PASCAL'S WAGER

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Abstract

Pascal's Wager, discussed in his *Pensées*, has provoked discussion and strong views ever since its publication. In it, he proposes:

> *Either God is or he is not. But to which view shall we be inclined? Reason cannot decide this question.*[1]

In this thesis I hope to make a contribution to the ongoing debate by setting Pascal's Wager into a modern decision-making context, providing a taxonomy of objections to the Wager and developing a critical framework which can be used to systematically examine each category in turn to see whether an objection holds. I will also present a new approach to handling 'mixed' strategies, as suggested by Alan Hájek and others, which uses a heuristic model of our perception of infinite rewards.

I hold that Pascal's remedy for the unbeliever is a therapeutic response which is entirely in line with modern psychological practice and should not offend moral sensitivities, because it is purely an experiment to see whether faith can naturally arise once the objections are temporarily set aside.

I argue that Pascal's Wager needs to be seen as an exercise in personal risk management and that Pascal anticipated both modern decision theory and the associated psychology of how we make choices in formulating his Wager. I suggest that if we understand it in this light, employing the critical toolkit that I assemble, then Pascal's Wager holds against all current objections.

[1] Blaise Pascal, *Pensées*, trans. A. J. Krailsheimer (London: Penguin, 1995). 122. L418

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This thesis is due in no small part to my supervisor, Karen Kilby, who took a risk in allowing me to study theology at Nottingham without my having any relevant qualifications at the time. Without her support and tolerance throughout the research process, together with her careful guidance and patient explanations of my ignorance, it would have been immeasurably weaker, had it happened at all. I am also grateful for the support of the Theology department at the University of Nottingham, whose kind words and financial assistance have been much appreciated.

I also would like to thank the many people with whom I have argued in online discussion forums for many years. They were the initial stimulus that led me to research the Wager and it was their objections which drove me into a systematic examination of its decision theory and psychology.

Chapter 1 Introduction

Pascal's Wager, discussed in his *Pensées*, has provoked discussion and strong views ever since its publication. In it, he proposes:

> *Either God is or he is not. But to which view shall we be inclined? Reason cannot decide this question. Infinite chaos separates us. At the far end of this infinite distance, a coin is being spun which will come down heads or tails. How will you wager? Reason cannot make you choose either, reason cannot prove either wrong.*[2]

It was not a completely new idea – John Ryan[3] finds references to the concept by La Bruyère in 1689 and even further back with St Thomas More - but Pascal is the first to clearly express it in the terms of a gambler. He asserts that we must choose what to believe, yet we cannot do so on the basis of evidence, or pure reasoning. Pascal's thesis is a probabilistic argument and as we shall see, it presages much modern decision theory. He presents the wager in terms of the outcomes, rather than the odds. His wager is a pragmatic and utilitarian approach to belief; it appeals to self-interest and personal risk reduction. Peter Bernstein, a historian of probability, concurs with Pascal's approach, saying that life is all about dealing with problems for which there is no certain solution and where any kind of rational decision is almost impossible to make.[4]

The Wager seems to infuriate atheists and has provoked a number of analyses of its basic premises. It has moved in and out of fashion in decision theoretical circles over the last thirty years, with various authors either confirming or rejecting its mathematics, only to have their conclusions overturned a few years later.

In this thesis I hope to make a contribution to the ongoing debate by setting Pascal's Wager into a modern decision-making context, providing a taxonomy of objections to the Wager and developing a critical framework which can be used to systematically examine each objection in turn to see whether it holds. As part of this critical framework, I identify some fundamental conceptions of the nature of God that are often tacitly used when discussing the wager, but have been rarely exposed for critical examination. I will also present a new approach to handling 'mixed' strategies, as suggested by Alan Hájek and others, which uses a heuristic model of our perception of infinite rewards.

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[2] Ibid. L418

[3] John K. Ryan, "The Wager in Pascal and Others," in *Gambling on God*, ed. Jeff Jordan (Maryland: Rowman & Littlefield, 1984).

[4] Peter L. Bernstein, "Facing the consequences," *Business Economics* 35(2000): 9.

I argue that Pascal's Wager needs to be seen as an exercise in personal risk management and that Pascal anticipated both modern decision theory and the associated psychology of how we make choices in formulating his Wager. I suggest that if we understand it in this light, employing the critical toolkit that I assemble, then Pascal's Wager holds against all current objections.

1.1 Shape of the Thesis

In the first chapter, I will examine the wording of the Wager itself and discuss how it incorporates several variants, as Pascal was developing and refining his ideas. I will briefly discuss the historical background that led Pascal to formulate the Wager and examine who his likely target audience were. Virgil Nemoianu is very critical of Pascalians who treat the Wager independently of Pascal's general thought[5] and so I will attempt to locate the Wager within Pascal's general theology, while acknowledging that this cannot be a definitive answer, since Pascal's own intentions about the work that came to be called *Penseés* are largely unknown.

Finally, I cover some of the modern reworkings of the Wager, since it has gained a life of its own in our age, independent of Pascal's own theology and times.

In Chapter 2 I will set out the critical framework that I will use in my detailed analysis of the objections to Pascal's Wager. I will start by discussing in broad terms the discipline of risk management and how this applies to religious faith within the Wager. I will then expose some assumptions and preconditions that pervade the Wager's logic, but which have not always been articulated. I suggest that uncovering these for critical review allows us to deal with many common criticisms of the Wager, by showing that such attacks violate one of these unspoken assumptions. This new approach allows critics the opportunity to challenge the axioms at the outset, but once accepted, there can be no appeal beyond those agreed parameters later on in the discussion. This understanding will underpin my later dissection of the individual objections which have built up over time and give us a toolbox to treat each one fairly and consistently.

As part of this chapter, I will provide an overview of the areas of classical decision theory (generally known as von Neumann-Morgenstern decision theory) that pertain to the Wager and will discuss some of the mathematical problems posed by the notion of infinite rewards.

In the final part of the chapter, I will explain how Pascal's suggestions for the unbeliever, who is convinced against his will, match the modern therapeutic practice of Cognitive Behaviour Therapy (CBT) and will refute the commonly held

[5] V. M. Nemoianu, "Pascalian Faith and the Place of the Wager," *Heythrop Journal - a Quarterly Review of Philosophy and Theology* 52, no. 1 (2011).

notion that Pascal thought that someone could (or should) fake belief in order to convince God.

Chapter 3 forms the bulk of the thesis and is a systematic examination of the major extant objections to the Wager, arranged within a new taxonomy. I developed this new arrangement so that we can understand the root of the objection and any axiomatic understandings that are being challenged by that approach. For each objection, I estimate whether it succeeds as a whole, in part, or whether it fails, using the toolbox that we developed in Chapter 2.

In Chapter 4 I discuss how modern developments in understanding decision-making have affected the traditional von Neumann-Morgenstern theories that were used in chapter 2 and how Pascal's own philosophy of mind and his choice of wording for the Wager anticipated those developments. I will discuss some of the paradoxes in how humans actually make real-world decisions and how this has an impact on the Wager's propositions. I also suggest some lines of further research in this area.

In chapter 5, I conclude by examining the extent to which the objections have succeeded and I consider whether Pascal's Wager still applies to us in our current cultural setting.

I will be using Dr A.J. Krailsheimer's translation of Pensées, except where noted, and references to the text use the numbering scheme of Louis Lafuma, such that *liasse* 418 (the one which contains the Wager) in Lafuma's system will be identified as L418. Where I use Roger Ariew's translation, which is based upon the Sellier text, I give the Sellier number followed by its Lafuma equivalent (e.g. S628/L428).

1.2 The Origins of the Wager

This thesis is not primarily a historical or textual study of Pascal's Wager, but in order to understand how Pascal viewed it and the context in which it arose, I believe that it is helpful to briefly set out some details of his own history, the development of his personal theological convictions and how he came to be interested in probability, particularly with respect to its application to games of chance.

Pascal's family were moderately religious people, typical of their time and social status. Blaise's mother, Antoinette had died shortly after the birth of his sister Jacqueline in 1625, leaving him to be brought up by his father and his older sister Gilberte.

One night in January 1646, Blaise Pascal's father, Étienne, was on his way to stop a duel, but slipped on ice and fell, breaking his hip. In the seventeenth century this was a serious condition and could easily have led to his death, or at least severe and permanent disability. However, Étienne knew two local bonesetters, M. Deslandes

and M. de la Bouteillerie[6] and was convinced of their skill, so allowed no-one else to attend him. This proved to be a good choice as he recovered quickly and was able to walk once more. The two men stayed in Étienne's house for three months and became an example for the Pascals, not only in their skill, but in their religious devotion.[7] The two men were Jansenists, having been converted by Guillebert of Rouville and they began to teach Blaise, Jacqueline and Étienne about this new version of Catholicism.

Jansenism had its origins in the book *Augustinius*, published in1640 by Cornelius Jansen, two years after his death. In the book he set out his thesis for an account of the divine will and the role of the human soul in salvation. Rejecting the Jesuit model that human will could frustrate the will of God, Jansen put forward a new framework, drawing heavily upon patristic writers, especially Augustine. This doctrine was treated with deep distrust by the Jesuits and by Richelieu, who saw it as form of Calvinism, and had its main surviving exponent, the Abbé de Saint-Cyran, imprisoned.[8]

While Jansenism was not true Calvinism, since it still allowed prayers to saints and the veneration of Mary, it had much in common with it, particularly the focus on predestination and irresistible grace. The Jesuits (or Molinists) taught that human will could frustrate the will of God, but that there was enough divine grace remaining after the Fall that humans could still choose good over evil. By contrast, Jansenism insisted on the total depravity of the human will and the idea of an "elect" who were chosen purely by God's sovereign will, irrespective of the individual's merits or conduct.

James Connor[9], argues that predestination became "chic" at that time, because it shifted the emphasis from having to do good works, to detecting whether or not one was one of the elect. Since the signs of the latter were decided by one's spiritual director, it gave those leaders immense power over their followers. Richelieu might be able to cast you into the Bastille, but Saint-Cyran might have the power to grant or deny salvation. Augustinianism was thus the perfect formula for assembling a holy "remnant" which would fight tirelessly for its cause. The martyrdom of Saint-Cyran merely added weight to it all.

Augustinius was condemned and the French church leaders in the Sorbonne set out five propositions within it that they declared to be heretical. The Jansenists generally took the approach of agreeing that the five propositions suggested were

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[6] James A. Connor, *Pascal's Wager: The man who played dice with God* (New York: HarperCollins Publishers, 2006). 70.
[7] Ernest Mortimer, *Blaise Pascal: the life and work of a realist* (London: Methuen & Co, 1959). 74.
[8] Connor, *Pascal's Wager*: 61.
[9] Ibid., 62-63.

indeed heretical, but that they did not actually appear in the book. The stage was set for a theological confrontation in which Blaise Pascal would eventually play a major part, even at the risk of his own life. The conflict resulted in his "Provincial Letters", which are a masterpiece of wit and creative writing, although they were not entirely fair in their treatment of Jesuit theology. The battle between the church and the Jansenists would continue for some time, although Pascal's frequent illnesses meant that he adopted a lower profile and largely moved out of the front-line. He suffered great pain throughout his entire life, possibly as a result of a skull malformation, which often confined him to bed.

Blaise, at twenty-three, was moved by the charitable works of the two bonesetters (they ran a hospital with thirty beds free of charge)[10] and by their new theology. He himself became more religious and was "converted" by them. By this we do not mean that he acquired faith for the first time,[11] nor ceased to be Catholic; rather that he gained a new piety and determination that he should do the work of God.

Up until this time the Pascals had been *honnête hommes* – people who were religious, but not particularly fervent in any respect. Now they were attentive and submissive to their new spiritual directors. Gilberte and her new husband became a consistently devout couple for the rest of their lives.[12] Jacqueline felt called to the religious life as a nun, a vocation that she would not be able to pursue for many years, as she needed to care for her father. Blaise became devoted to the scriptures and devoured Jansenist books like M. Arnauld's *De La Fréquente Communion*, which were brought by his father's carers. He read Saint-Cyran's *Reformation de l'homme interieur* and was energised, but also deeply troubled. In the book, it suggested that scientific curiosity was nothing more than a form of sexual indulgence. Pascal had spent a large part of his life as a scientist and it was one of his great passions (and no small talent). Suddenly Pascal's deepest joy in a life of pain had become a source of the basest wickedness.[13] What was he to do? It was a shadow on his life that would never completely lift.

Pascal's "worldly" period

After his father's death in 1651, Blaise was alone. His sister had taken the veil, leaving him bereft, and he fell into a deep depression. Some of his discomfort was compounded by money worries, but most of it was the loss of his immediate family, who had always cared for him. He moved around for a while, but finally retreated to Clermont to live with his sister Gilberte and her family from 1652-1653. He spent a lot of time trying to collect the debts owed to the estate without a great deal of

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[10] Ibid., 71.

[11] Hugh Davidson, *Blaise Pascal*, ed. Maxwell A. Smith, Twayne's World Authors (Boston MA: Twayne Publishers, 1983). 7.

[12] Mortimer, *Blaise Pascal*: 74-75.

[13] Connor, *Pascal's Wager*: 72-73.

success.[14] There is some evidence that Blaise hoped to marry,[15] although Jacqueline advised against it, possibly out of a fear that her brother was becoming increasingly worldly, or perhaps because she felt that his reasons were not entirely genuine.[16]

Although it is known as Pascal's "worldly" period, it is very unlikely that he indulged in the pleasures of the flesh, rather that it seemed worldly from the Jansenist viewpoint of Port-Royal, where anything short of monasticism could be seen as half-hearted. Pascal's actual life would look much more like extreme religious austerity to us, than that of a libertine. However, Blaise did travel and make acquaintance with a group of three friends who were distinctly outside his normal circle. These were the Duc de Roannez, Antoine Gombaud[17] (also known as the Chevalier de Méré), and M. Mitton.[18]

The Duc de Roannez had been born Arthus Gouffier, but inherited his dukedom on the death of his grandfather.[19] Blaise had met him and his sister, Charlotte, in Paris, as they owned a hotel just a short distance from the Pascals' residence. They shared a common Catholic background and a desire for authentic spirituality; Roannez also showed an entrepreneurial interest in the commercial exploitation of Pascal's earlier invention, the Pascaline, which was the first commercial calculating machine.

In 1653 Blaise travelled with the young duke to Poitou, where they met up with the other two.[20] The Chevalier de Méré described his companions in the following words:

> *"I once made an expedition to Poitou with the Duc de Roannez, who talks both wisely and well and is excellent company. With us came M. Mitton, whom you know and whom everybody at Court finds so entertaining. [...] The Duc is interested in mathematics and had brought with him a man entre deux ages who was little known at the time but has since made a great stir in the world. He was a great mathematician, but nothing else."*[21]

Clearly Pascal did not initially impress Gombaud, although he grudgingly admits that Blaise gradually loosened up over the course of the trip. Méré himself had been a knight and in the wars, but had tried to reinvent himself as one of the new

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[14] Ibid., 131-32.
[15] Davidson, *Blaise Pascal*: 14.
[16] Connor, *Pascal's Wager*: 132.
[17] Ibid., 134.
[18] Davidson, *Blaise Pascal*: 15.
[19] Connor, *Pascal's Wager*: 132.
[20] Mortimer, *Blaise Pascal*: 104.
[21] In ibid.

intellectuals and a man of poetry and fashion.[22] He spoke several languages and studied Plato, Demosthenes and Homer.[23]

M. Mitton was also one of the *libertins érudits*, having come out of a middle-class background and had once held high state office. He was a man with a powerful mind, but equally powerful passions and was both a gambler and a sceptic. Mitton makes several unflattering appearances in Pascal's Pensées such as: *"The self is hateful. You, Mitton, hide it up; but you do not succeed in getting rid of it".*[24]

It seems that Mitton and the Chevalier saw Pascal as a geek, while they were the "cool kids". He was probably rather a bore to them, as his only interests were religion and mathematics, while theirs revolved around gambling. Gilberte was certainly scathing about them both, in the way that only a big sister can be, writing with cold disdain about the two and their obsession with gambling.[25] Yet it is to these two bad influences that we probably owe the existence of Pascal's Wager.

The birth of probability

One night Méré approached the despised Blaise with a couple of mathematical problems. He had been losing money by the bucketful to Mitton on a game of chance. At first he had bet that he could roll one six in four throws,[26] where he won initially, but then started to lose. So he switched games and bet that he could roll a double six in twenty-four rolls of two dice. At this point he started to lose in a much bigger way, so was he simply unlucky, or was there more going on?

Pascal thought about it for a while and told the knight that double-six in twenty-four throws would be a bad bet, but it would be a good bet if it were twenty-five rolls.[27] He had invented a whole new field of mathematics.

Méré's second problem was rather more complicated. Two players agree that they will each stake thirty-two pistoles and that the winner of the pot will be the first player to win three games of dice. Now, suppose that they reach a position where player A has won two games and player B has won one, but they need to interrupt their wager. How should they divide the money between them?

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[22] Connor, *Pascal's Wager*: 134.

[23] Mortimer, *Blaise Pascal*: 107.

[24] Pascal, *Pensées.*, in Mortimer, *Blaise Pascal*: 106.

[25] Connor, *Pascal's Wager*: 135.

[26] To work this out, we calculate the probability of *not* throwing a single six in four throws. This is $\frac{5}{6}\times\frac{5}{6}\times\frac{5}{6}\times\frac{5}{6}=\frac{625}{1296}=0.482$ Thus the probability of throwing a six is $1-0.482=0.518$, so the odds were in his favour.

[27] The chance of throwing a double six in a single roll is $\frac{1}{36}$, so the odds of *not* throwing a double six are $\frac{35}{36}$. In 24 rolls, we have a chance of $(\frac{35}{36})^{24}$ which is 0.508, so we have 0.482 to roll the double six and on average we will lose. However, in 25 rolls it is now 0.505 to roll the double and it becomes a good bet.

Pascal's logic was typically elegant. If player A wins the next game, then he will have won three games and will collect all sixty-four pistoles. If he loses, then both he and player B will have won two games each, so it would be fair to divide the pot equally. Thus, A will have a minimum of thirty-two pistoles due to him either way. The remaining thirty-two will be his hàlf of the time, so his share is thus sixteen pistoles. The fair split is therefore forty-eight pistoles to player A and sixteen to player B.[28] For good measure, Pascal also calculated the splits after two games and just one.

Pascal wrote to Pierre Fermat (who had been a member of Étienne's mathematics group) of his discovery. We do not have his letter, but we can deduce from Fermat's reply that it might have been something like:

> *In a game of dice, a gambler bets that he will throw a six with a single die in eight tosses. The gambler throws three times and loses every time, but then for some reason the game is called off. What proportion of the stake does the gambler have the right to take with him?*[29]

Fermat appeared to misunderstand the problem as described and his reply implies that he thought Pascal was asking what the probability was of winning the next throw. Yet Pascal's purpose was different, he was thinking about the final outcome, not just the next throw. He had moved from simple probability to something far more complex.[30]

Although operating at a slight tangent to Pascal, Fermat arrived at similar conclusions algebraically and wrote back to Blaise in great excitement. Pascal immediately flung himself into further mathematical research and came up with his Arithmetical Triangle,[31] which made the development of binomial theory a simple step for Isaac Newton to make, as well as supplying Leibniz with the necessary

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[28] Connor, *Pascal's Wager*: 136.

[29] Ibid., 138.

[30] For those readers interested in the solution, the gambler has five further tosses to throw a six. The odds of *not* throwing a six are thus: $\frac{5}{6} \times \frac{5}{6} \times \frac{5}{6} \times \frac{5}{6} \times \frac{5}{6} = \frac{3125}{7776} = 0.40$ So he could claim 60% of the stake. His odds of winning at the start of the game were $1 - \frac{5^8}{6^8} = 1 - \frac{390625}{1679616} = 1 - 0.233 = 76.7\%$

[31] Pascal's Triangle arranges numbers in an equilateral triangle, so that each number is the sum of the two numbers immediately above it. i.e.

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        1
      1   1
    1   2   1
  1   3   3   1
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coefficients for integral calculus.[32] Pascal gave a short lecture on his discoveries at the Parisian Academy where he dubbed his new science the Geometry of Chance.[33]

The Night of Fire

Pascal enjoyed the company of his gambling friends and remained close to the Duc, but he had an increasing disquiet in his spiritual life. His close relationship with his sister Jacqueline had been damaged by Port-Royal's insistence upon a full 'dowry' for Jacqueline upon entering the convent after her father's death. The rift was gradually closing, but he himself felt a deep dissatisfaction with his life. Although he had been annoyed by Port-Royal, he visited his sister and his two nieces there and could not help but notice the serenity that they appeared to enjoy, which was in stark contrast to his own feelings of wretchedness. He wrote a short piece: "On the Conversion of a Sinner" where he tried to express something of the turmoil he felt.

> *"The soul can no longer serenely enjoy the things that captivated it. Constant scruples attack the soul in its pleasure and because of this introspection it no longer finds the usual sweetness in the things to which it once abandoned itself blithely with an overflowing heart".*[34]

Blaise spent a lot of time with his sister, discussing his discomfort. Unfortunately, she saw his pursuits of science and mathematics as the major stumbling block to faith, so her advice always was that he should sacrifice it as a worldly distraction. Yet for Blaise, it was his *raison d'être*, if he gave up his intellect, then he gave up everything that he valued. Why would God have given him such a mind, if it was not to be used? As Connor notes, had Pascal turned to the Jesuits for spiritual advice, they would have seen no problem, since there was no dichotomy between the faith and intellect. One finds God in life, rather than having to abandon it.[35] However, the Pascal family were not at all sympathetic to Jesuit theology and Blaise would later make deadly enemies of them.

On the evening of Monday 23rd November 1654, Pascal's life was transformed by an encounter with God. He never spoke about it and told no-one what had transpired that night. It was only after his death that a servant noted that one of Blaise's jackets seemed unusually padded. They examined it closely and found a fragment of paper sewed into the lining. This was a relatively common practice in the 17th Century, but Pascal kept his secret from everyone. When a jacket wore out, he would carefully unstitch the hidden pocket and re-sew it into the new garment.[36] The original paper no longer survives, but we have a copy in Pascal's handwriting

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[32] Mortimer, *Blaise Pascal*: 118.
[33] Pascal, *Oeuvres*, 2:1034-1035 in Connor, *Pascal's Wager*: 142.
[34] Pascal, *Minor Works*, in ibid., 145.
[35] Ibid., 147.
[36] Emile Cailliet, *Pascal: The Emergence of Genius*, 2nd ed. (New York: Harper & Brothers, 1945). 133.

which is attested to be a faithful copy by his nephew Fr. Périer. It is now displayed in the *Bibliothèque Nationale* in Paris.

The change in Pascal's behaviour was dramatic, but no-one around him knew what had caused it. His family imagined all sorts of events that might have triggered this conversion and discussed them in their correspondence at the time,[37] but no-one understood it until their discovery of the Memorial after his death. Blaise contacted Jacqueline and told her that he was ready to place himself under the direction of Port Royal and to turn his back upon the world.

Pascal was initially placed in the care of Père Singlin, who was no intellectual, although he was wise enough to realise that Pascal would need more than he could offer. So he despatched Blaise to Port-Royal-des-Champs where M. Arnauld would encourage him in the sciences and M. de Saci would teach him to despise them.[38]

Although Pascal remained interested in mathematics, he ceased his correspondence with Fermat on probability, stopped work on his arithmetic machines and postponed publishing his paper on the arithmetical triangle, although it had already been printed.[39] If he had entertained any thoughts of marriage, he gave them up at Port-Royal-des-Champs and from that point on, he never attached his name to any of his writings, apart from private correspondence.[40] His focus had turned heavenward, tracing the path set by his Jansenist mentors. He contacted the Duc de Roannez and told him that he had decided to go into retreat at Port Royal des Champs and would have to leave Roannez's entourage, which the Duc reluctantly accepted.[41]

Devising the wager

There seems little doubt that Pascal had his friends M. Mitton, the Chevalier de Méré and the Duc de Roannez in mind when devising the wager. M. Sellier dates the *infini-rien* fragment as having been written between 1658 and 1662[42] and it was in the summer of 1660, when Pascal was staying with Gilberte and her family in Clermont, that he received a letter from his mathematical correspondent Pierre Fermat inviting him to Toulouse. Pascal by this time had largely renounced his scientific work, but still wanted to meet his friend as a man of honour and integrity. Sadly, neither was well enough to visit the other by this stage and the two great collaborators never actually met in the flesh.

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[37] Connor, *Pascal's Wager*: 151.
[38] Ibid.
[39] Ibid., 152.
[40] Mortimer, *Blaise Pascal*: 125.
[41] Ibid., 127.
[42] Blaise Pascal, *Pensées*, trans. Roger Ariew (Cambridge: Hackett Publishing Co, 2005). 211.

It is possible that this letter from Fermat reminded him of his earlier work on probability and the puzzles set by his two gambling friends that he had corresponded with Fermat over. Thus, he set out to turn his mathematical discoveries in a more worthy apologetic direction.

1.3 Commentary upon the Wager

In this section I will develop a commentary on the text of the Wager, showing its somewhat fragmentary and provisional nature. Like much of Penseés it is clearly a work in progress and we can observe Pascal's mind in operation as he iteratively refines his logic in what Ian Hacking[43] and others[44] have seen as a succession of wagers. It is written on a single sheet, folded once to give four sides, two inside and two outside.[45] As we can see from a photograph of the *infini-rien* fragment below, it has many amendments and corrections. His writing becomes smaller and the lines get closer together towards the bottom of the page, as Pascal struggled to get all his thoughts down. Some lines are written vertically and the most famous section regarding the reasons of the heart is written upside down. Honor Levi suggests that it is possible that some of the later additions might not belong to the text itself, but were simply scrawled on the piece of paper that Pascal happened to have in his pocket at the time.[46]

[43] Ian Hacking, "The Logic of Pascal's Wager," *American Philosophical Quarterly* 9(2)(1972).
[44] Edward McClennen, "Finite Decision Theory," in *Gambling on God*, ed. Jeff Jordan (Maryland: Rowman & Littlefield, 1984).
[45] Blaise Pascal, "Writings on Grace," in *Pensees and Other Writings* (Oxford: Oxford University Press, 1995), 243. trans. Honor Levi
[46] Ibid.

Figure 1 The Wager Fragment [47]

In my commentary I am using the Krailsheimer translation of fragment L418, which is based upon the Louis Lafuma text, but I have inserted the horizontal separation marks that Pascal used and which are found in the Sellier version (also known as Copy B).

The section containing the Wager is entitled "Discourse on the Machine". It is an interesting title and we should start by briefly discussing what Pascal might mean by "the Machine". Pascal understood the value of machines, having already developed a very advanced one, which he called the Pascaline and which he had built to assist his father in his job as a tax collector. It was one of the earliest ever calculating machines and Pascal managed to sell a few, including one to royalty.

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[47] *Le manuscrit des Pensées de Pascal*, Phototypique ed. (Paris: Les Libraires Associés, 1962). at http://www.e-tidsskrifter.dk/ojs/tidsskrift-dk/revy/revimg/rro_0001_0069_1.jpg

Although the design was relatively straightforward, building it was a challenge and it took him two years to complete.[48] His initial version could only add and subtract, but Leibniz came up with the idea of using stepped teeth, which allowed repeated addition or subtraction so that the device could multiply and divide too.[49] It was thus a forerunner of the modern computer.

Pascal's choice of title might imply that he will be discussing how to construct an intellectual framework which will reduce the complex process of decision making into something which is as simple as turning the handle of a Pascaline.

Sara Meltzer holds that the title stems from Pascal's fundamental premiss that reason alone will not be adequate to find God in a universe in which God is both silent and where he has removed evident signs of his existence.[50] In her model, therefore, Pascal introduces the machine as a required substitute for conscious thought, which offers an alternative approach for those who wish to find God, but lack adequate signposts.[51] If one feeds in the possibilities, the machine will produce the correct decision where human reason cannot. This model of the mind accords closely with modern experimental psychology and I will explore this further in Chapter 4.

The Wager section begins with its fundamental proposition: infinity or nothing.

> *Infinity--nothing.*
>
> ---
>
> *Our soul is cast into the body, where it finds number, time, dimensions;*
>
> ---

Pascal sees the soul as being 'cast' into a body and the French word he uses here is *"jetée"*, which is the same verb as to throw or cast dice, so there is potentially a play upon words, indicating the gaming metaphor which is to follow.[52] Modern readers might find a foreshadowing of Martin Heidegger in this thrown-ness of the soul. For just as *Dasein* is 'thrown' into being and is placed into a world that is not of its creation, nor choosing, so the soul has fallen from pure potential into limited being. Pascal could be argued to be taking a Platonic, or neo-Platonic, model of the human soul and, as Leslie Armour notes, neo-Platonism[53] was certainly very much in the minds of seventeenth century France, both as espoused by Yves de Paris in

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[48] Mortimer, *Blaise Pascal*: 7.
[49] Connor, *Pascal's Wager*: 54.
[50] Sara E. Melzer, *Discourses of the Fall: A Study of Pascal's Pensées* (Berkeley: University of California Press, 1986). 58.
[51] Ibid., 59.
[52] Levi translates *"jetée"* as "thrust", although Krailsheimer and Ariew both go with "cast", which I believe makes more sense, for the reasons I outline.
[53] Armour uses the term "neo-Platonism" as a means of describing an updated Platonism and to distinguish it from "Neoplatonism", which is usually associated with the thought of Plotinus.

the years shortly before Pascal and then developed by Nicolas de Malebranche. Jansenism certainly has strong Platonic roots in Augustine. The neo-Platonic understanding of the One was that it was the source of everything and truly had no limits,[54] everything came from the One and would ultimately return to it. There seem to be some neo-Platonic overtones in Pascal's reference to the "Infinite" in his opening phrase, but it could equally be a dramatic device to add urgency to the argument which he is about to unfold.

This sense of fallen-ness and imposition of the arbitrary limits of dimensionality is echoed by Meltzer, who suggests that Pascal believed in an epistemological change at the Fall. Prior to the Fall, humankind had direct experience of God, but since the Fall we can only access that knowledge mediated through human memory. There was thus a fall from truth into language.[55] Pascal is not arguing for some form of dualism, such that taking on a human body constituted the Fall, but rather that an immaterial soul, which existed without limits, finds itself cast into materiality and can then only understand and reason based upon its sense experience.

> *It reasons about these things and calls them natural, or necessary, and can believe nothing else.*
>
> ---

Pascal spells out the limitations of the material world. In it we have found number, time and dimension, but these are all the material world knows, or can know. We are separated from true knowledge by the Fall and all understanding is now contingent upon the materiality which we inhabit. We can believe nothing else, because there is nothing else for us; we are entrapped within the rules of a Wittengensteinian language game This is the wretchedness of humankind which Pascal laments so often in his Penseés, decrying the fact that we have fallen from the riches of truth into the poverty of language.

Whatever Pascal meant of infinity in his opening statement, he now starts to use infinity in its strict mathematical sense.

> *Unity added to infinity does not increase it at all, any more than a foot added to an infinite measurement.*

Alan Hájek makes much of this Pascalian definition of infinity, calling it "reflexivity under addition",[56] namely that infinity plus one is still infinity or:

$$\infty + 1 = \infty$$

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[54] Leslie Armour, *Infini-Rien* (Carbondale: Southern Illinois University Press, 1993). xi.
[55] Melzer, *Discourses of the Fall*: 2-3.
[56] Alan Hájek, "Waging War On Pascal's Wager," *Philosophical Review* 112, no. 1 (2003): 45.

This is what Pascal means by:

> *The finite is annihilated in the presence of the infinite and becomes pure nothingness.*

The finite value '1' is annihilated by infinity, because it makes no difference to it. A finite quantity cannot have any material effect upon the infinite, so it may as well never have existed at all. Pascal now uses this mathematical axiom as an analogy for God:

> *So it is with our mind before God, with our justice before divine justice. There is not so great a disproportion between our justice and God's, as between unity and infinity.*
>
> ---

Pascal often took an apophatic approach in his Penseés and he reinforces it here. Although we have invoked infinity, Pascal is quite clear that we cannot limit God to a concept of infinity. God's justice is even greater than the distance between one and infinity; it is greater than infinite.

> *God's justice must be as vast as his mercy. Now his justice towards the damned is less vast and ought to be less startling to us than his mercy towards the elect.*

Although not central to his argument, Pascal takes time to remind us that there might be punishment or loss for the 'outcast', namely the unbeliever. As we will see when we come to discussion of moral objections to the Wager, Pascal is well aware that there could be a moral issue in denying an infinite reward to someone. After all, how could a just God legitimately deny a benefit to some, while granting it to others?

Pascal's reply is that we should not be offended that God blesses some, but rather we should be offended that he should grant eternal benefits to anyone at all. He suggests that it should be seen as a greater injustice to grant us grace which we do not deserve, than it would be to let us have our just deserts. In a typically Pascalian turn, he argues that although God's justice is infinite, his mercy is greater still.

He now returns to more traditional understandings of mathematical infinity, using it as an analogy for the unknown nature of God.

> *We know that the infinite exists without knowing its nature, just as we know that it is untrue that numbers are finite. Thus it is true that there is an infinite number, but we do not know what it is. It is untrue that it is even, untrue that it is odd; for by adding a unit it does not change its nature.*

Pascal is, of course, arguing from an understanding of infinity prior to Georg Cantor's work on it, nonetheless he understood that it could not be considered either even or odd in the strict sense.

> *Yet it is a number, and every number is even or odd. (It is true that this applies to every finite number).*

Modern mathematicians would be less comfortable with calling infinity a number at all, because it lies in a different branch of mathematics from the real numbers, or natural numbers. Pascal also recognises this fact that infinity is different from other numbers in its essential quality and uses it to argue that while God is not a thing like other things, this should not matter in this debate.

> *Therefore we may well know that God exists without knowing what he is.*

Pascal wants us to admit that we do not need to know what God is (even if that were possible) in order to know that God exists. He is using the analogy that if we can allow the possibility of an infinite number which is unlike other numbers and without knowing its nature, then we should not stumble over the possibility of God's being unlike any familiar object.

> *Is there no substantial truth, seeing there are so many true things which are not truth itself?*
>
> ---

It is not easy to see why he wants us to deduce the existence of a truth by the existence of many errors, but it is not central to his argument, so we will move on.

> *Thus we know the existence and nature of the finite, because we also are finite and are extended in space. We know the existence of the infinite, without knowing its nature, because it too has extension, but unlike us no limits like us. But we do not know either the existence or the nature of God, because he has neither extension nor limits.*
>
> ---

Pascal is establishing the boundaries of our knowledge. We are souls cast into a finite body and thus have discovered finite quantities, such as length, breadth and depth, which exist within finite dimensions. We recognise that we have limits and we can even measure them, but the infinite is different, because while it has extension (such as length), it does not have a limit. We can talk about the infinite simply by extrapolating what we do know. However, Pascal argues that we cannot even talk about God as having any material properties, such as length, or breadth, because he is not cast into dimensional existence in the way that we are.

But by faith we know his existence; through glory we shall know His nature. Now, I have already proved that we may know something exists, without knowing its nature.

Pascal has completed his scene-setting from a mathematical viewpoint. He has located us within limited dimensionality, but has established that it is intellectually allowable to speak of something which is infinite, as long as we retain at least one point of contact with our own existence, namely that it has extension. He now moves to his main thesis, which is that God is not knowable, nor can we reason by analogy, since we have no point of reference.

Let us now speak according to our natural lights. If there is a God, He is infinitely beyond our comprehension, since, being indivisible and without limits, he bears no relation to us. We are therefore incapable of knowing either what he is or whether he is.

He bluntly sets out the reality that we cannot know what God is like and in true apophatic fashion, that all we can know is that he is not like us.

That being so, who would dare to attempt an answer to the question? Certainly not we, who bear no relation to him. Who then will condemn Christians for being unable to give rational grounds for their belief, professing as they do a religion for which they cannot give rational grounds? They declare, that it is a folly, stultitiam,[57] *in expounding it to the world.*

He now challenges his interlocutors directly. How can they demand that Christians provide detailed apologetics for something which they cannot possibly know? St Paul said in his letter to the Corinthians that is was folly to attempt to try and explain the Cross of Christ to unbelievers, although Pascal here has expanded this understanding to encompass everything about God, including his nature and the fact of his existence.

and then you complain that they do not prove it. If they did prove it, they would not be keeping their word. It is by being without proof that they show that they are not without sense.

Pascal does not regard any of the traditional proofs of God as being of much value in legitimising belief and he has now established one reason why they are deficient. Christians believe not because of a series of logical proofs, but rather by faith, which transcends mere proof. If Christians were to provide such proofs, they would be negating the very ineffability of God which they rely upon in faith. Dawn Ludwin holds that Pascal rejects cosmological proofs of God as vehemently as he does the

[57] 1 Corinthians 1:18

heresy of pagan religions, believing that nature cannot yield even the vaguest flicker of knowledge of God, because that is only accessible through the mediation of Jesus Christ.[58]

> *"Yes, but although that excuses those who offer their religion as such, and absolves them from the criticism of producing it without rational grounds, it does not absolve those who accept it."*

Pascal wants to defend faith as being beyond reason, but his imaginary interlocutor presses the point that even if they cannot expect to have reason on their side, Christians still should not believe in this ineffable God. Pascal now sets up the discussion in terms of a game, in this case a simple coin-toss.

> *Let us then examine this point, and let us say, "Either God is, or he is not." But to which view shall we be inclined? Reason cannot decide this question. Infinite chaos separates us. At the far end of this infinite distance a coin is being spun which will come down heads or tails. How will you wager?*

Various authors accuse Pascal of over-simplifying the possibilities here, but Pascal is starting with the simplest possible case, that either God exists or he does not. In this example of a coin-toss, he appears to assume that the two alternatives are equi-probable, which is itself open to challenge as a proposition, but he justifies this by appealing instinctively to the Principle of Indifference,[59] a theorem which would not be described formally until much later.

> *Reason cannot make you choose either, reason cannot prove either wrong. Do not then condemn those who have made a choice; for you know nothing about it.*

Pascal suggests that we cannot criticise either choice unless we have reason to do so, but he has already established that it is axiomatic that we do not have any reason to prefer one option over the other.

The doubter suggests that it is therefore wrong to choose at all.

> *"No, but I will condemn them not for having made this particular choice, but any choice; for, although the one who calls heads and the other one are equally at fault, the fact is that they are both at fault; the right thing is not to wager at all."*

Pascal's opponent thus proposes agnosticism as the correct way forward in such matters. If we have no reason to prefer one over the other and no evidence to

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[58] Dawn M. Ludwin, *Blaise Pascal's Quest for the Ineffable*, New Perspectives in Philosophical Scholarship: Texts and Issues (New York: Peter Lang Publishing, 2001). 12.
[59] See further description on page 48.

support either choice, then the best option should be scepticism. We should reserve judgement until we have sufficient reasons to decide one way or the other. Pascal has his reply ready:

> *Yes; but you must wager. There is no choice, you are already committed.*

This is one of the key parts of Pascal's argument, that we are already embarked upon the journey. Scepticism cannot be an option for us, because its outcome will be identical with that of deciding that God does not exist. To use William James' term, this is a 'forced' option.[60]

> *Which will you choose then? Let us see. Since a choice must be made, let us see which offers you the least interest.*

Pascal continues with discussing what you can win or lose in this game which you are already playing. He sets up three pairs of values, starting with:

> *You have two things to lose, the true and the good;*

Potentially, either option could lose 'the true', simply by being wrong, but only one of those options can lose 'the good' in Pascal's understanding. For him, the only good is God and to love God is to love what is true.

> *and two things to stake, your reason and your will, your knowledge and your happiness;*

Pascal says that there are two things to stake, but then lists four. There are two ways of reading this. He could be bracketing reason and will together, implying that they operate as one, such that to lose your reason is also to lose the ability to rationally choose your actions and your ultimate destiny. Likewise, he groups knowledge and happiness together, which seems an unusual pairing. In the rest of this fragment Pascal talks much of happiness and a happy life, but does not mention knowledge again. Is he therefore arguing for a form of fideism, as Terence Penelhum suggests?[61] I do not think so. Rather Pascal is saying that to bet against God is actually to stake both your knowledge and your happiness. He often makes the distinction between the empty knowledge of the philosophers and the true knowledge, which is knowing God. Virgil Nemoianu suggests that Pascal describes "willing" as being transforming the particular, or individual, will into the fullness of the will of God and that knowledge must always be seen in its context of knowing

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[60] William James, *The Will To Believe*, The Will to Believe and Other Essays in Popular Philosophy (New York: Dover Publications, 1956).

[61] Terence Penelhum, *Religion and Rationality: an introduction to the philosophy of religion* (New York: Random House, 1971).

God.[62] Knowledge without God is thus empty and if God does not exist, then knowledge will perish together with happiness.

The other way to interpret this is to consider that reason and knowledge are one pair, while will and happiness are the other.[63] This would be appealing to the traditional Aristotelian or Scholastic understanding of the tension between reason (or *'ratio'*) and will (or *'voluntas'*). Our happiness is bound up in our will, while our reason must necessarily be anchored in knowledge, for how could we reason about things which we do not know? Whichever way we interpret this phrasing, it seems clear that all four are simultaneously at stake in this game of chance.

> *and your nature has two things to avoid, error and wretchedness.*

In his final pairing, Pascal turns to our human nature, which is concerned primarily with its own comforts and which thus wishes to shun misery, both temporal and eternal; whereas human reason wishes to avoid error.

> *Since you must necessarily choose, your reason is no more affronted by choosing one rather than the other. This is one point cleared up.*

He suggests that we have solved (or at least bypassed) the difficulties posed to our reason, by recognising that we do not have evidence to base any decision upon. This absolves us from being accused of acting against reason, because we lack the evidence required for a fully reasoned decision, but are still obliged to make a choice one way or the other.

He now moves on to discuss his central thesis, which is based upon the pursuit of happiness. He sums up the essence of the wager in its simplest form:

> *But your happiness? Let us weigh up the gain and the loss in calling heads that God exists. Let us assess the two cases: if you win, you win everything; if you lose, you lose nothing. Do not hesitate then, wager that he does exist.*

As I discuss in more detail on page 217, Pascal's choice or wording is extremely important here. It is phrased in the terms that if you lose, you lose nothing. It is a one-way bet that you can only win. Even if the two options are not equi-probable, there is no loss in being wrong, as long as you bet for God. Pascal does not see belief as having any drawbacks whatever, as we shall see later in the passage. Nonetheless, he anticipates the sceptic's next objection, that even if he is convinced, the stakes may be too high.

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[62] Nemoianu, "Pascalian Faith," 32.
[63] I am grateful to Karen Kilby for this suggestion.

"That is wonderful. Yes, I must wager; but perhaps I am wagering too much."-- Let us see.

Pascal, remembering his conversations with his gambling friends Mitton and Roannez, now moves to the mathematics of stakes and rewards. He starts with the simple coin-toss analogy:

Since there is an equal chance of gain and of loss, if you stood to win only two lives for one, you could still wager.

He starts by proposing odds of 2:1. That is, suppose you were to gain two lives by risking one, would you not choose to play? It is worth noting that Pascal is here apparently relying on the two possibilities being equal, although he will quickly show why the actual probabilities are irrelevant. I suggest that he is drawing his reader into his understanding of infinity by showing a trivial case, rather than leaping straight in to the insight which he has personally already grasped about infinity.

But supposing you stood to win three? You would have to play (since you must necessarily play), and it would be unwise of you, once you are obliged to play, not to risk your life in order to win three lives at a game where there is an equal chance of losing and winning.

He increases the odds to paying out 3:1, thus the average payout on a 50:50 chance will be one-and-a-half times the stake. He tells the reader that they would be being "imprudent" not to accept such odds, especially since they are already committed to playing anyway.[64] He then makes his next step by introducing the notion of eternity as being an infinite quantity.

But there is an eternity of life and happiness.

Now he makes a complicated sideways movement in the argument, almost stumbling over himself. Once infinite reward is in play, then any odds become reasonable. Even if there were an infinite number of chances, of which only one was a winner, you should still take that chance if there is infinite reward available for the winner.

That being so, even though there were an infinite number of chances, of which one only would be in your favour, you would still be right to wager one in order to win two, and you would be acting wrongly, being obliged to play, by refusing to stake one life against three at a game in which out of an infinity of chances there is one for you, if there were an infinity of infinitely happy life to be won.

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[64] Although, as we shall see in Chapter 4, real-world experiments suggest that many people require even better odds than this in order to play a gambling game.

Pascal goes much further, asserting that you would be more than just imprudent if you refused such a wager with an infinite payout, you would be acting "wrongly".[65]

As a brief mathematical aside here, we might observe that Pascal is playing rather fast and loose with the notion of infinity. He is assuming that:

$$\infty \times \frac{1}{\infty} = \infty$$

This is not necessarily a safe assumption, but I will discuss the difficulties of infinity on page 74 and so will not explore it further at this point. Pascal returns to safer ground when he compares an infinite reward with finite odds and a finite cost.

> *But there is here an infinity of an infinitely happy life to be won, one chance of winning against a finite number of chances of losing, and what you are staking is finite. That leaves no choice; wherever there is infinity and where there are not infinite chances of losing against that of winning, there is no room for hesitation, you must give everything.*

Here he is saying that:

$$\forall n > 0 \in \mathbb{R}: \quad \infty \times \frac{1}{n} = \infty$$

He has also introduced a second infinite quantity; not only is there an infinitely long life (or infinite number of lives), but this life is itself infinitely happy. Numerous authors, including James Wetzel, doubt that humans can actually comprehend what an infinitely happy life might be like, or whether an infinitely long life might not be tedious.[66] Thus they feel inclined to reject Pascal's account on this basis. There is, however, no reason to suppose that an eternal God would not be able to manage such difficulties and I deal with this topic further in Chapter 3.

> *And thus, since you are obliged to play, you must be renouncing reason if you hoard your life, rather than risk it for an infinite gain, as likely to occur as a loss amounting to nothing.*

If Pascal is accused of fideism, he counters that it would be irrational to try to hang on to our life when there is infinity to be won and we are forced to play. This life is finite and should be risked in order to obtain the infinite gain. It should be noted in passing that Pascal does make the claim in this sentence that the two options are equiprobable and he will repeat this further on in the passage.

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[65] Ariew rather aggressively renders this as "stupidly". There is a revision in Pascal's text changing *"auriez tort de"*, meaning "would be wrong to", into *"agiriez de mauvais sens"* which means "going in the wrong direction".

[66] James Wetzel, "Infinite Return: Two Ways of Wagering with Pascal," *Religious Studies* 29, no. 2 (1993): 148.

For it is no good saying that it is uncertain whether you will win, that it is certain that you are taking a risk, and that the infinite distance between the certainty of what you are risking and the uncertainty of what you will gain, makes the finite good which you are certainly risking equal to the infinite good that you are not certain to gain.

Pascal anticipates an objection which could be made, such that it is a certain risk, but an uncertain gain. Someone might thus argue that there is an infinite distance between certainty and uncertainty and that this should thus cancel out the infinity involved in the gain. I doubt that any modern reader would make such an objection, since we are brought up with a clear mathematical formulation of probability. In our system, an event which is certain has a probability of 1, while an event that will never occur is assigned a probability of 0. Any uncertain event thus has a probability between these two extremes: i.e.

$$0 < p < 1$$

and so we would not imagine an infinite distance between p and 1.

This is not the case. Every gambler takes a certain risk for an uncertain gain, and yet he is taking a certain finite risk for an uncertain finite gain, without sinning against reason.

He argues that the basis of all gambling upon earth is to place a certain stake against an uncertain reward. Since it is not an offence against reason to make such a wager for a finite stake and a finite reward, how could it offend reason to receive an infinite reward? As we shall see when we discuss moral objections on page 165, there may however be some case for an offence against *justice* here. It might be considered unjust to receive an infinite reward for a finite good, or conversely to receive an eternal punishment for a finite crime.

Here there is no infinite distance between the certain risk and the uncertain gain; that is not true. There is indeed an infinite distance between the certainty of winning and the certainty of losing,

With a dash of hyperbole, Pascal implies that the gain in betting on God is both certain and infinite, while the loss in betting against is also certain, but is finite. There is thus an infinite distance between those two options.

but the proportion between the uncertainty of winning and the certainty of what is being risked is in proportion to the chances of winning and losing.

Pascal observes that the payout is usually proportional to the risk in any gambling game. The riskier the game, then the greater the payoff. He illustrates this with the example of a simple coin-toss:

And hence, if there are as many chances on one side as on the other, you are playing for even odds;

He wants to distinguish this simple equation from the wager that he is suggesting, because this is a case where both the risk and the reward are finite.

and in that case the certainty of what you are risking is equal to the uncertainty of what you might win, it is by no means infinitely distant from it.

In his proposal, however, there is an infinite gain for only a finite stake and that this fact alone should be fully persuasive.

Thus our argument carries infinite weight, when the stakes are finite in a game where there are equal chances of winning and losing, and an infinite prize to be won. This is conclusive and if men are capable of any truth, this is it.

His imaginary interlocutor re-enters the conversation, accepting that the argument might be convincing, but asking if there might be any evidence to sway the decision one way or the other.

"I confess, I admit it, but is there really no way of knowing what the cards are?"--Yes, Scripture and the rest, etc.

Pascal points out that the tenets of the Christian faith set out plainly that God exists and that he rewards those who believe. This, of course, might be sufficient for Pascal personally, but he would have recognised that others might not find it fully authoritative. However, his thesis is that the Wager holds even if there were nothing else in its favour, because of its mathematical undergirding in an infinite reward.

Thus his dialogue partner gives up attacking the argument itself and instead turns to his[67] own plight. Even if he is convinced by Pascal, what is he supposed to do about it?

"Yes, but my hands are tied and my lips sealed; I am being forced to wager, and am not free. I am being held fast, and am so made that I cannot believe. What do you want me to do then?"

Puzzlingly, many modern critics of Pascal assume that he was unaware of this difficulty. Richard Dawkins, for example, asserts that *"There is something distinctly odd about [Pascal's Wager]. Believing is not something you can decide to do as a matter of policy".*[68] As a result of his misunderstanding of Pascal's intent, he goes on

[67] I use the masculine form throughout this section, partly for readability's sake and partly because I believe that Pascal wrote it with his male gambling friends in mind.
[68] Richard Dawkins, *The God Delusion* (London: Bantam Press, 2006). 103-4.

to mock it as a ludicrous idea.[69] Yet Pascal clearly tackles this issue of not being able to believe at will (or doxastic voluntarism) head-on in the text of the Wager. He does not expect people to feign belief, as Dawkins suggests, but rather recognises that this is a genuine obstacle and goes on to offer a practical solution.

> *That is true. But at least get it into your head that, if you are unable to believe, it is because of your passions, since reason impels you to believe and yet you cannot do so. Concentrate then not on convincing yourself by multiplying proofs of God's existence, but by diminishing your passions. You want to find faith, and do not know the road. You want to be cured of unbelief and you ask the remedy:*

Pascal is proposing that the genuine unbeliever should undertake a course of therapy to cure their unbelief. He holds that unbelief is an illness which needs to be treated and that a restoration of mental health will lead to natural, salvific belief in God. He suggests that the unbeliever needs to learn from those who have followed the same path.

> *learn from those who were once bound like you, and who now wager all they have. These are people who know the road which you wish to follow, and who have been cured of the affliction of which you wish to be cured:*

His methodology is not purely cerebral, as it relies upon its behavioural element. As I discuss in section 2.9, Pascal's approach has much in common with modern Cognitive Behavioural Therapy (CBT).

> *follow the way by which they began. They behaved just as if they did believe, taking holy water, having masses said, etc. This will make you believe quite naturally and will make you more docile*

He does not think that that we can control our *beliefs*, but that we can perhaps control our *behaviour* and thus habituate ourselves to faith by domesticating[70] our worldly passions.[71] Peter Bernstein suggests that Pascal's purpose was to reveal the dominating importance of decision making in that we cannot change our beliefs, but how we behave *is* a decision that we can make.[72] It is our passions that Pascal believes are blocking the path to true faith. Bernard Howells claims that Pascal intends the full force of the French *"s'abêtira"* with its implications of animal behaviour, but in an ironical sense.[73]

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[69] Ibid., 104.
[70] The word French word used *"s'abêtira"* means "to become like a beast", but I have deliberately chosen a gentler form of the verb.
[71] Pascal, *Pensées*: 124-25. L418
[72] Bernstein, "Facing the consequences," 9.
[73] Bernard Howells, "The Interpretation of Pascal's "Pari"," *The Modern Language Review* 79, no. 1 (1984): 58.

"But that is what I am afraid of."

It is a common complaint by non-believers that theistic belief may perhaps somehow compromise one's intellectual faculties. This is often expressed by citing perverse cases, such as hard-line creationism, which appear to show the believer in an unflattering light. It is implied that all belief is a form of fideism which denies scientific reality and goes against intellectual good practice. Pascal puts these words into his potential convert's mouth. The unbeliever values his acuteness and does not want it to be deadened, as Pascal is proposing.

--But why? What have you to lose?

Pascal feels that he has already demonstrated that the atheist will lose nothing if he is wrong, because he will not offend reason.

> *But to show you that this is the way, the fact is that this diminishes the passions, which are your great obstacles.*

He returns to the Biblical allusion of the obstacle, the stumbling-block (*σκανδαλον*) or *stultitiam* that he mentioned earlier in the discourse. For Pascal, it is the passions which prevent the formation of faith and which must therefore be repressed.

End of this address.--

Howells holds that this last section was added as an afterthought, perhaps trying to address the misplaced fears of the *libertin*.[74]

> *Now, what harm will come to you from choosing this course? You will be faithful, honest, humble, grateful, full of good works, a sincere, true friend ... It is true that you will not enjoy noxious pleasures, glory and good living, but will you not have others? I will tell you that you will gain even in this life*

As Nemoianu observes, Pascal genuinely believes that his wager has no actual costs.[75] If the unbeliever argues that he will have to give up his pleasures, Pascal is ready to point out that one should give those up anyway, in order to have pleasures that are actually much better.

