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Salvaging Pascal's Wager

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Abstract: Many think that Pascal's Wager is a hopeless failure. A primary reason for this is because a number of challenging objections have been raised to the wager, including the "many-gods" objection and the "mixed strategy" objection. We argue that both objections are formal, but not substantive, problems for the wager, and that they both fail for the same reason. We then respond to additional objections to the wager. We show how a version of Pascalian reasoning succeeds, giving us a reason to pay special attention to the infinite consequences of our actions.

1. Introduction

The argument commonly known as "Pascal's Wager" raises a host of interesting questions: historical, mathematical, and philosophical. While historically, several thinkers, including the Muslim philosopher and theologian Al-Ghazālī, have proposed versions of the wager (and Al-Ghazālī's actually dates earlier than Pascal's), we will keep to the current convention and refer to the famous argument as "Pascal's Wager."[1] Our aim in this paper is not primarily historical, and we will not address the textual question of what Pascal or Al-Ghazālī really meant.[2] When we refer to "Pascal's Wager" we will

1. For more on Al-Ghazālī's version of the wager, see Abu Hamid Muhammad Al-Ghazālī, *The Alchemy of Happiness*, trans. Claud Field (New York: M. E. Sharpe, 1991); Mohammad Shahid Alam, "Pragmatic Arguments for Belief in the Qur'an," http://dx.doi.org/10.2139/ssrn.1895559.

2. For discussions of historical questions, see essays in Nicolas Hammond, ed., *The Cambridge Companion to Pascal* (New York: Cambridge University Press, 2003); Graeme Hunter, *Pascal the Philosopher: An Introduction* (Toronto: University of Toronto Press, 2013); Joseph Anderson and Daniel Collette, "Wagering with and without Pascal," *Res Philosophica* 95 (2017): 95–110; Paul Bartha and Lawrence Pasternack, eds., *Pascal's Wager* (New York: Cambridge University Press, 2018), part 1. For introductions to the wager, see Jeff Jordan, "Pascal's Wagers and James's Will to Believe," in *The Oxford Handbook of Philosophy of Religion*, ed. William J. Wainwright (New York: Oxford University Press, 2007); Craig Duncan, "Religion and Secular Utility: Happiness, Truth, and Pragmatic Arguments for Theistic Belief," *Philosophy Compass* 8 (2013): 381–99; Alan Hájek, "Pascal's Ultimate Gamble," *The Norton Introduction to Philosophy*, ed. Alex Byrne, Joshua Cohen, Gideon Rosen, and Seana Shiffrin (New York: Norton, 2015); Alan Hájek, "Pascal's Wager," in *The Stanford Encyclopedia of Philosophy*, ed. Edward Zalta, accessed June 19, 2019, https://plato.stanford.edu/entries/pascal-wager/; Michael Rota, "Pascal's Wager," *Philosophy Compass* 12 (2017): 1–11.

simply be referring to the following decision matrix. Any probability higher than zero for the hypothesis *God exists* gives us the following expected values (EV), where *f* is some finite number:

Table 1.

	God Exists	God Does Not Exist
Believe in God	∞	f
Do Not Believe in God	$-\infty$	f

The expected value for believing is infinitely positive and the expected value for not believing is infinitely negative.[3] Choosing to believe in God is the best option given this matrix. As Pascal said, "Wager, then, without hesitation that [God] is" because "there is here an infinity of an infinitely happy life to gain" and "what you stake is finite."[4] In this paper, we outline a number of key objections to the wager, and we explain how the wager can still be useful

3. One might object that our use of negative infinity is illegitimate here because negative infinity is mathematically undefined. However, we aren't referring to "negative infinity" as a number, which is mathematically objectionable, but rather, as an infinite amount of bad or undesirable goods.

4. Blaise Pascal, *Pensées*, trans. William Trotter (New York: J. M. Dent, 1958), fragments 233–41. For defenses of Pascal's Wager, see Michael Martin, "On Four Critiques of Pascal's Wager," *Sophia* 14 (1975): 1–11; Geoffrey Brown, "A Defence of Pascal's Wager," *Religious Studies* 20 (1984): 465–79; Nicholas Rescher, *Pascal's Wager: A Study of Practical Reasoning in Natural Theology* (Notre Dame, IN: University of Notre Dame Press, 1985); Thomas V. Morris, "Pascalian Wagering," *Canadian Journal of Philosophy* 16 (1986): 437–54; William Lycan and George Schlesinger, "You Bet Your Life: Pascal's Wager Defended," *Reason and Responsibility*, 7th ed., ed. Joel Feinberg (Belmont, CA: Wadsworth, 1989); Jeff Jordan, "The Many-Gods Objection and Pascal's Wager," *International Philosophical Quarterly* 31 (1991): 309–17; Jeff Jordan, "Pascal's Wager and the Problem of Infinite Utilities," *Faith and Philosophy* 10 (1993): 49–59; Jeff Jordan, "Pascal's Wager Revisited," *Religious Studies* 34 (1998): 419–31; Jeff Jordan, *Pascal's Wager: Pragmatic Arguments and Belief in God* (New York: Oxford University Press, 2006); Jeffrey Jordan, "Theistic Belief and Religious Uncertainty," 2008, https://infidels.org/library/modern/jeffrey_jordan/belief.html; Joshua Golding, "Pascal's Wager," *The Modern Schoolman* 71 (1994): 115–43; Douglas Groothuis, "Wagering Belief: Examining Two Objections to Pascal's Wager," *Religious Studies* 30 (1994): 479–86; John Byl, "On Pascal's Wager and Infinite Utilities," *Faith and Philosophy* 11 (1994): 467–73; Howard Sobel, "Pascalian Wagers," *Synthese* 108 (1996): 11–61; James Franklin, "Two Caricatures, I: Pascal's Wager," *International Journal for Philosophy of Religion* 44 (1998): 115–19; Ward Jones, "Religious Conversion, Self-Deception, and Pascal's Wager," *Journal of the History of Philosophy* 36 (1998): 167–88; Paul Bartha, "Taking Stock of Infinite Value: Pascal's Wager and Relative Utilities," *Synthese* 154 (2007): 5–52; Frederik Herzberg, "Hyperreal Expected Utilities and Pascal's Wager," *Logique et Analyse* 213 (2011): 69–108; Bradley Monton, "Mixed Strategies Can't Evade Pascal's Wager," *Analysis* 71 (2011): 642–5; Lawrence Pasternack, "The Many Gods Objection to Pascal's Wager: A Decision Theoretic Response," *Philo* 15 (2012): 158–78; Paul Bartha, "Many Gods, Many Wagers: Pascal's Wager Meets the Replicator Dynamics," in *Probability in the Philosophy of Religion*, ed. Jake Chandler and Victoria S. Harrison (New York: Oxford University Press, 2012), 187–206; Michael Rota, "A Better Version of Pascal's Wager," *American Catholic Philosophical Quarterly* 90 (2016): 415–39; Michael Rota, *Taking Pascal's Wager: Faith, Evidence, and the Abundant Life* (Downers Grove, IL: InterVarsity, 2016).

for choosing between worldviews in spite of these objections.[5] In particular, we show how Pascalian reasoning gives us a reason to care about the (potentially) infinite consequences of our actions; finite ones only come in when the infinite ones are balanced.

This paper is structured as follows. In section 2, we explain the many-gods objection and the mixed strategies objection, and how they pose a problem for traditional formulations of the wager. In section 3, we use two thought experiments to show that these objections are structural, but not substantive problems, for the wager. In section 4, we suggest a particular method of comparing worldviews and provide an example of how one might salvage the substance of the wager in light of these objections. In section 5, we address other objections to the wager that apply to our formulation and argue that many of them can actually be incorporated into the decision matrix. We conclude in section 6 that something in the spirit of the wager can be salvaged while incorporating many prominent objections.

