

## CARTESIAN KNOWLEDGE AND CONFIRMATION\*

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Bayesian approaches to probabilistic inference have long been thought by many philosophers to capture the structure of confirmation in empirical science. Recently, however, such approaches to distinctively philosophical topics have been gaining in popularity. Bayesian conceptions of evidence have been invoked in recent arguments regarding the existence of God, the hypothesis of multiple physical universes, and the Doomsday Argument. Philosophers writing on these topics often claim that, given a Bayesian account of evidence, our existence or something entailed by our existence (perhaps in conjunction with some background knowledge or assumption) may serve as evidence for each of us.

In this paper, I argue that this widespread view is mistaken. The mere fact of one's existence *qua* conscious creature cannot serve as evidence on the standard Bayesian conception of evidence because knowledge of one's existence is a necessary part of the background

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knowledge relative to which all epistemic probabilities are defined. It follows that any proposition *a priori* entailed by one's existence cannot serve as evidence and that any proposition *a priori* entailed by the conjunction of one's existence and one's other background knowledge cannot serve as evidence, relative to that background knowledge. If I am correct, then many of the aforementioned recent applications of the Bayesian conception of evidence to philosophical problems are undermined. Furthermore, as will become apparent, if I am correct, then the very common assumption that it is possible for every single contingent proposition to serve as evidence, is mistaken.

#### I. CARTESIAN KNOWLEDGE AND THE STRONG PROBLEM OF OLD EVIDENCE

The sort of "Cartesian" knowledge which I contend that standard probabilistic approaches to evidential reasoning are unable to treat as evidence includes the following:

E1 = I exist.

E2 = I am conscious.

Though I will claim that such propositions are (or should be) certain for a given rational mental subject, I will make no particular assumptions about the ultimate nature of rational mental subjects.<sup>1</sup>

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<sup>1</sup> Those who claim that such '*de se*' knowledge requires a notion of belief which is fundamentally non-propositional (see David Lewis, "Attitudes *De Dicto* and *De Se*,"

Most Bayesians who provide an account of qualitative (incremental or relative) confirmation advance the following "positive relevance" account:<sup>2</sup>

PR:  $E$  confirms  $H$ , given background knowledge  $K$ , IFF  $P(H/E\&K) > P(H/K)$ .

This account of confirming evidence is an attempt to provide a precise characterization of the intuitive idea that  $E$  is evidence for  $H$  when  $E$  makes it *rational to be more confident* that  $H$  is true.<sup>3</sup>

This account also respects the fact that whether a given proposition counts as evidence for a hypothesis depends on one's epistemic situation. For example, whether the presence of Ted's fingerprints on the safe is evidence that he is the thief who last night burgled the store depends on whether one knows that Ted is the night manager with frequent and legitimate occasion to open the safe or, instead, a disgruntled former employee with a number of prior burglary

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*Philosophical Review*, LXXXVIII (1979): 513-543) should be able to recast my arguments in their preferred terms.

- <sup>2</sup> There is also a Bayesian project of articulating a *quantitative* measure of incremental confirmation. If the arguments I advance in this paper are correct, none of the proposed quantitative measures requiring a difference between  $P(H/E)$  and  $P(H)$ , or undefined when  $P(E) = 1$ , will allow E1 or E2 to serve as evidence.
- <sup>3</sup> Though PR attempts to capture a core intuitive notion of evidence, it also has, as noted by Carnap in *The Logical Foundations of Probability*, 2nd Edition (Chicago: University of Chicago Press, 1962), pp. 382-386, a number of somewhat counterintuitive consequences.

convictions. PR captures the relevance of one's epistemic situation by relativizing confirmation to background knowledge,  $K$ . Though I am inclined to think that one's epistemic situation, in the sense relevant to confirmation, contains sensory and other cognitive states which may not be explicitly captured by one's beliefs or knowledge, for present purposes this fact can be accommodated by the idealizing assumption that a fully rational creature is introspectively omniscient, i.e., has propositional knowledge of all of its own introspectively accessible mental states.

On PR, it is clear that  $K$  cannot entail  $E$  if  $E$  is to confirm  $H$  because in such circumstances the conditional probabilities in PR will be equal rather than unequal. This fact is the basis of the celebrated "Problem of Old Evidence," the first formulation of which is credited to Clark Glymour.<sup>4</sup> Given PR and a natural understanding of what an agent's background knowledge or information is, it would seem that if an agent knows  $E$  to be the case, then  $E$  must have an epistemic probability of 1 and it is impossible for  $E$  to confirm (or disconfirm)  $H$  since  $K$  includes  $E$  and hence  $P(H/K)$  is identical to  $P(H/E\&K)$ . The problem is that PR appears to imply the absurd conclusion that once a proposition is known to be true, it can no longer be evidence.

Nonetheless, it may still be the case that  $E$  confirms (or disconfirms)  $H$  relative to a more restricted set of background knowledge propositions,  $K'$ , which does not entail  $E$ . This suggests how  $E$ , though already known, might count as confirming evidence for  $H$ . The idea is simply to subtract  $E$  in some suitable way from  $K$  and to suggest that such "old evidence" has confirming power when  $P(H/E\&K') > P(H/K')$ . There are a variety of proposed ways to perform the

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<sup>4</sup> *Theory and Evidence* (Princeton: Princeton University Press, 1980).

relevant subtraction. Some, so-called "Historical Proposals," appeal to the actual historical epistemic situation of the relevant agent prior to learning that  $E$  is the case. They hold that  $E$  confirms  $H$  for  $S$  IFF prior to  $S$  coming to know  $E$ ,  $P(H/E\&K)$  was greater than  $P(H/K)$ .<sup>5</sup> A more plausible approach is to be found in proposals which appeal to counterfactual (rather than actual historical) epistemic situations in order to solve the problem. These, so-called "Counterfactual Proposals," hold that  $E$  confirms  $H$  for  $S$  IFF were  $S$  to fail to know  $E$ , then  $P(H/E\&K)$  would be greater than  $P(H/K)$ .<sup>6</sup>

The adequacy of these proposed solutions to the problem of old evidence has been much debated; but whatever the value of these proposals for accommodating standard cases of old evidence, there is no way *any* such proposal will allow E1 or E2 to serve as evidence. This is for one simple reason: unlike the situation with almost all other cases of old evidence, it is impossible to be in an epistemic situation in which one rationally doubts (i.e. lacks certain knowledge of) one's own existence or in which the epistemic probability of one's existence is less than 1. E1 and E2 are such that a fully rational agent is necessarily certain of their truth. Hence, they are a necessary part of the background knowledge a fully rational being has in any

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<sup>5</sup> Cf. Paul Horwich, *Probability and Evidence* (Cambridge: Cambridge University Press, 1982).

