicists are considering.¹²⁷ One hypothesis proposes that there are a trillion trillion observers in the universe and the other proposes that there are a trillion trillion trillion observers in the universe.¹²⁸ Instead of completing the experiment to determine which hypothesis is correct, the presumptuous philosopher reasons that the more observers that exist the more likely it is that you exist.¹²⁹ The evidence that you exist offers relative confirmation that more observers exist, in this case by a factor of a trillion. Strangely, Self Indication holds it more likely that there are more people without doing any experimentation to confirm. Furthermore, Self Indication fails to avoid further multiverse confirmation on just qualitative descriptive evidence. Self Indication treats

¹²⁶ Isaacs, Hawthorne, and Sanford Russell. 259.

¹²⁷ Bostrom, *Anthropic Bias*. 124.

¹²⁸ Bostrom. 124.

¹²⁹ Bostrom. 124.

self-locating evidence in much the same way as any other qualitative mundane evidence. Just as the odds of rolling a 6 receives relative confirmation as a function of the number of rolls, the odds of your self-locating evidence are proportional to the number of centers. Self Indication does not provide an escape from the massive multiverse confirmation of ordinary qualitative descriptive things.

All three of the leading self-locating epistemologies are fraught with problems but Isaacs, Hawthorne, and Russell argue that there is strong reason to hold that no matter what self-locating epistemology we come up with the multiverse will be confirmed on the evidence that we exist in a world fine-tuned to supports life.¹³⁰ Isaacs, Hawthorne, and Russell show that while self-locating epistemologies disagree on how to handle the multiverses with multiple live centers, any self-locating epistemology that accepts the premises ‘Agents’, and ‘Evidential Parity’ yields multiverse confirmation on the evidence that we exist in a universe fine-tuned for life.¹³¹ Agents is the claim that centers with no life are assigned zero probability on the evidence of our existence. Evidential Parity is the claim that there is no relative confirmation between evidentially equivalent possible worlds. Resting solely on these two premises, Isaacs, Hawthorne, and Russell prove that a multiverse small enough to not guarantee life, is confirmed.¹³² No relative confirmation between evidentially equivalent possible worlds in the example above is represented by the agents only having the knowledge that they are in a blue room. In our case, it means that we would have no evidence for existing in a single universe or a universe with identical evidence contained within a multiverse. Isaacs, Hawthorne, and Russell

¹³⁰ Isaacs, Hawthorne, and Sanford Russell, “Multiple Universes and Self-Locating Evidence.” 270.

¹³¹ Isaacs, Hawthorne, and Sanford Russell. 270-271.

¹³² Isaacs, Hawthorne, and Sanford Russell. 271.

stipulate that the multiverse is not large enough to guarantee life because Self Sampling only provides multiverse confirmation when life is fine-tuned.¹³³ Under Self Sampling, a multiverse is not confirmed over a single universe without fine-tuning. When life is guaranteed, a compensating mechanic causes the odds of a multiverse to be factored by the number of life containing centers.¹³⁴

As long as a self-locating epistemology updates the probability of the single universe with a live center by assigning it the entire probability of the single universe, the probability of the multiverse with one live center will always increase in the posteriors relative to the single universe, regardless of how to interpret the multiverses with two live centers.¹³⁵ Because a single universe always places more prior probability in the center with no agents, when centers without agents are reduced to zero probability, the single universe always loses a greater proportion of the prior probability. Isaacs, Hawthorne, and Russell then add a third premise that if life is guaranteed, the multiverse is not disconfirmed.¹³⁶ If the multiverse is not big enough to guarantee life, a multiverse is confirmed by the evidence of our existence. If life is guaranteed, the odds of there being a multiverse are not automatically reduced.

¹³³ Isaacs, Hawthorne, and Sanford Russell. 259.

¹³⁴ Isaacs, Hawthorne, and Sanford Russell. 258.

¹³⁵ Isaacs, Hawthorne, and Sanford Russell. 268.

¹³⁶ Isaacs, Hawthorne, and Sanford Russell. 273.

CHAPTER THREE

Objecting to Multiverse Confirmation

In Chapter Three, I will examine Isaacs, Hawthorne, and Russell’s three assumptions and two premises in their argument for multiverse confirmation. I will offer a few objections and consider what it would take to construct a self-locating epistemology that avoids multiverse confirmation. I will demonstrate that Isaacs, Hawthorne, and Russell’s multiverse confirmation is little affected by objections that do not rely on unreasonable assumptions. Isaacs, Hawthorne, and Russell conclude that, “if being in a universe with fine-tuned life is not evidence for the existence of a multiverse, then some principle in the multiverse confirmation theorems must fail: in the case of “small” multiverses, this means that priors are not separable, evidence is not local, or posteriors are not evidential.”¹³⁷ I will test the epistemic cost of invalidating their three assumptions separable priors, local evidence, and evidential posteriors. I will then consider their two premises, Agents and Evidential parity. I also will consider what it would look like to construct a self-locating epistemology that could avoid multiverse confirmation.

