Wagering on God:
Probabilistic Belief

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The metaphysical proofs of the existence of God are so remote from men's methods of reasoning and so involved that they produce little impact; and even if they did help some people, the effect would only last for a few moments while they were actually watching the demonstration, but an hour later they would be afraid that they had made a mistake.

Blaise Pascal
from *Pascal's Pensees*
Chapter 14, No. 381

"You see, I close my eyes and I reason like this: people do have faith, but where does it come from? I've heard it said that it all came originally from fear of menacing natural phenomena, and that there's nothing else to it. So I say to myself: 'What if, after I've been a believer all my life, when I die it suddenly turns out that after life there's nothing at all, nothing but wild grass growing on my grave,' as some writer put it. That's horrible! And how can I regain my faith? I must say, I only really believed when I was a little girl. I took things for granted then, without questioning. What is there to prove it to me now? This is what I have come here for, to throw myself at your feet and ask you. Why, if I miss this opportunity, I will never find the answer in all my life. So how can I prove it to myself, how can I become convinced? Oh, I am so unhappy! When I look around me, I realize that people don't care, hardly anyone does, and I'm the only one who cannot bear it. It is dreadful, just dreadful!"

"I am sure it is dreadful, but nothing can be proved, although one can become convinced."

exchange between Mrs. Khokhlakov and Zosima, the elder monk
in *The Brothers Karamazov*
by Fyodor Dostoevsky

Let us examine this point and declare: "Either God exists or He does not." To which view shall we incline? Reason cannot decide for us one way or the other: we are separated by an infinite gulf. At the extremity of this infinite distance a game is in progress, where either heads or tails may turn up. What will you wager? According to reason you cannot bet either way; according to reason you can defend neither proposition. . . . "Both are wrong. The right thing is not to wager at all." Yes; but a bet must be laid. There is no option: you have joined the game.

Pascal's Wager
from *Pascal's Pensees*
Sect. 343/233

Wagering on God:

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Pascal gets credit for setting up the game. Either God exists or God does not exist. Perhaps this dichotomy is the only real dichotomy. At least for a time, we must consider the question. If it remains unanswerable (if the existence of God remains unknowable), then we must decide whether to believe. If we decide to believe, then we must decide how to live our lives. If we decide not to believe, we face the same decision.

In *The Existence of God*, Richard Swinburne presents arguments for theism – old and time-honored arguments, some – but he presents them in a rather unique fashion. He uses a probability tool called Bayes's theorem to evaluate the strength of the arguments. His methods have generated substantial discourse. After an introduction to the theory itself and a review of Swinburne's arguments, we will delve into some of the discourse, add some of our own, and play games with the numbers. (Do not confuse this as playing games with God.)

During the twentieth century's last decade or so, Bayesian statistical methods gained increasing popularity among scientists and analysts in diverse fields ranging from archaeology to computers to biotechnology and medicine. Proponents suggest that, among the advantages over traditional hypothesis testing (that is, population sampling, Type I and Type II errors, and levels of significance), expressing results using Bayes's theorem makes conclusions "easier to understand and makes borderline or inconclusive results less prone to misinterpretation."[1]

Essentially, Bayes's theorem allows a researcher to begin the test with some prior expectation (or probability) of the accuracy (or truth) of the hypothesis in question. Many researchers refer to this existing knowledge (or expertise, belief, or even, notion) as *a priori*

knowledge. Bayesian theorists refer to it as "a *prior probability* in the sense that it is assigned prior to the observation of any empirical information."[2]

To this prior probability, Bayes's theorem allows the incorporation of new information, usually in the form of sampling or repeated observations. However, researchers may gain additional information through new tests, field questionnaires, polling, and even – as with Swinburne – evidence and argument. Through mathematical operations on these, what turn out to be, conditional probabilities, Bayes's theorem leads to what analysts call posterior probabilities, or revised probabilities, "because [they are] assigned after the observation of empirical or additional information."[3] Before presenting Bayes's theorem in its mathematical form, some examples might illustrate its use.

One oft-cited example originates in a 1763 discussion of Bayes's essay on solving problems of chance, presented by friend and fellow minister, Reverend Richard Price, himself an accomplished mathematician. Rev. Price, in his appendix to Bayes's essay, imagines a newborn child seeing the sun for the first time and then losing it that night. Totally ignorant of nature, the child figures one of two things will happen: he will see the sun again or he will not see the sun again. Each hypothesis he assigns a (prior) probability of one-half. With each new day and each next appearance of the sun, the child's revised probability of seeing the sun again increases, but as Rev. Price notes, "no finite number of returns would be sufficient to produce absolute or physical certainty."[4]

The example of the child, updated somewhat by *The Economist* in 2000, starts off with the child placing two marbles into a bag, one white and one black, representing the two possible events or hypotheses. The event of seeing the sun again, the child believes, has the same probability as the event of not seeing the sun again: one-half. When the child sees the sun again

the next day, he places another white marble into the bag. Now, the probability of plucking a white marble from the bag has increased to two-thirds. If the child sees the sun again the next day and puts another white marble into the bag, the probability of plucking a white marble from the bag increases to three-fourths (assuming replacement). With each sunrise, then, the initial *a priori* belief – two equal possibilities – transforms into a near-certain *a posteriori* belief that the sun will always rise again. Price refers to the initial assignment of equal probabilities in this example as knowledge in total ignorance: "these deductions suppose a previous total ignorance of nature."[5]

Morris Hamburg, in *Statistical Analysis for Decision Making*, presents another illustrative, two-event example.[6] Assuming a prior knowledge (or belief) that one percent of some population carries a disease, let A_1 represent the event "has the disease" and A_2 represent the event "does not have the disease." Then, the probability of A_1, or $P(A_1)$, is 0.01, and the probability of A_2, or $P(A_2)$, is 0.99. (How one justifies arriving at these purely prior probabilities deserves a much more detailed discussion; several authors think these prior probabilities the most critical factor in Bayesian analysis.)

Suppose some company later develops a new but imperfect test for the disease and eventually, through administering hundreds of tests on known carriers and non-carriers of the disease, determines conditional probabilities (also called likelihoods). Given the person has the disease, ninety-seven percent of the time the test will likely indicate presence of the disease. Five percent of the time the test indicates presence of the disease when, in fact, the person does not have the disease – an error, or false positive. Letting B represent the event "test indicates the disease is present," these statements become $P(B|A_1) = 0.97$ and $P(B|A_2) = 0.05$, respectively. In

words, these symbols imply the (conditional) probability of B given A_1 and the (conditional) probability B given A_2.

Leaving the derivation of joint probability formulas to introductory statistics texts, like Hamburg's text, a table representing the prior probabilities and revised probabilities looks like table 1. The probabilities of the joint occurrence of B and A_1 and the joint occurrence of B and A_2 result from multiplying each prior by its respective conditional. The revised probabilities result from dividing each joint probability by the sum of the joint probabilities, otherwise termed P(B) – the marginal (or total) probability that the test indicates the disease is present. Some Bayesians refer to the marginal probability as a "normalizing or scaling constant.[7] The marginal probability is a simple summation in this case because the two joint probabilities are mutually exclusive. That is, they do not overlap. Using set theory language, they do not intersect. Nowhere does the probability that a person has the disease and the test indicates the disease is present overlap (intersect) the probability that a person does not have the disease and the test indicates the disease is present. Hamburg's example is such because, obviously, a person cannot both have the disease and not have the disease (at least at a specific point in time).

Table 1. Bayes's Theorem Calculations for Hamburg's Two-Event Example

Events A_i	Prior Probabilities $P(A_i)$	Conditional Probabilities $P(B\|A_i)$	Joint Probabilities $P(A_i)P(B\|A_i)$	Revised Probabilities $P(A_i\|B)$
A_1	0.01	0.97	0.0097	0.16
A_2	0.99	0.05	0.0495	0.84
	1.00		P(B) = 0.0592	1.00

Source: Morris Hamburg, *Statistical Analysis for Decision Making*, 3rd ed. (New York: Harcourt Brace Jovanovich, Inc., 1983), 77, table 2-3.

The result of this basic, two-event example requires more interpretation and explanation before proceeding. Specifically, three points need made. First, and notably, the revised or posterior probabilities are themselves conditional probabilities. They provide the probability of event A_i given B, or here in the case of event A_1, the probability that a person has the disease

given the test indicates presence of the disease. (Read the revised probability of A_2 similarly.) Generally, revised probabilities indicate the probability of the initial hypotheses given the introduction of new evidence.