> *and that, at every step you take along this road, you will see that your gain is so certain and your risk so negligible, that in the end you will realise that you have wagered on something certain and infinite, for which you have paid nothing.*

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[74] Ibid., 60.
[75] Nemoianu, "Pascalian Faith," 331.

James Wetzel is critical of Pascal's apparent belief that the wagerer risks nothing, calling it a supercilious assumption that "all irreligious folk are liable to become decadent and despairing libertines, ready to set at naught the value of their finite satisfactions."[76] Perhaps Pascal could have softened this by reminding the reader that the finite should be considered to be as nothing when compared with the infinite. He now closes with the apparent conversion (or at least acquiescence) of his interlocutor.

> *"How these words fill me with rapture and delight! If my words please you and seem cogent, you must know that they come from a man who went down upon his knees before and after to pray this infinite and indivisible being, to whom he submits his own, that he might bring your being also to submit to him for your own good and for his glory; and that strength might thus be reconciled with lowliness.*

Pascal finishes on a humble note, attributing any skill that he may have displayed as being obtained through prayer, which he heartily recommends to his reader.

Its Place in Pascal's Theology

At first glance, Pascal's Wager seems completely at odds with his Augustinian belief in predestination and as I show on page 125, a deity who predestines people can be ignored from a risk-management perspective and is irrelevant to the Wager. Levi suggests that Pascal's nature was to desire a complete resolution of the dichotomy between his doctrine of grace and the apparent damnation of humankind and that he was struggling with their seeming incommensurability. Thus, it could be suggested that the Wager might simply be one strand that Pascal was trying to weave into a more complex whole and Levi holds that Pascal lacked the theological or philosophical depth to tackle the task adequately.[77] My own belief is that Pascal did not consider the Wager to be a way of obtaining faith as such, but that it was simply a device to penetrate what he perceived to be the thick skulls of his gambling friends. As Peter Kreeft argues,[78] Pascal's apologetic approach was threefold, as he writes:

> *Men despise religion. They hate it and are afraid that it may be true. The cure for this is first to show that it is not contrary to reason, but worthy of reverence and respect. Next make it attractive, make good men wish it were true, and then show that it is.*[79]

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[76] Wetzel, "Infinite Return: Two Ways of Wagering with Pascal," 144.
[77] Pascal, "Writings on Grace," xxxvi.
[78] See also Joel Esala, "The Epistemology of Pascal's Wager: A Christian Presuppositional Argument," *Reformed Perspectives Magazine* 8, no. 2 (2006), http://thirdmill.org/newfiles/joe_esala/pt.joe_esala.wager.html.
[79] Pascal, *Pensées*: 4. L12

His Wager addresses the first two of these points, showing that it is rational to believe in God and that men should wish that it were true that God exists, because their efforts to obtain faith would be infinitely rewarded. Krailsheimer argues that Pascal clearly believed that grace could never be earned and God could not be under any obligation to deliver eternal life, but that man could try and remove some of the obstacles to grace and thus create a state which was more conducive to its reception.[80] Pascal's initial approach is thus to show the suspicious reader that they are harming themselves by being in a state of unbelief, let alone breaking the laws of a God whose existence has yet to be proved.[81] Pascal is thus presenting the paradox that we must use reason in order to establish an order which is entirely beyond reason's capacity to appreciate. He says that

> *"Reason would never submit, unless it judged that there are occasions when it ought to submit. It is right, then, that reason should submit when it judges that it ought to submit".*[82]

The Wager therefore uses reason to show that this is a case where it should submit itself to something bigger and thus to embark upon a course of therapy, so that its own imperfections might be corrected.

Modern Reworkings

Whatever Pascal intended, the Wager has been taken from its original formulation and has taken on a life of its own, apart from its original context. The underlying argument is that pragmatic reasoning should be employed whenever there are momentous consequences at stake, but where there is considerable uncertainty over the exact possibilities involved. Pascalian logic has been used in the area of climate change, arguing that if we are wrong and we allow the earth to overheat, then the entire human race will perish, which dwarfs any costs that we might incur in averting the disaster.

Likewise it has been used to suggest that we should invest in cryopreservation. The logic runs as follows: Cryopreservation assumes that it is possible to freeze your body (or just your head) after death in such a state that future generations will be able to restore your corpse to life, complete with your personality. It is argued that even if we do not know how to accomplish such a thing today, we have seen such a colossal increase in scientific knowledge in our own time that we cannot rule out the possibility that scientists may be able to perform such a feat in the future. On the other hand, if we are not cryopreserved, then our bodies will decay and rot to the point that no-one will be able to recover them. Thus, if you are cryopreserved you have a chance of survival, while if you are not, then you will definitely die.

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[80] Ibid., xxi.
[81] Ibid., xxiii.
[82] Ibid., 54. L174

The Pascalian parallel is thus that if cryopreservation fails, then you lose nothing, because you would have definitely died without it, but if it succeeds, then you may live on. It could be argued that there is a significant cost in cryopreservation, but at death you lose all your material goods anyway, so losing part (or even all) of them is no worse an outcome. This assumes, of course, that you are indifferent to its effect upon your heirs, or even to your financial state upon resurrection.[83]

[83] Such resurrected corpses might find that they have accumulated considerable debts while in cryosuspension, due to the costs of keeping them in storage for centuries and the medical treatments required for revival. They could awake to find themselves as servants, slaves, or worse. James D. Miller suggests that a cryonics unbeliever and believer might make an agreement where the believer pays for the cryosuspension of the unbeliever in return for the unbeliever's becoming effectively the indentured servant of the believer in the event of success. http://jamesdmiller.blogspot.co.uk/2007/06/cryonics.html

Chapter 2 A Critical Framework for Evaluation

In this chapter I will outline a number of tools that I shall use to evaluate both the Wager and the objections raised against it. These form a framework against which I will judge the success or otherwise of Pascal's Wager and its various detractors. The tools are largely drawn from outside theology, because the Wager is at heart an appeal to the non-theologian, as we saw in the previous chapter. Using these tools, I will define a number of principles that will enable us to examine each objection on its own merits, but without my needing to spell out all the logical steps required in each case. My approach throughout this thesis is to consider Pascal's Wager as an exercise in practical risk management and I suggest that the fundamental risk is that of losing our eternal salvation.

I will commence this chapter by discussing risk management in general and then outline how I propose to use risk management techniques in a theological context. I move on to provide an introduction to decision theory, including the concept of a 'mixed' strategy, which incorporates a random element into the process and which is important in many modern mathematically-based objections to the Wager. I also discuss the Principle of Indifference, which is often cited in critiques.

In order to highlight some important assumptions that underpin the logic employed, I examine the model of God which I believe is being presumed within this context and how this may have an impact on the decision-making process. In the final part of this chapter, I examine how Pascal's answer to the wagerer, who is convinced by the Wager's logic, but who finds themselves unable to believe at will, anticipates the modern therapeutic practice of Cognitive Behaviour Therapy. I hold that this therapeutic approach sidesteps objections which suggest that the wagerer must somehow engage in deceiving either God or themselves.

If we are to view Pascal's Wager in the context of managing one's exposure to risk, as I suggest, then I first need to explain what I mean by risk management, since it is not a field that is usually studied within theology.

2.1 Risk Management

Michel Crouhy et al. identify four ways to deal with risk:[84]

- Avoid
- Transfer
- Mitigate
- Keep

[84] Michel Crouhy, Dan Galai, and Robert Mark, *The Essentials of Risk Management* (New York: McGraw-Hill, 2006). 2.

Although their focus is upon financial risk management, the risk management strategies they describe apply to most other spheres of decision making. The Institute of Risk Management et al. state that for organisations:

> *"The focus of good risk management is the identification and treatment of [the risks attaching to their activities]. ... It marshals the understanding of the potential upside and downside of all those factors which can affect the organisation. It increases the probability of success, and reduces both the probability of failure and the uncertainty of achieving the organisation's overall objectives"*[85]

These principles apply just as much for individuals but they are rarely considered in any sort of formal exercise, except perhaps when deciding upon one's investment portfolio. We can illustrate the four principles operating at a personal level with a simple example.

Imagine that we want to buy some fruit from the greengrocer's shop, but this will involve crossing a busy road. We can *avoid* the risk by deciding that we do not need the fruit after all, or perhaps by buying from a nearby supermarket, which does not require us to cross the road. We could *transfer* the risk by sending our spouse to get the fruit instead, or perhaps by having it delivered to our home. We can *mitigate* our risk, by using a pedestrian crossing and looking both ways before crossing the road, but even this strategy will leave some residual risk (such as being hit by an out-of-control, or speeding, driver) which we will have to *keep* (or accept). We might decide to accept the entire risk and step out without looking, but most people would not consider this to be sound risk management.

As can be seen from this example, we adopt every-day risk-management techniques, such as mitigation, throughout the process of our early education. Parents of small children start off by keeping a firm hold of their hand, to *avoid* the risk of their running out into the road and being hurt. They move on to teach them about road safety (in order to *mitigate* the risk), as their children become more able to appreciate and weigh the risks involved. Eventually, the parent has to *accept* any residual risk in allowing older children to cross the road unsupervised, because it is regarded as an essential part of their growing up and becoming adults in their own right.

As well as recognising that not all risks can be mitigated, we must also acknowledge that the potential costs of reducing the risk might end up being greater than the

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[85] The Institute of Risk Management, The National Forum for Risk Management in the Public Sector, and The Association of Insurance and Risk Managers, A Risk Management Standard, (London: The Institute of Risk Management, 2002), http://www.theirm.org/publications/documents/Risk_Management_Standard_030820.pdf. 2.

risk itself. For example, we might choose to manage our risk in crossing roads by never leaving the house, yet that might cost us far more in terms of social contact, or losing the benefits of exercise. Thus risk management includes calculating the costs of the different strategies and which strategy (or combination of strategies) offers the best net return.

Risk of faith

Religion is rarely seen in terms of risk in the modern Western world. Enthusiasm for preaching about hellfire has waned dramatically since the seventeenth century according to D.P. Walker[86] and the all-pervasive pluralism of religious education in the UK has eroded the claims of exclusivity in conventional Christianity to the point where many modern theologians and clerics are distinctly uncomfortable with even expressing the idea of Hell for non-believers.

Pascal speaks little of Hell in his Penseés, mentioning the word *"l'enfer"* just eight times, and he does not show any strong feelings about eternal torment, allowing for the possibility of annihilation instead. For example, he writes, *that "in leaving this world, I fall forever either into nothingness or into the hands of an angry God".*[87] Notably, the Wager is couched in terms of the loss of infinite reward, rather than bearing infinite punishment, and most modern treatments of the Wager also ignore the disutility of Hell, not least because including it makes the mathematics much more complicated, as we shall see on page 106.

Even so, missing out on an available infinite reward is effectively an infinite loss and Pascal is bemused by the fact that people could care so much about trifles in this present life, while ignoring what he saw as the greatest risk of all, namely this loss of eternal life.

> *"Nothing is so important to man as his own state; nothing is so terrifying to him as eternity. And thus it is not natural that there should be men indifferent to their loss of existence and to the peril of an eternity of wretchedness. ... And this same man who spends so many days and nights in rage and despair at the loss of some office, or because of an imaginary insult to his honour, is the very one who knows, without anxiety or emotion, that he will lose everything through death. It is monstrous thing to see in the same heart and at the same time this sensitivity to the slightest thing and this strange insensitivity to the greatest."*[88]

Pascal wants to make people understand the risk that they are running, whether they are currently aware of it or not. The nature of the Wager is such that the first

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[86] D.P. Walker, *The Decline Of Hell* (London: Routledge & Kegan Paul, 1964). cited in George Hunsinger, *Disruptive grace: studies in the theology of Karl Barth* (Cambridge: Wm. B. Eerdmans, 2000). 228.

[87] Pascal, *Pensées (tr. Ariew)*: 218. L428

[88] Ibid., 219. L428

technique of risk management, namely avoidance, is not open to us. Simply by being alive, we are already committed to one path or another and thus we cannot choose whether to play or not. Refusing to participate is simply to place our bet against God. We cannot avoid the risk, nor refuse to play, for we are already in the game. We must wager; it is not optional.[89]

Nor can we use the second technique and transfer the risk to another, because each player is in charge of their own destiny and living one's life is not a task that can be delegated to anybody else. Each person must thus bear their own risk.[90]

Accepting the risk and potentially bearing an infinite loss, would not be considered sound risk management strategy, unless the costs of mitigation were also infinite. No cost in a finite lifetime could ever be infinite, and so accepting the risk of an infinite loss should not be considered rational.

Thus, the only risk-management strategy available to us is one of mitigation. We need to reduce the risk to a level such that we could accept any residual losses. However, the only option available which delivers infinite benefit (and mitigates the loss) is that of coming to belief in God. This has the side-benefit that it not only avoids loss, but also delivers an infinite benefit and Pascal thus concludes that his argument has infinite force. Although objectors often suggest that becoming a Christian has significant (and possibly unacceptable) costs associated with it, Patrick & Christopher Toner argue that Pascal would have considered the adoption of a Christian lifestyle as a valuable gain in itself, rather than any sort of cost.[91] Nonetheless, whether there are losses or not, they will always be finite and thus overwhelmed by the infinite gain.

In this thesis, I suggest that Pascal's Wager is an exercise in rational risk management in a theological and anthropological context. For an objection to the Wager to succeed under my model, it must either uncover a logical flaw in Pascal's approach, or it must show that there is an alternative mitigation strategy that does at least as well as Pascal's. This is a different approach from most recent works, which have typically focused upon examining the validity of the game-theoretical underpinning, particularly with respect to the mathematics of infinity; or by suggesting that even if it is valid, the Wager cannot provide any actual guidance on which deity to select. My contribution is to offer a model which allows us to navigate our way around some of the difficulties, while remaining within the spirit

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[89] Ibid., 212. L418

[90] Christians might argue that the principle of substitutionary atonement actually allows for the risk to be transferred to Christ, but I would reply that it can only be obtained through the mitigation strategy of belief.

[91] Patrick Toner and Christopher Toner, "Pascal's First Wager Reconsidered: A Virtue Theoretic View," *International Philosophical Quarterly* 46, no. 181 (2006): 82.

of the Pascalian endeavour. I will start by discussing one of the major tenets of my argument, which is that if a risk has no mitigation, then we should ignore it.

Principle of Accepted Immitigable Risk

Risk management concerns itself entirely with risks which can be managed. At a number of points in this thesis, we will encounter cases where there is a risk, but no mitigation of that risk is possible. For example, if we were to take a hard-line predestination view and declare that salvation is the sovereign choice of God alone which cannot be affected by any earthly actions of the individual. Under those circumstances, a person accepting Pascal's Wager cannot actually affect their outcome; whatever they do, they cannot change whether or not they are included among the elect. This does not mean that Pascal's Wager has no value at all, since it might be the means by which God had preordained that they would come to faith; however it has no value to those outside the elect. In this particular case, there is no mitigation strategy available for the individual. No matter what one does, whether it is to attend church or not, it will not affect whether or not one receives the infinite reward. Therefore, the rational person will simply have to accept the residual risk of predestination and hope to be one of the chosen.

If there is no strategy to follow, except that of simply accepting the risk, then that case can actually be dismissed from further consideration within that risk management perspective. For example, there is a risk that an asteroid will collide with the earth and wipe out all life on the planet. However, there is nothing that we can do to avert such a disaster (at least with our current technology), nor can we buy asteroid insurance that would pay out adequate compensation in the event that it did occur. We therefore have to accept the risk, ignore it and get on with the more manageable risks in our lives, such as choosing to wear a seatbelt while driving. Risk management is fundamentally only concerned with risks that *can* be managed; the rest are simply noted and ignored.

I therefore suggest that we likewise dismiss all risks around Pascal's Wager which do not have an available mitigation strategy. This is not to say that these cases have no merit, but that once we have determined that we cannot chose any path but to accept the residual risk, we can safely dismiss them from further consideration, so as to focus our attentions on the risks which we can mitigate. When we encounter cases in subsequent discussion in this thesis that do not offer any mitigation, I will denote them as *accepted immitigable* risks, by which I mean that we have no choice but to accept the risk and to dismiss them from further consideration. Thus, the risk of a deity who predestines everyone is designated as an accepted immitigable risk.

This acceptance of immitigable risks provides a powerful tool in cutting through the swathes of notionally possible (if unlikely) deities for consideration, including

parodies such as Invisible Pink Unicorns[92] or The Flying Spaghetti Monster.[93] I will return to this in greater detail in Chapter 3.

2.2 Moral objections from a risk management point-of-view

I will cover some moral objections to Pascal's Wager on page 153 onwards, but someone who proposes a moral objection to a course of mitigation is setting up a decision-making framework that is outside that of risk management. For example, let us consider a country facing a threat from an unstable leader in a foreign nation. The rulers of the country under threat might consider assassination of the opposing leader as being an efficient means of mitigating the threat. However, modern democracies do not consider assassination to be a legitimate means of risk reduction, even if it might be the most effective in certain circumstances.[94] They thus choose strategies which may have a higher overall cost, but which do not pose the same moral difficulties.

Morality is not generally considered to be on a commensurate scale with efficacy, although this is a contentious area in itself. If someone does have an unbending moral objection to Pascal's Wager, then I suggest that they are placing themselves outside the risk management framework which I shall be using and I shall not be exploring those options in any depth. I shall be assuming that the actor in the Wager is willing to consider taking Pascal's suggested course of action, as long as they are sufficiently persuaded by the arguments that they should do so.

We shall now look at some of the central axioms of decision theory which are relevant to this essay. Pascal clearly anticipated some of decision theory's central formulae in the way that he approached the Wager and understood many of its tenets instinctively, although they would not be formally articulated until much later. I will start by discussing the theory of expected utility.

2.3 Utility theory

Within the field of economics, the term 'utility' represents a non-monetary value that may be placed upon a particular state of affairs.[95] Utility is derived from subjective, rather than objective valuations and is inferred from particular preferences or actual choices that have been made. It cannot be measured directly and has no objective existence.

As an example, if I had to choose between going out for an expensive dinner with my wife, or staying at home to watch the football game on TV, it is unlikely that anyone could place a monetary value on the two possible outcomes in order to

[92] See http://www.invisiblepinkunicorn.com/ipu/home.html
[93] See http://www.venganza.org/
[94] Or at least, such governments publicly *profess* that they do not believe in assassination.
[95] I acknowledge that not all economists agree on what utility is, or even whether it truly exists, but I believe the theory to have some applicability to our current discussion.

compare them. Let us assume that I choose to go out for a dinner[96] and that it has a higher monetary cost than staying at home. Since I have preferred the higher-cost choice to the lower-cost one, it is clear that there must be non-monetary factors at work here, such as the enjoyment (or disappointment) associated with each choice. Economists would thus infer that going out for dinner had higher *utility* for me.

Although systems of measurement have been proposed,[97] utility can only be used comparatively within the realm of the actual choices under consideration. Let us assume that I can choose to wear either a red or blue tie to an important meeting tomorrow. Since I think that the red tie goes better with my suit, I choose red and thus we can infer from that choice that the red tie has more utility than the blue tie for me. We do not need to know my underlying motives to know that it must have had more utility, since the estimation of relative utility is derived by observing the actual choices made. For example, if I said I preferred the red tie, but actually wore the blue one, we would infer that wearing the blue tie had more utility, whatever my stated preferences might have been. What we cannot do though, is to compare the utility value of wearing the red tie with the utility of going out for dinner, unless we can observe an instance where going out to dinner was an alternative to wearing a red tie.[98]

Utility applies where there is more than one choice and where we can rank our preferences. Let us assume that in my choices above, I could also choose to stay in and work on my thesis. We start by looking at the choices in pairs:

1. I'd rather go out than watch TV
2. I'd rather work on my thesis than watch TV
3. I'd rather go out than work on my thesis

If we use the notation $a \succ b$ to mean 'I prefer a to b', then we can express the ranking as:

$$Go\ out \succ Thesis \succ Watch\ TV$$

Although we have ordered them, it does not tell us how much we prefer one over the other. If we were to add the option to 'die painfully' to the possible choices then we would have:

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[96] Remembering always that my wife will be proofreading this.

[97] With units called 'utiles'.

[98] Or perhaps where an identical choice was offered in two different (but otherwise broadly comparable) scenarios, although establishing such comparability is exceptionally difficult, because people's circumstances will change over time.

$$Go\ out \succ Thesis \succ Watch\ TV \succ Die\ painfully$$

Since this simple ordering tells us nothing about the relative preferences, we might try to assign a numeric value to each state:

$$Go\ out\ (100) \succ Thesis\ (80) \succ Watch\ TV\ (70) \succ Die\ painfully\ (0)$$

That is, I assign a positive vale to the first three choices and no utility at all to dying painfully (in fact I might give it a very high negative value). However, these numeric values are completely arbitrary and apply only within the context of that one choice. If we returned to the red/blue tie choice, we might get:

$$Red\ tie\ (2) \succ Blue\ tie\ (0)$$

We have assigned a utility of zero in two distinct circumstances: selecting a blue tie in one example, and dying painfully in the other. This does not mean that I am indifferent between the two options of wearing a blue tie or dying painfully; the numerical values only apply within the context of each scenario. Utility values are not commensurate between scenarios, unless we have some linking comparison between the two.

Utility theory holds that these comparisons should be *transitive* within a single context, that is, that if we have three possibilities: *a, b, c* and we know that: $a \succ b$ and $b \succ c$, then it necessarily follows that $a \succ c$. As we shall see in Chapter 4, experimental economists, such as Daniel Kahneman, have shown that this assumption is not necessarily true in real-world decision making and that the human mind may use different heuristic systems of thought, depending upon the nature of the task. However, for the purposes of the initial discussion, I shall assume that utility relationships are transitive.

Rational behaviour

An important part of utility theory is that people will be *rational.* That is, that the choices they made represented the highest utility for them, rather than being completely arbitrary. It is not that people actually calculate a numeric utility value for each outcome and then take the highest one (although there may be some weighing of pros and cons), it is rather that we can infer the utility from the choice. However, we must recognise that context plays a part in any decision. On a given day, I might prefer a red tie over a blue one because I like red more than blue, but if I were attending the Conservative conference, I might well choose the blue tie because I want to avoid causing offence. Thus decisions are contextual and the utility values may change accordingly.

One side effect of the assumption of rationality is the expectation that if we reveal the payoffs and probabilities to the players, then people will choose accordingly. As

we will see in Chapter 4, this is far from a safe assumption, but we will leave discussion of those complexities for later and proceed here under the assumption that we can operate using a relatively simple calculus.

2.4 Decision making

According to Duncan Luce and Howard Raiffa,[99] decisions can be made in one of three contexts:

> **Certainty** – each action is known to lead invariably to a specific outcome
>
> **Risk** – each outcome leads to one of a set of possible outcomes, each outcome occurring with a known probability.
>
> **Uncertainty** – each action has as its consequence a set of possible specific outcomes, but the probabilities of these outcomes are unknown or not even meaningful.

Decision making under *certainty* occurs in a number of situations: for example, a company may want to know the optimum route for a salesman to travel between a number of cities. The distance between each city is known. It is merely a matter of calculating each possible route and then selecting the shortest overall.

An example of a decision under *risk* might be where we toss a fair coin and gain £10 if it comes up 'heads' but lose £5 if it comes down 'tails'.[100] Wagers in casinos are usually made under risk – the stake, the probability of winning and the payout are all known to the gambler in advance, although he cannot know which outcome will occur.

Most of our life decisions are made under *uncertainty*. In the example earlier about what I should do tonight, I cannot know all the outcomes of going out for dinner, nor can I know the exact probability that I will end up sleeping on the sofa if I choose to stay at home and watch TV, rather than going out for dinner with my wife.

Pascal's Wager is a decision under uncertainty – we cannot assign an exact probability to God's existence and it may not even be meaningful to try and guess one.

Decision Theory

As a simple introduction to decision theory under risk let us consider a gambling game where there are two outcomes and the probability of each is known, for

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[99] R. Duncan Luce and Howard Raiffa, *Games and Decisions* (New York: Dover Publications Inc, 1989; repr., Reprint of John Wiley 1957 edition). 13.

[100] For the moment, we will ignore the cases where the coin might land on its edge or be swallowed by a passing eagle.

example, playing roulette in a casino where we will simply bet on red or black. We can make a bet of a given size (the 'stake') and, if we win, we get our stake back plus an amount equal to that stake.

In decision theory, it is common to express the possibilities in a matrix. In this example, each row represents the possible bet and each column represents the possible outcome. The intersection of row and column shows the payoff for the combination of bet and outcome.

	Red comes up	Black comes up
Bet £5 on red	Win £10	Lose £5
Bet £5 on black	Lose £5	Win £10

In this example we might add another row: do not bet at all; in which case we neither lose nor win anything.

	Red comes up	Black comes up
Bet £5 on red	Win £10	Lose £5
Bet £5 on black	Lose £5	Win £10
Do not bet	Win £0	Win £0

We can calculate the expected value (or EV) by multiplying the probability of each outcome by its payoff and then subtract the cost of playing.

EV = (Probability of outcome × Payoff) – Cost

Let us work on the basis that we will bet £5 on red and that red has a one in two (or ½) chance of coming up.[101]

EV(red) = (Probability of red × Payoff for red) – stake

= (½ × £10) - £5

= £0

If the expected value is deemed to be the sole utility of the bet then, as we can see, there seems to be no point in playing this particular game.[102]

[101] In reality casinos do not offer 50:50 bets like this. Roulette wheels have a zero, which is considered to be neither red nor black. If it comes up, then all red and black bets lose. Some casinos even have a double-zero as well. In a single zero wheel, there are 18 red slots, 18 black and a zero. The probability of red is thus 18/37 or 0.4865, so the EV would be (0.4865 x £10) - £5 = -£0.135.

[102] The fact that people do bet in casinos, when their odds are actually worse than this, implies that there are other factors involved.

To show a more complex game, let us assume that we toss a fair, six-sided die and bet £5. If it comes up with a value 1, 2 or 3, then we lose; if it is 4 then we win £6, and if it is 5 or 6 we win £12. The expected value is the sum of the probabilities, multiplied by the payoff for each. The probability of rolling any single number is one in six, or $\frac{1}{6}$; the probability of rolling a 1, 2 or 3 is three in six, or $\frac{3}{6}$. So we can compute the EV as follows:

$$\begin{aligned} EV &= (\tfrac{3}{6} \times £0) + (\tfrac{1}{6} \times £6) + (\tfrac{2}{6} \times £12) - £5 \\ &= £0 + £1 + £4 - £5 \\ &= £0 \end{aligned}$$

The result is that it has the same EV as the simple coin toss or red-black game and thus we have seen that we can compare different sorts of wagers, by looking at their EV, even if the games associated with the wagers are quite different.

Dominance

An important concept in decision theory is that of *dominance*. Within a game, each player will adopt a strategy in order to win. There are no implications of long-term thinking or creativity in the choice of the word strategy, since it is perfectly allowable to have a poor strategy. It simply describes how a player makes her choices for each move in the game.

If we take a simple two-player game like noughts and crosses[103] then we can show that there is an optimal strategy for the player who goes first. That player will always win, or at worst draw. There is also an optimal strategy for going second which always guarantees a draw at worst. The player going second can only win if the player going first plays sub-optimally. Thus, choosing to go first will dominate.

To show simple dominance let us consider an example from Morton Davis.[104] Consider a game with a 3x3 matrix of outcomes, where you can choose one of the three rows (A, B, or C) and your opponent can choose from one of the three columns (I, II or III). Your payoff is given by the intersection of the two.

	I	II	III
A	5	-2	1
B	6	4	2
C	0	7	-1

[103] Known as tic-tac-toe in the USA.

[104] Morton F Davis, *Game Theory: A Nontechnical Introduction* (Mineola, NY: Dover Publications Inc., 1997). 12.

By choosing row B you will always gain 2, 4 or 6 units and you can never lose. While you might gain more by choosing row C, where the maximum payoff is 7, you could end up with nothing or even lose 1. As the second player we can see that column I appears a dead loss since it never gains, but could lose 5 or 6, while column III has the lowest risk, since we can never lose more than 2.

If we simply consider row B against row A we can see that for each column chosen by the opponents, row B will always yield a better outcome. We can say that Row B *dominates* row A. Likewise for player 2, column III dominates column I because whichever row player 1 chooses, the result will be better for column III.

If we eliminate the dominated rows and columns, we can thus simplify the problem to a 2 x 2 matrix.

	II	III
B	4	2
C	7	-1

Now which row should player 1 choose? If he takes row B then he is guaranteed to gain at least 2, but if he chooses row C then he could gain 7 at the risk of losing 1. If we take the average payoff of each row, we find that they are the same:

$$\text{Row B} = \frac{4 + 2}{2} = 3$$

$$\text{Row C} = \frac{7 - 1}{2} = 3$$

Before deciding, let us look at the choices for player 2. Column II will lose between 4 and 7, while column III might lose 2 or gain 1. The average payoffs are thus:

$$\text{Column II} = \frac{4 + 7}{2} = 3.5 \text{ loss}$$

$$\text{Column III} = \frac{2 - 1}{2} = 0.5 \text{ loss}$$

In fact column II is dominated by column III. It will always do better whichever row player 1 chooses. Therefore, player 2 should always pick column III. Knowing this, the first player must choose row B in order to avoid a loss. Establishing dominance within the strategies ends up constraining each player's choices. In fact, like tic-tac-toe, no player should ever choose to play second because he will be guaranteed a loss. As we will see, dominance (or indeed super-dominance) plays a part in the decision theory of Pascal's Wager.

Mixed strategies

A *mixed* strategy is one where we assign probabilities to each of a number of competing 'pure' strategies and then use a random device in order to arrive at a particular choice from the available options. This could be as simple as tossing a coin to decide whether or not to believe in God. As we shall see in Chapter 3, mixed strategies play a significant part in some of the most successful of the mathematical objections to the Wager and thus it has been necessary for us to at least understand what we mean by a mixed strategy as part of developing our analytical framework. We now need to consider another decision theoretical idea which appears in some critiques, which is commonly known as the Principle of Indifference.

2.5 Principle of Indifference

The principle of indifference has a reasonably long history, appearing in various forms. Gottfried Leibniz (b. 1646) initially coined the phrase the "Principle of Sufficient Reason" (or "PSR") in his *Discourse on Metaphysics*, although he was following on from Spinoza and Anaximander of Miletus who had described similar arguments. Arthur Schopenhauer, who wrote his doctoral thesis on the PSR, prefers Christian Wolff's description as being the most general: *"nihil est sine ratione cur potius sit quam non sit"* (or "Nothing is without a reason or ground why it is").[105] In its simplest form, the PSR states that "For every fact *f*, there must be an explanation why *f* is the case." [106] The PSR can be expressed in a number of different ways, such as:

- For every entity *x*, if *x* exists, then there is a sufficient reason why *x* exists.
- For every event *e*, if *e* occurs, then there is a sufficient reason why *e* occurs.
- For every proposition *p*, if *p* is true, then there is a sufficient reason why *p* is true.

The Principle of Insufficient Reason was developed from the PSR by Bernouilli (b. 1654) and Laplace (b. 1749) and argues that if you do *not* have such a sufficient reason to prefer one case over another, then you should treat them as equi-probable. John Maynard Keynes (b. 1921) renamed it the "Principle of Indifference" in his *A Treatise on Probability*, but was rather more cautious, arguing that it could only be applied in cases where we genuinely had no prior knowledge about the probabilities. As Nicholas Shackel puts it, the "possibilities of which we have equal

[105] Arthur Schopenhauer, *On the Fourfold Root of the Principle of Sufficient Reason*, trans. E.F.J. Payne (Peru, Illinois: Carus Publishing Company, 1974). 6.
[106] Yitzhak Melamed and Martin Lin, "Principle of Sufficient Reason," in *The Stanford Encyclopedia of Philosophy*, ed. Edward N. Zalta (2011).

ignorance have equal probabilities".[107] He cites a few paradoxes that arise (drawing upon Johannes von Kries) and I will briefly paraphrase one of them.

Suppose that we imagine a possible line whose length is a integer number of centimetres between 1cm and 10cm long. There are ten possible lengths, so we therefore assume that the probability of any given (non-zero) length is 1/10. So what is the probability that its length is 3cm or less? The principle of indifference states that it is 30% and in this case it is.

Now let us make a square in similar fashion. The area of any possible square lies between 1 and 100 cm^2. So what is the probability that the area of any given square is $30cm^2$ or less? At first glance, we might conclude that it too ought to be 30%, but let us look at the possible squares and their areas:

Side length (cm)	Area (cm^2)
1	1
2	4
3	8
4	16
5	25
6	36
7	49
8	64
9	81
10	100

As we can see from the squares shaded in yellow, 50% of the squares have an area less than or equal to 30 cm^2. Now let us consider a cube, whose volume ranges from 1 to 1,000 cm^3. What proportion of the cubes have a volume that is $300cm^3$ or less?

[107] Nicholas Shackel, "Bertrand's Paradox and the Principle of Indifference," *Philosophy of Science* 74(2007): p 150.

Side length (cm)	Volume (cm^3)
1	1
2	8
3	27
4	64
5	125
6	216
7	343
8	512
9	729
10	1000

In this case, 60% of the cubes have a volume of $300cm^3$ or less, which is twice the figure that the Principle of Indifference suggests that it should be.

The Principle of Indifference relies upon there being a uniform linear distribution of cases across the entire range of possibilities and this can only strictly apply when we know that this is the case. As we have seen, if the distribution is not linear, such as with volume, then the Principle of Indifference will yield results that are dramatically wrong. In the cases I have cited above, we might reasonably expect that there would be some non-linear scaling in effect, since we know that area is proportional to the square of the sides and volume is proportional to the cube of the side length, but that is rather to beg the question. If we knew the distribution in advance, we would not be using the Principle of Indifference at all. As Nicholas Shackel suggests, only the "possibilities of which we have equal ignorance have equal probabilities";[108] as soon as we know something about the distribution, we should use that knowledge instead.

As with many aspects of decision theory, the Principle of Indifference particularly struggles when contemplating infinitely many possibilities, as exemplified by Bertrand's Paradox,[109] but despite its known weaknesses, we encounter the Principle of Indifference quite often in objections to Pascal's Wager, particularly when we come to the many-gods objections in Chapter 3. In this thesis, I intend to follow Keynes and only allow the Principle of Indifference to apply when we genuinely have no reason to prefer one option over another. Wherever possible, other factors will be used to adjudicate between competing options which have the same expected outcome.

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[108] Ibid., 150.

[109] For further discussion see ibid. or Edward T. Jaynes, "The Well Posed Problem," *Foundations of Physics* 3(1973).

2.6 Assumptions and preconditions

Pascal's Wager incorporates a model which assumes a number of characteristics of God and of humanity which are not usually articulated, although a number of the extant objections hinge upon different models. In this section I sketch what I see as some unspoken assumptions that set preconditions for wagering and I briefly suggest some possible rationale underpinning those assumptions, together with any corollaries for the Wager. This is an area which is familiar to philosophers of religion and I do not propose to cover arguments around the nature or alterity of God in any depth and space does not permit much exploration of any notions of divine justice. Rather I am illustrating some assumptions that I believe are inherent in Pascal's formulation, purely in order that we might view the roots of objections more clearly.

God will act fairly

The essence of the Wager is the apparent bargain between the unbeliever and God, which in crude terms offers the proposition by God that: "if you will believe in me, then I will give you an eternal reward". We will assume for the moment, as Paul Bartha suggests, that it is the act of wagering that leads to the infinite reward in the case where God exists.[110] We therefore need to be sure that if we do wager, that God is trustworthy and will keep his side of the bargain. Pascal clearly believes that God is just, infinitely more so than we are, as he sets out in the opening part of the Wager:

> *There is not so great a disproportion between our justice and that of God, as between unity and infinity. ... The justice of God must be vast like His compassion.*[111]

It seems reasonable to assume that a just God will act fairly and will keep his word,[112] even without any external control[113] and that having allowed us to wager,[114] he will honour the promise of eternal bliss. We trust that he will not change the terms of the contract, either before or after our death. Graham Oppy asks what would happen if there were a committee of deities who decide the

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[110] Paul Bartha, "Many Gods, Many Wagers," in *Probability in the Philosophy of Religion*, ed. Jake Chandler and Victoria S. Harrison (Oxford: Oxford University Press, 2012), 189.

[111] Pascal, *Pensées*: 121. L418

[112] Ibid., 262. L840

[113] In earthly bargains such as the purchase of a house, there is a third-party, in the form of the state, which enforces performance of any such contracts between individuals. Most nations have clearly articulated rules about what constitutes a valid contract and what remedies should be applied in the event of non-compliance by one or other party. In this case, however, God is both the offeror and the guarantor of the bargain. There is no third-party to appeal to if God fails to deliver his part of the deal. The human party is therefore entirely dependent upon God to honour the bargain.

[114] Assuming that God does not reject us simply because we wagered.

criteria for acceptance on some sort of rota.[115] In that case, the constantly changing requirements might make achieving the goal impossible, but I would like to defer discussion of this problem of unknowable or mutable criteria to section 3.4.

Alfred Benn raises some interesting questions about whether even a single God can be trusted. He starts from the observation that a hidden God will have to make any prophecies ambiguous and misleading if he is to remain concealed. Benn reminds us that Pascal says that the game for our souls is being played out at an infinite distance[116] and that the evidence for God's existence is set out in the pages of scripture. But if the evidence in scripture is necessarily clouded, then how do we know that the game is fair? The cards' "colour and value depend entirely upon the inscrutable will of the dealer. He can call black red and a king a knave."[117] If God is good, as understood in the normal human sense, then this concern can be safely ignored. However, if we postulate an immoral God, then it becomes a proper concern, although not one that we can actually address.

Pragmatically we have to trust that God will honour the Wager, since there is no alternative.[118] No mitigation is possible in the event that God is unfair, so this is an example of a scenario where we must accept the risk and then dismiss the case from further consideration. We need to assume that the criteria will remain constant and that the reward will not be taken away at some point in the future.

It is also an important assumption that God will judge according to the observed beliefs and behaviour[119] of the candidate and that this judgment will be fair, rather than on some whimsical scale. There would be no point in wagering if the reward were not linked to our actual belief/behaviour. In Victor Vroom's expectancy theory[120] (developed in the context of management psychology), he holds that there must be a clear chain as follows:

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[115] Graham Oppy, "On Rescher on Pascal's Wager," *International Journal for Philosophy of Religion* 30(1990): 5.

[116] Pascal, *Pensées*: 122. L418

[117] Alfred W Benn, "Pascal's Wager," *International Journal of Ethics* 15, no. 3 (1905): 315.

[118] We also have the difficulty of making a judgement about God's fairness. It seems safe to assume that no human can observe God's mind, nor inside the minds of individuals, so no-one outside God can actually determine whether a given person believed or not (or whether such belief was sufficiently salvific). We are required to accept God's sole determination of the outcome, without possibility of appeal or review and we must therefore operate on the basis that God is fair. Unless there is a conscious afterlife, no-one would know that they had been condemned at all and, in any event, would be unable to say whether or not the sentence was just. If 'failure' simply means annihilation, they could not ever know that they had been deemed to have failed.

[119] This question of whether it is belief or behaviour that matters is a particularly complex one and I do not intend to elaborate upon the faith v works argument here. I shall assume that the deity values some combination of both, without trying to tease them apart.

*[120] See https://sites.google.com/site/motivationataglanceischool/vroom-s-expectancy-theory for a simple overview, or Victor Vroom, *Work and motivation*, John Wiley & Sons, (1964) for the original theory. The exact details need not concern us here.

- Performance must be related to effort. That is, if we apply more effort to a task, our performance should improve proportionately.
- Improved performance will lead to increased rewards[121] and these rewards must be valued by the person concerned.
- Assessment of the performance will be fair.

In companies, employees need to know that if they work harder, the boss will increase their rewards in proportion. In the context of the Wager, assessment of whether we have met the criteria for betting on God needs to be done fairly.

While it might seem a truism that God should be good, some critics of the Wager (as we shall see in Chapter 3) have described deities who are not good, at least in the sense that we might usually understand the term. I hold that there is an assumption of goodness in the Wager, and expectancy theory requires that the reward itself should be good, which implies that the being delivering the reward should also be good.[122] Pascal suggests that it is an infinitely good reward, so it would seem rather odd for a deity to be able to produce a reward that is infinitely better than itself; thus God must also be infinitely good.[123]

Graham Oppy allows more flexibility in this area and makes the point about his synthetic deities that

> *"while these beings are not wholly good, I do not see that this fact provides any more reason to suppose that the existence of these beings is somehow more improbable than the existence of the traditional Christian God".*[124]

I am not using goodness as some sort of guide to probability; rather I am arguing that God must be good in order to be able to deliver on the promise of infinite

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[121] In the Wager's case, the reward is a step function, rather than a curve.

[122] I accept that there is a possibility that an evil deity could deliver a good reward, although there might be moral implications in accepting it. I will return to this on page 169.

[123] I would go further and suggest that God must be in fact be perfect, or it would not be safe to spend eternity with him. Over infinite time, a being who is not 100% good will inevitably do bad things. This might include terminating our salvation at that point. If there is a non-zero probability that this could occur, then it *will* definitely happen at some point in infinite time.
It could be argued that we might have a deity who has a 20% probability on any given day of doing something bad, but on each of those days decides not to do so. Thus, although there is the possibility of something bad occurring, it never actually happens, but upon what basis could we assign this probability of 20%? It cannot be from an observed frequency of occurrence, because that would yields a 0% probability. If we tossed a coin a thousand times and it came up heads every time, would we really be able to tell a third-party that there was a 50% chance of coming up tails? I believe that we would rather conclude that the coin was biased, than that we were simply unlucky. As I describe in section 3.3 infinity causes particular problems for any estimates of probability. In this particular case I am proposing the common-sense understanding that if something bad *can* happen, then over infinite time it *will* happen. Thus, if there is any chance that God can reject us in eternity, then he will. God must therefore be wholly good, if he is to deliver infinite good to us and to maintain that good for eternity.

[124] Oppy, "On Rescher on Pascal's Wager," 5.

reward. Schlesinger, however, does see a good God as somehow more probable, writing that

> *"A God of faithfulness [...] whose attributes altogether resonate with our nobler sentiments, makes a great deal of sense and it is therefore reasonable to ascribe a higher probability to his existence than to an unprincipled, arbitrarily acting, wanton god."*[125]

Christians might argue that our idea of what is noble is derived from being made "in the image of God",[126] but that is unlikely to cut any ice with an atheist. Therefore, I cannot see that God's goodness does necessarily affect his probability, although we should admit that a purely good God is far more attractive as an eternal companion.[127]

God is able to deliver infinite good

God may be good and totally trustworthy, but he must actually be able to deliver the promised reward if we are to accept the Wager. We might argue that a good, trustworthy God would not make a promise that he could not keep, but that implies omniscience on the part of the deity.[128] However, if heaven is to be infinitely good, then God must be able to produce an infinite reward.[129] Thus, there has to be the assumption that for the purposes of the Wager not only must God be good, but also able to deliver an infinitely good reward to those who meet the criteria.[130]

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[125] George Schlesinger, "A Central Theistic Argument," in *Gambling on God*, ed. Jeff Jordan (Maryland: Rowman & Littlefield, 1984), 91.

[126] Genesis 1:26

[127] We could imagine an oscillating god who gives us immense bliss one day and tortures us on the next. As long as this god is marginally nicer than nasty, the net benefit would still be infinite from the Wager's point of view, but it seems far less valuable than that of a purely good God. There is also an aberrant heaven to consider, where the offer is an infinite number of days of finite torment, followed by an infinite number of days of infinite bliss. Mathematically it may seem that each day of infinite bliss should outweigh the corresponding day of finite torment, but of course, we never reach the bliss.

[128] We might allow that a non-omniscient deity could intend to do good, but encounter unforeseen circumstances that prevent the fulfilment of that promise.

[129] Potentially that could be experience infinite bliss for a finite time, which might be easier to supply than finite bliss for infinite time, but as we cannot easily imagine exactly how infinite, eternal bliss might be delivered, I do not want to get drawn down into the mechanics too much.

[130] This necessarily assumes that an infinitely good reward is possible and it could be argued that an infinitely long life, however delightful on a day-to-day basis, would ultimately become tedious and repetitive. There are possible strategies to mitigate this, such as having the person forget sufficient previous days such that each new day can be enjoyed in its own right. For example, this topic was explored in the 2004 film "50 First Dates", where the character Lucy has short-term memory loss (known medically as anterograde amnesia) and meets her prospective suitor Henry every day as if it were their first encounter. The 1993 film "Groundhog Day" takes more dystopian view, where the protagonist remembers every day, but the people around him are unaware of the preceding identical days. I will assume that God can manage any difficulties associated with the potential ennui of infinite life, having (almost by definition) already dealt with them as part of his own eternal existence.

The hiddenness of God and decisions under uncertainty

It is an essential precondition for the Wager that God is hidden, at least to some significant degree. Pascal believed that God was incompletely hidden, as we have seen.

> *"If there were only one religion, God would be clearly manifest. [...] God being thus hidden, every religion that does not say that God is hidden is not true; and every religion which does not explain why does not instruct. If there were no obscurity, man would not be sensible of his corruption; if there were no light, man would not hope for a remedy. Thus, it is not only fair, but advantageous to us, that God be partly hidden and partly revealed; since it is equally dangerous to man to know God without knowing his own wretchedness, and to know his own wretchedness without knowing God. "*[131]

If God were to present some repeatable observable manifestation, then it would become possible for humans to find God purely by their own efforts. It would become a matter of scientific enquiry, rather than philosophical or theological. This would therefore be a process amenable to reason and could be encapsulated in a particular praxis and passed down from generation to generation. The existence of God in that respect would be no different from any other physical phenomenon. While it might be argued that identifying all the attributes of God might be too complex for such a project, I would reply that physical laws have proved somewhat tricky to pin down too. Newton's laws operate very well for everyday life, but they are found wanting when we consider the sub-atomic level. However, having a detailed understanding of quantum tunnelling and state superposition is not a prerequisite for driving a car to work. We manage perfectly well without that knowledge.

In the same way, we might know enough of God to get ourselves into heaven, such that unravelling the minutiae could be left to specialist theologians. If such a thing were possible, the Wager would not apply, since its starting point is that "reason cannot decide this question".[132] We would no longer have a decision under uncertainty, merely a methodical enquiry.

At the same time, if we are to modify our behaviour such that we might be (more) acceptable to God, then fairness demands that we must have some means of knowing what it is that we must do. There is an essential tension between the hiddenness of God that allows free choice and the notion of culpability. Pascal writes:

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[131] Pascal, *Pensées*: 74. L242
[132] Ibid., 123. L418

> *"If there is a God, he is infinitely beyond our comprehension, since, being indivisible and without limits, he bears no relation to us. We are therefore incapable of knowing either what he is or whether he is."*[133]

It could be that God is partially hidden and partially discoverable, or that he is perfectly hidden. If partially discoverable, there is an interesting question of how much is visible. This seems to be a fine balancing act. If too much of God's nature is exposed, then he becomes accessible to reason, but how little of God's nature can it be? Any visibility of a perfect God might be enough to constitute concrete evidence and this is something I will deal with on a case-by-case basis in the examples to follow.

If God is perfectly hidden, how can we know what he desires of us? Accepting that there is a continuum of options available, I will attempt to simplify it by considering it under three headings:

- God gives revelation to at least some people
- God built intuitions into us so that we innately know what he wants
- God is completely hidden

This examination of the hiddenness of God is not designed to be exhaustive, as it requires much longer treatment than I can afford in this essay. I will attempt to cover what I see as the salient points, so that they may act as a reference when we consider alternative gods and theologies.

God gives revelation to at least some people

We start by considering Pascal's Christian model of God, where we can consider there to be three levels of revelation: the revelation of Christ in the Incarnation; the revelation given directly by the Holy Spirit; and the body of revelation which is deposited in the scriptures and in the traditions of the church.

Christian doctrine generally holds that we cannot find God directly, but rather that he first finds us. In the traditional Calvinist approach, God's grace to save us is irresistible and we are incapable of any action in God's direction, but we will only consider Arminian theology here, as Augustinian predestination makes the Wager irrelevant.

Although Pascal was Augustinian, we find areas of heterodoxy in Pensées, such as where he writes: "God's will has been to redeem men and open the way of salvation to those who seek it".[134] This implies that he thought man could initiate

[133] Ibid., 122. L418
[134] Ibid., 50. L149

the search and that God would assist the seeker in his quest. He portrays God as granting conditional revelation based upon our attitude.

> *"Thus wishing to appear openly to those who seek him with all their heart and hidden from those who shun him with all their heart, he has qualified our knowledge of him by giving signs which can be seen by those who seek him and not by those who do not."*[135]

This view of God is consistent with Pascal's methods in the Wager. Once we are convinced by the terms of the Wager, we need to seek for God and he will then cooperate with us in order to bring us to salvific faith. The Wager is thus simply a push to start us in the right direction and Pascal still expects God to bring it to fruition. This stance seems just, as the honest seeker is rewarded and encouraged further, but the uninterested or downright lazy are deterred.

If we now consider any revelation to be given to us in the current age, we could subdivide this into immediate revelation, where we believe God has spoken to us directly, and mediated revelation where God has revealed himself to a third-party. In the case of immediate revelation, this ought to inform our reason. For example, if we were to witness "a booming voice from above followed by, say, a proof of Goldbach's Conjecture written in the sky"[136] as Craig Duncan suggests, then we might consider ourselves to have at least some evidence of God's existence that ought to sway our decision.[137]

There is mediated revelation located within religious traditions.[138] Jordan sees such tradition as "standing on the shoulders of others"[139] so that we should be able to see further and make better decisions as a result. He accepts Locke's concern that "there is much more falsehood and error amongst men, than truth and knowledge",[140] but feels that the considered reflections of earlier generations should carry at least some epistemic weight. If we consider ourselves to be part of an ongoing community in which God's revelation has taken place, then we can

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[135] Ibid. L149

[136] Craig Duncan, "Do Vague Probabilities Really Scotch Pascal's Wager?," *Philosophical Studies: An International Journal for Philosophy in the Analytic Tradition* 112, no. 3 (2003): 281.

[137] I am aware that there is considerable discussion in the literature of whether any level of such revelation should be convincing to the individual, but it is not particularly germane to the discussion here.

[138] For example, any revelation of Christ in the Incarnation is necessarily mediated through the scriptures, since we have no access to it directly, nor to any first-hand observers. If we are to accept them as valid testimony then we must therefore believe the scriptures to be true, at least in this respect, and that they have been faithfully maintained within the Christian tradition. Whether we should believe these scriptures is a decision that is made outside of the Wager, although it could be seen as a consequence of deciding to bet on the Christian God.

[139] Jeff Jordan, *Pascal's Wager* (New York: Oxford University Press, 2006). 81.

[140] John Locke, *Essay Concerning Human Understanding* (Oxford: Clarendon Press, 1689; repr., 1975). 657

accord the accounts some place in our understanding. Tradition provides guidance in what others have believed God wanted of them and might steer us in the correct direction. It allows a middle way between the certainty of evidence-based faith that would arise from direct, personal revelation and the otherwise impenetrable fog of infinite possibilities.

I believe that the Wager implies and depends upon this partial revelation. Pascal describes a God who is hidden, but who allows us fleeting glimpses. This will become clearer as we look at the cases to come.

God built intuitions into us

One way of God's ensuring that we follow the correct path, once we accept the Wager, is to build into us an innate sense of what is required. Richard Carrier writes: "God could reveal [what he wants from us] through our natural moral intuition, or through his secret inspiration of the world's cultures".[141]

There is some Biblical support for this in Genesis 1:26, but we also have the idea in Genesis 2 that the knowledge of good and evil is an acquired characteristic. Either way, we might all be born with an inner moral compass that directs us in the way that God wants. This need not conflict with our freedom to choose another path, although there is a clear tension. If we know of an inner voice that continually guides us and tells us that what we are doing is morally wrong, does that not impinge on our freedom to believe that our actions are correct?

Augustinian doctrine holds that we are incapable of doing the right thing on our own and Pascal echoes this, saying: "Men without faith can know neither true good, nor justice",[142] although he also feels that man has the contrary possibility of being great. As he writes: "religion must necessarily teach us that there is in man some principle of greatness and some great principle of wretchedness."[143] Yet Pascal does believe in some weak vestige of righteousness in man, although it is overwhelmed by concupiscence.

> *"The senses, independent of reason and often its master, have carried him off in pursuit of pleasure. [...] [Men] retain some feeble instinct from the happiness of their first nature, and are plunged into the wretchedness of their blindness and concupiscence, which has become their second nature."*[144]

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[141] Richard Carrier, "The End of Pascal's Wager?," (2006), http://www.infidels.org/library/modern/richard_carrier/pascalreply.html.
[142] Pascal, *Pensées*: 45. L148
[143] Ibid., 46. L149
[144] Ibid., 48. L149

If a deity does implant particular values, but still wishes to remain hidden, the values need to be disguised or be equivocal, or else their very existence may provide evidence for that deity's existence and thus undermine his hiddenness.

God is completely hidden

Let us move on to the case which is usually assumed within discussions of the Wager – the case where God is completely hidden from us. It is this hiddenness of God that allows opponents of the Wager to construct the bizarre and perverse deities that we will encounter in Chapter 3. If we had a better grasp of God's character, then many of these gross caricatures might be dismissed instantly without further ado. Jordan attempts this by using his Jamesian Wager to claim that none can be 'live' options for us. I believe that there is a simpler way to deal with them, which is to use risk-management techniques so that we can safely dismiss most of them from consideration. Although I will elaborate this in more detail in the following section, I can summarise it by stating that if God is so completely hidden that we cannot know what is required of us, then we cannot mitigate our risk and must simply accept it and move on to risks that we might be able to manage.