Assumptions and Premises

Considering the Evidential posteriors assumption, Isaacs, Hawthorne, and Russell “call a posterior evidential if and only if no world is confirmed relative to any evidentially equivalent world.”¹³⁸ In the model above, any two circles of the same color

¹³⁷ Isaacs, Hawthorne, and Sanford Russell. 274.

¹³⁸ Isaacs, Hawthorne, and Sanford Russell. 271.

are evidentially equivalent centers. The world that only has one blue center and one universe without life is an intrinsic duplicate to the single universe world that has one blue center. If two worlds have a one-to-one correspondence between centers with identical evidence, there is no reason for one world to receive higher posterior confirmation over the other. Priors are updated on evidence and so Evidential posteriors is just the assumption that whatever makes a difference in two world's posterior probabilities come from some evidential difference between them. To deny this premise would be to deny a fundamental principle of Bayesian probability framework that prior probabilities are updated on evidence.

This assumption is reasonable, and one would have to update on something other than evidence, like faith or a feeling, to deny Evidential posteriors. Consider two identical sealed rooms externally labeled A and B with one agent in each with a reasonable split of the prior probabilities between the two rooms. An agent inside either room would have no evidence that they are in room A instead of room B. For an agent to update to have a higher posterior probability for room A over room B, they would need to update their prior probability on something other than evidence, like a gut feeling. Just as an agent in one of the rooms can have a gut feeling that they are in room A, we can have a gut feeling that we are not in a multiverse. If I flip a coin and reason that there is a .5 probability of heads but then learn that the coin is loaded to land on heads, I should update the probability that the coin lands heads on my new evidence. If I just have a gut feeling that the coin will land heads, I should not update my probability. Under reasonable standards for evaluating hypotheses, a gut feeling is not enough to make a

probabilistic difference. Evidential posteriors holds unless we grant that gut feelings make an outcome more likely.

Next we will examine the Separable priors assumption that each universe will have independent intrinsic profiles not affected by the number of other universe or their intrinsic profiles.¹³⁹ In other words, the prior probability of having a certain intrinsic profile is the same for all universes regardless of the size of the containing multiverse.¹⁴⁰ This independence assumption is dubbed separability and follows from an independence assumption used by both Hacking and White. Isaacs, Hawthorne, and Russell acknowledge that separability is an idealizing assumption, but they use it to simplify the consideration of how multiverse confirmation functions on self-locating evidence.¹⁴¹ Understanding multiverse confirmation with separable priors can clarify multiverse confirmation without the Separability assumption. Separability is primarily concerned with prior probabilities and so it is reasonable to think that even without separable priors their argument for relative confirmation may still stand. For example, if the prior probability of life existing in any given universe was not separable but instead was dependent on how many other universes exist, then multiverse confirmation could still hold even without separability. If the prior probability for life is only slightly affected by the existence of multiple universes, massive confirmation for the multiverse could still arise from finetuning and our self-locating evidence.

Separability is a reasonable default assumption. Appealing to simplicity, universes that do not affect one another is a more intuitive assumption than a system

¹³⁹ Isaacs, Hawthorne, and Sanford Russell. 269.

¹⁴⁰ Isaacs, Hawthorne, and Sanford Russell. 269.

¹⁴¹ Isaacs, Hawthorne, and Sanford Russell. 270.

through which prior probabilities are dependent on the number of other universes. Separability allows us to consider how multiverse confirmation on self-locating evidence goes in a simplified case where prior probabilities for intrinsic profiles are not dependent on each other. There could, of course be good reasons to expect different intrinsic profiles for a single universe and a universe contained in a multiverse.¹⁴² Isaacs, Hawthorne, and Russell explain that, “one might allocate some prior probability to a theistic hypothesis, according to which God does not care much about how many universes there are, but is adamant that at least one universe contains life.”¹⁴³ If this were true, then a single universe would have very high prior probability for containing life while a universe in a multiverse would have a reduced prior probability dependent on the number of other universes.¹⁴⁴

Contingent on God guaranteeing the existence of life, we would expect that if there is one universe it would contain life but if there are many universes, they may not need to contain life. Isaacs, Hawthorne, and Russell use this example to show that there could be some reasons to doubt the separability assumption. If we know a priori that there must be life in some universe, then the probability of there being life in the single universe is 1, but the prior probability for the existence of life would be lower in any given universe in a multiverse. Our evidence is that life is not guaranteed but instead extremely unlikely. If the initial conditions necessary to support life are extremely unlikely in our universe, it is reasonable to assume that these fine-tuned initial conditions would also be unlikely in other universes.