Second, and somewhat related to the first note, confusion may reign unless analysts clearly state – and their audience clearly understands – the hypotheses, the new evidence, and the resulting probabilities. In Hamburg's example, the initial hypothesis (or belief) under consideration is that a person in this (given) population has the disease. This initial hypothesis equates to Swinburne's initial hypothesis (or belief) that God exists given some general background knowledge.

In Hamburg's example, the new evidence is test results indicating presence of the disease in test subjects already known to have or not have the disease. In other words, we pick a marble from a bag of black and white marbles. We look at and somehow determine the color of the marble. A new test tries to determine the color of the marble, too. We evaluate its results. They indicate a white marble ninety-seven percent of the time that the marble is in fact white and five percent of the time that the marble is in fact black. Medical terminology calls the result a false positive when a test indicates the presence of a disease when in fact the disease is not present (that is, indicating a white marble when in fact it is black). Traditional hypothesis testing refers to this as a Type I or Type II error, depending on how the analyst sets up the initial, or null, hypothesis. In this case, where our null hypothesis under consideration is "has the disease," accepting a false positive would equate to accepting the null hypothesis when in fact it should be rejected, – a Type I error.[8]

Bayesian analysts and their intended audience must again clearly state and understand the distinction between the new-evidence probabilities and the revised, or posterior, probabilities –

both conditional probabilities – before proceeding. In the two-event case, the new-evidence probabilities must indicate one state of nature for each of the two possible states of nature under consideration. This means, for Bayesian analysis to work in the two-event case, new evidence, tests, empirical observations, or arguments, must provide the total probability of something – in the form of two likelihoods. New evidence must indicate a black ball given we pulled a black ball from the bag (correct conclusion) and a black ball given we pulled a white ball from the bag (false conclusion). Thus, we have total (new evidence) probability of a black ball. A new test must indicate presence of the disease given the person has the disease (true positive) and presence of the disease given the person does not have the disease (false positive). Thus, we have total (new test) probability of presence of the disease. A new argument must indicate the presence of God given that God exists and the presence of God given that God does not exist. Thus, we have total (new argument) probability of the presence of God. New tests may alternatively indicate absence of a disease or new arguments may alternatively indicate the nonexistence of God. However, for Bayesian analysis to work, we must know their total probability of this event given each prior state of nature.

Posterior probabilities, then, reflect revised probabilities of states of nature given new test results, empirical evidence, or an argument or arguments supporting one of the possible states of nature. In Hamburg's example, the resulting probability for A_1 increases given a positive test result; the probability of A_2 decreases given a positive test result. Bayesian analysis has resulted in revised probabilities – based on testing positive – of the belief about disease presence in persons belonging to a target population. Analysts may base their initial prior probabilities or beliefs on a hunch, a sample, an older test, general background evidence, or even ignorance or indifference. In the last case, Bayes (i.e., Price) argues for beginning with equal prior

probabilities.[9] Subsequent Bayesian analysis could then begin again with this revised probability as its prior probability and introduce more recent tests or additional evidence or arguments to calculate and further revise probabilities about states of nature. Swinburne's many arguments for the existence of God, if taken separately rather than together, could amount to such a sequential Bayesian approach. (We will not examine any sequential analyses.)

Analysts should emphasize, too, that Hamburg's Bayesian analysis example at its conclusion says nothing about revised probabilities for persons picked at random from the target population and administered the test with negative results. Because Hamburg did not provide empirical test results for negative cases, no conclusive numbers exist regarding conditional probabilities of the test indicating non-presence of the disease given a person's state of disease. Swinburne's Bayesian analysis, in a similar manner, lacks arguments to the nonexistence of God given general background knowledge.

Third, and finally, the numerical revised probabilities in Hamburg's example seem somewhat intuitively strange, especially given general public notions about "approved" medical tests for diseases. As Hamburg relates, "the posterior probability (0.16) is 16 times as large as the prior probability (0.01) [and yet] 0.16 is still a surprisingly low probability that the individual has the disease given that the test indicated the disease was present."[10]

These counterintuitive numbers result from a large number of false positives using this particular test. For example, by using a test with a false positive rate of only one percent (vice the five percent in the example), the posterior probability of having the disease given a positive test indication rises to 49 percent. Going further, to raise to 95 percent the revised probability that a person has the disease given a positive test indication requires a test that reduces false positives in this population to approximately five-hundredths of a percent, or 0.0005. Even a test

that indicates disease presence with complete accuracy given that the person has the disease, or $P(B|A_1) = 1.0$, only increases by 17 percent the revised probability that a person picked at random has the disease given a positive test indication, all else remaining constant. (I use this type of analysis, called sensitivity analysis, later on Swinburne's arguments to the existence of God.)

Obviously, a test is not very reliable when, of ninety-nine percent of the population supposedly disease free, it indicates that five percent of them have the disease – conceivably a very large actual quantity of false positives, indeed. Stated another way, the marginal probability of 0.0592 means that the test indicates the percentage of people with the disease is almost six times the originally believed percentage – and it mostly results from false positives. One needs to completely understand the background for and implications of all the numbers associated with prior probabilities and new, empirical evidence when interpreting the significance of the resultant, revised probabilities in Bayesian analysis.

Spreadsheets like table 1 make calculating revised probabilities straightforward and insightful. An alternate mathematical method to get revised probabilities simply substitutes numbers directly into Bayes's theorem which, according to Hamburg, "is really nothing more than a statement of conditional probabilities."[11] Written out, the revised probability for "has the disease" given the "test indicates the disease is present," or $P(A_1|B)$ looks thus:

$$P(A_1|B) = \frac{P(A_1)P(B|A_1)}{P(A_1)P(B|A_1) + P(A_2)P(B|A_2)}$$

The formula above represents Bayes's theorem for a two-event case. We should note that the denominator in the above equation reflects the total probability of the evidence, P(B). The two addends comprising the total evidence reflect $P(A_1$ and $B)$ and $P(A_2$ and $B)$, respectively. The multiplication rule for conditional probabilities (again, not presented in this discussion)

establishes the two addends in the denominator above. Substituting the numbers from Hamburg's example into Bayes's theorem looks like this:

$$P(A_1|B) = \frac{(0.01)(0.97)}{(0.01)(0.97) + (0.99)(0.05)}$$

The revised probability, $P(A_1|B) = 0.16$, results from a straightforward calculation and, obviously, reflects only one of the revised probabilities from table 1. The other results similarly.

Because Swinburne also deals with only a two-event model (i.e., "God exists," "God does not exist"), no real need arises here to extend this discussion of Bayes's theorem to n events (or hypotheses). However, pure philosophical reasoning requires at least a short digression. Briefly, then, an n-event extension of Bayes's theorem, where n is greater than two, could possibly apply to an examination of religious pluralism. That is, an n-event problem might examine the existence of God as a Hindu god, a Buddhist god, a Judeo-Christian-Muslim god, and so on. The n-events become collectively exhaustive with the inclusion of the two events "God exists as some god not specifically mentioned" and "God does not exist."

However, before proceeding further, the analyst would need to prove the mutual exclusivity of the n-events and provide reasonable prior probabilities for each. Mutual exclusivity may prove problematic; John Hick, for example, draws a connection between world religions.[12] As for prior probabilities, since new evidence in Bayes's theorem does not affect prior probabilities of one or zero, each event could take the value of 1/n (equal prior probabilities or "total ignorance of nature"). Alternatively, an analyst might assign prior probabilities that reflect the current percentages of followers of world religions, counting non-believers (believers of the nonexistence of any type of God) as a religion of sorts. This paper does not examine the n-event problem any further.

If Swinburne had used but one argument in an attempt to revise the prior probability of the existence of God, his use of Bayes's theorem would exactly mimic the Hamburg example, except for Swinburne's slightly more complicated notation, described shortly. However, Swinburne presents seven arguments of varying support for the existence of God. Bayesian analysis, then, must factor in all of these arguments to attain a Swinburne-revised probability of the existence of God.