5. For objections to Pascal's Wager (some, but not all, of which we respond to below) see William Clifford, "The Ethics of Belief," in *Lectures and Essays* (Macmillan, 1879); Antony Flew, "Is Pascal's Wager the Only Safe Bet?," *Rationalist Annual* 76 (1960): 21–5; Antony Flew, "The Presumption of Atheism," *Canadian Journal of Philosophy* 2 (1972): 29–46; Antony Flew, *The Presumption of Atheism and Other Philosophical Essays on God, Freedom and Immortality* (New York: Harper & Row, 1976); James Cargile, "Pascal's Wager," *Philosophy* 35 (1966): 250–7; Ian Hacking, "The Logic of Pascal's Wager," *American Philosophical Quarterly* 9 (1972): 186–92; Larimore Nicholl, "Pascal's Wager: The Bet Is Off," *Philosophy and Phenomenological Research* 39 (1978): 274–80; J. L. Mackie, *The Miracle of Theism* (New York: Oxford University Press, 1982); Michael Martin, *Atheism: A Philosophical Justification* (Philadelphia: Temple University Press, 1990); Michael Martin, "Pascal's Wager as an Argument for Not Believing in God," *Religious Studies* 19 (1983): 57–64; Anthony Duff, "Pascal's Wager and Infinite Utilities," *Analysis* 46 (1986): 107–9; Graham Oppy, "On Rescher on Pascal's Wager," *International Journal for Philosophy of Religion* 30 (1991): 159–68; Gregory Mougin and Elliott Sober, "Betting against Pascal's Wager," *Noûs* 28 (1994): 382–95; Robert Amico, "Pascal's Wager Revisited," *International Studies in Philosophy* 26 (1994): 1–11; William Gustason, "Pascal's Wager and Competing Faiths," *International Journal for Philosophy of Religion* 44 (1998): 31–9; Bradley Armour-Garb, "Betting on God," *Religious Studies* 35 (1999): 119–38; Alan Carter, "On Pascal's Wager, or Why All Bets Are Off," *Philosophical Quarterly* 50 (2000): 22–7; Alan Hájek, "Objecting Vaguely to Pascal's Wager," *Philosophical Studies* 98 (2000): 1–16; Alan Hájek, "Waging War on Pascal's Wager," *Philosophical Review* 112 (2003): 27–56; Alan Hájek, "Blaise and Bayes," in *Probability in the Philosophy of Religion*, ed. Jake Chandler and Victoria S. Harrison (New York: Oxford University Press, 2012), 167–86; Paul Saka, "Pascal's Wager and the Many Gods Objection," *Religious Studies* 37 (2001): 321–41; Allen Wood, "The Duty to Believe according to the Evidence," *International Journal for Philosophy of Religion* 63 (2008): 7–24; Nick Bostrom, "Pascal's Mugging," *Analysis* 69 (2009): 443–5; Sharon Ryan, "In Defense of Moral Evidentialism," *Logos and Episteme* 6 (2015): 405–27. See also Jeff Jordan, ed., *Gambling on God* (Lanham, MD: Rowman & Littlefield, 1994).

2. Two Prominent Objections

2.1. The Many-Gods Objection

One common objection to Pascal's Wager is to point out that the Christian God isn't the only God possible; the Gods of other worldviews need to be included in the matrix. Many of these worldviews are mutually exclusive, and believing the truth of one religion will often not give you the payoff of another. If one adds a Muslim God who sends Christians to hell, then the results become inconclusive. Any set of nonzero values for probability of Christianity and probability of Islam will give us the following, somewhat confusing, results.

Table 2.

	Christianity Is True	Islam Is True	Atheism Is True	Expected Value (EV)
Believe Christianity	∞	$-\infty$	f	$\infty + -\infty$
Believe Islam	$-\infty$	∞	f	$\infty + -\infty$
Believe Atheism	$-\infty$	$-\infty$	f	$-\infty$

The expected values seem to imply that atheism is not a wise choice. However, atheism can avoid this negative outcome. For example, in "Betting against Pascal's Wager," Gregory Mougin and Elliott Sober suggest the possibility of some heretofore undiscovered laws of nature that cause atheists to experience eternal pleasure after death and theists to experience eternal pain after death—essentially a naturalist version of heaven and hell ("Atheism+" from now on).[6] Even if one thinks that Atheism+ is improbable, it is logically possible and should be assigned a nonzero probability.[7] Given Atheism+, it is not obvious that any of the three options is better or worse than any other.

6. Mougin and Sober, "Betting against Pascal's Wager," 386. Note, however, that Mougin and Sober's main argument is distinct from the many-gods objection and goes beyond merely pointing out that Atheism+ is a possibility. This is one subpoint made in Sober and Mougin's series of interesting objections to Pascal's wager, several of which we do not have space to respond to here. Thanks to Elliott Sober.

7. If for no other reason, because of the axiom of regularity: namely, that only (known?) necessary falsehoods should be assigned probability 0. See David Lewis, "A Subjectivist's Guide to Objective Chance," in *Studies in Inductive Logic and Probability*, ed. R. Jeffrey (Berkeley: University of California Press, 1980), 263–93; Brian Skyrms, *Causal Necessity* (New Haven, CT: Yale University Press, 1980).

Table 3.

	Christianity Is True	Islam Is True	Atheism+ Is True	Expected Value (EV)
Believe Christianity	∞	$-\infty$	$-\infty$	$\infty + -\infty + -\infty$
Believe Islam	$-\infty$	∞	$-\infty$	$\infty + -\infty + -\infty$
Believe Atheism	$-\infty$	$-\infty$	∞	$\infty + -\infty + -\infty$

If there is a small chance that Atheism+ is true, then we don't have a decision theoretic reason to be a theist rather than an atheist. In fact, since all worldviews end up with the same perplexing expected value on this formulation of the wager, there is no reason to pick one over another. Therefore, the many-gods objection seems to show that Pascal's Wager is useless for deciding between worldviews.

2.2. The Mixed Strategies Objection

Anthony Duff, in "Pascal's Wager and Infinite Utilities," and Alan Hájek, in "Waging War on Pascal's Wager," argue that, not only is the wager useless for choosing between worldviews, but incorporating infinities into decision theory gives all decisions the same expected value. Pascal's original wager has been considered such a powerful argument because, if correct, it purported to show that your credence in theism doesn't matter—as long as it is a positive number—because that number multiplied by infinity will always be infinite. Thus, believing in God has an infinite expected value. However, consider the following alternative decision: flip a coin, and if that coin lands heads, believe in God. If it is tails, do nothing. While this lowers the probability that you'll believe in God to 0.5, this action still has an infinite expected value ($0.5 \times$ your credence in theism $\times$ infinity). Thus, you have no reason to believe in God directly, rather than flip a coin, and, if it lands heads, believe in God. Both options have infinite expected value.

Hájek and Duff point out that, using this same logic, you can show that any decision has infinite expected value. This is because any decision you might make includes the positive probability that you will eventually come to believe in God. This probability, no matter how small, when multiplied by the infinite reward of heaven, gives the decision an infinite expected value. As Hájek puts it:

> Wager for God if and only if a die lands 6 (a sixth times infinity equals infinity); if and only if your lottery ticket wins next week; if and only if

> you see a meteor quantum-tunnel its way through the side of a mountain and come out the other side. . . . Pascal has ignored all these mixed strategies—probabilistic mixtures of the 'pure actions' of wagering for and wagering against God—and infinitely many more besides. And all of them have maximal expectation. Nothing in his argument favors wagering for God over all of these alternative strategies.[8]

In other words, any action which could potentially lead to belief in God, no matter how small the probability (as long as it's positive), has infinite expected value. For example, since the probability of eventually coming to believe in God given the decision to tie your shoe is greater than zero, the expected value of tying your shoe is infinite. Duff concludes, "I have, therefore, no reason to try to increase the probability that I will come to believe in God, since no such increase in probability can increase the expected value of my actions—which is already infinite."[9] Thus, according to the mixed strategies objection, the wager has essentially zero practical import; as soon as Pascal's infinities are introduced into decision theory, we have no reason to perform any action rather than another action.

