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# THE INTRINSIC PROBABILITY OF GRAND EXPLANATORY THEORIES

Ted Poston

This paper articulates a way to ground a relatively high prior probability for grand explanatory theories apart from an appeal to simplicity. I explore the possibility of enumerating the space of plausible grand theories of the universe by using the explanatory properties of possible views to limit the number of plausible theories. I motivate this alternative grounding by showing that Swinburne's appeal to simplicity is problematic along several dimensions. I then argue that there are three plausible grand views—theism, atheism, and axiarchism—which satisfy explanatory requirements for plausibility. Other possible views lack the explanatory virtue of these three theories. Consequently, this explanatory grounding provides a way of securing a nontrivial prior probability for theism, atheism, and axiarchism. An important upshot of my approach is that a modest amount of empirical evidence can bear significantly on the posterior probability of grand theories of the universe.

My aim in this paper is to articulate an alternative grounding to a relatively high prior probability for grand explanatory theories of the universe.<sup>1</sup> This is important for empirical arguments for such theories. For instance, one argument for theism begins with contingent features of the world: that it exists, that it exhibits temporal order, that it includes conscious human persons, that human persons exhibit moral awareness and make morally significant decisions, etc. The argument then continues that theism is probable given these contingent features of the world. Arguments of this kind are best construed as inferences to the best explanation.<sup>2</sup> Yet before

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<sup>1</sup>My thanks to Scott Davidson, Chris Dodsworth, Michael Ferry, Nicholas Jones, Daniel Massey, Kevin McCain, Thomas Metcalf, Calum Miller, Mark Murphy, Richard Swinburne, and Chase Wrenn for helpful comments on a previous draft. An earlier draft of this paper benefited from useful discussion at The Society for Philosophy of Religion. I am grateful to two anonymous reviewers of this journal for in-depth comments. Any errors that remain may be credited to the entropy of the universe, to Karen, or to the author's failure to heed the sensible advice of superb colleagues.

<sup>2</sup>See Lipton (*Inference to the Best Explanation*) for a superb discussion on inference to the best explanation.



we can evaluate the impact of these contingent features of the world we must first survey the field of candidate theories and evaluate the probability of those theories prior to the specific evidence they are intended to explain. This stage of evaluation gets at the intrinsic probability of a theory. The intrinsic probability of a theory tracks a theory's probability prior to considering empirical evidence. To evaluate a theory's intrinsic probability, one examines its content given only tautological information. If it is correct to infer that theism is the best explanation of the contingent features of reality then it must be that the intrinsic probability of theism is not negligible; for theories with negligible prior probabilities are not viable theories for empirical confirmation.

Richard Swinburne has provided the most sophisticated argument that theism has a non-negligible intrinsic probability by arguing (i) that theism is a simple (i.e., parsimonious) hypothesis and (ii) that simplicity (parsimony) is a mark of truth.<sup>3</sup> It is standard in the literature to distinguish two aspects of simplicity: *elegance* and *parsimony*.<sup>4</sup> A theory's elegance measures its syntactic simplicity, roughly the simplicity of its linguistic expression. For example,  $F = ma$  is more elegant than  $V = \pi r^2 h$ . At first pass, a theory's parsimony is a measure of the number and type of entities postulated.<sup>5</sup> In what follows I'll use "simplicity" and cognates to track parsimony.

There are numerous challenges to the claim that simplicity is an alethic virtue of theories.<sup>6</sup> Moreover, there is a tension between Swinburne's account of simplicity and his claim that theism is a simple hypothesis. It would be desirable if a defense of a relatively high value for the intrinsic probability of theism didn't rely on a general defense of simplicity. In this paper I explore this possibility. I investigate a route for defending a relatively high value for the intrinsic probability of theism by way of characterizing the space of plausible competing theories, where plausibility tracks the explanatory structure of a given theory. In particular, I assess a theory's explanatory structure by assessing whether it posits properties held without any finite limit. I assume that it is a good making feature of explanations that they are deeply structural such that any finite limits are explained in terms of a deeper structure without finite limits. If it is a brute fact about an explanation that it posits properties of a finite limit then that is a strike against the theory.

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<sup>3</sup>Swinburne, *Simplicity as Evidence of Truth, Epistemic Justification, The Existence of God*, and "God as the Simplest Explanation of the Universe."

<sup>4</sup>See Baker, "Simplicity."

<sup>5</sup>The relationship between parsimony and elegance is a matter of debate. See Sober, "What is the Problem of Simplicity?"

<sup>6</sup>See Baker, "Quantitative Parsimony and Explanatory Power" and "Simplicity"; Grünbaum, "Is Simplicity Evidence of Truth?"; Huemer, "Explanationist Aid for the Theory of Inductive Logic" and "When is Parsimony a Virtue?"; Willard, "Against Simplicity"; and Sober, *Ockham's Razors*.

My strategy in this paper is to use the explanatory features of possible views to generate a finite, indeed small, list of plausible views. Intrinsic probability then tracks plausibility rather than mere possibility. My proposal is that this explanatory strategy provides an alternative grounding for a relatively high prior on theism. This is a friendly amendment to the Swinburne project by showing how it can be motivated on a more modest foundation.<sup>7</sup> But it is also a friendly suggestion for empirically based arguments for atheism and axiarchism. In the first section I motivate this proposal by reviewing the problem of simplicity in the context of Swinburne's views. Then I move to my positive proposal by discussing the nature of theism, the field of competing hypotheses, and then I defend the claim that the intrinsic probability of theism along with other grand theories is relatively high.