<sup>6</sup> Cf. Colin Howson and Peter Urbach, *Scientific Reasoning: The Bayesian Approach* (Chicago: Open Court, 1989).

epistemic situation whatsoever and, given PR, cannot serve as evidence. E1 and E2 thus present us with what I shall call "the strong problem of old evidence."<sup>7</sup>

My argument thus far may be precisely stated as follows:

- [1]  $E$  is evidence for  $H$ , relative to  $K$ , IFF  $P(H/E\&K) > P(H/K)$ .<sup>8</sup>
- [2] The probabilities in [1] are epistemic probabilities.
- [3] Epistemic probabilities are relative to an epistemic situation.
- [4] The epistemic probability of "I exist" is 1 for me in every possible epistemic situation I could occupy.<sup>9</sup>

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<sup>7</sup> Henceforth, I'll drop constant reference to E1 and E2 and generally refer only to E1. I assume that my arguments apply equally to both propositions.

<sup>8</sup> A version of this problem arises as well for Likelihoodists (see Anthony W. F. Edwards, *Likelihood* (Cambridge: Cambridge University Press, 1972)), who decline to think of evidence as raising the probability of a theory and claim that  $E$  "supports" (in their stipulative sense)  $H1$  over  $H2$ , relative to  $K$ , IFF  $P(E/H1\&K) > P(E/H2\&K)$ . Perhaps my argument in this section provides further justification for Elliot Sober's likelihoodist skepticism regarding the possibility of E1 serving as evidence. See his "The Design Argument," in William Mann, ed., *The Blackwell Guide to the Philosophy of Religion* (Malden, MA: Blackwell), pp. 117-147. It should be noted that the objection to premise [2] discussed in Section III might be more successful if offered by an "objective likelihoodist" as the likelihoodist notion of "support" is not clearly grounded in same intuitive rationale as PR.

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[5] "I exist" cannot be evidence for me.

## II. DUTCH BOOKS AND CARTESIAN KNOWLEDGE: *ALEA LUDO, ERGO SUM*

Subjective Bayesians of a particularly pure sort might reject premise [4] because they maintain that probabilistic coherence is the only necessary constraint on (synchronic) rational credence and probabilistic coherence does not require that any contingent proposition receive a probability of 1. While the Bayesian theory of rational belief requires that a rational agent's degrees of belief satisfy the axioms of the probability calculus, there are a variety of formulations of those axioms. In particular, there are a variety of formulations of the requirement that a certain class of propositions receive a probability of 1. The standard formulations of that axiom include the following:

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<sup>9</sup> Accounts of belief on which *all* belief is fundamentally belief *de se* would also seem to imply that one can have no epistemic probabilities without certainty regarding one's existence. Furthermore, the intriguing analysis of epistemic probability advanced by Barbara Davidson and Ronald Pargetter, according to which all *de dicto* epistemic probability is *de re* probability relative to a grasp of one's world under the description "world of which I am a part," implies that the epistemic probability of "I exist" is necessarily 1. See their "Probability *De Re*," *The Southern Journal of Philosophy*, XXV (1987): 313-330, and Pargetter's "Conditional Epistemic Probability," *The Southern Journal of Philosophy*, XXVI (1988): 555-571.

$P(t) = 1$  if  $t$  is a tautology or logical truth.<sup>10</sup>

$P(A) = 1$  if  $A$  is true in all possible worlds.<sup>11</sup>

Let us call the first formulation "the logical formulation" and the second "the modal formulation." A less frequently proposed formulation, which we might call "the epistemic formulation," is

$P(\text{certain proposition}) = 1$ .<sup>12</sup>

It should be clear that these three formulations are not equivalent. First, it is supposed by most philosophers that there are necessary truths which are not logical truths. If so, then the logical and modal formulations are not equivalent. As well, if rationality requires, as maintained by the epistemic formulation, assigning 1 to a certain proposition, then because the Cartesian propositions seem certain on any reasonable construal of that claim, they must receive

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<sup>10</sup> See Howson and Urbach, *Scientific Reasoning: The Bayesian Approach*; Horwich, *Probability and Evidence*.

<sup>11</sup> See John Earman, *Bayes or Bust* (Cambridge, MA: MIT Press, 1992); Alvin Plantinga, *Warrant and Proper Function* (New York: Oxford University Press, 1993).

<sup>12</sup> See Ian Hacking, *An Introduction to Probability and Inductive Logic* (Cambridge: Cambridge University Press, 2001); Roger Rosenkrantz, *Foundations and Applications of Inductive Probability* (Atascadero, CA: Ridgeview, 1981).



a probability of 1, even though this diverges from the requirements of the logical and modal formulations. So, if there is any objection to premise [4] from those who hold that only probabilistic coherence is required for rationality, it must be grounded in the logical or modal formulations of the relevant axiom and not in the epistemic formulation.

An initial (and, I believe, fully satisfactory) reply to the claim that rationality does not require a probability of 1 for one's existence is simply that it is extremely plausible on intuitive grounds that this is false. The *philosophical* defense of axioms of epistemic probability requires argument and the accommodation of our strongest intuitions. Hence, if subjectivists deny that rationality requires a probability of 1 for one's existence, they demonstrate the clear poverty of their theory as an account of epistemic probability. However, as this objection may be dismissed by some subjectivists with bluster about the unreliability or irrelevance of such intuitions, I shall now argue that the subjectivists' own main argument that rationality requires probabilistic coherence (as standardly formulated), if sound, also justifies imposing a requirement that one have a probability of 1 for one's own existence. That justification for coherence as a necessary condition of rationality appeals to the thought that in violating the axioms one opens oneself up to a series of bets (a "Dutch book" or "sure loss contract") which one is guaranteed to lose. The idea is that there is something defective in the doxastic state of an agent who is such that she is in a position to accept as fair a series of wagers which is such that, no matter how the world turns out, she must lose. In the words of Paul Horwich, "if a person is rational, he will distribute his probabilities—his degrees of belief—in accord with [the

usual probability axioms]. For only if he does this will he be able to avoid a so-called Dutch book being made against him."<sup>13</sup>

A standard motivation for imposing the requirement that an agent assign a probability of 1 to any tautology or logical truth is that such a proposition is guaranteed to "turn out" true and so, insofar as a Dutch book can be made against an agent when her degrees of belief sanction bets which will result in a net loss no matter how the world turns out, any partial belief of degree  $n$  which is less than 1 in such a proposition will necessarily result in a loss on the corresponding bet against the proposition based on degree of belief  $1-n$ . This may be what inclines some to hold that the requirement of maximal credence extends to all necessary truths since any bet against such a truth is bound to be a losing one.