3. Comparing Infinities

To a large extent we agree with the points made by advocates of the many-gods and mixed strategies objections; they bring out real problems with Pascal's Wager. However, we think that they prove too much if an implication of their arguments is that we cannot rationally rank one infinite good over another using contemporary decision theory.[10] Put differently: they bring out important structural, but not substantive, problems with the wager. This is because there are many situations where it is clearly rational to prefer one infinite good to another. Two such examples are as follows.

3.1. Eternity of Ecstasy versus Eternity of Moderate Happiness

Imagine a relatively happy moment of your life: perhaps receiving a good grade on a test or enjoying a decent meal. Now imagine one of the most incredibly joyous occasions of your life: a moment of great love, compassion, glory, creativity, for example, your wedding day, being offered your dream job, and so on. Now suppose that you have the option to choose between two "heavens." In the first heaven, the moderately good moment is repeated infinitely for an eternity of moderate happiness. In the second version, the

8. Hájek, "Waging War on Pascal's Wager," 31.
9. Duff, "Pascal's Wager and Infinite Utilities," 108.
10. Ibid., 109.

moment of peak joy is repeated infinitely for an eternity of ecstasy. However, without a way to compare infinities, we are multiplying a finite amount of happiness by infinity, so the result will be infinite for both. Therefore, it appears like advocates of the above objections have proved too much, because one should prefer the infinity of ecstasy to the infinity of moderate happiness.

3.2. Same Happiness, Different Probability

Imagine that you have two eternities laid before you. Both "heavens" are infinite, and in both, you will experience the same level of happiness at each moment. The catch is, neither guarantees you will receive its reward; in each, there is a chance you could be annihilated instead. In the first heaven, the probability you will get the reward is 0.000001. In the second heaven, the probability you will get the reward is 0.999999. Both heavens offer the same payoff, but it is clear that you should prefer the second to the first, if given a choice. Therefore, simply because two worldviews offer the same infinite rewards does not necessarily mean they have equal expected value; the probability you will get the reward is a key a part of the equation.

These two thought experiments show that, in many cases, depending on the value of the payout and probability you will get it, it is rational to prefer one infinity to another. Thus, while the many-gods and the mixed strategies objections raise an important technical problem with the wager (and decision theory more generally), these thought experiments show that the problem is not a substantive one, as long as we have a way of altering decision theory so we can utilize it to compare different infinite payoffs. Below, we suggest one possible way to do so; however, our method below is only an example of how this might work. Our main goal is not necessarily to commit to this technical apparatus in particular, but to give an extended example that shows that there are ways to salvage decision theory and the wager in light of these objections.[11]

4. Salvaging Pascal's Wager

In order to address both objections at once, we propose that one deal with infinity differently than it is dealt with in the standard formulation of the wager. In the standard formulation, the agent's credences are multiplied by infinity for the worldviews offering infinite rewards and, as long as the cre-

11. Hájek, "Waging War on Pascal's Wager," section 4, suggests a number of ways one might compare infinite payoffs. See also Eddy Chen and Daniel Rubio, "Surreal Decisions," *Philosophy and Phenomenological Research*, forthcoming (available at https://doi.org/10.1111/phpr.12510) for a similar framework that uses surreal numbers.

dences are positive, this always leads to an infinite expected value. We suggest a reformulation to how the quantities of infinity are compared.

4.1. Pleasure or Utility per Period

First, we will distinguish the amount of pleasure or utility in a particular moment from the duration of time for which that utility persists. We will assume it is possible for a finite being to exist for an infinite amount of time, but that it is impossible for a finite being to experience an infinite amount of pleasure or utility at any particular moment.[12]

Hájek proposes approaching infinites in a similar way; he considers both the idea of using finite utilities over an infinite time period and the idea that humans have a saturation point for experiencing utility. (Here, a "saturation point" refers to the maximum amount of pleasure or utility a human can experience in a single moment). Hájek points out that, if God could have created beings with a higher saturation point, salvation would no longer be the greatest thing possible. Pascal would have rejected this assumption, and Hájek rejects this approach because it is not true to the spirit of Pascal.[13] However, this seems to be more of a problem for Pascal's theology than an objection to the reformulated wager itself. This may come down to a difference of priorities; Hájek may very well be right that, as a historical matter, Pascal would be unsatisfied with a reformulation that uses finite utilities over an infinite time. However, we are less concerned with historical questions and more concerned with a different feature of Pascal's Wager, namely, whether it gives a decision theoretic reason for agents to pay attention to infinite afterlife gains and losses.

12. While we are willing to flag this as an assumption as our project and leave it at that, we also think this assumption has intuitive appeal, because an infinite experience in a moment would require an infinite capacity in the being having the experience. E.g., it seems metaphysically possible for a person to eat food for all eternity, but it seems impossible for a person to eat an infinite amount of food all at once. One way our project could be expanded is to do away with this assumption. If one thought that "supertasks" were metaphysically possible for humans (or something similar which would enable humans to experience infinite pleasure in a finite amount of time), then different sizes of infinity could be compared and result in a similar ratio to ours (that concerns finite numbers). Bartha, "Taking Stock of Infinite Value," has suggested an approach along these lines (see n13). One reason to resist expanding the problem in this way is that, if there is no limit to the utility a human can experience in a finite amount of time, the matrix would allow for a "super-worldview," or a worldview that claims to give more pleasure than all the other worldviews. The amount of pleasure could be so large that this worldview would have the highest EV, even if one's credence in it is extremely low.

13. Hájek, "Waging War on Pascal's Wager," section 4.

4.2. Ratio in the Limit

The second way in which we want to deal with infinity differently is that we want to focus on finding the ratio in the limit between two (or more) rewards, instead of simply multiplying everything by infinity.[14] Section 3 explained how it can be rational to prefer one infinity to another. Measuring different infinite rewards using ratios and limits will enable us to capture the intuition that one infinite reward can be better than another.[15]

Our proposal is to find what the ratio in the limit between the two options would be; instead of multiplying the two finite amounts of utility by an infinite amount of time, we propose multiplying them by larger and larger amounts of time until one finds their ratio in the limit. In the first example in section 3, where one chose between receiving moderate happiness or ecstasy for infinity, suppose the moderate happiness was 1 unit of utility per day and the ecstasy was 100 units of utility per day. The ratio would be 1:100, and we could rationally choose the second option over the first, even though they are both infinite rewards. We will also include one's credences for each worldview in the ratio, since our second thought experiment showed that, *ceteris paribus*, one ought to prefer the worldview for which one has a higher credence over the one which has a lower credence, even if they both offer the same infinite rewards.

Before we give an extended example, we note that a *prima facie* problem for our method involves cases where the limit is undefined, so it does not converge to a single number. For example, there might be a heaven where one receives drastically differing amounts of pleasure and pain every day. In cases where a worldview promises a heaven with some finite repeating pattern of utility per day, we can define that pattern as an interval, take the average of the numbers in the interval, and treat that as the limit for that worldview. If a worldview's utility per day had no repetition at all, but always stayed above or below some value, it is possible that the worldview could be ordinally ranked with other options. Cases where the limit has no repetition or pattern at all cannot be incorporated into our method. We don't consider this to be a serious cost to our method because it is not pre-theoretically clear how one should rank worldviews with no repetition or patterns in afterlife utility.