### 1. *The Problem of Simplicity*

The intrinsic probability of a theory is its probability prior to considering empirical evidence in its favor. The evaluation of evidential support of any theory requires two stages: (i) a determination of its intrinsic probability and (ii) a determination of its power to explain the relevant evidence. The first stage of evaluation involves considering the nature of the theory itself and its relation to other possible views. Swinburne notes three aspects of a theory that determines its intrinsic probability: fit with background knowledge, scope, and simplicity. Theories of everything have equal scope and fit with background knowledge. The scope of a theory is how much evidence it is intended to explain. A grand theory of everything is intended to explain the origin and nature of the universe. In the case of the intrinsic probability of a grand theory, the background evidence is tautological information and thus it is the same. Hence, as Swinburne reasons, the sole determinant of the intrinsic probability of a grand theory is its simplicity.<sup>8</sup>

What are the criteria for determining simplicity? Swinburne offers the following list.

The simplicity of a theory . . . is a matter of it postulating few (logically independent) entities, few properties of entities, few kinds of entities, few kinds of properties, properties more readily observable, [and] few separate laws with few terms relating few variables, the simplest formulation of each law being mathematically simple.<sup>9</sup>

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<sup>7</sup>Draper ("Simplicity and Natural Theology") proposes replacing Swinburne's criterion of simplicity with a different criterion of coherence. Draper argues that such a replacement weakens Swinburne's evidential case for theism. My proposal differs from Draper's on how to measure a theory's intrinsic probability as well as its upshot for Swinburne's evidential case. I should also note that, in virtue of being a friendly amendment to Swinburne's project, it does generate the criticisms of Plantinga and Hasker that the probability of theism given the empirical evidence is neither necessary nor sufficient for reasonable faith. See Plantinga, "Rationality and Public Evidence," and Hasker, "Is Christianity Probable?"

<sup>8</sup>See Swinburne (*The Existence of God*, 72) for related remarks about theism and physicalism.

<sup>9</sup>Swinburne, *The Existence of God*, 53. Cf. Swinburne, *Epistemic Justification*, 87–93 and "God as the Simplest Explanation of the Universe," 7–10.

There are several questions one may have about this list. Is it complete? How do the criteria relate to one another? How do we count entities, properties, and kinds?<sup>10</sup> If simplicity is to be used to determine intrinsic probability then one needs a specific account of simplicity to generate a trackable probabilistic measure. My aim is to motivate a different approach to the intrinsic probability so I leave this problem to the side.

I want to motivate this approach by considering the problem of simplicity in the context of Swinburne's thought that a criterion of a theory's simplicity is having "properties more readily observable" than the properties of alternative theories. Swinburne motivates this by the grue problem.<sup>11</sup> To understand the grue problem, let's begin with a brief review of Hume's problem of induction. Hume observed that any defense of inductive inference requires a principle that the unexamined cases will follow the same pattern as the examined cases. Suppose we survey Xavier students to see how many are Catholic. Out of a sample of 100 we find that 65 are Catholic. We then infer that most Xavier students are Catholic. We have our evidence—a sample of 100, and we have a target population—all Xavier students. For our inference to be good we must be justified in thinking that what is true of our sample is true of the target population. But what justifies this claim? The natural answer is that the sample is varied and not biased. But why think that a varied, non-biased sample will give us information about the entire population. The natural response, again, is that this is true because nature is uniform. But what does that mean? That means that nature is the same (in some important and relevant way) regardless of where we look. But this amounts to the claim that sample observations tend to be true of the general population. But that's exactly what we wanted to prove. This is Hume's problem of induction. We may summarize Hume's problem of induction thusly: *inductive inference projects patterns in samples to patterns in populations, but there's no non-circular justification for pattern projection.*

The grue problem is deeper than Hume's problem of induction because Hume takes for granted a kind of realism about patterns. Hume assumes that there is a fact of the matter about whether a sample has a given pattern. The grue problem, in essence, claims that there are no fixed patterns in samples; however we choose to describe the sample we can project any pattern whatsoever. Consider Goodman's classic example.<sup>12</sup> A sample of the colors of 100 emeralds reveals that all 100 emeralds are green. Should we project this pattern onto the entire population and conclude that all

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<sup>10</sup>Is *thing* a kind so that a universe like ours counts as having exactly one kind? Presumably not, but then how to count? Swinburne briefly considers the counting question. He writes, "What constitutes one entity as opposed to two? Entities require a certain causal unity to them; they stick together. But whether the parts of a physical thing stick together is a matter of degree, and it's not always clear when there are two entities rather than one" (Swinburne, "God as the Simplest Explanation of the Universe," 7).

<sup>11</sup>Swinburne, *The Existence of God*, 54.

<sup>12</sup>Goodman, *Fact, Fiction, and Forecast*.

emeralds are green? We should only if there are not other relevant patterns that may also be projected to the entire population. In essence, Goodman argues that this necessary condition for inductive inference is never satisfied; there are always other relevant patterns in the sample.

To illustrate the problem with pattern projection, Goodman introduces the predicate "grue" which means "x is sampled before 2050 and green or x is blue." Given this definition of grue, the sample also reveals that the 100 emeralds are grue. So we have two patterns in our sample. The green pattern and the grue pattern. The problem here is that the empirical basis for the inference is the same. The sample is both of all green emeralds and of all grue emeralds. But the pattern isn't the same because after 2050 the grue projection implies that newly sampled emeralds will then be blue. Note this doesn't imply that emeralds will change colors; only that we will no longer find green emeralds.<sup>13</sup>

The grue problem is troubling because it purports to undermine inductive inference. One solution to the grue problem maintains that non-empirical virtues (such as simplicity) make the grue hypothesis much less probable than the green hypothesis. Swinburne argues for this kind of solution. He claims that among the aspects of a theory that determine its simplicity is whether its properties are more readily observable than properties of other theories. The property of being grue isn't as observable as the property of being green. So, using simplicity, the grue hypothesis is less probable.