Disintermediation

In this thesis I shall assume that the individual is able to contract directly with God and does not require any intermediary to act on their behalf. I do not accept those who make claims on behalf of the deity, or who offer to improve one's chances of salvation by means of their own influence, or accumulated merit, with God. I would therefore exclude practices such as indulgences which have had a sorry history within the Christian church.[145] I acknowledge that some strands within the church have long established practices of appealing to intermediaries, such as the Blessed Virgin Mary, or the saints. The underlying belief in this case (in very simple terms) is that the saints have some special access to God and who can intercede on our behalf. My reply is that the earliest saints themselves had no intermediaries to act for them, so it must be possible for people to follow sufficiently worthy lives, such that they are acceptable in their own right. If we allow that the saints were granted some particular additional grace to be able to do this, then we should reasonably expect a similar gift to be offered to us, if it is actually required for salvation. This follows naturally on from the principle of fairness that I articulated earlier. If we are to assume that God distributes the potential of being saved in a fair manner, then it should be possible for any given individual to meet the criteria without additional aids.

[145] To be fair to the Roman Catholic Church, indulgences are not claimed to grant salvation, merely to reduce the temporal punishment that would otherwise be due for a sin which has already been forgiven.

We might suggest that the route to salvation lies through the intermediation of the saint and that this actually is the path set out and provided by God, such that to not follow it would constitute disobedience and failure. I suggest that if this were to be the case, then we would have to have some revelation of this fact, or some innate sense that this is the valid path. Otherwise it would be unfair to expect us to know that we should use such an intermediary. There are such a wide range of potential intermediaries, that I fear that we might encounter a "many-saints" problem in addition to the "many-gods" one. I will therefore appeal to Occam's Razor, such that we should not unnecessarily multiply the entities required for salvation. If a single fair deity would be able to grant salvation, then there is no necessary reason to believe that we would do better with an intermediary.[146]

I hold that no intermediary can demonstrate their ability to deliver an improved chance of obtaining the eternal reward and we would therefore view any such claims with suspicion. Under strict Pascalian logic, it could be argued that even a slight improvement in one's chances would lead to gaining an infinite reward and thus it would be rational to expend all one's resources in order to achieve this. However, there no reason to suppose that any given deity might not be offended by such an attempt and this might actually diminish (or even obviate) one's chances. We will cover this in more detail when we discuss Tabbarok's Wager on p173. For the purposes of this thesis, I will assume that no intermediary is required.

2.7 The nature of God in the Wager

Together, these attributes of being fair, good and able give us a picture of God which is largely consistent with an orthodox Christian view, although we have to take an Arminian perspective towards salvation itself, as we shall see later. In critiques of Pascal's Wager, however, many other potential deities are implied whose characteristics do not meet these basic criteria and Schlesinger argues that a God who does not meet Anselmian criteria is "not a fit deity to worship".[147] It is not clear why an atheist should care about this particular topic, since they were not looking for a suitable target for their adoration, and would argue that the Wager is ultimately about personal rewards, not whether a given deity is worthy. I will take a slightly different approach and suggest that such deities are inferior and that even if they might possibly exist, they will lose out in any head-to-head comparisons with more attractive options. That is, if we include any properly Anselmian deities in our deliberations, they will always be preferred over lesser options.

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[146] The intermediary need not be an individual, but a church, for example, and it could be argued that a faithful church might have greater influence with the deity than a single individual. However, space does not allow a fuller discussion and this is left as an area for further research.

[147] Schlesinger, "A Central Theistic Argument," 96.

I hold that if we are faced by equiprobable and equally valuable alternatives in terms of Expected Value, that it is logically acceptable to use other criteria as tie-breakers when we can only select one of the available options, but we are obliged to take one. Risk management demands that we mitigate risk as far as we reasonably can. If we were faced by two equiprobable, but mutually exclusive choices, then it would not be sensible to act like Buridan's Ass and refuse to choose either. Thus, it is entirely reasonable to try and find the better choice (if we can) by using other criteria. In the case where an Anselmian deity competes against a non-Anselmian one, *ceteris paribus* we will always choose the Anselmian deity.[148]

In the following section, I very briefly discuss the current state of discussion around the philosophical formulation of what constitutes an Anselmian conception of God for the purposes of the Wager. I shall make a small contribution of my own to this understanding, but this is merely an adjunct to my main thesis and I am not intending that this should be a comprehensive account of what is now a vast and sprawling subject.

Nothing greater

In his *Proslogion*, St Anselm sets out an argument based upon his premise that "God is that, than which nothing greater can be conceived". In modern discussions about God, this often leads to use of words like omnipotent, omniscient, omnibenevolent and so on. These words are philosophically charged and lead to a number of well-known internal paradoxes. As many philosophers have found, we can continually develop thought experiments which break the working definition of omnipotence and require further qualifying sub-clauses to the extent that it becomes hard to visualise exactly what is being described. Once we try and add other divine characteristics, the picture becomes even more muddled.[149] Merely redefining omnipotence to avoid the difficult cases makes it so bound up with qualifications as to be useless as a signifier of excellence. We can come up with thought experiments to defeat all of the omni- words, which make their use rather suspect, yet if we wish to remain true to St Anselm's definition, we require a being who is greater than anything else that can be conceived. An omnipotent being would seem to trump one who is merely very powerful, but if omnipotence is not actually conceivable, then we are free to allow something less.

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[148] Note that if there really were no difference at all, then it would still be better to adopt a mixed strategy and toss a coin, than to choose neither.

[149] For example, the discussion as to whether God is necessarily morally perfect (or impeccable) and is thus incapable of sin. If he cannot sin, it is argued, then he is clearly not omnipotent, as there is something that he cannot do, which is to sin. If he can sin, then he is not essentially morally perfect. This conflict can be found at least as far back as Aquinas, so we might assume than an early resolution to the problem seems unlikely.

The perfect God

George Schlesinger tackles this problem by focusing on perfection instead. He argues that St Anselm's God is essentially perfect and that any of the divine attributes we see are merely aspects of that perfection. One way of looking at characteristics like omnipotence, omniscience and omnibenevolence is to treat them as independent unique properties exemplified by God. The other is to think of them as tightly interconnected and that each one is merely a different aspect of the same attribute, namely perfection. An important part of this argument is that God displays these properties to a degree no more, but no less than required by absolute perfection.[150]

I suggest that we might consider the analogy of colour. A perfect light would be perfectly red, perfectly blue and perfectly green, all at once. However this means that it actually appears as none of those colours, rather it is the synthesis of them, being perfectly white.

Schlesinger's treatment allows us a far more fluid and descriptive way of tackling the problems of the omni- words. Rather than needing God to be omnipotent as such, he merely has to be powerful to the degree required by perfection. If God were more powerful than necessary, then this would actually diminish his perfection, rather than increasing it. It is thus the combination of attributes in perfect proportion that gives rise to perfection, rather than any one attribute on its own. Returning to our colour example, increasing the intensity of red in a perfectly balanced white light makes it less white, not more so.

The Maximal God

Yujin Nagasawa argues that is it perfectly consistent with the Anselmian view that God need not be an "OmniGod" as he calls him, but that a "MaximalGod" would suffice. His definition of the MaximalGod is "the being that has the maximal consistent set of knowledge, power and benevolence".[151] This God is very knowledgeable, very powerful and very benevolent, but need not be omniperfect. Nagasawa suggests that considering each attribute independently on a case-by-case basis is often unhelpful and that we need to consider them all at once, if we want to avoid the problems that we have seen. He argues that this definition is consistent with Biblical revelation because it talks about the significant extent of God's knowledge, power and benevolence, but it says nowhere that God is omniperfect.[152] The MaximalGod thesis is consistent with the OmniGod, because no upper limit is placed on the individual attributes and if the maximal consistent set is

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[150] George Schlesinger, *New Perspectives on Old Time Religion* (Oxford: Oxford University Press, 1988; repr., reprinted 2001). 5.
[151] Y. Nagasawa, "A New Defence of Anselmian Theism," *Philosophical Quarterly* 58, no. 233 (2008): 583.
[152] *Ibid.*

actually omniperfection, no conflict arises. However, this model does not demand that any of the divine characteristics are individually maximal.

Nagasawa illustrates his case with a number of possible deities. Suppose we have a God who has maximal power and benevolence, but slightly less than maximal knowledge. This could be achieved if there were a single proposition which the God did not know. This God will satisfy the MaximalGod thesis in a particular scenario as long as there is no candidate deity available who has greater knowledge, even if it has equal power and benevolence. This succeeds with the Anselmian test, since there is no conceivable being in those given circumstances who is greater, even if we could imagine a greater single attribute.[153] [154] I will assume for the purposes of this essay that only one MaximalGod can exist at a time.[155]Summary

In Schlesinger's and Nagasawa's MaximalGod, I believe that we have an neo-Anselmian model which is relatively immune to the problems of internal coherence that plague the OmniGod. The inherent paradoxes of the omni- words find suitable resolution, at least to a degree that will allow us to use the Anselmian model as a measuring stick when comparing candidate deities. I will rely upon this in the following sections as one means of deciding whether we should take a particular model of godhood seriously. Obviously, if a sub-optimal deity were the only one on offer, then sound risk management would indicate that we should take whatever we can get, but where we have competing options and a candidate deity would fall short of the MaximalGod thesis, then we can reasonably decide to eliminate that option from further consideration. I will search therefore, for a God who would satisfy both Pascal and St Anselm.

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[153] Nagasawa considers Robert Merrihew Adams' connection between the omniperfection of God and his worthiness to be worshipped. For Adams, only the omniperfect God should be worshipped, because our worship depends on our acknowledgement of God's supreme degree of intrinsic excellence. Yet if God's excellence is the maximum possible and there is no greater, on what grounds would we withhold our worship? Surely it cannot be because we can conceive of a theoretical possibility that one or more aspects could be better. I contend that part of worship ought to be driven by love and it is entirely possible to love someone who is far from perfect. I am not convinced that we worship God because he matches our theoretical best; rather we worship because it is a right response to our creator and redeemer. That aside, it seems reasonable that we should worship the one who embodies the highest possible virtues and who holds them in perfect balance together. There can be no better candidates for worship, since any deity which excelled in one area, would be deficient to a greater extent in another.

[154] Robert Merrihew Adams, *Finite and Infinite Goods : A Framework for Ethics* (New York: Oxford University Press, 2002). 14.

[155] It could be argued that two or more MaximalGods might potentially exist with non-overlapping magisteria (to borrow a phrase from Stephen Jay Gould), such that each would be maximal in their mutually agreed areas of responsibility. However, space does not permit further exploration of this topic.

2.8 Summary of critical principles

I have described some principles that we can employ in evaluating challenges to Pascal's Wager and I have set out what I believe to be the key ones below.

I. Principle of Accepted Immitigable Risk

> If a scenario offers no mitigation, then its risks will be deemed to be accepted and the scenario dismissed from further consideration.

II. Principle of Maximality

> Any deity to be considered must at least meet the criteria prescribed for a MaximalGod.

III. Tie-break Principle

> If two options tie in terms of their expected utility, then other secondary factors may be used to decide between them. This includes a subjective assessment of the most likely to occur, even though this probability may already have been incorporated in the EV calculation.

IV. Principle of Disintermediation

> We will only consider cases that deal with the deity directly and not via any intermediaries.

These principles are intended to act as axioms within the set of problems that we are considering and they provide benchmarks for examination of the Wager. I will use them particularly in Chapter 3, where I will aim to narrow the possibilities sufficiently for us to make a rational decision. In general, evaluation will take place within a utilitarian framework of reference and a decision will be considered the best option, if it out-performs its competitors in terms of the net utility it delivers to the individual.

I am not suggesting that these are the only possible criteria, but that as a set they make a contribution by providing a coherent framework in which we can consider options fairly and on an equal footing. They are intended to set out a methodology for evaluation, but are not framed to be water-tight, nor are they articulated in formal logic, because I believe that this would merely obfuscate the decision-making, without providing any additional rigour in real terms. Developing them more fully would be a task for further work in this area.

2.9 Role of CBT

Before moving on to the objections raised against the Wager in greater detail, we need to briefly discuss Pascal's remedy for those who are convinced by the logic, but find themselves temperamentally unable to achieve the required level of belief. Christopher Hitchens holds that he is that sort of person whom Pascal described as being made so as to be unable to believe.[156] Pascal suggests that such people should

> *at least learn your inability to believe, since reason brings you to this, and yet you cannot believe. Endeavour then to convince yourself, not by increase of proofs of God, but by the abatement of your passions. You would like to attain faith, and do not know the way; you would like to cure yourself of unbelief, and ask the remedy for it.*

Pascal is proposing that the genuine unbeliever should undertake a course of therapy to cure their unbelief. He approaches unbelief as if it were an illness that needs to be cured. Modern readers might find this assumption of the normality of faith as a rather disturbing concept. Indeed, religious faith is sometimes portrayed as a sort of mental illness, or intellectual deficit,[157] as can be seen in some New Atheist writers, like Richard Dawkins, who compares it to a virus.[158] Pascal, by contrast, holds that unbelief is the malady and that a restoration of mental health will lead to natural, salvific belief in God. He therefore proposes that the unbeliever should study those who have taken the same path.

> *Learn of those who have been bound like you, and who now stake all their possessions. These are people who know the way which you would follow, and who are cured of an ill of which you would be cured.*

One way of understanding the route that Pascal is offering is to regard it as a course of Cognitive Behavioural Therapy (or CBT), albeit a few hundred years ahead of the current practice. I will briefly summarise the main ideas within CBT and examine how Pascal grasps their essential benefits and how they might be applied in this case.

CBT has its roots in the Behavioural Therapy of Wolpe and others in the 1950s and 60s, together with the Cognitive Therapy of A.T. Beck, which arose in the 60s but

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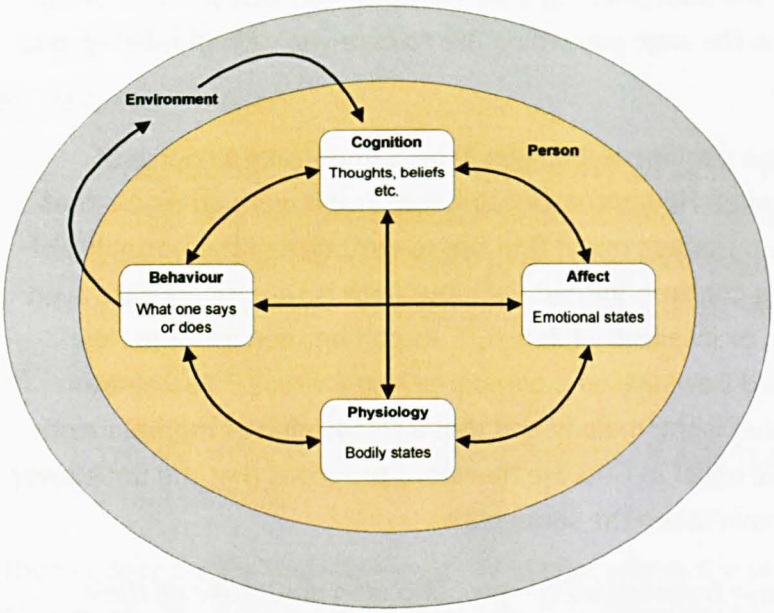
[156] Christopher Hitchens, *God is Not Great : How Religion Poisons Everything* (London: Atlantic Books, 2007). 6.

[157] Dawkins, *The God Delusion*: 16. This is accompanied by his suggestion that atheists should dub themselves "brights", which fellow atheist Hitchens described as "cringe-making" in Hitchens, *God is Not Great*: 5.

[158] Dawkins, *The God Delusion*: 191.

became more influential in the 70s.[159] CBT considers behaviour (i.e. what we do) as crucial in maintaining and (more importantly for its use in Pascal's Wager) *changing* psychological states.[160] It suggests that there are four main 'systems' within the person that interact with each other and also with the external environment. These are:

- Cognition
- Affect (or emotion)
- Behaviour
- Physiology



The cognitive principle of CBT is that it is the *interpretation* of events, not the events themselves which are crucial and its behavioural principle is that what we do has a powerful influence on our thoughts and emotions. It also holds that it is more important to focus on the here-and-now, rather than on the past.[161] Thus it distances itself from event-based, backward looking therapies, such as psychoanalysis.

Within the general idea of cognition, CBT suggests that there are distinct levels of cognition, which can roughly be grouped into three categories in a therapeutic context: Negative Automatic Thoughts (NATs), Core Beliefs and Dysfunctional Assumptions (DAs). In order to show how these apply within Pascal's model, I will briefly describe each.

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[159] David Westbrook, Helen Kennerley, and Joan Kirk, *An Introduction to Cognitive Behaviour Therapy: Skills and Applications* (London: Sage Publications Ltd, 2011). 2.
[160] Ibid., 5.
[161] Ibid., 8.

Negative Automatic Thoughts

This term is used to describe the stream of thoughts that most of us can recognise if we pay attention to them. They are negatively tinged appraisals or interpretations that we take from what happens around us and they exert a direct influence over mood from moment to moment. They are usually specific, although they can become stereotyped in some chronic problems.

Core Beliefs

At the other end of the scale, a person's core beliefs are what they believe about themselves or the world in general. They are not usually accessible to conscious examination, even by the person concerned, and usually have to be inferred from that person's thoughts and behaviours. They are fundamental and absolute views about the world and are assumed to apply in all situations. CBT holds that these core beliefs (also known as 'schemas') are usually learned early on in life, but may sometimes develop or change later as a result of severe trauma, e.g. a previously well-adjusted girl may develop self-loathing after being raped. Christine Padesky offers the metaphor of prejudice as one way of understanding how core beliefs operate.[162]

Belief in the existence of God could be considered to be a core belief, although it has traditionally received little attention from CBT practitioners according to Kirk Bingerman.[163] This belief in God's existence may interact with core beliefs derived from other sources, such as the person's fundamental belief about the world, or of their own self-worth, to yield composite schemas; for example, the nature of God and whether God can be trusted.[164]

Dysfunctional Assumptions

Dysfunctional Assumptions bridge the gap between the core beliefs and NATs and usually take the form of condition if...then... propositions, or are framed as should...must... statements. They may represent attempts to live with negative core beliefs. For example, someone who feels unlovable I may develop the DA that "If I always try to please other people, then they may put up with me, but if I assert myself, they will reject me".

In diagrammatic form:[165]

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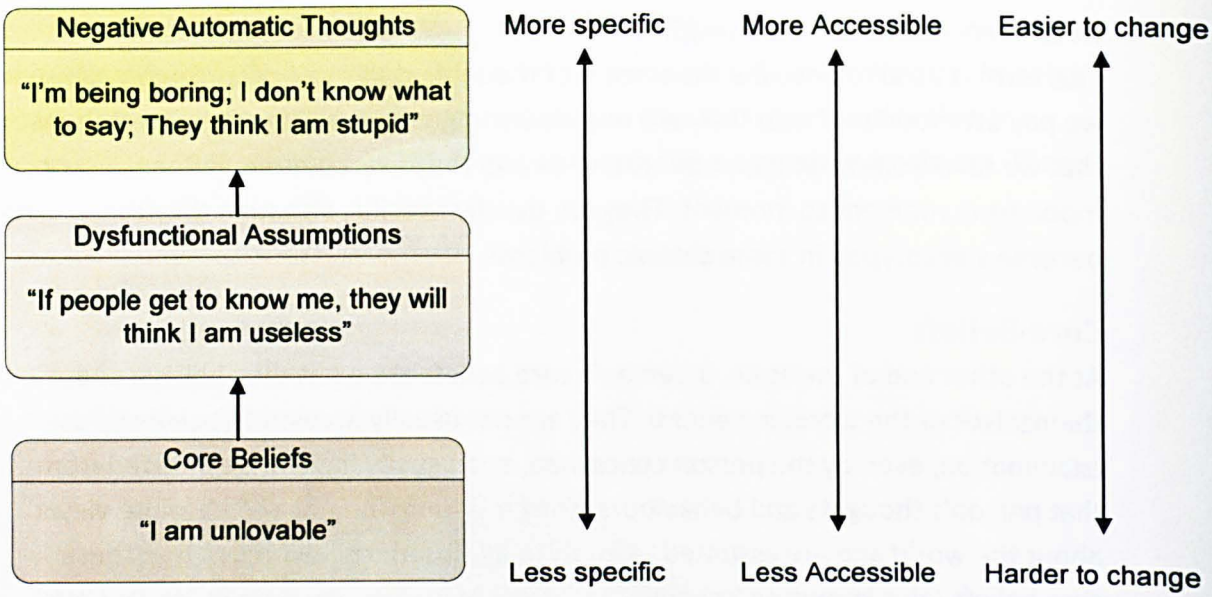
[162] Christine A. Padesky, "Schema as self-prejudice," *International Cognitive Therapy Newsletter* 6(1990): 6.

[163] Kirk. A Bingerman, *Treating the New Anxiety: A Cognitive-Theological Approach* (Lanham, Maryland: Rowman & Littlefield, 2007). 65.

[164] Ibid., 68.

[165] Westbrook, Kennerley, and Kirk, *Cognitive Behaviour Therapy*: 9-11.



Pascal understood this relationship between our core beliefs and their outward manifestation and wrote about it often in his *Penseés*. His whole discourse on diversion hinges on the way in which we engage in fruitless activity in order to prevent ourselves from examining our own core belief that we are wretched.[166] [167]He also strongly believes that our behaviour conditions our attitudes:

> *What are our natural principles, apart from our accustomed principles? ... A different custom will produce different natural principles.*[168]

He therefore suggests to the unbeliever that they should perform what in CBT is called a Behavioural Experiment (or 'BE') in which a client explores a situation in order to challenge their own dysfunctional assumptions. In a BE, the client is trying to obtain new information about a stressful situation that will allow them to test their beliefs about themselves, others and the world. The word "experiment" is chosen deliberately, because it is an attempt to gather information to confirm or refute the current working hypothesis.[169] This is different from Behavioural Therapy (BT), in which clients may enter a situation in a controlled manner, so that they learn to decrease their stress by becoming habituated to it.

The idea of a BE is that it is not simply to habituate the client to the stressful situation, but to incorporate a cognitive element. For example, in both BT and CBT, a client with agoraphobia might be encouraged to visit a supermarket. In BT, the aim would be to stay in the situation long enough (and repeated often enough) for the anxiety response to die away. The environment thus becomes less scary,

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[166] Pascal, *Pensées (tr. Ariew)*: 6. S33/L414

[167] Diversion actually forms part of the behavioural strategies of CBT and is used to direct a patient's thoughts away from NATs.

[168]Pascal, *Pensées (tr. Ariew)*: 33. S158/L125

[169] Westbrook, Kennerley, and Kirk, *Cognitive Behaviour Therapy*: 196.

because it is common-place. In CBT, the client is there to discover whether their negative thoughts are actually justified. Thus if the client believes that "If I become anxious then I will pass out, or go mad", the intent of the BE would be to explore whether this is actually true. Thus, when they discover that they do not pass out, they can challenge that belief with hard evidence. The intent of CBT is to alter beliefs, not to simply extinguish them and a BE is an attempt to gather empirical evidence about the problem and thus to be able to re-evaluate the client's assumptions and thus (indirectly) to alter their core beliefs.[170]

It is fair to say that Pascal talks mainly about the behavioural aspects of the therapy in the Wager itself, since he suggests that doing as Christians do will make you believe "naturally and mechanically"[171] (as Roger Ariew translates the word *s'abêtira*). However, he does not expect blind unthinking obedience, but rather that his patient should observe their own progress, for he is confident that they will see "such a great certainty of gain and so much nothingness in what they risked".[172] He is asking them to conduct an experiment to see whether they can believe and to challenge what he sees as their dysfunctional assumption that they cannot.

Pascal recognises two sorts of people whom he respects: "those who serve God with all their heart because they know him and those who seek him with all their heart because they do not know him".[173] For someone to be ignoring God entirely, he sees as a "monstrous thing".[174] Thus, he sees no recourse but to therapy in order to repair such defective thinking.

Pascal knows that it is the core beliefs that need to change, but recognises that these are not amenable to reason alone. Although he has set out a cognitive element in his rationale by describing the utility of belief, he recognises that if he is to alter the core beliefs materially, then the treatment must incorporate a strong behavioural element. At no point is he suggesting that doxastic voluntarism is an option (*contra* Dawkins), but rather that therapy is required. Pascal's suggested behavioural experiment is not an attempt in self-deception, any more than it is an attempt to fool God and thus it cannot be immoral to pursue such a course, providing always that it is attempted within the agreed therapeutic context. He is not suggesting blind faith, nor unwitting obedience, but rather a conscious experiment. Pascal is ever the scientist.

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[170] Ibid., 196-7.
[171] Pascal, *Pensées (tr. Ariew)*: 214. S680/L418
[172] Ibid. S680/L418
[173] Ibid., 220. S681/L427
[174] Ibid., 222. S628/L428

Having discussed the four basic principles and the therapeutic nature of Pascal's solution, I will now examine some objections more systematically, using the framework which I have outlined.

Chapter 3 Arguments and Objections

The bulk of this chapter examines some of the major classes of objection that have been made and selects the relevant principles that we should apply in each case. The wide range of attacks upon the Wager mean that I would necessarily need to cover a lot of ground if I were to treat each one comprehensively and while there are many similarities between them, each has nuances which would make for a rather fragmentary and repetitive account. I will therefore treat some of the objections in much greater depth, particularly those where attention has been focused in the literature, but with others I will merely indicate the principles that should apply in handling them.

I focus particularly on the problems with the use of infinity, as this is a topic where there has been much recent interest. As part of this section I outline some attempts to resolve the problems and I make a contribution in this area by suggesting a solution of my own which is both intuitively attractive and mathematically robust.

I tackle the many-gods problem in section 3.4, by sketching out how my risk-management principles might be used to defeat the major classes of each objection. This cannot be a fully systematic account, because there are many variants of each argument, each with its own subtleties, but I show that the principles are sufficiently robust to be applied more widely against other exemplars.

In section 3.5, I discuss difficulties that have been raised with probability assignments in the Wager, looking particularly at infinitesimal probabilities and whether one might rationally apply a zero probability, either explicitly or via Hájek's 'vague' probabilities. I suggest that there is a lower bound on probability that a rational agent can apply and give an outline of a rationale behind such a bound. Various authors have suggested that God might be irrational or immoral and I investigate their claims critically in section 3.6, focusing specifically on Greg Janzen's and Terence Penelhum's objections in this regard.

Section 3.7 examines some of the moral difficulties which have been raised, both in the act of wagering and in the Cliffordian suspicion that it may be morally wrong to make judgements in this fashion. Then in the final section I look at abuses of Pascalian logic, including Pascal's Mugger and the Persecutor's Wager.

Let us start by setting out the main arguments that have been identified within the Wager and the way in which von Neumann-Morgenstern decision theory applies to them.

3.1 Decision Theory and Pascal's Wager

In its popular formulation, Pascal's Wager appears to offer two choices: to believe or not to believe. If you believe and God exists, then you win an infinite amount; if

you believe and God does not exist then you lose nothing. In Pascal's words : *'si vous gagnez, vous gagnez tout; si vous perdez, vous ne perdez rien'*.[175] Displayed as a matrix, the options would look as follows:

	God exists	God does not exist
Bet on God	Infinite gain	Lose nothing
Do not bet on God	No gain	No gain

Or, if we convert to numbers, using ∞ as our symbol for infinity, we get:

	God exists	God does not exist
Bet on God	∞	0
Do not bet on God	0	0

If we take the probability of God's existence to be *p,* then the probability of God's non-existence[176] will be $1 - p$ and the Expected Value (EV) is thus:

$$\begin{aligned} \text{EV(bet on God)} &= (p \times \infty) + ((1\text{-}p) \times 0) \\ &= (p \times \infty) + 0 \\ &= \infty \end{aligned}$$

$$\begin{aligned} \text{EV(bet against God)} &= (p \times 0) + ((1 - p) \times 0) \\ &= 0 \end{aligned}$$

In decision theory terms, the row 'Bet on God' row *dominates* the other row since it never does worse and sometimes does better. It is thus the strategy that the rational person should pursue.[177]

Various authors, including Alan Hájek, have argued that there are costs associated with the bet, although these are agreed to be finite. So we might reformulate the matrix with three additional finite costs f_1, f_2 and f_3:

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[175] *Pensées*: 122-23. L418

[176] Probabilities are always a value between 0 and 1 inclusive. The total of all probabilities for a given situation must be 1. So, if we have just two possibilities and one has probability *p*, then the other must have probability 1-*p*

[177] Alan Hájek suggests that the argument from dominance may be flawed, but I am not entirely persuaded by his arguments and space does not allow for a fuller rebuttal. I will therefore follow the general acceptance of the argument from dominance by other writers. For further exploration see: Alan Hájek, "Blaise and Bayes," in *Probability in the Philosophy of Religion*, ed. Jake Chandler and Victoria S. Harrison (Oxford: Oxford University Press, 2012).

	God exists	God does not exist
Bet on God	∞	f_1
Do not bet on God	f_2	f_3

$$\text{EV(bet on God)} = (p \times \infty) + ((1\text{-}p) \times f_1)$$

$$= \infty$$

$$\text{EV(bet against God)} = (p \times f2) + ((1 - p) \times f3)$$

For any value of p which is not zero or infinitesimal we will have an infinite payoff, which still dominates the finite reward for the bet against God. Ian Hacking summarises the position:

> *...although we have no idea of the chance that God exists, it is not zero. Otherwise there would be no problem. There is a finite, positive chance that God exists. No matter what this finite chance is – no matter how small – the expectation of the pious strategy with infinite reward exceeds that of the worldly one. Hence, the pious strategy must be followed.*[178]

Hacking[179] identified three arguments in the wager, which have been later slightly modified by Alan Hájek.[180] In this section, I describe each of the three arguments and their location in the text. The objections that naturally arise out of these three strands are manifold and varied, so I will deal with each of those separately.

The Argument from Superdominance[181]

We have already seen this argument in part, when we discussed decision theory. Here is the key text from Pascal:

> *Let us weigh up the gain and the loss involved in calling heads that God exists. Let us assess the two cases: if you win, you win everything, if you lose you lose nothing. Do not hesitate then; wager that he does exist.*[182]

Edward McClennen[183] summarises this argument in decision theory form as:

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[178] Hacking, "The Logic of Pascal's Wager," 27.
[179] Ibid.
[180] Alan Hájek, "Pascal's Wager," ed. N. Zalta Edward, *The Stanford Encyclopedia of Philosophy*(2004), http://plato.stanford.edu/archives/spr2004/entries/pascal-wager/.
[181] The term *superdominance* has been put forward to describe the situation where an alternative's worst outcome is as good as, or better than, the best return from the other option.
[182] Pascal, *Pensées*: 122-23. L418
[183] McClennen, "Finite Decision Theory," 117.

	H God exists	T God does not exist
Bet on God	[Truth] 'You win everything' (heavenly happiness)	[Error] 'You lose nothing' (hence, status quo)
Bet against God	[Error] Wretchedness	[Truth] Status quo

Or simplified further as:

	God exists	God does not exist
Bet on God	You win everything	Status quo
Bet against God	Wretchedness	Status quo

The bet on God not only dominates the alternative, being better in its best case and never worse, but it *superdominates*, because its worst case is no worse than the best available for the alternative (status quo) and its best case is far better (you win everything).

McClennen analyses these cases in detail and shows that, as long as we assign a probability greater than zero to God's existence, then betting on God always superdominates the bet against God. Hájek argues that assigning a zero probability to God's existence defeats this superdominance, saying *"Rationality does not require you to wager for God if you assign probability 0 to God existing. And Pascal does not explicitly rule this possibility out until a later passage".*[184]

It seems a weak argument to suggest that because Pascal had not already excluded a zero probability, that we can allow it in this passage. It is obvious that Pascal wrote the *infini-rien* in a hurry and it is full of amendments and additions. It is certain that Pascal would have set everything out clearly and with mathematical rigour in his final publication. In any case, Hájek is missing the point: even if we did assign a probability of zero, it does not yield a *better* outcome and it seems to be pre-judging the outcome. As I discuss on page 140, assigning a zero probability to God's existence would be a significant leap of faith and would surely be a dogmatic stance, as Craig Duncan suggests.[185]

The second argument appears as Pascal addresses his imaginary opponent and deals with the issue that one might be staking something by believing in God. This could be self-respect, the feeling of complete personal freedom or even the chance to pursue worldly indulgence. Thus he imagines his adversary saying: 'That is

[184] Hájek, "Pascal's Wager".
[185] Duncan, "Do Vague Probabilities Really Scotch Pascal's Wager?," 281.

wonderful. Yes, I must wager, but perhaps I am wagering too much.'[186] Pascal then moves on to his next line of argument: the argument from expectation.

The Argument from Expectation

Pascal talks about the potential payoff for the Wager in terms of extra lives. This seems on the surface to be a rather odd concept, but he is talking about the typical model of wagers, where the gambler is paid as a multiple of the original stake. Since we have only our lives to offer as a stake, it seems reasonable to define a payoff in terms of extra lives, although Pascal is vague about how that might operate.

> *Let us see: since there is an equal chance of gain and loss, if you stood to win only two lives for one you could still wager, but supposing you stood to win three?*
>
> *You would have to play (since you must necessarily play) and it would be unwise of you, once you are obliged to play, not to risk your life in order to win three lives at a game in which there is an equal chance of losing and winning.*[187]

Pascal is saying that, given there are only two possibilities and you cannot tell which to choose, the probability of either's being correct is ½. This would seem to be an appeal to the Principle of Indifference which I discussed in the previous chapter and many critics baulk at its use in this context; Hacking calling it a "monstrous premiss" and claims that the argument "can work only for people who are, in the strongest sense, exactly as unsure whether God exists, as they are unsure whether he does not exist".[188] Certainly from probability theory, it is nonsense. The odds of winning the UK Lottery are around 14 million to 1.[189] If I buy a ticket, then on the day after the draw I will either have won the lottery, or I will not. Given there are only two possible states, does that mean that they are equally probable? Certainly not!

I believe, however that Pascal's point is more subtle. Let us look at how he continues...

> *[E]ven though there were an infinite number of chances, of which only one were in your favour, you would still be right to wager one in order to win two; and you would still be acting wrongly, being obliged to play, in refusing to stake one life against three in a game, where out of an infinite number of chances, there is one in your favour*

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[186] Pascal, *Pensées*: 123. L418
[187] Ibid. L148
[188] Hacking, "The Logic of Pascal's Wager," 189.
[189] More precisely: 13,983,816 to 1 for the UK Lotto, in which players pick 6 numbers that range from 1 to 49.

If we return to the lottery ticket analogy, it is like saying that you have paid a pound and you can either have a lottery ticket for your pound, or nothing. Although you are only slightly better off with the lottery ticket, with a 1 in 14 million chance of winning, it still dominates the alternative where you have no chance of winning at all. In this approach, Pascal is assuming that the cost in the wager is what economists call 'sunk cost' – it is already invested, since you cannot have your life back, nor use it anywhere else. Neither Hájek nor Hacking pick up on this and focus instead on the apparent statistical flaw of assuming equal probabilities, although Hájek is more suspicious in his 2004 summary and observes: 'Pascal realises that the value of ½ plays no real role in the argument'.[190] McClennen admits: 'I can make little sense of the remarks [about an infinite number of chances]'.[191] Perhaps he had forgotten just how clever a mathematician Pascal was.

It is certainly a novel idea that if there were 'an infinite number of chances, of which only one were in your favour, you would still be right to wager one in order to win two'. After all, it seems wrong to enter a lottery with an infinite number of tickets, but where the payoff is only twice your stake. We therefore need to unravel the mathematics a little. If p is the probability of winning and you risk one life to gain two then:

$$\text{EV(bet for God)} = (p \times 2 \text{ lives}) + ((1-p) \times 0) - 1 \text{ life}$$

If we say that there are an infinite number of tickets, but only one winner, then we can calculate that p is $\frac{1}{\infty}$, so if we consider the equation in units of lives we have:

$$\text{EV} = \left(\frac{1}{\infty} \times 2\right) + 0 - 1$$

$$= \frac{2}{\infty} - 1$$

Thus the net outcome would be to lose one's life, albeit with what seems like an infinitesimal upside. If we compare this negative outcome with the payoff obtained by not playing (which is zero) then it would seem more attractive not to play at all. Pascal's point though, is that we do not have a choice about whether to play – we *must* gamble.

Since we are embarked upon the game and the payoff if God does not exist is zero, then the EV for betting against God is to lose one's life with no chance of compensation at all.

$$\text{EV(bet against)} = (p \times 0) + ((1-p) \times 0) - 1$$

[190] Hájek, "Pascal's Wager".
[191] McClennen, "Finite Decision Theory," 120.

$= -1$

So we can summarise the alternatives as:

$$\text{EV (bet on God)} = -1 + \frac{2}{\infty}$$

$$\text{EV (bet against)} = -1$$

Even though the EV is only infinitesimally greater when betting on God, it is still greater and thus should be the rational choice. This becomes particularly pertinent if we consider the heavenly life received as being in any way superior to the earthly life staked. [192]

Ultimately though, this discussion of equal probabilities and limited payoffs is just a precursor to Pascal's main argument – he is simply setting the stage by arguing that if you could get two or three times your stake then you would be compelled to take it. He now introduces the infinite payoff.

The Argument from Generalised Expectations

This is Pascal's major argument and it is the strand which has provoked the most debate, as Pascal introduces the concept of infinity. As a brilliant mathematician he was well aware of the somewhat counter-intuitive properties of infinity and he uses these to support his argument by pointing out that the life offered is eternal life, which he calls an 'infinity of infinitely happy life'.

> *[T]here is an eternity of life and happiness. That being so, even though there were an infinite number of chances, of which only one were in your favour, you would still be right to wager one in order to win two; and you would still be acting wrongly, being obliged to play, in refusing to stake one life against three in a game, where out of an infinite number of chances, there is one in your favour, if there were an infinity of infinitely happy life to be won. But here there is an infinity of infinitely happy life to be won, one chance of winning against a finite number of chances of losing, and what you are staking is finite. That leaves no choice; wherever there is infinity, and where there are not infinite chances of losing against that of winning, there is no room for hesitation, you must give everything.*[193]

Detailed exegesis of this passage can be difficult, as Pascal seems to be falling over himself in his excitement to reveal his great idea – that of infinite gain. Thus, we find references to two and three lives in ways that seem to go against the sense of

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[192] Hájek had noted this point in his earlier 2003 paper that 'any infinitesimal probability for God's existence still dictates wagering for God, for even an infinitesimal amount of heavenly value trumps any amount of earthly value'.

[193] Pascal, *Pensées*: 123. L418

the passage (which we covered in the previous section). I shall concentrate here on its major idea – that there is infinite gain to be obtained from a finite number of chances.

As we saw before, for any finite (non-zero and non-infinitesimal) probability p, we get:

$$\text{EV(bet on God)} = (p \times \infty) + ((1-p) \times 0)$$
$$= (p \times \infty)$$
$$= \infty$$

There seem to be three major assumptions in this formulation:

a) the stake is finite (one's life)

b) the number of possibilities is finite

c) the potential gain is infinite

Nicholas Rescher[194] draws these together into a decision table, by saying that if there are n losing tickets (or possibilities) in the lottery then we have a probability $\frac{1}{n+1}$ of getting the winning ticket and a probability $\frac{n}{n+1}$ of getting a losing ticket. The return is calculated in terms of 'life units' – that is in terms of your stake. If we bet against God, we are simply conserving our life for whatever purpose we choose and thus our EV is 1 life unit.

	God exists Probability: $\frac{1}{n+1}$	God does not exist Probability: $\frac{n}{n+1}$
Bet on God	∞	0
Bet against God	1	1

At first glance it appears that the total EV for betting against God is 2, but that is because we have not multiplied through by the probability of each option. If we do so, we get the following:

	God exists	God does not exist	Total EV
Bet on God	$\frac{\infty}{n+1} = \infty$	0	∞
Bet against God	$\frac{1}{n+1}$	$\frac{n}{n+1}$	1

[194] Nicholas Rescher, *Pascal's Wager: a study of practical reasoning in philosophical theology* (Notre Dame: University of Notre Dame Press, 1985). 14.

Thus, although the bet on God does not dominate the bet against God, because it sometimes does worse, the EVs of the two choices are dramatically (infinitely) different. However, as we will see in Chapter 3, as *n* tends towards infinity (i.e. that there are infinitely many possible gods to be considered), the mathematics becomes less clear. The result of dividing infinity by infinity is undefined, even if a common-sense understanding would suggest that the answer should be 1. Thus, in our matrix we have the following:

	God exists	God does not exist	Total EV
Bet on God	$\frac{\infty}{\infty+1}=?$	0	?
Bet against God	$\frac{1}{\infty+1}$	$\frac{\infty}{\infty+1}=?$	?

Since each option is indeterminate, we cannot make a decision either way. There are solutions to this particular problem and I set out my own on page 106.

Having covered the basic decision theory of the Wager, we have already see some difficulties in its approach and particularly in the use of infinity within this context. We now move on to discuss the objections to the Wager in greater detail and will attempt to deal with the mathematical difficulties, as well as a wide range of attacks from other directions.

3.2 A taxonomy of objections

Since Pascal's text first became available, commentators have raised objections against its logic. In the later part of the twentieth century, these became increasingly sophisticated and took a number of different lines of attack upon the Wager. I have attempted to classify them into families, by looking at what fundamental aspect of the Wager's logic is under attack. Critics often use multiple strands of argument in their approach and so I have attempted to separate out each class of objection separately, since if none of the strands holds on its own, it is very hard to make a case for their holding all together. Some attacks I have deemed to be not worth considering, because they do not fully engage with Pascal, or with the subtleties of his argument. For example, Richard Dawkins suggests that Pascal was "probably joking"[195] when he proposed the Wager, but Dawkins' grasp of the text is so weak[196] that we need not take him seriously either.

Since modern critics have built upon the work of earlier attempts, I will generally deal with the most recent and/or best argument in each class, rather than showing a family tree of how each argument has evolved over time. My thesis is that none of these objections succeeds and so it seems appropriate to take what I consider to be the most developed version of each argument, rather than picking weaker exemplars.

I suggest that we can categorise the broad families of objections as being based around problems with:

- infinity
- the decision matrix
- probabilities (zero, infinitesimal and vague)
- the nature or character of God
- the process of wagering

3.3 Problems with infinity

The argument from superdominance relies upon the property of infinity that when it is multiplied by any positive finite number, the result is still infinite. Alan Hájek calls this *reflexivity under multiplication*[197] and Pascal saw it as the key factor in favour of his Wager, because infinite reward always trumps any finite alternative. It is not a univocal argument, however, and there are attacks upon Pascal's Wager that use the properties of infinity in order to defeat the Wager's logic. In this section I consider arguments whose main thrust is focused upon the nature of infinity and its employment within the Wager.

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[195] Dawkins, *The God Delusion*: 105.

[196] Dawkins raises an objection (doxastic voluntarism) which Pascal actually addresses in the text of the Wager.

[197] Hájek, "Waging War," 49.

Infinity is a slippery concept. Pascal was aware of many of the properties of infinity as a mathematician, although he predates Georg Cantor who developed much of our modern understanding of the nature of infinity. Nothing in our universe is infinite as far as we can tell. Our current understanding of physics leads us to believe that there are a finite number of particles,[198] there is a finite maximum speed in the universe[199] and there is even a finite amount of energy.[200] Cantor's main contribution to our understanding is that infinity comes in different 'sizes'. Some infinities, like the number of integers,[201] are theoretically possible to calculate if you have infinite time; while others like the number of real numbers are uncountable, no matter how much time you have in order to try.

Infinity, usually represented by the symbol ∞, has odd mathematics. If you add to it, subtract from it or multiply it by another number, the answer is still infinity. Pascal gave a simple description of infinity in *Pensées*:

> *Unity added to infinity does not increase it at all, any more than a foot added to an infinite measurement: the finite is annihilated in the presence of the infinite.*[202]

However, infinity also has a number of paradoxes, one of which – the St Petersburg Paradox - is usually cited whenever discussing the mathematics of Pascal's Wager. Paul Saka suggests that the unsettling nature of the St Petersburg Paradox might give us cause to doubt the efficacy of decision theory when infinite quantities are involved and thus by implication to be suspicious about Pascal's Wager.[203] Hájek agrees, saying that the St Petersburg Paradox is particularly apposite in this area.[204] Some recent work, both theoretical and experimental, has shown that the St Petersburg problem may not be a paradox after all, so I will cover this in a little detail, in order to close off this particular line of objections to the Wager.

The St Petersburg Paradox

In this paradox, we are asked to imagine a game where a fair coin is tossed a number of times until it comes down heads. The prize doubles each time that the coin comes down tails before the final head. Let us look at a few sample games:

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[198] There are estimated to be between 10^{72} (that is: a 1 followed by 72 zeroes) and 10^{87} particles in the universe.

[199] The maximum speed according to Einstein is the speed of light or 299,792,458 metres per second.

[200] The figure for this is contested. Some cosmologists, like Hawking, have argued that the total energy is zero as this makes some of their maths work, others pick a big number.

[201] An integer is a 'whole' number, like 1, 2 or 99.

[202] Pascal, *Pensées*: 121. L418

[203] Paul Saka, "Pascal's Wager," *Internet Encyclopedia of Philosophy*(2005), http://www.iep.utm.edu/p/pasc-wag.htm.

[204] Hájek, "Blaise and Bayes," 177.

a) Comes down heads first time – we win £2

b) Comes down tails the first time and then heads – we win £4

c) Comes down tails twice and then comes down heads – we win £8

We can represent our winnings mathematically as $£2^n$ where *n* is the total number of coin tosses. If we look at the probabilities for the above cases, we get the following picture:

a) Probability of winning on the first toss = ½ so the EV is: ½ × £2 = £1

b) Probability of winning on the second toss = ½ × ½ = ¼ so the EV is:
¼ × £4 = £1

c) On the third toss it is = ½ × ½ × ½ = ⅛, the EV is ⅛ × £8 = £1

If we add all these expected values together we have an infinite series:

EV(St Petersburg) = (½ × £2) + (¼ × £4) + (⅛ × £8) + ...

= £1 + £1 + £1 + ...

= £∞

The longer the run of tails, the more we win. The probability of such a long run is halving each time, but the payoff is doubling. Unlike most gambling games, we do not place an initial stake in this game, instead we have to decide how much we will pay in order to play it. Since the game appears to have an infinite EV (similar to that in Pascal's Wager), what is a rational stake?

Most people would not pay very much, although theoretically we should risk everything we have. Daniel Bernoulli enunciates the St Petersburg problem in his 1738 paper *'Exposition of a New Theory on the Measurement of Risk'*[205] where he proposes that a number of factors are at work. One is risk-aversion, in that different people have a different attitude towards risk and to the sorts of risk which they are willing to take. For example, most people would not take risks that carry a significant chance of death or serious injury, although mountain climbers and extreme skiers do exactly that. Chris Landry described extreme skiing with the phrase 'if I fall, I die.'[206] Some people are willing to take risks with all their possessions, as seen on Sky TV's 'Double or Nothing' programme in 2004. The

[205] Daniel Bernoulli, "Exposition of a New Theory on the Measurement of Risk," *Econometrica* 22(1954).
[206] http://www.thesierraweb.com/stories/extreme.html

contestant, Ashley Revell, sold all he had, raising about £80,000 and bet it all on a spin of the roulette wheel in Las Vegas. He chose red, and won.[207]

Bernoulli's main insight, which now forms part of economic theory, is known as the diminishing marginal utility of money. This means that the more money that you have to start with, the less you would value any additional money. If you could have a billion pounds, having two billion would not have twice as much utility to you. As the saying goes: 'You can only sleep in one bed at a time. You can only eat one meal at a time, or be in one car at a time.'[208] Bernoulli did not say how quickly utility declines, but it is usually assumed to be logarithmic.[209] I will return to this concept of decreasing marginal utility on page 102.

Sorensen quotes Weirich,[210] who shows that the St Petersburg paradox carries infinite reward, but it does so only at infinite risk and thus he proposes that we should consider a set of finite gambles with the St Petersburg bet as the limit on the series. He believes that 'there is some number of birds in the hand worth more than any number of birds in the bush'.

Ian Hacking[211] argues that the most that anyone should pay for the St Petersburg wager is £25, which is well short of 'all we have' for most of us. The paradox appears to be that while we perhaps ought to risk everything we have for a potentially infinite gain, no-one actually would do so in practice. The Marquis de Condorcet (one of Pascal's contemporaries) suggests that the bet would fail because of inadequate backing, because after the hundredth toss of the coin, the gambler would be entitled to a mass of gold bigger than the sun.[212] Since no offeror could actually pay the possible winnings, the gambler would be entitled to refuse the bet. As we saw in Chapter 2, it is an essential precondition of Pascal's Wager that God is able to deliver infinite good to us, otherwise we would have legitimate grounds for objection.

Such limits affect real-life gambling, as we can see if we consider the betting system known as a Martingale, originally described by Lévy.[213] If we play roulette and

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[207] http://news.bbc.co.uk/1/hi/uk/3618883.stm

[208] Usually attributed to the singer Ray Charles.

[209] In a logarithmic curve, the value rises proportional to the power. So going from 100 to 1,000 is only an increase from 10^2 to 10^3 or a logarithmic increase of 1. In this model, the utility for a million pounds would be only six times the utility of ten pounds.

[210] Paul Weirich, "The St Petersburg Gamble and Risk," *Theory and Decision* 17(2)(1984).

[211] Ian Hacking, "Strange Expectations," *Philosophy of Science* 47(1980): 563.

[212] Roy Sorensen, "Infinite Decision Theory," in *Gambling on God*, ed. Jeff Jordan (Maryland: Rowman & Littlefield, 1984), 142.

[213] Eric W. Weisstein, "Martingale," *MathWorld--A Wolfram Web Resource*(2012), http://mathworld.wolfram.com/Martingale.html.

choose either red or black, we have a 50:50 chance of winning.[214] In the simplest form of the Martingale betting, each time we lose, we double the stake on our next bet. Let us look at some scenarios. In each case we will start with £20, bet on black and stop playing after we win.

1. We place our £1 stake on black which leaves £19 in our hands. It wins, so we get £2. We now have £19 plus the £2 making £21.

2. We place our £1 stake, but it comes up red and we lose. We thus have £19. We now double the stake to £2, leaving £17 as the ball spins. When it stops, we find that we have won £4, which gives us £17 + £4 = £21.

3. We place £1 and lose, then we place £2 and lose again. We bet £4, so we have £13 in our hands, but this time we win. Our winnings are £8, which together with the £13 left in our chip stack, makes £21.

This system looks like an easy way to make money. We always end up with £1 more than we started with. Casinos are well aware that it exists, not least because they have seen thousands of hopefuls try it out. Mathematically it should work, but it relies upon two big assumptions. Firstly, it assumes that the player has enough cash to double their stake each time. The player who loses n times must find £2^n for their next bet. The player who loses a dozen times in a row will have already lost £4095 and must stake £4096 on the next spin, all to end up with £1 more than they started. Secondly, casinos generally impose a maximum bet size that they will accept for any given wager, known as a "table limit". This is usually a multiple of the minimum stake, so a table that allowed a player to bet £1 might well have a limit of £100 on a single bet. Casinos set such limits so as to manage their own risk exposure, since they may not be comfortable with a £1m bet on roulette that could lose them £36m on a single roll. Casinos make their money by taking lots of small risks, which are weighted in their favour, rather than taking one-off big risks which could go badly. In our scenario above, if we lose six times (making a total of £127 lost), then our logical next stake would be 2^7 or £128. With a table limit of £100, however, we cannot break even, because we cannot stake more than £100 and even if we win, we will only get a net £100 back, which will not cover our losses to that point. Casinos are happy to accept a sequence of small bets, where they can afford to pay out on any bet that they accept, because the more bets placed, the more likely the odds are to conform to the theoretical expectations (through a process known as *regression to the mean*).[215]

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[214] For the purposes of this illustration I will ignore the green zero, which is neither red nor black and thus the bet loses when zero comes up.

[215] This phenomenon is also known as the Gambler's Ruin. If we assumed a simple game where two players each have a finite number of pennies. They toss a coin and one person calls heads or tails.

We can see that no casino should logically offer the St Petersburg game as part of their portfolio, assuming that they wanted to, because they could not afford to pay out in the (admittedly rare) event that the sum earned exceeded the net worth of the casino itself. To offer the game is to open oneself to a potentially unlimited loss. It would also be unattractive to gamblers, because they may end up dramatically over-paying in order to play. This has been noted by a number of commentators including Benjamin Hayden and Michael Platt[216] and which is particularly summed up by Colin Camerer who argues that loss-aversion explains the paradoxically low values that people suggest for the stake.[217] He concludes that if the maximal payoff is £1 billion, a reasonably loss-averse person will not offer more than £17.55. Even if the maximal payoff is raised to £1 trillion, the bid will rise only to £22.71. Hayden and Platt suggest that these values are close to the 20 ducats that Bernoulli thought was reasonable.[218]

Ole Peters takes an entirely different tack. He argues that the St Petersburg game requires infinite time to play to its conclusion, in order to get the infinite reward. He makes the interesting point that he suspects that probabilities should not be used to guide one-off decisions and that any decision regarding a single event must resort to intuition or morals.[219] Peters suggests that the calculation of the mean outcome using the ensemble-average system as proposed by Huygens, Fermat and others is inappropriate, because an individual in a one-off lottery does not care how he might fare in any number of parallel universes; he only has one chance to play and thus he is only interested in factors that affect his judgement in this single case. What matters to his financial well-being is whether he makes decisions under uncertain conditions in such a way as to accumulate wealth over time.[220] Obviously, the player in Pascal's Wager is in a similar quandary. We have but one life to live and only one life to wager. It does not matter how we might do in another life,

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The winner gets one penny from the loser. If this process is repeated indefinitely, one player will always lose all their pennies to the other and the probability of which player it is depends upon the number of pennies that each has. For each player, the chance of going bankrupt is:

$$P_1 = \frac{n_2}{n_1 + n_2}$$

$$P_2 = \frac{n_1}{n_1 + n_2}$$

Thus, the player with the smallest number of pennies has the greatest chance of losing. Since gamblers usually have less money than casinos, the casinos always win in the long run. Casinos also bias the odds in their favour, so that even people who start off richer than the casinos will still lose in the long-run.