However, while it could "turn out" that most contingent propositions are false, it couldn't turn out, relative to the fact that one is in the betting situation envisaged in the Dutch book arguments, that one not exist. If it is the guarantee of losing the corresponding bet that requires one to have a probability of 1 for any necessary truth, then a similar guarantee of loss should require one to assign a probability of 1 to one's own existence because any wager one makes against that proposition is bound to produce a loss. If so, then the Dutch book justification for the standard requirement that one have a probability of 1 for any necessary

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<sup>13</sup> Horwich, *Probability and Evidence*, pp. 19-20.

truth will do as well for the requirement that one assign a probability of 1 to one's own existence.<sup>14</sup>

This exclusive focus on the necessity of loss might, however, be thought mistaken as I am surely not irrational in being less than fully certain that Water is H<sub>2</sub>O or that George and Barbara Bush are the biological parents of George H. W. Bush, especially if I lack relevant empirical evidence. While many hold that these are necessarily true propositions, my rationality is not necessarily impugned by failure to invest full confidence in them. This shows, I think, that it cannot be the mere *existence* of a series of loss-guaranteeing bets which are sanctioned by my degrees of belief that is sufficient to convict me of irrationality. Rather, the role of the bookie is to make vivid the fact that the book must be, in a certain sense, constructible in a particular epistemic situation. Clearly, if the bookie knows some contingent fact which I do not, his ability to make a book against me does not in any way impugn my rationality. This is why standard formulations suppose that the bookie knows nothing contingent but the credences of his potential victim. Similarly, if the bookie knows some necessary truth the justification of which is partly empirical, such as the candidate *a posteriori* necessary truths mentioned above, his ability to take advantage of my lack of certainty regarding such a proposition does not impugn my rationality.

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<sup>14</sup> Similarly, there is a Dutch book argument for the requirement that one have maximal credence in claims about one's credence. Howard Sobel, for these reasons, holds that "introspective omniscience is part of an ideal for intellects" in his "Self-Doubts and Dutch Strategies," *Australasian Journal of Philosophy*, LXV (1987): 56-81, p. 69.

This is nicely captured by David Christensen, when, in a searching exploration of the force behind Dutch Book arguments, he suggests that

It is ... plausible that, if a set of betting odds allows someone to devise *a priori* a way of exploiting those odds to inflict a sure loss, then there is something amiss with those betting odds. ... The fact that the diagnosis can be made *a priori* indicates that the defect is not one of fitting the beliefs with the way the world happens to be. Like deductive inconsistency, it is a defect internal to the agent's belief system.<sup>15</sup>

Christensen's plausible account of the underlying motivation of Dutch Book arguments quite naturally extends to justify requiring a probability of 1 for one's existence. First, if one has (partial) beliefs about anything, then one exists and so a failure to fully believe that one exists is clearly a defect "internal to" one's belief system. Second, while the world "happens to be" such as to contain one, one's belief about one's existence does not just "happen to be" true and so the defect is not one of *fitting* that belief with the way the world happens to be. Finally, it seems

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<sup>15</sup> "Dutch-Book Arguments Depragmatized: Epistemic Consistency for Partial Believers," this JOURNAL, XCIII, 9, (September, 1996): 450-479, p. 457.

that a book against an agent uncertain of her own existence can be made by a bookie with no contingent knowledge of the world beyond knowledge of the existence of the potential victim.<sup>16</sup>

Perhaps, then, the real force of Dutch book arguments is that they reveal that one has a defect in one's belief system which is, in principle, discoverable solely on the basis of rational reflection, independent of how the non-mental contingent world presently happens to be. This captures the notion that those necessary truths discoverable independent of empirical investigation of the world ought to be accorded a probability of 1. It properly does not, contrary to the modal formulation of the relevant axiom, imply that every necessary truth must receive a probability of 1. However, it implies that one's own existence ought to be accorded the maximum probability.<sup>17</sup> So, any set of axioms defensible on a properly justified Dutch book argument will include the requirement that "I exist" have a probability of 1. I conclude that if rationality requires immunity from a Dutch book, then it requires certainty regarding one's existence. Hence, not only is premise [4] quite obviously true, but those who wish to argue that

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<sup>16</sup> I assume here that the bookie is in a position to grasp (at least indirectly) the relevant proposition which I know in knowing E1. A full evaluation of this issue would require a detailed account of how the bookie is to produce the relevant set of sure loss bets.

<sup>17</sup> It is, of course, a matter of some debate whether to classify one's knowledge of E1 as *a priori* or *a posteriori*. The difficulty is that knowledge of E1 seems not to depend on experience but it is also not justified by whatever non-experiential source one takes to justify us in believing *a priori* necessary truths.

rationality requires coherence (with its standard axioms) on Dutch book grounds, ought to accept premise [4] on those same grounds.<sup>18</sup>

### III. LOGICAL PROBABILITY AND CARTESIAN KNOWLEDGE

For those who agree that PR appeals to an inequality between epistemic probabilities, my conclusion is established. However, some may attempt to undermine premise [2] by claiming that PR refers to *logical* (or *inductive*) probabilities rather than *epistemic* probabilities. Actually avoiding the conclusion of my argument would also require maintaining that these probabilities exist even where no possible epistemic situation consists only of the propositions in  $K$  and so  $K$  could not be the total background knowledge of any possible rational agent. Such proponents of logical or inductive probability may respond to my arguments by suggesting that my existence can be positive relevance evidence for a hypothesis, provided that we take PR to appeal to such non-epistemic probabilities.