We can now straightforwardly state the problem of simplicity. Why is it that a theory whose properties are more readily observable than the properties of another theory is thereby more likely to be true? One can see how the theory with more easily observable properties would be easier to confirm for creatures like us, but being easier to confirm is a heuristic virtue, not a truth-conducive virtue. A heuristic virtue is a feature of a theory that allows us to easily determine its truth value. Some argue that simplicity is a heuristic virtue because simpler theories can be more easily checked. Whether or not this is in general true, it seems to hold for Swinburne's appeal to observation. Moreover, the appeal to observable properties works at cross purposes for Swinburne's goal of arguing that theism has a high intrinsic probability. The reason is that God is a being of pure intentional power and not observable as such. God does not have a shape, a color, or a location. Observation is, in an important sense, public; anyone that meets the viewing conditions will be able to observationally track the object. While this may require training and expertise, observable objects are nonetheless public in a way that a being of pure intentional power is not public. Eleonore Stump, for instance, has argued that it is possible to have second-person experience of an intentional agent without utilizing the bodily senses.<sup>14</sup> While this is possible, the process here is not one of observation. So, at least

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<sup>13</sup>An emerald's color is caused by the relative amounts of chromium, vanadium, and iron. Perhaps, after 2050 the trace elements in emeralds are only found in different proportions.

<sup>14</sup>See Stump, *Wandering in Darkness* and "Omnipresence, Indwelling, and the Second-Personal."

on one dimension, on Swinburne's own terms the hypothesis that there is a God is less simple than any alternative physical hypothesis that posits only potentially observable substances. Let us therefore explore the possibility of a different way to ground a relatively high intrinsic probability of theism and other grand theories.

## 2. *The Formulation of Theism*

Theism is the view that there is a God. God is a person who can act for reasons. God is not an impersonal force that, like Plotinus's "the One," exudes creative power. But God is not merely a person; God is all-powerful, all-knowing, and all-good. The reasons God has for acting come from the content of goodness. God is not affected by non-rational desires as we are. In this connection, God is perfectly free. God is a spirit; God does not have a defined location. God is omnipresent in virtue of being able to act anywhere and know whatever is going on at any place. Theism, apart from a kind of dualism, involves the claim that God created the universe and sustains the universe at each moment. Every contingent feature of reality occurs because God sustains it. God does not come to be. God is eternal.

Theism has great informational content. I just took a paragraph to explain the content of theism and even that is exceedingly brief compared to the tomes on the doctrine of God. So one might think it's a non-starter to even attempt to argue that the hypothesis of theism is a simple hypothesis. But that would be a mistake. Euclid's five axioms are simple but have tremendous content on account of all the surprising theorems which follow from them. Theism may be like Euclid's axioms; simple to state but hard to grasp all its commitments apart from years of dedicated study.

Is there a simple way to state the content of theism so that it doesn't look as an assemblage of claims? Swinburne suggests there is.<sup>15</sup> Theism amounts to the hypothesis that *there is a being of necessarily pure limitless intentional power*. Swinburne claims that the property "limitless intentional power" is a single property.<sup>16</sup> Intentional power is the kind of causality we are all familiar with when we perform an action. Swinburne argues that the divine properties are all unified by limitless intentional power. He finds a parallel to Aquinas's idea that the divine properties can be derived from the single property of being "the primary efficient cause of things."<sup>17</sup> If this is an accurate characterization of theism, then it implies that the core theistic hypothesis is the hypothesis that there is a substance with exactly one property held without any finite limit.

Let's first see how this alternative characterization captures the traditional informational content of theism. God is omnipotent because, in virtue of having limitless intentional power, God can do whatever he intends.

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<sup>15</sup>Swinburne, *The Christian God*, 126.

<sup>16</sup>Swinburne, *The Christian God*, 158.

<sup>17</sup>Swinburne, *The Christian God*, 158.

God is omniscient for a similar reason; for any question God forms, the answer is present. God is perfectly good because God's intentional power is pure; there are no external pressures to act in anyway beyond the content of the moral law (which God knows from omniscience).<sup>18</sup> God is spirit follows from pure intentional power. God is creator does not *strictly* follow because God is free not to create. But it does follow that God is necessarily creator of anything outside of God. The property of limitless intentional power implies that God is not Plato's divine craftsman (the demiurge) in the *Timaeus* who can only persuade the pre-existing chaos; a being of limitless intentional power cannot be a mere persuade of preexisting stuff. So, while this alternative definition is compatible with God deciding not to create, it does imply that anything that does exist outside of God is created by God. Not much hangs on this point, though, for our overall dialectic.

In what follows "God" is shorthand for "a being of pure limitless intentional power."

### 3. *The Field of Competing Hypotheses*

In this section I explore the intrinsic probability of the competing hypotheses. I begin with a discussion on intrinsic probability, turn to an examination of the competing hypotheses, and close by applying of my argument to Draper's recent "low priors" argument.<sup>19</sup>

#### 3.1. *Intrinsic Probability*

Let  $G$  be the hypothesis that there is a God. Let  $k$  include all tautological information and the fact that something exists.<sup>20</sup> When we ask about the intrinsic probability of theism we are inquiring as to the value of  $Pr(G | k)$ . On my view, probabilities (in this context) reflect the degree of belief a person ought to have in  $G$  given that all the person knows is encoded in  $k$ . Probability, as I understand it here, is not merely subjective; it reflects objective facts about the strength of evidence for a particular proposition given a body of evidence.<sup>21</sup>

There is a wrong-headed way of thinking about the value for  $Pr(G | k)$  that we should clear up first. It's a simple consequence of the axioms of probability that  $Pr(G \vee \neg G) = 1$ . One might then be tempted to split the probabilities of  $G$  and  $\neg G$  into equal parts and argue that theism's probability

<sup>18</sup>Alternatively, one may explicate God's perfect goodness in a way that is compatible with divine command theory. God's intentional power is unlimited. Evil is a privation. Consequently, God's actions are perfectly good. Note also that the claim that perfect goodness follows from pure intentional power requires reasons internalism, the view that moral motivation is intrinsic to moral beliefs.