¹⁴² Isaacs, Hawthorne, and Sanford Russell. 270.

¹⁴³ Isaacs, Hawthorne, and Sanford Russell. 270.

¹⁴⁴ Isaacs, Hawthorne, and Sanford Russell. 270.

To support the claim of non-separable priors, we would need evidence from beyond our universe or non-local evidence. Isaacs, Hawthorne, and Russell use the final assumption of Locality which claims that “intrinsic duplicate universes are evidentially equivalent” to rule out non-local evidence.¹⁴⁵ I will consider whether a single universe could have an intrinsic duplicate in a multiverse at all and then consider whether intrinsic duplicates would be evidentially equivalent. One might object that there is some evidence we would necessarily have in a multiverse that we would not have in a single universe. This would make intrinsically duplicated universes in a single universe and a multiverse impossible because some evidence would necessarily differ. To use the model from Chapter Two, if we knew that the center in the single universe necessarily was green instead of black or blue then there could be no intrinsic duplicates between a multiverse and a universe.

Anything that can happen will be likely to happen in a large enough multiverse and so if it were possible to construct a way of broadcasting some message to all universes in a multiverse, then we would expect it to occur. Consider two hypotheses; there is advanced intelligent extraterrestrial life or there is not. Regardless of the prior probabilities one assigns to either hypothesis, the evidence that we have not been contacted by extraterrestrial life is best explained if there is not extraterrestrial life at all. So, the no extraterrestrial life hypothesis is relatively confirmed on our evidence. One might think that if a multiverse is large enough to explain the very unlikely existence of fine-tuned life, then the multiverse might also be large enough to explain the existence of a multiverse radio broadcasting information to all universes in the multiverse. By the

¹⁴⁵ Isaacs, Hawthorne, and Sanford Russell. 270.

same reasoning against the existence of extraterrestrial life, a multiverse is made less likely by not having received any communication from such a radio.

Leading scientific theories agree, however, that communication between universes is impossible and will be impossible in all universes due to the constant speed of light.¹⁴⁶ There are already parts of our own universe between which communication is impossible due to the speed of light because a postulate of special relativity is that the speed of light in empty space does not vary.¹⁴⁷ It is also conceivable that some universes in the multiverse might be necessarily isolated from cross universal communication. There could be an intrinsic duplicate universe in a multiverse that is incapable of receiving external communication. Anything that we could have as evidence from within the universe that would indicate whether we exist in a containing multiverse could be maintained in an intrinsic duplicate universe in a multiverse.

Isaacs, Hawthorne, and Russell consider that, “if phenomenal states are evidence, one might assign some prior probability to the hypothesis that the content of one’s phenomenal states is partially determined by what goes on in other universes.”¹⁴⁸ Williamson argued that a phenomenal conception of evidence is initially appealing because it can provide an escape from skeptical concerns like being a brain in a vat, a person fed false experiences, or, in our case, being an in an intrinsic duplicate world in a multiverse.¹⁴⁹ He ultimately holds that the phenomenal conception of evidence is not well founded because even accepting a phenomenal conception of evidence does not provide

¹⁴⁶ “Gravity Probe B - Special & General Relativity.”

¹⁴⁷ “Gravity Probe B - Special & General Relativity.”

¹⁴⁸ Isaacs, Hawthorne, and Sanford Russell, “Multiple Universes and Self-Locating Evidence.” 271.

¹⁴⁹ Kelly, “Evidence.”

an adequate escape from skeptical concerns.¹⁵⁰ If our phenomenal states count as evidence, it is still possible that there could be an intrinsic duplicate agent in a multiverse with an identical phenomenal state. It is not unreasonable to think that our phenomenal states would be different in a multiverse than in a single universe but to rely on a phenomenal conception of evidence to undermine multiverse confirmation requires the assumption that no duplicate agent can share one's phenomenal state. It is unreasonable to claim that a single universe could not be intrinsically duplicated in the multiverse.

Because there could be intrinsic duplicate worlds, we must now consider whether intrinsic duplicate universes are evidentially equivalent. Isaacs, Hawthorne, and Russell explain that "two possible universes are evidentially equivalent if and only if there is a one-to-one correspondence between the centers in the two universes that takes each center in one universe to an evidentially equivalent center in the other."¹⁵¹ Each center is an agent experiencing the same set of local mundane evidence. If two agents have the same evidence, then neither agent would have any evidence over the other to know that they are in a multiverse instead of a universe.