A possible basis for such an "Objective Bayesian" rejoinder to my argument can be found in the work of inductive logicians like Rudolph Carnap and Brian Skyrms, and has been

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<sup>18</sup> Some probabilists avoid Dutch book arguments and appeal instead to the notion that one minimizes the inaccuracy of one's beliefs only when one's beliefs are probabilistically coherent (see James Joyce, "A Nonpragmatic Vindication of Probabilism," *Philosophy of Science*, LXV (1998): 575-603). However, if it is the accuracy of *one's own* partial beliefs that should be maximized, then surely failure to assign a probability of 1 to  $E_1$  will be less accurate than would be an assignment of 1.

developed in "two-function" Bayesian approaches advanced by James Hawthorne and Mark Lange,<sup>19</sup> each of whom is explicitly attempting to avoid the problem of old evidence. On such approaches, a rational agent is characterized by *two* probability functions. The first is a function representing an agent's current *rational degree-of-belief* in each proposition. This function is the one that typically changes over time with the receipt of new information, as rational degree of belief (or epistemic probability) is relative to one's evidence. The second function represents the *degree-of-support* which a proposition provides another proposition. The exact nature of this second function is a matter of disagreement among these objective Bayesians, but they all agree that it will usually vary from an agent's degree-of-belief function.<sup>20</sup>

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<sup>19</sup> See Carnap, *The Logical Foundations of Probability*, and "Inductive Logic and Rational Decisions," in Rudolph Carnap and Richard Jeffrey, eds., *Studies in Inductive Logic and Probability I* (Berkeley: University of California Press, 1971), pp. 5-31; Brian Skyrms, *Choice and Chance*, 3rd Edition (Belmont, CA: Wadsworth, 1986); James Hawthorne, "Degree-of-Belief and Degree-of-Support: Why Bayesians Need Both Notions," *Mind* CXIV (2005): 277-320; Mark Lange, "Calibration and the Epistemological Role of Bayesian Conditionalization," this JOURNAL, XCVI, 6, (June, 1999): 294-324.

<sup>20</sup> "Degree-of-belief" and "degree-of-support" are Hawthorne's terms. He disavows the Carnapian claim that prior probabilities can be fixed on purely logical or syntactic grounds, but he emphasizes the "objective" and "quasi-logical" character of many likelihoods in the support function. Carnap calls the first function a "rational credence function" and the second a "credibility function."

This last feature is what allows for the solution to the standard problem of old evidence. While it may be true that, at any time when an agent has certain knowledge of  $E$ , her degree-of-belief function will contain  $P(E) = 1$ , it will not, allegedly, when  $E$  is contingent, be true that her degree-of-support function will contain  $P(E) = 1$ . As Hawthorne puts the point, the support function will not assign  $E$  support-strength 1 unless all of the relevant alternative hypotheses yield degree-1 likelihoods for  $E$  (313). Hence, so long as the support function includes  $P(E1)$  of less than 1, the problem I have been developing would seem to be avoided and the two-function account will allow  $E1$  to serve as evidence, even given  $PR$ .

This sort of Bayesianism and its general strategy for dealing with the standard problem of old evidence seem to me extremely plausible. However, it cannot avoid the *strong* problem of old evidence raised by  $E1$ . This is because, as noted above, while almost every other contingent putative evidence statement for which a possible old evidence problem might arise is a statement which a rational agent could fail to know, the same is not true for  $E1$ . Hence, as I shall now show, the version of the problem of old evidence raised by Cartesian knowledge is so strong that it cannot be overcome without destroying the required connection between logical and epistemic probabilities.

Rather than attempting to engage here with the details and nuances of variations on this view, I shall provide an argument directed against their common core. My argument consists of a dilemma for any proponent of such a two-function view who wishes to evade the argument of Section I: Either the envisaged support function probabilities are *possible* epistemic probabilities or they are not. If they are possible epistemic probabilities, then my arguments in Sections I and II would seem to show that the appeal to such logical or inductive probabilities will be



unavailing in avoiding my conclusion.<sup>21</sup> If they are not possible epistemic probabilities, then while the inequality required by PR may obtain with respect to the support function, the connection between PR and its intuitive rationale will have been severed. Hence, no appeal to logical probability can allow knowledge of E1 to serve as evidence in the sense which PR attempts to capture.

Taking the first horn as established by the arguments of earlier sections, what can be said for the second horn? If support function probabilities are not possible epistemic probabilities, then it may be that  $P(E1)$  is less than 1 and it may be that for some  $H$ ,  $P(H/K \& E1) > P(H/K)$ , as required in order to satisfy PR. The resulting account would, however, allow for the satisfaction of PR in a case where the fundamental intuitive rationale for PR is violated. That rationale, recall, is that  $E$  is evidence for  $H$  (relative to  $K$ ) if and only if knowledge of  $E$  would

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<sup>21</sup> Two-function Bayesians are not always entirely clear what constraints are placed on support functions (beyond adherence to the usual axioms) and why. However, some logical probabilists make use of Dutch book arguments in arguing for the correctness of a favored support function. See, for example, Carnap, *The Logical Foundations of Probability*; John Kemeny, "Carnap's Theory of Probability and Induction," in Paul Schilpp, ed., *The Philosophy of Rudolph Carnap* (La Salle, IL: Open Court, 1963), pp. 711-738. If my argument in Section II is sound, however, adherence to such arguments requires a probability of 1 for E1 in the support function. Hawthorne leaves open the possibility that a support function is to be identified with some suitably chosen (counterfactual) rational degree-of-belief function. That route clearly also forecloses the use of E1 or E2 as evidence.

make it rational to be more confident of  $H$ .<sup>22</sup> The comparative "more" clearly requires that we compare a situation in which one does not know  $E$  with one in which one does know  $E$ .

However, if  $E$  is something one could not fail to know with certainty, then such a comparison will be impossible and  $E$  cannot satisfy the rationale at issue. So, while the proposed appeal to support functions nicely avoids the *standard* problem of old evidence while respecting the intuitive rationale behind PR, it yields an account of evidence that cannot solve the *strong* problem of old evidence presented by E1 without abandoning the rationale behind PR.

The difficulty E1 presents for two-function Bayesians may be clarified by further attention to the connection such theorists wish to forge between inductive probability and epistemic probability. As Hawthorne notes, the "primary role of a support function in the two-function model . . . is to underwrite and justify the agent's belief strengths for hypotheses" (309). Given that, "intuitively, each agent's belief strength for a hypothesis should be just the degree to which the hypothesis is supported, according to her support function, by the totality of the evidence she has acquired" together with whatever fixes one's prior probabilities (307), Hawthorne holds that the fundamental connection between the two functions is that a rational agent ought, at each time  $t$ , to "align" his degree-of-belief function with his degree-of-support function conditional on his total evidence at  $t$ .