<sup>19</sup>See Draper, "Atheism and Agnosticism," §6.2.

<sup>20</sup>Why include this latter fact? Because Swinburne takes as a serious alternative to theism that nothing exists; clearly we are not in that situation. This does complicate Swinburne's Bayesian version of the cosmological argument, but in my judgment this is no overall loss.

<sup>21</sup>See Maher ("The Concept of Inductive Probability" and "Bayesian Probability") for a defense of this conception of probability, which he terms "inductive probability."

is. This is a mistake because  $\neg G$  isn't a single hypothesis; it catches all the hypotheses incompatible with theism. There are potentially many hypotheses incompatible with theism.

Let's fill out this lesson by an analogy. Imagine there is a six-sided die before us. We are about to roll it and consider the proposition  $O$ : The side with one pip will land up. What is the probability of  $O$ ? Suppose we think of it in a similar way from the above.  $Pr(O \vee \neg O) = 1$ . So we can divide up the space of options into the  $O$  part and the  $\neg O$  part. Consider that we don't know anything about a standard die other than the fact that it has six sides with the number of pips on each side ranging from 1 to 6. If we divide up the  $Pr(O)$  and  $Pr(\neg O)$  so that they are equal and sum to one then we get the result that there is one-half chance of getting either a 2, 3, 4, 5, or 6 and a one-half chance is getting a 1.

It should be clear what is going on. We need to first figure out what the outcome space looks like. We need to describe the set of all possible events in a way that is mutually exclusive and jointly exhaustive, that is, for any two events  $e_i, e_j \in \Omega$  (i)  $\neg \diamond (e_i \wedge e_j)$  and (ii)  $\sum_{e_i \in \Omega} Pr(e_i) = 1$ . In the die case, we know that either 1, 2, 3, 4, 5, or 6 will occur and that we can't get a result of (e.g.,) 1 and 2. Only when (a) we have a firm grasp of the relevant outcome space that divides it among mutually exclusive and jointly exhaustive alternatives and (b) we have no reason to think that any one outcome is more likely than the other, do we then divide probability evenly over it.<sup>22</sup>

### 3.2. The Competing Hypotheses

The intrinsic probability of grand theories can be grounded by following a similar procedure to ascertain the relevant outcome space. This procedure begins by considering possible theories of the origin of the universe. Anyone who has studied the history of religion knows that there are many differing accounts of the origins of the universe.<sup>23</sup> In my view this multitude of various origin accounts are, if explanatorily virtuous, expressions of three basic views. These views may be understood as general classes of more specific views.

*Theism.* There is one being of pure limitless intentional power who governs creation and change on the basis of reasons.

*Naturalism* (i.e., *atheism*). There are only non-normative, non-intentional substances and laws governing change.

*Axiarchism.* There is a fundamental normative but non-intentional principle governing creation and change.

Theravada and Zen Buddhism are expressions of atheism, whereas Mahayana Buddhism is, while on the face of it polytheistic, has affinities

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<sup>22</sup>This does involve a form of the principle of indifference. I discuss some of the issues with a general use of an indifference principle below. My use of a principle of indifference is qualified so as it avoid the typical contradictions that arise from an unqualified use.

<sup>23</sup>See, e.g., Smith, *The World's Religions* and Smart, *The Religious Experience*.

with certain branches of Hinduism which are expressions of axiarchism.<sup>24</sup> Hinduism divides over whether Brahman is impersonal (Brahmajyoti) or personal (Parabrahman). Impersonal forms of Hinduism are expressions of axiarchism, and personal forms of Hinduism express theism. Taoism is an expression of an axiarchic view (one force two natures). Polytheistic views such as Greek mythology or Norse mythology are not serious views; for they leave so much unexplained that each has a near-zero chance of being true. A crucial factor in determining the intrinsic probability of a theory is that it doesn't posit finite limitations that have no deeper structural explanation. These three views do not posit finite limitations; each explanation arises out of a structure without brute contingencies.

*Competing hypotheses and explanatory virtue.* What makes each of these three explanatorily virtuous? I'll comment on the details of each view below, but here I offer the central insight. Each view has only one basic explanatorily principle with a free parameter that doesn't have a finite value. A finite value for a free parameter calls out for a deeper structural explanation. Why is it that the gravitational constant, for instance, takes the value it has? A natural answer is that there is some deeper limitation or structure that explains that particular value. Apart from a deeper structural explanation that a free parameter takes a particular value, it would be utterly mysterious that it has such a value. That this is so can be seen in the scientific search for deeper explanations for particular observed values to free parameters. In the case of grand theories, it's much more explanatorily virtuous to suppose that any such free parameters have no finite limitations. Hence the values are either zero or without limit.