Internalist, with respect to knowledge, consider evidence to be internal to the agent experiencing the evidence rather than the evidence being concretely in the world.¹⁵² Isaacs, Hawthorne, and Russell claim that, "for an internalist who holds that intrinsic duplicate agents are evidentially equivalent, Locality follows automatically."¹⁵³ The internalist will consider both agents to have intrinsically duplicate evidence in their minds and so there is evidential equivalence between the two worlds. With an externalist

¹⁵⁰ Kelly.

¹⁵¹ Isaacs, Hawthorne, and Sanford Russell, "Multiple Universes and Self-Locating Evidence." 271.

¹⁵² Parent, "Externalism and Self-Knowledge."

¹⁵³ Isaacs, Hawthorne, and Sanford Russell, "Multiple Universes and Self-Locating Evidence." 271.

conception of evidence, an agent's evidence is in their environment. If the universes are intrinsic duplicates however, all surroundings will be identical and so evidential equivalence would be maintained from the local level all the way to the universal level. In an intrinsic duplicate universe in a multiverse, even our evidence of the most distant stars would be the same. Isaacs, Hawthorne, and Russell consider that locality does not need to rely on internalism to support the locality assumption and instead only needs the idea that if evidence is not in the head, it is at least contained in the universe.¹⁵⁴ Except for the most extreme version of externalism, in which our evidence is not based in the mind but in the physical world even beyond our universe, intrinsic duplicate worlds will be evidentially equivalent. If we cannot have evidence from outside of our universe, then it is hard to see how there could be evidence to favor a single universe over an intrinsic duplicate universe in a multiverse. Nonlocal evidence would involve learning that we are not in a multiverse from within our universe.

It is not clear how we could learn such a thing because it would require knowledge about the external state of our universe. Isaacs, Hawthorne, and Russell argue that "it would be surprising if the true theory of multiverse epistemology crucially relied on nonlocal evidence."¹⁵⁵ While it would be odd if the multiverse was disconfirmed on nonlocal evidence, it is worth noting that for many skeptical concerns, non-local evidence plays an important role. For example, "it's commonplace to say that an agent with hands knows that they are not a handless brain-in-a-vat with misleading appearances, and that a handless brain-in-a-vat with misleading experiences does not know whether they are an

¹⁵⁴ Isaacs, Hawthorne, and Sanford Russell. 271.

¹⁵⁵ Isaacs, Hawthorne, and Sanford Russell. 271.

agent with hands or a handless brain-in-a-vat with misleading appearances.”¹⁵⁶ In the same way, one could claim that those in a single universe would know that they are not contained in a multiverse while those in a multiverse would not know whether they are in a single universe or a multiverse. This reasoning relies on a conception of thick evidence. An example of thick evidence might occur if I lose my dog but then find a dog that looks just like my dog. According to a conception of thick evidence, I will be able to know whether the found dog is in fact my dog not based on any physical or particular evidence. Rather, I simply know the dog is in fact my lost dog because the dog is my lost dog. I have thick evidence that the dog is my dog. Thick evidence denies the premise of Locality by claiming that an agent could have some knowledge of being in a single universe rather than a multiverse.

A conception of thick evidence explains how we might seem to be in an intrinsic duplicate universe but still know that we are not in a multiverse. An agent in a single universe could know that they are not in a multiverse simply because they are not in a multiverse. Even if it were possible for an agent to have this kind of evidence, it seems that we do not. An understanding of thick evidence of this proportion becomes problematic for systematic reasoning. A theist could say, “I know I am not in a multiverse, because I have faith that God would not make me in a multiverse.” It is not clear that a multiverse of a certain scale is inconsistent with the existence of God. Perhaps what the theist means is, “I find the existence of a multiverse unlikely based on the existence of God.” This just serves to set the priors of the multiverse and universe assuming the existence of God. Multiverse confirmation through Isaacs, Hawthorne, and

¹⁵⁶ Isaacs, Hawthorne, and Sanford Russell. 285.

Russell's reasoning applies regardless of where the priors for a multiverse are set. If the priors for the multiverse are not set astronomically low, the multiverse will always gain some ground on the universe when updating for the existence of fine-tuned life.

From these assumptions, Isaacs, Hawthorne, and Russell construct their Evidential parity premise, that there is no relative confirmation between evidentially equivalent worlds. Consider two identical rooms with no windows or doors with one agent in each room in two separate universes. Outside of one of the rooms there is a metal ball. If you found yourself in such a room, you would have no reason to think that your room is more likely to be in the universe with the ball or the universe without the ball. The two rooms are evidentially equivalent and so there would be no relative confirmation between the two rooms. In the same way, Isaacs, Hawthorne, and Russell claim that there would be no relative confirmation if we exist in a single universe with either nothing beyond our universe, or other universes that are entirely inaccessible.¹⁵⁷

Isaacs, Hawthorne, and Russell consider an objection to evidential parity from physics. They explain that, "the multiple universes that appear in contemporary physics are not entirely separate and independent of one another."¹⁵⁸ In some theories of quantum mechanics, "there is a certain physical quantity of 'amplitude' or 'branch-weight' that ought to make a difference to the epistemic probability of being in one branch of the quantum wave function or another."¹⁵⁹ This means that two universes in the same multiverse could be evidentially equivalent but still receive different confirmation because of differing quantum amplitudes or branch weights.¹⁶⁰ If two worlds that are

¹⁵⁷ Isaacs, Hawthorne, and Sanford Russell. 270.