14. Thanks to Graham Leach-Krouse for originally suggesting this approach. For a related approach, see Byl, "On Pascal's Wager and Infinite Utilities."

15. Bartha, "Taking Stock of Infinite Value," has also responded to Hájek using ratios. However, our papers suggest very different methods for calculating the ratios; he uses different sizes of infinities, while we use limits and finite numbers. Additionally, Bartha's paper focuses on showing that the use of ratios is consistent with decision theory as traditionally understood; our project is rather about preserving Pascal's idea that we have a strong decision theoretic reason to pay attention to possible infinite goods and harms in the afterlife.

4.3. Maximizing Expected Value

We will now work through an example of how this system would work with eight simplified worldviews and a fictional agent named Peter who must choose between them. Before we go through the example, one important caveat: some might say that our version is no longer Pascal's Wager, since (as you will see from the example) Christianity no longer automatically comes out on top regardless of credence. However, that is not the goal of our project. When we say we are salvaging the wager, we take the goal to be providing a decision theoretic apparatus that gives us a strong decision theoretic reason to pay special attention to possible infinite goods and harms in the afterlife.

Example: Peter is choosing between eight worldviews. Each worldview has a credence, a per-time-period amount of pleasure/utility, a length of time for which the reward will be experienced, a per-time-period amount of suffering/disutility for choosing incorrectly, and a length of time for which the punishment will be experienced. We will use basic versions of most worldviews in order to keep the example as simple as possible.[16] Universalism represents the view that everyone gets into heaven. Plato's worldview is very loosely based on a worldview described by Plato in the *Republic* with a 10,000 year afterlife.

Table 4.

Worldview	Credence	Utility/ Pleasure	Disutility/ Pain	Time Period
Atheism (A)	(.5)	10u	10d	100 years
Universalism (U)	(.2)	10u	0	
Plato (Pl)	(.1)	10u	10d	10,000 years
Buddhism (B)	(.1)	10u	10d	100 trillion years
Mormonism (M)	(.03)	10u	10d	
Hinduism (H)	(.03)	10u	10d	
Islam (Is)	(.03)	10u	20d	
Christianity (C)	(.01)	10u	20d	

We now plug these values into a standard decision theory matrix. The left column is the action of believing a certain worldview (or doing whatever is necessary in order to get the rewards of that worldview. This might in-

16. For the sake of simplifying the example, we also assume that the length of time for reward and punishment is the same for all worldviews.

clude practicing that worldview or doing certain good works—whatever that worldview requires). The top row is the state of the world where that worldview is true. The value in each inside square is the credence multiplied by the per time period amount of utility or disutility. In order to calculate the EV, units of utility will be treated as positive numbers and units of disutility will be treated as negative numbers. Once everything else is calculated, we will multiply each value by increasingly higher finite numbers representing the length of time in heaven or hell, until we find the ratio in the limit of the values between the various worldviews.

Table 5.

1 Year	A(.5)	U(.2)	Pl(.1)	B(.1)	M(.03)	H(.03)	Is(.03)	C(.01)	EV
bA	5	2	−1	−1	−.3	−.3	−.6	−.2	3.6
bU	−5	2	−1	−1	−.3	−.3	−.6	−.2	−6.4
bPl	−5	2	1	−1	−.3	−.3	−.6	−.2	−4.4
bB	−5	2	−1	1	−.3	−.3	−.6	−.2	−4.4
bM	−5	2	−1	−1	.3	−.3	−.6	−.2	−5.8
bH	−5	2	−1	−1	−.3	.3	−.6	−.2	−5.8
bIs	−5	2	−1	−1	−.3	−.3	.3	−2	−5.5
bC	−5	2	−1	−1	−.3	−.3	−.6	.1	−6.1

After one year, Atheism appears to be the clear winner; this is mostly due to Atheism being given the highest credence. We now factor in time periods. First, we will multiply every value by 100, which will give us the EVs of each worldview after 100 years. This gives us the same ratio of EV's as the above matrix since every worldview has a reward/punishment time period that lasts at least 100 years.

Table 6.

100 Years	A(.5)	U(.2)	Pl(.1)	B(.1)	M(.03)	H(.03)	Is(.03)	C(.01)	EV
bA	500	200	−100	−100	−30	−30	−60	−20	360
bU	−500	200	−100	−100	−30	−30	−60	−20	−640
bPl	−500	200	100	−100	−30	−30	−60	−20	−440
bB	−500	200	−100	100	−30	−30	−60	−20	−440
bM	−500	200	−100	−100	30	−30	−60	−20	−580
bH	−500	200	−100	−100	−30	30	−60	−20	−580

100 Years	A(.5)	U(.2)	Pl(.1)	B(.1)	M(.03)	H(.03)	Is(.03)	C(.01)	EV
bIs	−500	200	−100	−100	−30	−30	30	−20	−550
bC	−500	200	−100	−100	−30	−30	−60	10	−610

After 100 years, Atheism is still the clear winner. Next, we multiply every worldview with a time period of 10,000 or greater by 10,000. This changes the results somewhat, since Atheism hits a ceiling once it gets to 100 years, so its values will stay the same while the values for other worldviews increase.

Table 7.

10k Years	A(.5)	U(.2)	Pl(.1)	B(.1)	M(.03)	H(.03)	Is(.03)	C(.01)	EV
bA	500	200k	−100k	−100k	−30k	−30k	−60k	−20k	−239,500
bU	−500	200k	−100k	−100k	−30k	−30k	−60k	−20k	−140,500
bPl	−500	200k	100k	−100k	−30k	−30k	−60k	−20k	59,500
bB	−500	200k	−100k	100k	−30k	−30k	−60k	−20k	59,500
bM	−500	200k	−100k	−100k	30k	−30k	−60k	−20k	−80,500
bH	−500	200k	−100k	−100k	−30k	30k	−60k	−20k	−80,500
bIs	−500	200k	−100k	−100k	−30k	−30k	30k	−20k	−50,500
bC	−500	200k	−100k	−100k	−30k	−30k	−60k	10k	−110,500
Note: k = 1,000									

Increasing the time period to 10,000 years has drastically changed our results. Atheism now has the absolute lowest EV. Universalism also looks terrible, although it is no longer dead last. Platonism and Buddhism have moved to the top two spots thanks to their high credences and the fact that they haven't hit their afterlife timeline ceilings yet. Next, we multiply each value (with a time period greater than or equal to 100 trillion) by 100 trillion.[17]

Table 8.

100T Years	A(.5)	U(.2)	Pl(.1)	B(.1)	M(.03)	H(.03)	Is(.03)	C(.01)	EV
bA	500	200T	−100T	−100T	−30T	−30T	−60T	−20T	−40T
bU	−500	200T	−100T	−100T	−30T	−30T	−60T	−20T	−40T
bPl	−500	200T	100T	−100T	−30T	−30T	−60T	−20T	−40T

17. To simplify, we rounded up all the numbers in the EV column to exclude anything below 1 trillion. Further, technically there is +500 for Atheism and −100k for Platonism, but, as with the rest of this column, this is negligible when dealing with numbers as large as 40 trillion.

100T Years	A(.5)	U(.2)	Pl(.1)	B(.1)	M(.03)	H(.03)	Is(.03)	C(.01)	EV
bB	−500	200T	−100T	100T	−30T	−30T	−60T	−20T	160T
bM	−500	200T	−100T	−100T	30T	−30T	−60T	−20T	20T
bH	−500	200T	−100T	−100T	−30T	30T	−60T	−20T	20T
bIs	−500	200T	−100T	−100T	−30T	−30T	30T	−20T	50T
bC	−500	200T	−100T	−100T	−30T	−30T	−60T	10T	−10T
Note: T = trillion									

After 100 trillion years, Platonism has moved down from being tied for first to being tied for last. Buddhism has now become the clear favorite due to its high credence and the fact that its ceiling for length of afterlife has not been reached yet. The benefits and rewards of Atheism and Platonism have both become negligible. Next, we multiply by a 100 googol.[18]

Table 9.