Swinburne bases his resultant revised probability of God's existence on a summation of the qualitative strength of all his arguments taken together as new evidence. Note that nowhere does Swinburne assign numerical probabilities to his arguments (or new evidence). However, he correctly remarks in several places, the requirement for probability to exceed one-half in order to speak of God's existence being more likely than not. After examining each of Swinburne's individual arguments and his summation qualitatively, my discussion will attempt to illustrate his Bayesian process like Hamburg's example in table 1, including some sensitivity analysis. Note that quantitative Bayesian analysis of each of Swinburne's arguments taken separately might provide more insight into relative strengths of the arguments – a possible topic for more research.

The exact intention of the Reverend Thomas Bayes when developing his theory to solve problems of chance remains unknown. In fact, biographers know very little of either the nonconformist minister Bayes or the mathematician Bayes.[13] Hamburg, though, surmises (without providing any source) that Bayes's "motivation was his desire to prove the existence of God by examining the sample evidence of the world about him."[14] However, Bayesian methodology became known only posthumously, in 1763, with the publishing of a short essay unrelated to any proof of God's existence.[15] Even if the historical record does not support

Hamburg's supposition about the intentions of Rev. Bayes, Swinburne leaves no doubt about the critical role Bayes's theorem plays in his investigation of the likelihood of God's existence.[16]

Again, Swinburne's methodology rests on a detailed analysis of seven general arguments either for or against the existence of God – arguments, the premises of which "report what are (in some very general sense) features of human experience."[17] Swinburne presents cases for the cosmological argument, two arguments from design (the teleological argument and the argument from providence), arguments from consciousness and morality, arguments from miracle and revelation, the problem of evil, and the argument from religious experience. At the conclusion of each argument, Swinburne assigns it his personal, qualitative judgment of just how strongly it supports the hypothesis that God exists. In his summation, Swinburne assesses the cumulative strength of the seven arguments.

Before examining Swinburne's analysis of the arguments, four preliminary points need addressed. Swinburne, of course, develops these points much more extensively. First, the arguments presented consist only of inductive arguments for the existence of God.[18] According to Swinburne, deductive arguments for theism (like the ontological argument) offer only unprovable, conceptual truths as premises and "are very much mere philosophers' arguments and do not codify any of the reasons which ordinary men have for believing that there is a God."[19]

Second, Swinburne evaluates his arguments as either good P-inductive or good C-inductive arguments. A good P-inductive argument implies "the premisses (sic) make the conclusion probable." A good C-inductive argument implies "the premisses (sic) add to the probability of the conclusion" or help "'confirm' the conclusion," and "some will obviously be stronger than others." Actually, Swinburne reserves his opinion on a good P-inductive argument until the end, when looking at the strength of all his arguments taken together. For clarification,

a good P-inductive argument essentially increases the probability of the hypothesis above one-half. A good C-inductive argument adds to the probability of the hypothesis, but does not push it into more-probable-than-not territory.[20]

Third, Swinburne bases the estimation of the prior probability of a theory or argument on three considerations: its simplicity, its fit with background knowledge, and its scope. Generally, "[t]he more simple a theory, and the better it fits with background knowledge, the greater its prior probability." Also, according to Swinburne, "a theory's prior probability is diminished in so far as its scope is great." However, in analyzing the effect of all three considerations when scope is great (as in "God exists"), Swinburne essentially dismisses the considerations of fit and scope: "For large-scale theories the crucial determinant of prior probability is simplicity."[21]

Fourth, Swinburne actually approaches his Bayesian analysis with a conditional probability as his initial prior probability. In fact, Swinburne conditions all of his probabilities on background knowledge and, as Kelly Clark writes, essentially questions, "Is the existence of the actual world more probable, given the hypothesis of theism than on background knowledge alone?"[22] Because of his additional term indicating background knowledge, Swinburne's formulation of Bayes's theorem seems unnecessarily complicated, although entirely correct and complete for the terminology he uses in his accompanying text:[23]

$$P(h|e.k) = \frac{P(h|k)P(e|h.k)}{P(h|k)P(e|h.k) + P(\sim h|k)P(e|\sim h.k)}$$

In Swinburne's equation, *h* represents the hypothesis "God exists" and ~*h* the negation of the hypothesis, or "God does not exist." Hamburg, earlier, represented similar hypotheses with A_1 and A_2, respectively. Swinburne lets *e* represent new evidence; Hamburg represented it with B. Swinburne's formulation of Bayes's theorem adds the additional term, *k*, to represent "general background knowledge of what there is in the world and how it works."[24] However,

omission of this dependence makes for a more convenient and readable formula – an allowable omission since, as Rodney Holder notes, "[a]ll probabilities are further conditioned on [*k*]."[25] Swinburne's formula then mirrors Hamburg's:

$$P(h|e) = \frac{P(h)P(e|h)}{P(h)P(e|h) + P(\sim h)P(e|\sim h)}$$

We will return to a discussion about Swinburne's formulation of probabilities – especially his *a priori* probabilities, or intrinsic probabilities as he calls them. Several authors count these as the most important and influential parameters in Bayesian analysis. First, though, we proceed with a look at Swinburne's new-evidence arguments, noting that *e* refers to each specific argument in turn. (Swinburne might more precisely have used e_1, e_2, e_3, e_4, e_5, e_6, and e_7 for the individual arguments and *e* for the arguments taken as a whole.)

Swinburne's discussion of the cosmological argument (prime mover, first cause, non-contingent being), though acknowledging its probable origin in the second and third of Aquinas's five ways, actually follows "that given by Leibniz in his paper, 'On the Ultimate Origination of Things.'" Swinburne defines the cosmological argument as "an argument to the existence of God from the existence of some finite object or, more specifically a complex physical universe." He discounts as inexplicable an infinitely old universe where each state in time "has a complete . . . scientific explanation in terms of a previous state . . . and natural laws." Either God comes into the picture by being responsible for the laws of nature which affect a change from one state to the next, or God comes "at the beginning of the series (if it has one) as starting the process off."[26]

Swinburne relies on Leibniz's exposition: "And so, however far you go back to earlier states, you will never find in those states a full reason why there should be any world rather than none, and why it should be such as it is." Given the choice "between the universe as stopping-

point and God as stopping-point," Swinburne appeals to Leibniz's Principle of Sufficient Reason, which repudiates claims of "the universe as a brute, inexplicable fact." Essentially, Leibniz's Principle says that the ultimate root must be a metaphysical being, since only from the essence of such a being can "existence spring." In fact, only a metaphysical being "could not but exist."[27]

Swinburne resorts, then, to the simplicity criteria in assigning a qualitative probability to new evidence presented by the cosmological argument. Conceding equal coherency of an existing "complex physical universe but no God"[28] and a necessary metaphysical being or ultimate cause, Swinburne argues that the latter, or theism, constitutes a more simple – thus, more rational – explanation.

> A complex physical universe (existing over endless time or beginning to exist at some finite time) is indeed a rather complex thing. . . . There are lots and lots of separate chunks of it. The chunks each have a different finite and not very natural volume, shape, mass, etc. – consider the vast diversity of the galaxies, stars, and planets, and pebbles on the seashore. . . . the existence of the universe has a vast complexity, compared with the existence of God.[29]

Because of the "vast complexity" of the physical universe, Swinburne assigns a "low" probability to P(e|~h). However, because he "cannot see that God has overriding reason to make such a universe," Swinburne claims P(*e*|*h*) is "not . . . especially high" but also not "very low." At one point, Swinburne concludes that P(*e*|*h*) does not exceed P(*e*|~*h*) and, yet, Swinburne later calls the cosmological argument "a good C-inductive argument." He finally summarizes:

> There is quite a chance that if there is a God he will make something of the finitude and complexity of a universe. It is very unlikely that a universe would exist uncaused, but rather more likely that God would exist uncaused.[30]

Leaving behind Swinburne's cosmological argument and confusing conclusions for the moment, we move to the next argument he considers – the teleological argument, or argument from design. First, Swinburne differentiates between regularities of co-presence (all the parts of

a car or an animal arranged and working together at a given instant) and regularities of succession (laws of nature). He then acknowledges Paley's *Natural Theology* and Hume's *Dialogues*. He also reconstructs the design argument to circumvent premises proved false – by Darwin – in the original eighteenth-century argument. His reformulation postulates nature as a "machine-making machine." Since man today makes "not only machines, but machine-making machines, he may therefore naturally infer from nature which produces animals and plants, to a creator of nature similar to men."[31]

However, Swinburne only attributes a "small degree of probability to the hypothesis that a rational agent was responsible for the laws of evolution"[32] and so moves on to a second, supposedly stronger version of the teleological argument. This version – having more to do with temporal order – claims the very order of nature, its compliance with higher-level laws unexplained and unalterable by science, forces the postulation of "an agent of great power and knowledge . . . one of infinite power, knowledge, and freedom, i.e. God."[33]

By appealing to the condition of simplicity, Swinburne dismisses the viability of Hume's objection – which raises the possibility of many gods at work, like a "great number of men join in building a house or a ship."[34] Next, citing both the unlikelihood of nature's order to occur uncaused, and the essence of God's character to favor creating this state of order rather than some other state, Swinburne evaluates the strength of the new evidence. He concludes first that the teleological argument cannot stand independently of the cosmological argument because of the similarity of their premises – a relevant note if investigating the sequential use of Bayes's theorem here. Finally, Swinburne concludes he has made "a good C-inductive argument to the existence of God,"[35] and that $P(e|h) >> P(e|\sim h)$, where >> implies "much greater than."