¹⁵⁸ Isaacs, Hawthorne, and Sanford Russell. 270.

¹⁵⁹ Isaacs, Hawthorne, and Sanford Russell. 269.

¹⁶⁰ Isaacs, Hawthorne, and Sanford Russell. 269.

intrinsic duplicates have different branch weights, the two worlds would appear identical but have differing prior probabilities. In this way, the prior probabilities for a universe in the multiverse could differ while maintaining evidential parity. Their argument for multiverse confirmation can avoid this objection by stipulating that intrinsic duplicate universe also have the same quantum branch weights.

The final premise for Isaacs, Hawthorne, and Russell's findings is that universes with no life are updated to zero probability on the evidence that we exist. The only way that this could be refuted is by taking seriously the possibility that we do not exist. Agents is almost entirely unobjectionable unless one is willing to accept the claim that we do not exist. Total skepticism would undermine multiverse confirmation, but it also undermines theism and just about everything else. If we do not exist at all, then the fine-tuning of the universe for life is insignificant. It is reasonable to claim that we exist. If we exist, then worlds that feature no life at all are updated to zero probability. If there is some chance that instead of ourselves, we could have been the metal ball outside of the room in the example above, then perhaps that could provide relative confirmation between evidentially equivalent worlds. Isaacs, Hawthorne, and Russell explain that "the necessitist holds that, come what may, one would have been some-thing—but this something might have been a very boring nonconcrete object, without any thoughts or feelings or spatiotemporal location."¹⁶¹ Necessitism requires that everything exist by necessity, however, and so the one universe with the ball makes the universe without the ball impossible. Even setting aside the strange metaphysical implications of necessitism, any other center that could lead to differing probabilities in a universe and a multiverse

¹⁶¹ Isaacs, Hawthorne, and Sanford Russell. 285-286.

are not evidentially equivalent and so necessitism does not provide an objection to evidential parity. To object to Isaacs, Hawthorne, and Russell's argument requires the adoption of unreasonable assumptions.

Novel Self Locating Epistemology

Isaacs, Hawthorne, and Russell claim that there is no way of updating on self-locating evidence that does not lead to multiverse confirmation as long as the self-locating epistemology follows the general assumptions above. Because specific qualitative local evidence led to strong multiverse confirmation, one might have hoped that self-locating epistemology could provide an escape from strong multiverse confirmation on mundane evidence.¹⁶² Self Indication and Self Sampling avoid multiverse confirmation from qualitative local evidence as neither relies on the probability of an arbitrary agent having your mundane evidence.¹⁶³ Self Indication still confirms a multiverse but only determined by the expected number of live centers.¹⁶⁴ The probability of a given local property leads to an expected number of live centers in a single universe. In a multiverse the expected number of live centers is directly dependent on the number of universes.¹⁶⁵ Compartmentalized Conditionalization considers the odds of an arbitrary agent having your specific mundane evidence, and so the arrangement of the clouds or the grass still offers multiverse confirmation. It treats you experiencing some qualitative evidence the same as someone experiencing some qualitative evidence.¹⁶⁶

¹⁶² Isaacs, Hawthorne, and Sanford Russell. 264.

¹⁶³ Isaacs, Hawthorne, and Sanford Russell. 264.

¹⁶⁴ Isaacs, Hawthorne, and Sanford Russell. 256.

¹⁶⁵ Isaacs, Hawthorne, and Sanford Russell. 257.

¹⁶⁶ Isaacs, Hawthorne, and Sanford Russell. 254.

Under Self Indication, multiverse confirmation is not sensitive to the degree of finetuning while under Self Sampling the multiverse requires fine-tuning to receive confirmation.¹⁶⁷ Because Self Sampling does not confirm the multiverse without fine-tuning and Self Indication provides the same level of confirmation regardless of fine-tuning, Isaacs, Hawthorne, and Russell explain that, “one might hope to come up with a single theory that combines both of these features; such a theory would say that a multiverse is not confirmed even with fine-tuning.”¹⁶⁸ A theory like this would apply Self Sampling in the cases without fine-tuning, yielding no multiverse confirmation, and then appeal to Self Indication in the cases with finetuning to show that the multiverse is not more confirmed with finetuning that it was confirmed without finetuning, leading to no confirmation. Any version of a self-locating epistemology that follows fundamental standards of epistemology will not switch from one system to another but instead will hold the same system up for every case.