1g Years	A(.5)	U(.2)	Pl(.1)	B(.1)	M(.03)	H(.03)	Is(.03)	C(.01)	EV
bA	500	200g	−100k	−100T	−30g	−30g	−60g	−20g	60g
bU	−500	200g	−100k	−100T	−30g	−30g	−60g	−20g	60g
bPl	−500	200g	100k	−100T	−30g	−30g	−60g	−20g	60g
bB	−500	200g	−100k	100T	−30g	−30g	−60g	−20g	60g
bM	−500	200g	−100k	−100T	30g	−30g	−60g	−20g	120g
bH	−500	200g	−100k	−100T	−30g	30g	−60g	−20g	120g
bIs	−500	200g	−100k	−100T	−30g	−30g	30g	−20g	150g
bC	−500	200g	−100k	−100T	−30g	−30g	−60g	10g	90g
Note: g = googol									

The generosity of the Universalist God has allowed everyone to move back into the black. But the four worldviews which were all early favorites—Atheism, Universalism, Platonism, and Buddhism—have all moved into last place. Meanwhile, Islam, which hasn't made much noise so far, has moved into first place. This is due to the extreme severity of its hell combined with

18. A googol is 10^{100} or 1 followed by 100 zeroes. To simplify, we rounded up all the numbers in the EV column to exclude anything below one googol. Further, there is technically +500 for Atheism and −100k for Platonism, but, as with the rest of this column, this is negligible when dealing with numbers as large as 60 googol.

the fact that there is no other exclusivist infinite afterlife worldview with a higher credence. Next we multiply by a 100 googolplex.[19]

Table 10.

100gp Years	A(.5)	U(.2)	Pl(.1)	B(.1)	M(.03)	H(.03)	Is(.03)	C(.01)	EV
bA	500	200gp	−100k	−100T	−30gp	−30gp	−60gp	−20gp	60gp
bU	−500	200gp	−100k	−100T	−30gp	−30gp	−60gp	−20gp	60gp
bPl	−500	200gp	100k	−100T	−30gp	−30gp	−60gp	−20gp	60gp
bB	−500	200gp	−100k	100T	−30gp	−30gp	−60gp	−20gp	60gp
bM	−500	200gp	−100k	−100T	30gp	−30gp	−60gp	−20gp	120gp
bH	−500	200gp	−100k	−100T	−30gp	30gp	−60gp	−20gp	120gp
bIs	−500	200gp	−100k	−100T	−30gp	−30gp	30gp	−20gp	150gp
bC	−500	200gp	−100k	−100T	−30gp	−30gp	−60gp	10gp	90gp
Note: gp = googolplex									

As we multiply by larger and larger numbers the ratio of the EVs will even out to 6:6:6:6:12:12:15:9 or 2:2:2:2:4:4:5:3. The ratio as the length of time approaches infinity is 2:2:2:2:4:4:5:3. This means that, in order to maximize EV, Peter ought to choose Islam.

4.4. Addressing Many Gods and Mixed Strategies

This approach allows us to rank infinite utilities while still maintaining the structure of standard decision theory approaches. In some sense, this approach incorporates the many-gods objection into the wager instead of trying to find a way around it. Nonetheless, the conclusion of the many-gods objection that all worldviews given a credence greater than 0 and an infinite afterlife have the same EV is not correct. Our thought experiments show that considering them equal is counterintuitive, and our framework provides a way to compare these worldviews in a standard decision-theory matrix. But what about the idea that Atheism+ is the case, so atheists go to heaven and theists go to hell? Since Atheism+ is a worldview promising infinite rewards/punishments, it would not get washed out by the other infinite worldviews as standard Atheism does in our example. However, when the many-gods objection is applied to our new formulation of the wager, Atheism+ would

19. A googolplex is a 10 to the power of a googol (10^{googol}) or 1 followed by a googol zeroes. To simplify, we rounded up all the numbers in the EV column to exclude anything below 1 googolplex. Further, there is technically +500 for Atheism and –100k for Platonism, but, as with the rest of this column, this is negligible when dealing with numbers as large as 60 googolplex.

only promote a nontheistic worldview when one's credence for Atheism+ is sufficiently high. People with a sufficiently high credence in Atheism+ should thus remain atheists.[20] In this, if one thinks that salvaging the wager requires a theistic position to win, then they may not find our project satisfying. However, for most people, Atheism+ will lose out to another infinite worldview in which they have a higher credence. Generally, with the new version of the wager, the force of the many-gods objection is significantly diminished.

Our approach also incorporates the mixed strategies objection. Any mixed strategy approach such as flipping a coin and then believing the worldview if heads can be included in the decision matrix. However, none of these mixed strategies will ever have as high of an expected as simply converting to the worldview with the highest expected value without a coin flip. This is because one now needs to (multiply the value per year * credence) by 0.5 (the probability of getting heads), and this mixed strategy will change the final ratios, privileging the pure strategies over the mixed ones.

5. Addressing Additional Objections

A number of other objections have been raised to Pascal's Wager; some apply to our revised version of the wager above. We now turn to those objections.

5.1. Infinite Possible Number of Worldviews Objection

Our sample matrix only includes a small number of worldviews. However, there are many more possible worldviews or gods that we could add. In theory, one could come up with infinitely more possible gods, each of whom eternally punish and reward people for something different. If we wanted to take all these worldviews into consideration, our decision matrix would end up having an infinite number of columns and rows.

If one takes this objection seriously, it creates a problem for all decision theory. In every given situation, there are an infinite number of possible ways the world could be. We could never use decision theory to make rational decisions if one insisted that every possible way the world could be must be included in every decision matrix. So, of course, we will have to rule out some options and represent the probability space in a particular way—just as we do

20. But see Mougin and Sober's "Betting against Pascal's Wager," sections 3 and 4, for arguments in favor of betting on Atheism+. Thanks to Elliott Sober.

in any standard decision table.[21] The choice between religions should not be treated differently than any other decision problem.

5.2. Psychological, Epistemic, and Bet Hedging Objections

One might object that there are epistemic and/or psychological problems with simply choosing to believe something because it has the highest expected utility in a decision matrix. For example, one might argue that we do not have the ability to believe a particular religion at will.[22] First, we note that many religions might not require belief for conversion: some may teach that trying to believe, having faith, taking certain kinds of morally good actions, or making a lifelong commitment to a religion are sufficient. However, no matter what a religion requires for conversion, this objection can be incorporated into the wagerer's decision matrix. In addition to multiplying by the credence that the worldview is true, which is already part of the calculation, one ought to also multiply by *the probability that attempting to convert will be successful*.

A similar objection is that it is epistemically irrational or morally irresponsible to believe on the basis of expected value instead of on the basis on evidence.[23] Our response is that this can also be incorporated into the framework by assigning a cost to breaking the epistemic or moral rule and subtracting that cost from (utility per year × credence × probability of successful conversion). Other factors, such as the degree to which certain religions allow you to hedge your bets while still receiving eternal rewards, can be factored into the matrix in a similar way.

21. For discussion, see Elizabeth Jackson, "How Belief-Credence Dualism Explains Away Pragmatic Encroachment," *Philosophical Quarterly* 69 (2019): 511–33; Jacob Ross and Mark Schroder, "Belief, Credence, and Pragmatic Encroachment," *Philosophy and Phenomenological Research* 88 (2014): 259–88.