[216] B. Y. Hayden and M. L. Platt, "The mean, the median, and the St. Petersburg paradox," *Judgment and Decision Making* 4, no. 4 (2009).

[217] Colin F. Camerer, "Three Cheers — Psychological, Theoretical, Empirical — for Loss Aversion," *Marketing Research* 42, no. 2 (2005).

[218] Hayden and Platt, "The mean, the median, and the St. Petersburg paradox," 3.

[219] O. Peters, "The time resolution of the St Petersburg paradox," *Philosophical Transactions of the Royal Society a-Mathematical Physical and Engineering Sciences* 369, no. 1956 (2011): 4918.

[220] Ibid., 4921.

because we must make our decision in this one.[221] Peters concludes from his time-based analysis that the player should risk any amount of money that does not lead to bankruptcy. This seems in accord with Bernouilli's belief that we should risk all that we have, albeit with some qualification. It is also consistent with Pascal's advice that we must risk our current life in the hope of more to come.

Hayden and Platt suggest strongly that the root of the problem is in using any sort of mean in order to calculate the EV, because the mean of an infinite series will itself be infinite. They argue that the median gives a far better guide in this scenario and that if we use the median outcome, there is no paradox.

Empirical experimentation shows a significant difference between the theoretical payoff and the reality. As long ago as 1777 M. Buffon hired a child to flip a coin until it came up heads and to do so 2048 times. Augustus De Morgan did a similar experiment in 1828 and added another 2048 data points.[222] Since then, computer simulation has extended the data greatly, but with remarkably similar conclusions. The median payoff lies between £1 and £2 and Eric Weisstein suggests that we should fix it by convention at £1.50. Hayden and Platt conducted a survey of 200 respondents who were asked to make their estimate of what they would pay to play.[223] The results matched the simulations well, with a median result of $1.5 and strong modes at $1 and $2, although estimates ranged from $0 to $50,000.

They identified that the median bid is lower than is commonly supposed and suggest that the payoff is not infinite, but rather that it is *undefined*. They postulate that faced with an infinite series, people are innately using the median payoff as their benchmark, rather than calculating the mean. They challenge the conventional calculation of EV, suggesting rather that EV is heuristically considered to be the central tendency of the distribution embodied in a given gamble. In a massively skewed distribution, such as in the St Petersburg Paradox, the median gives a better estimate of that central tendency than the mean does.[224]

Summary of the St Petersburg Problem

As we have seen, the empirical evidence is that the St Petersburg Paradox is not directly comparable to Pascal's Wager, because it will typically fail on one of two grounds. It fails because it can only deliver infinite reward at the end of infinite time and pays out nothing in the interim. The empirical tests also show that most of the time, it pays very little. Thus, a lack of confidence in the St Petersburg game should have no bearing on our consideration of Pascal's Wager.

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[221] I will consider the possibility of reincarnation and its effect upon Pascalian decision-making on page 133.

[222] Hayden and Platt, "The mean, the median, and the St. Petersburg paradox," 3.

[223] Their survey used dollars, rather than Sterling.

[224] Hayden and Platt, "The mean, the median, and the St. Petersburg paradox," 3.

That does not mean that we might not try to devise another game that pays out more quickly, or more reliably. However, any such game will fail unless we can assume that the offeror is able to deliver the infinite reward. I suggest that this assumption cannot reasonably be made without some concept of deity.

Having dismissed the St Petersburg problem as being largely inapplicable to Pascal's Wager, we now need to move on to another objection, which also has its roots in infinity.

Infinity and Mixed Strategies

The special properties of infinity are what drive the argument from superdominance that we saw earlier. Any finite fraction multiplied by infinity becomes infinite, so no matter how small your estimated probability for God's existence, you still get infinite utility by wagering for God. This superdominance is the strength of the wager calculations, but it can also be a major weakness. Let us consider the application of a 'mixed' strategy, which we saw on page 42.

What happens if we say that we find the argument moderately convincing, but we want to settle it by tossing a coin? We tell ourselves that If it comes down 'heads' we will wager on God, but if it is 'tails', we will wager against and (to humour the pedants[225]) if it comes down on neither, then we will toss the coin again. What effect does this have on the EV? The odds of a fair coin toss under these circumstances are ½ either way, so:

$$\text{EV(heads)} = ½ \times ((\infty \times p) + (f_1 \times (1-p))) = \infty$$

$$\text{EV(tails)} = ½ \times ((f_2 \times p) + (f_3 \times (1-p))) = \text{finite}$$

$$\text{EV(heads + tails)} = \infty$$

The EV for choosing on the basis of a tossing a coin is infinite. It is still infinite if we roll a die and bet on God only if we roll a 6. It is infinite if we will bet on God if and only if we win tomorrow's lottery jackpot and next week's jackpot as well. In fact, the EV is infinite no matter how low we reduce the possibility of success.

Various authors have argued that no special action is required on our part to accept the wager: whatever we do, there is a small chance that this will lead us to bet on God and thus we will obtain infinite utility. Even deciding to bet against God today might conceivably lead me to ultimately bet on God in the future. It seems that

[225] I number myself among such pedants.

bringing infinity into the calculations somehow breaks decision theory. I will briefly cover why that can happen, even outside Pascal's Wager.

Problems of infinity in decision theory

In order to try and regularise the mathematics of utility theory, Luce and Raiffa propose a number of axioms to be used in establishing comparisons.[226] Their modelling is based upon the idea of a number of different lotteries in which we might place our stake. Since there is no skill involved in a lottery, we should choose the one that best reflects our preferences. Different people might use different criteria in making their selections: a cautious person might prefer the lottery that gives the highest probability of paying back, while a less risk-averse gambler might prefer the lottery with the highest possible winnings, even if it pays out less often. Luce and Raiffa wish to establish axioms so that there is some level of consistency and true comparability between choices.

They thus suggest a number of possible lotteries and establish rules for which lottery (if any) is the most attractive. If the two lotteries offer outcomes such you would not prefer one over the other, then you are said to be *indifferent* between them. I will not discuss all six axioms, but briefly cover the two axioms which are problematic when we involve infinite utilities.

Continuity axiom

In assumption 3, known as the continuity axiom, let us assume that we have three outcomes which we will call: O_1, O_2 and O_3. We arrange them in order of preference, as before, using the notation $a \succ b$ to mean "I prefer *a* to *b*". Let us assume that we strictly prefer O_3 to O_2 and strictly prefer O_2 to O_1 that is:

$$O_3 \succ O_2 \succ O_1$$

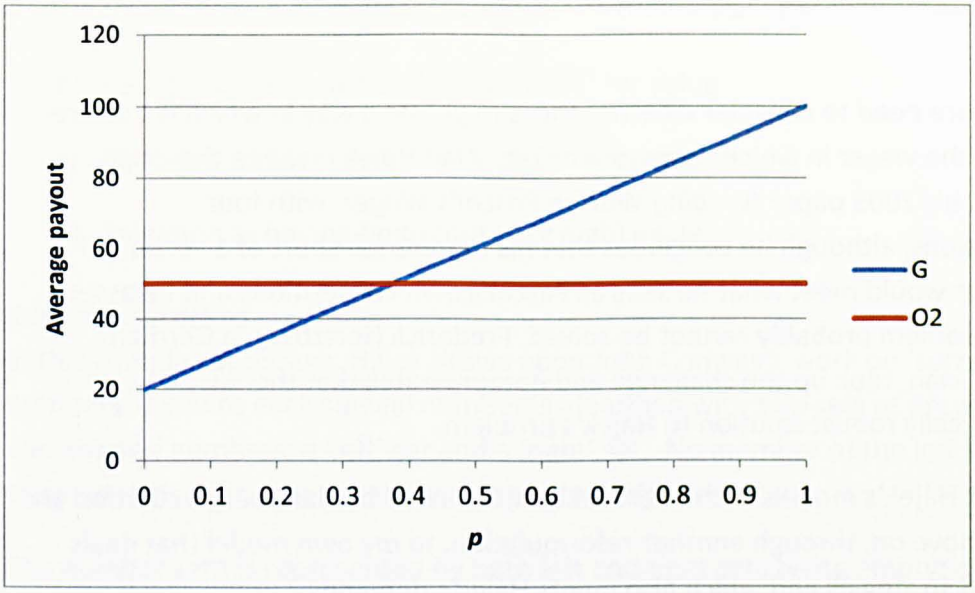
We then postulate another lottery (which we will call *G*) where we have a chance of winning either the most preferred prize O_3 or least the preferred prize: O_1. Let the probability of winning O_3 be *p* (which must be greater than zero) and the probability of winning the least valued outcome O_1 be (1-*p*). The axiom states that for some value of *p*, you would be indifferent as to whether to participate in the lottery *G* or simply to have the middle outcome O_2.

This is easier to see if we put monetary values on the three outcomes: let us say that O_1 = £20, O_2 = £50 and O_3 = £100. Our lottery *G* thus allows us to win £20 or £100, based upon the value of *p*. If *p* were 1 so we were guaranteed £100, we would clearly prefer *G* to the guaranteed £50 from O_2. Likewise, if *p* were 0.00000001 so we were nearly certain to only win £20 in lottery *G*, then we would

[226] Luce and Raiffa, *Games and Decisions*: 27.

clearly prefer O_2. The average payout of G at any point is £20 x p + £100 x (1-p), while that of G is fixed at £30. Somewhere between the extremes of p must be a cross-over point where we would switch our preferences from G to O_2 (or vice-versa).

If we plot them graphically, we can see the cross-over clearly:



The intersection of the two lines is the point at which we value the two lotteries the same, or where we are *indifferent* between them.[227] In this case, it is where p is 0.375.

If we use infinity in the decision matrix, this axiom is violated. This is because if O_3 is infinite, but O_1 and O_2 are both finite, then there is no non-zero value of p, such that p multiplied by O_3 is not infinite. Since this will always be greater than the finite value O_2, there will be no point where we are indifferent between the two lotteries.

Monotonicity axiom

Assumption 6 of Luce and Raiffa describes another two lotteries where we take the most preferred and least preferred outcomes as above: i.e. O_1 and O_3. If the probability of getting outcome O_3 in lottery A is p and the probability of getting that outcome in lottery B is q, then we prefer lottery A over lottery B if and only if p is greater than q. This seems reasonably intuitive: that we prefer the lottery which has the greatest possibility of delivering the most favourable outcome.

However, if the outcome O_3 is infinite, then no matter what non-zero values we assign to p and q they will both deliver infinite utility and thus we become indifferent between the lotteries in violation of the axiom.

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[227] It is not quite so clear if we were to choose £100, £10 and death as the outcomes. Would we really be indifferent between receiving £10, or a participating in a lottery where we might die?

Does this mean that decision theory is broken?

The effect of the involvement of infinity is to break the fundamental rules which give order to decision theory. As we saw above, a mixed strategy abuses the properties of infinity in EV calculations and threatens to make the terms of the Wager meaningless. If we can achieve infinite utility without having to take any action whatever, or even to be aware of the bet, is there really any decision being made?

We therefore need to consider whether there might be a way in which we can re-formulate the wager in which to restore order. Alan Hájek makes a thorough attempt in his 2003 paper *'Waging War on Pascal's Wager'* with four reformulations, although he concludes that his models fall short of a version of infinity that would meet what he sees as Pascal's own conceptions and he asserts that this problem probably cannot be solved. Frederick Hertzberg, a German mathematician, took up the challenge and demonstrates that there is a mathematically robust solution to Hájek's problem.

I will cover Hájek's models in the next section, followed by Hertzberg's solution and will then move on, through another reformulation, to my own model that deals with mixed strategies and which also meets Hájek's demands.

Trying to Resolve the Problems of Infinity

As we have seen, it is the superdominance of infinity which drives the utility calculations in favour of belief, but can we resolve any of the difficulties that we encounter when using a mixed strategy? Hájek works through four reformulations of Pascal's Wager trying to deal with the problems posed by mixed strategies and in order to test whether his modelling succeeds, he proposes two requirements:

Requirement of Overriding Utility

> *The utility of salvation must completely override any of the other utilities that enter into the expected utility calculations, thus rendering irrelevant the exact probability one assigns to God's existence. (We impose this requirement in order to uphold the spirit of the original argument – for otherwise we would not have a reformulation of it, but some quite different argument.)*

Requirement of Distinguishable Expectations

> *We must be able to distinguish in expectation outright wagering for God from the various mixed strategies... In particular, the smaller the probability of winding up wagering for God, the smaller should be the expectation, so that one is rationally compelled to make that probability as high as one can.*[228]

[228] Hájek, "Waging War," 34.

These two tests seem fair to me. The first requirement is to match Pascal's assertion that the utility of heaven overrides any earthly cost, the second is introduced so that tricks like tossing a coin will not distort the results.

His reformulations adopt four different approaches:

a) Using 'surreal' infinities (a complex mathematical approach)

b) Using vectors[229] rather than scalars[230] for value

c) Salvation as having a finite value for infinite time

d) Salvation as having finite (but very high) value

Surreal infinities

In this complex approach, Hájek draws upon John Conway's work on 'surreal' numbers[231] where each surreal number is identified with two sets of previously constructed numbers: a 'left' set and a 'right' set. No member of the left set may be greater than or equal to any member of the right set.

The number zero is represented by both left and right sets being empty: <Ø, Ø>.[232] The next number '1' has a left set with 0 and an empty right set. e.g. ⟨{ }, Ø⟩. The number '-1' has an empty left set and 0 in its right set e.g. ⟨Ø, { }⟩ This proceeds with each new number being formed according to the rules. After infinitely many stages, we reach our first infinity whose left set is {0,1,2,3 ... } and whose right set is empty. This we call ω, the first infinite number. We can work out ω-1 [233] and other useful numbers like $\frac{1}{\omega}$. The great value of this system, even if confusing to the non-mathematician, is that is possible to perform familiar arithmetic operations on ω and the usual rules apply. So, if we use ω as our infinite utility, we can re-cast the decision matrix as:

	God exists	God does not exist
Bet on God	ω	f_1
Bet against God	f_2	f_3

EV(bet on God) $= (p \times \omega) + f_1 \times (1-p)$ = infinite

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[229] A vector is a measure which has two components: a magnitude (or size) and a direction. Velocity (or speed) is a vector because it matters which direction you are going as well as how fast.

[230] A scalar is a simple one-dimensional value, like length. It does not matter whether you measure the length of a pencil starting at the sharp or the blunt end.

[231] John H. Conway, *On Numbers and Games*, 2nd ed. (Natick, MA: A K Peters, 1976). 3-22.

[232] Ø is the empty set – a set with no members.

[233] It is ⟨{0,1,2,3 ... }, {ω}⟩

$$\text{EV (bet against God)} = (f_2 \times p) + (f_3 \times (1-p)) \qquad = \text{finite}$$

So our basic equation succeeds – it is rational to bet on God. The next test is to see what happens when we toss a coin.

$$\text{EV(heads)} = \tfrac{1}{2} \times (p \times \omega + f_1 \times (1-p))$$
$$= \tfrac{1}{2} \times (p \times \omega + f_1 \times (1\text{-}p)$$

$$\text{EV(tails)} = \tfrac{1}{2} \times (f_2 \times p + f_3 \times (1-p)) = \text{finite}$$

By eliminating the simple additions and subtractions of finite numbers, we see that the dominating value in this becomes ½ × (p × ω), compared with (p × ω) in the straight bet. In our surreal numbers, $\frac{\omega}{2}$ is smaller than ω and thus tossing a coin reduces our utility. Hájek's second condition is met.

Have we now solved the wager, albeit using some complex mathematics? Hájek thinks not. He sees no reason that an agnostic or atheist cannot assign an infinitesimal probability to God's existence, which in this case would be $\frac{1}{\omega}$. If we put this infinitesimal value as p in the equation, we get the following:

$$\text{EV(bet on God)} = (\frac{1}{\omega} \times \omega) + f_1 \times (1\text{-}\frac{1}{\omega})$$
$$\cong 1 + f_1$$

$$\text{EV(bet against)} = f_2 \times \frac{1}{\omega} + f_3 \times (1 - \frac{1}{\omega})$$
$$\cong f_3$$

The infinitesimal cancels out the positive infinity and we are back to a trade-off between the two finite costs f_1 and f_3. If we were to follow the principle of indifference,[234] then we might say that, in the absence of any evidence, we should assume that f_1 equals f_3 and thus the EV of betting for God dominates betting against, albeit narrowly.

Hájek acknowledges that Pascal may himself have excluded infinitesimal probabilities in the wording: 'But here there is an infinity of infinitely happy life to be won, one chance of winning against a finite number of chances of losing'.[235] In other words, Pascal anticipates infinitesimal possibilities but excludes them. I agree with Pascal on this and I discuss on page 143 why I do not believe that infinitesimal probabilities can be rationally used as part of an argument. Hájek, however, challenges Pascal, seeing no reason to accept any such limitation and he concludes that infinitesimal probabilities might defeat the Wager. In order to answer Hájek,

[234] Discussed in more detail on page 48
[235] Pascal, *Pensées*: 123. L418

my own reformulation on p104 suggests a means of dealing with infinitesimal probabilities, even though I do not agree that they are applicable.

Using vectors for utility

In his second reformulation, Hájek wonders if the utility of belief could be expressed as two components – an earthly reward (*e*) and a heavenly reward (*h*), much as a graph can have an *x* and a *y* axis. The two values are independent of one another, but they describe a plane in which each point of utility is described by a pair of (e, h) components. He postulates that the heavenly component of belief has the value 1 (i.e. one life in heaven) with a certain amount of earthly reward. So the matrix looks like:

	God exists	God does not exist
Bet on God	$(e_1, 1)$	$(e_2, 0)$
Bet against God	$(e_3, 0)$	$(e_4, 0)$

The EV calculation shows that only a bet on God can generate heavenly reward and that even an infinitesimal probability still yields more reward than a bet against (as we saw before with the argument from expectations).

It apparently succeeds and meets Hájek's tests, but seems to take the discussion a little outside traditional decision theory. It has epistemic weight, I believe, since it is reasonable that heaven's utility may not be measurable in earthly units. Yet, I think its appeal to the incommensurability of earthly and heavenly rewards perhaps goes against the grain of Pascal's logic. It does not need to draw upon infinity at all and thus does not sit easily with a passage entitled *"Infini, rien"*.

Finite utility for infinite time

In his third reformulation, Hájek postulates that heaven could consist of a finite amount of happiness, but for an infinite period. He introduces the notion of a limit over time, drawing upon Vallentyne's work on utilitarianism and "producing more utility" (or PMU*), which is defined as:

> *PMU*: An action a_1 produces more utility than action a_2, if and only if there is a time t such that for any later time t' the cumulative amount of utility produced by a_1 up to t' is greater than that produced by action a_2 up to t'.* [236] [237]

I believe that John Byl[238] does a better job of exploring this topic in a 1994 paper which Hájek does not cite. Byl proposes that we can model the infinity under

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[236] Peter Vallentyne, "Utilitarianism and Infinite Utility," *Australasian Journal of Philosophy* 71(1993).
[237] PMU* has been shown to be lacking (e.g. by James Cain in 1995) and Vallentyne has refined it subsequently, but I will not explore the topic any further here, because it is not central to the argument.

discussion (i.e. eternal happiness) by considering it as a finite amount of happiness per day in heaven, for an infinite number of days.

In Byl's model, if we have *H* units of happiness per day and *T* days of happiness, then the total happiness is $H \times T$. If we simply substituted infinity for *T* at this point, then the *H* and *T* would disappear and we would be left with just infinity units of happiness. To bring infinity under control, Byl uses the idea of a limit.[239] To give an example, let us consider a series of fractions, where each fraction is exactly half the previous one in the series. i.e.

$$\frac{1}{2} + \frac{1}{4} + \frac{1}{8} + \frac{1}{16} \cdots$$

We could write this in mathematical terms as $\sum_{n=1}^{\infty} \frac{1}{2^n}$ or more simply as: the sum of all the fractions of the form $\frac{1}{2^n}$ where *n* is an integer greater than zero. As shown, the first four terms add up to $\frac{14}{15}$ and for each extra term, it gets closer and closer to 1. If we took this sequence all the way to infinity, it would add up to 1. We say that this is a series whose limit tends to 1 as *n* tends to infinity.

Byl argues that we can treat the infinite happiness as being the limit of $H \times T$ as *T* tends to infinity, but how does this help us in dealing with Pascal's Wager? The key advantage from a mathematical viewpoint is that we may be able to recast the equation so as to eliminate infinite quantities, even if it is derived from a series that is tending to infinity.

Let us substitute this limit for infinity in our original formulation for the wager. We will write the limit as: $\lim_{T \to \infty}(HT)$

Let us now consider the mixed strategy with a coin toss, which defeated our earlier formulation. Byl suggests that we can compare the two cases of a coin toss versus a straight bet on God by dividing one case by the other, or:

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[238] John Byl, "On Pascal's Wager and Infinite Utilities," *Faith and Philosophy* 11(1994).

[239] Hájek also uses the concept of limit and describes is as being an economic concept dealing with the long-run-average.

$$\frac{EV(heads+tails)}{EV(bet\ on\ God)}$$

We start by simply representing the relative EV in terms of HT alone i.e.

$$\frac{\frac{1}{2} \times p \times HT}{p \times HT}$$

Then we compute the limit in order to obtain our infinite reward as T tends to infinity:

$$= lim_{T\to\infty}\left(\frac{\frac{1}{2} \times p \times HT}{p \times HT}\right)$$

Both top and bottom values contain the expression $p \times HT$ which we can now cancel out. This leaves just the simple fraction.

$$= lim_{T\to\infty}\left(\frac{1}{2}\right)$$

We can see that the coin toss has now halved our expected value, when compared with a straight bet on God. The mixed strategy significantly reduces our expected value and the original formulation triumphs once more.

Byl points out that this is similar to the case where we have two people: one earns £1 per day for eternity and another earns £2 per day. Although both theoretically sum to infinity and each becomes infinitely rich, at any given time the second person is always twice as rich as the first. If you were given a choice between the two, it would be completely rational to choose the second.

Paul Bartha, develops a similar, but richer model of what he terms 'relative' utilities, using the extended real numbers (i.e. the real numbers with the addition of positive and negative infinity), which I will discuss shortly. Like Byl, Bartha uses ratios to distinguish between potentially infinite outcomes.

One complication of this new formulation might be that Pascal's definition of utility demands more than simply finite happiness per day: 'But here there is an infinity of infinitely happy life to be won'.[240] We could deal with this in the same manner, by adding a limit for H as well as T as they each tend to infinity i.e. $\lim_{H\to\infty}\ \lim_{T\to\infty}(HT)$. This will still yield the same result, which is in favour of the bet on God.

Finite (but very high) utility

In his fourth reformulation, Hájek discusses the idea of using a finite value to represent the utility of heaven. He starts by postulating the lowest probability which anyone has ascribed, or will ever ascribe, to God's existence and he calls this p_{min}. He then imagines a value f such that $f \times p_{min}$ is always large enough to

[240] Pascal, *Pensées*: 123. L418

dominate the decision matrix. The exact size of f does not matter, it simply has to be large enough.

The new finite value meets Hájek's two requirements (of overriding utility and distinguishable expectations) and he observes that it also parries the objections of decision theorists, like Jeffrey and McClennen who have qualms about the concept of infinite utility.

Hájek's remaining problem

Hájek believes that his four reformulations all succeed in validating Pascal's argument, at least to some degree, but he thinks that they each still fall short of Pascal's model of infinity. Hájek refers to the text in *Pensées* where it says: 'Unity joined to infinity adds nothing to it ... the addition of a unit can make no change in its nature'.[241] Symbolically this means that: $\infty + 1 = \infty, \infty + 2 = \infty \ldots \infty + x = \infty$, for all positive x. Hájek calls this property *reflexivity under addition.* He holds that any salvation under Pascal's Wager must be the greatest possible and therefore it must have this reflexivity under addition.

His surreal infinity, ω, fails this test, since $\omega + 1$ can be computed and it is greater than ω. The vector model fails the test initially, since the value 1 is a scalar and you cannot add a scalar to a vector. However, if we refashion the scalar as the vector (1, 0) and add it to our result: $(e_1, 1)$ we get $(e_1 + 1, 1)$ which is still bigger than $(e_1, 1)$. The final two cases both work on finite values, so adding 1 to either case yields a utility which is slightly bigger, rather than the same.

The related property, which Hájek calls *reflexivity under multiplication,* is that any number multiplied by infinity will still yield infinity as its result. That is: $\infty \times 1 = \infty, \infty \times 2 = \infty \ldots \infty \times x = \infty$, for all positive x. The difficulty here is that if x is less than 1, this property allows mixed strategies to defeat the wager.

Hájek states that if the utility is to be the best possible then it must be reflexive under addition (and also by multiplication by numbers greater than 1), yet it must not be reflexive under multiplication by positive numbers less than 1. He writes: 'I believe that it is a problem that runs deep, not one that will go away with some clever tinkering'.[242]

Frederick Hertzberg, a mathematician at the University of Frankfurt, takes up Hájek's challenge and develops a mathematical case using hyperreal utilities. The hyperreal numbers are an extension of the set of real numbers to include infinite numbers and infinitesimals and were originally developed by Abraham Robinson in

[241] Ibid., 121. L418
[242] Hájek, "Waging War," 49.

1966 as part of what he called "non-standard analysis".[243] Robinson builds an ideal number system in which the infinitely small or infinitely large numbers play a part and where they have properties and can be ordered in a similar fashion to the real numbers. McClennan suggests that standard utility theory cannot deal with infinite utilities[244] and so Hertzberg sets a mathematical model that allows for infinite utilities and which also satisfies Hájek's two requirements.

Hertzberg's Hyperreal decision theory

Hertzberg's model operates on an internal *-convex[245] subset of a *-linear space and uses the operator " $\preccurlyeq$ " such that "$x \preccurlyeq y$" means *"x is not preferred over y"* or *"either y is preferred over x, or they are equivalent"*. His *Hyperreal von Neumann-Morgenstern Theorem* is that:[246]

> There exists a *-affine function[247] $U: X \to {}^*\mathbb{R}$ such that $U(x) \leq U(y) \Leftrightarrow x \preccurlyeq y$ holds for all $x, y \in X$ if and only if $x \preccurlyeq y$ possesses all of the following properties:
>
> (1) Completeness: $for\ all\ x, y \in X, either\ x \preccurlyeq y\ or\ y \preccurlyeq x$
> (2) Transitivity: $for\ all\ x, y, z \in X, with\ x \preccurlyeq y\ and\ y \preccurlyeq z, one\ has\ x \preccurlyeq z$
> (3) Infinitesimal Continuity: $for\ all\ x, y, z \in X, with\ x \prec y \prec z, there\ exist\ hyperreals\ p, q \in {}^*(0,1)\ such\ that\ px + (1-p)z \prec y \prec qx + (1-q)x$
> (4) Independence: $for\ all\ x, y, z \in X\ and\ every\ p \in {}^*(0,1]\ the\ relation\ x \preccurlyeq y\ is\ equivalent\ to\ px + (1-p)z \preccurlyeq py + (1-p)z.$

Hertzberg develops his theorem and proves that it is consistent and mathematically sound.[248] Having defined a suitable number space and operators, he develops further theorems to show how hyperreal preference relations lead to an internally

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[243] Abraham Robinson, *Non-standard Analysis* (Amsterdam: North-Holland Publishing Company, 1966). in F. Herzberg, "Hyperreal Expected Utilities and Pascal's Wager," *Logique Et Analyse*, no. 213 (2011).

[244] McClennen, "Finite Decision Theory," 116.

[245] The star notation e.g. "*-convex" indicates that it is an analogue of the corresponding function for real numbers, but using hyperreals.

[246] Herzberg, "Hyperreal Expected Utilities and Pascal's Wager," 5-6.

[247] Affine simply means "connected with". For example, an affine space is one where any point in that space can be represented by a tuple of its coordinates and each point in the space can be reached from any other, simply by applying a vector. By way of analogy, I can walk from my house to my church without needing to know the exact latitude and longitude of either. I merely need to know how far apart they are and what direction to walk in.

[248] I am not a professional mathematician, so I am unable to comment on whether his proof holds, but the paper appeared in a well-respected, peer-reviewed mathematical journal and so I assume that it has been examined with suitable rigour by those who are qualified to judge.

consistent hyperreal utility theory, which is an exact analogue of traditional utility theory.

In Hertzberg's model he suggests that there can be a correspondence between the hyperreals and the reals which preserves the essential characteristics of comparability and ordering, even though there may not be a one-to-one correspondence between each real number and another hyperreal. His hyperreals are a superset of the real numbers that includes infinite quantities.

He then constructs a set S (which is a subset of the hyperreals ${}^*\mathbb{R}$)which has a maximum value I that represents the utility of salvation. In this set, I represents the largest value in ${}^*\mathbb{R}$ and cannot be exceeded. I is infinitely large and multiplying by any non-infinitesimal probability p also yields an infinite value when multiplied by I, which satisfies Hájek's requirement of Overriding Utility, in that no matter how low the probability assigned to God's existence, the bet on God still gives an infinitely large utility.

However, in his hyperreals ${}^*\mathbb{R}$ there are many infinite values (an infinity of them), but they are not the same size and in our set S we can both compare and order them. I is a hyperreal infinitely large quantity, so if it is multiplied by any real value q, where $0 < q < 1$, the result will still be infinitely large. However, in the hyperreal ordered set S, the value obtained can be compared with I and since q is less than 1, the result qI will always be less than I. Mathematically we can write this as:

$$\forall\, q \in (0,1): qI < I$$

Since I multiplied by any non-infinitesimal probability q will always be less than I, any mixed strategy will always yield a lower utility than the pure bet, even though the utility obtained may still be infinitely large. Thus Hájek's requirement of Distinguishable Expectations is also met within this system.

Hertzberg then shows that he can construct a set S, such that its maximum I is also reflexive under addition. This deals with Hájek's insistence that the infinity under consideration must be the absolutely largest possible number, unlike his own surreal infinity ω, which was not reflexive under addition as we saw on p85.

In an appendix, Hertzberg also questions whether reflexivity under addition truly is a requirement of the Wager. His exegesis of the phrase "unity joined to infinity adds nothing to it" draws upon the immediately following sentence in Pensées where Pascal continues: "the finite is annihilated in the presence of the infinite". Hertzberg therefore argues that Pascal was simply comparing the finite to the infinite, where the finite value appears as if it were nothing compared to the

infinite.[249] Hertzberg suggests that we might thus relax the requirement for reflexivity under addition. If so, then his model can be modified such that it can deal with infinitesimal probabilities as well as real numbers. As I do not consider infinitesimal probabilities to be rational, which I discuss on page 117, I will not go further into Hertzberg's proof here.

Hertzberg's solution may seem entirely technical, since it requires that we adopt a rather abstruse understanding of numbers and probabilities, but we must allow that it is designed to counter a purely technical objection. Mixed strategies to defeat the Wager are themselves purely technical arguments. Could we really convince ourselves that it is believable that tossing a coin should yield the exact same result as making a pure wager? I do not believe that we could and I suggest that the use of mixed strategies appears to be much more an attempt at finding a loophole than being a genuine objection. By responding with a detailed proof, Hertzberg has provided a sound mathematical framework for dealing with infinite utilities in a decision-theoretical context, which may also assist with other ethical puzzles involving infinite utility. It meets both of Hájek's requirements and answers McClennen's concerns around the use of infinite utility within conventional decision theory.

Bartha's Relative Utilities

In a separate approach, Paul Bartha attempts to solve Hájek's dilemmas by using the concept of relative utilities. His key shift is to introduce the notion that we do not necessarily compare two outcomes against each other, but rather that we compare each against the worst possible outcome. He starts by suggesting a utility function *u(x)* that returns a real value and uses this to obtain a relative utility. He also introduces the notion of a worst outcome, which he refines later into a base point for comparisons. The use of the worst outcome derives from the idea that any outcome is preferable to W, no matter how remote the possibility of obtaining it. For example, if we considered W to be "eternal torture" then it is reasonably clear that we would rationally prefer any alternative, including our immediate death.[250]

Let the utility of the worst outcome W be *u(W),* the utility for outcome A be *u(A)* and the utility for outcome B be *u(B).* The *relative* utility of A and B (or $\mathcal{U}(A,B)$) is obtained as follows:

[249] Herzberg, "Hyperreal Expected Utilities and Pascal's Wager," 17.

[250] While I am sure that the reader can think of worse things than eternal torture, I believe that there is a limit to that which anyone might reasonably postulate for a worst outcome. This is thus the antithesis of the Anselmian viewpoint in that it is the outcome which is worse than the worst thing which can be imagined. Whatever that outcome is for an individual, we designate it as 'W'.

- If *u(A)* is equal to *u(W)* and *u(B)* is not equal to *u(W)* then $\mathcal{U}(A,B) = \infty$. That is, any case which is better than the worst-case is deemed to have infinite relative utility.
- If *u(A)* and *u(B)* are both equal to the worst-case *u(W)* then $\mathcal{U}(A,B) = 1$.
- If neither *u(A)* nor *u(B)* are equal to the worst-case *u(W)*, then we obtain the relative utility by subtracting *u(W)* from each and taking the ratio of the two sums. i.e.

$$\mathcal{U}(A,B) = \frac{u(A) - u(W)}{u(B) - u(W)}$$

Bartha wishes to ensure that there is continuity such that if we had three outcomes: A, A' and B and that for either A or A' obtains with probability *p*, the following equation holds:

$$\forall p \in (0,1): \mathcal{U}([pA,(1-p)A'],B) = p\mathcal{U}(A,B) + (1-p)\mathcal{U}(A',B)$$

Bartha's introduction of infinity may seem somewhat contrived and we might ask why a finite value would not suffice for a relative utility. He admits that any finite value would do as well at this stage in the problem-solving process and that it makes no difference whether $\mathcal{U}(A,B) = \infty$, or whether $\mathcal{U}(A,B) = 2$, as long as we set *u(A)* = 1 for any gamble where A is strictly preferred over W. However, as he wishes to dispense with the fixed worst outcome W, infinity will be required in order to preserve the relation above. Otherwise there would be values of *p* for which $\mathcal{U}([pA,(1-p)A'],B) \neq p\mathcal{U}(A,B) + (1-p)\mathcal{U}(A',B)$.

Bartha's next step is to consider a three-place utility function, where he uses a base-point Z instead of the fixed worst-case W. In this new function, our relative utility for A is infinite relative to B (with base-point Z) in any case where we prefer a non-trivial gamble between A and Z over outcome B. In other words, $\mathcal{U}(A,B;Z) = \infty$ whenever we are willing to sacrifice B to obtain A instead of Z, no matter how slight the chance of achieving this.[251] Thus:

$$\mathcal{U}(A,B;Z) = \infty \leftrightarrow B \preccurlyeq [pA,(1-p)Z] \; for\; all\; 0 < p \leq 1$$

Thus infinity is not required for A, B or Z, which sidesteps some objections around the nature of infinite reward that we saw earlier. The definition merely takes a structured set of preferences, rather than requiring a utility function that takes infinity as a parameter. I am not entirely convinced that this approach is not begging the question, because it presumes that an infinite utility could be obtained from finite reward, which seems distinctly suspicious. Bartha is attempting to move away from a Pascalian view of heaven as the ultimate reward and turning instead to

[251] Paul Bartha, "Taking Stock of Infinite Value: Pascal's Wager and Relative Utilities," *Synthese* 154(2007): 17-18.

some notion of an infinite utility which can be appropriated on earth. I think that such a construction could be more easily obtained by fixing a lower bound for p (as I do on page 151) and then using Hájek's model of an overwhelming but finite utility.[252]

Bartha's approach does deal with infinite quantities and using a simpler number system than Hertzberg. Bartha is able to achieve his goal using only the extended real numbers and does not require the *-affine ordered set of Hertzberg. However, his utility function requires three parameters, including a notional worst-case, or base-point value, which is rather harder to establish. Its main contribution is that it is able to distinguish between multi-variate cases more easily and Bartha considers a limited version of the many-gods argument as part of his thesis. I will cover this briefly here, but I will return to it when I consider advances in non-EV-based decision-making systems in Chapter 4.

If we consider our 2x2 matrix, Bartha's model looks at each of the four possible outcomes.

	God exists	God does not exist
Bet on God	O_1 (∞)	O_2 (f_2)
Do not bet on God	O_3 (f_3)	O_4 (f_4)

Since salvation is deemed to be the goal which we prefer over any alternative, the top-left corner of the matrix (or outcome O_1) is denoted as having infinite utility. We can now compute the relative utilities of the other cells, using Bartha's rules e.g.

$$\mathcal{U}(O_2, O_4; Z) = \frac{f_2}{f_4}$$

$$\mathcal{U}(O_3, O_2; Z) = \frac{f_3}{f_2}$$

We can also compare any of the cells with the optimal outcome, O_1, and show that the relative utility of O_1 over any other cell is infinite. Thus for any probability value we assign, we can show that betting on God is infinitely preferable to betting against. We are, of course, arguing in a circle, because we are simply replaying our earlier decision to prefer salvation over anything else on offer. Thus, if only one route could ever offer salvation, we would be bound to take it.

[252] Hájek, "Waging War," 43-44.

Where Bartha's formulation adds value is in its ability to distinguish between a mixed strategy and a pure bet. He proposes that we should calculate the weighted sum of utilities for each approach and then compare these to see which is the highest. This is similar to the EV calculation, but Bartha adds an interesting twist. In order to compare a mixed strategy against a pure bet, we should look at the highest possible outcome in either approach and then calculate the relative utilities of each cell against that benchmark. As we already saw, the optimum result is O_1 which had infinite utility. Thus we build a table as follows:

	God exists	God does not exist
Bet on God	1	0
Bet against God	0	0

The to-left corner has infinite utility and thus has a relative utility of 1 compared to O_1, while all the other cells have a relative utility of 0. Thus, for all pure strategies, the optimal strategy is to bet on God. If we now consider mixed strategies of the form: [*p*(Bet on God), *(1-p)* (Bet against)] and a probability *q* that God exists, we get a similar result:

	God exists *q*	God does not exist *(1-q)*
Bet on God *(p)*	***pq***	0
Bet against God *(1-p)*	0	0

For all non-zero values of p and q, the bet on God dominates. Bartha admits that this may be simply be projecting our preferences on to the highest plateau,[253] such that any lower-order preferences are simply ignored. He answers this by using what he calls the "happy secular" outcome, that is where we bet against God and there turns out to be no God.

	God exists	God does not exist
Bet on God	∞	$\frac{f_2}{f_4}$
Bet against God	$\frac{f_3}{f_2}$	1

As before, the bet on God dominates the bet against.

[253] Bartha, "Relative Utilities," 26.

Bartha offers an interesting solution to the many-gods problem, by comparing a pair of candidate deities A and B, with our subjective probability for the existence of each: q_a and q_b, thus we yield the following table:

	A exists q_a	B exists q_b	No god exists $1-(q_a+q_b)$
Bet on A	1	0	0
Bet on B	0	1	0
Bet against all gods	0	0	0

In this case, we would make our choice based upon our subjective probabilities q_a and q_b. This is similar to the conclusion reached by Roy Schlesinger who argues that "in cases where two acts yield distinct probabilities for the same prize (or prizes of equal value), we ought to prefer the act associated with the higher probability".[254] Bartha recognises that this might be problematic for conventional Pascalians, since an atheist might assign a greater subjective probability to a deity who rewards atheists, or perhaps Mougin & Sober's X-theology which suggests that atheists might go to heaven and theists to hell, even though no deity exists.[255]

Bartha argues that this mathematical demonstration exposes the tacit assumption in the Wager that the notion that any other deity (or indeed any other state of affairs) might lead to infinite reward is awarded a zero probability by default. While I agree that this assumption exists, I do not accept that it is germane to the discussion, because we can only deal with risks that we recognise and for which there may be mitigation available. There may be an infinite number of alternative ways of obtaining salvation, but we can only mitigate against the specific cases that come before us. It is not acceptable to refuse to take any action because of the possibility of "unknown unknowns". Short of omniscience (which would make the Wager moot in any case), there will always be the possibility of an infinite number of unknown factors. I will return to this topic in my fuller discussion of the many-gods objection in section 3.4.

Deluxe salvation and relative utilities

Bartha sets out a thought experiment regarding how to deal with the case of two competing deities, Argle and Bargle.[256] Argle offers his followers eternal salvation which consists of an infinite number of days of happy existence. Bargle, however, offers deluxe salvation, which consists of an infinite number of days of infinite happiness. Bartha asks how we should behave, assuming that we assign a far lower

[254] Schlesinger, "A Central Theistic Argument," 90.
[255] Bartha, "Relative Utilities," 31.
[256] Ibid., 32-34.

subjective probability to Bargle's existence than to Argle's. The starting decision table is relatively simple when we set the base point to be zero. Let S_a be the salvation offered by Argle and S_b be the deluxe salvation of Bargle

	A exists q_a	B exists q_b	No god exists $1-(q_a+q_b)$
Bet on A	S_a	-	-
Bet on B	-	S_b	-
Bet against all gods	-	-	-

Bartha asks what value we ought to assign to $\mathcal{U}(S_a, S_b; Z)$. If we assign the value ∞, then we are saying that we would prefer Bargle's salvation over Argle's no matter how remote a possibility it might be. However, if we assign the value 1, then we are saying that we are indifferent between the outcomes and would thus decide based upon our subjective probability estimates of the likelihood of their existence.

Bartha argues that infinite gains appear equally attractive from a finite viewpoint and he uses an analogy of stellar parallax to justify his approach. Stellar parallax refers to the angular displacement of a nearby star, relative to more distant stars. This can be used to determine the star's distance from Earth and for most practical purposes we can regard two distant stars as infinitely remote. If we were to look at two of these 'infinitely' distant stars A and B, we would see no angular displacement and they would remain fixed in the same place relative to each other as Earth traces its orbit around the sun. Bartha suggests that, by analogy, two infinite rewards look the same from our earthly perspective and that it does not strictly matter to us whether one is actually more distant than the other. Thus he considers $\mathcal{U}(S_a, S_b; Z) = 1$ to be the most reasonable value.[257]

I am not entirely convinced by this analogy, nor by Bartha's logic. If we were presenting this argument to a follower of Argle, who already perceives themselves as possessing an infinite reward, the base-point ought to be different. Such a believer might well see themselves as facing the very high probability of infinite loss, mitigated by only the minuscule chance of improving their lot.[258] We might want to add a dimension of credibility, since a disciple of Argle might reasonably doubt that Bargle can deliver something which Argle cannot. I think that it also falls short of Hájek's Pascalian sense that salvation should be the ultimate good available. Argle clearly fails this test since Bargle's salvation is clearly better (even if is less likely).

[257] Ibid., 34.
[258] I shall discuss the asymmetry between the perception of gain and loss in Chapter 4.

Bartha offers a solution for the problems faced if we introduce the notion of damnation to our calculations. If we start with a basic matrix:

	God exists	God does not exist
Bet on God	∞	f_2
Bet against God	$-\infty$	f_4

We can compute the relative utilities by taking negative infinity as our worst case and then applying the rules to obtain the following:

	God exists	God does not exist
Bet on God	1	1
Bet against God	0	1

The bet on God dominates, because it always does better than the bet against God. If we now introduce 'harsh' versions of Argle and Bargle who damn anyone who does not believe in them we get:

	A exists q_a	B exists q_b	No god exists $1-(q_a+q_b)$
Bet on A	∞	$-\infty$	f_1
Bet on B	$-\infty$	∞	f_2
Bet against all gods	$-\infty$	$-\infty$	f_3

When we try to compute the sum of each row, we face the sum: $\infty - \infty$ which is undefined. However, once reformulated with relative utilities and taking $-\infty$ as our base-point we obtain:

	A exists	B exists	No god exists
Bet on A	1	0	1
Bet on B	0	1	1
Bet against all gods	0	0	1

The bet against all gods is dominated by the bet for Argle and Bargle, so we would need to use subjective probabilities (or some other tie-breaker) to decide between them.

Summary of relative utilities

Bartha's suggestions for relative utilities meet Hájek's demands and also provide additional rules to deal with cases of many gods and of harsh gods who penalise unbelievers as well as rewarding the faithful. However, it seems at heart that they are simply a device to keep infinity in the mix by means of treating it as an output, rather than an input to the decision-making process. It seems to be arguing in a circle, since any decisions it makes could be equally made just by invoking a

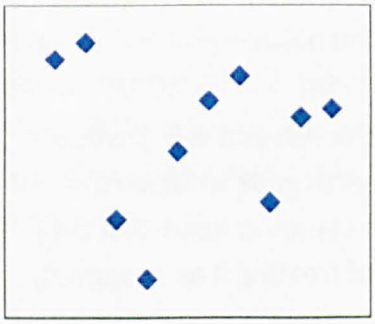
common-sense view of infinity, rather than a strict mathematical formulation. If we were to allow a simple set of rules such as $\mathbb{R} < \frac{\infty}{2} < \infty$ and $\infty - \infty = 0$, then we could achieve the same results, albeit at the expense of strict mathematical rigour. In this respect Hertzberg's formulation is much clearer, although it requires more complicated mathematics in order to justify it.

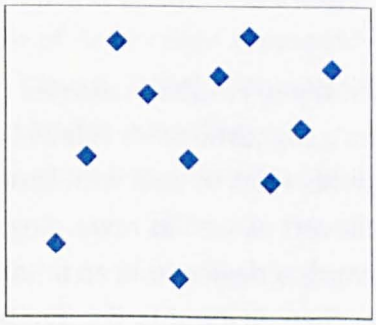
Where I believe that Bartha's model shows promise is that it recognises the importance of the base, or starting point, for decision-making. As I discuss in Chapter 4, the position that we currently enjoy makes a very large difference to our attitude to risk. Imagine for a moment that tomorrow you will have a net worth of £1m. How you regard that prospect depends entirely on how much you have today. If your current net worth is £1, then it looks very attractive, but for Bill Gates it would look disastrous. Bartha's angel,[259] who already enjoys immortality, takes a very different risk in looking for Bargle's salvation (and thus risking Argle's damnation) from that of an ordinary mortal. Thus, Bartha's model could potentially be modified to incorporate elements of asymmetry, or of risk appetite. I will briefly discuss this as part of Chapter 4, but it is an area for further research.

I will now go on to develop my reformulation of the wager which meets Hájek's conditions and also deals with the difficulties that he finds insurmountable, while still being capable of being understood by non-mathematicians.

Perception of utility

We are finite beings – each one of us is composed of a finite number of cells. Our brains may have 100 billion neurons and perhaps as many as 10^{15} inter-connections, but it is still finite. There is no way for us to realise the concept of infinite anything, except in the fuzziest of terms. Any representation of infinite utility that we can recognise must, necessarily, be a finite quantity or a proxy. It can be no more than a symbol or sign of the infinite, rather than the infinite itself. There is necessarily a mapping between the external world and the space that our thoughts occupy. Our concept of number is particularly limited. For example, look at the two patterns below and decide (without counting) whether they have the same number of dots and if they differ, which one has the most.





[259] Bartha, "Relative Utilities," 35.

It is very rare for anyone to be able to do so instantly,[260] although it is a talent associated with savant syndrome, with examples such as Kim Peek, who was the inspiration for the character Raymond Babbitt in the film "Rain Man". Our brains are not geared to recognise number at a glance, although most of us could manage to say whether there were three, four or six spots on a die, although even that task is much harder if they are not organised into a recognisable pattern.

E.L. Kaufman et al. coined the term "subitizing" in 1949 (from the Latin word "*subitus*", meaning "sudden") for the ability to recognize a quantity at a glance.[261] They discovered that people could easily recognise 2, 4 or 6 dots, with a very high degree of confidence, but at 8 or more dots the subjects' confidence declined dramatically, as did their accuracy.[262]

Recent research has shown that language plays a part in the recognition of quantity. The Pirahã tribe who live on the banks of the Maici River in Brazil do not have words for specific numbers, just "bigger amount" and "smaller amount" and they show a greater inability to recognise quantities at a glance than people who speak English.[263] Peter Gordon, an anthropologist at Columbia University, identified that the Pirahã counting system consists of the words: "*hói*" (falling tone = one) and "*hoí*" (rising tone = two). Larger quantities are designated as "*baagi*" or "*aibai*" (= many).[264] Michael Frank et al suggest that the Pirahã truly have no linguistic method of expressing any exact quantity, even "one."[265] From an evolutionary viewpoint we might suggest that there was little advantage to our ancestors to know (or communicate) that there were precisely 478 attackers advancing on their group. It sufficed for them to recognise that there were "many" and to respond accordingly.

Thus, I wish to propose that precise evaluations of infinity are rather a distraction when we consider Pascal's Wager. We simply cannot apprehend infinity, let alone infinity plus one, except symbolically. Infinity is a linguistic concept for most people, rather than a mathematical one and after Cantor we now understand that there are different 'sizes' of infinity, which is extremely hard for us to grasp at an intuitive level. In many ways, we view infinity as a shorthand for "more than I can imagine" in the same way as the Pirahã view any number bigger than two as being "many".

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[260] It is the picture on the right which has 11 dots, while the one on the left has 10.

[261] E. L. Kaufman et al., "The Discrimination of Visual Number," *The American Journal of Psychology* 62, no. 4 (1949).

[262] To test one's own 'number sense', there is an online test available at http://www.nytimes.com/interactive/2008/09/15/science/20080915_NUMBER_SENSE_GRAPHIC.html

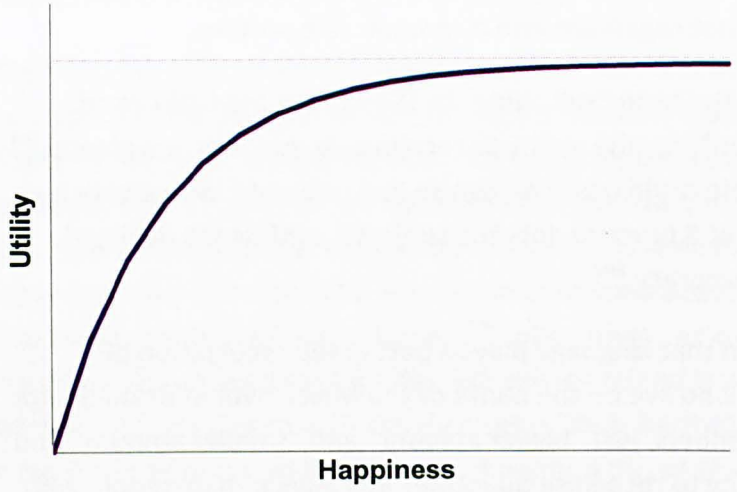
[263] P. Gordon, "Numerical cognition without words: Evidence from Amazonia," *Science* 306, no. 5695 (2004): 496.

[264] Ibid.

[265] Michael C. Frank et al., "Number as a cognitive technology: Evidence from Pirahã language and cognition," *Cognition* 108, no. 3 (2008): 820.

Diminishing utility

Bernoulli's diminishing utility curve, as previously discussed, means that the utility associated with any amount of money, or happiness[266] will eventually plateau and reach some limit value.[267] It might look like the curve below:



However, it could be that the curve continues to increase, albeit at a slower rate and that we cannot see a finite limit. For example, the series: $\frac{1}{2}+\frac{1}{3}+\frac{1}{4}\ldots$ does not reach a finite limit, although by the time we were adding the 10,000th term, it would be impossible for us to recognise any change in the graph with the naked eye.

The dotted line on the curve above represents the effective limit on utility from our point of view. As happiness tends to infinity, our maximum visible utility will approximate to this value. This limit need not be the same for all people, nor even for the same person in different circumstances. However, there will always be a limit because we are finite beings.

Limits are not a problem in themselves; we already recognise that our universe is finite and that it has a finite amount of energy, as we saw before. It is normal and natural that Pascal's Wager should use a limit when discussing the utility of salvation as seen from our perspective. However, it is an error to act as if this is the actual utility, rather than simply a proxy used for the convenience of a finite being.

To follow Bartha's example and suggest an analogy, consider the visual angle of the human eye.

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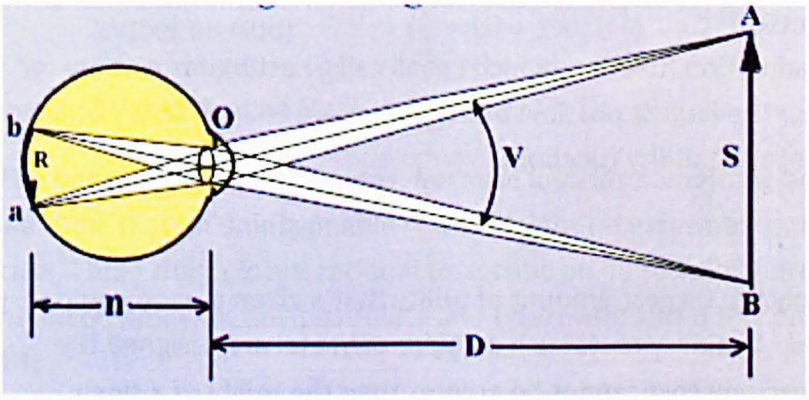
[266] It could be argued that happiness is synonymous with utility, but we are familiar with characters, like Jane Eyre, who give up happiness for morals, duty, or another noble ideal.

[267] We could also obtain such a curve by applying a discount factor for future utility, as in classical economics.



[268]

An object S, which is distance D from the eye, subtends the angle V at the lens and then casts an inverted image R on the retina. The formula for calculating the visual angle is $V = 2 \times \arctan\left(\frac{S}{2D}\right)$. We can see that if the retinal image R is bigger than the macula of the retina, where the retinal cells which detect light are found, then the object cannot be seen in full. The macula is roughly 1.5mm in diameter and the width of the eye (n) is 17mm, so the maximum visual angle is roughly 0.3 radians, or 16°. To see a one metre stick in its entirety, it must be held nearly 2m from the eye. At 1m from the eye, it is not possible to differentiate between a stick 1m long and another which is 100m long. They are both too big to see in their entirety. Of course, we can move our eyes and can thus perhaps gain clues about which is the bigger. However, if we place those same two sticks 10km away it will not be possible to distinguish between them, assuming that we had sufficient visual acuity to see them at all. That is because the cells in the retina also have a size and we need to stimulate at least two adjacent cells in order to perceive anything more than a point.