If life was guaranteed then a multiverse could be disconfirmed using Self Sampling because “if our evidence indicates that our universe has a relatively small population, compared to the expected population size of an arbitrary inhabited universe, then the expected proportion of centers compatible with our evidence is higher for a single universe than it is for a multiverse.”¹⁶⁹ Olum suggests that our own universe is barely inhabited compared to what would be reasonable to expect in an inhabited universe, which offers some confirmation for a single universe relative to the multiverse on Self Sampling with the guarantee of life.¹⁷⁰ If life is guaranteed, but independence

¹⁶⁷ Isaacs, Hawthorne, and Sanford Russell. 268.

¹⁶⁸ Isaacs, Hawthorne, and Sanford Russell. 268.

¹⁶⁹ Isaacs, Hawthorne, and Sanford Russell. 273.

¹⁷⁰ Olum, “Conflict between Anthropic Reasoning and Observation.”

holds between universes in a multiverse, and we only have local evidence, then “it’s not clear why we would think that our evidence favors a single universe.”¹⁷¹ For Self Sampling, the multiverse makes it more likely that someone is experiencing your mundane local evidence, but it also makes it more likely that there are more people who are not experiencing your mundane local evidence.¹⁷² To derive a method for updating on self-locating evidence that does not lead to multiverse confirmation one would have to deny the assumptions evaluated above or mistakenly join mutually exclusive elements of different self-locating epistemologies. Isaacs, Hawthorne, and Russell’s findings are strong and provide relative confirmation for a multiverse over a single universe. We will now consider how theism fares in light of multiverse confirmation.

¹⁷¹ Isaacs, Hawthorne, and Sanford Russell, “Multiple Universes and Self-Locating Evidence.” 273.

¹⁷² Isaacs, Hawthorne, and Sanford Russell. 259.

CHAPTER FOUR

Effects on Theism

In this section, I will explore the effect of Isaacs, Hawthorne, and Russell's findings on the fine-tuning argument for the existence of God. I will consider a God of the multiverse and argue that small enough multiverses are not theologically significant. I will then argue that theism can still have strong priors, is still confirmed over single universe atheism, and does not face the same skeptical concerns posed to atheism by large multiverses.

Setting Priors

The same evidence of fine-tuning used by theists to argue for the existence of God confirms a multiverse as well. To consider more than just relative confirmation we need priors for theism and a multiverse. Assigning prior probabilities for the existence of God and the existence of a multiverse is complicated and unclear. On our evidence of fine-tuned life, theism and the multiverse are made more likely. Arguing that either the prior probability the multiverse or theism should be set low enough to take the hit from fine-tuning and still be unlikely in the posterior is unreasonable. Setting the priors of something so incredibly low, requires strong justification. Because we expect to have little or no evidence for a God or a multiverse, having strong justification for such low priors is dubious. A multiverse seems unlikely, and God seems unlikely. Neither is so unlikely that it remains negligible on the evidence of our existence.

There is likely to be more direct evidence of a God than evidence of a multiverse. If there is a God, then there is some chance they wish to reveal themselves. If they reveal themselves, there is some chance we gain some evidence of a God. We can never have direct evidence of a multiverse, however, because we cannot have evidence from beyond our own universe. There is a higher chance of having evidence of a God if God exists than the chance of having evidence of a multiverse. There are several good arguments for the existence of God like the argument from history or the argument from consciousness that can serve to increase the prior probability of a God separate from the fine-tuning argument. The multiverse may have less support outside of the fine-tuning argument because the multiverse theory primarily is a way to explain our physics like fine-tuning. Just because a proposition has more purported evidence or good arguments for it, is not a reason to give that proposition a higher prior probability, although it would be reasonable to think that a God is more likely than a multiverse. The principle of simplicity is not much help when setting the prior probabilities for a God and the multiverse. Both hypotheses introduce serious complexity. To set the prior probabilities for God and a multiverse is difficult. The best we can do is reason that even if neither is likely, they both become massively more likely on the evidence that there is fine-tuned life.