22. Those who defend or discuss this objection include Clifford, "The Ethics of Belief"; Flew, *The Presumption of Atheism*, 64; Nicholl, "Pascal's Wager: The Bet Is Off"; Mackie, *The Miracle of Theism*, 203; Oppy, "On Rescher on Pascal's Wager," 167. For an alternative response to this objection, see Elizabeth Jackson, "Wagering against Divine Hiddenness," *European Journal for Philosophy of Religion* 8, no. 4 (2016): 100. Doxastic involuntarism, the idea that we do not have voluntary control over our beliefs, is the orthodox view in the literature; see Bernard Williams, "Deciding to Believe," in *Problems of the Self* (New York: Cambridge University Press, 1970), 136–51; William Alston, "The Deontological Conception of Epistemic Justification," *Philosophical Perspectives* 2 (1988): 257–99; Pamela Hieronymi, "Believing at Will," *Canadian Journal of Philosophy* 35 (2009): 149–87.

23. Those who defend or discuss this objection include Mackie, *The Miracle of Theism*, 201; Duff, "Pascal's Wager and Infinite Utilities," 108; Ward, "Religious Conversion, Self-Deception, and Pascal's Wager," 173; Jordan, *Pascal's Wager*, 38–9. Alternative responses include Pascal, *Pensées*, fragments 233–41; Golding "Pascal's Wager"; Rota, *Taking Pascal's Wager*.

5.3. Hell and Divine Justice

One might object that the omnibenevolence and justice of God is inconsistent with the existence of hell. Since a good and just God wouldn't send people to hell, we can rule out worldviews that posit both omnibenevolence/justice and hell *a priori*; wagering is thus unnecessary (or would look quite different than we propose above). Our response is threefold.

An initial response is that divine omnibenevolence isn't inconsistent with the existence of hell, because our eternal destiny is not God's decision; it is up to us. God does not "send people to hell," but hell is something that people freely choose. Al-Ghazālī illustrates this response as follows:

> Thou prepared clothing to shield thee from the cold of winter, yet makest no preparation for the afterlife. Thy state is like that of a man who in mid-winter should say, 'I will wear no warm clothing, but trust to God's mercy to shield me from the cold.' He forgets that God, at the same time that He created cold, showed man the way to make clothing to protect himself from it, and provided the material for that clothing. Remember this also, O soul, that thy punishment hereafter will not be because God is angry with thy disobedience; and say not, 'How can my sin hurt God?' It is thy lusts themselves which will have kindled the flames of a hell within thee; just as, from eating unwholesome food, disease is caused in a man's body, and not because his doctor is vexed with him for disobeying his orders.[24]

Hell isn't something randomly imposed on people by God, but rather the result of human free decision. On this model, it is much less clear that hell and omnibenevolence conflict. One might worry, nonetheless, that even if we freely choose hell, the idea of punishing us infinitely is still inconsistent with divine justice, since our sins aren't infinite. This brings us to two additional responses.

A number of theologians and philosophers have argued that it is possible for a just God to send humans to an infinite hell. For instance, Oliver Crisp argues hell is infinite because "all sin against this God incurs an infinite demerit, since it is an affront to the infinite glory and honour of God, thereby accruing an infinite disvalue."[25] Rogers and Conroy similarly argue that, if God is infinite, then God can feel infinite pain.[26] Given certain retributivist principles, if God feels infinite pain when some human sins, God is justified

24. Al-Ghazālī, *The Alchemy of Happiness*, chap. 6: "Concerning self-examination and the recollection of God."

25. Oliver Crisp, "Divine Retribution: A Defence," *Sophia* 42, no. 2 (2003): 37. See also St. Anselm, *Cur Deus Homo*, trans. Sidney Norton Dean (Chicago: Open Court, 1903), 1:21; Thomas Aquinas, *Summa Theologiae*, I, q.87, a.4, arg.2; Jonathan Edwards, *Original Sin*, ed. Clyde A. Holbrooke (New Haven, CT: Yale University Press, 1970); Jonathan Kvanvig, *The Problem of Hell* (New York: Oxford University Press, 1993), chap. 1.

26. Andrew Rogers and Nathan Conroy, "A New Defense of the Strong View of Hell," in *The Concept of Hell*, ed. B. McCraw and R. Arp (London: Palgrave Macmillan, 2015), 49–65.

in punishing them infinitely. Finally, C. S. Lewis and Michael Murray suggest a model on which the inhabitants in hell keep sinning, and thus their sins (including those committed in hell) are, in fact, infinite.[27] Overall, if there's even some chance at least one of these arguments succeeds, then there is a reason to pay attention to the infinite consequences of your actions with respect to the possibility of hell. In other words, one need not conclude that these arguments successfully establish that hell is just, but something much weaker: that hell is on the table as a live possibility.

Even so, the possibility of hell is not a *necessary* condition for a version of Pascal's Wager to succeed. First, if one thinks annihilationism is possible, and, for example, everyone either goes to heaven or is annihilated, then one has reason to wager, in order to maximize their chance at going to heaven rather than being annihilated. Second, a version of Pascal's Wager is consistent with universalism, given the possibility of levels of heaven that vary in terms of infinite goodness (for example, ten versus twelve units of happiness per day). On this version of the wager, you have reason to take actions that maximize your chance at getting into the higher level of heaven possible.

5.4. The Homer Simpson Objection

The renowned philosopher Homer Simpson once said, "Suppose we've chosen the wrong god. Then, every time we go to church, we're making him madder and madder." Homer's remarks hint at the following theological position: God is a very jealous God. God wants you to pick the correct religion. However, God also strongly prefers that you "remain neutral" and not practice any theistic religion at all (for example, live as an atheist or agnostic) rather than practice the wrong religion. In this sense, atheism and agnosticism are less risky than practicing a religion. On this theological view, maybe atheists and agnostics are annihilated, but those who practice the wrong religion will suffer in an especially painful hell (maybe significantly more painful than heaven is pleasurable).[28] This kind of scenario has the implication that it may not be always rational to convert to a religion that offers infinite rewards and punishments; whether one should convert to a religion depends on more wholistic facts about their decision table.

We have four things to note in response. One, above, we've purposefully framed things in terms of the importance of paying attention to possible infinite afterlife payoffs. We acknowledge that this means our framework may not always favor practicing theistic or infinite worldviews. It does mean, though, that one should pay attention to the infinite consequences of their

27. C. S. Lewis, *The Great Divorce* (London: Geoffrey Bles, 1945); Michael Murray, "Heaven and Hell," in *Philosophy of Religion: A Reader and Guide*, ed. William Lane Craig (New Brunswick: Rutgers University Press, 2002).

28. Thanks to Ofra Magidor for raising this objection.

actions; the finite will only come in to break ties among infinite options. Our framework suggests, quite controversially, that it is irrational to ignore potential afterlife rewards and punishments.

Two, there are reasons to doubt Homer Simpson's theology. Many religions prescribe the same kinds of actions, for example, helping to the poor, prayer, attending religious services, and tithing. Thus, even if you're practicing the wrong religion, you would still be taking a lot of actions prescribed by the true religion. This is a reason to think that God would prefer you practice some religion, even a false one, rather than not practicing a theistic religion at all. This is especially salient if, for example, Christians and Muslims worship the same God. For instance, imagine that you have two children and you invite them both to your fiftieth wedding anniversary. The first child comes to the party but brings you a gift that isn't exactly what you wanted because they have some false beliefs about your desires. The second child ignores the invitation completely and says that you don't exist. Which is the better child?