A recent argument by Calum Miller illustrates the virtuous role of structure explanations.<sup>25</sup> Consider an exceptionless nomological generalization of the form *All As are Bs*. Any claim of the form—*All As are Bs except for i As*, where *i* ranges from 1 to *n*—is inconsistent with the exceptionless generalization. There are infinitely many of such claims, while there is only one such exceptionless generalization. Apart from Popperian worries that universal generalizations have probability zero, it is reasonable to believe that nomological generalizations have a positive probability.<sup>26</sup> Yet consider the probability of the large disjunction of these inconsistent claims. On the assumption that each claim of the form *All As are Bs except for i As* has some positive probability, the probability of the disjunction is the sum of the probability of each individual claim. The crucial question is whether the probability of the exceptionless generalization is greater than the probability of the disjunction. Given the fact that some universal generalizations are plausible and receive greater empirical support than

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<sup>24</sup>Some Buddhist traditions take aim at the coherence of metaphysical theorizing about the world. The present argument assumes that metaphysical theorizing—the formulation of a space of possible views that have truth-values—is possible.

<sup>25</sup>See Miller, "Is Theism a Simple Hypothesis?," 56–59.

<sup>26</sup>See, for instance, Colin Howson's discussion of Popper's argument in "Popper, Prior Probabilities, and Inductive Inference."

the exceptions, it follows that the probability of the exceptionless generalization must be greater than the disjunction of alternatives. My appeal to structural explanations to guide plausibility and hence probability makes sense of this. To the extent that the exceptions are brute, the exceptionless generalization is much more virtuous.

*Competing hypotheses: theism.* Let us more closely examine the details of each view to understand its relevant explanatory virtues. We've already commented on how theism posits one substance of necessarily pure limitless intentional power. I'll assume here that the ontological argument fails and so theism leaves unexplained why this eternal being exists. If theism is true then there is no deeper account of the logically contingent fact that this metaphysically necessary being exists. But other than this, theism (as such) doesn't posit finite limitations. Properties that come in degrees raise questions as to why they have that particular degree.

Swinburne explains that this is a matter of simplicity in the passage below. In contrast I hold that this a matter of being more explanatorily virtuous by not positing a brute limitation. Swinburne writes,

That there is an omnipotent God is a simpler hypothesis than the hypothesis that there is a God who has such-and-such limited power. It is simpler in just the same way that the hypothesis that some particle has zero mass or infinite velocity is simpler than the hypothesis that it has a mass of 0.34127 of some unit, or a velocity of 301,000 km/sec. A finite limitation cries out for an explanation of why there is just that particular limit, in a way that limitlessness does not. There is a simplicity about zero and infinity that particular finite numbers lack, a simplicity recognized by scientists as evidence of truth in the judgements that they make about the relative probability of scientific theories.<sup>27</sup>

My view is that Swinburne's appeal to a general virtue of simplicity is unnecessary here. The explanatory virtue of limitlessness is logically weaker than a general virtue of simplicity, it has broader plausibility, and it suffices to secure a relatively high intrinsic prior for theism.<sup>28</sup> Theism, in virtue of positing one substance of limitless intentional power, is a deeply structural explanation of the origin and nature of the world.

*Competing hypotheses: atheism.* Atheism is more than simply the negation of theism. It offers an account of the origin and nature of the universe. One version of atheism claims that there is no causal explanation of the origin of the universe; the universe began to exist and prior to that nothing existed. This version of atheism is utterly implausible. As Parmenides

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<sup>27</sup>Swinburne, *The Existence of God*, 334. For a critical discussion of Swinburne's use of simplicity see Gwiazda, "Richard Swinburne, the Existence of God, and Principle P" and "Richard Swinburne's Argument to the Simplicity of God via the Infinite." For a response see Miller, "Is Theism a Simple Hypothesis?"

<sup>28</sup>The explanatory virtue of limitlessness also provides a plausible response to the Goodman's new riddle of induction. The property of being grue posits an unexplained limitation to our ability to find green emeralds after 2050.

said, “nothing comes from nothing.”<sup>29</sup> A more acceptable version of atheism is that there was no prior state at which the universe failed to exist. Our local universe may be eternal or it may be part of a deeper eternal structure consisting of a block or tree of other universes. If we are considering atheism as positing a single universe that is eternal then there are many deep inexplicable mysteries relating to the contingent state of this universe. Take, for instance, the strength of the strong nuclear force. The particular strength of this force is crucial because if it varies beyond an extremely narrow range then it is no longer physically possible for carbon and oxygen to form within stars. It is utterly implausible that the strength of that force would be a brute feature of reality. So an eternal single world form of atheism is not a plausible view.

A much more plausible form of atheism is an eternal many-worlds view. This view may be joined with a general principle according to which each contingent possibility is realized in some world or other. Apart from this principle, many-worlds atheism faces some of the same problems with surprising contingencies as the single-world version and so drives its probability down below the level of plausibility. While the principle of plenitude is not itself explained, this feature of many-worlds atheism is on par with theism’s unexplained claim that an eternal, contingent being exists. From the perspective of intrinsic probability, theism and many-worlds atheism are on par.

*Competing hypotheses: axiarchism.* Axiarchism is the view that there is fundamentally an impersonal normative creative force that explains the universe’s existence. Leslie characterizes the view as this: “Neoplatonism [axiarchism] is the view that some ethical needs are themselves creatively effective.”<sup>30</sup> Derek Parfit characterizes axiarchism thus: “In its simplest form, the Axiarchic View makes three claims: (1) It would be best if reality were a certain way. (2) Reality is that way. (3) (1) explains (2).”<sup>31</sup> According to Parfit, axiarchism holds that “Truths about value are . . . creatively effective.”<sup>32</sup> Leslie finds in the “new theologians” like Paul Tillich a form of axiarchism. Leslie explains that

Several “new theologians” reject a person named “God.” . . . Much that is obscure is said by writers in this tradition, but some are most simply interpreted as viewing God-as-a-person as mythical personification of a force of ethical necessity. The ethical pull which originates and saws onward the stream of events is not imagined as that of any individual, either inside or beyond the world around us. Tillich’s God is not a being but “the creative and abysmal ground of being,” as well as “that which concerns man ultimately.”<sup>33</sup>

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<sup>29</sup>This is Parmenidean Fragment 8. This principle is often quoted in Latin as *Nihil fit ex nihilo*.