Isaacs, Hawthorne, and Russell do not address theism in their paper because multiverse confirmation is not a direct objection to theism. Multiverse confirmation just provides a feasible explanation, as an alternative to theism, for the unlikely existence of fine-tuned life. Multiverse confirmation makes no direct claim about the likeliness of God. The relationship between the probability of a multiverse and the probability of theism depends on how likely a multiverse is given atheism. If we suppose that the

probability of life in a single universe without a God is 0 and the probability of life in a multiverse without a God is 1. If the probability of life given theism is $\frac{1}{2}$ then we would not know whether the existence of life confirms theism over atheism. If multiverses are unlikely given atheism, then theism is more likely on the evidence of that there is life. If a multiverse is guaranteed given atheism, then atheism is more likely on the existence of life. Establishing priors for a multiverse given atheism is challenging. If the multiverse is mutually exclusive with the existence of God, then relative confirmation for a multiverse over a single universe would detract from the likelihood of God because God would be limited to only a single universe. There is good reason to think that there could be a God of the multiverse, however.¹⁷³

Reasoning through the theological implications of a God of the multiverse is beyond the scope of this paper but there are a few implications I will review. There is nothing mutually exclusive about the existence of a God and the existence of multiple universes. If we consider the simplest example, a universe just like ours but accompanied by one other dead universe is a multiverse but holds essentially no theological significance. The compatibility of a multiverse with the existence of God becomes more complicated as the multiverse becomes larger. There could certainly be a God of the multiverse and God creating a multitude of universes may even be likely given theism.

A skeptical concern that arises for a God of the multiverse is that in a multiverse large enough to explain the unlikely existence of life, the odds of fraudulent religion increase. The odds of a true religion might increase as well in a multiverse. However, if God guarantees that a true religion exists in at least one universe then the multiverse

¹⁷³ Page, "Does God So Love the Multiverse?"

would increase the ratio of expected fraudulent religions to true religions. Assuming God will guarantee at least one true religion, if there is only one universe then God will ensure that there is a true religion in the sole universe. If there is a multitude of universe, God may ensure that there is a true religion in some universe but leave the rest to false beliefs. We can consider the odds of miracles in a multiverse using the same reasoning. If God ensured that one universe experienced plenty of miracles, we would expect there to be plenty of miracles in our world if we are a sole universe. If we thought that there was a distinct absence of miracles compared to what we be expected in a single universe given God, we might have reason to think that we are in a multiverse. There could be some other universe in the multiverse that receives the expected miracles. If the multiverse is large enough to explain life, then it is large enough to explain other things with higher prior probabilities than fine-tuned life arising by chance. Some miracles are more likely than life occurring by chance. Miracles are unlikely but so is the finetuning for the existence of life. Both theism and multiverse atheism propose to explain propositions that are a priori unlikely.

If there is a multiverse large enough to explain life, then skeptical concerns are plentiful for both theism and atheism. Theism presents some reasons to think that God would be a constant across the multiverse. We expect math to be constant across the multiverse and in the same way, if there is a God, we can expect him to be the same across the multiverse. I argue that the God of a multiverse provides escapes from the skeptical concerns of a large multiverse. God could tune the multiverse to avoid some of particularly challenging skeptical situations. There can be many different multiverses with different levels of skeptical situations. For example, some multiverses might be

more prone to contain intrinsic duplicates of agents that are being deceived about their experiences. God could tune the multiverse to avoid such skeptical concerns.

Robin Collins argued that the multiverse theory was simply a way of passing the conversation of fine-tuning to the multiverse level.¹⁷⁴ He wondered why we should expect the multiverse to be fine-tuned to produce a universe with life at all. The fine-tuning is in the dish, that we have a fine-tuned universe, and it is in the menu, that the multiverse could contain a fine-tuned universe at all. The fine-tuning of the multiverse opens the door to a multiverse generator that could explain the fine-tuning of the multiverse from a naturalistic point of view. Collins responds to this idea of a universe generator in his paper, “The Fine-Tuning Design Argument.”¹⁷⁵ Collins does not think that the multiverse theory defeats the fine-tuning argument and neither do I. Collins responds by pointing out that the multiverse theory requires a physical process called a universe generator that makes various universes with different constant values and different laws. Collins main objection is that the universe generator either possesses the ability to create the specific fields and laws that are necessary for complex life or it does not. If the universe generator lacks the necessary ingredients for a universe with complex life then it is certainly unlikely that such a universe generator exists based on the evidence that we have complex life. On the other hand, if the universe generator has the necessary ingredients for complex life then Collins claims the universe generator is finely tuned.¹⁷⁶ Collin’s argument shifts to say that even if there is a universe generator, its ability to make worlds that support complex life is more likely than not given the

¹⁷⁴ Murray, *Reason for the Hope Within*.

¹⁷⁵ Murray.