As I have already allowed, this account provides a way around the standard problem of old evidence and it does so in a way that *generally* accommodates what I have claimed is the

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<sup>22</sup> See Patrick Maher, "Subjective and Objective Confirmation," *Philosophy of Science*, LXIII (1996): 149-174.

guiding intuition behind the positive relevance criterion of evidence – that  $E$  is evidence for  $H$  (relative to  $K$ ) if and only if knowledge of  $E$  would make it rational to be more confident of  $H$ . It does so because, given the claim that a rational agent aligns his degree-of-belief function with his degree-of-support function, a rational agent with background knowledge  $K$  would, in the absence of knowledge of  $E$ , have a lower degree-of-belief in  $H$  than he would when he knows  $E$  just when his support function includes  $P(H/E\&K) > P(H/K)$ . Exactly here, however, we find an appeal to possible epistemic situations and if  $E$  is something one *could not fail* to know, then either the possibility of satisfying PR remains because  $E$  has a support-function probability of less than 1 but alignment with both sides of PR will be impossible, or the support function admits a probability of 1 for  $E$  and preserves the possibility of alignment with both sides of PR while rendering impossible the inequality it requires if  $E$  is to serve as evidence.<sup>23</sup>

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<sup>23</sup> Lange also touches on some of these issues when he notes that his account begins with an initial probability function (much like Hawthorne's "degree-of-support function" in being distinct from one's current rational degrees of belief) and he suggests one question regarding that initial function is why it constitutes "a reasonable place to begin one's doxastic life" (303, fn 19). If that is the question, then it seems clear that the probability function at issue must include a probability of 1 for one's own existence. Furthermore, as Lange notes that his envisaged initial probability distribution is "like a counterfactual degree of belief in that it may be a fictitious state of opinion," if the prior probability distribution must at least be a *possible* state of opinion, it would seem to require a probability of 1 for one's existence.

This fundamental conflict between PR (when construed as a claim about support function probabilities) and the alignment requirement is simply elided when it is supposed that every contingent proposition must be capable of serving as evidence and that an ideal rational agent "begins"<sup>24</sup> or "could" under "idealized conditions" have begun<sup>25</sup> with a rational degree of belief function which is identical to his support function conditional on a tautology.<sup>26</sup> Once this conflict is brought to light, it is clear that the envisaged fully general connection between logical and epistemic probabilities cannot be sustained in a manner according with PR. It seems, then, that such proponents of inductive or logical probability cannot escape the conclusion of my argument in Section I by denying premise [2] as that premise must be true if PR is to remain properly grounded in its intuitive rationale.

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<sup>24</sup> Hawthorne, p. 307.

<sup>25</sup> Carnap, "Inductive Logic and Rational Decisions," p. 18.

<sup>26</sup> I am assuming throughout this paper that "I exist" is not a tautology or logical truth. David Kaplan suggests that it is a logical truth of the "logic of demonstratives." See his "On the Logic of Demonstratives," *Journal of Philosophical Logic* VIII (1978): 81-98. If the concept of a tautology or of a logical truth is stretched so as to include truths in the logic of demonstratives, then, of course, E1 presents no obstacle to the notion of epistemic probabilities relative to purely logical knowledge. However, it is also then quite clear that the logical probability of E1 is 1 and so E1 cannot serve as evidence on the logical conception of probability.

Before proceeding to consider the further implications of my central theses, we might pause to note that the result before us is, when considered in an appropriate light, quite plausible. Removing our Bayesian lenses, if we accept that one intuitive notion of evidence is a notion of knowledge which does or could justify us in changing our credence in some hypothesis, we should find it quite plausible that knowledge which is an essential part of any possible epistemic situation in which we could find ourselves cannot serve as that kind of evidence. Such knowledge, if we are perfectly rational, could never have come newly to our attention and require adjustment in our view of the world in order to accommodate it. An essential part of any possible epistemic situation cannot, under any circumstances, provide a fully rational creature with any reason to change her view.

#### IV. GOD, THE MULTIVERSE AND DOOM

If my arguments above are successful, then E1 and E2 cannot serve as evidence for us as they are necessary components of any possible epistemic situation which we might occupy.

Furthermore, propositions known *a priori* to be entailed by E1 and E2 cannot count as evidence as they must also have a probability of 1. Such propositions include the existential generalizations of E1 and E2:

E3 = Something exists.

E4 = A conscious being exists.

Furthermore, the arguments above justify the claim that  $E$  can serve as evidence for  $S$ , relative to background knowledge  $K$ , only if it is logically possible that  $P(E/K) < 1$ . The remaining task is to demonstrate how these results undermine some standard formulations of a number of significant contemporary probabilistic philosophical arguments.

*IV.A. Arguments for Theism.* Philosophers of religion have shown an increasing interest in probabilistic, rather than the traditional deductive, arguments for and against the existence of God. The most systematic probabilistic case for the existence of the traditional God has been put forward by Richard Swinburne.<sup>27</sup> Swinburne explicitly attempts to demonstrate that various known facts are evidence, in exactly the sense formalized by PR, for the existence of the theistic God. On Swinburne's view, the simplest probabilistic version of the cosmological argument is based on an evidence statement which merely asserts the existence of a finite object. Where  $H$  is the theistic hypothesis, he claims that "if we take  $E$ , most generally, as the existence of a finite object . . .  $P(E/H\&K)$  will exceed  $P(E/\sim H\&K)$ " (131) and so the existence of a finite object raises the probability of God's existence and constitutes evidence in the sense of PR for God's existence. As Swinburne's  $E$  is, given the knowledge that I am finite,<sup>28</sup> entailed by  $E_1$ , my

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<sup>27</sup> *The Existence of God*, 2nd Edition (Oxford: Oxford University Press: 1990).