I am using this illustration, not to get into a discussion of the exact visual acuity of any given species, but merely to illustrate that we operate every day with imperfect information. Things that are very large, or very far away, may be impossible for us to perceive accurately, or to distinguish between two cases. We therefore operate routinely on a heuristic basis. If I am crossing the road, I merely need to know whether a bus is likely to hit me or not; I do not need its exact speed.

I am therefore suggesting that utility is not a precise calculation but a heuristic one. I believe that each finite being has a valuation *function* in operation, which estimates an approximate utility figure from a presented value. It operates on a curve in a similar model to Bernouilli's marginal valuation and it also employs maximum and minimum values, such that a utility value might range from "too small to care about" to "too big to comprehend". It is imprecise enough that I will refer to it as "guesstimation".

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[268] Source: http://upload.wikimedia.org/wikipedia/commons/2/23/EyeOpticsV400y.jpg

Guesstimation function

In my model, this guesstimation function (which I shall call $\mathcal{G}$) estimates a utility for each level of happiness. The largest possible utility, which we will call Ω, is obtained when we pass infinity into the utility function:

$$\Omega = \mathcal{G}(\infty)$$

This value Ω is effectively the biggest amount of utility that a given person could imagine or comprehend. Ordinary costs such as $\mathcal{G}(f_1)$, $\mathcal{G}(f_2)$ etc. are assigned the arbitrary value 1, because any cost cannot be greater than the utility of a single lifetime.

I do not propose that this limit Ω is a universal utility of salvation, not least because it will vary by person, but Ω is the *output* of our guesstimation function for infinity (and also for all quantities that appear to be infinite from a finite perspective).

If we plug this value into the standard matrix we get:

	God exists	God does not exist
Bet on God	$\mathcal{G}(\infty)$	$\mathcal{G}(f_2)$
Bet against God	$\mathcal{G}(f_3)$	$\mathcal{G}(f_4)$

Which yields the following results:

	God exists	God does not exist
Bet on God	Ω	1
Bet against God	1	1

$$\text{EV(bet on God)} = (p \times \Omega) + 1 \times (1\text{-}p) \cong p\Omega$$

$$\text{EV (bet against God)} = (1 \times p) + (1 \times (1 - p)) = 1$$

This conforms with the common-sense expectation that betting against God is simply to retain one's own life and to forego the possibility of anything more.

Since Ω is necessarily far greater than a single life's-worth of utility,[269] it will still dominates the decision matrix, as long as it overwhelms any reasonable probability p. We merely require that $p \geq \frac{1}{\Omega}$ and since have defined Ω as being our guesstimation of an infinite quantity, it therefore follows that $\frac{1}{\Omega}$ must be our guesstimation of an infinitesimal. That is: $\mathcal{G}\left(\frac{1}{\infty}\right) = \frac{1}{\Omega}$. In which case, the bet becomes:

[269] They are inherently limited to the utility (or disutility) of a single lifetime

$$\text{EV(bet on God)} = (\tfrac{1}{\Omega} \times \Omega) + 1 \times (1-\tfrac{1}{\Omega}) = 2$$

$$\text{EV (bet against God)} = (1 \times p) + (1 \times (1-p)) = 1$$

The bet on God still dominates, because it yields something beyond this life, even if we think that an unimaginable reward might be extremely unlikely to occur. In any case, I hold that it is not rational to ascribe an infinitesimal probability (or its heuristic proxy) to any possibility and I deal with this question more fully on page 143.

None of this looks very impressive; all we seem to have done is to swap the case of a Greek letter as compared with Hájek's reformulation, but this use of a utility function is a crucial part of dealing with the problems that Hájek envisaged. Let us turn to the problem of reflexivity. It is a requirement that salvation be the best possible result, even with infinite utility. So, what happens if we try to increase salvation by addition or multiplication? Since we are dealing with the quality of salvation itself, not our calculation of it, we need to pass this 'improved' salvation through the guesstimation function. i.e.:

$$\begin{aligned}\text{utility} &= \mathcal{G}(\infty + 1)\\ &= \mathcal{G}(\infty)\\ &= \Omega\end{aligned}$$

or

$$\begin{aligned}\text{utility} &= \mathcal{G}(\infty \times 2)\\ &= \Omega\end{aligned}$$

or even:

$$\begin{aligned}\text{utility} &= \mathcal{G}(\infty \times \tfrac{1}{2})\\ &= \Omega\end{aligned}$$

In each case, the function $\mathcal{G}$ returns Ω, so we have retained reflexivity under addition and multiplication by positive numbers. The value Ω is consistent with the Pascalian requirement that it be the greatest possible reward.

The question is how well it deals with mixed strategies. The first thing to bear in mind is that a mixed strategy does not affect the actual utility of the outcome; rather it changes the probability that we obtain such an outcome. In the classic formulation, all the factors multiply out to yield the result, but here it has a different effect.

If we put it into the mixed strategy we get:

$$\text{EV(heads)} = \tfrac{1}{2} \times (\mathcal{G}(\infty) \times p + (0 \times (1-p)))$$
$$= \tfrac{1}{2}\, p\, \Omega$$

$$\text{EV(tails)} = \tfrac{1}{2} \times (0 \times p + 0 \times (1-p))$$
$$= 0$$

$$\text{EV(heads + tails)} = \tfrac{1}{2} p\, \Omega$$

Since Ω is not itself infinite, even if it dominates lesser utilities, ½ $p\Omega$ is always less than the $p\Omega$ obtained from the straight bet and so we meet both of Hájek's requirements for overriding utility and distinguishable expectations. We can also show that the use of Ω does not violate either the continuity or monotonicity axioms of Luce and Raiffa.[270]

If there is a weakness in $\mathcal{G}$ it is that it cannot distinguish between ordinary and superior salvation. So, if we consider the salvation offered by Bartha's Argle and Bargle on p97, $\mathcal{G}(\infty_a)$ is the same as $G(\infty_b)$ and so we are indifferent between the rewards. Thus, we would make the choice based purely on the subjective probabilities of each. This is in accord with Bartha's own views on what one ought to do.[271]

Disutility of Hell

If we consider Hell to produce infinite disutility, then it follows that my guesstimation function can handle it in a similar manner.

$$\text{utility} = \mathcal{G}(-\infty)$$
$$= -\Omega$$

Thus, if we wish to consider Hell in the matrix, we can proceed as follows:

	God exists	God does not exist
Bet on God	**Ω**	***1***
Bet against God	**−Ω**	***1***

$$\text{EV(bet on God)} = (p \times \Omega) + 1 \times (1-p)$$
$$\cong p\Omega$$

$$\text{EV (bet against God)} = (p\, x\, -\Omega) + (1 \times (1-p))$$
$$\cong -p\Omega$$

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[270] The proof is left as an exercise for the reader.
[271] Bartha, "Relative Utilities," 34.

We can also deal with 'harsh' versions of Argle and Bargle too, who deal out damnation to everyone except their followers. We recall the table from earlier:

	A exists q_a	B exists q_b	No god exists $1-(q_a+q_b)$
Bet on A	∞	$-\infty$	f_1
Bet on B	$-\infty$	∞	f_2
Bet against all gods	$-\infty$	$-\infty$	f_3

Feeding these values into our guesstimation function and multiplying the result by our subjective probabilities we obtain:

	A exists	B exists	No god exists
Bet on A	$q_a\Omega$	$-q_b\Omega$	$1-(q_a+q_b)$
Bet on B	$-q_a\Omega$	$q_b\Omega$	$1-(q_a+q_b)$
Bet against all gods	$-q_a\Omega$	$-q_b\Omega$	$1-(q_a+q_b)$

EV(Argle) $= q_a\Omega - q_b\Omega + 1-(q_a+q_b)$

EV(Bargle) $= -q_a\Omega + q_b\Omega + 1-(q_a+q_b)$

EV(Neither) $= -q_a\Omega - q_b\Omega + 1-(q_a+q_b)$

From this we can see that betting against all gods is likely to be a losing bet, since we are damned if either Argle or Bargle exists and thus our EV is approximately $-\Omega$.

As before, whether we should choose Argle or Bargle depends on the relative probabilities that we assign to their existence. If we believe that $q_a > q_b$ then we should choose Argle, otherwise we should select Bargle.

Summary of my approach

The use of a guesstimation function satisfies both the requirements of the Pascalian and Hájek while being relatively simple to comprehend. It does not require number systems other than real numbers and also remains firmly within the axioms of conventional decision theory.

3.4 Problems with the matrix

As soon as any Pascalian presents the familiar 2x2 matrix of choices and outcomes, an objector asks why there are only two rows or columns. After all, there are more historical faiths than Christianity and others also have concepts of heaven for adherents and hell for unbelievers. So how is the religiously uncommitted person to decide between all the truth claims presented? Let us start with the familiar simplified 2x2 matrix:

	Christianity is true	Christianity is false
Believe in Christianity	∞ (Eternal life)	0
Do not believe	0	0

Only the bet on Christianity yields a positive outcome and it has infinite value.[272] However, as William Gustason writes:

> *By having just one consequence described as 'Christianity' is false and ascribing to it a value of zero, the wager tacitly assumes that competing faiths ... have a zero probability.*

Gustason wants us to include another faith with a heaven and a hell, in this case, fundamentalist Islam. So the matrix moves to 3x3 to include the extra possibilities:[273]

	Christianity is true	Islam is true	Neither is true
Believe in Christianity	∞ (Eternal life)	0	0
Believe in Islam	0	∞ (Eternal life)	0
Do not believe in either	0	0	0

Yet why stop at two faiths? Paul Saka has a set of other faiths which he believes merit inclusion in the matrix, including the cockroach god, which stems from a joke made by Ellen DeGeneres:

> *Sometimes I wonder what God is like. We picture God to look like us... But... maybe God looks more like those drawings of aliens...Maybe God is a giant bug,*

[272] I am heavily simplifying the matrix here as its complications in terms of earthly cost etc. are covered

[273] As discussed earlier, I have removed Hell from the matrix as we would otherwise end up with sums like: ∞ + -∞ which are indeterminate.

and when we die we're going to have to account for every cockroach and ant we've killed.[274]

Saka supports the idea of a cockroach god as a genuine alternative to a traditional deity by appealing to the animal gods of the Egyptians and Hindus and by a quotation ascribed to JBS Haldane: "The Creator, if he exists, has an inordinate fondness for beetles".[275] While Saka recognises that DeGeneres was joking, he also believes that the idea has some resonance and that it would not work if there were not some truth in it. It is on this last point that I feel he over-reaches. Parody is a well-established form of humour whose only point of reference needs to be recognisable analogy. DeGeneres is mocking an anthropocentric view of God, which might be dealt with in more serious terms by, say, Emmanuel Levinas and his ideas of the 'otherness' of God. The cockroach is chosen by DeGeneres because of its potential to offend and is selected precisely because it is *not* credible.

Saka also wants to include other faiths which have existed at some point in history, on the grounds that these have at least some warrant from tradition. This is to undermine Jordan's suggestion that we should prefer faiths which have some tradition behind them.[276] Jordan's intent was to exclude what we might regard as parodies of religion, such as the Flying Spaghetti Monster[277] or Invisible Pink Unicorns.[278] Saka feels that there is no reason to exclude these synthetic creations unless we can confidently assign a zero probability to them. This action would open the doors for atheists to assign a zero probability to the Christian God, as they would argue that Christianity is equally synthetic, if somewhat older. He carefully brings in faiths which pre-date Christianity, thus hemming Pascal in between ancient and contemporary myths.

Saka finds an ingenious way to include Satan in this pantheon, by presenting him as a Promethean hero and also looking to Manichean and Zoroastrian beliefs as support for theological dualism. He argues that there is some Biblical warrant that Satan has power as great as (or even greater than) God's.

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[274] Ellen DeGeneres, *My Point...and I Do Have One* (New York: Bantam Doubleday, 1995). 129. in Paul Saka, "Pascal's Wager and the Many Gods Objection," *Religious Studies* 37(2001).

[275] This is possibly apocryphal in its exact wording, although the phrasing: *"The Creator would appear as endowed with a passion for stars, on the one hand, and for beetles on the other"* appears in Haldane's 1949 book "What is Life?" p258 according to http://quoteinvestigator.com/2010/06/23/beetles/.

[276] Jordan, *Pascal's Wager*: 80-81.

[277] The Church of the Flying Spaghetti Monster can be found at http://www.venganza.org/ and wherever his noodly appendages extend. The Flying Spaghetti Monster was invented to challenge the Kansas School Board's ruling on teaching Intelligent Design alongside scientific evolution.

[278] Invisible Pink Unicorns are another parody of religious belief. See: http://www.invisiblepinkunicorn.com/ The concept originated in alt.atheism on UseNet but references can now be found more widely, including Dawkins (2006).

Notice that despite God's command against eating of the tree of knowledge, it is Satan's mere suggestion to do otherwise that prevails.[279]

While admitting that this particular idea is flatly contradicted by other biblical passages, Saka claims that Satanism is a live, if minority, option in modern society and must thus be taken seriously. He writes:

"[T]here is no excuse for any citizen of a pluralistic society to dismiss, out of hand, exotic religious hypotheses. ... There are versions of Judaism, Christianity and Islam which make it foolish to risk believing in any of them, and furthermore these versions are not ad hoc (they were not concocted for the sole purpose of refuting Pascal); they are traditional (we can find multi-generation populations in actual history who have held them)"[280]

Many Gods Objections

As Jeff Jordan observes,[281] this "many-gods" objection to Pascal's Wager is one of the most frequently employed. It is also one of the earliest referenced, with Thomas Diderot writing in 1762:

Pascal has said that if your religion is false, you have risked nothing by believing it true; if it is true, you have risked all by believing it false. An Imam could have said as much.[282]

Voltaire was similarly unimpressed,[283] asserting that Pascal was not covering all the relevant possibilities and that there were a "hundred religions in England, all of which damn you if you believe in your dogmas, which they call absurd and impious". More recently, Anthony Flew writes that "the central and fatal weakness of this argument as an argument is that Pascal assumes, and has to assume, that there are only two betting options".[284] Critics claim that a major weakness of the Wager is that, even if it may demonstrate theism to be the only rational choice,[285] it does not specify which deity to follow. In other words, in proving too much, it proves nothing at all.

In this section I will set out different forms in which the many-gods objection has been framed and will discuss some of them in detail. I will look at how other Pascalians have defended the Wager against the many-gods argument and will assess their relative success in that project. Then I will set out the assumptions which I believe are relevant to this particular objection and that will guide us

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[279] Saka, "Pascal's Wager". 333.
[280] Ibid.
[281] Jordan, *Pascal's Wager*: 73.
[282] Denis Diderot, "Additions to Philosophical Thoughts," *Oevres* 112(1875): para LIX.
[283] F.M.A Voltaire, *Philosophical Dictionary*, ed. T. Besterman (London: Penguin Books, 1971). 280.
[284] Anthony Flew, *The Presumption of Atheism* (London: Elek Books Ltd, 1976). 66.
[285] I recognise that most of the Wager's critics admit no such thing.

towards a proper resolution. I agree with Schlesinger that opponents of the Wager have had the tendency to "magnify the gravity of the problem by over-calculating the number of alternative deities".[286] I will demonstrate, by using the principles which I established on page 58, that there are actually very few categories which need to be addressed and that each of these has a relatively simple answer. In the course of this examination, I will also show that one God who satisfies the requirements of the Wager is the Christian one, but not the Augustinian (or Jansenist) understanding of God that Pascal appeared to hold personally.

I will not deal much with the topic of Hell for two reasons: firstly, it complicates the maths without affecting any of the outcomes;[287] secondly, as Christoph Lumer notes, people who do not believe in a deity, do not believe in her hell either.[288]

Jordan[289] categorises these alternative faiths into two major classes which he calls *possibilist* and *actualist*. The *possibilist* faiths are ones where the deity in question is merely a possibility, quite often where no rational person would consider such a deity at all seriously and some where the god is deliberately designed to be maximally implausible. By contrast, *actualist* faiths are centred on deities in which some people have actually believed at some point in history, as demonstrated by the existence of sacred scriptures, temples and other such artefacts. We shall discuss Jordan's analysis and attempt at resolution in the next section, but let us continue first with a few more exotic possibilist examples, namely:

- Number-based gods – where salvation depends upon a hidden number and thus there is an infinite quantity of them
- Evidentialist gods – who prefer atheists/agnostics if evidence is equivocal
- Perverse gods – who deliberately reject theists (and proponents of Pascal's Wager)

Number-based gods

Richard Gale proposes a 'sidewalk God'[290] who rewards with infinite bliss those who make a point of stepping on every third crack in the sidewalk (or 'pavement' for British readers) and metes out infinite punishment to those who do not. This could be logically extended to include any number of cracks, or any given sequence.

Graham Oppy is one of the most prolific of the "many-gods" proponents. He writes:

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[286] Schlesinger, "A Central Theistic Argument," 87.
[287] Although Batha's relative utilities offer ways of dealing with this, as would my own utility guesstimation function.
[288] Christoph Lumer, "Practical Arguments for Theoretical Theses," *Argumentation* 11(1997): 339.
[289] Jordan, *Pascal's Wager*: 73-101.
[290] Richard Gale, *On the Nature and Existence of God* (Cambridge: University Press, 1991). 350.

Now, perhaps it will be objected that, although this argument does show that there are further possibilities which Pascal ought not to have discounted, nonetheless it does not serve to establish that there is really an infinite set of possible deities. No matter; we can establish this quite directly. For consider the following:

1. For each natural number n there is the deity S_n who is much like the traditional Christian God, except that s/he rewards all and only those people who live for exactly n years (rounded down to the nearest whole year).

2. For each natural number n there is the deity T_n who is much like the traditional Christian God, except that s/he rewards all and only those who are among the first n people to die.

3. For each natural number n there is the deity U_n who is much like the traditional Christian God, except that s/he rewards all and only those who are not among the first n people to die.[291]

4. For each natural number n, there is a world W_n in which there are n deities (all much like the Christian God) who reward all and only those people who believe that there are n deities who are much like the Christian God.

His intent is to create an infinite pantheon of gods who are all theoretically possible and he suggests that since we cannot rule them out and we cannot decide between them, then our task of finding the correct one is impossible. While he certainly succeeds in creating his notional pantheon, it seems an empty achievement. By way of analogy, let us remember that for the simple arithmetic sum of 2 + 2 there are a non-denumerable number of wrong answers. If we were to conclude that there was therefore an infinitesimal probability of obtaining the correct solution, no-one would take us seriously.[292]

Jordan does not accept that these possibilist cases, which he refers to as "philosopher's fictions", are equiprobable with any actualist gods; however Saka insists that they should merit some consideration, even if it is very small. Oppy and others' logic is that since there is an uncountable infinity[293] of these fictions, it becomes theoretically impossible to pick any one as being definitive, assuming that we assign a non-zero probability to each one's existence. I will propose a solution to this problem on page 117.

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[291] Oppy, "On Rescher on Pascal's Wager."

[292] Determining the correct answer is left as an exercise for the reader.

[293] It is easy to postulate a god who accepts only those who can name his favourite real number. Since there is an uncountable infinity of such numbers, we have an uncountable infinity of possible gods.

Evidentialist gods

The next class of deity to consider is the one who values evidentialism. As J.L Mackie suggests:

> *There might be a God who looked with more favour on honest doubters or atheists who, in Hume's words, proportioned their belief to the evidence, than on mercenary manipulation of their own understanding. Indeed, this would follow from the ascription to God of moral goodness"*[294]

W.K. Clifford suggests with a strong sense of moral outrage that "it is wrong always, everywhere, and for anyone, to believe anything upon insufficient evidence."[295] Perhaps an evidentialist god will reject all those who did not avail themselves of Bertrand Russell's proposed defence on Judgement Day that there was insufficient evidence for God in order for anyone to be a believer. For the Cliffordian, if a god does turn out to exist after all, then they will not (or perhaps should not) judge the unbeliever harshly, as long as any decision was based purely upon the evidence available to them. For the deity to do otherwise would be fundamentally unjust and thus it would fall short of the MaximalGod and not be worthy of worship. It would therefore be rejected under my Principle of Maximality.

Such Cliffordian arguments are frequently employed against the Wager and it is hardly surprising that Jordan constructs an elaborate Jamesian defence in response, which I consider on page 121. I believe that the Cliffordian challenge is inherently flawed for other reasons and I will elaborate on this on page 135.

Perverse gods and theologies

A number of authors have designed possibilist deities who deliberately frustrate the terms of Pascal's Wager by turning the bet on god from a winning to a losing proposition. Oppy suggests a Perverse God who "infinitely rewards all and only those who fail to believe in any God". Likewise, Michael Martin suggests one who "punishes with infinite torment after death anyone who believes in God or any other supernatural being (including himself) and rewards with infinite bliss after death anyone who believes in no supernatural being".[296] Jordan also references Walter Kaufman and Leslie Stephen who put forward similar models and which Jordan collectively terms "deviant theologies".[297]

William James is a profound critic of the Wager on moral grounds and writes:

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[294] J. L. Mackie, *The Miracle of Theism* (Oxford: Oxford University Press, 1982). 203.
[295] W.K. Clifford, "The Ethics of Belief," in *The Ethics of Belief and Other Essays* (London: Prometheus Books, 1879).
[296] Michael Martin, *Atheism: A Philosophical Justification* (Philadelphia: Temple University Press, 1991). 231.
[297] Jordan, *Pascal's Wager*: 74-75.

> *We feel that a faith in masses and holy water adopted wilfully after such a mechanical calculation lacks the inner soul of faith's reality; and if we were of the Deity, we should probably take pleasure in cutting off believers from their infinite reward.*[298]

James proposes that God would be offended by anyone who came via Pascal's Wager and would reward them with nothing. As we will see, it is ironic that James's formulations of pragmatic reason will contribute to one of the strongest defences against the many-gods objection to Pascal's Wager.

Mougin & Sober propose X-theology, where there need not be any deity at all, but "atheists go to heaven and theists go to hell, regardless of whether God exists or not".[299] This neatly sidesteps an obvious flaw in Oppy's and Martin's formulations, for theists in those systems are actually correct, because God and/or supernatural beings do exist, and atheists are as wrong as they can be. We shall return to this on page 129.

Summary of the many-gods objections

The wealth of examples we have seen, has led a number to suppose that the "many-gods" problem is particularly intractable for the Pascalian. There seems to be no limit to the number of philosophers' fictions, particularly as philosophers are so creative in producing objections to other people's theories.

Franklin weakly tries to protect Pascal by suggesting the wager was possibly only aimed at the 17th century *homme moyen sensuel* who might only have known about, or considered a straight choice between French Catholicism and atheism.[300] Simon Blackburn makes the same error[301] and Saka rightly dismisses both, pointing out that this view is profoundly mistaken because it misrepresents history:

> *"sophisticated Parisians in 1660 knew of the existence of Greek paganism, Roman paganism, Judaism, Islam, Protestantism, new world paganism and probably even the Satanism that was imputed to the freemasons and Knights Templar"*[302]

Saka contends that even if Franklin's claim were true, it would have little bearing for us today. "[T]he real problem is that any given deity is less probable than the combined probabilities of all other deities".[303] In such an untamed universe of

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[298] James, *The Will To Believe*: II.
[299] Gregory Mougin and Elliott Sober, "Betting on Pascal's wager," *Nous* 28(1994): 385.
[300] James Franklin, "Two caricatures, I: Pascal's Wager," *International Journal for Philosophy of Religion* 44(1998): 111.
[301] Simon Blackburn, *Think: A Compelling Introduction to Philosophy* (Oxford: Oxford Paperbacks, 2001). 175.
[302] Saka, "Pascal's Wager". 339.
[303] Ibid.

gods, how can the agnostic or atheist possibly select just one to wager upon? I would argue that it is still irrational to pick none at all. Any god is better than none, unless one gives greater weight to the possibility of ending up in hell for making the wrong choice, rather than reaching heaven for the right one. It would seem that such atheists are actually backing the evidentialist God which, as I shall demonstrate later, is a very poor bet indeed.[304]

It is usually assumed by proponents of the many-gods objection that God will care exactly which name is used for him and that a Muslim could never reach the Christian heaven, simply because he worshipped under the wrong appellation. This runs against a lot of scriptural examples, the notion of "Anonymous Christianity" espoused by Karl Rahner and even the doctrine of the Roman Catholic Church. For example, in the papal document *Dominus Iesus* we find:

> *"Nevertheless, God, who desires to call all peoples to himself in Christ and to communicate to them the fullness of his revelation and love, "does not fail to make himself present in many ways, not only to individuals, but also to entire peoples through their spiritual riches, of which their religions are the main and essential expression even when they contain 'gaps, insufficiencies and errors'" Therefore, the sacred books of other religions, which in actual fact direct and nourish the existence of their followers, receive from the mystery of Christ the elements of goodness and grace which they contain."*[305]

CS Lewis gave an example of such tolerance in his allegorical book "The Last Battle" where Emeth, a Calormene soldier (the enemy of Narnia), finds himself after death face-to-face with Aslan, whose name he has hated in his lifetime. Aslan surprisingly says to Emeth that "all the service thou hast done for Tash, I account as service done to me".[306] In other words, God may be less bothered about strict nomenclature as long as our actions are pure. Saka doubts that this is a real possibility, arguing that "different religions do not merely prescribe occasionally conflicting modes of worship; they *usually* prescribe conflicting codes of morality."[307] That having been said, this is not an essay on comparative theology and most critics of the Wager assume strict enmity between named gods.

The essence of the many-gods objection is that there are simply too many deities to choose from and we become like Buridan's ass, paralysed between the alternatives.

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[304] I allow that they could also be hoping that a benevolent God would value their demonstration of the free will that they had been given more than having their slavish and feigned obeisance.

[305] Congregation for the Doctrine of the Faith, Dominus Iesus, (Rome: Offices of the Congregation for the Doctrine of the Faith, 2000), http://www.vatican.va/roman_curia/congregations/cfaith/documents/rc_con_cfaith_doc_20000806_dominus-iesus_en.html. I.8.

[306] C.S. Lewis, *The Last Battle* (London: Grafton, 1956; repr., reprinted 2002). 154.

[307] Saka, "Pascal's Wager". 331.

I believe that we can narrow that search considerably using the toolkit which I developed Chapter 2, but before doing that I will briefly consider how Jordan and others attempt to deal with some of the questions we have just raised.

Defending against many gods

Jordan identifies three themes within the panoply of options:

- What he terms 'engulfing' wagers
- That the non-denumerable number of possible gods makes the probability of any individual god infinitesimal.
- The actualist argument that there are multiple gods on offer in the modern world with genuine adherents.

I shall cover each of these in turn, followed by a discussion of Jordan's Jamesian Wager.

Engulfing wagers

Jordan defines an 'engulfing' wager as follows:

> *A wager W is engulfing just in case there is another wager, W', which recommends inculcating belief in deity α, while W recommends inculcating belief in deity β who rewards all and only those who believe in β, and punishes all and only those who believe in α.*[308]

Jordan is thus suggesting that for any deity under consideration there could be another deity who offers a similar reward, but who punishes the other's adherents.

While this relies upon the ability to create suitable philosophers' fictions for each and every possibilist or actualist god, it seems reasonable to believe that we could do so, just as we did for the harsh version of Argle and Bargle on page 99. Jordan's reply is to suggest that for engulfing wagers to succeed, there must be in existence the underlying premise that the ability to think of a logically possible proposition automatically grants it a non-zero probability of being true. Jordan then demonstrates this assumption to be false by suggesting propositions like "I did not have parents". While this may not be biologically possible,[309] the statement itself does not involve any logical contradictions and there is no logical necessity that I should exist. Thus, although we might intuitively understand that the sentence is wrong, we cannot fault it on purely logical terms. By showing a proposition which we know to be logically coherent, but still false, Jordan challenges the assumption that merely to think of a possible deity means that it needs to be assigned a non-zero probability of existence. Thus attacking the premise at its origin, Jordan justifies his assignment of a zero probability to the existence of the sidewalk god. As

[308] Jordan, *Pascal's Wager*: 79.
[309] Except perhaps for Adam and Eve

he says: "No one who sincerely reflects on the matter will find the philosophers' fictions live hypotheses".[310] He goes on:

> *"being cooked up, the philosophers' fictions are maximally implausible. These gerrymandered hypotheses are so bizarre that one is justified in assigning them a zero possibility, or perhaps, if it is possible, an infinitesimal probability assignment."*[311]

Jordan suggests the analogy of tossing a coin. When we discuss a coin toss, we do not usually allow for the possibility that the coin may land on its edge,[312] or be swallowed by a passing crow or to vanish into thin air. All of these are theoretically possible, yet in standard decision theory we would only look at the 'heads' and 'tails' outcomes. Paul Saka is unhappy with this analogy, arguing that if a coin were to land on its edge, we would not consider the toss to have been successful and we would simply toss the coin again.[313] He suggest that this is why we would exclude the aberrant results from the probability matrix. However, we must allow that no such opportunity exists in the Wager. There is no chance to toss the coin again; indeed this becomes a major support for Jordan's Jamesian formulation of the Wager, which we shall consider shortly.

The weakness of Jordan's rejection here seems to be that he could be accused of privileging his own judgement as to what should be considered as a valid possibility. Strict atheists could (and do) claim that they find the Christian God to be "maximally implausible". If they sincerely believe that God to be fictional, then they feel justified in putting him in the same category as the Flying Spaghetti Monster. It is not clear how Jordan's view trumps theirs. As Saka observes: "The privileging of one's own culture [...] is unjustified ethnocentrism".[314]

Infinitesimal probability of finding the right god

The generation of an infinitely large pantheon of possibilist gods is pursued because it is alleged that this reduces the probability of finding the correct one to an infinitesimal quantity. Some authors (e.g. Gale[315]) have suggested that if we multiply an infinite value by an infinitesimal one, the result is infinitesimal and thus Pascal's Wager will fail to deliver an infinite reward, because the infinitesimal probability will dwarf the infinite reward received. This is not true. Let us consider two infinite series:

$$A = 2 \times 2 \times 2 \times 2 \times \ldots$$

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[310] Jordan, *Pascal's Wager*: 80.
[311] Ibid., 81.
[312] Ibid., although the wilder examples are my own.
[313] Saka, "Pascal's Wager". 325.
[314] Ibid., 340.
[315] Gale, *On the Nature and Existence of God*: 350.

$$B=\frac{1}{2}\times\frac{1}{2}\times\frac{1}{2}\times\ldots$$

We might suggest that A x B = 1, but the actual result is undefined because we could bracket the individual elements in an infinite number of ways. e.g.

$$\left(2\times\frac{1}{2}\right)\times\left(2\times\frac{1}{2}\right)\ldots \quad = 1$$

$$\frac{1}{2}\times\left(2\times\frac{1}{2}\right)\times\frac{1}{2}\times\left(2\times\frac{1}{2}\right)\ldots \quad = \textit{infinitesimal}$$

$$2\times\left(\frac{1}{2}\times 2\right)\times 2\times\left(\frac{1}{2}\times 2\right)\ldots = \textit{infinite}$$

In Robinsonian non-standard analysis, the product of an infinite and an infinitesimal is known as an *indeterminate* form.[316] We cannot determine the product, unless we know what the infinity and the infinitesimals actually are and how we should combine them.

The implied argument from Oppy et al. is that if there are a non-denumerable infinity of possible gods, of whom only a finite number can offer infinite bliss, then our chances of receiving that reward are infinitesimal and thus so is our expected utility. As we have just seen, this assumes that the infinity of reward will necessarily be less than the reciprocal of the infinitesimal probability. We might counter that a suitable deity should be able to offer a reward which is greater than the number of possibilist alternatives, which is itself necessarily limited by human imagination.

Leaving aside pure mathematical objections about the relative sizes of infinity, if we accept that there are a non-denumerable infinity of gods to consider, then it is clear that we cannot ever make a decision, because it would take an infinite amount of time to consider all the alternatives. It would not be considered rational to make a choice without considering each option fairly and thus the infinite pantheon effectively stifles Pascal's Wager, even if it does not defeat it on decision-theoretical grounds.

I believe that the problem posed by number-based deities should be decomposed into two separate tasks:

(a) Is there a deity who uses a number-based criterion as the determinant of salvation?
(b) What is the actual number?

If we are able to reject proposition (a), then proposition (b) has no force. The fact that the number space is infinite does not constrain us to postulate an infinite

[316] H Jerome Keisler, Foundations of Infinitesimal Calculus, (2007), http://www.math.wisc.edu/~keisler/foundations.pdf. 31.

number of possibilist deities. It only requires us to postulate a single deity whose criterion is unknowable, but which is selected from an infinite set. Since the demands upon us are unknowable, there is no way for us to knowingly mitigate our risk and, according to the Principle of Accepted Immitigable Risk, if we cannot mitigate it, then we must accept it. We have no choice therefore, but to accept this residual risk of *all* number-based deities, which then leaves us free to ignore them and concentrate on the risks that we might be able to mitigate.

Jordan's approach to this problem is suitably pragmatic. As we saw earlier, there are always a non-denumerable number of wrong answers, but that does not make each wrong answer as probable as the correct one. For the objection to hold, it has to assume that all possible gods are equiprobable with the real one, although there is no reason to believe that this is true. We saw on page 42 that the Principle of Indifference, which suggests that we might treat them as equiprobable, is itself deeply flawed and should not be held up as any sort of yardstick.

By analogy, let us assume that you wish to find Kevin Grumball in the UK. We can easily postulate an infinite number of possible Kevins as well as (at least) one real one.[317] However, this does not inflate the task in the slightest, since we will not actually search through that imaginary set. While Kevin may require effort to find, the work will only be finite.

Jordan's approach here is to repeat his earlier rebuttal that mere logical possibility does not require assignment of a non-zero probability. Just as with our task in finding the real Kevin, Jordan holds that we do not need to search through fictitious imaginings. Paul Saka is not so sure and thinks this may be begging the question.

> *If a religious proposition P currently numbers among our background beliefs, then (assuming methodological conservatism) we already have a reason to believe P; Pascalian calculations are beside the point, as they won't affect P's status for us. On the other hand, if P does not currently count as one of our background beliefs, there is no reason for us to be conservative about it.*[318]

He wants us to be open minded and suggests that excluding the sidewalk god might be pre-judging the question. While we may choose to exclude the fictions, we need to have sufficient reason to do so and we cannot presume that everyone else should do likewise. "In order legitimately to assign a probability of zero to a proposition, one needs to have a reason for doing so".[319]

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[317] I know of at least one other Kevin Grumball in the world, but he does not live in the UK.
[318] Saka, "Pascal's Wager". 325.
[319] Ibid., 326.

I do not entirely agree. It seems just as valid to demand that I should assign a probability of zero unless I have a reason to do otherwise.[320] Thus, I am only obliged to consider one of the fictions if I have a reason to believe that it might be true *and* if there is an opportunity for me to mitigate my risk in that case. In the case of actualist options, the presence of at least one genuine believer might require me to assign a non-zero probability, but for the fictions, no such obligation exists. This immediately reduces the search space from an infinite proposition to a finite one, which we will now consider.

Actualist options and Jordan's Ecumenical Wager

The earliest critics of the Wager like Voltaire and Diderot saw no reason to invent gods, as they could find enough contradictions in the actual religions around them.[321] Let us assume that there are two competing religions, A and B, where each offers similar infinite rewards for belief. If we assume that we cannot believe in both, then we face 3 choices: believe in A, believe in B or reject both. If each option is considered equiprobable, the outcomes are as follows:

$$EV_A = 1/3 \times \infty_A$$

$$EV_B = 1/3 \times \infty_B$$

$$EV_{Neither} = 1/3 \times 0$$

So it becomes irrational to reject both A and B, because choosing either of the other options has equal infinite utility; any god will do, but atheism will not. Jordan calls this his 'ecumenical' version[322] of the Wager.

Although I will discuss some actualist examples in this essay, including non-deistic belief systems, I do not explore them in any detail, because critics of the Wager generally reject all religions, rather than any one in particular. In addition, merely identifying all the variants of actualist faiths and assembling them into a suitable systematic framework would be a significant task in its own right. The intent of this thesis is to develop a toolkit which can be used to decide between competing faiths with respect to Pascal's Wager, rather than to identify the one which I consider to be the most successful in that regard. That would be an area for future research.

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[320] De Finetti might not agree with me here, because he holds that we should only assign a zero probability if we believe it to be impossible. However, I am faced with a pragmatic decision based upon my finite resources. I cannot consider all the options, so I believe that I can assign a 'pragmatic zero' to the probability of such deities. I will return to this when I discuss zero probabilities on p146.

[321] *Contra* Blackburn, Dawkins et al who suggest that 17th Century thinkers were only aware of Christianity.

[322] Jeff Jordan, "The Many-Gods Objection," in *Gambing on God*, ed. Jeff Jordan (Lanham, Maryland: Rowman and Littlefield, 1984), 110.

Jordan's Jamesian Wager

William James argued that a decision could legitimately be made under uncertainty, even if there were no conclusive evidence either way, as long as three conditions prevailed:

- It should be a 'live' option, by which James means that it must contain only hypotheses that you might reasonably consider to have some chance of being true.
- It should be a 'forced' decision, where there is no opportunity to suspend judgment pending proper evidence.
- It should be 'momentous' by which James means a once-in-a-lifetime opportunity:

> *"if I were Dr. Nansen and proposed to you to join my North Pole expedition, your option would be momentous; for this would probably be your only similar opportunity, and your choice now would either exclude you from the North Pole sort of immortality altogether or put at least the chance of it into your hands."*[323]

It is clear that at least two of these pre-conditions are met within the Wager. It is certainly 'momentous', since the decision affects our eternal destiny. It is also 'forced', since we have to decide before we die and we have no opportunity to suspend judgment until later. As Pascal notes: "Yes, but you must wager. There is no choice, you are already committed".[324]

Jordan's innovation in relating it to objections to Pascal's Wager is to insist that any of the choices to be considered must be *living* options in James' terms.

> *"A living option is one in which both hypotheses are live ones. If I say to you: "Be a theosophist or be a Mohammedan," it is probably a dead option, because for you neither hypothesis is likely to be alive. But if I say: "Be an agnostic or be Christian," it is otherwise: trained as you are, each hypothesis makes some appeal, however small, to your belief."*[325]

Jordan therefore dismisses the philosophers' fictions *en masse,* as none of them could be living options for anyone rational.

> *"If one finds a hypothesis maximally implausible, even if logically possible, and a pure fantasy, one will find that the hypothesis 'refuses to scintillate with any credibility at all'"*[326].

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[323] James, *The Will To Believe*: I.
[324] Pascal, *Pensées*: 123. L418
[325] James, *The Will To Believe*: I.
[326] Jordan, *Pascal's Wager*: 96. (the last phrase in inverted commas comes from James)

Oddly, Jordan ignores to the probable counter from the hard-line atheist. I would expect a New Atheist to reply that she finds the Christian God just as implausible as any of the possibilist alternatives and that Christianity is therefore not a live hypothesis for her.

We might rebut this argument to some extent by pointing out that the atheist needs to start by admitting that as a resident of the UK, her own noetic state could be either theist or atheist, depending on a wide range of factors, and that this state should be considered to be mutable. After all, we can see examples where even hard-line atheists, such as Anthony Flew, can reconsider late in life[327] and we also know of famous British theists (e.g. the triple-jumper Jonathan Edwards[328]) who have lost their faith. As Craig Duncan notes, it is irrational that an atheist should remain so if she encounters suitably convincing evidence, even if such evidence would not necessarily be available to anyone else.[329] It must be allowed that an atheist living in a Christian country might have been Christian instead, had certain things been different in her life. It is difficult to avoid any encounter with the Christian faith in the British education system, not least because it is a statutory obligation on all state schools. It is also unlikely that any given atheist has never encountered a single Christian who is both rational and articulate. Although the atheist may be reasonably sure that such a Christian is wrong-headed, it would be dogmatic to assume that she could never have been like that person. Thus it can be argued that her current faith stance is simply a matter of probability, rather than an immutable fact, and Christianity should be allowed as a live option in the Wager, even if the atheist currently believes it to be false.

The question, therefore is whether a British atheist can successfully claim that Christianity is truly not a live hypothesis. I can quite accept that such an atheist could claim that Odin is a fiction, just as much as the animist deities observed in what we would consider to be primitive cultures. I am less convinced that it is a fully defensible stance for a British national to take an immovable stance on the existence of the Christian God. Too much of our culture is bound up in its Judeo-Christian origins for these to be simply extracted, as if our current value system were not rooted in a religiously-inspired one. Nietzsche is particularly scathing about what he saw as a typically English attempt to remove Christianity from our Western European world-view. He writes:

> *"When one gives up the Christian faith, one pulls the right to Christian morality out from under one's feet. This morality is by no means self-evident: this point has to be exhibited again and again, despite the English flatheads. Christianity is*

[327] Anthony Flew, *There Is A God* (New York: Harper Collins, 2007).
[328] http://www.scotsman.com/sport/interview-jonathan-edwards-record-holding-athlete-1-1560508
[329] Duncan, "Do Vague Probabilities Really Scotch Pascal's Wager?," 281.

a system, a whole view of things thought out together. By breaking one main concept out of it, the faith in God, one breaks the whole: nothing necessary remains in one's hands. ... it has truth only if God is the truth — it stands and falls with faith in God."[330]

I suggest that the atheist's claim to be able to extricate themselves from the Christian culture in which they are immersed is therefore particular difficult task, yet it is one that must be absolutely achieved before it would be legitimate to assert the Christianity could never be a live hypothesis in any degree.

James offers more hope, though, since his definition of a live hypothesis "is one which appeals as a real possibility to him to whom it is proposed". To be live in James' terms is thus for something to be a 'real' possibility, which I think might require a greater epistemic weight that a mere outside possibility. If we adopt James' stricter requirement, then we might allow the atheist's claim to hold in this regard, despite my own reservations. Jordan uses the term 'live hypothesis' in the rather weaker sense that it is something which ought to be at least considered, without being dismissed out of hand.

For our atheist to escape the ecumenical version, combined with the Jamesian one, however, she would require the denial of the possibility of any and all post-death reward systems and an assertion that all actualist faiths are wrong, but without any evidence to actually support this belief. I would suggest that this takes her rather further into the realms of dogma, than those of argument.

Where there might be more room for manoeuvre is in the sort of quasi-deistic faith that Dawkins and others have allowed as a possibility. While denying that any of the traditional religions are correct, Dawkins accepts that it might be permissible to believe in a form of what he calls "Einsteinian religion". However, he would strenuously deny that any such deity would take any interest in the affairs of mankind, and would reject the idea of earning an afterlife through such a belief.[331] Pascal would have had little time for such a stance and he condemned Descartes for what he saw as an attempt in that direction:

"I cannot forgive Descartes. In all his philosophy he would have been quite willing to dispense with God. But he had to make Him give a fillip to set the world in motion; beyond this, he has no further need of God"[332]

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[330] Friedrich Nietzsche, *Twilight of the Idols, Or, How to Philosophize with the Hammer*, trans. Richard Polt (Indianapolis: Hackett Publishing Co., 1889). 80-81.
[331] Dawkins, *The God Delusion*: 18-19.
[332] Blaise Pascal, *Pensées*, trans. W.F. Trotter (1944). B77 (NB: this fragment does not appear in Lafuma's or Sellier's editions.)

Jordan's Next Best Thing

Jordan attempts to bring these objections together and recasts a single traditional deity, a deviant theology (i.e. one where the deity favours atheists) and atheism into a 3x3 matrix, arguing that any other cases are simply variants of those primitive options.

	Deity exists	Atheism is correct	Deviant theology is true
Accept deity	F_1 ∞	F_4	F_7
Accept atheism	F_2	F_5	F_8 ∞
Accept deviant theology	F_3	F_6	F_9 ∞

Three of these cells (F_1, F_8 and F_9) yield infinite reward and we can assume that we are indifferent between them. Each row has one chance of achieving the infinite bliss and we should note that even the atheist receives infinite bliss if the deviant theology turns out to be true, by virtue of having rejected all deities.

Jordan argues that his Jamesian Wager offers a reward that is at least as good as the best of the other outcomes available and has no outcome worse than the worst of the other two outcomes. If we want to accept the deity, therefore, we simply need to establish that F_1 is as good as the best outcome in the other two rows, which it is, because it is infinite. We next need to show that F_4 and F_7 are no worse than the worst outcomes of the other options. Jordan holds that this is the case, since the deviant theology's hell is no worse than the deity's (although I think that this might be open to debate) and that atheism has no downside after death. Having established this, he then observes that in the event of a tie we are still obliged to make a decision. Since we have exhausted the EV calculations, he suggests that we may use other criteria in order to make a choice. His solution is to use what he calls the "next-best thing",[333] which is to look at the finite costs of each. This is in accord with my Tie-Break Principle.

Rescher (and others) hold that there are costs to belief,[334] and it is orthodox doctrine that Christian faith may involve sacrifice and suffering. Jordan, however, draws on sociological studies which demonstrate that religious faith may improve lifespan and increase the level of happiness among believers, as compared with unbelievers. Thus, he argues that it is rational to choose Christianity because it does no worse in the worst case, does at least as well in the best case and appears to grant benefits in this life too. Personally, I think this simply reflects the society in which the surveys were conducted. If we had interviewed Christians burning at Nero's parties, the statistics might have given a significantly different picture.

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[333] Jordan, *Pascal's Wager*: 89.

[334] Rescher, *Pascal's Wager: a study of practical reasoning in philosophical theology*: 31.

Jordan runs the risk of making Christianity a fair-weather faith, to be abandoned when adversity threatens. I suggest that it runs counter to the Pascalian spirit for us to be relying on positive returns in the material world.

Solving the many gods problem by a process of elimination

In moving on to my own solution to the many-gods objection, we will draw upon the principles outlined on page 58 and also upon my discussion around hiddenness on page **Error! Bookmark not defined.**. Many of these have been taken for granted in other models, much like the hidden assumptions of the Wager which I discussed on page 45.

It is my contention that we can eliminate the vast majority of possible gods. For some of these cases it will be because we cannot change our behaviour in order to meet their criteria. In others it will be because the proposed god is actually internally incoherent. By eliminating a lot of the distractions, I believe that we can focus more clearly on those that actually matter. Mine is to be a pragmatic approach.

Predestination

My first partitioning of candidates is between those cases where our actions can realistically change the outcome and those where they cannot. If we cannot reasonably meet the god's criteria for acceptance then no mitigation is possible for the risks we face. Under my Principle of Accepted Immitigable Risk on page 58, we agreed that that if a scenario offers no mitigation, then its risks will be deemed to be accepted and the scenario dismissed from further consideration. Thus, for any predestining deity, we must simply accept the risk of not having been selected and not spend any further effort in considering whether or not it may apply to us.

To show no favour, we should start with Pascal's own Christian orthodoxy. Pascal is heavily influenced by the Jansenists, an austere Augustinian sect, and his writings reflect their teaching. In his *Writings On Grace*, we find passages like:

> *"That God, by an absolute and irrevocable will, wanted to save his elect, in a purely gratuitous act of goodness, and that he abandoned the others to the evil desires to which he could have justly abandoned all men."* [335]

Jordan writes: "Although a Catholic in allegiance, Pascal was Calvinistic regarding grace and free will". Voltaire spotted this at the time and complained:

> *"It is in my interest no doubt, that there is a God, but if, in your system, God only came for so few people, if the small number of the elect is terrifying, if I can do*

[335] Pascal, "Writings on Grace," 222.

nothing at all by my own efforts, tell me, please, what interest I have in believing you?"[336]

Jordan, however, sees no problems with predestination and declares "the doctrine of predestination is no part of the Wager and one can endorse and employ the wager without subscribing to that doctrine".[337] While I agree one can employ the Wager if one does *not* subscribe to predestination, I am not sure how one could do so in the other case. Jordan's defence of this point seems weak, saying that inculcating belief may still have value and besides, the doctrine may be wrong. I contend that it would be on very dubious moral ground to encourage people to risk all that they have, in pursuit of something which they could never achieve.

I hold that for all gods who predestine people, the Wager is irrelevant. No matter what they do, they cannot get themselves either into (or out of) the elect and no mitigation of risk is feasible. Thus, using the Principle of Accepted Immitigable Risk, we simply ignore predestining gods from our calculations and focus our attention on risks which we may be able to mitigate.

Of course, we must remember that no one can know for certain whether they are predestined or not, so they must behave under the Wager as if predestination did not apply. While this may seem a belt-and-braces approach, it may be a prudent one.

Universalism

The universalist god is like the predestining god as far as the Wager is concerned. No-one will actually be rejected by such a god, so actions make no difference and it is another case where the Principle of Accepted Immitigable Risk applies. No mitigation is possible (or necessary), because no actions of our own can expose us to the risk of rejection.

Bartha notes an interesting corollary when we are considering a choice between a universalist god A and a less forgiving one B. In this case, we have nothing to gain by believing in A, since we will be admitted to A's heaven, even if we choose B. Therefore, we should choose B, because we win if B exists and still get to A's heaven, even if we are wrong. As Bartha says, "Nice gods finish last!"[338]

Saka observes: "If the universalist God exists, it doesn't matter what you believe now because your payoff in the long run will always be infinite."[339] The existence of a universalist god does not affect any of the other choices in the Wager and thus we

[336] Voltaire, *Pascal's Thoughts*, 127.
[337] Jordan, *Pascal's Wager*: 145.
[338] Bartha, "Relative Utilities," 38.
[339] Saka, "Pascal's Wager". 337.

should always act as if such a God does not exist, even if that might seem a little churlish.

Reincarnation

Saka argues that we need to include Buddhism in the matrix and that "Buddhist practice not only isolates one from the joys and sorrows of earthly life, it precludes theistic worship."[340] As Buddhism is clearly not a philosophers' fiction, it cannot simply be discarded on those grounds, so we need to consider what effect it has. I propose that one key can be found in Buddhism's doctrine of reincarnation, which suggests that if we do not achieve nirvana in this life, we will re-enter the wheel of reincarnation and try again in another life.[341]

Thus we have an option which is not available to the traditional theist – a second chance. Richard Carrier suggests that the "best kind of God" would "include reincarnation in alternate *(sic)* universes: so those not saved get to try again and again until they learn."[342] In this model all souls would eventually attain nirvana and Buddhism will behave more like a universalist god in its payoff. If everyone gets salvation eventually, we need not waste what might be our only shot at immortality by selecting an option which has inbuilt mitigation.[343]

Many believers in reincarnation report some knowledge of their previous lives, so they might argue that this constitutes sufficient evidence in order to remove the uncertainty which is a fundamental precursor of the Wager. Pascal says: "Reason cannot make you choose",[344] but if reason *could* make you choose, then the Wager is not required. Let us assume that there is a finite probability p in each life that you will acquire enough knowledge of previous lives to properly believe in reincarnation. The probability that you will believe after your n^{th} life can be calculated as $1-(1-p)^n$ and this will tend towards unity very rapidly as the number of lives increases. It is also affected by the probability that you will attain nirvana in a given life; once you do this, by whatever means, you will no longer need to believe anything. This model of progressive improvement operates in a similar manner to the universalist case, albeit over several lifetimes rather than just one. We would therefore dismiss it from our risk management strategy, since it acts a safety-net, without our needing to consider it further.

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[340] Ibid., 331.

[341] I admit that this description is heavily over-simplified, but space does not allow a fuller discussion.

[342] Carrier, "The End of Pascal's Wager?". 2.

[343] We should note that this argument will hold true for *every* incarnation in the absence of any deciding information, so the soul should rationally choose to support a deity rather than Buddhism on each occasion. The corollary of this strategy is that, if pursued for eternity, no soul would ever actually attain nirvana, except by accident, such as if the deity chosen requires a religious practice close enough to Buddhism as to provide the desired effects.

[344] Pascal, *Pensées*: 122. L418

No god and/or no after-life

If atheism is correct and there is no deity, or if there is a God, but there is no afterlife for us, as is suggested by some strands of Judaism, then this is another case where there is no mitigation available. We cannot achieve infinite bliss, whatever we believe and so the Principle of Accepted Immitigable Risk excludes the option from further consideration.

This is a very similar case to the universalist god, but a lot less cheerful, because no one gets to heaven. There is therefore no pragmatic reason to ever believe in atheism (or no after-life), except in the hope that there are gains to be made in earthly existence. As we have already seen, there is no good evidence that this is the case, at least in modern Western democracies.

In these four models of predestination, universalism, reincarnation and no after-life, we have very briefly examined cases where a change in behaviour will not grant us an infinite reward (except perhaps in progress towards nirvana). We have seen there is no mitigation available to us in any of these situations and thus, under the Principle of Accepted Immitigable Risk, we must accept the risk that they may be correct and dismiss them from further consideration.

I would now like to move on to look at the options when our behaviour *will* have a direct bearing on our heavenly reward. The key point of my analysis here will be to examine how we are to know what behaviour the deity values. If our eternal reward is conditional upon our behaviour, then successful mitigation of the risk will depend entirely upon our ability to behave in the approved manner. Pascal's suggestions of what we should do once we are convinced by his logic are framed in terms of French Catholicism and it seems safe to assume that Pascal expected us to believe in the Christian God. If we are to consider theological alternatives, these will necessarily come with their own demands upon us. If these demands turn out to be not achievable, or knowable, then it will not be possible to mitigate our risks in respect of those deities and thus we will exclude them under the Principle of Accepted Immitigable Risk.

Arbitrary gods

Many of the philosophers' fictions fall into the category of being arbitrary in their demands. The requirement imposed matches no known ethical system and is selected purely to frustrate the decision theory of the Wager. We find here the real-number god, Oppy's multiple variations on a theme and Gale's "two-crack" god about whom Jordan wryly observes that if anyone were to profess belief in such a god, listeners would "properly think that sidewalks are not the only things

cracked".[345] The essence of each is that the god's demands are unknowable by human means.