¹⁷⁶ Murray.

existence of God.¹⁷⁷ To use another dice analogy, Collins responds to the multiverse theory by acknowledging that while multiple dice being rolled does make a result more likely, the evidence that the dice being rolled even have been divinely tuned to even include a “6” side is evidence for God.¹⁷⁸

Someone might disagree with Collins by arguing that we do not have any prior reason to believe that a universe generator would *not* have access to the constants or laws that are required for life. Collins could respond by saying that even if the universe generator could, by chance, have the necessary components for life, it is still more likely given a divine creator than by chance. I agree with Collins that there could be a God of the multiverse. I agree with him that the evidence of the laws and constants necessary for life are better explained by the existence of God than by the random chance that the multiverse generator would have access to the right ingredients for complex life.

Confirmation over Single Universe Atheism

Where the priors for a multiverse begin is not settled, but Isaacs, Hawthorne, and Russell’s multiverse confirmation shows that the posterior probability of the multiverse increases relative to a single universe. Because the multiverse and theism both receive confirmation from the existence of fine-tuned life the question comes down to priors. Consider the 4 available configurations of theism, atheism, a single universe, and a multiverse below:

Theism		Atheism	
Multiverse	Universe	Multiverse	Universe

¹⁷⁷ Murray.

¹⁷⁸ Murray.

If we assign equal prior probability to all 4 categories, then when we update on fine-tuning, single universe atheism is reduced to nearly zero. In the table above, regardless of the priors, if we assign the atheistic single universe a non-zero probability then, updating on the evidence that there is fine-tuned life, the atheistic single universe becomes unlikely relative to all other options which are confirmed by the existence of fine-tuned life. In this case, atheism loses almost half of its prior probability while theism does not lose any. To maintain atheism considering fine-tuning, one should accept the multiverse theory. Typically, prior credence for the multiverse theory is low but considering fine-tuning, those who believe in single universe atheism ought to accept theism or the multiverse theory. They should not hold that we got inexplicably lucky.

Larger Multiverses and Skepticism

According to Self Indication, one of the three leading theories of self-locating epistemology, a multiverse is confirmed as a factor of how many universes it contains. Larger multiverses are favored relative to smaller multiverses by Self Indication. The larger the multiverse the more likely it is that we are experiencing a skeptical scenario in which our experience is untrustworthy. Isaacs, Hawthorne, and Russell note that, “if the world may well be vast, the chance of there really being many agents in unfortunate skeptical predicaments—like “Boltzmann brains”—is not negligible.”¹⁷⁹ We might be brains in vats, sleepers deceived by demons, or Boltzmann brains simulating other’s real experience. A massive sprawling multiverse makes these situations more likely. Imagine that there is a chain of 99 brains that are hooked up to a wire. When you plug the wire

¹⁷⁹ Isaacs, Hawthorne, and Sanford Russell, “Multiple Universes and Self-Locating Evidence.” 285.

into your brain all the brains have the same sensory evidence, memories, and experience as you. While the wire is plugged in you should think that your experience is false because there are 99 identical copies of your brain that are experiencing the same thing that you are experiencing. Only one is experiencing something real rather than something simulated. While the wire is not plugged in you should be more confident that your experience is real. In the same way larger multiverses introduce skeptical concerns by raising the probability that there are beings with false experiences.

If there are tons of versions of you, then even if you think that there is a slim chance that your senses are untrustworthy the trustworthiness of your experience goes down. Not only are there skeptical concerns for a large multiverse, but also in a larger multiverse there could be duplicates of you that are in euphoric states or in states of constant torture. The meaning of goodness, pleasure, and the trustworthiness of our senses is upended in a large multiverse. I do not claim that multiverse atheism must use Self Indication. Avoiding confirmation of massive multiverses is a reason to use a different self-locating epistemology. Atheism is in a challenging position if single universe atheism is extremely unlikely given fine-tuning while multiverse atheism introduces the skeptical concerns of a large multiverse. I argue that in light of fine-tuning atheism should accept the multiverse but that accepting the multiverse potentially leads to destructive sprawling multiverses. God could explain the fine-tuning for life without potentially confirming the skeptical concerns of a massive multiverse. The fine-tuning argument attempted to show that God's existence is more likely relative to atheism, given the existence of fine-tuned life. Multiverse confirmation reduces the relative confirmation for theism over atheism to only concern single universe atheism. However, a multiverse

with atheism faces serious skeptical concerns that can render existence meaningless. A multiverse of a small enough size is not mutually exclusive with theism and can explain fine-tuning for life without God.

In this paper, I have explained the fine-tuning argument, the multiverse objection, and multiverse confirmation. I have examined three self-locating epistemologies and their short comings while reviewing Isaacs, Hawthorne, and Russell's findings. I have evaluated what it would take to refute their findings and concluded that neither thick evidence nor a novel self-locating epistemology offers a reasonable method for avoiding multiverse confirmation. Finally, I have argued that multiverse confirmation is not dire for theism due to the possibility for favorable theistic priors, the remaining confirmation over single universe atheism, and the skeptical concerns introduced by a large multiverse.

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