Three, potentially for reasons similar to those just mentioned, it is likely that many reading this won't agree with Homer's theology. However, if you do agree with Homer's theology, then we admit that it may not be rational for you to practice a religion, in the same way that if you have a high credence in Atheism+, you should remain an atheist. We reiterate that our goal is not to argue that everyone should practice Christianity, or even that everyone should practice a theistic religion.

Finally, as noted in section 5.3, there are versions of Pascal's Wager that exclude hell and only include heaven; for instance, ones on which everyone who doesn't go to heaven is annihilated. On these versions of Pascal's Wager, Homer's objection does not apply, and many of these versions prescribe practicing infinite religions.

5.5. Pascal's Mugging Objection

In "Pascal's Mugging," Nick Bostrom asks us to imagine a scenario like the following: a philosophical mugger comes up to you in a dark alley and claims that, if you give him your wallet now, then he'll give you a trillion times the money in your wallet tomorrow. If your credence that he's telling the truth is less than one in a trillion, then imagine a scenario where he offers you an amount that is more than the inverse of your credence. It seems irrational to give the mugger your wallet, but if you accept the reasoning of Pascal's Wager then, Bostrom maintains you should accept the reasoning of Pascal's mugger as well. The Pascal's mugging argument can be formalized as follows:

(1) In Pascal's mugging, you ought not wager (that is, give the mugger your wallet).

(2) Pascal's mugging is relevantly similar to Pascal's Wager.
(3) Thus, in Pascal's Wager, you ought not wager (that is, believe in God).

First, note that there are different versions of the Pascal's mugger objection—finite versions, in which the mugger only offers you finite goods, and infinite versions, where the mugger claims that infinite goods are at stake. In Bostrom's original paper, he only considers the finite version of the mugging, but we will consider both versions for the sake of completeness.

We have three responses to the Pascal's mugging objection. First, when dealing with finite version, one could respond by arguing that as the mugger's claims get more extreme, your credence that he will deliver should lower in proportion; thus, your credence would never be high enough to accept the mugger's offer. If the mugger asks for your credence before making the offer, then that gives you new evidence that he is not to be trusted. This response rejects premise two. (Note also that this response could be extended to the infinite version if one accepts the possibility of infinitesimal credences.)

Second, underlying premise two is an assumption about cases like Pascal's mugging; namely, that in cases with a similar structure, it is irrational to take the mugger's offer. We maintain this assumption is contentious. Note first that cases that share the structure of Pascal's mugging are relatively common. When you see an advertisement that implies that you'll be rich, successful, attractive, or skilled, if you buy a certain product, your case is structurally similar to Pascal's mugging. Many ads we see every day imply that you'll acquire the talent of a professional athlete if you wear certain shoe or drink a certain sports drink.

Further, in structurally similar cases, it is not at all obvious that it is irrational to "accept the mugger's offer"; intuitions about when acceptance is rational are likely to be largely situational. Consider: when people ask you to donate time or money or make lifestyle changes in order to support a cause related to some potential catastrophic event, like global warming, a worldwide nuclear war, or runaway artificial superintelligence, one could say they are using a Pascal's mugging strategy on you. These cases are especially applicable in a time where the idea of uploading consciousness and achieving eternal life through technology is discussed seriously by philosophers and scientists. When people try to sell you on some new life-extending or life-saving technology, your case is similar to Pascal's Mugging. In many of these cases, it could be rational to accept the mugger's proposal, by, for example, trying a risky new medication or treatment for a life-threatening illness.[29] If, in some cases similar to the mugging case, it is rational to take the offer, then there must be some principled difference between the mugging and these other cases. And it is not at all obvious that Pascal's wager would fall on the

29. See Al-Ghazālī, *The Alchemy of Happiness*, who discusses religion as a cure for death (chap. 6).

irrational side of whatever line we draw between these cases. This response applies to both finite and infinite versions of the mugging, as some of the examples might include infinite utility (for example, uploading your consciousness to a computer so you can live indefinitely after your biological death or investing in new scientific advancements that purport to cure all diseases and enable immortality).

Our third response to Pascal's mugging is that most decisions, including the decision to give the wallet to the mugger, carry the possibility of infinite risk and reward. Why think this? Well, one, our actions might determine whether we go to heaven or hell. Two, even in situations where that isn't the case, our actions could determine the degree of infinite reward in heaven or punishment in hell. For example, given the emphasis that most religions place on giving to the poor, it seems plausible that most decisions regarding money are moral—ones that God cares about. And any moral decision has potentially infinite consequences, even from a self-interested perspective, because it could be a deciding factor in the degree of afterlife infinite reward or punishment. For instance, making the morally right choice in a certain situation could cause one to be upgraded from receiving ten units of pleasure per moment in heaven to receiving eleven moments of pleasure per moment in heaven. Thus, making the correct choice, even in a seemingly minor decision, can cause an infinite increase in pleasure. Given all our decisions include the possibility of infinite risk and reward, the finite versions of the mugger will be washed out, and the infinite versions of the mugging could be outweighed by other infinite considerations. This response also provides grounds for denying premise two, on both the finite and infinite versions; you ought not give the mugger your wallet, because his claims are trumped by the weightiness of other considerations that bear on how we ought to act.

5.6. Temporal Discounting Objection

One might object that rational agents are future discounters. That is, they care less about what happens to them in the far future than what happens to them in the more immediate future. Depending on the discount function, far off experiences may be weighed less (for example, in proportion to how far away they are), or may not be given any weight at all. Either way, a rational agent would care more about experiences in the near future, and not care (or care very little) about what happens to them in, for example, 100 million years.[30] In our model above, we weighed the utility at all times of an agent's life equally, but without this assumption, it isn't obvious we have the same kind of reason to care about the afterlife. Given the centrality of afterlife con-

30. Thanks to Laura Callahan for raising this objection.

siderations to Pascal's Wager, this threatens not only the version above but many, if not all, versions of the wager.

In response, first, it is controversial whether temporal discounting is rational. While economists often assume it is rational, many philosophers disagree.[31] To motivate why philosophers think this, consider the "marshmallow test" experiment, in which children were given the choice between one marshmallow now or two marshmallows after a short waiting period.[32] In this case, assuming the children prefer two marshmallows to one, it is natural to think that the children who chose the one marshmallow were, in some sense, prudentially irrational. We make similar judgments about people who neglect their far-off future by failing to plan ahead or save for retirement. Or consider the avid smoker, who continues with the habit because he cares more about the current enjoyment of smoking than any long-term health detriments smoking might cause. One obvious way to explain why these agents seem irrational is because it is irrational to care more about the immediate future than the far future.

Second, it is worth noting that the Pascalian reasoning we endorse above will still have bite for certain kinds of future discounters, namely, those whose discount functions have no sharp drop off point. If you care about the very distant future, but just care about it *less* than the closer future, your actions still have potentially infinite consequences that you should to pay attention to; they will just be weighed differently than someone who does not discount the far future.[33] Thus, to get this objection off the ground, one not only needs to assume that future discounting is rational, but also that a discount function *with a sharp drop off point* is rational.[34]

To show why having a sharp drop-off point in your discount function seems irrational, consider the following thought experiment. Let's suppose you have a discount function on which you only care about what happens to you for the next 500 years; then your discount function drops off sharply and you no longer care. Then, suppose I give you a choice between two 1,000-year futures, both on which you experience the same happy life for the next 500

31. See, e.g. Megan Sullivan, *Time Biases: A Theory of Rational Planning and Personal Persistence* (New York: Oxford University Press, 2018).

32. Walter Mischel, Ebbe B. Ebbesen, and Antonette Raskoff Zeiss, "Cognitive and Attentional Mechanisms in Delay of Gratification," *Journal of Personality and Social Psychology* 21 (1972): 204–18.