<sup>30</sup>Leslie, *Universes*, 171. See also Leslie, “The Theory that the World Exists Because It Should.”

<sup>31</sup>Parfit, “The Puzzle of Reality.”

<sup>32</sup>Parfit, “The Puzzle of Reality.”

<sup>33</sup>Leslie, *Value and Existence*, 297. I should add that these new theologians have been criticized on the grounds that their theological innovations are not at all novel, but expressions of older forms of Hinduism.

There are many variations on this view according to the value specified. In the following I focus on axiarchism about the good, using “good” as a thin normative term. According to this view, the universe exists because it is good. Leslie, Rice, and Parfit defend this view.<sup>34</sup>

Swinburne discusses this view in a footnote, complaining that it conflicts with our background knowledge. He writes,

The suggestion of Leslie and others is that the axiarchic principle operates to bring forth good things out of nothing. The trouble with this suggestion is that, while there are innumerable instances of mundane phenomena rightly explained by a personal or scientific explanation, there are no mundane examples of anything coming into existence because it is good that it should.<sup>35</sup>

Swinburne concludes that we have no criteria for judging the credibility of this explanation and so no grounds for supposing that it’s true.

On the contrary, the view does specify an alleged deep structural feature of reality that, if true, would explain much of our evidence. Moreover, the fact that it conflicts with normal accepted explanations isn’t probative because we are considering ultimate theories of the universe. With such theories fit with background knowledge doesn’t play a significant role. A better reason to think that axiarchism has a lower intrinsic probability than theism would appeal to how well it explains relevant evidence. It may be that axiarchism does not fit well with the empirical fact that the universe contains evil, but, then again, it may be that, in some sense, the universe is overall better for containing some evil. But this is a different stage in an inference to the best explanation. In terms of its intrinsic probability, axiarchism posits an unlimited source of creative power. Hence, axiarchism should get consideration for empirical confirmation.<sup>36</sup>

To sum up, we have identified three different fundamental theories of the nature of the universe. Each theory is a purported explanation of the universe in terms of deeply structural facts that lack particular finite limitations. Moreover, each theory captures aspects of the diverse religious traditions. Hence, we have some reason for thinking that the big three captures the space of plausible explanatory views.

### 3.3. Draper’s “Low Priors” Argument

I close this section with an application of the view I have been articulating that there are a limited number of explanatorily virtuous grand theories,

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<sup>34</sup>See, for instance, Leslie, *Value and Existence*; Parfit, “The Puzzle of Reality”; Rice, *God and Goodness*.

<sup>35</sup>Swinburne, *The Existence of God*, 47. See also Swinburne, “Response to Derek Parfit.”

<sup>36</sup>Swinburne (personal correspondence) suggests a different answer to the hypothesis of axiarchism. He suggests axiarchism posits a universe that is governed by a law that ensures its other laws lead to the emergence of good states of affairs. It may be then that axiarchism is liable to the objections in the last section of Swinburne, “God as the Simplest Explanation of the Universe.”

the virtues of which ground a relatively high intrinsic probability for each. My argument has the upshot that the intrinsic probability of atheism is not greater than the intrinsic probability of theism. This consequence conflicts with a recent argument by Paul Draper that that atheism is very probably true and much more probable than theism. Draper argues for this by two claims. First, that the total evidence doesn't favor theism over atheism. Second, that atheism's intrinsic probability is vastly greater than theism's intrinsic probability.<sup>37</sup> It is not our purpose in this paper to evaluate the first claim. What does Draper say in defense of the claim about intrinsic probabilities? Draper describes atheism as *source physicalism*, the view that the physical world existed before the mental world and caused the mental world to exist. Draper contrasts this with *source idealism*, the view that the mental world existed prior to the physical world and caused the physical world to exist. Draper holds that source physicalism and source idealism are equally intrinsically probable because they are equally specific and have the same ontological commitments, differing only in terms of what caused what.

Draper then reasons that theism is a specific version of source idealism that makes "a number of very specific claims about the sort of 'mental world' that produced a physical world."<sup>37</sup> This mind is, for instance, claimed to be all-powerful and all-knowing. Moreover, Draper reasons, theism "presupposes a number of controversial metaphysical and meta-ethical claims by asserting in addition that this being is both eternal and objectively morally perfect."<sup>38</sup> Thus, Draper reasons, theism is intrinsically much less probable than the more general view of source idealism and hence also less probable than source physicalism.

In reply, Draper's argument that theism is a specific version of source idealism and thus improbable does not take seriously the explanatory viciousness of any form of source idealism that posits brute limitations. That it would be a fundamental fact of the world that there are two finite minds who jointly created the physical world is utterly mysterious. Whence the limitations? As I've stressed, we understand specific limitations of properties in terms of deeper structural features. Apart from such structural features limitations are completely implausible. Theism has the virtue that it posits a single substance of limitless intentional power and then derives the traditional theistic properties from this property. While Draper is correct that to understand the specific content of theism one must take a stance on controversial metaethical claims (e.g., reasons internalism v. reasons externalism), that decision is independent of the intrinsic probability of theism. Reasons internalism is a necessary truth, if true at all. The situation with controversial metaethical claims is not one in which you are adding extra properties to the core theistic claim; rather

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<sup>37</sup>See Draper, "Atheism and Agnosticism," §6.2. Draper uses the terminology of "omni-theism" and "source physicalism" in place of my "theism" and "atheism."