Swinburne's next chapter argues to the existence of God from consciousness and morality. Here, Swinburne posits that the existence of conscious beings, namely animals and men, provides evidence of God. That "men are capable of marvelling (sic) at the natural world and worshipping God," that they "have moral knowledge," and that they possess a limited free will with the power to grow in freedom and "decrease the influence over [themselves] of natural inclinations" provide evidence of a God who has reason to create such beings.[36]

Swinburne establishes reasons for man's limited free will. As opposed to God's perfectly free will, man's limited free will provides the opportunity for growth and choice; God – perfectly free and omniscient – would have no wish but to do what is right. Swinburne also raises the point that science cannot and never will be able to explain consciousness. Mental events exist and "they are not analysable (sic) exclusively in non-mental terms."[37] He implies only God, a personal explanation, can overcome the oddness and bigness associated with "correlations of mental events and intentions with brain-events."[38]

As for the argument from morality, Swinburne gives it little weight, observing that normal scientific processes could easily explain moral awareness. Swinburne notes, "man's moral knowledge does not wear its source on its face."[39] In this chapter, then, Swinburne only comments on the strength of the argument from consciousness; he concludes that the argument from consciousness is a good C-inductive argument for the existence of God and that $P(e|\sim h)$ is low. However, only a short time later, he disclaims "that God has more reason for bringing about *e* [conscious beings] than for bringing about alternative states."[40] He only claims that $P(e|h) > P(e|\sim h)$.

The next argument Swinburne puts forth as evidence for the existence of God is the argument from providence. This inquiry focuses on, as Swinburne puts it, "whether the general

circumstances of the world are such as to show that a good God is providing for the basic needs of men and animals, i.e., whether the world is a providential place." Swinburne's general background evidence (*k*) in this argument is "the existence of an orderly universe (i.e. the existence of some laws of nature) and of conscious beings."[41]

Swinburne provides his thoughts on why God has reason to make a world where God gives man the opportunity to provide for himself, to provide for others, and to realize that animals are his responsibility. Because God has such reason, according to Swinburne, then there exists "some" probability that God will make such a world. However, Swinburne never indicates in an obvious way the strength of this argument. In fact, he even counters, "Of course our judgements on what God would or would not have reason to do are highly fallible." In the final analysis, this argument really appears to be just a forerunner for the problem of evil in the subsequent chapter, which Swinburne says will provide "stronger confirmatory evidence for the existence of God than the argument of this chapter alone."[42]

Because of Swinburne's ending remarks on his argument from providence, he apparently wishes its evidence taken together with his subsequent argument from the existence of evil – and not separately, as his chapter titles and first chapter comments indicate. "The problem of evil," says Swinburne, "is of course the problem of how if God, by definition omniscient, omnipotent, and perfectly good, made the world, there is evil in it." With his argument from providence, Swinburne reminds us he largely justified "the existence of evil in the world by God's gift to man of free will." He also used the defense "that a perfectly good God might well allow the occurrence of biologically useful pain – to encourage free agents to make right choices, without forcing them to do so."[43]

In his struggle with the problem of evil, Swinburne reflects that so-called natural evils pose the bulk of the problem. Natural evils Swinburne defines as follows:

> evils not brought about deliberately or knowingly allowed to occur by men; they may be either evils produced by natural processes which men do not know how to prevent, or evils produced accidentally by men.[44]

In addition to the free will defense against the problem of evil, three other traditional defenses exist. Swinburne dismisses all three.

The first, that "evil suffered by a man is God's punishment for his sins," cannot explain the "suffering of babies or animals." The second, that God lets other men and later generations of men and animals suffer for man's wrong choices (biblically supported, according to Swinburne, in Genesis 3: 16-20), fails to explain "the suffering of animals long before men arrived on earth." (In reading Swinburne, I have concluded he is apparently not a creation scientist.) The second defense, Swinburne continues, also does not provide gain (i.e., growth) "if man does not believe that his actions have these effects (as perhaps normally he does not)." The third defense, that "natural evils have been brought about by free agents other than men, viz. fallen angels," Swinburne calls more "substantial," claiming that it "certainly saves the theist from a conclusive disproof of the existence of God." However, the fallen-angel defense, because it adds to and complicates (thus making less simple) the original hypothesis "God exists," actually decreases both the prior and posterior probabilities. Swinburne dismisses the third defense because, at least taken alone, it lowers the probability that God exists and disconfirms theism.[45]

Swinburne builds upon the free will defense in making his case against the problem of evil. To previous general background knowledge *k* (an orderly universe of conscious beings), Swinburne now adds "with limited free will" (i.e., choice). He then argues that

> the existence of many natural evils . . . are necessary if agents are to have the *knowledge* of how to bring about evil or prevent its occurrence, knowledge which they must have if they are to have a genuine choice between bringing about evil and bringing about good.[46]

Explaining further, Swinburne discusses the relationship between knowledge and proximity to experience, extrapolates from individuals in the short term to races of men in the long term, and even comments on the role of "the story of animal evolution" in our knowledge of "*very* long-term consequences of changes of circumstances, environment, or climate."[47]

Briefly, Swinburne adds two additional arguments to rationalize the problem of evil. First, he argues that "various evils are logically necessary conditions for the occurrence of actions of certain especially good kinds." Second, he argues that "it is good that men should have experience of a full range of possible experiences . . . of the logical possibilities of pain and disease, of rejection of lovers, of the desolation of orphans, etc." Finally, Swinburne addresses God's right to inflict harm (or create a world with natural evil) and God's determination of the quantity of evil and suffering in the world. Swinburne maintains that God has set limits to suffering – a temporal limit (death) and a limit as to intensity (the point at which the brain shuts down). He also maintains that "the fewer natural evils a God provides, the less opportunity he provides for man to exercise responsibility."[48]

Before concluding, Swinburne makes a quick but interesting note about complicating the hypothesis of theism ("God exists") with additional hypotheses, as many have done when attempting to explain the problem of evil. Additional hypotheses like fallen (bad) angels, life after death, and redemptive incarnation (Christian theology) only "complicate theism so that it needs more in the way of confirming evidence." In his conclusion, Swinburne maintains that our world is as it is (and not some other way) because God, as defined, has reason to bring it about. Were there no God, our world could equally likely exist as any one of a number of possible

worlds. However, Swinburne acknowledges his arguments explaining the existence of evil "may not have been adequate to convince many a reasonable opponent." This inadequacy arises, says Swinburne, owing to the briefness of his explanation and lack of personal experience which "may fail to appreciate [the] full horror" of the world's harsher evils. Swinburne claims the argument from the existence of evil "is no good C-inductive argument . . . to the non-existence of God," but he never claims his arguments explaining the existence of evil add any evidence to the existence of God.[49]

Swinburne argues in his next two chapters from evidence of a more particular nature and of a more specifically theistic nature. The first argument, from history and miracles, attempts to provide evidence to the existence of God by citing the occurrence of historical events that violate universal laws of nature or that seem exceedingly unlikely to occur. Swinburne calls the latter case a quasi-violation of statistical laws – not such a clear-cut notion, he admits.

Now, by definition, "violations and quasi-violations are clearly events not explicable by natural processes."[50] Most theologians refer to them as miracles, and most would agree with Swinburne that they "confirm the existence of God."[51] However, skeptics and non-believers would question the proof of their actual occurrence in some cases. They might also raise the issue that science, in other cases, has not yet reached a point to provide explanation.