This unknowability proves to be the gods' downfall under the Wager. We should start by properly excluding from consideration any cases where we cannot perform the required action. If a god only accepts elephants, then it is beyond my abilities to be one. Such a god has already predestined me to rejection. This can naturally be extended to the case where we cannot know what the action is. We might stumble across the solution by blind luck, but that is necessarily unlikely given the construction of these arbitrary gnostic gods. I have an infinitesimal probability of doing so, therefore it is unlikely that anyone gets to heaven.

Our only real chance is either that we innately have the ability, or that the god reveals the solution to us.[346] If knowing the solution is an innate skill, then there cannot be a non-denumerable infinity of such solutions, as we are finite and must be capable of knowing and/or articulating the single value. Pragmatically, we would also expect to see real-life examples of such religions, because this innate desire or knowledge would surely manifest itself into action

If the required information is to be given by direct revelation, it is solely up to the god to choose to whom she will reveal the solution and that action becomes indistinguishable from predestination.

If we do not have either available to us, then we have no realistic chance of success and should therefore treat them all as if they predestined us to failure. As we have seen, such cases have no mitigation and thus miscarry under the Principle of Accepted Immitigable Risk and we can dismiss them from further consideration with impunity.

Perverse gods and/or theologies

Within the pantheon of perverse gods, there are subtle distinctions. I will, therefore deal with the general case and then highlight how the principles apply to specific cases.

Let us start with the anti-Pascalian god, who rejects all those who believe in god because of Pascal's Wager. It is unclear why the deity (or mechanism) should take such a pathological dislike to Pascal's Wager that they will cast its supporters into stygian darkness. Nonetheless, the theme occurs often enough in anti-Pascalian writing that we need to give it proper consideration.

Firstly, this fails the test of understanding the text of the Wager, since it is clear that Pascal does not think that faith can be achieved in this way. Such a god is objecting

[345] Jordan, *Pascal's Wager*: 81.
[346] As discussed on p55.

to doxastic voluntarism, but that is a straw man, as Pascal agrees. Accepting the Wager to be true means behaving in the same way as believers *until* genuine faith arrives, which Pascal expected would be by grace. I consider it exceptionally unlikely that there is anyone at any time who would meet the criteria for rejection, so I suggest that we can safely dismiss it as another case without mitigation and deal with it under the Principle of Accepted Immitigable Risk.

A specific instance to consider is Leslie Stephen's objection:

> *"[God] may choose – it is not a very wild hypothesis – to damn me for lying or deliberate self-deception. If, as we are supposing, He has not supplied me with evidence of a fact, He may be angry with me for deliberately manufacturing beliefs without evidence"*[347]

The damnation is here for self-deception, even though it has led to the correct conclusion – after all, Stephen's God *does* exist in this scenario, so the believer has reached the right answer. It therefore seems that Stephen's god values correct process more than correct results and I personally would not be too enthusiastic about spending eternity with such a pedant. It might be argued that it is not unreasonable to value the process more than the results. We would be unimpressed by someone who merely guessed the answer to a complicated mathematical problem, because it is a requirement of that discipline that a person should be able to show their working. A deity might be more interested in how the results were obtained, than in whether the person obtained the correct result. Yet has the believer actually committed the offence which Stephen suggests? To do so, she would have to manufacture belief, but that is not a requirement of the Wager at all. As we have said, accepting the Wager is about changing one's behaviour as part of a therapeutic experiment.

For Stephen's objection to succeed, it must therefore entail that it is invalid to use any form of behavioural experimentation. Pascal is not insisting that we deceive ourselves, but rather that we perform the sort of behavioural experiment which is routinely employed in Cognitive Behavioural Therapy as we saw on page 58. While I might accept that to deliberately deceive oneself might be seen by God as being a wicked action, I am hard put to agree that a simple experiment should also be outlawed by any deity who can measure up to our MaximalGod requirement. We must bear in mind that the God does actually exist in this scenario and thus it must be defensible to believe that this God exists.

Let us examine the two possible outcomes of our behavioural experiment. If we perform the various ritual actions, but nothing works for us and thus we do not

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[347] Leslie Stephen, "Pascal," in *Studies of a Biographer* (London: Duckworth &Co, 1898), 274-5. in Jordan, *Pascal's Wager*: 75.

form a belief in God, we are apparently safe (if wrong). On the other hand, if the experiment succeeds such that we now believe that God exists, then since God *does* exist, this is actually a true belief. What course of action would be open to us now? In order to not believe that God exists and thus satisfy the requirements, we will need to deceive ourselves and deliberately embrace a falsehood. It must surely be a greater sin to deliberately embrace a lie than to believe in the truth.

It might be that we wish to suggest that the deity rejects everyone who believes for the 'wrong' reasons, in which case, there must be a duty of care on this god to make us aware what the 'right' reasons are, such that we can be in no reasonable doubt as to the procedure to be followed. As in my mathematical example above, we could not condemn a student for using the wrong method, unless we had made it abundantly clear what the right method is.[348] Ultimately this sort of reasoning becomes moral, rather than the utilitarian basis that we agreed would govern discussions and I will discuss moral objections in more detail on page 165.

The only safe state in this particular scenario appears to be the one where the deity does not exist, in which case we have nothing to fear anyway. Although Stephen asserts that it is "not a wild hypothesis", I rather believe that it is.

Martin's 'Perverse Master'

The next class is the god who rejects everyone who believes in him, or any other supernatural being. Martin suggests a Perverse Master who "punishes with infinite torment after death anyone who believes in God or any other supernatural being (including himself)".[349] Oppy's Perverse God "who infinitely rewards all and only those who fail to believe in any God" is very similar.

Why does the god do this? Is it for lack of evidence (often tacitly assumed in various formulations) or sheer contrariness? If it is because of lack of evidence, we will come to this in the Cliffordian god presently. If it is just perversity, then proponents might take the opportunity to recite "God moves in mysterious ways" at this point and refuse to explain further, claiming that this is a favourite ploy of theists when faced with questions of their god's motivations.

Yet, what is it that this god wants? Apparently, she wants us to believe a falsehood. She *does* exist, but she wants us to act as if she does not. Rationally, we therefore need to deceive ourselves and to avoid any study of anything which might lead us to belief, which would probably include religion and philosophy. She effectively

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[348] I will explore this line of thought further when I discuss the Cliffordian God on p141.
[349] Michael Martin, "Pascal's Wager as an Argument for Not Believing in God," *Religious Studies* 19(1983).

desires liars and/or fools. To parody Graham Oppy, what is so great about getting very stupid people *not* to believe in God?[350]

Such a God wants her followers to be deceivers (of at least themselves, if not of others), so it seems foolish to assume that such a god will be good. Any god who wants only the dishonest and/or stupid in the after-life does not seem to be a god who can be trusted in the slightest degree. A promise of eternal life from such a god looks like a very dubious proposition indeed. We should therefore reject such a deity under the Principle of Maximality (that any god to be considered must at least meet the criteria prescribed for a MaximalGod).

Finally, how could we meet these requirements if we genuinely were to believe in such a perverse god? We have already ruled out doxastic voluntarism and any effective study of science in such a universe might point towards the existence of that god, simply because that is the true state of affairs. That is, unless the deity is also prepared to falsify the origin of the universe to such an extent that it would be unreasonable for anyone to believe that it was divinely made. Unless the deity is a perfect forger/liar/trickster, it would seem that the diligent enquirer will find it difficult to escape from belief and thus hellfire. The only logical approach would be to avoid any pursuit of knowledge, lest the inadvertent discovery of the deity's existence should cost the seeker all that they have. I suggest that this case has no mitigation for intellectually honest people and thus we should reject it under the Principle of Accepted Immitigable Risk.

Kaufman's God

As a variation on this theme, Walter Kaufman suggests a god who "punishes all and only those who endeavour to engage in religious activity to please him and who rewards those indifferent to religion".[351] This is slightly different, in that the sin is engaging in religion, rather than simple belief in his existence. Yet what constitutes 'religion'? The anthropologist (and atheist) Clifford Geertz suggests that religion is:

> *"a system of symbols which acts to establish powerful, pervasive, and long-lasting moods and motivations in men by formulating conceptions of a general order of existence and clothing these conceptions with such an aura of factuality that the moods and motivations seem uniquely realistic."*[352]

He claims that "religious symbols formulate a basic congruence between a particular style of life and a specific (if, most often, implicit) metaphysic, and in so

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[350] Oppy, "On Rescher on Pascal's Wager," 4.

[351] Walter Kaufman, *Critique of Religion and Philosophy* (Princeton: Princeton University Press, 1978).

[352] Clifford Geertz, "Religion As a Cultural System," in *The Interpretation of Cultures* (New York: Basic Books, 1973), 90.

doing sustain each with the borrowed authority of the other".[353] Geertz focuses not on the reality of the deity, or even of the truth of the underlying metaphysical concept, but rather that religion consists of a series of behaviours, or at least the tendency to perform them. He suggests that to be pious is not to be performing something that we would call an act of piety, but to be liable to perform such an act.[354]

Geertz's definition seems quite wide-reaching in including non-deistic religious activity as well as conventional faiths. I believe that I could argue that many believers in scientific naturalism, such as Dawkins, Hitchens et al would also be caught up in its net (although space does not permit fuller discussion here). If their attempts to use symbols such as "selfish genes" to "establish powerful, pervasive, and long-lasting moods and motivations in men", might the deity also class them as religious? If, as Geertz suggests, it is sufficient to merely to have a *tendency* to do so, then it would seem that few humans could escape damnation under Kaufman's god. To be fair, Geertz does draw a distinction between secular and religious motivations when he observes that a "man can indeed be said to be 'religious' about golf, but not merely if he pursues it with passion and plays it on Sundays: he must also see it as symbolic of some transcendent truths."[355] Whether the New Atheists go that far with their regard for natural selection is debatable, but I would suggest that Cliffordian evidentialism, which I will discuss next, does show elements of the same sort of mutual reliance and reinforcement.

There does seem to be an essential contradiction within Kaufman's theology. It seems reasonable to believe that, if a deity exists and wishes a certain form of behaviour, then they will embed that desire (or at least the knowledge of that required behaviour) into their creation. The created being might feel virtuous when obeying the deity's will and experience discomfort, such as pangs of conscience, when they are not. Presumably the deity will also endue a sense of the non-existence of gods or perhaps the values an agnostic world-view, in order to ensure that their subjects are informed enough in order to be morally culpable. That is, the god would take steps to "establish powerful, pervasive, and long-lasting moods and motivations in men by formulating conceptions of a general order of existence". Under Geertz's definition, this makes the *deity* guilty of religious behaviour and thus self-damned!

There is an irresolvable tension between the deity's need to be completely hidden (in order to avoid giving evidence for the existence of a god, which could reasonably lead to the emergence of religious behaviour) and the desire that humans should

[353] Ibid.
[354] Ibid., 95.
[355] Ibid., 98.

follow a particular behavioural code, but without that code's becoming a religious system in itself. If there is to be a taboo on religious activity, then it seems that there needs to be some sort of rationale against religion which is intuitively obvious to all creatures. It must be self-evident or axiomatic, such that any individual would be morally culpable if they defied it. Yet, surely an intelligent, self-aware creature within that universe would ask *why* there was such a taboo and potentially reason their way to the god and thereby to their own destruction.

Kaufman's god condemns those who engage in religious activity to please him, but I would argue that doing what God wants (or at least what the believer thinks God wants) is the very essence of theistic religious behaviour. In Christian belief, adherents are continually exhorted to listen to God and to do his will. The Lord's Prayer includes the wish that God's will should be done on Earth. Yet Kaufman's god leads to a paradox if we include doing the deity's will as part of religious behaviour. By which I mean that not engaging in religion will necessarily be religious, because it is performing that action at the behest of the deity, rather than for personal gratification, or other reasons (although I allow that it might have concomitant motivations) .

Thus, by requiring his followers to avoid religion, the deity is commanding them to disobey him, because religion is attempting to do what that deity desires. His desire is that they should *not* do what he desires, but if they do not, then they *will* be doing what he desires. In other words, this is self-contradictory and no-one can ever succeed. Although superficially attractive (see the section on types of thinking on p207 for why these suggestions appeal) it is another case where no mitigation is possible and is therefore excluded under the Principle of Accepted Immitigable Risk.

X-Theology

In an attempt to head off such self-contradiction, Mougin & Sober's X-theology states that "atheists go to heaven and theists go to hell, regardless of whether God exists or not." [356] On the face of it, this escapes the circularity of Kaufman and the perverse gods, because it does not rely on any sort of deity. Yet Mougin & Sober are positing a theology which fails in the case where God does exist. Let me briefly sketch why this is the case.

If God exists and is to meet the requirements of the MaximalGod hypothesis, he cannot be subject to X-theology because God must be the greatest thing in that universe. If the force behind X-theology were more powerful than the deity, then God clearly could not be a MaximalGod and we would exclude him under the Principle of Maximality.

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[356] Mougin and Sober, "Betting on Pascal's wager," 385.

A MaximalGod will protect theists from any consequences of X-theology, not least because it would be fundamentally unjust for them to go to hell when they are actually correct. Thus X-theology will necessarily be defeated in the case where God exists, at least in any case which we would consider.

If God does not exist in this scenario, then the theists are indeed wrong, but they fare no worse than in any other case where they have believed in the 'wrong' harsh deity, which we have covered at length already on page 97.

X-theology is thus simply a variant of Argle and Bargle, or any other pair of competing deities. We would deal with it by using tie-break criteria, such as our relative probabilities. I doubt that even Mougin & Sober regard X-Theology as having any possibility at all of being true and I suspect that the uncommitted would see it as far less likely than any conventional deity.

In summary, not one of the perverse gods or theologies defeats the Wager.

Cliffordian god

Our final discussion on other gods will be to consider the evidentialist, or Cliffordian, god who arises from W.K. Clifford's statement: "it is wrong always, everywhere, and for anyone, to believe anything upon insufficient evidence."[357] Saka says: "Imagine a god who rewards intellectually scrupulous sceptics and punishes fawning worshippers."[358] Various authors including Kaufman and Martin have suggested very similar variants to J.L Mackie's "professors' god":

> *There might be a God who looked with more favour on honest doubters or atheists who, in Hume's words, proportioned their belief to the evidence, than on mercenary manipulation of their own understanding. Indeed, this would follow from the ascription to God of moral goodness"*[359]

Space does not permit a complete examination of evidentialism and it is a task which the "Reformed Epistemologists" like Alvin Plantinga, Nicholas Worlterstorff, William Alston and others have tackled far more comprehensively than I am able to in this thesis.

There are perhaps two separate concerns being put forward here and I would like to deal with them separately. There is a dimension to the Cliffordian objection which suggests that it is morally wrong to attempt to manipulate one's noetic state in pursuit of personal gain. I would like to deal with this more fully as part of the discussion around moral objections to the Wager on page 165. In this section I

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[357] Clifford, "The Ethics of Belief."
[358] Saka, "Pascal's Wager". 328.
[359] Mackie, *The Miracle of Theism*: 203.

focus more upon the logical difficulties in coherently describing a Cliffordian deity who might be able to provide a robust challenge to Pascal's Wager.

I would like to highlight two other immediate problems that I see with the Cliffordian deity:

- What constitutes evidence?
- How much is 'enough'?

Despite its popularity as an objection to the Wager,[360] none of its supporters satisfactorily engage with these two essential points. Plantinga observes that evidentialists seem to take it for granted that the evidence in question must be *propositional* evidence, by which he means evidence from other propositions that we believe and that we derive our evidence for the current proposition by argument from those axioms.[361] Plantinga dismisses this approach at great length and starts by arguing that it is self-contradictory, which seems apparent from Clifford's own words. For if it is always wrong to believe something without evidence, then what evidence and arguments does he offer to support this proposition? If none (and there can be none), then we must have a duty not to believe Clifford and thus reject this proposition as being morally wrong.

Plantinga then discusses what he calls classical foundationalism, which he describes in the following terms:

> *A belief [in classical foundationalism] is acceptable for a person if (and only if) it is either properly basic (i.e. self-evident, incorrigible, or evident to the senses of that person), or believed on the evidential basis of propositions that are acceptable and that support it deductively, inductively, or abductively.*[362]

Plantinga both rejects this as the sole ground of rational justification (because it does not meet its own standards) and he also questions whether any such argument can, or even should be used in theistic discussions. He accepts that Christianity does not meet the requirements of classical foundationalism, but argues along with Thomas Reid that the majority of our beliefs do not conform to this pattern and are none the worse for it.[363] While it may be quite clear from Plantinga's arguments that evidentialism is insufficient as a total belief system, perhaps our Cliffordian deity wishes it to be applied in the area of theistic beliefs, whatever we might use in other areas of knowledge.

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[360] I think it also underpins some of the perverse theologies in that there is an assumption of Cliffordian logic, although it is usually hidden.
[361] Alvin Plantinga, *Warranted Christian Belief* (New York: Oxford University Press, 2000). 70.
[362] Ibid., 84-85.
[363] Ibid., 97.

If the Cliffordian deity wishes to be discoverable by an evidential route, I argue that he must endue his creation with either a properly basic belief in the existence (or non-existence) of himself, or must provide other properly basic beliefs and evidence which would rationally lead to a decision on this subject. It is apparent that the main proponents of evidentialism do not believe that a deity exists (Cliffordian or otherwise), otherwise they could accept Plantinga's arguments that his own theistic beliefs are properly basic to him. After all, if a deity exists and implants properly basic beliefs, then it would be reasonable that some people could legitimately claim to hold such beliefs.

Since evidentialists are rejecting the notion that belief in a deity can be a properly basic belief, then it follows that an evidentialist god would need to place other foundational beliefs in humanity which we could rely upon as properly basic and that from those beliefs we could establish whether a deity exists or not by means of reason. Yet, if we could do such a thing, we would immediately run into the fundamental premiss of Pascal's Wager: that reason cannot decide.

Thus, if we accept the premiss that reason cannot decide and simultaneously reject the notion of properly basic beliefs in a deity, then the evidentialist god must be perfectly hidden. Any evidence that exists will necessarily be equivocal and thus the Cliffordian would suggest that we should apportion belief equally between the existence or non-existence of the deity. It is not clear how one might achieve this and Pascal points out that to suspend judgment is to actually bet against God, because we are embarked upon the journey already. We therefore need to ask how we might mitigate our risk.

If we accept that the evidence is equivocal and we feel that we cannot suspend judgement on such a momentous issue, then I argue that it is entirely reasonable to conduct a behavioural experiment, if only in order to obtain further evidence. If the Cliffordian god requires us to use evidential reasoning, then he must allow us to conduct experiments, without punishing us for doing so. Thus, the rational course would be to follow Pascal's prescription.

I believe that Plantinga's approach comprehensively dismisses the truth claims and deontological responsibilities entailed by evidentialism and although this implies that no further work need be done here in addressing a Cliffordian deity, I would like to briefly sketch a different solution which tackles the issue based upon observable evidence and our own logical processes.

Life in the Cliffordian universe

Let us consider the state of the universe in which the Cliffordians live. There is a god and the universe is created. Therefore the Argument from Design is not only true, but logically valid. The competent Cliffordian will assess the evidence and

should invariably conclude that the universe is created and that there is a god. Thus, all the Cliffordians will be theists, if they are to go by the evidence.

If the Cliffordian god wishes to avoid this conclusion, although it is unclear why he should, then he must conceal himself completely. This is problematical, as he must not only conceal himself, he must also cover up all the evidence that he created the universe. Yet, this is only possible if he can create a universe which would appear that it could have spontaneously generated itself, or perhaps was created by an entirely different deity. Even if the physical laws of the universe allow for such spontaneous generation when examined by physicists, that will not stop the question of why those laws exist.[364] There is an infinite regress of causality, of which the simplest solution is the correct one – that the Cliffordian god is the creator. If the god is to avoid this, he must deceive his creations and become an actor.[365] Thus he stops being a good god and therefore fails the Principle of Maximality. How can people be expected to make valid judgements, if they are being manipulated to get the 'right' answer, which is, paradoxically, the wrong one?

The Cliffordian god also has a problem with the advance of science. As people know more about the universe, their views on creation may change. Does the evidence required for salvation change with it? If so, then this may privilege the people of different eras, which is unjust. If not, then the number of people being saved over time may also vary, which is also unjust.

It seems that we cannot construct a coherent universe for the Cliffordian god at all, let alone one which even vaguely resembles our own. What is the Cliffordian god to do with the theist whom he deems to have insufficient evidence? How could such a person even exist, unless the deity failed to give her an adequate sense of evidence? If he condemns her, then he is condemning someone who actually has the right answer, despite his best attempts to mislead. If he does not, how can he condemn any at all?

Another wrinkle for the evidentialist deity is how one should apportion belief. After all, religious belief is rather binary in nature and, as we have discussed, is not under our conscious control. If we are 70% sure that God exists, should we pray about 70% of our concerns? If I think there is a 25% chance that God exists, am I allowed/required to go to church once a month?

Let us consider a final paradox of the Cliffordian god by imagining that we are in this Cliffordian universe where the god has so ordered affairs that there is no conclusive evidence that he exists. In this universe I can confidently assert that I do not believe

[364] Remember that the Strong Anthropic Principle is also completely correct in the Cliffordian universe.

[365] The Greek word for actor is the root of our English word 'hypocrite'.

that there is enough evidence that the Cliffordian god exists and that I also do not believe in an uncountable infinity of gods, whom I can list until I get bored. I will then assert that the Christian god does exist.

If the Cliffordian god exists, I should arguably be accepted into heaven, since I made the correct decision about him and about an uncountable infinity of gods. Admittedly, I made one slip about the Christian god, but it would be clearly unjust to condemn me for one error, when I got an uncountable infinity correct, including the question of the Cliffordian god, which is surely the most important. It seems unfair that he should privilege errors about the Christian god over all others, unless he supplied me with evidence that the Christian God does not exist. Thus, if the Cliffordian god does not exist, I should still get a second chance with the Christian god (or any other of my choosing).

All these examples demonstrate that the possibility of a Cliffordian god is irrelevant to the Wager. Unless there is undeniable evidence for his existence, it suffices to deny him.

Summary

In this section I have demonstrated that all the possibilist cases of the many-gods objection fail, either because they are incoherent in themselves, or because they actually have no effect on the Wager. I support Jordan's Jamesian Wager, but it relies upon any objector's accepting Jordan's restriction to 'live' options. I have shown that the many-gods objections fail for other reasons beyond their being merely philosophers' fictions. Jordan hoped that "philosophers might be spurred to discard the many-gods objection onto the proverbial ash heap of philosophical history".[366] I believe I have removed any choice in the matter.

[366] Jordan, *Pascal's Wager*: 101.

3.5 Problems with Probability

In the earlier sections, we have discussed different values of probability (p) in the expected value (EV).

$$EV = p \times \text{reward}$$

If the reward is infinite, then any non-zero finite value for p will result in an infinite expected value. Yet what of the cases where p is zero, or an infinitesimal? In this section I will discuss why I believe that neither value is allowable for the rational person and I will also dismiss the possibility of an alternative *pragmatic* zero probability which might be suggested by opponents of the Wager.

Does nothing beat the Wager?

If the probability is zero, then clearly the expected value will also be zero, no matter what reward is offered. Several authors have proposed that it might be valid for someone to assign a probability of zero to God's existence and thus be exempt from the Wager. As Nicholas Rescher observes: "[Pascal's] argument will certainly fail to touch the convinced atheist. Someone who sets the probability of God's existence at zero will obviously not arrive at the argument's conclusion".[367] Yet is it legitimate to assign a zero probability? Alan Hájek argues that "strict" atheists could do so with no violation of the norms or rationality.[368] However, he acknowledges that such strict atheists are few and far between, because to assign a zero probability is in effect saying that it is *impossible* for God to exist. Hájek admits that "most professed non-believers would not be quite so skeptical".

Having said that zero probabilities are probably not permissible, Hájek promptly attempts to smuggle them back into the argument, by disguising them within a range of what he calls "vague" probabilities. His claim is that we cannot ascribe a value accurately for many events, so we phrase it within a range of possible values. No-one would say that there is a 13.645% chance of rain tomorrow, but we might say that there is a10-20% chance of rain tomorrow, without having to pick a specific value. Our estimate is thus vague over a range of values.

The difficulty here is that phrases like "a 10-20% chance of rain tomorrow" are not plucked out of the air. Rather they are derived from the output of computer models. The weather forecasting system computes a number of scenarios for tomorrow's weather, varying the parameters slightly for each model. Weather in temperate regions is extremely complex and the output of the model can vary widely for very small changes in the input values. The forecasters therefore run the scenarios many times and give their estimate based upon the range of the output values obtained. If all the models predict rain, then they would say that rain was

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[367] Rescher, *Pascal's Wager: a study of practical reasoning in philosophical theology*: 24.
[368] Alan Hájek, "Objecting Vaguely To Pascal's Wager," *Philosophical Studies* 98(2000): 3.

almost certain, but if only 10% of the models said that it will rain, then they would adjust the forecast accordingly. If the models differ massively in their predictions such that some are forecasting bright sun, while others offer only thunder, lightning and hailstones the size of golf-balls, then the Met Office will usually talk about the weather's being "unsettled". These values are therefore not 'vague' at all. They are the result of systematic calculations and are obtained from the aggregation of a large number of estimates. Hájek is over-simplifying the task.

We might allow that humans do make vague estimates of probability, for example in betting on horses. If a punter believes that a given horse has a 25-50% chance of winning the race, but the bookmakers are offering odds of 10 to 1,[369] then the bet ought to be worthwhile on an EV calculation. That is because in the case of either the low or high estimates, it always has a positive payoff.

$$EV_{low} = 25\% * £10 - £1$$
$$= £1.50$$

$$EV_{high} = 50\% * £10 - £1$$
$$= £4$$

Our expected payout is thus 'vague' over the range £1.50 to £4. Of course, we are assuming that our subjective estimate of the horse's chances are accurate and this disparity between our beliefs and the bookies' might lead us to reasonably conclude that perhaps the bookies are better informed than we are. Nonetheless, I accept that we can use vague probabilities in this way, such that we have a range of values in which the true value is expected to fall. We could also qualify this by giving a confidence level, such as by asserting that we are 90% sure that the value will lie within the specified range.

While allowing that it may be admissible to use a vague range in this way, I would not consider it to be meaningful if this range were to be particularly wide, nor if it were to involve making radically different statements in quality. If we claimed that there was a 10-90% chance that a horse called Free Will would win the 3:30 at Kempton Park, it is unlikely that we would ever make a bet on it, unless the odds were exceptionally attractive.

Hájek puts forward Bas van Frassen's concept of agnosticism suggesting that one's probability for God's existence could well be vague over an interval that includes zero.[370] Hájek admits that he does not believe this to be correct, but labels it "skeptical agnosticism" and identifies it as the sort of agnosticism which cannot

[369] That is, it returns £10 for a £1 stake.
[370] Hájek, "Objecting Vaguely," 6.

turn into belief although it can turn into strict atheism.[371] In order to justify this, he draws upon Jeffrey conditioning (part of Bayesian learning from experience) which entails that assignments of zero probability are never to be updated to non-zero probability, no matter what new experiences one undergoes.[372]

This attempt to include zero as a probability within a set of non-zero values is self-contradictory. If a zero probability means that an event is impossible, then how can it be validly included with values which require that the event *is* possible? If the skeptical agnostic will *always* believe that God's existence is impossible, how can she allow any other possibility and expect to be taken seriously? While I might allow a range from say 0.0000001 to 0.1, these are still what I would consider to be qualitatively the same, but to include zero in the range would introduce an entirely different quality, because assigning a zero value is a different class of probability from very small values. In our horse race above, a zero probability would imply that the horse would not run at all; because if it completes the course there is always a small probability that it could win, even if that is by all the other horses falling during the race. We would probably have to insist that the horse were dead to assign a zero probability, as if it were merely ill, it still might get better and run after all. To be on the safe side (and to exclude being raised from the dead miraculously), the horse should not ever have existed! [373]

Craig Duncan thinks that the skeptical agnostics have a further problem:

> *"if Hájek is right ... he will have shown that skeptical agnostics can escape the Wager, just as strict atheists can. This result, however, will be of little significance if it turns out that no one ought to be a skeptical agnostic. And indeed I think this is the case. For consider again that no sort of conceivable experience could get the skeptical agnostic to change her mind and become a believer. Now, I am not a believer myself, but I can conceive of some possible experiences that might get me to change this stance of mine. A booming voice from above followed by, say, a parting of a sea, witnessed by me and many others (including some with cameras) would do quite nicely."*[374]

Duncan therefore decides that such agnostics should be called "dogmatic" agnostics[375] rather than skeptical, because they can never be convinced by evidence.

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[371] Ibid., 7.
[372] Ibid., 13.
[373] In fact, the pedant in me baulks at even that, because if there is a logical possibility that the horse might exist, then I cannot legitimately assign a zero probability.
[374] Duncan, "Do Vague Probabilities Really Scotch Pascal's Wager?," 281.
[375] Ibid.

Bruno de Finetti provides further doubt of the validity of assigning a zero probability in this case. He observes: "if we do not know whether something is possible or impossible, then by definition, it is possible."[376] Thus, in the case where we do not know whether God is possible or not (which is the Wager's first premiss),[377] it is begging the question to assign a probability value which claims that we certainly *do* know. Unless we are *certain* that God is impossible, we must always assign a non-zero value to the probability of his existence.

In summary, zero probabilities make zero sense in the Wager.

Infinitesimal probabilities

If we accept that assigning a zero probability should be reserved for logical impossibilities, then we next need to consider infinitesimal probabilities. Graham Oppy proposes that it is epistemically allowable that the probability that God exists is infinitesimal.[378] One immediate problem is mathematical; if we allow infinitesimal probabilities and infinite rewards, then the expected value becomes impossible to compute. While it might seem to the layman that infinity multiplied by an infinitesimal should equal one, it does not, as we saw on page 117.

$$\frac{1}{\infty} \times \infty \neq 1$$

If we use infinitesimal probabilities, we break the EV calculation whenever it involves infinite rewards. Oddly, a number of authors from Gale[379] onwards assert that the product of an infinite value and an infinitesimal is infinitesimal,[380] but as we have seen, that is incorrect; the result is indeterminate. Oppy is more accurate in his mathematics and recognises that using infinitesimals means that the argument from expected utility does not go through in all cases.[381] He dismisses objections that infinitesimals are "dubious entities" in this context,[382] stating that measure theory supports the use of infinitesimals as valid probabilities when there are infinitely many choices. However, as we saw earlier, there are not infinitely many choices to consider in the Wager, because the number-based gods proposed by Oppy can be shown to be far more limited in their scope if we break them into their component parts. Even if there were an infinite number to consider, it would not necessarily legitimise the use of infinitesimal probabilities in other contexts.

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[376] Bruno de Finetti, *Theory of Probability: a critical introductory treatment, vol 2*, 2 vols., vol. 2 (London: John Wiley & Sons, 1970). 279.
[377] Pascal, *Pensées*: 122. L418
[378] Oppy, "On Rescher on Pascal's Wager," 3.
[379] Gale, *On the Nature and Existence of God*: 350.
[380] Jordan, *Pascal's Wager*: 82.
[381] Oppy, "On Rescher on Pascal's Wager," 4.
[382] Ibid., 7.

Sauce for the goose?

We might ask whether the use of infinitesimals is merely levelling the playing field for agnostics. After all, theists continually lay claim to the infinite, so it might be reasonable that their opponents should also have a counter-argument. We could suggest that there is no reason to privilege theistic approaches. If theists are permitted to draw upon characteristics that we do not observe in our universe, then it seems only fair to allow the same license to agnostics. The weakness here is that the agnostics' essential claims are that there is no infinite being and that we can only argue from what we observe. Thus, they would undermine their central empirical argument by drawing upon a wholly theoretical construct in order to support it. As I shall show, we cannot construct an example of an infinitesimal probability which could exist in the real world.

For theists with an eternal God in their system, the infinite becomes accessible as part of that paradigm. There are long-held traditions of eternal life within religious thought and we see just such an argument within the Wager itself. If agnostics wish to use infinitesimals, I believe that it is up to them to propose a working infinitesimal, which does not break their existing world-view, before it should be admitted as a legitimate objection to the Wager. In this next section I will discuss a couple of possible models and will demonstrate why they cannot be properly held by agnostics.

Are there any real world analogues?

If we are to allow infinitesimals as estimates of probability, we need some solid grounds for doing so. One favourite way of modelling probabilities amongst statisticians is to try to construct a fair lottery which reflects the situation under consideration.[383] We might take inspiration from some of Oppy's examples[384] and propose a lottery where the winner is the one who correctly guesses an unknown randomly selected real number. On the surface, this seems extremely reasonable, but is it possible to offer such a lottery in the real world? I do not believe that it is. How would one enter a guess? If we were to tick boxes on a form, such as in a standard UK lottery ticket, then we would need a ticket which is infinitely large. Setting aside the issue of how we would handle such an object, finding the correct boxes in order to complete it could take infinite time. Even if we simplify the task down to just writing out the digits of our guess, there is a limit on how many digits we could write out in a finite lifetime.

I would like to adapt Bruce Schneier's thermodynamic argument from cryptography in order to demonstrate why this is so. If we were to try to encode the information

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[383] Lotteries are typically used because they operate on a purely probabilistic model, which does not reply on skill, knowledge or preferences.

[384] Oppy, "On Rescher on Pascal's Wager," 5.

in binary, then the Boltzmann constant sets a limit on the minimum energy required in order to set a single bit to either one or zero. Schneier estimates that there is insufficient energy in our universe to even enumerate all the possibilities for a 2^{512} bit number,[385] which seems to sets a rather low limit on the size of our lottery. If we cannot even count the tickets for a lottery with just 2^{512} possibilities, how could we rationally discuss a lottery with infinitely more?

If this lottery is to be fair, then it must be possible to enter any value in the possible range for our lottery, otherwise the lottery would be inherently weighted in favour of those who have the longest lifespan (or live in a universe with more energy than ours). It is also a requirement of fairness, that the lottery should remain open long enough for anyone to reasonably enter a ticket. Since it could take infinite time in order to enter one's guess, the lottery can never actually close. Any attempt to enforce an earlier cut-off would necessarily limit the range of possible answers and thus render the lottery unfair once more. As we have seen, our universe simply would not have enough energy to print the winning number,[386] so the winner would never know the result.

It seems that we cannot have a fair lottery along those lines, so are there other alternatives? We could propose a lottery with an infinite number of tickets, but then we hit the problem of what to use for our entries, since there are only a finite number of molecules in the universe to draw from.

As another alternative, we might try taking a frequentist approach in order to construct an infinitesimal probability. If we have an event which occurs a finite number of times within infinite time, then that might be a way of constructing an infinitesimal probability. That is, what is the probability of each event at a given time? This looks initially promising, but runs straight into the earlier objection; as far as we can tell, our material universe had an origin and it will eventually die. We simply do not have access to infinite time. Even if we were to take the age of the universe in attoseconds,[387] we would still have a finite (if large) number of time slots.[388]

There is another difficulty with this formulation; the mean time between occurrences will also be infinite, so the frequentist cannot establish the probability

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[385] Bruce Schneier, *Applied cryptography : protocols, algorithms, and source code in C* (New York ; Chichester: New York ; Chichester : Wiley, 1996). 157-58.

[386] While it could be argued that our lottery might 'get lucky' and select a number for which there is enough energy, we should be clear that there is only an infinitesimal chance of this. The set of numbers that we can choose from is finite, but we will be drawing that set from an infinite set of possibilities and for every element in the finite set, there will be an infinite number of elements which are not.

[387] One attosecond is 10^{-18} seconds

[388] If the universe is 13.7 billion years old and there are 31.6 billion seconds per year, then we have a universe which is approximately 4.3×10^{38} attoseconds old.

with any certainty. In order to establish the number of occurrences, she would have to observe the whole of infinite time and without such observation, it is not possible for her to establish that the number *is* finite. If an observation is made over finite time, it cannot be extrapolated safely across an infinite possibility space and the average interval between such events will also be infinite, which poses problems for a mortal observer.

In each of these constructions, we have had to draw upon the reserves of infinity, whether it be infinite time, or infinite energy. These could only be available to an immortal and infinitely powerful being. It seems ironic that we would need God in order to establish that he does not exist.

Do we need infinitesimals at all?

De Finetti discusses very small probabilities (and conversely, those very close to one). He writes:

> *"Approximations which are adequate ... in the vicinity of p = ½ (e.g. 50% ± 5%, ± 1%, ± 0.1%) are different from those required in the case of very small probabilities: here the problem concerns the order of magnitude (whether, for example, a small probability is in the order of 10^{-3}, or 10^{-7} or 10^{-12}, ...). In this connection it is convenient to recall Borel's suggestion*[389] *of calling 'practically impossible', with reference to human, earthly, cosmic and universal scales, events where probabilities have the orders of magnitude of 10^{-6}, 10^{-15}, 10^{-50} and 10^{-1000}."* [390]

This notion of small probabilities has far better grounding in reality, even if it leaves the objector at the mercy of infinite quantities within the Wager. De Finetti talks about Good's "device of imaginary observations" with which to test our subjective probabilities. Let us imagine that we have someone who comes to us and claims to be able to guess which of our hands is holding a small coin. How many trials would we have him perform before we believed that he had such an ability? On each trial, he has a ½ chance of guessing correctly, so his chance of guessing correctly on *n* trials is $½^n$ which is approximately $10^{-0.3n}$. So, after ten trials, he would have approximately 10^{-3} chance of guessing each correctly, or one in a thousand. After fifty trials, that chance has fallen to 10^{-15} or one in a quadrillion. Would anyone seriously doubt our savant after fifty consecutive right answers under strict laboratory conditions and with trained magicians observing from every angle? I suggest that anyone who continued to doubt after such a demonstration would have strayed from rationalism into blind dogma.

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[389] Borel, *Valeur Pratique*, in Bruno de Finetti, *Theory of Probability: a critical introductory treatment, vol 1*, 2 vols., vol. 1 (London: John Wiley & Sons, 1970).
[390] Ibid., 180.

Borel's suggestion is that something with a probability of less than 10^{-1000} is "practically" impossible on a universal scale, that is, we can safely assume that it will never happen. The universe is only 10^{20} seconds old and has maybe 10^{80} particles in it but both those numbers are completely dwarfed by Borel's practical impossibility. So is it rational to postulate something even less possible, except as an attempt to wriggle out of the Wager? I contend that infinitesimal probabilities are simply another philosopher's fiction.[391] They are invented purely to frustrate the mathematics of decision theory, rather than as a genuine estimate of likelihood.

De Finetti considers infinitesimal probabilities as being useful only to deal with the occasional oddities, such as occur with an infinite lottery (if one could exist). He discusses how, in a lottery with an infinite amount of tickets, the probability of any particular ticket's winning is zero, if we restrict probabilities to real numbers. However, one ticket clearly *will* win in such a lottery, so it is not actually impossible. Thus, if we sum the real number probabilities, we might get:

$$0 + 0 + 0 + 0 \ldots = 1$$

which looks instinctively wrong. However, if we allow infinitesimal probabilities (using ⓪ as a symbol for the positive infinitesimal closest to zero) , then we would get:

$$⓪ + ⓪ + ⓪ + ⓪ \ldots = 1$$

which looks more sensible, such that an infinity of infinitesimals adds up to one. Thus De Finetti suggests that "consideration of probability as a non-Archimedean quantity[392] would permit us to say, if we wished, that 'zero probabilities' are in fact 'infinitely small' (actual infinitesimals), and only that of the impossible event is zero."[393] De Finetti is unconvinced that the use of infinitesimals adds much value in probability and thinks that it has its own problems, as "it is a useless complication of language, and leads one to puzzle over 'les infiniment petits'".[394]

De Finetti's rejection of infinitesimal probabilities does however offer a small ray of hope to the agnostic, in that it might revive the possibility of assigning a zero probability. If an infinitesimal probability is simply a pragmatic version of a zero probability, could the strict atheist therefore legitimately say that she assigns a zero probability to God's existence, while allowing that such existence is not actually impossible? Let us consider that option further.

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[391] Jordan, *Pascal's Wager*: 75.
[392] An Archimedean property is one which has no infinitely large, or infinitely small elements.
[393] de Finetti, *Theory of Probability: a critical introductory treatment, vol 2*, 2: 347.
[394] Ibid.

Pragmatic zero

Pascal's Wager is an exercise in pragmatic ethics, so we need to allow pragmatic considerations at each point within it. I will discuss how we might formulate a *pragmatically* zero probability. By this I am suggesting that there may be a proposition which we believe has no likelihood of being true, but which we still allow that it is not logically impossible. For example, the agnostic might assert that there is no chance that God exists, while allowing that it is not impossible.

We need to examine whether this pragmatic zero probability helps us. Can we resuscitate strict atheism by re-labelling it "pragmatically strict atheism"? I do not believe that we can, but to show that, we need to look first at De Finetti's subjective probabilities. He holds that "subjective probabilities are realities in the minds of people"[395] and that in fact we never deal with objective probabilities at all, because we rely all the time on assumptions and observations. If we roll a six-sided die, we assume that it is formed so that the probability of landing on each side would be exactly $\frac{1}{6}$, yet it is impossible for us to make such a perfect die. All dice will be slightly imperfect or non-homogeneous, even if only at the molecular level, and we also lack a perfect table to throw it upon. Each time we throw the die, we will distort it slightly and also wear the edges. Even our act of throwing will not be random either, each person will deliver the die within a certain range of parameters. This sort of predictability has been exploited many times in various gambling coups.

One scam in Las Vegas involved observing exactly which number was passing a fixed point as the croupier released the ball in a game of roulette. The cheats noted that each croupier propels the ball at roughly the same velocity each time, so they could anticipate a range of numbers on the wheel in which the ball was most likely to land.[396] They could then bet on those numbers while the ball was still spinning. This was not guaranteed to win every time (which would have been suspicious anyway), but the gang merely needed to move the odds in their favour.[397] The typical house advantage[398] for roulette is 2.7%, so just a 3% improvement in selection would

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[395] *Theory of Probability: a critical introductory treatment, vol 1*, 1: 197.

[396] I am simplifying the sophistication of the techniques which the cheats actually used.

[397] There are 37 numbers on a European roulette wheel (0-36), but you cannot bet on zero. The right number pays out 36 times the stake. American roulette has a zero and a double-zero, but still pays out only 36, so the house 'edge' is over 5% in that case.

[398] The casino (or house) always has an advantage over the gambler, otherwise they would be gamblers themselves and not businesses. The level of the advantage depends on the game (or even different bets within a game). Some games like Blackjack or Craps may have a low house advantage (under 2%) while others are 'sucker bets' where the house has a big advantage. Roulette is pretty much a sucker bet, since it has a reasonably large house advantage which cannot be mitigated by any amount of player skill.

provide potentially large wins.[399] After discovering the coup, casinos modified roulette tables to introduce more baffles in the path of the ball. These deflect the ball more randomly and widen the range of numbers that the ball will fall into, thus removing the cheats' advantage. However, there is still little true randomness in the process and they cannot exclude the possibility that a more sophisticated analysis might still show a trend.

Thus, even in a situation like a casino table, where we believe we have access to raw probability, we still have to make lots of assumptions about fairness and randomness. It is these assumptions, De Finetti believes, that make our belief in objective probabilities worthless. He goes further still, with his bald statement that probability does not exist.[400] He writes:

> *"The abandonment of superstitious beliefs about the existence of Phlogiston, the Cosmic Ether, Absolute Space and Time ... or fairies and Witches, was an essential step along the road to scientific thinking. Probability too, if regarded as something endowed with some kind of objective existence, is no less a misleading conception, an illusory attempt to exteriorize or materialise our true probabilistic beliefs."*[401]

In so doing, De Finetti is not simply privileging subjective over objective, but declaring that we *only* have subjective probabilities. If we were to adopt a pragmatically zero probability, what would it mean as a subjective probability? De Finetti gives some guidelines about subjective probabilities, saying that:

> *"probability is not an external fact, relating to the event, but, instead relating to your state of information regarding the event and the previsions you derive from this information"*[402]

The key here, I think, is "your state of information". By asserting that God's existence has zero possibility, we are also claiming that we have enough information to make that assessment. I can see that an agnostic might try to justify this claim along the following lines: "At present I can see no evidence for God's existence, but I can see good reason to suppose that he does not exist. While I might change my mind at some point in the future, if better evidence came along, at present I believe that there is zero possibility that this will happen".

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[399] If you have a 0.5% advantage, you simply need to bet enough money enough times. If you stake $1m then you will make $50,000 profit on average. In order to avoid tipping off the house, gamblers vary the bet size and use other obfuscation techniques.
[400] de Finetti, *Theory of Probability: a critical introductory treatment, vol 1*, 1: x.
[401] Ibid.
[402] Ibid., 204.

That still seems like hubris to me. It is effectively a claim that we have better information (and/or better understanding of the information) than every theist in the world and that we can definitively prove them wrong. I think it absurd that anyone could make such a claim in good conscience. In any case, this built-in provision for changing one's mind later undermines the claim for a zero probability. Instead, I think we need to represent the doubt that we may change our mind as part and parcel of the previsions.

We can decompose the claim into its two constituent parts, namely:

> (a) The probability that God exists
>
> (b) The probability that, at some point in the future, I will believe that God exists

Seen in this light, it seems obvious that our subjective probability estimate should be the sum of those two components. Upon closer examination, however, we can see that (a) may be redundant, since it will not be properly knowable before death. It is also ridiculous to claim that (b) could ever receive a zero probability, even a pragmatic one, from a rational person; it would simply be dogma, as Duncan observes.

Thus, zero probabilities, like Lazarus, have enjoyed a brief revival, but suffer the same eventual fate as they are consigned back to the grave.

Confidence intervals in the real world

If we were to develop a new drug, we would be expected to test it carefully in properly conducted clinical trials before releasing it to the public at large. These trials are conducted all the time and they use control cases to ensure that (a) the drug has some real benefit and (b) that it does no harm. The commonest technique is the double-blind trial where patients are divided into two groups; one group is given the active pill and the other is given an inert pill which looks exactly like the active one. Neither the patient, nor the person administering the pills knows which regime the patient is on. After the pills have been taken for some time, physicians then examine the patients, looking for improvements in the disease and/or any side-effects. They compare the group taking the active drug with the ones taking the inert pill, using a number of statistical measures. To decide that the drug has a real benefit, they would normally look for what is known as a confidence level of statistical significance. A confidence level of 5% means that there is only a 5% possibility that the results seen could have occurred by chance. Levels of 1% and 0.1% would be described as extremely statistically significant and would be seen as very strong evidence for the drug's efficacy.

Let us look again at those numbers; doctors consider a 1 in 100, or 1 in 1,000 chance as being significant enough to give a drug to patients. As we saw earlier, that is similar to our magician guessing in which hand we hold a coin ten times in a row. It is clear that 10^{-3} is deemed a "good enough" measure, even for life and death situations, so why should we ever need infinitesimal probabilities? It is my view that Borel's measures are more than adequate for any real-world estimate of probability, subjective or otherwise.

A lower bound on probability

I am suggesting that no-one can rationally use an infinitesimal or zero probability, but a critic might reasonably ask what the lower bound might be. In this case I believe that Borel's values are perhaps too conservative. Assigning a probability of 10^{-1000} does not make any real sense to us; it is simply a number plucked out of the air. Instead I wish to offer a statistical model. I believe that we need to start by recognising that we are not a special case with respect to theistic belief. Whatever our current beliefs, we need to admit that they are the product of multiple factors, including culture, parental influence, genetic predisposition and personal life experience. If those had been different, then we might believe differently. Now let us agree that our subjective probability of whether God exists or not depends upon that noetic state. Thus, our subjective probability should never be lower than the possibility that we might personally be a theist.

The question therefore devolves to the probability of any individual in the world taken at random holding theistic beliefs. There is no reason to believe that we might not have been that person, had our life followed a different path to theirs. If we take the YouGov poll from 2011 conducted on behalf of the British Humanist Society, 61% indicated that they had a religious belief, although only 29% identified themselves as 'religious'.[403] Thus a random UK citizen is more likely to be a theist than not, even though they may not be practising. Even if we take a very conservative view of the figures, it seems unreasonable to assign a value any lower than 1%.

The atheist will no doubt argue that most people are part of an unthinking herd and that they have decided their views upon the available evidence, rather than being societally conditioned. Apart from the obvious special pleading here, let us consider the truth claim that the atheist is making. In asserting that people only believe because of conditioning, the atheist is claiming that each and every theist in the world is a) wrong and b) incapable of rational decision making. This seems a rather bold claim, without much evidence to support it.

[403] http://www.humanism.org.uk/campaigns/religion-and-belief-surveys-statistics

I would like to suggest an alternative thought experiment. Do we believe that there could be a rational person, who has examined all the evidence available and has concluded that there is a God? That is, to ask whether there might be a single rational theist, even if we might believe them to be mistaken in their theism. If we allow that there might be a theist who is as rational as we are (or at least not completely irrational), but who has decided differently on this issue, then our lower bound must be the probability that such a person might be ourselves.

If we only allow that there is only one such theist in the whole population of the world, then our lower bound should be no lower than one in six billion. It makes no sense to assign a subjective probability that is smaller than this, unless we are resorting to some special pleading.

Summary of small probabilities

As we have seen, the lower bound on small probabilities is much higher than critics suppose and neither a zero probability, nor its cousin the infinitesimal, has any real place in the discussion of Pascal's Wager. They are both fictions which could not be rationally held by an agnostic or an atheist. Being close to nothing, they have nothing to add and, in this case, nothing does not defeat the Wager.

3.6 Problems with God

Having discussed difficulties arising from the mechanics of probabilities and EV calculations, let us move on to objections which focus on the nature of the deity under discussion. In this section I will concentrate mainly upon two writers, Greg Janzen and Terence Penelhum who I believe provide the best exemplars in this space.

An irrational God

Greg Janzen argues that the Pascalian proposition implies that God is irrational and that since an omniscient being could not be irrational, we should therefore conclude that God does not exist.[404] Janzen's argument follows a number of stages, starting with the premiss that theistic belief traditionally holds that believing in God is a necessary condition for salvation.[405] He allows that belief may not be *sufficient* for salvation, but insists that it is at least *necessary*. His second premiss is that God, if he exists, has the power[406] to bring it about that every person believes that he exists,[407] but that we know that it is not the case that God has done so. Thus, Janzen argues, God, if he exists, has elected to hide.

Janzen uses an argument by analogy which involves a rich eccentric who offers a reward to anyone who is both fond of painting and who also believes in his existence. The eccentric hides himself, but makes it an absolute condition that any recipient of his largesse must not only be fond of painting, but must believe in the eccentric's existence as well. Janzen suggests that this highly contrived example is analogous to God's behaviour; for, despite hiding, he makes belief in his existence a condition for salvation. Janzen therefore suggests that because we would consider the eccentric to be irrational, we should consider God to be irrational as well.

Janzen's argument is somewhat confused. We might accept that the eccentric's desire to hide could be irrational, because we are unable to see good reasons for why someone might do such a thing; particularly as Janzen has written his example to ensure that no good reason can reasonably be suggested, but it does not follow that God would be in the same position. As I observe on page **Error! Bookmark not defined.**, if God were fully visible to us, then it would have dramatic effects upon our behaviour. To draw my own analogy, I would suggest that speed cameras do exactly this. Near where I live there is a speed camera on the main road and it is noticeable that its presence significantly changes the behaviour of drivers. Before the camera was there, few cars travelled within the speed limit, but since its arrival I have personally noticed people braking heavily upon the approach to that camera.

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[404] G. Janzen, "Pascal's Wager and the Nature of God," *Sophia* 50, no. 3 (2011): 332.
[405] "Is God's belief requirement rational?," *Religious Studies* 47, no. 4 (2011): 467.
[406] Janzen here draws upon a traditional conception of an omnipotent deity.
[407] Janzen, "Is God's belief requirement rational?," 468.

This, of course, is the desired behaviour when seen from the view of the county council who erected the camera.[408] The presence of the camera is *designed* to alter behaviour, which is why they are legally required to be bright yellow and clearly visible.

If God were continually and perfectly visible, I suggest that our behaviour would be affected far more than for a mere speed camera. If every action, word and thought were not only observed, but *known* to be observed, could anyone suggest that we would possess free will? As George Orwell noted in his dystopian novel "1984", such constant monitoring would make life Hell. At least Big Brother could not read Winston Smith's thoughts, which allowed Winston the illusion that he might be able to get away with his non-compliance. It was Orwell who coined the term "thought-crime" which had been invented in that society for the cases where it was immoral (and illegal) to even think about disobeying party doctrine.

Thus, we can imagine that God might have good reasons for being hidden, as it is by being concealed from us that our true inclinations and preferred behaviour may be observed. If the police wish to catch criminals, then they use secret cameras and tape recorders, so that offenders will commit the crime that they have planned, believing that they will not be discovered. If police informers carried tape recorders in their hands and large placards denouncing them, then no criminal would ever talk to them. I therefore suggest that God may be hidden, in order to observe us as we truly are, or rather so that *we* might know how we truly are, since God has already seen within our hearts.

Pascal argues that we have exactly the right level of visibility of God, because:

> *"God wishes to move the will, rather than the mind. Perfect clarity would help the mind and harm the will".*[409]

Pascal rejects Janzen's requirement for full disclosure and does so on rational grounds. Janzen insists that if God wishes someone to make a certain decision, then he has to make all the relevant facts available. Pascal holds that God is more interested in our motives and will than in some purely intellectual exercise. If God were fully disclosed,[410] then there would be no decision to make. It would be completely irrational to decide that God did not exist and would be as crazy as denying the existence of the earth. Thus, in order to preserve the integrity of the decision, the demands of the intellect must give way to the needs of the will. Pascal also wishes to allow space for the determined sinner to be able to succeed in their desire to escape God. He writes:

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[408] I will not impute the darker motives of revenue generation, as some have done.
[409] Pascal, *Pensées*: 139. L446
[410] Assuming we could survive such an encounter.

"There is enough light to enlighten and enough obscurity to humiliate them. There is enough obscurity to blind the reprobate and enough light to condemn them and deprive them of excuse".[411]

Peter Kreeft suggests that to reveal fully and adequately the truth about ourselves to ourselves in our present state, it was necessary for God to use obscurity.[412] Space does not permit a full exploration of this topic here; I merely wished to illustrate that God might have very good reasons for hiding and thus cannot be considered to be irrational for doing so.