<sup>38</sup>Draper, "Atheism and Agnosticism," §6.2.

one is explicating the content of that claim. So appealing to controversial metaethical claims doesn't diminish the probability of theism. Since theism is the most plausible form of source idealism, it gets the lion's share of probability.

Similar problems with limited source idealism, affect limited source physicalism. As I explained above, the most plausible form of source physicalism is committed to a principle on which every contingent possibility is realized. The upshot is that while Draper's premise 2 of the "low priors" argument is false, it is not an overall win for any particular view. Both theism, atheism, and axiarchism are on par and so if there is a difference in their posterior probability, it must be a difference indicated by the evidence.

#### 4. *Objections*

In the following I examine two challenges to my argument that arise from particular religious traditions. These challenges further illuminate the use of explanatory reasoning in determining a space of plausible views.

##### 4.1. *There Are More Views*

Perhaps, there are several more classes of basic views. Epicurus and later Hume suggest that it may be that there is an all-powerful, all-knowing, perfectly malevolent being.<sup>39</sup> Malevolence is understood in terms of a will that desires evil, that is desires to corrupt the good. My tendencies run in an Augustinian direction on which evil is a privation or perversion of a good structure.<sup>40</sup> Hence, a malevolent god would be a being that is a corruption of good. That implies a limitation which if it were brute, would be utterly mysterious.<sup>41</sup> Moreover, if Swinburne is correct that limitless intentional power entails the traditional omniproperties, a malevolent god is impossible.

More importantly, though, the argument I give here is compatible with missing some plausible explanatory views. The upshot is that we can use explanatory reasoning to trim the space of possible views to the space of plausible views and then distribute probability over the space of plausible view. Only then do we take into account the observed evidence. If there are ten plausible views, for instance, then distributing probability evenly over the ten views implies that the prior of theism is. Such a value provides a robust prior probability for theism. The crucial point is that the prior probability of theism is not negligible such that would be pointless to look for empirical confirmation.<sup>42</sup>

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<sup>39</sup>For recent discussions of the evil-god hypothesis see Law, "The Evil-God Challenge" and Collins, "The Evil-God Challenge: Extended and Defended."

<sup>40</sup>See Anglin and Goetz, "Evil is Privation," for the good discussion of a privation theory of evil.

<sup>41</sup>See Miller, "Why God is Probably Good," for arguments that there is a significant asymmetry in the intrinsic probability of theism compared to maltheism (the hypothesis of a malevolent god).

<sup>42</sup>If, for instance, theism were one of an infinite number of viable theories.

*Zoroastrian dualism.* Let us look in more detail at another specific view. An interesting challenge to my claim that there are exactly three plausible theories of origins comes from Zoroastrian dualism. Standard theistic dualism claims there are two divine beings, perhaps two morally on par or one supremely good and another completely evil. These forms of dualism suffer incoherence problems. First, it is incoherent to suppose that there are two independent omni-competent beings. Both beings would have the same sphere of power—viz., everything—and the exercise of such power by one being conflicts with the exercise of power by the other.<sup>43</sup> Second, if the two beings are not perfectly wise, powerful, and good, then it is difficult to understand whence the limitations. To be sure, it is conceivable that an ultimate being is limited in some way and that limitation lacks an explanation, but that would be nothing less deeply mysterious.

The innovation of Zoroastrian dualism is that it attempts to conjoin a serious monotheism with a personal but finite being that is responsible for evil.<sup>44</sup> According to Zoroastrianism there is a supremely wise, good, and powerful being, Ahura Mazda. Ahura Mazda is an eternal being who created all good things. Ahura Mazda is a pure spirit lacking a body but capable of acting anywhere. Ahura Mazda is supremely benevolent. He can do anything that is possible to do.

Whence evil? According to Zoroastrianism, evil comes from the eternal uncreated spirit of destruction, Angra Mainyu. Angra Mainyu, while eternal, is not all-knowing. He has limited knowledge and great power. All the evil in the universe is traceable to the actions of Angra Mainyu. The difference in power and knowledge between Ahura Mazda and Angra Mainyu provides the basis for Zoroastrian eschatology. The good will overcome evil even though evil is eternal.

This view does not neatly fit into the big three. Should it be afforded some plausibility and then taken into consideration? My ultimate strategy is compatible with affording some positive probability to a handful of alternative views; for it matters not to the ultimate Bayesian project of assessing evidence for grand theories whether one starts with views with priors around a third, a tenth, or a hundredth. So whatever one makes of the following border skirmishing, in the grand picture it is not consequential. Nonetheless, it is crucial that the space of plausible theories doesn't approach infinity.

Should Zoroastrianism be one of the several grand theories to be taken seriously? A problem with Zoroastrianism, like polytheism, is that it posits a being with limitations that are unaccounted for. Angra Mainyu lacks complete knowledge and complete power and yet is an uncreated and eternal being. We understand limitations in terms of a field that has

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<sup>43</sup>If such beings have dependence relations among the exercise of wills then there may not be coherence problems.

<sup>44</sup>My description of Zoroastrian dualism follows Kronen and Menssen, "The Defensibility of Zoroastrian Dualism."

some structure. No human being can be taller than 100 feet because, among other things, the force of gravity limits the ability of human heart to circulate blood. A heart that generated enough force to circulate blood throughout a 100-foot-tall human body would, other things being equal, damage other internal organs. The heart can only pump blood effectively over relatively short distances. Of course, one might change the relevant limitations by changing some of the structure. But with theories of everything there are no contingent structure limitations. Hence, it's a puzzle why Angra Mainyu would have such and such specific limitations. Distributing probability evenly over all possible limitations leaves us with a zero probability that Angra Mainyu exists. I do not see a principled reason then for taking this view as a serious contender.