<sup>28</sup> Given the conception of finitude at issue, this knowledge is surely also available merely on reflection as one can know on mere reflection that one is not omniscient. (Alternatively, given that  $E_1$  is part of  $K$ , if  $\sim H\&K$  is consistent, then it implies the existence of a finite object and  $P(E/H\&K)$  could not exceed  $P(E/\sim H\&K)$ ). Probabilistic cosmological arguments based

earlier arguments demonstrate that this probabilistic recasting of the cosmological argument fails to provide any evidence for the existence of God.<sup>29</sup>

Like a number of other philosophers, Swinburne also argues that the existence of conscious persons provides positive relevance evidence for the existence of God (174). However, the mere existence of conscious persons cannot, given my earlier results, serve as evidence for any hypothesis whatsoever. The issues here are complicated by the fact that Swinburne sometimes appears to take the relevant evidence to be the existence of *embodied* conscious agents. Nonetheless, as I have shown that certainty regarding the existence of

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upon the existence of a contingent object are similarly vitiated by my arguments if one can tell (as it seems one can) on reflection alone that one is contingent.

<sup>29</sup> Given standard Bayesian idealizations, the general principles on which my argument regarding E1 and E2 is based also show that neither

\*: I know *a priori* necessary truths,

nor

\*\* : I am a rational being,

nor their *a priori* entailments can serve as evidence for or against any hypothesis, contrary to what some theistic philosophers seem to maintain.

conscious creatures is a necessary component of any epistemic situation, the proponent of such an argument from embodiment must hold that there is a possible epistemic situation in which one lacks certainty regarding the existence of embodied conscious creatures and that one's discovering such embodiment is more likely on theism than on its negation. Given merely certainty that one exists as a conscious creature (whether embodied or not), I see no reason to think one is more likely to be embodied given theism than given its negation. Clearly, at the very least, the theist must give up on any argument from the existence of conscious creatures and make a case for the positive relevance of embodiment, relative to a situation in which one is certain that one exists *qua* conscious creature.

*IV.B. Arguments from Fine-Tuning.* Recent discoveries in fundamental cosmology have suggested to many scientists and philosophers that our universe is "fine-tuned for life." Put more precisely, such writers claim that the value of various variables in the fundamental account of the universe do not follow from our fundamental theory.<sup>30</sup> Furthermore, for many such variables, the range of values which allow for the existence of life is extremely small, relative to the range of theoretically possible values. It is alleged that, taking as background knowledge the aforementioned claims, the fact that the relevant variables actually have life-permitting values is positive relevance evidence for at least one of two hypotheses. The first is

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<sup>30</sup> For skepticism about such arguments, see Tim McGrew, Lydia McGrew and Eric Vestrup, "Probabilities and the Fine-Tuning Argument: A Sceptical View," *Mind*, CX (2001): 1027-1038.



the hypothesis of traditional theism.<sup>31</sup> The second is the hypothesis that there actually exist many physical universes (a "Multiverse"), of which ours is merely one.<sup>32</sup> The first hypothesis is said to render the existence of life more probable than does atheism, given some axiological facts and the nature of God. The second hypothesis is said to render the existence of life more probable than does the hypothesis of a single universe because it provides more "chances" for a life-permitting universe.

While I have just framed the argument in terms of the fact of the universe being "life-permitting," it is clear that most proponents of the argument are actually focused on the existence of *conscious* living creatures. This is clearest in the theistic version of the argument as God is presumed to value the existence of conscious creatures and not the mere existence of unconscious biological life as such. Furthermore, most proponents of the argument clearly assume that we are living physical beings or are suitably dependent on the existence of such beings for our existence as conscious creatures. Indeed, the usual assumption is that *we* would not exist if the relevant constants had different values. Hence, the arguments of this paper undermine certain simple formulations of the reasoning just rehearsed. This is because, relative to knowledge that one is part of a universe, or that one is or is dependent upon a particular living being, and the usual assumption that certain "fine-tuning" conditions must be met for conscious living creatures to exist in a universe, the probability that the universe one is in meets

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<sup>31</sup> See Swinburne, *The Existence of God*.

<sup>32</sup> See Rodney Holder, "Fine-Tuning, Multiple Universes and Theism," *Nôus* XXXVI (2002): 295-312; Peter van Inwagen, *Metaphysics* (Boulder, CO: Westview, 1993).

those conditions necessary for conscious life is 1, and so the fact that one occupies such a universe or that such a universe exists cannot serve as evidence for any hypothesis whatsoever. Hence, it appears that, given the usual shared assumption noted above, both theists and proponents of a multiverse are mistaken in thinking that the aforementioned cosmological discoveries provide any evidence for their respective hypotheses.<sup>33</sup>

It seems appropriate to note that we have here a novel vindication of a non-trivial version of the "Anthropic Principle."<sup>34</sup> There are many different versions of this infamous principle.<sup>35</sup> Some hold that our existence requires no explanation or that our existence (and the conditions which must obtain for our existence) are somehow inevitable. Such claims seem to

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<sup>33</sup> For a much more detailed discussion of more precisely formulated fine-tuning arguments and an attempt to reduce those arguments to arguments based on E1 or E2, see Kai Draper, Paul Draper and Joel Pust, "Probabilistic Arguments for Multiple Universes," *Pacific Philosophical Quarterly* (forthcoming). That paper also adumbrates parts of the argument of Section I.

<sup>34</sup> John Earman notes, in his "The SAP Also Rises: A Critical Examination of the Anthropic Principle" *American Philosophical Quarterly* XXIV (1987): 307-317, that some versions of the principle are merely trivial instances of the multiplication axiom of probability.

<sup>35</sup> See John D. Barrow and Frank J. Tipler, *The Anthropic Cosmological Principle* (Oxford: Oxford University Press, 1986); Brandon Carter, "The Anthropic Principle and Large Number Coincidences," in Malcolm Longair, ed., *Confrontation of Cosmological Theories with Observation* (Dordrecht: Reidel, 1974), pp. 291-298.

me at best dubious. However, my arguments do provide a clear Bayesian grounding of the claim that knowledge of the obtaining of any condition which is known (or assumed on all the relevant competing hypotheses) to be necessary for our own conscious existence cannot serve as confirming evidence, just as some versions of the Anthropic Principle (including the one most relevant to responding to the fine-tuning argument) appear to maintain.<sup>36</sup>

*IV.C. The Doomsday Argument.* One of the most interesting and controversial recent philosophical applications of Bayesian ideas is to be found in what has come to be known as "The Doomsday Argument." Though the argument can be formulated in a variety of ways, the core idea of the argument is that information about one's birth rank in the human species provides more confirmation (i.e. relative confirmation) of the claim that there will be fewer total human beings in the history of the universe (the "Doom Soon" hypothesis) than it does less pessimistic hypotheses ("Doom Later" hypotheses).<sup>37</sup> The modest and highly simplified version of the argument presented by Darren Bradley and Brandon Fitelson<sup>38</sup> asks that we imagine

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<sup>36</sup> Notice that the objection I have raised cannot be evaded by arguments utilizing an evidence statement such as "Other conscious beings exist" or "More than one finite being exists" because, given that the relevant Cartesian knowledge is included in the epistemic situation, the relevant conditional probabilities will not clearly differ in the way required.