Swinburne cites four types of evidence for miracles: personal memory, testimony from others, traces of the past, and our knowledge of the world and the way things work. Says Swinburne, "The occurrence of much evidence of miracles is indirect evidence of the existence of God for it is evidence of the occurrence of events which natural processes do not have the power to produce." Swinburne also appeals to the character of God through a parental analogy and desire for friendship with his created beings as positively impacting the argument.[52]

Along with his chapter section on incarnation, his appeal to the character of God works, admittedly, only for those who have "had some contact with the Christian tradition or some religious tradition with similarities to the Christian one." Swinburne concludes his argument from history and miracles by calling it incomplete (having examined no particular events), by admitting it only "very weakly" confirms God's existence, and by citing it as merely a building block for his next chapter on religious experience.

Swinburne's last argument, the argument from religious experience, claims that "many have experienced God (or some supernatural thing connected with God) and hence know and can tell us of his existence."[53] Swinburne makes the initial point that "[c]ertainly one would not expect too evident and public a manifestation."[54] Such knowledge of God would necessarily curtail man's freedom. This reads much like a passage from Dostoevsky's chapter, "The Grand Inquisitor," from *The Brothers Karamazov*, where Christ, upon visiting his flock during the time of the Inquisition, is arrested and brought before the cardinal, the Grand Inquisitor. The Grand Inquisitor admonishes Christ thus:

> Thou didst not come down from the Cross when they shouted to Thee, mocking and reviling Thee, "Come down from the Cross and we will believe that Thou art He." Thou didst not come down, for again Thou wouldst not enslave man by a miracle, and didst crave faith given freely, not based on miracle. Thou didst crave for free love and not the base raptures of the slave before the might that has overawed him forever.[55]

Swinburne apparently agrees with the notion that complete knowledge of the existence of God removes from man choice and free will. Complete knowledge that God exists, then, does not coincide with general background evidence of an orderly universe with conscious beings possessing limited free will. This becomes more important in my later discussion about prior probabilities.

Swinburne begins his argument by discussing the nature of religious experience, calling it "a conscious mental going-on" and explaining why "all arguments from religious experience must be phrased as arguments from experiences given internal descriptions." He acknowledges that the crucial feature of what makes an experience religious is how the subject perceives it – "the way it seems to the subject."[56]

Granting the existence of both public and private religious experience and the fact that sensations (visual cues, auditory cues, etc.) may give rise to different experiences in different people, Swinburne then describes five types of religious experience. Generally, the first two types are public and the last two are private. The first two deal with perceiving the supernatural in either an ordinary non-religious public object or a very unusual public object. The last three private experiences Swinburne differentiates by sensory experience and available vocabulary for describing the experience. That is, the religious experience is either sensory and describable, sensory and not describable, or non-sensory (awareness but no sensation). Again, Swinburne reiterates that the same sensations to two different people may produce two different experiences, not necessarily religious.[57]

Swinburne then introduces two principles: the Principle of Credulity and the Principle of Testimony. The Principle of Credulity, which Swinburne hopes his readers take as intuitively correct, states the following:

> in the absence of special considerations, all religious experiences ought to be taken by their subjects as genuine, and hence as substantial grounds for belief in the existence of their apparent object – God, or Mary, or Ultimate Reality, or Poseidon.[58]

He argues against general attempts to restrict the Principle of Credulity in ways that would eliminate its application to religious experience. However, Swinburne allows for special considerations which negate the use of the Principle of Credulity. According to Swinburne, four

special considerations exist: an unreliable subject (i.e., person claiming the experience), situations where similar circumstances cannot repeat the experience (if of a repeatable nature), background evidence which makes the claim very improbable, and causal explanations which do not involve the supernatural at any stage.[59]

The Principle of Testimony, according to Swinburne a "further important principle of rationality," says that "in the absence of reason for challenge, we believe what people tell us about their experiences." Although arguably claiming at one point that "We do not normally check that an informant is a reliable witness before accepting his reports," Swinburne later puts forth a pretty reliable truth test for someone's religious experience testimony. Has the subject undergone a life-style change because of the experience?[60]

In concluding his final argument, Swinburne relies heavily on the Principle of Credulity, to the point of stating, "Initial scepticism (sic) about perceptual claims – regarding them as guilty until proved innocent – will give you no knowledge at all." He further states, "Religious perceptual claims deserve to be taken as seriously as perceptual claims of any other kind." Given the weight he places behind the Principle of Credulity, Swinburne's conclusion about the "considerable evidential force of religious experience" should surprise no one.[61]

Swinburne's summation in his final chapter points out more fully how the evidence for each argument relies on the strength of the preceding argument. This reliance, somewhat like the cosmological argument, again begs the question, I believe, about a starting point – the appropriate prior probabilities to use at the very beginning of the Bayesian analysis. Swinburne reiterates in his summation that the argument from morality (evidence of the existence of morality) is not confirming evidence of God's existence. Also, he reiterates that the existence of

evil does not "count against the existence of God."[62] For Swinburne, the probability that God exists is just the same after introducing the new evidence of existent evil as it was before.

Swinburne reports he "could not reach a final conclusion on just how strong a C-inductive argument" the argument from history and miracles provides because he examined no direct evidence concerning the occurrence of just such historical phenomena or miracles. Also, the strength of the argument from religious experience, according to Swinburne, increases with proximity to the experience, the strongest evidence obviously being personal religious experience. Lastly, Swinburne apologizes for omitting a discussion about free will and for merely assuming no credible argument exists to demonstrate men do not have free will. This assumption directly affects the arguments from consciousness, morality, providence, and evil.

The remaining question for Swinburne centers on whether he has presented a good P-inductive total argument for the existence of God. That is, considering all the arguments (evidence) together, does P($h|e$) exceed P($\sim h|e$)? This would of necessity make P($h|e$) greater than one-half. From his conclusion, the strength of Swinburne's total evidence rests on two things. First, he claims that the extreme simplicity of the hypothesis "God exists," relative to all other possibilities for what exists, makes the *a priori* probability for *h* very high. Second, Swinburne proposes that "everything turns on" the probability that *e* (all the evidence) holds and there is no God. To this, he answers the following:

> Clearly, as I argued in Chapter 7, there can be no scientific explanation of the existence of a universe; for all that science can do is to explain how a present state of the universe was brought about by a past state. It cannot explain why there is a universe at all.[63]

He builds upon the inadequacies of science by revisiting chapters 8 through 12. Science cannot explain why we have the most basic laws of nature. Science cannot explain why we have conscious beings. Science cannot explain why we have suffering and evil. Science cannot

explain why we have miracles. (Almost absurdly, but and more closely paralleling Swinburne's words about miracles in his conclusion, science cannot explain why "there occur particular scientifically inexplicable events."[64])

"If there is an explanation of these things," Swinburne continues, "it must be a personal explanation, because that is the only other kind of explanation which we have." This remark refers back to Swinburne's discussion of scientific and personal explanation in chapters 2 through 4. I note with interest that at one point in his conclusion, Swinburne claims that, as human beings (embodied agents), "We expect all things to have explanations." Yet, shortly thereafter, he remarks similarly by personifying the non-embodied universe as "crying out for explanation."[65]

Of more interest, though, is Swinburne's ultimate finding. Without using actual numbers, Swinburne concludes that all the evidence up to but not including religious experience, gives at best a posterior probability of one-half to the existence of God. Essentially, without the argument from religious experience, we might as well flip a coin. At best, the toss has even odds of landing heads or tails. More likely, the coin favors one side, that side equating to the non-existence of God. Swinburne notes, "theism is neither very probable nor very improbable,"[66] but his use of Bayes's theorem results in a probability of one-half or lower.

Only when the evidence of religious experience, "the testimony of many witnesses to experience apparently of God," gets added to the equation does theism become overall probable. Swinburne now concludes, "On our total evidence theism is more probable than not," and the evidence – as a whole – makes a good P-inductive argument. For Swinburne, religious experience is the key to theism being more probable than not:

> The experience of so many men in their moments of religious vision corroborates what nature and history shows to be quite likely – that there is a God who made and sustains man and the universe.[67]

Having come to the end of Swinburne's book, we can now return to his arguments with perspectives from other thinkers – and this author. Obviously, Swinburne uses some arguments for theism that others originated. To his credit, he discusses and acknowledges some of these originating and differing perspectives in his text. My further analysis mentions a few of these perspectives in general. I look, too, at instances of some authors' specific examinations of Swinburne's versions of the arguments – with Swinburne's answers, where available. Finally, I return to the development of Bayesian posterior probabilities, with particular attention given to views of Swinburne's intrinsic probabilities.