33. The one exception would be asymptotic functions that eventually drops into the infinitesimals, but, given how controversial infinitesimals are, this kind of function is likely to be quite rare.

34. It is also worth noting that positing a sharp drop off point is not *sufficient* to render wagering irrational. The point at which the drop off occurs and one's credence in various afterlives are both relevant for determining whether those with drop-off discount functions should wager. While posting a drop off point does take the possibility of infinity utility off the table (assuming super tasks are impossible for humans; see footnote 10), one might still have good reason to care about the finite goods and harms that could take place in the afterlife, and thus might have a reason to take the wager.

years. On future 1, after the first 500 years, you are tortured for 500 years. On future 2, after the first 500 years, you live blissfully for the second 500 years. Given your discount function, you should be indifferent between these two futures, and, if I paid you one dollar to pick future 1, you should do so. Note also that you can substitute any amount of time for the 500 years (depending on the discount function) and get similar results. The absurdity of this conclusion calls into question whether discount functions with a sharp drop off can ever be rational. Thus, our first response to this objection is that it is not at all clear whether the discount functions required to invalidate Pascalian reasoning are rational.

Now we turn to a second response to the discounting objection, in which we argue that many of the considerations that motivate the rationality of future discounting either (i) don't apply in the Pascalian case or (ii) are not well motivated. We do so by considering various possible motivations for future discounting.

One, you might discount the future because you don't know when you will die. You might care less about what happens to you in fifty years because there is a higher probability you will be dead then. However, this consideration drops out when considering religious promising afterlife and resurrection. The possibility of death actually works in favor of Pascalian reasoning, because it makes afterlife considerations all the more pressing. Thus, (i) applies; this kind of reasoning isn't relevant in the Pascalian case.

A second reason you might discount is because you have less certainty about what the world will be like in the future. For example, you might prefer to bet on the behavior of a certain stock tomorrow rather than its behavior in twenty years, because you have less certainty about what the stock market will be like that far into the future. The latter bet is much riskier. However, betting on a religion is very different than betting on stocks or economic trends, because, while the value of a stock is continually changing, the truth value of a religious claim does not change. The worldview that is true today will also be true in the far future. Again, (i) applies; this kind of reasoning isn't relevant in the Pascalian case.

Third, you might care less about the future because you doubt your personal identity will continue through time. You might be unsure that you will be the same person many years from now. Since you're more likely to be the same person tomorrow than 500 years from now, you might have stronger preferences about tomorrow than about 500 years from now. To quote Homer Simpson again, "That's a problem for future Homer! Man, I don't envy that guy!"

In response, first, we can incorporate this objection into the decision matrix in a similar way to the other objections addressed in section 5.2, that is, by factoring *the probability you will survive death* into the decision matrix. Even if you hold to a theory of personal identity that doesn't allow you to sur-

vive your biological death, there's some chance that you're wrong and you do survive; you can incorporate this probability into the decision table. Second, even if you're sure your personal identity doesn't continue into the far future, you may still have reason to care about what happens to that future being. That person is still related to you in some (potentially significant) way; this might give you a reason to care, and thus to wager. Further, even if you are absolutely certain that that future person is not related to you in any significant way at all (that is, assign it probability 1), you still might have the desire to save a random person from hell. This desire could make wagering rational. Thus, (ii) applies; this reasoning is relevant, but *ultima facie* does not provide a case against wagering.

5.7. Transformative Experience Objection

We close by addressing on final objection, related to the previous one, that might justify a certain kind of radical lack of future preferences. This objection involves a concept called *transformative experience*. A transformative experience is one in which your core preferences, life goals, and worldview change. L. A. Paul argues that becoming a parent is (at least in some cases) an example of a transformative experience: you might go from a self-absorbed person who dislikes children to someone who is utterly committed to your child's welfare.[35] In many cases of transformative experience, from the present self's perspective, the future self is changed beyond recognition.[36] In "Transformed by Faith," Rebecca Chan argues that transformative experience causes a special problem for defenders of Pascal's Wager. If religious conversion is a transformative experience, then your current self might be so alienated from your future, religious self, that you cannot, given your current preferences, rationally decide whether to commit to a religion (at least on the basis of self-interest).[37]

In response, we first note that, from the perspective of your present self, it is not guaranteed that converting to a religion would be a transformative experience. While Chan and others adopt this as a simplifying assumption, it's not clear that we are justified in assigning probability 1 to the proposition *all cases of religious commitment are radically transformative*. When deciding whether to commit to a religion, you should consider both possibilities: that making the commitment will be transformative, and that making the

35. L. A. Paul, *Transformative Experience* (New York: Oxford University Press, 2014); L. A. Paul, "What You Can't Expect When You're Expecting," *Res Philosophica* 92 (2015): 149–70.

36. Note that this is separable from the personal identity objection. As Rebecca Chan, "Transformed by Faith," *Faith and Philosophy* 36 (2019): 8–9 explains, "As radical as [transformative experiences] like parenthood are, these changes are not typically taken to be changes that call into question the continuity of personal identity . . . *metaphysically* speaking, the changes in question aren't existential ones—they don't threaten the existence of the person."

37. Chan, "Transformed by Faith," 4–32.

commitment won't be transformative. Even if, given you have the experience, your present self can't have rational preferences about the future, there's always the possibility the experience isn't transformative. On this possibility, you can still have rational preferences about the future, and those preferences can underlie a rational Pascalian commitment. The indeterminate parts of one's decision table can be ruled out, in the same way that, although we cannot rule out the possibility that induction fails in the near future, this possibility needn't be a live option when drawing up a decision table.

Second, it is unclear that transformative element of these experiences undermines your ability to form rational preferences about the future in the way that Chan and Paul suggest. For instance, when deciding whether to become a parent, you can gather evidence to inform your decision by talking to those who were similar to you before becoming parents. In the religious case, you can participate in religious communities and talk to those who underwent religious conversions and in order to gather evidence to inform your decision. Further, on many religions, God is aware of your desires, and has the power to satisfy them, whatever they may be. Thus, even if you undergo radical transformation via a religious experience, the epistemic and practical barriers might be overcome by the fact that God knows and can satisfy your desires; and converting raises the probability that God will do so. Overall, these considerations motivate the idea, in the religious case, that you *can* rationally form preferences on behalf of your future self and use those to inform present decisions, *contra* Chan and Paul.

Finally, we note that even if all the responses above fail, and transformative experiences do undermine our ability to rationally form future preferences (and religious conversion is always or usually an instance of this), this isn't a special problem for Pascal. It is a problem for a wide array of potential transformative choices one might make, including parenthood, career decisions, getting cochlear implants, and even more mundane decisions such as trying new foods like Vegemite.[38] Thus, the transformative experience objection is a problem for everyone who maintains that decision theory applies widely and underlies most or all cases of rational decision making.

6. Conclusion

We have argued for a method of decision making in regards to competing worldviews which takes seriously two powerful objections to Pascal's Wager: that there are many possible gods offering infinite rewards, and that one can use mixed strategies when choosing between infinite worldviews. One important upshot of our project is that, while infinity still does important

38. Paul, "What You Can't Expect When You're Expecting," 160.

work in the wager, epistemology nonetheless still matters; the probability of a particular worldview is a key part of the wagerer's decision matrix.

Thus, as in the standard version of Pascal's Wager, our proposed method gives us a strong decision theoretic reason to pay attention to infinite goods and harms in the afterlife, but unlike the standard version of Pascal's Wager, our proposed method will also advantage worldviews to which one assigns a higher credence. Further, many objections to Pascal's Wager can actually be incorporated into the wagerer's decision matrix, and thus do not provide reason to refrain from wagering altogether. While we do not claim to have answered every possible objection to the wager, we conclude that many traditional objections are unsuccessful.[39]

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