<sup>37</sup> The argument's title is perhaps immodest as some versions allow that the less pessimistic hypotheses may remain vastly more probable than the more pessimistic ones.

<sup>38</sup> "Monty Hall, Doomsday and Confirmation," *Analysis* LXIII (2003) 23-31.

three possibilities for how many people there are, and will ever be, in the entire universe. According to H1, there will be one person, according to H2, there will be two people, and according to H3, three people. According to this version of the Doomsday Argument, learning that you are the second person to exist in the universe is, given natural assumptions, confirming evidence for H2. More generally, one's birth rank provides the most confirmation for that hypothesis (consistent with one's birth rank) on which there are the fewest total people.

Whatever the merits of the Doomsday Argument in this or its other formulations, the theses of this paper undermine a common rejoinder to the argument. That rejoinder accepts the above reasoning for a probability increase in the Doom Soon hypothesis, but maintains that we have additional evidence which, when antecedently taken account of, exactly counterbalances the aforementioned probability increase, leaving us with precisely whatever probabilities the various hypotheses regarding the duration of the human species have independent of this alleged evidence. The additional evidence which is alleged to provide this convenient "cancellation" of the Doomsday Argument is our own existence.<sup>39</sup> Among the proponents of this rejoinder, Ken Olum claims that "in the scenario where the human race is very long-lived and there are many humans altogether, there is a greater 'chance to exist at all' than in the

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<sup>39</sup> See Dennis Dieks, "Doomsday—Or: The Dangers of Statistics," *Philosophical Quarterly* XLII (1992): 78-84; Ken Olum, "The Doomsday Argument and the Number of Possible Observers," *Philosophical Quarterly* LII (2002): 164-184; Paul Bartha and Christopher Hitchcock, "No One Knows the Date or the Hour: An Unorthodox Application of Rev. Bayes's Theorem," *Philosophy of Science* (Proceedings) LXVI (1999): S229-S353.

scenario where the race is soon to die out" (166) and Paul Bartha and Christopher Hitchcock claim that the doomsday argument is flawed because "our being alive at all does have evidential bearing upon the number of people that will ever live" (13). The basic idea of this reply is that our existence provides evidence that there will be many more persons and our existence with a given birth rank provides evidence that there will be fewer persons. So, as Bartha and Hitchcock note, "in the simplest cases, these two effects cancel one another out, yielding the happy result that our existence now tells us nothing whatsoever about the coming of Doom" (18).

If I am correct, this rejoinder to the Doomsday Argument fails as it explicitly treats knowledge of one's existence as evidence in the sense captured by PR and so runs afoul of the strong problem of old evidence. Bartha and Hitchcock admit that some will look askance at their proposal because "the prior probabilities are ones we literally could never have had" and "we never actually have subjective probabilities in which our existence is not taken as a given." Claiming that the problem here is just another instance of the problem of old evidence, they tentatively endorse an appeal to hypothetical probability distributions as a means of solving that problem. While I am quite sympathetic to such appeals to solve most instances of the problem of old evidence, I believe that they have failed to appreciate the fact that the hypothetical probability distribution that their rejoinder requires is, unlike that required for solving standard instances of the problem of old evidence, one that is logically impossible. Their reply fails because we could not have (coherent or rational) subjective probabilities in

which our existence is not taken as a given. So, if the Doomsday Argument is to be defeated, it must be by some other means.<sup>40</sup>

## V. ESCAPING THE FIRING SQUAD

It may seem to some that the position defended thus far is open to clear counterexamples. A putative counterexample runs as follows:

On a certain occasion the firing squad aim their rifles at the prisoner to be executed. There are twelve expert marksmen in the firing squad, and they fire twelve rounds each. However, on this occasion all 144 shots miss. The prisoner laughs and comments that the event is not something requiring any explanation because if the marksmen had not missed, he would not be here to observe them having done so. But of course, the prisoner's comment is absurd; the marksmen all having missed is indeed something requiring explanation; and so too is what goes with it—the prisoner's being alive to observe it. And the explanation will be

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<sup>40</sup> For an account of how some of these ideas create difficulties for one recent attempt to solve the Sleeping Beauty problem, see my "Horgan on Sleeping Beauty," *Synthese* (forthcoming).

either that it was an accident (a most unusual chance event) or that it was planned (e.g., all the marksmen had been bribed to miss).<sup>41</sup>

Setting aside the issue of explanation, it might be suggested that the view I have been advancing is incapable of accommodating the widespread intuition that the prisoner has *evidence* (after the shots are fired) for the hypothesis that the marksmen intended to miss (H1) and against the hypothesis that they intended to kill (H2).

It is reasonable to hold that the prisoner has *some* evidence for H1, at least because standard presentations of the case leave crucial details unclear. For example, his knowledge that

E5: No bullet hit me.

is evidence for H1.<sup>42</sup> However, this is perfectly consistent with my position, as his *existence* isn't here alleged to be evidence. In order to render the case a potential problem for my thesis, we must attempt to imagine a case in which the only thing that the prisoner comes to know is that he exists at the appropriate time.

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<sup>41</sup> Swinburne, *The Existence of God*, p. 171. See also p. 138 and Van Inwagen, *Metaphysics*, p. 135, for structurally identical examples produced in response to objections based on some version of the Anthropic Principle.

<sup>42</sup> Sober, "The Design Argument."

Consider, then, a variant case in which the prisoner is entirely deprived of all sensory input from the moment after the firing of the bullets. In this case, it may seem that the prisoner is aware only of his continued conscious existence and so if he has evidence, it must consist of Cartesian knowledge such as

E6: I exist now.

Given my arguments, E6 can serve as evidence only if there is some possible epistemic situation relative to which E6 has a probability of less than 1.