In 1948, when Father F.C. Copleston, Jesuit priest, engaged Bertrand Russell, twentieth-century philosopher and agnostic, in debate about the existence of God using the argument from contingency, he reasoned to a necessary, external existent being (apart from objects we have experienced), "itself the reason for its own existence." (Swinburne introduces us to this same argument from contingency but calls it the Leibniz version of the cosmological argument.) Russell first countered by denying the idea of necessary and contingent beings. He only accepted the idea of the word "necessary" as applied to analytic propositions (not to things). He then countered by claiming that if "there is a being whose essence involves existence, so that his existence is analytic," it brings us back to the ontological argument. (Swinburne recognized and rejected this Kantian accusation.[68]) Finally, Russell adopts an option that Copleston rejects but finds difficult to argue (as does Swinburne some thirty years later): "I should say that the universe is just there, and that's all."[69]

Keith M. Parsons, in reviewing Swinburne's cosmological argument, questions Swinburne's use of intrinsic (purely *a priori*) probabilities like P(*h*) and P(*e*). He asks, "How can we meaningfully assign a probability to such statements when we have no information upon which to assess such probabilities?" Parsons also disagrees with Swinburne's characterization of theism as an extremely simple hypothesis. Ultimately, Parsons destroys Swinburne's "project as a whole." That is, Parsons explains in detail why Swinburne's attempt to provide a theistic argument does not equate to any type of scientific argument, particularly the ones to which Swinburne alludes. It does not resemble scientific arguments about quarks because "the cumulative case for the existence of quarks is based on the experimental confirmation and predictive success of the model, not merely on its simplicity and ability to account for previously known data." It does not resemble the development of Newton's laws of motion because "it fails to imply any immediately testable consequences . . . [and] never mentions any previously unknown facts that would confirm his hypothesis by their occurrence or disconfirm it by their nonoccurrence." Parsons even makes an interesting argument for an atheistic hypothesis, in two separate cases – for both an infinitely old universe and a finite universe.[70]

One of J.L. Mackie's criticisms of Swinburne's cosmological argument deals with the concept of personal explanation. Mackie questions the likelihood that any being possesses the "key power . . . of fulfilling intentions directly, without any physical or causal mediation, without materials or instruments." He also questions the likelihood of an uncaused being (God) resting so heavily on Swinburne's supposition of extreme simplicity. Mackie makes the ironic observation that "whereas God seemed to Anselm and others to be self-explanatory because he is something than which nothing greater can be conceived, he now seems to Swinburne to be relatively self-explanatory because he is simple."[71]

I concur with Parsons's unfavorable views of Swinburne's intrinsic, or *a priori*, probabilities, which is why I take a different approach to them later. I also disagree with Swinburne's characterization of the universe as a finite object.[72] Were this so, it seems to me a lot of differential equations and integral calculus might prove even more incomprehensible than many already think, with their dependence on the concept of infinity. Perhaps we could agree that the universe at least bounds infinity if we cannot agree that it is infinite (as in, possibly, infinitely old).

Mackie also raises an objection to Swinburne's teleological, or design, argument:

> [Swinburne] cannot consistently say that, without the theistic hypothesis, it is highly improbable *a priori* that there are any regularities; for the latter assertion of improbability is equivalent to saying that there is a strong presumption of randomness.[73]

Mackie does not like excessive reliance on any *a priori* probabilities. Swinburne counters by using Mackie's argument in, what he presents as, an equivalent case:

> Suppose that there are before us, ready for use, many packs of cards. On examining some of them at random we find that they are all arranged in order of suits and seniority. That allows us to infer that the other packs which we have not examined will also be so arranged. Any normal observer would then immediately suspect that these coincidences are to be explained in terms of something beyond themselves, e.g., an agent or a machine constructed by an agent which arranged the packs in order.[74]

Swinburne's rebuttal, however, illustrates a point often raised about some Bayesian analysis – namely it proposes probabilities without evidence from sampling theory. Critics of statistical arguments about the universe agree: we cannot talk of coincidences when only presented with one universe as background knowledge.

Hick echoes the design argument's problem with probabilities: "the statistical concept of probability which is used in the sciences cannot be applied to the unique case of the universe as a whole." Hick also makes a case for my sensitivity analysis on the *a priori* probabilities at the

end of this paper: any estimation of the probability of theism "must accordingly be an 'alogical' type . . . it must represent a judgment of general human reasonableness or common sense."[75]

Swinburne seems to strongly resist the thought that a well-ordered universe, conforming to laws of nature, has much likelihood of arising out of randomness or chance – or without the existence of God. He furthers his cosmological argument in an appendix by adding supposed evidence for a fine-tuned universe. Swinburne cites a 1986 Oxford study as lending support to evidence "that the occurrence of life was a rare event" and that more rare was the development of just the type of body-vehicles necessary for the expression of consciousness.[76]

I would offer as counter-argument even newer scientific evidence, from 1999, of order rising out of randomness and chance. In test tube experimentation with fast-reproducing bacteria, through the course of eleven years and 24,000 generations, scientists have concluded that "when it comes to organism adaptive performance . . . evolution is remarkably reproducible."[77] These experiments, echoed by other experiments, have shown that "evolution seems truly reproducible down to the level of genes."[78]

Can we now make large, leaping inferences from evolving genes to evolving consciousness, somewhat like Swinburne did in 1979 (in another direction) from human embodied agents to a non-embodied agent (God)? At one time, we even thought it impossible to map the human genome. We should take care not to proceed so fast; science appears to be advancing very quickly now, but still has a long way to go in this area.

Along another line of evidence, Swinburne essentially dismisses two arguments in his book: morality and evil. He dismisses the argument from the existence of evil for having no explanatory evidence to the existence of God, though he concludes that his theodicy has countered any of its explanatory power for the non-existence of God. David O'Connor,

however, poses an alternative world concept that a good and omnipotent God could create that would provide "compelling reason for not making the present world" – thus lessening the probability of God.

O'Connor's God-created world would have man born "with the knowledge of good and evil in such a way that, upon desiring something wrong or getting into danger, the appropriate warning or information would come into that person's consciousness." He continues:

> This would obviate the need, on Swinburne's version, for God to warn or enlighten us on a case-by-case basis. Being able to foresee all circumstances, an omniscient and omnipotent God could store in our memories all such information as we would ever need and do so with a success and efficiency never dreamed of by any mere computer programmer. Notice that no determinism is involved here; only information would be stored, not directions on actions to take.[79]

By withholding knowledge of the source, God has created a world where natural evil need not exist for any educational role, and moral evil can exist at the present level. Thus, God has created "a world with far less evil than is contained in the present one."[80] Supposedly, too, O'Connor has successfully created a situation that lessens the probability that God exists – at least as it fits into Swinburne's Bayesian argument.

Robert Prevost, who conducts a good overall evaluation of the methodology and problems with Bayesian analysis, begins his analysis by looking at Swinburne's particular use of evil and theistic explanation. Although acknowledging the overall appropriateness of Swinburne's methodology, Prevost concludes the specific argument from the problem of evil – that is, explaining why God allows evil – is not appropriate to Bayesian analysis.[81]

Although relevant to theism, Prevost sees the problem of evil as both a logical problem and an evidential problem. The logical problem, the logical incompatibility of the premises and the conclusion (all-good, all-powerful God, evil exists), is just not compatible with a Bayesian probability approach. The evidential problem creates two issues with theism. First, the

"existence of apparently pointless evils, so called gratuitous evil" remains unexplained. Second, the severity of some, especially particular individual instances of purposeless, evil remains unexplained.[82]

Swinburne's strongest argument with respect to his Bayesian approach seems, in his mind, to be the argument from religious experience. Returning to Russell and Copleston, we see that Russell's concept of religious experience as a mental state parallels Swinburne's "mental going-on" description. However, Russell notes a "tricky affair" in arguing from a private mental state to something completely outside us. Russell also contends he has had experiences that "altered [his] character profoundly" but did not involve the existence of something outside him.[83]

My problem with Swinburne's reliance on the argument from religious experience lies with his lack of examples. One in particular comes to mind, though I do not advocate its applicability as a general example: the case of Joan of Arc. In 1431 she was burned at the stake by a church for heresy. The church seems also to have had some problems with her gender-bending dress code. In 1456, the church reversed the verdict, and in 1920, nearly 500 years later, the Catholic Church made her a saint.