Janzen's next argument is that God cannot rationally both hide and simultaneously demand belief in his existence as a criterion for eternal life. He suggests that for God to be considered reasonable, there must be an intellectually plausible rationale for God's granting salvation only to believers.[413] He discusses the problem of what he calls "inculpable unbelievers" who are those who are either incapable of sophisticated propositional belief, or who have never had the opportunity to believe.[414] He therefore argues that God is deliberately excluding virtuous people on largely arbitrary grounds and revisits the topic of doxastic voluntarism, arguing that "some people are not suitably disposed to believe in hidden deities".[415]

This question of inculpable ignorance/unbelief is hardly a new one in theology, having been expounded by Thomas Aquinas long before it was re-examined by J.L. Schellenberg and Theodore Drange at the end of the 20th century. God may well accept behaviour as the criterion for salvation, rather than intellectual assent to a given proposition. Accepting Pascal's Wager is not intellectual capitulation in the face of a propositional onslaught, but rather a behavioural experiment.

Janzen's argument thus fails for two reasons: firstly because God is not necessarily irrational in hiding and secondly because intellectual belief is not an essential component of the Wager's premisses. Pascal argues that if there is a God, who is hidden for perfectly good reasons, then it is rational to perform an experiment to see whether God will grant salvific faith as a natural consequence. Virgil Nemoianu suggests that Janzen's assumption is a common error found in critics of the Wager:

"Underlying these treatments, one typically finds a central assumption about what Pascal takes faith in God to be: wagering, it is said, means having faith, and faith is affirming a belief that God exists or taking steps toward affirming a belief that God exists. To put it slightly differently, faith is thought to be a

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[411] Pascal, *Pensées*: 73. L236
[412] Peter Kreeft, *Christianity for Modern pagans: Pascal's Pensees* (San Francisco: Ignatius Press, 1993). 249.
[413] Janzen, "Is God's belief requirement rational?," 472.
[414] Ibid., 470.
[415] Ibid.

matter of inducing one's intellect, directly or indirectly, to adopt the belief that God exists." [416]

He suggests that we need to understand the Pascalian insight into the three orders of body, mind and charity, rather than our modern understanding of reason as a purely intellectual pursuit. Nemoianu holds that for Pascal

"faith is love of God rather than merely holding an intellectual belief that God exists or imagining God. It is God known by the heart rather than the mind (reason) or the body (fancy and imagination)." [417]

Nemoianu thinks that it is possible to love a hidden God and thus there will be no tension between God's hiddenness and Pascal's Wager because "while genuine faith will likely include corresponding intellectual beliefs, it is not simply or even primarily a matter of belief in this sense."[418]

Is Pascal's God good?

Terence Penelhum argues that the God of Pascal's Wager could not be moral. His objection hinges upon his assertion that "it seems immoral to condemn someone to loss of eternal life for *any* offence: But it particularly seems immoral to condemn him for not *believing* something."[419] Penelhum suggests that the only defence to an accusation of immorality would be if men were somehow culpable for not believing and that it constitutes a moral defect on their part that they do not believe. If so, he reasons, then believing in God must be something which they are free to do.

On the face of it, this creates a paradox. If it is to be a free choice then God must be hidden, or there could be no reasonable grounds for doubt. Yet if he is hidden and it is morally culpable not to believe, then there must also be sufficient proofs to convince us that he does exist and that the only reason we do not see him is because he is hidden from us. Penelhum avoids the easy trap of declaring this impossible and instead investigates whether it might be that we should recognise the signs of God and yet be free to reject them as proper signs of God.

Our own day and age shows more clearly than the age of Pascal possibly could, that men can, in a quite clear sense, hear of God and yet be totally untouched in their convictions by what they hear – even when they may recognise their spiritual maladies when the twentieth century priests, the social scientists, tell them about them.[420]

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[416] Nemoianu, "Pascalian Faith," 27.
[417] Ibid., 31.
[418] Ibid., 32.
[419] Penelhum, *Religion and Rationality*: 207.
[420] Ibid., 208.

In this case, as Penelhum describes it, unbelief is a deliberate choice by people who both see and recognise the signs, but reject them as being valid revelation. Atheism thus constitutes a direct and considered rebellion against God. Penelhum quotes John Baillie as saying that "the atheist denies with the top of his mind that which he knows from the bottom of his heart".[421]

Pascal rather supports this view of unbelief as a deliberate act saying that:

> *"it is not true that everything reveals God and it is not true that everything conceals God. But it is true at once that he hides from those who tempt him and that he reveals himself to those who seek him"*[422]

For Pascal, it is important that men should not be convinced against their will, as he writes:

> *"If he had wished to overcome the obstinacy of the most hardened, he could have done so by revealing himself so plainly that they could not doubt the truth of his essence. ... 'There is enough light for those who desire only to see and enough darkness for those of a contrary disposition.'"*[423]

Penelhum suggests that the unbeliever's sin is one of self-deception, a place where wickedness and foolishness merge and create doubt between them.[424] He admits that self-deception on all sorts of issues is a common trait in human beings, indeed he acknowledges that this is why so much of Pascal's account of humanity in Pensées rings true.

In order to address Penelhum's concerns in his terms, rather than Pascal's, we need to answer whether refusal to believe in God can legitimately be described as wilful self-deception of this nature and, more importantly, whether this constitutes a moral failing which merits the loss of eternal blessing. Many ancient Christian authorities, like Augustine, have no difficulty with this whatsoever and would cite the apostle Paul in support:

> *For, since the creation of the world, God's invisible qualities—his eternal power and divine nature—have been clearly seen, being understood from what has been made, so that men are without excuse.*[425]

It is more problematical in our current age. The rise of rationalism and the march of scientific progress has continually undermined what we previously felt instinctively

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[421] John Baillie, *Our knowledge of God* (London: London : Oxford University Press ; Humphrey Milford, 1939). in Penelhum, *Religion and Rationality*: 192.
[422] Pascal, *Pensées*: 139. L444
[423] Ibid., 50. L149
[424] Penelhum, *Religion and Rationality*: 208.
[425] Romans 1:20, NIV

to be true. So is it perhaps more acceptable now to have genuine doubt in the case of such conflicting evidence? Penelhum believes so and he argues that if doubt is acceptable, then it might be immoral for God to withhold eternal blessing on account of it. Penelhum holds that for us to support such an approach would make us complicit in God's immorality. If the Wager suggests that we should put ourselves in a state of mind where we might come to approve of a cosmic policy which is immoral, then we would ourselves become immoral in following the Wager. While it might be prudent to follow such a direction, Penelhum believes that prudence should not override issues of morality.[426]

This argument relies upon the premiss that the sort of exclusivism described is inherently immoral, although this is only a statement of faith, however sincerely held. However, it does not seem to me to be an unreasonable position for someone to take, so it merits proper consideration.

Let us grant, for the sake of argument, that such exclusivism might be immoral and consider whether we will inevitably become complicit in this immorality. By way of analogy, let us consider a case where there is a known child murderer, who justifies his actions by saying that they are based upon solid reason and that, if we studied his rationale, we too would be convinced and would join him. Would we be immoral if we simply considered that logic? I do not think so. In fact I think it might be incumbent upon us to do so, if only to confirm our suspicions that the logic was specious, or that its initial premisses were flawed. Thus, if we have already decided that God's actions are immoral and that there can never be sufficient justification for his actions, then we find ourselves in a dogmatic stalemate. If we refuse to ever consider God's justification, then we would have pre-judged the issue. I am not convinced that an argument from prejudice can have any significant weight.

It is hard to say why we would not at least look at the logic behind his actions. After all, society has changed its attitudes towards a wide range of ethical considerations over time. Slavery was once completely acceptable and it was deemed extremely odd, even offensive, to challenge it. Yet we would now believe the complete opposite. It seems unreasonably dogmatic to say that we must never even examine the criminal's logic, lest we be irresistibly tempted and corrupted by it. I therefore think that we would (however briefly) examine the murderer's justifications and that in doing so we would not compromise our own morality. As such, I do not believe that contemplating the Wager need give us any grounds for concern over the loss our moral rectitude. I would go further still and allow that we may accept the Wager to find out whether we can acquire faith and still remain morally secure.

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[426] Penelhum, *Religion and Rationality*: 207.

Let us consider briefly the two possible outcomes. If we find that there is no God after all, then we cannot have aligned ourselves with an immoral God, since none (apparently) exists. I grant that we may have behaved in a way which we later found ethically problematic, but I hold that this should be at least partially offset by our need to keep an open mind on the subject. In the case where the immoral God exists, we might find that we do have a genuine belief in a deity after all, but that this does not necessarily take away our free choice to decide not to associate with him because we deem him unnacceptable.[427] Penelhum seems to believe that even considering the Wager will in some way corrupt us irrevocably by association, but I think that his case is far from proven.

Does God owe us salvation?

Now let us return to whether God's exclusivism itself is immoral, as Penelhum claims. It seems to me that believers would always have the defence that God's morality is not constrained by ours and that he is completely sovereign. This, however, is unsatisfying, especially as I argued on page **Error! Bookmark not defined.** that immoral (or downright evil) Gods are not worth spending eternity with. I believe that this is in accord with John Stuart Mill's vehement rejection of a second-rate God.

> *I will call no being good, who is not what I mean when I apply that epithet to my fellow-creatures; and if such a being can sentence me to hell for not so calling him, to hell I will go*[428]

Thus, I think we do need to consider the proportionality of God's response to the perceived offence and I offer the following analogy. Let us imagine that we have a small child who refuses to eat broccoli. We would consider it reprehensible if we suggested that we might not feed the child ever again as a result of this wilful disobedience. If the child were to die, we would be (rightly) vilified. In the case of eternal salvation, we are postulating an infinite punishment (or deprivation) in response to a finite sin. If we feel that a moral deity is obliged to maintain proportionality, then this would be unacceptable.[429]

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[427] If we were to accept that God were not moral, then it would put us in a difficult position. After all, we would be created by this immoral God (unless we assume a pantheon of some kind), so whence came our improved moral powers? If God is flawed, then why are we not also flawed? It seems that we would need to postulate a second, better God who is more moral than the Pascalian God and who offers salvation to all. As I showed on page 132, we can disregard this universalist God for purposes of the Wager, because we receive eternal life no matter what.

[428] John Stuart Mill and J. M. Robson, *An examination of Sir William Hamilton's philosophy, and of the principal philosophical questions discussed in his writings* (London: London : Routledge, 1996)., para 394

[429] Such a dilemma could be partially resolved by devices such as some sort of purgatory, by which I mean that an unbeliever's sin would result in a punishment or deprivation which is proportional to the sin, but which is not eternal. So, for example, someone who does not believe is sent to purgatory

Philip Quinn takes the opposite tack and argues that Penelhum's basic assertion is false, because God is not *obliged* to give eternal salvation to anyone. He writes that

> *"we must first disabuse ourselves of the notion that humans can merit salvation. Nothing any mere human can do requires in justice that God should respond with the rewards of an infinity of infinitely happy life".*[430]

It seems logical to me that no finite action could reasonably merit infinite reward, as this would of itself be a disproportionate response, which we rejected earlier. Quinn suggests, however, that God must be free to grant such a reward to those who are pleasing to him in some particular way, be it in their approach to worship, or something as arbitrary as the colour of their hair. So, as long as God grants salvation fairly, using consistent criteria, Quinn sees nothing immoral in so doing.

I am not fully persuaded by Quinn's argument. For God to have the opportunity to grant eternal salvation and then to arbitrarily withhold it does not sit comfortably with me. For example, imagine if I were to have an immense pile of food and the ability to transport it to an area of natural disaster and then I deliberately did not share it. Most people would consider that to be bordering on immoral, if not downright wicked. Space does not allow adequate coverage for such a complex theological issue, so I will briefly give one counter to the argument: namely that any insistence that God must grant salvation to all, may lead to the state where it runs counter to our wishes. For example, if someone did not want eternal life, then they might be eternally grumpy that they were saved against their will. If we allow that God must respect our choices, then those who reject belief in God must be allowed to reject eternity with it, and only God will be in a position to evaluate who made which choice.

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for correction. After a finite time in that place, the person is properly educated and prepared for heaven and duly graduates there. In each case the time spent there would be proportional to the gravity of the sin.

Unfortunately, this concept would remove a leg from the decision theory which has so far supported the Wager. If such correction is finite, but we still eventually receive an infinite reward, then there is now no overriding need to accept the Wager.

EV(Bet on God)	= Infinite reward – cost of faith
	= ∞
EV(Bet against God)	= Infinite reward – cost of purgatory
	= ∞

The question then becomes whether the costs of faith are lower than the cost of potentially spending time in a waiting state for heaven. In any case, either cost will be dwarfed by the ultimate infinite reward, so we might consider it irrelevant. Although one set of costs might be more predictable, it still comes down to a matter of judgement on the relative probabilities of each. So, the purgatory becomes a variant of the universalist God, albeit with different finite costs, and the logic I have used earlier would still apply as far as decision making goes. (i.e. that we can safely ignore it, because we never actually lose eternity).

[430] Philip Quinn, "Moral Objections to Pascalian Wagering," in *Gambling on God*, ed. Jeff Jordan (Maryland: Rowman & Littlefield, 1984), 77.

The origin of ethics

If we are to answer the broader question of whether God is ethical, we first need to consider on what we will base our ethics. Theists often ground ethics in the person of God, for if God were not the source of morality, then there would have to be some higher power to which he would be required to conform and that would undermine any Anselmian conception of deity. This is hardly a new philosophical problem and is simply the Euthyphro dilemma[431] recycled. So, we could argue that as God defines what is moral and his actions are by definition perfect (or at least maximally so), then whatever his actions are, they will necessarily be maximally moral.

John Stuart Mill would not agree. He expects God to at least conform to the highest human standards of morality in order to be worthy of worship.

> *If, instead of the "glad tidings" that there exists a Being in whom all the excellences which the highest human mind can conceive, exist in a degree inconceivable to us, I am informed that the world is ruled by a being whose attributes are infinite, but what they are we cannot learn, not what are the principles of his government, except that "the highest human morality which we are capable of conceiving" does not sanction them; convince me of it, and I will bear my fate as I may. But when I am told that I must believe this, and at the same time call this being by the names which express and affirm the highest human morality, I say in plain terms that I will not. Whatever power such a being may have over me, there is one thing which he shall not do: he shall not compel me to worship him.* [432]

It can be argued that Mill's sentiments here are somewhat at odds with his utilitarian ethics, since the benefits of eternal blessing would surely outweigh any finite moral inconvenience that he feels he would endure in order to obtain them. However, if this discomfort would persist throughout eternity, then as Alfred Benn observes, the moral degradation of worshipping an omnipotent demon through eternity might conceivably be more painful than any punishment it is in the demon's power to inflict.[433]

If we are to resolve this argument for the purposes of the Wager (since it is too large a philosophical/theological field to cover in this essay), it seems that we need

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[431] Euthyphro appears in Plato's dialogues and features Socrates and a young man named Euthyphro. The debate centres on whether actions are pious because the Gods approve of them, or whether the Gods approve of them because they are pious.

[432] Mill and Robson, *An examination of Sir William Hamilton's philosophy, and of the principal philosophical questions discussed in his writings.*, para 394

[433] Benn, "Pascal's Wager," 322.

to examine the case where there is a God and the alternative when there is not. By looking at both models, we can look at the potential rewards, risks and cost of each.

If there is a God, then it is reasonable that some form of divine command ethics might apply. If so, then I am convinced by Robert Adams' arguments that any God issuing such commands will necessarily be good and in accord with our own moral values. He holds that

> *Respect for divine authority motivates, largely because it coheres with, organises, supports and is supported by goods that we care about for their own sakes.*[434]

We have a sense of what is good, because we are created with that sense. It would be perverse for a deity to create beings whose value system was radically different from her own and then to condemn them for not acting in accord with those values. While this argument is not conclusive, space does not allow me to present in full Adams' justification for identifying God with the Good.

On the other hand, if there is no God, then we find ourselves postulating that either there could be a non-theistically derived moral basis to the universe, or perhaps that a post-modernist approach applies, where all truth is merely subjective and ethnocentric. From the Pascalian viewpoint, we are already presuming that we cannot tell whether God exists, since that has been the whole basis of our enquiry with the Wager. So is there a way of resolving this? I think there is.

If God exists and is good, then accepting the Wager should normally be safe, since its goal is to bring us to genuine faith in that God via a morally-neutral behavioural experiment. If the post-modernists,[435] such as Richard Rorty, are correct then our ethics are entirely subjective and/or local to our community, so there should be no overriding objection to the Wager, because there are no universal ethics with which to condemn it. An individual or group could declare the Wager immoral, but their decision would not be binding upon anyone else. We should also note that they would also be preferring a finite good (their current moral scruples) over an infinite good (eternal salvation) which would not be strictly rational in decision theoretical terms. However, if the post-modernist already denies the possibility of any after-life, then such considerations might be discounted. In this sense, they place themselves with Craig Duncan's *dogmatic* atheists.[436]

Finally, we need to consider the case where there is an underlying and universal set of ethics in the universe, but no God. There is a possibility that the Wager may

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[434] Adams, *Finite and Infinite Goods*: 274-75.
[435] I accept that I am using a broad-brush term for what is a complex philosophical field.
[436] Duncan, "Do Vague Probabilities Really Scotch Pascal's Wager?," 281.

offend those ethics, but no easy means of assessing the impact and if there is no deity, then there is probably no eternal reward either (nor eternal punishment). In any case, I am unaware of any usable consensus on such ethics amongst atheists, humanists or agnostics that would help us resolve this problem. Various atheists have, at times supported the Wager's logic and only a very few have condemned it on ethical grounds, so we may be safe in that respect, but must allow for future authors who disagree. If we cannot mitigate our risk, then we need to dismiss this scenario under the Principle of Accepted Immitigable Risk.

Are we complicit in immorality?

Setting aside the issues of whether God can be immoral, would it be immoral for us to comply with the requirements of an immoral God? I do not think that it would be. Let us assume that there is an independent standard of "good" against which both God's actions and our own can be measured. In this scheme, actions will not be deemed moral based upon who does (or commands) them, but by their own innate character. So, if a moral God commands us to murder a child under this system, then we are evil if we do so, because the act is evil, not because it was commanded by an evil being. Likewise, if Satan were to command us to love our neighbour, then that act would be good, even if Satan is not.

Under this system is there anything inherently morally wrong in accepting the Wager? I do not believe that there can be. Even if we allow that an uneven distribution of salvation should be considered immoral, then it is still not incumbent upon me to reject that salvation in order to be moral, since my action is separate from God's character.

I think that Penelhum is conflating political or social action with this issue of salvation. We might decide to boycott countries which practice apartheid, but our motivation there is to change their behaviour, not to maintain some sort of moral distance from them. By instituting sanctions against them, we hope to effect change. It might therefore be argued that to continue to buy products from corrupt regimes is to be complicit in maintaining that corruption, but there is no hint here that our refusal to accept the Wager will have any effect whatever on God's behaviour. It is also not clear that our refusal to accept the Wager's terms will enable anyone else to be saved in our stead.

Penelhum's argument is that by coming to worship God as the natural result of conversion, we will also come to approve of God's policy on salvation, which he has already deemed immoral, and therefore, we will become immoral by converting. Again, I think this is not guaranteed. We might not approve of God's policy per se, but rather approve of God and trust that God's knowledge of what constitutes fairness might actually be better than our own. Since God is transcendent, ineffable

etc. we might be able to reasonably suspend judgement on the morality of exclusive salvation without thereby becoming corrupted in the process.

It could be argued that one should honour one's moral imperatives, even in the face of other commitments. For example, consider the son of a mafia boss who discovers that his father is a gangster. Should he honour his father and take up the family business, even though he finds it morally repugnant? Or should he walk away from his family and ignore all the sacrifices they have made and the evident love that they have for him? I think that this is missing the point. In this example we have postulated a child who has a developed and clear moral code about what to do. Pascal's Wager rarely applies where the matter is already decided. Its whole rationale is to give us a pragmatic way of acting when we do not have such imperatives. If someone feels that Pascal's Wager is morally repugnant and could never be contemplated, then that is no different in practice from the person who decides to be an atheist. The Wager is primarily directed to *l'homme moyen sensuel* who has not yet made up his mind.

In summary, I would hold that our acceptance or rejection of the Wager is morally neutral and is a completely separate issue from the issue of whether God might be immoral in selectively offering infinite reward. I believe that we can accept the Wager without compromising our moral sensibilities. Yet perhaps we are in violation of some epistemic duty by accepting the Wager out of pure self-interest and that this might also be morally dubious. I will therefore move on to explore whether we might have such a duty and, if we do, whether Pascal's Wager violates its principles.

3.7 Problems with the process

A duty not to believe this way

It is a common objection to Pascal's Wager that it induces people to believe when they should not. Larimore Reid Nicholl writes:

> *"[Pascal's Wager] is superficially persuasive but actually it is insidiously destructive on closer look. First, it claims that somehow it is legitimate to believe something in the face of an absence of evidence, or even in spite of evidence to the contrary.*
>
> *Second, it claims that there is some legitimacy in doing the right thing for the wrong reasons, rather than showing the correct reasons for doing it."*[437]

While I could argue that the Wager does not say that one should believe, merely that one should try to acquire a genuine faith by means of a behavioural experiment, there is a wider issue here, which I feel I should address. Is there a duty that we should believe things only for a particular set of reasons and that there is a moral duty upon us to only believe under those criteria? The reader will instantly have picked up the inherent circularity in this argument. Why should we believe that the criteria selected are indeed the right ones? What meta-criteria would we need to establish the validity of the criteria? Pretty soon we would find ourselves in a Kantian infinite regression of proofs, where each criterion must be justified by higher criteria *ad infinitum*. However, let us grant that there may be worthy reasons for belief, such as hard evidence, and that there are unworthy reasons, such as prejudice. I do not propose to revisit the entire debate taken up by the Reformed Epistemologists which we saw earlier, but I would like to briefly touch on some points, especially with respect to the legitimate methods which we may employ to decide matters.

One of the most famous expositions of the moral worthiness of beliefs is W.K. Clifford's essay: "The Ethics of Belief", which I mentioned earlier in this chapter. In it Clifford postulates a ship-owner who does not bother to check the state of a vessel before sending it to sea, full of immigrants. The owner has legitimate doubts about the seaworthiness of the vessel, based upon its past history, but subdues these "melancholy reflections"[438] on the grounds that "she had gone safely through so many voyages and weathered so many storms that it was idle to suppose she would not come safely home from this trip also."[439] He thus convinced himself that, despite his concerns about the trustworthiness of his workmen, he should put his

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[437] Larimore Reid Nicholl, "Pascal's Wager: The Bet is Off," *Philosophy and Phenomenological Research* 39, no. 2 (1978): 279.
[438] Clifford, "The Ethics of Belief."
[439] Ibid.

trust in "Providence, which could hardly fail to protect all these unhappy families that were leaving their fatherland to seek for better times elsewhere."[440] The ship subsequently sinks, together with all its hands and Clifford asks whether the ship-owner should be considered to be morally culpable for their deaths. Concluding that the ship-owner was at fault, Clifford generalises his argument such that it becomes morally wrong to believe without good grounds for doing so. In fact, he becomes dogmatic, stating: "it is wrong always, everywhere, and for anyone, to believe anything upon insufficient evidence".[441]

Philip Quinn notes that Clifford does not argue that believing on insufficient evidence is injurious to the believer because it fosters credulity in the believer, but rather because it endangers civilization and is a betrayal.[442] Clifford's prose borders on religious awe:

> *In regard, then, to the sacred tradition of humanity, we learn that it consists, not in propositions or statements which are to be accepted and believed on the authority of the tradition, but in questions rightly asked, in conceptions which enable us to ask further questions, and in methods of answering questions. The value of all these things depends on their being tested day by day. The very sacredness of the precious deposit imposes upon us the duty and the responsibility of testing it, of purifying and enlarging it to the utmost of our power. He who makes use of its results to stifle his own doubts, or to hamper the inquiry of others, is guilty of a sacrilege which centuries shall never be able to blot out. When the labours and questionings of honest and brave men shall have built up the fabric of known truth to a glory which we in this generation can neither hope for nor imagine, in that pure and holy temple he shall have no part nor lot, but his name and his works shall be cast out into the darkness of oblivion for ever.*

Yet, Clifford's thesis is incomplete. While we might agree that we need sufficient grounds for some beliefs, what constitutes "sufficient"? Clifford has no answer for us. As George Mavrodes puts it:

> *While Clifford tells us that it is wrong to believe on insufficient evidence, he does not tell us how much evidence, in general, is sufficient for belief. And he does not tell us how to go about deciding how much evidence is sufficient.*[443]

On the other hand, as James observes,[444] the history of science is littered with beliefs which turned out to be wrong, but which nonetheless have helped advance

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[440] Ibid.
[441] Ibid.
[442] Quinn, "Moral Objections to Pascalian Wagering," 64-65.
[443] George Mavrodes, "Intellectual Morality in James and Clifford," in *The Ethics of Belief Debate* (Atlanta, GA: Scholars Press, 1986), 212.

the cause. Had no-one ever believed in atoms, then we might never have discovered the nucleus, or the even-smaller 'fundamental' particles. Even the completely erroneous belief in phlogiston helped us to recognise the role of oxygen in combustion. Is it therefore reasonable to make our best guess at the time, without risking being accused of betraying the "sacred tradition of humanity"?

I suspect that Clifford would completely reject Pascal's Wager and see it as a corrosive influence, for similar reasons to Nicholl. There seems little doubt from the quotation above that he would see belief acquired via the Wager as being morally wrong and verging on blasphemy.

Quinn argues that Pascalian reasoning does not violate Clifford's principles. After all, its starting point is that there is insufficient evidence to convince us either way. If we take this to mean that there is as much evidence for God's existence as there is to the contrary, then how are we to decide? Is must be reasonable that we use some sort of tie-breaker in these circumstances and so Mavrodes introduces what he calls the "Meatloaf Factor".[445] Suppose that there is in your fridge a piece of meatloaf which has been there for an unknown period of time. You cannot tell whether the meatloaf is good or bad by simply looking at it, so should you eat it or not? If you eat it and it turns out to be bad, then you might suffer and even die. However, if it is good, then you receive a nutritious meal for free. Thus, there is an asymmetry between the outcomes, where the bad case is much worse than the good case is beneficial. In those circumstances, he argues, we are justified in preferring one outcome over the other. Although we have no firm evidence either way, we make our choice based upon pragmatic considerations. Pascal is suggesting exactly the same class of decision, where our choice is driven by the asymmetry between the potential outcomes.

A duty to doubt

Much of the rhetoric surrounding Clifford and his supporters seems to hinge on a belief that we have some duty not to be deceived, nor to make ourselves gullible. We might therefore reject Pascal's advice that we need to subdue our objections and be appalled at the idea that we might "make ourselves docile"[446] as Krailsheimer's translation has it. The French phrase used, *"vous abêtira"*, embarrassed the Port Royal authors, according to Benn,[447] and it took a later editor, Victor Cousin, to restore Pascal's original text. Brunschvieg's translation rendered it as "to stupefy you", which might have confirmed Clifford's suspicions as to where this sort of decision making process might lead.

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[444] James, *The Will To Believe*: VIII.
[445] Mavrodes, "Intellectual Morality in James and Clifford," 213.
[446] Pascal, *Pensées*: 122. L418
[447] Benn, "Pascal's Wager," 309.

So do we have a duty to reject the Wager because its ultimate demand is that we make ourselves stupid and is that what Pascal really intended? It is easy to claim as Benn does that "if so great a writer wanted to say [something else], he had command enough of the French language to say it for himself". Yet that ignores the physical evidence of the fragment containing the Wager, which is covered in revisions and crossings out and has writing up and down the margins. It also overlooks the fact that we are clearly examining a work in progress in Pensées, rather than a finished thesis. In my view, it is entirely reasonable that Pascal might have phrased his final version more elegantly in order to avoid any hint of committing intellectual suicide in accepting the Wager. We also need to see it within Pascal's model of humanity, where we are continually blown about by our passions and concupiscence, and it is these which need to be tamed, so that matters of faith can be properly and soberly considered.

If the evidence for and against God is equivocal, as Pascal claims, then what duty do we violate if we prefer one side over the other? As we saw with Mavrodes' meatloaf, we might use pragmatic reasoning in order to settle the matter and thus choose to minimise our risk. Indeed, this is following Clifford's example of the ship-owner. As Quinn observes, part of Clifford's thesis is that the risks are asymmetrical. If the ship sinks then the subsequent deaths are a catastrophic loss, while the potential losses of an inspection and cancelling the trip are relatively minor. If we recast the problem, such that the ship-owner merely worried whether the ship looked nice as it sailed and if he ought to repaint it before sailing, no-one would hold him morally at fault for failing to go and look. It is the very asymmetry of losses which drives the moral conviction. In Pascal's Wager, the same logic applies. The potential losses are infinite and eternal, so they must drive our behaviour. Clifford is actually a Pascalian (at least in this example).[448]

If risk management is a reasonable means of preferring one decision over another which is otherwise equally likely, then no Kantian duty can be violated. Someone might argue that if we knew one outcome were actually far more likely than the other, then we might be in breach of such a duty, but modern law does not recognise any such thing. To ferry operators in the early 1980s, it seemed extremely unlikely that anyone would leave the bow doors open on a Channel ferry, but when it occurred on the Herald of Free Enterprise in 1987, the ship owners were still prosecuted for manslaughter.[449] It seems that the magnitude of the consequences does legitimately play a part in how we should approach our decision making.

[448] I admit that his later example of slander is less so.
[449] http://en.wikipedia.org/wiki/Herald_of_Free_Enterprise

Is wagering immoral or simply unworthy?

The distaste with which many writers discuss Pascal's proposition seems to arise from two threads: firstly they believe that gambling is in itself morally suspect; and secondly because they hold that such blatant self-interest runs contrary to the message of the gospels.

In current English society gambling is largely frowned upon, although attitudes vary considerably by socio-economic class and a large proportion of the population play the Lotto every week without a moral qualm. In the USA many people see no moral conflict in holidaying, or even getting married in Las Vegas.[450]

The public attitude to gambling has changed over time. Justine Crump notes that disapproval for gambling was absent in earlier writings about the Wager such as Tillotson's "Wisdom of Being Religious" (1664). She observes that Tillotson tolerates the speculative urge, but attempts to redirect it in a more profitable wager on God, rather than on faulty and unsatisfying temporal prizes. This relative acceptance of the gambling impulse may reflect the age in which Tillotson wrote, when gambling was not yet perceived as an all-devouring social and political monster".[451] Later writers seemed uncomfortable that spiritual matters might be tainted by contact with such a disreputable activity, or seemed inappropriate when concerning matters of such weight. Voltaire writes: "This article seems a little indecent and puerile: the idea of a game, and of loss and gain, does not befit the gravity of the subject."[452]

However, it is the appeal to self-interest that draws the most ire. Nicholl sums this attitude up well:

> *It cannot escape notice that the prime motivation underlying the glorious wager is hedonistic and selfish. The bet is based exclusively on unabashed selfishness – the attempt to maximise one's own pleasure, both quantitatively and qualitatively. Yet it is explicit in Christian ethics that selfish behaviour is unethical, while behaviour based upon genuine altruistic motives is moral and necessary for one to be qualified for Christian immortality.*[453]

Thomas Hardy also expressed his concerns through Coggan, one of the characters in his book *Far From The Madding Crowd:*[454]

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[450] I have been many times to Las Vegas in the course of my business, because there used to be a large computer exhibition held in the city every year. I have yet to gamble there.

[451] Justine Crump, ""Il faut parier": Pascal's Wager and Fielding's "Amelia"," *The Modern Language Review* 95, no. 2 (2000): 314.

[452] F.M.A. Voltaire, "Remarques sur les Pensees de M. Pascal," in *Oeuvres*, ed. Garnier (Paris: Garnier, 1728), 32-33. vol XXII in Hacking, "The Logic of Pascal's Wager," 192.

[453] Nicholl, "Pascal's Wager: The Bet is Off," 278.

[454] I owe this insight to Quinn.

"Chapelfolk be more hand-in-glove with them above than we," said Joseph, thoughtfully.

"Yes," said Coggan. "We know very well that if anybody do go to heaven, they will. They've worked hard for it, and they deserve to have it, such as 'tis. I bain't such a fool as to pretend that we who stick to the Church have the same chance as they, because we know we have not. But I hate a feller who'll change his old ancient doctrines for the sake of getting to heaven.".[455]

Of course, no section on these criticisms of the Wager would be complete without William James' scathing condemnation.

You probably feel that when religious faith expresses itself thus, in the language of the gaming-table, it is put to its last trumps. Surely Pascal's own personal belief in masses and holy water had far other springs; and this celebrated page of his is but an argument for others, a last desperate snatch at a weapon against the hardness of the unbelieving heart. We feel that a faith in masses and holy water adopted wilfully after such a mechanical calculation lack the inner soul of faith's reality; and if we were of the Deity, we should probably take pleasure in cutting off believers from their infinite reward.[456]

Strong words indeed and seemingly at odds with James' reputation as a pragmatist. I cannot deny that there is something which offends people in the Wager's appeal to pure self-interest. Surely, they argue, the pursuit of God (or The Good) should be untainted by such worldly matters. While I accept that the Wager is based upon self-interest, I will show in the following section that such interest is entirely consistent with orthodox Christian doctrine and completely in line with Jesus' words as recorded in the gospels. While this may be small comfort to those who do not accept the Christian scriptures, it locates the Wager inside the fold of mainstream Christian thought, rather than as some black sheep of the theological family.

Self-interest in the gospels

I do not propose to conduct a deep exegesis in these examples, but merely illustrate the compatibility of self-interest with the gospel message. Let us start with Matthew's account of two of Jesus' parables:

"The kingdom of heaven is like treasure hidden in a field. When a man found it, he hid it again, and then in his joy went and sold all he had and bought that field.

[455] Thomas Hardy, *Far From the Madding Crowd* (London: Penguin Classics, 2007). 267-68.
[456] James, *The Will To Believe*: II.

"Again, the kingdom of heaven is like a merchant looking for fine pearls. When he found one of great value, he went away and sold everything he had and bought it."[457]

In each of these two parables, one way of reading them is that Jesus describes how someone discovers something of great value and then sells all he has in order to obtain it for himself.[458] In each it is implicit that one should give up the lesser good for the greater one.

These are parables with a strong sense of self-interest, yet there is no condemnation attached. Again Matthew reports Jesus as saying:

"But when you give to the needy, do not let your left hand know what your right hand is doing, so that your giving may be in secret. Then your Father, who sees what is done in secret, will reward you. [...] Do not store up for yourselves treasures on earth, where moth and rust destroy, and where thieves break in and steal. But store up for yourselves treasures in heaven, where moth and rust do not destroy, and where thieves do not break in and steal. For where your treasure is, there your heart will be also."[459]

This is another appeal to self-interest. It tells us to act in a particular way, *so that God will reward us* and it explicitly suggests that we should be aiming for reward in heaven. It would seem that the gospel writer was not at all uncomfortable with staking our worldly goods in order to win heavenly/eternal ones. In fact, it is positively recommended.

On the avoidance of loss, Mark has Jesus saying:

If your hand causes you to sin, cut it off. It is better for you to enter life maimed than with two hands to go into hell, where the fire never goes out[460]

Jesus appears to be saying that cutting off your hand is a finite loss, which is far better than the infinite loss of being thrown into Hell. There is approval for looking after your own interests and taking whatever steps necessary, however extreme, in order to obtain or preserve your heavenly reward.

Improperly earning the reward

For William James it seems that the association with the gaming table implied that any faith obtained that way had not been properly earned, much as many people are unhappy with the idea of wealth obtained by lottery, rather than by hard work.

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[457] Matthew 13:44-46, NIV

[458] We might observe that in the first parable the treasure finder feels no obligation to tell the landowner of the true worth of his property!

[459] Matthew 6:3-4 and 19-21

[460] Mark 9:43

Yet many would argue that this is the very essence of the gospel; salvation can never be earned, it is always the undeserved gift of grace. In any case, there is not a hint from Pascal that he thought the Wager would grant salvation, merely that it would turn the unbeliever's heart towards finding God. Nicholl dismisses the Wager as "doing the right thing for the wrong reasons",[461] but does not suggest what the right reasons might be. After all, if the pursuit of God is the highest calling, how could we cavil at the means by which we discover that truth?

The morality of the Wager

As we have seen, Quinn finds no moral difficulty in God's offering salvation to only a selected few, since God cannot reasonably be obliged to grant infinite reward for any finite action. I agree and hold that grace is the unearned gift of God, not something which can be earned, or demanded as our due. It is this asymmetry which is one of the great mysteries of the gospel. Likewise, Pascal's Wager does not violate any duty to avoid self-deception, nor does it undermine our belief system in general. I suggest that our decision making may be legitimately formed by consideration of the outcomes, especially when there is a distinct asymmetry between the possibilities. So it is entirely legitimate for us to use a cost/reward basis in order to select between alternatives when we have no overriding reasons to prefer one option over another.

I do not believe that the language of gambling tarnishes the pure goals of Pascal's Wager. Distaste against gambling should be more about its excesses and, as we have seen, attitudes have varied over time. In my view, gambling itself is not necessarily evil and even if it were, the present logic of decision theory is not bound to it, even if that might have been its birthplace. To give another example, we do not suggest that life insurance is morally corrupt, although its actuarial roots lie buried in the same statistical soil.

Finally, one of the insults aimed at Jesus himself was that he was found in the company of sinners.[462] Pascal might have been proud such an association.

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[461] Nicholl, "Pascal's Wager: The Bet is Off," 279.
[462] Luke 15:2

3.8 Problems with Pascalian Logic

Having dealt with some objections to the deity and the process, I now move on to discuss some ways in which the logic underpinning Pascal's Wager has been turned by critics in order to produce either ridiculous or morally dubious ends. The intent of these objections has generally been to question whether the logic itself is sound, or whether it is too crude a tool to be used in such important matters. I will start with two humorous parodies: Tabbarok's Wager and Pascal's Mugger, in order to sketch how the principles established earlier can be used to construct a suitable defence against them. I will then tackle Criag Duncan's "Persecutor's Wager" in more detail.

Tabbarok's Wager

The logic of superdominance that drives the Wager has potential downsides to it. Alexander Tabarrok makes the following proposal:

> *"For a fee of all your wealth I will use my line to God to put in a word on your behalf. I assert that individuals for whom I put in a good word are more likely to enter heaven and receive everlasting joy than are other individuals."*[463]

Tabarrok offers us the opportunity to take advantage of his revelation of God and his claimed intimate relationship with the deity, in return for our worldly goods. He uses solid Pascalian logic that this is a rational course of action and Lars Peter Østerdal confirms the mathematical soundness, although he adds the caveat that "even accepting Pascal's Wager, it does not follow that Tabarrok's Wager should be accepted".[464] This is not a new offer, of course. The Church has a long and sordid history of making such offers, although perhaps not quite as openly greedy. Indulgences were freely sold by sections of the Catholic Church until the practice was banned by Pope Pius V in 1567, following the Council of Trent. One modern tongue-in-cheek parody of indulgences can be found in the "Get Out of Hell Free!"[465] cards offered by Randy Cassingham which have the tag line ""Sin All You Want, We'll Print More."[466].

The question in such a mediated offer is whether the offeror can deliver on the promise and this was one of the preconditions that I discussed earlier. I doubt that anyone, including Tabarrok himself, believes that he can. Tabarrok's defence is that, even if he offers only a small increase in our probability of reaching heaven, is it still worth doing. He carefully does not explore the possibility that his intervention

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[463] Alexander Tabarrok, "Believe in Pascal's Wager? Have I Got a Deal for You!," *Theory and Decision* 48(2000): 124.

[464] Lars Peter Østerdal, "Pascal and Tabarrok's Wagers," *Theory and Decision* 57(2004): 4.

[465] Randy Cassingham modelled these on the "Get Out of Jail Free" cards in the Hasbro's board game, MONOPOLY®. The cards have proved to be very popular, especially amongst clergy, and Cassingham has sold over a million so far.

[466] http://www.goohf.com/

might *decrease* our chances of getting into heaven. After all, God might become so annoyed with Tabbarok (and/or the gullibility of his followers) that he casts all of Tabbarok's believers into hell instead. Tabbarok also glosses over the possibility of doing other things with our worldly possessions, such as giving them all to the poor[467], which might have a better chance of success. Paul Bartha's relative utilities (discussed on p93) suggest that when we are faced with two competing infinite utilities, we should make the decision on the basis of our subjective probabilities.[468] Tabbarok's Wager ultimately succumbs to a "many alternatives" objection.

Pascal's Mugger

There is also an objection known as Pascal's Mugger, which Colin Bostrom describes in a humorous essay. In it Pascal is confronted by a mugger who demands Pascal's wallet, which contains ten livres. When Pascal asks why he should hand it over, the mugger engages in a series of offers, parodying the form of Pascal's Wager, firstly by offering to give twice as much money back tomorrow. The mugger then raises the stakes by claiming to being an Operator of the Seventh Dimension who can deliver additional days of happy life. Pascal is dubious, but the mugger assures him that there must be some non-zero probability that he is telling the truth and Pascal reluctantly assigns it a probability of one in a quadrillion.

> *Mugger: Good. Now we will do some maths. Let us say that the 10 livres that you have in your wallet are worth to you the equivalent of one happy day. Let's call this quantity of good 1 Util. So I ask you to give up 1 Util. In return, I could promise to perform the magic tomorrow that will give you an extra 10 quadrillion happy days, i.e. 10 quadrillion Utils. Since you say there is a 1in 10 quadrillion probability that I will fulfil my promise, this would be a fair deal. The expected Utility for you would be zero. But I feel generous this evening, and I will make you a better deal: If you hand me your wallet, I will perform magic that will give you an extra 1,000 quadrillion happy days of life.*[469]

Pascal replies "I admit I see no flaw in your mathematics" and grudgingly hands over the wallet with its ten livres.

This satire is directed at the misapplication of superdominance, which we can also see appearing in wider fields such as global warming. If there is a non-zero probability of infinite disaster, it is argued that we should employ any amount of resources in order to avoid it. These arguments usually fail because we either reject the underlying proposition, or because we simply cannot afford to mitigate the risk. Thus we simply have to accept them.

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[467] Matthew 19:21
[468] Bartha, "Relative Utilities," 30.
[469] Colin Bostrom, "Pascal's Mugger," *Analysis* 69, no. 3 (2009): 445.

In this instance Bostrom is suggesting that there is a non-zero possibility of a claimant having magical powers to offer an overwhelming finite reward. Bostrom's mugger specifically does not claim to have infinite power, nor to offer an infinite reward; he merely offers a vast finite reward which is sufficient to overwhelm a small subjective probability.

It seems that the principle of Maximality should apply: this mugger is not a deity at all, let alone a MaximalGod. After all, his powers do not extend to creating, or obtaining ten livres of his own. We can thus reject him and if his Seventh Dimension exists at all, then there may be better people to deal with. I do think, however, that the point being raised by Bostrom is a valid one. If someone can claim to have magic powers and if we are willing to assign a non-zero probability of their actually possessing them, then there may be cases where our decision theory is frustrated by a Pascalian escalation of the rewards on offer. The obvious rebuttal is to demand evidence of the claimant's abilities, but this would be to ensnare the Wager in similar evidentialist attacks.

We could also consider the claim in its wider context. After all, there is another possibility: that the mugger is lying. Indeed, the style that Bostrom adopts is designed to convey this to us in the narrative. It would be rather naïve of us to not acknowledge this fact. However, this does not reduce the Pascalian impact, because the loss in that scenario would only be the ten livres. Pascal, however, was much brighter than how he is portrayed in Bostrom's account. Anyone who had read his brilliant destruction of casuistry in The Provincial Letters could believe that he would so readily accede to the mugger's demands. There are a number of replies which are possible. Firstly, he can reply in like kind and assert that he too is from the Seventh Dimension and thus he has as much access to the happy days as the mugger does. While this is untrue, it is surely allowable for Pascal to reason that there is perhaps a one in a quadrillion chance that it *might* be true and that he might have been previously unaware of it. Perhaps he has been inhabiting the Seventh Dimension all this time without knowing it, which might explain his frequent headaches! Pascal can reason to himself that while he does not think it to be true, if it is possible at all, then there must be some small possibility that he is indeed also from the Seventh Dimension. After all, there is no reason to suppose that the mugger is more likely to be from that dimension that he himself is. He continues in thought and deduces that since he himself does at least have ten livres, unlike the mugger who is forced to beg, he ought consider himself the superior being and thus more likely to have access to any higher powers. Therefore, the mugger is not necessarily offering him anything which he could not obtain without the expense of ten livres. Faced with two identical competing rewards, the Tie-Break Principle allows us to pick the more probable and/or the one with the lower cost.

There is a more elegant approach: Pascal could perform a behavioural experiment and offer the mugger ten quadrillionths of a livre in return for a single happy day tomorrow. Or better still, ten billionths of a livre in return for a billion happy days. If the mugger delivers on his promise, which will require less than a billionth of his power, then there will be no problem handing over the rest of the money.

I believe that this answers Bostrom within the spirit of the Wager. Pascal does not guarantee eternal bliss, nor does he think that it is necessarily obtainable in this way. The Wager is merely a tool to overcome what Pascal sees as flaws in our noetic fabric and to start us on a path towards salvific faith. He makes no promises and instead asks us to test it for ourselves.

If Tabbarok's and Bostrom's suggestions are somewhat tongue-in-cheek, Craig Duncan's challenge is more carefully articulated and asks the question whether Pascal's could be used to justify actions which we would otherwise hold to be morally unacceptable. If so, then we might have to face the possibility that any Pascalian arguments are inherently flawed and should therefore be avoided.

The Persecutor's Wager

We saw in Chapter 3 that if I accept Pascal's argument from superdominance, then I am rationally compelled to try to believe in God. Craig Duncan discusses whether similar Pascalian logic might support religious oppression and he sets out this thesis in his 2007 paper "The Persecutor's Wager".[470] While the aim of his paper is primarily an attack on consequentialist thought within a utilitarian framework, I believe that we need to examine whether it undermines the legitimacy of Pascalian logic in general. In this section I will critically examine Duncan's Persecutor's Wager as a potential *reductio ad absurdum* attack on Pascal's Wager.

The outline of a reductio attack

We have shown that if a particular action results in infinite gain, then any and all finite costs may be incurred in pursuing that action. i.e.

$$\begin{aligned} EV(\text{action}) &= p(\text{action}) \times \infty - \text{cost} \\ &= \infty \end{aligned}$$

This holds no matter how small a value we choose for the probability of such action producing the gain, provided that it is greater than zero. I argue on pages 140-152 that neither zero, nor infinitesimal probabilities could be rationally used against this sort of argument, so it would seem to be a valid line of attack on Pascal's Wager to show that *all* such arguments might be inherently suspect, especially as that is many people's instinctive reaction when discussing Pascal's Wager.

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[470] Craig Duncan, "The Persecutor's Wager," *Philosophical Review* 11, no. 1 (2007).

The logic behind this *reductio* attack would be thus:

a) The argument from superdominance cannot rationally be defeated (within its premises) so
b) If we find a solid argument from superdominance from which unquestionable evil inevitably results then
c) All arguments from superdominance are inherently flawed and may be set aside, or at least treated with a large amount of caution.

I admit that I do not believe this to be a water-tight case against Pascalian reasoning, since I am not convinced that the final step necessarily follows from the first two. It is not necessarily the case that finding a single unacceptable outcome should invalidate a whole methodology. Let me briefly give a counter-example: let us say that I believe in fairness (by which I mean treating each person equally) and I also believe in eliminating starvation. I will act to maximise each of these goals in my life. However, I lack the resources to be able to aid all starving people, so I must necessarily limit my charitable actions to a few. This is unfair, by my criteria, on those who are not aided. The question is how we could we resolve the dilemma. We could accept a compromise, but it could be problematic to find the correct balancing point. Should we aid no-one, or perhaps give them each the same, even if that is too little food to make any difference to their starvation? There is a tension between those two goals, but it does have a gruesome solution: I could simply murder all starving people. All would be treated in the same way and afterwards there would be no starving people, so it would seem to meet the criteria I set, although it is obviously morally abhorrent.

In a similar fashion, we might find that there are problem sets where Pascal's Wager could be turned to produce a recognisably evil outcome, as Craig Duncan attempts to do, but we need to consider these within our wider moral framework, not as if they existed in some sort of intellectual vacuum. Having said that, I still think we need to take this attack seriously. It does, after all, cast further doubt about how we might legitimately use infinite utility within such a decision theoretical context.

The end justifies the means

This Pascalian argument above could be more simply expressed in the traditional formula of "the end justifies the means". The decision theory we have been following suggests that if we have infinite reward available, then gaining that should justify any costs we incur. In earlier chapters we have been considering that equation purely from the viewpoint of the individual who both bears the costs and reaps the rewards. In Duncan's thesis we move into a realm where the costs may be borne by others, who may or may not participate in the gains. This is much less

acceptable on a moral basis and may render such a course of action to be outside the live[471] options which we might consider. I shall return to this argument later.

I start by outlining Duncan's Wager and exposing the underlying logic. I also highlight what I believe are its strengths, as well as why I believe that the argument ultimately fails. I present two defences to the Persecutor's Wager, one as a "free-will" defence and a "many-errors" defence. In conclusion I summarise why I believe that the Persecutor's Wager fails as an argument in its own right and also why it makes no real impact on Pascal's Wager, but let us start with Duncan's thought-provoking paper. He opens his essay with a horrific account:

> *In October of 1553, the Unitarian theologian Michael Servetus was burnt at the stake in Geneva on the grounds of heresy. ... We are told that the executioners secured Servetus to the stake with an iron chain. They wound a thick rope several times tightly around his neck, until Servetus pleaded that it be wound no further. A pile of wood was placed at his feet and a crown of straw coated in sulphur was placed on his head; the whole contraption was then set alight. Several people from a large crowd of spectators came forward to throw some wood of their own onto the fire. As the flames began to reach him, Servetus let forth a horrifying shriek; within half an hour he was dead.*[472]

Duncan finds support for this execution from the reformer John Calvin, who asserted that Servetus had denied the Trinity and since that was a damnable belief, it could not be tolerated and death was therefore deserved.[473] Christians might find some scriptural support for such a hard-line approach in the synoptic Gospels, where it says:

> *"if anyone causes one of these little ones who believe in me to sin, it would be better for him to have a large millstone hung around his neck and to be drowned in the depths of the sea."*[474]

If preaching false doctrine can cause people to fall into sin, then the gospel writers have Jesus confirming that death would be preferable. Matthew also records Jesus as saying:

> *"If your right eye causes you to sin, gouge it out and throw it away. It is better for you to lose one part of your body than for your whole body to be thrown into hell"*[475] [476]

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[471] As William James would put it

[472] Duncan, "Persecutor's Wager," 1. based on Roland Bainton, *Hunted Heretic* (Boston: Beacon Press, 1953).

[473] Duncan, "Persecutor's Wager," 1.

[474] Matthew 18:6 (NIV)

[475] Matthew 5:29 (NIV)

The essence of the justification is primarily an epidemiological argument, where false doctrine is treated as if it were a transmissible disease. The difference is that, since we have an infinite loss to consider, the stakes are much higher. Thus, if holding a particular belief might disqualify someone from eternal salvation; and if that person were to try and promulgate such a belief such that other people would lose (or fail to gain) eternal salvation; then any and all means should be allowable to prevent such proselytising. Duncan takes it further still, saying that given that eternity is at stake, then it is not only allowable, it is *imperative.*

If we were talking about a plague which spread by contact, then we might see it as entirely reasonable to prevent people from moving freely, possibly even imprisoning them if they refused to comply. One US citizen was recently tracked down and isolated[477] after failing to comply with a movement restriction when he was suffering from extremely drug-resistant tuberculosis (XDR-TB).[478] On the other hand, it is unlikely that society would approve of the murder of plague carriers and even during the great plagues of the past, it was not common. Incurable contagions such as leprosy were dealt with by social strictures and by isolation in leper colonies, not by genocide. So the burning of heretics seems to be an excessive response, unless we consider that isolation from words and ideas is harder to achieve than simple segregation and thus murder becomes the only viable option. We might find support for this in the evidence of dissidents within Communist countries in the twentieth century, where their writings reached the West even though the authors were imprisoned in remote areas.

If false doctrine spreads like a contagion, then written texts and tracts provide a reservoir of infection, as well as being a vector for its wider transmission. So the quarantine argument would justify book burning and the control of literature, perhaps by restricting publication to those books deemed to be suitable by an appropriate authority. We do not have to look very far to find examples of this in history.[479] Modern Western culture, with its emphasis on free speech, finds such an approach abhorrent, but could it be justified using some form of Pascalian logic? Could it be rational to be cruel to some in order to be kind to the majority? Duncan starts with a simple case and then progressively refines it.

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[476] There thus appears to be some scriptural backing for maiming or killing heretics, which Duncan does not explore, possibly because his target in the essay is consequentialists, rather than orthodox Christians.

[477] CDC Investigation of Traveller with Extensively Drug-Resistant Tuberculosis (XDR TB): Questions and Answers for Passengers and Flight Crew on Affected Flights http://www.cdc.gov/tb/xdrtb/travellerfactsheet.htm

[478] This is a form of tuberculosis which is resistant to all the major antibiotics used to treat the disease, and specifically has evolved resistance to rifampicin and isoniazid which are the second-line drugs used to treat other resistant forms of TB.

[479] As in the *imprimatur* of the Roman Catholic Church.