*Polytheism.* There are a wide variety of polytheistic views. Often the number of varieties of polytheism is the main reason for thinking that the intrinsic probability of theism isn't so high because each polytheistic view has some chance to be true and chances are additive. Eric Steinhart has recently defended the plausibility of ordinal polytheism.<sup>45</sup> On his view there are an infinite number of world-creators corresponding to the cardinality of the continuum. The details of his view do not particularly matter for my argument. On his view ordinal polytheism is committed to world-creators with finite powers. There is no account for why these beings exist and there is no structural explanation for why these beings have the limitations they do. It's a mystery, then, why it would be a fundamental feature of reality that there are such beings.

Consider also Hume's confederation of deities. Hume criticizes the conclusion of the design argument by suggesting that the design in the universe may be the product of a confederation of demi-gods. He writes,

Why may not several deities combine in contriving and framing a world? This is only so much greater similarity to human affairs. By sharing the work among several, we may so much farther limit the attributes of each, and get rid of that extensive power and knowledge, which must be supposed in one Deity, and which, according to you, can only serve to weaken the proof of his existence. And if such foolish, such vicious creatures as man can yet often unite in framing and executing one plan; how much more those Deities or Daemons, whom we may supposed several degrees more perfect?<sup>46</sup>

Hume's alternative hypothesis is that there is a confederation of limited deities. Yet in terms of its explanatory features, it leaves much completely unexplained. Why are there  $n$  such beings rather than  $n \pm 1$ ? Why are there any such beings at all? Why do they form a common purpose? How do they manage collectively to create a physical world? And so on. These questions do not have plausible answers without a structure that then would generate some plausibility. For instance, there are exactly  $n$  deities because there is an  $F$  and all  $F$ s are  $G$ s which implies that there are exactly

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<sup>45</sup>Steinhart, "On the Number of Gods" and "On the Plurality of Gods."

<sup>46</sup>Hume, *Dialogues Concerning Natural Religion*, 69–70.

$n$  deities. Perhaps, Zeus exists, he is a father, and he begets exactly  $n$  offspring which share in Zeus's powers to a lesser extent. The explanatory problem is that the structure itself that would generate a rich polytheism is deeply contingent. Hence, the explanatory burdens of the Humean confederation view implies that it is not a plausible view.

#### 4.2. *The principle of indifference*

The second objection arises from objections to the principle of indifference. The principle of indifference says that if you lack knowledge of various possibilities then you may assign them all the same probability. Unconstrained, the principle of indifference leads to contradictions because of incompatible ways of describing the relevant outcome space. This is known as the Bertrand Paradox. Consider this illustration of the paradox.<sup>47</sup> Suppose you know that a car has traveled one mile between one to two minutes. You know therefore that the car traveled somewhere between 30 to 60mph. By an indifference principle one may justify the claims (i) that there's a 50% chance the car traveled between 30 to 45 miles per hour and corresponding a 50% chance that the car traveled between 45 and 60 miles per hour, and (ii) that there's a 50% chance that car took between 60 to 90 seconds and correspondingly that the car took between 90 seconds and 120 seconds. The problem is that (i) and (ii) are inconsistent. If the car traveled from 30 to 45 miles per hour, then the trip would have taken 120 to 80 seconds. So, since the former has probability of .5, then the latter would have probability of .5. Thus (i) implies that (ii) is false. Similar reasoning shows that (ii) implies that (i) is false.

A solution to the Bertrand Paradox is to restrict it to cases in which we have a firm grasp on how to carve up a space of possibilities. If we have a six-sided die and we are describing the relevant probability space, there are no paradoxical applications to dividing probability evenly over the relevant outcome space. In the car case above, the problem with an appeal to indifference is that we lack a grasp of relevant explanatory parameters. One can either explain the speed of the car in terms of the time traveled or one can explain the time traveled in terms of the speed of the car. Either explanation is adequate given just the information that the car has traveled one mile between one to two minutes. So in this case an appeal of the principle of indifference to generate relevant probabilities yields inconsistencies.

The situation is different, though, when we do have a grasp of the relevant explanatory parameters. In the case of grand theories of the universe, we divide competing views according to whether or not the basic explanatory power is intentional power of an agent or not. If not then is it a normative power or not. This generates the three explanatory views

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<sup>47</sup>The following example comes from Fumerton, *Metaepistemology and Skepticism*, 215.

without suffering an alternative way to divide up these possibilities so that an appeal to indifference would generate inconsistent probabilities.<sup>48</sup>

We can thus confidently then apply an indifference principle in the context of plausible grand theories to generate a prior probability for each. The upshot is then that as long as there are relatively few of these theories they have a relatively high prior. In the case I have argued for, there are three such theories, and thus the prior probability of each is.

### Conclusion

I've argued for a new way to ground a relatively high prior probability for grand theories that does not rely on simplicity principles. It relies on the intuitive explanatory principle that properties that have finite limits require an explanation as to why this limit exists. If such limits are brute features of the world then that is deeply mysterious and its possibility drops below the level of plausibility. In the case of grand theories of the world this explanatory principle implies that we should give credence to possible views that explain the relevant facts in terms of properties without finite limit. Given this explanatory principle, we are led to the conclusion that there are three plausible grand theories and that consequently each has a nontrivial probability. If this approach is sustainable then we've made some progress in placing a justification for grand theories on more modest grounds. In modesty lies strength.

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<sup>48</sup>For a more in depth discussion of how explanatory properties restrict the principle of indifference see Huemer, "Explanationist Aid for a Theory of Inductive Logic"; Weisberg, "Locating IBE in the Bayesian Framework"; and Poston, *Reason and Explanation*.

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