Aside from the evident mind changing of the church, this particular case violates Swinburne's condition about proximity to the event when evaluating the reliability of personal testimony. It also, at least with current medical diagnostics, may benefit by explanation for then unknown biological and psychological abnormalities (for example, schizophrenia, etc.). To me, Swinburne's religious experience argument suffers because it lacks a close look at examples.

One additional theologian, David Casey, makes the comment that, though refreshing, Swinburne's argument from religious experience needs maturing and support for his principles of credulity and testimony. He continues:

> From the alleged absence of serious incompatibility among the claims of various religious traditions, Swinburne seems to assume too readily a vague convergence of many religious experiences on a common notion of God.[84]

Stepping back and reviewing Swinburne's overall approach, I would make three sweeping observations. First, Swinburne's use of biblical references and Christian theological support increases from the middle to the end of the book.[85] This detracts from what Mortimer Adler calls pure philosophical reasoning, the approach that Swinburne seemingly favored at the beginning of his analysis. Swinburne at least recognizes and partially agrees with Adler in his differentiation between pure philosophical argument and theistic philosophical argument.[86,87]

Second, by Swinburne's own admission, he does not evaluate "arguments against the existence of God."[88] Therefore, his analysis of the cumulative effect of the arguments he does evaluate seems unfairly tilted toward a likely outcome for the existence of God. In essence, his "trial" of God sends the jury to deliberate when the defense rests, without hearing from the prosecutor.

Third, Swinburne supports certain aspects of several arguments by analogizing God as parent and God as friend. This leap when attributing characteristics from embodied agents to a non-embodied agent, from finite beings to an infinite being, from the physical to the metaphysical (or supernatural) seems unsupportable in a pure philosophical sense. It may be comforting to think of God as such a being, but it is not necessarily accurate.

Finally, returning to the concept of probabilities, several authors comment. Personally, I see two problems with Swinburne's formulation of his prior probabilities. First, who can really say "God exists" provides a more simple explanation than "God does not exist"? Swinburne does not convince on this point in his various examples.[89] A god who creates and puts a hand (so to speak) or an imprint on everything, to many, may be far less simple than an eternally existing

universe that from a creative explosion (or from each creative explosion) makes (or remakes) itself randomly.

One could further argue that the complexity of the universe – stars of different size and mass, galaxies of various shapes, planets at different stages of existence, with differing ability to support life, uncountable billions of "chunks" – supports calling God the more complex of the two alternatives. Try to imagine creating such a diverse assortment of entities. An infinite, eternally existing universe – perhaps one that "bangs" into a random existence, expands, and then eventually collapses into itself, only to "bang" again into another random existence – seems at least as simple a theory as a metaphysical being that thinks through the creation of each of the billions and billions of non-similar "chunks." Out of all those random "chunks" might conceivably and easily emerge a world like the one we currently experience. "God exists" may again be more comforting, but it is not necessarily more simple.

My second concern about prior probabilities is, if trying to change minds, would it not improve the analysis by taking as prior probabilities a person's starting belief in the hypothesis "God exists" and then add new evidence to get a revised probability? I evaluate the strength of Swinburne's arguments taken as a whole, and using the starting-belief approach, as a last detail in this analysis.

Prevost maintains a similar objection:

> The fact that criteria such as these [fit, scope, and simplicity] must be used points to another problem of Bayes's theorem. If differing criteria are used, even granting the logical necessity of epistemic probabilities, the theorem reports conflicting values for the probability of a hypothesis on given evidence. Disputants, by appealing to different evaluative criteria, can agree on the methodology of Bayes's theorem but come to contradictory conclusions. In such a case, the use of Bayes's theorem does not provide a helpful method for assessing the weight of the evidence for a given hypothesis.[90]

However, I disagree with Prevost's quick dismissal of Bayes's theorem as unhelpful. Even with differing criteria providing a range of prior probabilities, sensitivity analysis (as seen in the Hamburg example) shows to what degree prior probabilities must gain support. It also shows to what level new evidence must aspire to effect a revised probability that "God exists" is more likely than not.

An additional question to pose when evaluating prior probabilities is "Why something rather than nothing?" Such a question, though, seems equally applicable to God as to the universe. Therefore, the intrinsic probability of theism seems no stronger than that of non-theism. For some then, particularly agnostics, the two opposing *a priori* probabilities might as well each take on equal values of one-half, like a fair coin being subjected to new evidence tosses.

Another point arises when considering prior probabilities. For two reasons, no *a priori* probability when using Bayes's theorem can have a value of 1 or 0. First, the follow-on calculations become trivial and the *a posteriori* probabilities never change. They receive no benefit from new evidence. Second, since a probability of 1 implies sure knowledge, absolute truth, and nothing-left-to-dispute, theism or atheism (whichever takes the value of 1) becomes not a belief but knowledge. A probability of 1 leaves no room for faith.

What can we say then about the degree of belief someone has in theism or atheism? Obviously, a pure agnostic would proceed with a Bayesian analysis starting off with P("God exists") = 0.5. At what probability does an agnostic leaning one way or another become either an atheist or a theist? That debate could prove as interesting and seemingly unresolvable as the debate over whether God exists. I propose, for argument's sake, a window of 15 percent on either side of pure agnosticism to cover the cases of leaning agnostics. Therefore, any *a priori*

probability greater than 0.65 that God exists indicates theistic belief. Any *a priori* probability less than 0.45 indicates atheistic belief. Let me begin the sensitivity analysis with these numbers in mind and see what happens to the *a posteriori* probabilities.

Seemingly, the most interesting calculations in this study would involve determining the required strength of the new evidence probabilities in order to revise the belief in the existence of God to something greater than one-half. We will begin with the supposedly pure agnostic belief in God where P(*h*) = P(~*h*) = 0.5. Then, we will look at the marginal atheist, say, P(*h*) = 0.2 and P(~*h*) = 0.8. For argument's sake again, we will call a marginal theist one whose P(*h*) = 0.8.

By Swinburne's own admission, the strength of his arguments taken together – without the added strength he assigns to the argument from religious experience – at best could only raise P(*h*|*e*) to 0.5. Adding in religious experience, according to Swinburne, "makes the existence of God probable if it is not already on other evidence very improbable."[91]

Since Swinburne does not exactly provide a ringing endorsement or clear comparison, we might assume that at least P(*e*|*h*) > 0.5 > P(*e*|~*h*), though not by a wide margin. As an initial calculation we will assign P(*e*|*h*) = 0.7 and P(*e*|~*h*) = 0.4 and proceed from there with some tables. We will use Hamburg's notation, so for our purposes in the following tables A_1 represents "God exists" and A_2 represents "God does not exist." As for new evidence, B represents Swinburne's arguments taken as a whole.

Table 2. Bayes's Theorem Calculations for Agnostic and Evidence

Events A_i	Prior Probabilities $P(A_i)$	Conditional Probabilities $P(B\|A_i)$	Joint Probabilities $P(A_i)P(B\|A_i)$	Revised Probabilities $P(A_i\|B)$
A_1	0.5	0.7	0.35	0.64
A_2	0.5	0.4	0.20	0.36
	1.00		P(B) = 0.55	1.00

Table 3. Bayes's Theorem Calculations for Marginal Atheist and Evidence

Events A_i	Prior Probabilities $P(A_i)$	Conditional Probabilities $P(B\|A_i)$	Joint Probabilities $P(A_i)P(B\|A_i)$	Revised Probabilities $P(A_i\|B)$
A_1	0.2	0.7	0.14	0.30
A_2	0.8	0.4	0.32	0.70
	1.00		P(B) = 0.46	1.00

Table 4. Bayes's Theorem Calculations for Agnostic to Become Marginal Theist

Events A_i	Prior Probabilities $P(A_i)$	Conditional Probabilities $P(B\|A_i)$	Joint Probabilities $P(A_i)P(B\|A_i)$	Revised Probabilities $P(A_i\|B)$
A_1	0.5	0.90	0.45	0.80
A_2	0.5	0.22	0.11	0.20
	1.00		P(B) = 0.56	1.00

Table 5. Bayes's Theorem Calculations for Marginal Atheist to Become Agnostic

Events A_i	Prior Probabilities $P(A_i)$	Conditional Probabilities $P(B\|A_i)$	Joint Probabilities $P(A_i)P(B\|A_i)$	Revised Probabilities $P(A_i\|B)$
A_1	0.2	0.95	0.190	0.50
A_2	0.8	0.24	0.192	0.50
	1.00		P(B) = 0.382	1.00

The implications of this cursory sensitivity analysis are dubious at best. As most authors have already noted, assigning actual numbers to prior probabilities and new evidence when making a case for theism will never garner total agreement – and may garner lots of snide remarks. The above exercise, however, does provide a notion about just how strong the new evidence for theism needs to be before changing someone's mind. It also provides a notion about the relative difference needed between the new evidence as it explains theism and as it explains non-theism. Note here that the examples above do not constitute an ultimate answer or final solution to the needed strength of the evidence. These examples only offer four distinct points along a continuum – some might argue an infinite continuum – of possible probabilities.