Although the knowledge in question involves the vexing indexical "now," even without a detailed investigation of such knowledge we can distinguish views on which token instances of E6 thought (and known) at distinct moments in time express distinct propositions and views on which they do not. On the latter views, it seems that instances of E6 must have, relative to any possible epistemic situation, a probability of 1 and, hence, no instance of E6 can serve as evidence. However, before it is concluded that the modified Firing Squad case would, on such views, present us with a potential counterexample to my claims, it should be noted that, in spite of our attempt to imagine otherwise, the prisoner clearly has other new knowledge which, for all I have argued, can serve as evidence for H1. In the prisoner's case, it seems that propositions such as

E7: I exist after the firing squad fires



or, given certain assumptions about the date and time of the possible execution,

E8: I exist at 4:30 p.m. on January 15th, 2005

can serve as evidence.<sup>43</sup> So, even *if* we hold that all instances of E6 express knowledge of the same proposition, we have in the Firing Squad case no reason to question the arguments of this paper.

Though knowledge of E7 and E8 is also available to serve as evidence on views according to which instances of E6 express knowledge of *different* propositions, on such views it remains possible that one might occupy an epistemic position relative to which a given instance of E6 is not known (even though another instance, expressing a distinct proposition, would be known with certainty). On such views it may be possible to construe the new indexical knowledge as evidence. Even *if*, however, such an account can be made to work, it is crucial to note that the temporally indexical Cartesian proposition, expressed by an instance of E6, which might thereby serve as evidence in the Firing Squad case can do so *only relative to a possible*

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<sup>43</sup> It might be objected that E7 is equivalent to the conjunction of E6 and

\*\*\*: Now is after the firing squad fired

and that E7 cannot be evidence if E6 and \*\*\* are not. But while E6&\*\*\* entails E7, the converse does not hold and they are not equivalent.

*epistemic situation which must include certainty regarding one's (then) current existence.* In other words, while one's current (at  $t$ ) existence might, on these views, serve as positive relevance evidence, this can be so only if knowledge of one's current existence makes it rational to have greater credence in some hypothesis than would be rational if one were not to know of one's current (at  $t$ ) existence. Such a situation, however, would be one in which one was certain of one's current (at  $t-1$ ) existence. Hence, even if we disregard knowledge of propositions like E7 and E8, it can, at best, be said not that one's existence at a time counts as evidence, but that one's *continued* existence may count as evidence. These are the crucial facts missed by those who think cases like the Firing Squad establish the *general* acceptability of appeals to one's existence as evidence and such facts undermine their attempt to demonstrate that the mere fact of one's existence or consciousness may serve as evidence.

My thesis, suitably qualified to accommodate the various possible ways of responding to cases like the Firing Squad, is that (1) instances of the atemporal E1 clearly cannot serve as evidence because they are an essential part of any epistemic situation and (2) instances of the temporally indexical E6 are either (a) each expressions of the same proposition and cannot serve as evidence because they are an essential part of any epistemic situation, or (b) each expressions of different propositions which can serve as evidence only by amounting, in virtue of their relation to the relevant contrasting epistemic situation (in which they do not feature but which must itself include knowledge of another instance of E6), to the proposition that one has continued to exist. In this last case, however, the hypothesis in question would have to be relevant to one's continued existence, given that one antecedently existed.

It might reasonably be wondered whether this last view, if it turns out to be defensible, would allow reformulation of the various arguments which were shown in Section IV to encounter difficulties when based upon E1 or E2. Notice, however, that such reformulations would, in essence, concede my earlier claim that E1 and E2 cannot serve as evidence and would attempt to formulate different arguments based upon a different evidence statement like E6 or E7. Recognizing that much more might be said regarding possible reformulations of the problematic arguments, it is quite difficult to see how such arguments might succeed. For instance, it appears that there is little reason to think that one's continued existence or consciousness at some particular time is, given that one does exist *qua* conscious creature, more probable on theism than on its denial. Hence, the cosmological argument and the argument from consciousness cannot be easily reformulated with an acceptable evidence statement. Likewise, it appears that, given my existence now, my continued existence is no more probable no matter how many universes there might now or ever be and, given my existence in a fine-tuned world, my continued existence in a fine-tuned world is no more probable on theism than its denial. Finally, the "cancellation rejoinder" to the Doomsday Argument cannot be reformulated to focus on my knowledge of my continued existence as its focus is on the alleged evidential bearing of my existing at all and, given that I now exist, it seems my continued existence is not differentially probable conditional on the various hypotheses regarding how many people will ever exist. So, it seems that our earlier negative results survive the Firing Squad and a difficult burden rests with those who wish to successfully reformulate the earlier arguments.

## VI. CONCLUSION

I have not, of course, shown that E1 and its relatives cannot serve as evidence on an account of evidence suitably severed from appeal to standard Bayesian foundations.<sup>44</sup> Nonetheless, I have shown that, contrary to a number of philosophers, given PR, they cannot serve as evidence and cannot be excluded from the background knowledge relevant to assessing whether knowledge of any proposition is evidence for any hypothesis. The strong problem of old evidence demonstrates that those convinced that their existence or some proposition entailed by their existence and relevant background knowledge might be evidence cannot be Bayesians of any sort. More importantly, it shows that we cannot treat our existence (or its relevant entailments) as evidence on any conception of evidence grounded in the fundamental intuitive motivation for the positive relevance account. We have, it seems clear, a choice between (a) rejecting the notion that the mere fact of one's existence may serve as relevance evidence in the sense

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<sup>44</sup> In addition, for all I have argued here, it may still be maintained that E1 is evidence in the *absolute* sense of confirmation, according to which  $E$  is evidence for  $H$  if and only if  $P(H/E)$  is greater than some fixed  $n > .5$ . This absolute sense involves no clear comparison to an epistemic situation in which one is bereft of knowledge of  $E$ . The interest of this sense of confirmation is perhaps diminished by noting that it allows a tautology to confirm an empirical hypothesis, a logical truth to confirm itself, and all the contingent conjuncts of  $E$  to reduce the probability of  $H$  even though  $E$  confirms  $H$ . Furthermore, to my knowledge, no author has claimed that E1 absolutely confirms any of the hypotheses under discussion in this paper.

captured by PR, and with it a number of apparently important recent philosophical uses of such alleged evidence, or (b) rejecting PR and the plausible intuitive rationale in which it is grounded. While I favor the former option, I have here tried to demonstrate that the choice is quite significant and that choose we must.

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