As a final note, evaluating the strength of the evidence provides only a portion of the puzzle when making a decision to believe or disbelieve based on probabilities. To complicate the entire matter, one would need to also evaluate the payoffs, play a game with the consequences. If you believe in God – and live your life as you believe you should if you believe in God – and God exists, what do you win? Do you lose anything if God does not exist? If you do not believe and God exists, what do you win? Or do you only lose? What possibilities exist for living your life if you do not believe? Are your life-style choices more limited if you believe?

All this becomes a typical game-theory or decision-analysis problem, if you choose to make it so. Some would balk. Says Alan Dershowitz, "To profess belief on a cost-benefit analysis is to trivialize religion."[92] In the end, though, one must decide. Pascal may have formalized the wager, but we all must play the game.

Notes

1. “In Praise of Bayes,” *The Economist* 356 (30 Sep. 2000): 83.

2. Morris Hamburg, *Statistical Analysis for Decision Making*, 3rd ed. (New York: Harcourt Brace Jovanovich, Inc., 1983), 76.

3. Ibid.

4. Thomas Bayes, *Facsimiles of Two Papers by Bayes*, ed. W. Edwards Deming (New York: Hafner Publishing Co., 1963), 409.

5. Ibid., 410.

6. Hamburg, 75-78.

7. John Stutz and Peter Cheeseman, “A Short Exposition on Bayesian Inference and Probability,” (1 Jun. 1994): accessed 27 Nov. 2002, <http://ic.arc.nasa.gov/ic/projects/bayes-group/html/bayes-theorem-long.html>.

8. Hamburg, 248-249.

9. Bayes, 409-410.

10. Hamburg, 77.

11. Ibid., 75.

12. “This notion of religions as mutually exclusive entities with their own characteristics and histories – although it now tends to operate as a habitual category of our thinking – may well be an example of the illicit reification, the turning of good adjectives into bad substantives, to which the western mind is prone and against which contemporary philosophy has warned us. In this case a powerful but distorting conceptuality has helped to create phenomena answering to it, namely the religions of the world seeing themselves and each other as rival ideological communities.” Hick at another point states, “Among the great religious traditions, and particularly within their more mystical strands, a distinction is widely recognized between the Real or Ultimate or Divine *an sich* (in him/her/its-self) and the Real as conceptualized and experienced by human beings. The widespread assumption is that the Ultimate Reality is infinite and as such exceeds the grasp of human thought and language, so that the describable and experienceable objects of worship and contemplation are not the Ultimate in its limitless reality but the Ultimate in its relationship to finite perceivers.” John Hick, *Philosophy of Religion*, ed. Elizabeth Beardsley and Tom Beauchamp, 4th ed., Prentice Hall Foundations of Philosophy Ser., (Englewood Cliffs, NJ: Prentice Hall, 1990), 111, 117.

13. Hilary L. Seal, "Bayes, Thomas," in *Bayesian Statistics: Principles, Models, and Applications*, by S. James Press (New York: John Wiley & Sons, 1989), 175.

14. Hamburg, 75.

15. Bayes.

16. Richard Swinburne, *The Existence of God*, 1979, rev. ed. (Oxford: Oxford University Press, 1991), 2, 64.

17. Ibid., 9.

18. "Hence I shall not discuss the traditional ontological argument for the existence of God, or any variants thereof. Nor shall I discuss arguments agains the existence of God." Swinburne, 9-10.

19. Swinburne, 10.

20. Ibid., 7.

21. Ibid., 52-53.

22. Ibid., 130.

23. Ibid., 64, 286.

24. Ibid., 64.

25. Ibid., 51.

26. Ibid., 118-122.

27. Ibid., 125-127.

28. Ibid., 128.

29. Ibid., 130.

30. Ibid., 131.

31. Ibid., 135-136.

32. Ibid., 136.

33. Ibid., 141.

34. Ibid.

35. Ibid., 148.

36. Ibid., 152-156.

37. Ibid., 166.

38. Ibid., 172.

39. Ibid., 179.

40. Ibid., 174.

41. Ibid., 180-181.

42. Ibid., 199.

43. Ibid., 200-201.

44. Ibid., 201.

45. Ibid., 201-202.

46. Ibid., 202-203.

47. Ibid., 209.

48. Ibid., 214-219.

49. Ibid., 220-222.

50. Ibid., 232.

51. Ibid., 233.

52. Ibid., 234-239.

53. Ibid., 244.

54. Ibid.

55. Fyodor Dostoevski, *The Grand Inquisitor on the Nature of Man,* trans. Constance Garnett (Indianapolis, IN: Bobbs-Merrill Educational Publishing Co., 1948), 34.

56. Swinburne, 244-247.

57. Ibid., 249-252.

58. Ibid., 254.

59. Ibid., 260-271.

60. Ibid., 271.

61. Ibid., 275-276.

62. Ibid., 277.

63. Ibid., 286.

64. Ibid., 287.

65. Ibid., 287-289.

66. Ibid., 289.

67. Ibid., 291.

68. Ibid., 128.

69. John Hick, ed. *Classical and Contemporary Readings in the Philosophy of Religion*, 3rd ed. (Englewood Cliffs, NJ: Prentice Hall, 1990), 227-232.

70. Keith M. Parsons, *God and the Burden of Proof: Plantiga, Swinburne, and the Analytic Defense of Theism*, (New York: Prometheus Books, 1989), 72-96.

71. J.L. Mackie, *The Miracle of Theism: Arguments For and Against the Existence of God*, (Oxford: Clarendon Press, 1982), 100.

72. Swinburne, 118.

73. Mackie, 148.

74. Swinburne, 298.

75. Hick, *Classical*, 506.

76. Swinburne, 300-322.

77. Tim Appenzeller, "Test Tube Evolution Catches Time in a Bottle," *Science* 284 (25 Jun 1999), 2109.

78. Ibid., 2110.

79. David O'Connor, "Swinburne on Natural Evil" *Religious Studies* 19 (1983), 72.

80. Ibid., 71.

81. Robert Prevost, *Probability and Theistic Explanation*, Oxford Theological Monographs (Oxford: Oxford University Press, 1990), 12-13.

82. Ibid., 20-25.

83. Hick, *Classical*, 235-238.

84. Rev. David Casey, rev. of *The Existence of God*, by Richard Swinburne, *International Philosophical Quarterly* 21.4 (1981), 468.

85. From about the middle of his book, Swinburne begins interjecting increasingly more theological references, especially from the Christian tradition. Here is a sampling – reference (page number). Jeremiah (142), Jeremiah (143), angels (156), angels (160), Genesis 1:28 (198), Genesis 3:16-20 (202), Psalmist (215), Christian tradition (241), incarnation (239), resurrection (235), Exodus and Acts possibly supporting pluralism (266), Christian religious experiences (274).

86. Swinburne, 10-21.

87. Mortimer Adler, *How to Think about God* (New York: Macmillan Publishing Co., Inc., 1980), 8-17.

88. Swinburne, 10.

89. Ibid., 105-6, 108, 111.

90. Prevost, 33.

91. Swinburne, 291.

92. Alan Dershowitz, "Why Be a Good Person?" *Letters to a Young Lawyer* (Basic Books, 2001), accessed 8 November 2001, <http://aol.beliefnet.com/story/92/story_9263.html>.

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