The Simple Case

We can illustrate the simplest case with our familiar 2x2 matrix. Let us consider just the Christian God versus no god and decide whether we should enforce Christianity, or allow complete religious freedom. Duncan argues that enforcing Christianity will result in more people believing in the Christian God. Although this seems contentious, it cannot be denied that when Christianity was enforced on past cultures then there appeared to be more people who did believe than now. Duncan cites Barry, who wrote: "The effectiveness of coercion in producing genuine belief over the course of a few generations is beyond question"[480] and Duncan argues that the plight of the Bahá'ís in Iran constitutes a real-life example.[481]

In a population, let the number of Christians be "c" and the number of additional people who become Christians due to enforcement be "Δc". We assume that each believing Christian obtains salvation, whose value we represent here as S. Let the probability of the Christian God's existence be *p*. So we have:

	An exclusivist Christian God exists	No god exists
Grant religious liberty	$S \times c$	0
Enforce Christianity	$S \times (c + \Delta c)$	0

$$EV(\text{liberty}) = p \times (S \times c) + (1 - p) \times 0$$

$$EV(\text{enforce}) = p \times (S \times (c + \Delta c)) + (1 - p) \times 0$$

It therefore appears that enforcing Christianity has a higher expected value than allowing liberty as long as Δc is positive, although we have not yet considered the costs involved. For this section I propose to ignore finite cost and assume that they are overwhelmed by the benefits. Duncan argues that salvation has incomparably greater value than any earthly sacrifice and so it becomes not only allowable, but *imperative* to enforce Christianity.

It is immediately apparent that this argument has a flaw, for as soon as we give salvation an infinite value, there is no longer any gain in enforcement. For if S is infinite then:

$$EV(\text{liberty}) = p \times (S \times c)$$

$$= p \times (\infty \times c)$$

$$= \infty$$

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[480] Brian Barry, *Theories of Justice* (Berkeley: University of California Press, 1989). in Duncan, "Persecutor's Wager."

[481] "Persecutor's Wager," 13.

$$\begin{aligned} EV(\text{enforce}) &= p \times (S \times (c + \Delta c)) \\ &= p \times (\infty \times (c + \Delta c)) \\ &= \infty \end{aligned}$$

Thus, if the Persecutor's Wager uses infinite value then it becomes trapped in a similar way to the difficulties faced by Pascal's Wager with mixed strategies, as we saw in Chapter 2.

In response to this predicament, Duncan tries to argue for a finite, but incomparable good, and he acknowledges Alan Hájek's reformulation, which splits earthly and heavenly quantities and which I discussed on page 87.[482] Duncan admits that he struggles to define what the "tremendously large finite number" should be, or why it should be different from the normal concept of infinity, much as Hájek also rejected the reformulation. However Duncan makes the intuitive step that "one should not *ipso facto* reject the good of salvation in magnitude to the goods of this life. ... Instead, one ought to conclude that the usual mathematical notion of ∞ turns out not to be the proper way of mathematically modelling the root idea of incomparability".[483] Possibly Duncan might find my guesstimation function more useful in solving this problem for him, although the function would need to be adopted for a population, rather than an individual. This would be an area for further research.

[482] Hájek, "Waging War," 39.
[483] Duncan, "Persecutor's Wager," 18.

Zero-sum

Duncan continues exploring the problem and develops an interesting line in modelling the zero-sum[484] situation of believers/non-believers in a population. He considers the case where every member of a population is either a Christian or a Muslim. Thus any gain by conversion for one group is an equivalent loss for the other.

Let S_i be the reward for Islamic salvation and S_c be the reward in Christian salvation. Then let Δc be the increase in Christians if Christianity is enforced and Δi be the increase in Muslims if Islam is enforced.

	An exclusivist Christian God exists with probability p_c	An exclusivist Muslim God exists with probability p_i	No god exists
Religious freedom	$S_c \times c$	$S_i \times i$	0
Enforce Islam	$S_c \times (c - \Delta i)$	$S_i \times (i + \Delta i)$	0
Enforce Christianity	$S_c \times (c + \Delta c)$	$S_i \times (i - \Delta c)$	0

EV (religious freedom) $= p_c \times S_c \times c + p_i \times S_i \times i$

EV(enforce Islam) $= p_c \times (S_c \times (c - \Delta i)) + p_i \times (S_i \times (i + \Delta i))$

EV(enforce Christianity) $= p_c \times (S_c \times (c + \Delta c)) + p_i \times (S_i \times (i - \Delta c))$

We can subtract out the common terms from each leaving:

Relative EV (religious freedom) $= 0$

Relative EV (enforce Islam) $= p_i \times S_i \times \Delta i - p_c \times S_c \times \Delta i$

Relative EV (enforce Christianity) $= p_c \times S_c \times \Delta c - p_i \times S_i \times \Delta c$

It thus depends on which god is more probable, whether the rewards are different and/or whether enforcing Islam is more effective than enforcing Christianity. As it stands, there appears to be no advantage to religious freedom, apart from its predictability. If we can assign values to p_i, S_i, Δi, etc. then we can choose to enforce Christianity or Islam and obtain a better result than with religious freedom. If we are indifferent between them, then they all give the same result. So enforcement never does worse than freedom and sometimes does better.

[484] A zero-sum game is one where any player's gain is necessarily funded by another player's corresponding loss.

The argument that Duncan then develops is that if we have any reason to believe that there is any advantage to enforcing one religion or persecuting another, then it becomes a moral imperative that we *must* engage in such persecution. Clearly, John Calvin believed this, although it needs to be noted that he recommended a more humane death for Servetus and it was the civil authorities who insisted on burning at the stake.[485]

Let us briefly see what happens if we assume that the salvation offered by each religion is equivalent, or at least broadly comparable. In this case, $Sc \approx Si$, which we could simplify back to just the symbol S again. Then let us assume that enforcement is also similarly effective for either faith, that is: $\Delta c \approx \Delta i$, which we then simplify to just Δ. We could now write:

Relative EV (religious freedom)	$= 0$
Relative EV (enforce Islam)	$= p_i \times S \times \Delta - p_c \times S \times \Delta$
	$= (p_i - p_c) \times (S \times \Delta)$
Relative EV (enforce Christianity)	$= p_c \times S \times \Delta - p_i \times S \times \Delta$
	$= (p_c - p_i) \times (S \times \Delta)$

Now, if we assume that they are equiprobable, using the Principle of Indifference,[486] then $(p_c - p_i) = (p_i - p_c) = 0$ and we now have:

Relative EV (religious freedom)	$= 0$
Relative EV (enforce Islam)	$= 0$
Relative EV (enforce Christianity)	$= 0$

So, in a true Pascalian situation where reason cannot help us decide,[487] there is no advantage in enforcing any one religion over another. However, if we *do* have reason to believe that one faith is more probable than any another while still assuming that the salvation offered and the efficacy of enforcement are equal, it becomes incumbent upon us to enforce that religion, as far as we are able.

[485] Edwin Curley, "Sebastian Castellio's Erasmian Liberalism," *Philosophical Topics* 31(2004): 51.
[486] As I discuss on page 48, the Principle of Indifference is not very reliable in these matters.
[487] Pascal, *Pensées (tr. Ariew)*: 122. L418

Duncan does not evaluate a separate issue, which is that one faith might be more attractive, or at least easier to enforce than another, for any difference in conversion rates (or Δ) also swings the equation as long as we do not hold the two to be *exactly* equiprobable. That is, if we consider one to be marginally more probable than the other, say 49.9% likely to 50.1% likely, so that there is a 0.2% difference between them. We might also adopt Hájek's concept of *vague* probabilities,[488] and say that we consider them to be vaguely equiprobable, but with a margin for error. So we might assign the term $(p_i - p_c)$ to have a value between -0.2% and +0.2%, but not exactly zero. In this case, the argument for enforcement might depend upon the attractiveness of each.

For example, let us imagine an ascetic faith, which we will call "A" and whose adherents eat a single meal a day of plain boiled rice, drink only water and mortify their flesh daily using rusty iron flails. Then let us postulate a Bacchanalian religion (called "B"), which insists that its followers should eat rich food, drink the best wine, have riotous parties and be as sexually promiscuous as they like. Both religions have a concept of eternal salvation and each promises eternal bliss for its adherents,[489] but annihilation for unbelievers. Let us assume that each appears vaguely equiprobable *ceteris paribus*. Experience from history strongly implies that B might be much more popular than A, especially amongst the undecided. It would thus be likely to be easier to enforce and have a higher conversion rate. So Δb would be greater than Δa and it would become rational to enforce hedonism.

[488] Hájek, "Objecting Vaguely."
[489] We could imagine that the hedonistic heaven with its endless parties might look a good deal more attractive than an eternity of fasting, self-flagellation and silence.

A whiff of hellfire

The picture becomes a little more complex once we add in the possibility of an eternal Hell. A deity could choose to send believers to heaven, but cast doubters into the fires of an eternal Hell. When I discussed this earlier, with respect to the standard Pascalian Wager, it was obvious that the possibility of Hell made no difference to the decision. If the comparison were between infinite bliss and nothing, then infinite bliss would obviously win. If instead the choice were between infinite bliss and infinite agony, then the decision would still be in favour of bliss. However, if we postulate several gods, each offering infinite bliss or infinite suffering, then it becomes less clear cut. Let us insert Hell into the earlier Christian/Muslim decision matrix.

	An exclusivist Christian God exists with probability p_c	An exclusivist Muslim God exists with probability p_i	No god exists
Religious freedom	$S_c \times c + H_c \times i$	$S_i \times i + H_i \times c$	0
Enforce Islam	$S_c \times (c - \Delta i) + H_c \times (i + \Delta i)$	$S_i \times (i + \Delta i) + H_i \times (c - \Delta i)$	0
Enforce Christianity	$S_c \times (c + \Delta c) + H_c \times (i - \Delta c)$	$S_i \times (i - \Delta c) + H_i \times (c + \Delta c)$	0

Now we see that the effects of choice are doubled. If the right religion is enforced then not only do additional people go to heaven, an equal number are saved from Hell. However, enforcing the wrong religion has a double disadvantage. Not only do we snatch salvation from those who might have otherwise believed, we then also subject them to the tortures of Hades. Duncan therefore argues that, although there will be regret for those who enforced the wrong religion in either case, there will be *more* regret in the case where the error leads to hellfire. If the enforcers had allowed religious tolerance instead, then they might have converted fewer people, but as it has turned out, those unconverted people would have gone to heaven. By converting them, the enforcer has condemned them to Hell, along with himself. He will therefore experience more regret than he would have done if there had been no Hell to consider at all.

Choosing from the options

It appears that if we look at the best-case scenario, then this occurs when either we enforce Christianity and the Christian God exists, or when we enforce Islam and the Muslim god exists. Both of these outperform religious freedom, so if we assume that we have no prior reason to prefer one over the other (either from the value of salvation, or the probability of existence) we might reasonably toss a coin to decide which to enforce.

Likewise, we could examine the worst-case scenario. This occurs when we enforce Christianity, but the Muslim God exists, or vice versa; thus, we would have converted people away from eternal salvation, which might be considered to have infinite negative value. If we want a risk management strategy where we avoid the worst-case, we might think that we should therefore support religious freedom. However, it is not quite as simple as that, especially when we bring the idea of Hell into the equation. Duncan's approach is that the increase in regret means that we should prefer religious freedom in those cases, since it has less regret.

Clearly the worst outcome for the Christian is when the exclusivist Muslim god exists and vice versa. If there are more of one group than the other, then this disturbs the equilibrium. The minimum overall loss occurs when we have exactly the same number of Christians as Muslims in the population. So it would be rational to use coercion (or persecution) to maintain equal numbers of each group[490] and each birth and death would potentially require us to re-balance.

Duncan's conclusions

For each of several principles, Duncan tries to show that religious tolerance gives the best overall result. However, it seems that he has already decided the outcome and then selects weighting to give that result. For example:

> *The optimism-pessimism principle. This principle directs one to compute, for each option, a weighted average of that option's best case scenario and worst case scenario (the weight of the average being determined by where one personally falls on an optimist-pessimist spectrum); one is then to choose the option with the highest such weighted average. We have already seen that that liberty has the best worst-case scenario; it also has the best best-case scenario, namely, the existence of a god who saves all citizens as they are, without any ordeal of religious enforcement. Hence liberty will have the highest weighted average, and an optimism-pessimism principle will select it as the superior option.*[491]

Yet, this simply is not true. The best best-case scenario he suggests is identical for all options and, in fact, it denies the whole principle. For example, let us postulate a god who damns all people to Hell. This gives us a worst-case scenario which dominates all others and which renders the whole process futile. Either universal salvation or damnation will make *any* wagering irrelevant, so they should be excluded from such calculations.

Once we take the universalist god out, then we find that religious tolerance does not have the best best-case scenario at all. Duncan glosses over this, perhaps in a

[490] Duncan, "Persecutor's Wager," 50.
[491] Ibid.

desire for the 'right' conclusion. The actual best best-case is when an exclusive god exists and where worship of that god is enforced to the extent that most people are converted. The worst worst-case appears to be where there is an exclusive god, whom very few people worship, possibly because they have been converted to another faith. However, modelling these cases tells us very little that we can actually use to make decisions. Duncan wants us to exercise religious tolerance and I agree that this does no worse in the worst case and should do better than cases where belief in the wrong god is enforced. Although we need to bear in mind that an attitude of complete religious tolerance might lead to drifting away from faith that they might have retained under a stricter regime, or even under persecution.

I will now discuss some further weaknesses in Duncan's case and go on to show why the Persecutor's Wager does not succeed.

Duncan's assumptions

Duncan's argument looks unpromising at first glance because it appears to have so many assumptions within it. For example, it assumes that we can reliably identify "damnable" doctrines, for on what basis could John Calvin decide that denying the Trinity was a damnable belief, as opposed to being a lesser sin (or even being the correct option)? After all, the doctrine of the Trinity was slow to arise within the Church, and the first mention of the word is generally acknowledged to be by Tertullian (c.155-230). What of all the first century Christians? Were they all damned? It took until the Council of Nicea in 325 for the Trinitarian formulation to become formal doctrine, largely in response to Arius. Even then, debate raged for some time. We therefore need some definitive guide to doctrine, or we need to expand our calculations to include some probability estimation for each and every belief within the canon. The Seven Deadly Sins would need error bars.

The Persecutor's Wager also has the premiss that believing wrong doctrine can cause us to lose salvation, which, as Duncan notes, is strangely at odds with Calvin's insistence on predestination.[492] That aside, Duncan argues strongly that

> *"so long as there is some probability, no matter how small, that only orthodox believers are saved, and no rival religious group can credibly claim that only its believers are saved, then ... consequentialism not only permits religious persecution, but absolutely requires it."*[493]

Duncan's argument intends to be all-embracing for a whole range of belief sets. For example, he also goes on to argue that a God who accepts everyone except unrepentant murderers is still an exclusivist God. It thus would become incumbent

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[492] I freely acknowledge that some Augustinians would hold that it is not necessarily a contradiction, but the demands of this thesis do not allow me to pursue this further here.

[493] Duncan, "Persecutor's Wager," 5.

upon society to devote all its resources into convincing murderers to repent, since by so doing, they would obtain an infinite good.

Once we allow the possibility of an exclusivist God, it is essential that we do all that we can to meet the sufficient conditions for salvation. Duncan therefore concludes that any case for religious liberty has to be founded upon a surprisingly strong form of religious scepticism in which no one has any reason, however slight, to believe in an exclusivist God.[494] Duncan is carried forward by the Pascalian logic that even the tiniest probability will still yield an infinite expected value and thus must drive our actions. Duncan makes a strong case for enforcement, but I believe that it is based upon a false premiss, that of doctrinal infallibility, which I discuss on page 193.

One infinity is enough

One key weakness in trying to use the Persecutor's Wager to attack Pascal's Wager is its move from the EV of an individual to the EV of a population. Pascal's Wager allows an individual to move from a finite reward in this life to an infinite payoff in the next. There is no sense in which a person already has an infinite good.

Let us assume that we have a population who are either Christian or Muslim, as we did before.[495] Now let us look at the EV of the population under each scenario.

	An exclusivist Christian God exists with probability p_c	An exclusivist Muslim God exists with probability p_i	No god exists
Religious freedom	$S_c \times c$	$S_i \times i$	0
Enforce Islam	$S_c \times (c - \Delta i)$	$S_i \times (i + \Delta i)$	0
Enforce Christianity	$S_c \times (c + \Delta c)$	$S_i \times (i - \Delta c)$	0

Yet if S_i is infinite, as is S_c, then we can simplify this[496] to:

	An exclusivist Christian God exists with probability p_c	An exclusivist Muslim God exists with probability p_i	No god exists
Religious freedom	∞	∞	0
Enforce Islam	∞	∞	0
Enforce Christianity	∞	∞	0

[494] Ibid.

[495] One interesting thought is whether you can convert people to a religion to which no-one yet subscribes. Who would do the evangelising under that scenario? So, if there has to be a believer in order to beget more believers, then there must already be infinite utility in the population. However, I can see that we might have the first person converted by direct revelation from the relevant deity.

[496] I have assumed that no conversion is 100% effective, so that we do not ever reach a position where there are no Christians (or Muslims) left.

There is now no reason to enforce anything. Whatever the reality of God's existence, the overall outcome will be identical for each case. As we saw earlier, this is also true if we assume that each god is equiprobable and that conversion rates are the same. It is no wonder that Duncan wants a finite proxy for the infinite good. This problem of infinite utility is a live one for utilitarians and a number of papers have been published by a range of authors making assertions and rebuttals about whether infinite utility can be added to or not. I do not propose to rehearse those arguments here, because Pascal's Wager suffers similar problems in dealing with mixed strategies, as I discuss in Chapter 2. The problem here is that *intuitively* there is some gain in adding another person to the number who will gain eternal bliss, but *mathematically* it appears to make no difference.

One possibility is if we consider eternal bliss to be strictly incommensurate with earthly life, except for the single mathematical relation[497] which states that one unit of eternal life is greater than any number of units of earthly satisfaction (or cost). We need not use infinity in this case, we could simply say that a unit of heavenly life is equivalent to 10^{1000} units of earthly life. Thus, to gain one person into heaven is still of greater value than the collective life of humanity and we retain the notion that it is better to have two people gaining heavenly life than just one.

Using the guesstimation function

We could attempt to restore Duncan's position by using my guesstimation function as his finite proxy, although we need to have some flexibility about what we mean by Ω, which we previously treated as being unique to an individual. As we saw earlier:

$$\text{EV (bet on God)} = (p \times \Omega) + 1 \times (1\text{-}p) \cong p\Omega$$

$$\text{EV (bet against God)} = (1 \times p) + (1 \times (1 - p)) = 1$$

If we assume that we can sum Ω across a population of size n, then we can plug this into our earlier table to give the following:

	An exclusivist Christian God exists with probability p_c	An exclusivist Muslim God exists with probability p_i	No god exists
Religious freedom	$\Omega_c \times c$	$\Omega_i \times i$	$n - i - c$
Enforce Islam	$\Omega_c \times (c - \Delta i)$	$\Omega_i \times (i + \Delta i)$	$n - i - c$
Enforce Christianity	$\Omega_c \times (c + \Delta c)$	$\Omega_i \times (i - \Delta c)$	$n - i - c$

[497] Relations are found in a mathematical niche known as discrete mathematics. This draws upon set theory to establish connections between sets. I do not propose to discuss it further at this point, as its use here should be reasonably obvious.

We have restored the differential, but only if we can safely assert that there are inherent differences between the salvation as perceived by a Christian and that of the Muslim. Thus, if we believed that $\Omega_c > \Omega_i$ we could perhaps argue for forced conversion. However, I do not think that we could sustain this, since we observe that there are conversions in both directions and it seems unlikely that someone's guesstimation function would be so easily mutable. Thus, we return to the dynamic equilibrium that we saw before, where the minimum loss strategy is to maintain equal numbers of Christians and Muslims.

God would be much better at coercion than we are

The fatal flaw in the Persecutor's Wager as a *reductio ad absurdum* of Pascal's Wager is that it relies on free will in order for choice to be salvific, but then assumes that a deity would subsequently accept individuals who are convinced against their will. Duncan appears to believe that the faith acquired through enforcement will be indistinguishable from that achieved in a culture of religious tolerance and freedom.[498] Even if it might seem that way to earthly observers, there is no assurance that the deity would take the same view. I would like to examine this idea a little further and suggest that the very existence of free-will should give us cause to believe that free choice is an essential part of the salvific process, at least in as far as it pertains to the Wagers. For the moment I wish to ignore questions of how we might educate our children, or select the 'right' doctrines.

Why should free will exist?

Let us start by considering the goals of the deity. We might put forward the idea that a transcendent god is essentially unknowable, but that rather defeats the object of pursuing any natural argument whatsoever. Let us instead assume that the deity's goals in this area are capable of broad understanding and that the thought processes are close enough to our own model of rationality for us to work with them. I propose that we take the following premisses:

(1) The deity only selects those people who have a genuine belief in that deity

(2) Those who are selected will have an eternal, valuable reward after death

(3) Those who do not have a genuine belief may be annihilated or punished after death

(4) Genuine belief can only be achieved by a free choice of the individual.

Of these, only (4) is new to this discussion. We have already been assuming (1)-(3), so I will set out the reasons why I believe that (4) is an essential premiss in this debate.

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[498] Duncan, "Persecutor's Wager," 13.

Let us set aside the concept of free-will for a moment and postulate instead that the deity wishes the maximum possible yield of the saved and is indifferent to the means employed to achieve this. The obvious way to maximise the yield is for the god to manufacture her creations with that belief already implanted in such a way that it cannot be changed. After all, if a toy manufacturer wanted blue footballs, he would naturally ensure that the production line sprayed all the footballs indelibly blue during the manufacturing process. Thus, any deity who allowed her creations to choose religious beliefs for themselves would necessarily be accepting a much lower yield of believers, unless she also presents them with indisputable evidence of her existence and the need for belief. This means that a hidden deity, such as we observe in the context of the two wagers, either does not care about the yield, or has some other reason for risking the possibility that her creations would make the wrong choice. If the deity is indifferent to the numbers saved, then there is no particular reason to attempt to increase them by coercion and/or persecution of dissenters.

It might be argued that the god wished to participate with believers and that persecution of unbelievers was a necessary part of that process. Ignoring the moral implications for such a deity, this still does not square with the desire for effective conversion. It is hard to imagine that a human persuader could be anywhere nearly as effective in ensuring conversion, compared with an omniscient creator, who would know all the victim's motivations and desires and who could thus come up with a wholly persuasive argument, tailored to each individual. Of course, a perverse god might actually value the development of persecutors and be indifferent to human suffering, but I am unclear why any decent person would want to spend eternity with such a being.

A deity who built belief into her creations so everyone has the inbuilt belief would be pragmatically identical to a universalist god. If it were limited to the elect, then she becomes indistinguishable from a predestining god. Using the Principle of Accepted Immitigable Risk we have seen that such gods have no effect on Pascal's Wager and I contend that such gods have no role to play in the Persecutor's Wager either.

A Free Will defence to the Persecutor's Wager

Since we can be reasonably sure that that humans do not have such an implanted inerrant and universally consistent belief set, it would seem that we are allowed to choose to believe *because the choice itself is important*. As is often argued, love is only valued when it is a free choice of the individuals, not when it is forced upon a couple. Anything else is little more than puppetry. We therefore need to ask the question, that if God wants people to have a free choice, why would we nullify that by enforcing a specific belief set, which might not even be the correct one? Any

persecution at all becomes hard to justify wherever it reduces the freedom of choice.

A similar approach has been proposed as a theodicy explaining why an omnibenevolent God would allow suffering in the world. It suggests that God allows suffering because it affords us an opportunity to participate in the process of relieving suffering. If no-one suffered, then we would have no opportunity to sympathise, or to respond and that our personal development would be compromised as a result. Yet what would we be saying about the nature of a deity who wanted us to persecute others?

Thus, we can argue that while coercion increases the apparent yield of believers, it is actually decreasing the *quality* of that belief, possibly to the level where it is actively damaging faith and reducing the true yield below the levels achieved by religious tolerance.[499] Duncan argues that if we believe that enforcing Christianity would actually result in a lower yield of Christian believers, then we should rationally do the opposite and enforce atheism (or Islam) instead. The resulting backlash against coercion would then lead people to contrarily embrace Christianity instead and would thus boost the Christian ranks, so that the persecution would still be justified. I do not agree. I am not arguing for increasing the notional yield, for the reasons I have already given. I believe that the evidence is that it is the free choice of Christianity which must be the Christian God's goal and thus coercion, or reactive revolt against coercion, will not achieve it.

Am I building a trap for myself here? If we agree that we must be able to freely choose a religion, then surely it then becomes incumbent upon us to make that choice as free as possible, which might lead us to think that we need make a pluralistic, unbiased presentation of each possible faith. This might be infeasible, for to present each person with every possible religious option, in order that their decision should not be biased by cultural considerations, would require the subject to spend their entire life in the task. So we need some sort of heuristic approach. We might, for example, only present those options which we (collectively) deem to be the most probable. We might also choose to limit the set to those where choice determines eternal destiny, by which I mean that the Pascalian need only consider live exclusivist faiths. This is typically what many parents do in bringing their children up in their own faith and educating them about it, while accepting that the children must ultimately make their own decision in the matter.

[499] It could be argued that the Augustinian persecution of Donatists led in many cases to their having a genuine faith, but this presumes that the Augustinian doctrines were the correct option. If the Donatists were actually right, then it potentially did infinite harm.

A Many-Errors defence to the Persecutor's Wager

The Persecutor's Wager has another serious problem which I alluded to earlier: how could we know that any given belief will disqualify us from infinite reward? If we look at extant religions, we see that sects within those groups may disagree on specific doctrines and we have seen many cases of major disagreement. The case of Servetus, which we started with, is a prime example of where two viewpoints collide. In these cases it tends to be ruled by "might is right" and the stronger group drives out the weaker. No doubt the victors would ascribe their triumph to the rightness of their doctrine, but we can observe that different doctrines have held sway at different times, with no evidence that it was a god's support that enabled one group to prevail, nor why that deity later apparently changed her mind on the matter. It is axiomatic in Pascalian arguments that we do not know the correct answer (i.e. which god, or which doctrine), so we can only decide by a pragmatic assessment of the risks and rewards. Thus, we cannot know which doctrine is truly orthodox, or which might be damnable and should proceed very cautiously in that regard.

If Pascal's Wager is to be troubled by the Many Gods objection, then the Persecutor's Wager seems to be afflicted by a parallel "Many Errors" objection. After all, *any* belief might have a non-zero chance of causing us to lose our salvation, however small that risk, so believing anything at all seems foolhardy. For any given point of doctrine, there will be a single correct solution[500], but there are an infinite number of wrong answers. Thus, we would have an infinitesimal chance of finding the correct doctrine and it is almost certain that we would be preaching heresy at every turn.

We might accept that we have to believe *something*, so we could allow the presentation of beliefs for consideration. If we hold that each person makes their own choices before God, and that to lead them into error could be catastrophic, then we cannot ever allow enforcement of a particular belief set.

Summary

The Persecutor's Wager ultimately collapses under its own weight. While it might show that it is rational to enforce belief, it relies upon our confidence that such a belief set is entirely complete and correct. If Calvin can argue that a single erroneous belief (in Servetus' case, rejection of the doctrine of the Trinity) leads to damnation, then we must recognise that there are an infinite set of such potential errors available to us. The many-errors defence sinks the Persecutor's Wager, since any persecutor risks damning people rather than saving them. It is also apparent that we live in a world where free-will is allowed and must therefore conclude that,

[500] I admit that this could be an over-simplification. It could be that a deity is so complex that doctrinal points can have many simultaneously equivalent solutions.

if there is a creator then the creator must have willed it so. Thus, to frustrate that desire could itself court the wrath of any deity, and lead us to a charge of *hubris*, since we would necessarily believe that we can inculcate genuine belief better than the creator could.

In my opening comments I suggested that the Persecutor's Wager would have three stages in mounting an attack on Pascal's Wager. Let us remind ourselves of the second step:

> If we find a solid argument from superdominance from which unquestionable evil inevitably results then...

My question here is what constitutes "unquestionable evil"? To what extent are our views formed or clouded by our cultural milieu? It seems obvious that John Calvin did not see the persecution of heretics as unquestionably evil, even if we might be less comfortable with that idea today. So even if the Persecutor's Wager were successful, we might be simply arguing in a circle to call its conclusions evil. This need not trouble us for too long, since we have seen that the Persecutor's Wager is not a solid argument in any case. It does not succeed in demonstrating why persecution would be rationally required, as any leanings in favour of persecution are equally balanced by the need to avoid error.

3.9 Conclusions on objections

In this chapter, I have used my critical framework to work through a wide range of objections and showed how none of them succeed when viewed from a risk-management perspective. This is an important contribution to the debate, because previous attempts to resolve the difficulties have largely relied upon ad-hoc methodologies with an excessive focus on technicalities. I have analysed some objections in reasonable detail in order to show how the principles may be applied to reduce the problem set to a manageable size, while for others I have simply sketched out which principles may be appropriate for tackling it.

In the following chapter I will explore whether the core assumptions that have prevailed throughout the last fifty years of debate around the Wager may in fact be flawed.

Chapter 4 The Failure of Expected Value

So far in this thesis I have discussed the theory of Expected Value (EV) as if it were accepted to be true. Recent developments in economics and psychology have uncovered numerous examples where EV does not adequately explain actual human behaviour. The examples that I will produce in this chapter were at first thought to be anomalous and some economists suggested that this was due to the process by which they were obtained. Many of these anomalies were identified by the means of controlled experiments, which treated economics as if it were a discipline within the experimental sciences. This went against the traditions of economists, who had largely assumed up to that point that the topic under investigation was too complex and interconnected to be capable of such dissection. Since the early experimental results obtained in the 1950s the field has grown and flourished to the point that a systematic treatment of the current position would be infeasible, yet many economists are still suspicious of this approach. Bardsley et al suggest that

> *"it would be a mistake to think that experimental methods are no longer controversial in economics. Most economists do not conduct experiments and many still remain unconvinced as to their usefulness."*[501]

As the body of experimental evidence has developed, it has become apparent that there are systemic problems with Expected Utility Theory in general which cannot simply be dismissed as artefacts of an invalid approach. Experimental economics has become a new branch of economics and shares much of its methodology with experimental psychology, which is hardly surprising since it is engaged in discovering the decision-making processes within the human mind.

In this chapter I trace some of the history of dissatisfaction with Expected Utility Theory and discuss the competing philosophies which have been used to try and explain the observed behaviour. I will then focus most of my attention on the work of one particular experimental psychologist, Daniel Kahneman, whose careful exposition of the problems and subsequent exploration of possible causes brought him the Nobel Prize for economics in 2002. Having described his theory of cognition and decision-making, I will show how I believe that it applies particularly to Pascal's Wager and how some of the objections to the Wager can be understood in the light of Kahneman's models. I suggest that Kahneman's theories and approach to cognition lend support to my own Guesstimation function which I introduced on page 107. I believe that my introduction of experimental science into our

[501] Nicholas Bardsley et al., Experimental Economics: Rethinking the Rules, (Princeton and London: Princeton University Press, 2010). 46.

understanding of Pascal's Wager makes a significant contribution and offers a number of avenues for future research in this area.

4.1 The first crack in the edifice – the Allais Paradox

Bernoulli's suggestion of EV remained as part of the canon of economic theory from its original formulation in the seventeenth century until Maurice Allais conducted a series of experiments which he documented in a paper in 1953. In his first experiment Allais asks subjects to choose between two lotteries. The first lottery offers a million pounds with 100% chance of success, while the second offers a 10% chance of winning five million pounds, an 89% chance of winning one million pounds and a 1% chance of winning nothing at all.[502] Which would you prefer?

The EV for each can be calculated as follows:

EV_1 = £1m

EV_2 = £5m x 0.1 + £1m x 0.89 + 0 x 0.01

= £500k + £890k

= £1.39m

Conventional expected utility theory (EUT) suggests that we should always choose the second lottery, because it has a higher EV. Experimentally however, the vast majority of people prefer the certainty of the first lottery over the higher potential gains of the second, perhaps following the proverb about "a bird in the hand". Subjects significantly prefer the offer of a certain million pounds over a 99% chance of doing as well (or much better), but with its concomitant 1% risk of receiving nothing at all, which seems to loom large over any potential gains.

On its own, this might simply suggest that people are risk-averse, but Allais performed a second experiment. In this case subjects had to choose between two lotteries where one offers an 11% chance of £1m and 89% of receiving nothing, while the other offers a 10% chance of £5m, but a 90% chance of nothing.

Before looking at the working below, it is instructive to ask yourself which you would choose.

In EV terms, it is relatively simple to calculate:

EV_3 = 11% x £1m

= £110k

[502] In Allais' original experiment the currency was French Francs, but further experiments have shown that the principle is independent of currency.

EV_4 = 10% x £5m

= £500k

In this case, almost everyone follows the EV calculation and picks the second choice, despite the fact that they have a lower probability of winning. It seems that the significantly greater prize, for what seems like roughly similar odds, becomes the dominant factor in the decision. Thus, in one experiment people exhibit risk-averse behaviour, but in the other, they are risk-seeking. This has become known as the Allais Paradox.

A second phenomenon discovered by Allais is known as the *common ratio effect* and can be demonstrated in the following thought experiments.[503] Which would you prefer: to win a certain £3000, or to receive a ticket in a lottery with an 80% chance of winning £4,000?

Now consider whether you would rather have a 25% chance of winning £3,000, or a 20% chance of winning £4,000.

Allais predicted that most people would choose the certain £3,000 over the risky £4,000, but in the second experiment, where there is risk in both options (albeit subtly different), people would go for the higher prize of £4,000, despite the lower probability of obtaining it. This turns out to be the case. The calculations are below:

EV_5 = £3000

EV_6 = 80% x £4,000 = £3,200

EV_7 = 25% x £3,000 = £750

EV_8 = 20% x £4,000 = £800

This *inversion of preference* (as it is known) has perplexed economists since its discovery, with many authors proposing new theories in order to try to explain the phenomenon. Chris Starmer suggests that most of these theories have three features in common:

i. People's preferences are represented by some function V(.) which is defined over the individual prospects on offer.
ii. This function V(.) satisfies ordering and continuity.

[503] Examples adapted from Chris Starmer, "Developments in Non-Expected Utility Theory: The Hunt for a Descriptive Theory of Choice under Risk.," *Journal of Economic Literature* XXXVIII(2000).

iii. While V(.) is designed to allow for the observed violations of EUT, it will still retain monotonicity. That is, if one prospect dominates the other, then subjects will choose that option.[504]

Some authors maintain that it is possible to construct such a function which operates on a single domain, while others argue that there may be more factors at work and that these must be taken into consideration. Starmer suggests that there are two assumptions underpinning conventional understanding of EUT which are challenged by empirical studies.

a. It is assumed that people's preferences are invariant of the method which is used to elicit them. That is, that people's choices will not be affected by the nature of the experiment and will remain consistent. This is known as *procedure invariance*.
b. It is assumed that preferences will reflect the underlying probabilities and rewards and will not be affected by the way in which the prospects are described. This is known as *description invariance*.

There is a large body of evidence to suggest that both these assumptions are markedly false. There are numerous experimental demonstrations of preference reversal, usually following the pattern where subjects are asked to choose between two prospects. The first prospect (the "money-bet" or "$-bet") offers a small chance of winning a 'good' prize. The second (the "probability-bet" or "P-bet") offers a larger chance of winning a smaller prize. The experiment thus elicits whether subjects value a higher amount of money, or a higher chance of winning. After a number of other unrelated intervening tasks, the procedure then asks subjects to place a monetary value upon each of those bets, by getting them to set the minimum amount that they would accept if they were to sell that bet to a third party (which we will designate $M(P)$ and $M(\$)$). Repeated studies have shown that people choose the better probability over the greater money (i.e. that $P \succ \$$) but that the same subjects place a higher value on the money-bet (i.e. $M(\$) \succ M(P)$). This was first noticed in 1971 by Sarah Lichtenstein and Paul Slovic[505] and separately by Harold Lindman.[506] In Lichtenstein & Slovic's study, conducted on the floor of the Four Queens casino in Las Vegas, the two bets were:

P bet: $\frac{11}{12}$ chance to win 12 chips, $\frac{1}{12}$ chance to lose 24 chips

$ bet: $\frac{2}{12}$ chance to win 79 chips, $\frac{10}{12}$ chance to lose 5 chips.

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[504] Ibid., 335-38.
[505] Sarah Lichtenstein and Paul Slovic, "Reversals of Preference between Bids and Choices in Gambling Decisions," *Journal of Experimental Psychology* 89, no. 46-55 (1971).
[506] Starmer, "Developments in Non-Expected Utility Theory: The Hunt for a Descriptive Theory of Choice under Risk.," 338.

As would be expected from Allais' results, gamblers chose the P bet, but placed a higher monetary value on the $ bet.

If we are hoping to use a single evaluation function, it is hard to explain why $P \succ \$$, but $M(\$) \succ M(P)$, because it seems to be a violation of transitivity. In normal relations if $A > B$ and $B > C$, then we confidently assume that $A > C$. It thus ought to be the case that our estimation of $M(P)$ and P should be fixed and should not vary depending upon context, yet it seems that this does not hold in a number of repeatable experiments.

Two professors of economics, David Grether and Charles Plott, attempted in 1979 to deal with what they suspected might be experimental biases on the part of the psychologists, by constructing experiments of their own. Their concerns included a worry that the experiments that had been hitherto chosen were too far removed from real life to be able to give a correct account of affairs. They were also worried that the subjects selected (often psychology students) were not representative of the general population and their motivation might be to get the 'correct' answer, or to impress the experimenters who were after all, the teachers responsible for their grades. They write:

> *"Subjects nearly always speculate about the purposes of experiments and psychologists have the reputation for deceiving subjects. It is also well-known that subjects' choices are often influenced by what they perceive to be the purpose of the experiment. In order to give the results additional credibility, we felt that the experimental setting should be removed from psychology"*[507]

In short, the economists did not trust the psychologists and Grether & Plott's experiments were specifically designed "to discredit the psychologists' works as applied to economics".[508] Slovic notes that they identified thirteen criticisms and potential artefacts that would render preference reversals irrelevant to economic theory and so they included:

- special incentives to heighten motivation
- control for income and order effects,
- the ability to allow indifference in the choice responses,
- testing the influence of strategic or bargaining biases

[507] David M. Grether and Charles R. Plott, "Economic Theory of Choice and the Preference Reversal Phenomenon," *The American Economic Review* 69, no. 4 (1979): 629.
[508] Ibid., 623.

Most importantly, they had 'proper' economists conducting the study. To their surprise and probable dismay, preference reversals remained prevalent despite all their determined efforts to eradicate them.[509]

The use of empirical experiments in economic theory is still controversial and Bardsley et al observe that any view that experiments provide a test of economic theory has been vigorously resisted by economists such as Frank Gul and Wolfgang Pesendorfer[510] and that a substantial majority of economists still regard economics as a nonexperimental science.[511] For the purposes of this chapter, I will therefore focus on whether experiments have a place to play in our understanding of Pascal's Wager, which is itself fundamentally a question of human decision making and theology, rather than pure economics.

In order to deal with the observed anomalies, many authors from Ward Edwards in 1955 onwards have suggested that there might be a weighting function which adjusts the absolute probabilities of a given risk into a subjective probability used in the decision process. Many experimenters have found that people tend to overweight very small probabilities, while underweighting large ones. Kahneman suggests a rationale for this by setting a thought experiment.[512] He asks how we feel about four cases, where our chance of winning £1m increases by 5% in each case:

i) from 0% to 5%
ii) from 5% to 10%
iii) from 60% to 65%
iv) from 95% to 100%

A simple EV calculation would imply that our utility increases in each case by exactly 5% of the utility of winning £1m, yet we know that this is not the case. Everyone agrees that the change from 0 → 5% and from 95% → 100% are more impressive than either 5% →10% or 60% → 65%. The change from 5% → 10% doubles the EV, but it does not double the psychological value of the prospect. The large impact of 0% → 5% is what Kahneman calls the *possibility effect*. At 0% there is no possibility of winning the prize, while at 5% there definitely is. The psychological value of such a difference can be seen in the UK National Lottery's slogan of "you've got to be in it to win it". Without a ticket, you can never win, but once you have one, then "it could be you!" Such techniques are employed to persuade people to participate in

[509] Paul Slovic, "The Construction of Preferences," *American Psychologist* 50(1995): 366.
[510] Bardsley et al., *Experimental Economics: Rethinking the Rules*. 46.
[511] Ibid., 47.
[512] Daniel Kahneman, *Thinking, Fast and Slow* (London: Allen Lane, 2011). 311.

a gamble where the EV is actually negative.[513] In this case, people overvalue the small chance of winning, aided by the disproportionate gain of the large reward and its life-changing consequences. Kahneman argues that the change from 0% → 5% is a *qualitative* change, while the change from 60% → 65% is merely a *quantitative* one.[514]

Likewise, the change from 95% → 100% is also a qualitative change and demonstrates what Kahneman calls the *certainty* effect. He asks us to imagine that we have inherited £1m, but our greedy stepsister is contesting the will and has taken us to court. The judgement is expected tomorrow and our lawyer assures us that we have a 95% chance of a favourable judgment. We are approached by a loss-adjustment company which offers us £910,000 in cash to take over our claim. This is lower by £40,000 than the EV of waiting for tomorrow's decision (and £90,000 lower than the full amount), but how many of us would actually reject such an offer? The offering company, who might make dozens of such approaches, can develop a portfolio of cases, such that they can afford to accept some losses, because of their overall gains. However our own position with a one-off opportunity might persuade us to accept a lower settlement in return for certainty.[515] George Quattrone and Amos Tversky consider the game of Russian Roulette and point out that people will pay far more to reduce the number of bullets from one to none, than they would to reduce it from four to three.[516]

Kahneman and his long-term collaborator Amos Tversky performed a number of experiments which enabled them to develop a table of people's preferences in games with modest monetary stakes.[517]

Probability %	0	1	2	5	10	20	50	80	90	95	98	99	100
Decision weight	0	5.5	8.1	13.2	18.6	26.1	42.1	60.1	71.2	79.3	87.1	91.2	100

We can see that the decision weights are identical with the actual probability in the extremes of 0% and 100%, but the weights depart dramatically from the expected values in the regions very close to those extremes.

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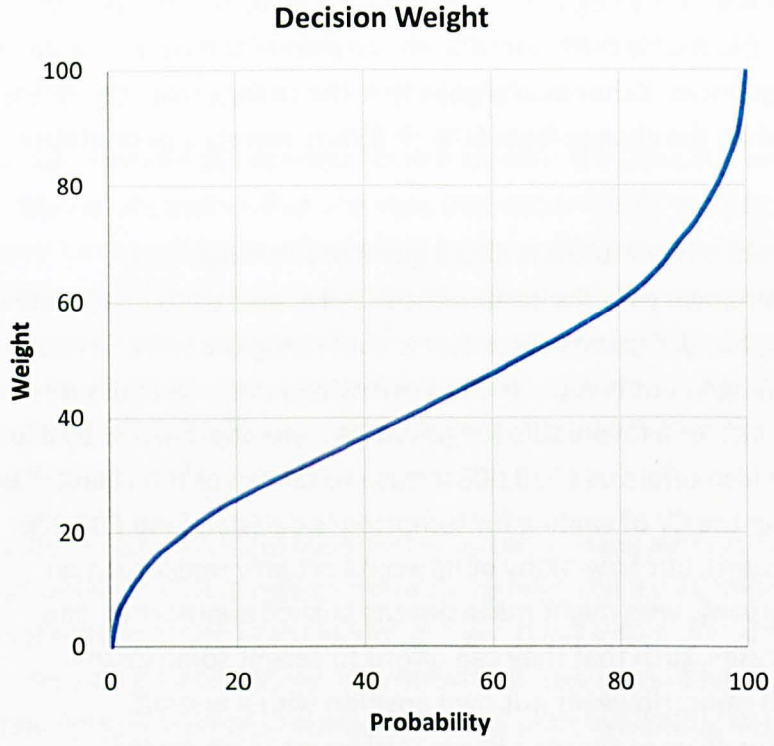
[513] The average payout in the UK National Lotto is around £2m, but the actual odds are approximately 14 million to one. Thus the EV of a £1 ticket is: $\frac{£2m}{14m} - £1$, meaning an average loss of roughly 86p for each ticket.
Source: http://www.national-lottery.co.uk/player/p/help/aboutlotto/prizecalculation.ftl

[514] Kahneman, *Thinking*: 311.

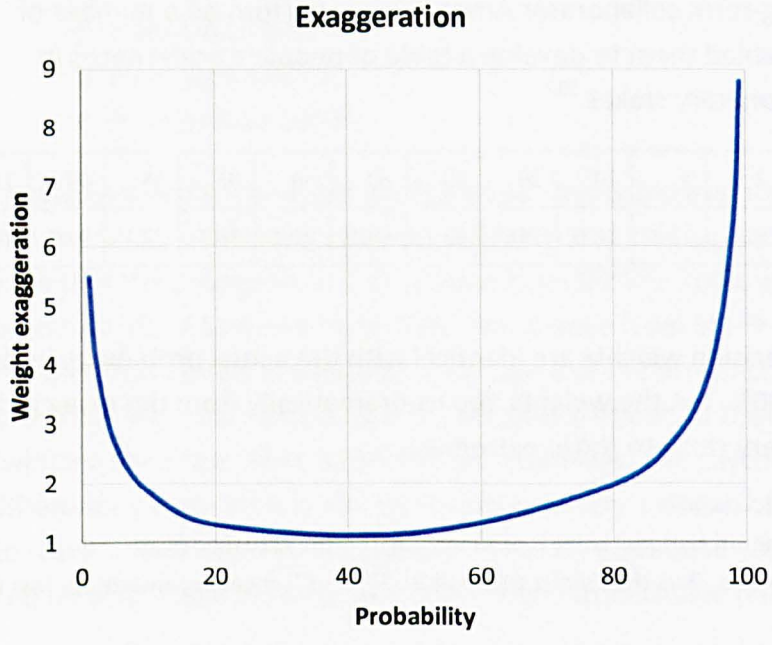
[515] Ibid., 312.

[516] George A. Quattrone and Amos Tversky, "Contrasting Rational and Psychological Analyses of Political Choice," *American Political Science Review* 82, no. 3 (1988). Reprinted in Daniel Kahneman and Amos Tversky, eds., *Choices, Values and Frames* (Cambridge: Cambridge University Press, 2000), 465.

[517] Kahneman, *Thinking*: 315.



If we compute the perceived v actual gap, showing the number of times by which the perceived value is a multiple of the actual gap, it looks like this:



A 1% risk is viewed as being more than five times as big as it actually is, while the corresponding 99% risk is significantly undervalued. Despite being only 1% away from 100%, people magnify that gap more than eight times over.

4.2 Loss aversion and Prospect Theory

In addition to mistakes in estimation, Kahneman exposes another flaw in Bernoulli's theorem, which he demonstrates with some further thought experiments. Consider these two problems:

> Problem 1: Which do you choose?
> Get £900 for sure OR 90% chance to get £1,000.
>
> Problem 2: Which do you choose?
> Lose £900 for sure OR 90% chance to lose £1,000.[518]

Most people choose the first option for problem 1, which is as Bernoulli would expect, because it is the risk-averse option. People prefer the sure thing over the risk of receiving nothing at all. What would have puzzled Bernoulli is that the vast majority prefer the second option in problem 2. It seems that when facing a certain loss, people become risk-seeking instead, accepting the possibility of a greater loss in the hope of having no loss at all.

Under traditional EUT the options should be identical, but it appears on experimental evidence that losses and gains are as important as the absolute amounts involved. Kahneman suggests two further problems to show this. Please work out how you would respond to the two problems below:

> Problem 3: In addition to whatever you own, you have been given £1,000.
> You are now asked to choose one of these options:
> 50% chance to win £1,000 OR get £500 for sure.
>
> Problem 4: In addition to whatever you own, you have been given £2,000.
> You are now asked to choose one of these options:
> 50% chance to lose £1,000 OR lose £500 for sure.[519]

From a pure EUT standpoint, the four possible outcomes are identical. On average you would end up richer by £1,500. Yet, as before, the vast majority of respondents preferred the sure thing in problem 3, but the gamble in problem 4.

Kahneman asks how much notice we take of the initial sentence in each problem. Did the gift of £1,000 or £2,000 make any difference to us? His experimental evidence is that most people simply ignore this and incorporate it into what he calls the *reference point* for the decision.[520] Kahneman argues that it is the reference point which is the missing variable in Bernoulli's theorem and so he and Amos

[518] Ibid., 279.
[519] Ibid.
[520] Ibid.

Tversky came up with what they named *prospect theory*.[521] In EUT it is deemed sufficient to know the state of wealth, but in prospect theory we also need to know the reference state. Thus any evaluation is done relative to a reference point, or adaptation level.

To demonstrate this, he suggests that we set up three bowls of water, placing iced water in the left-hand bowl, hot water in the right-hand bowl and filling the middle one with water at room temperature. Then place our right hand in the right-hand bowl and our left in the left-hand bowl for a minute. Finally, move both to the central bowl. We will experience the same temperature as heat in one hand, but cold in the other.[522] Thus, in Kahneman's model, outcomes which are better than the reference point are viewed as gains and those which are worse are perceived as losses.

He suggests that there is diminishing sensitivity in both sensory dimensions and in the evaluation of wealth. Just as turning on a weak light in a darkened room has a large effect, so there is less subjective difference between a £100 change from £900 to £1,000, than there is from £100 to £200.[523]

The third principle in prospect theory is that of loss aversion. When losses and gains are directly compared against each other, losses loom larger than gains. Richard Thaler and Cass Sunstein estimate that a gain has to be twice as large as the corresponding loss for the two to be considered equal, that is, the prospect of winning £200 just offsets the prospect of losing £100.[524]

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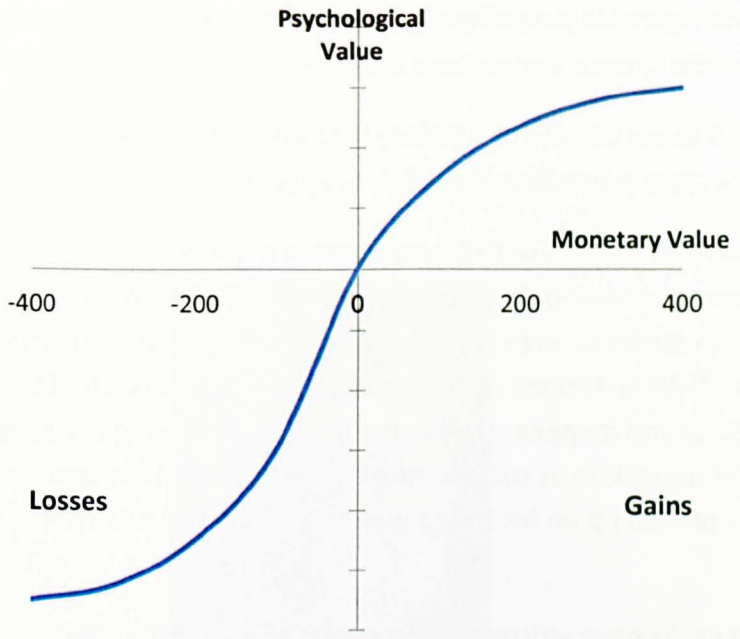
[521] Daniel Kahneman and Amos Tversky, "Prospect Theory: An Analysis of Decision under Risk," *Econometrica* 47, no. 2 (1979).
[522] Kahneman, *Thinking*: 279.
[523] Ibid., 282.
[524] Richard Thaler and Cass R. Sunstein, *Nudge: Improving Decisions About Health, Wealth, and Happiness* (London: Penguin Books, 2009). 38.



The S-shaped curve of prospect theory is significantly steeper for losses than for gains, although both show diminishing sensitivity.[525] When Pascal presents the Wager, he carefully sets out the effect on our happiness (or its psychological value) in the following terms:

> *If you gain, you gain all; if you lose, you lose nothing. Wager, then, without hesitation that He is.*

Pascal presents the alternative of "gain all" against "lose nothing". He is no doubt aware from his friends, M. Mitton and the Duc de Roannez, that losses loom large in the eyes of a gambler and thus he reassures his listener that their losses will be nothing at all. He phrases his wager in the language with the highest psychological appeal to the listener and he repeats:

> *when one is forced to play, he must renounce reason to preserve his life, rather than risk it for infinite gain, as likely to happen as the loss of nothingness.*

Again he juxtaposes an infinite gain with a loss of "nothingness". He offers the possibility of infinite reward while dealing with loss-aversion by reassuring his reader that there can be no loss in wagering.

Kahneman demonstrates that the way in which a proposition is framed can have a significant impact on the preferences displayed. He asks us to consider the following scenarios:

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[525] Kahneman, *Thinking*: 283.

A: Would you accept a gamble that offers a 10% chance to win £95 and a 90% chance to lose £5?

B: Would you pay £5 to participate in a lottery that offers a 10% chance to win £100 and a 90% chance to win nothing?

On close inspection, it is obvious that these two propositions are identical in their outcomes and that someone who was looking from a purely economic framework ought to be indifferent between them. In experiments, however, option B attracts far more positive answers.[526] When framed as buying a ticket in a lottery, the £5 loss becomes less visible to us and it appears to be just the cost of playing the game and does not appear as a material loss as such. Kahneman reports that Richard Thaler used to have a note pinned up on his board which read "COSTS ARE NOT LOSSES".[527]

I suggest that Pascal could easily have written his Wager in terms which reflect Biblical themes, such as Luke 17:33 where we are told to lose our lives in order to keep them. He could have framed his Wager in terms of loss, but I believe that it would have been less compelling had he done so. For example it might have read:

> "If you lose your life then you will gain an eternal one, but if you keep your life you will never receive an infinite reward".

This does not have the same immediacy as Pascal's formulation, because foregone gains are less motivating than the avoidance of losses. We accept costs as part of wagering, because we do not see them as losses to be avoided, but if Pascal had chosen to frame his wager where the losses were shown explicitly, then it would have had far less appeal.

Given how much of modern thought that Pascal anticipated, whether it is decision theory itself, or cognitive behaviour therapy, we should not be surprised that he also understood the human psyche well enough to choose his words carefully. I think that he understood how best to present his case and how to appeal to the heart, rather than necessarily to the economic head.

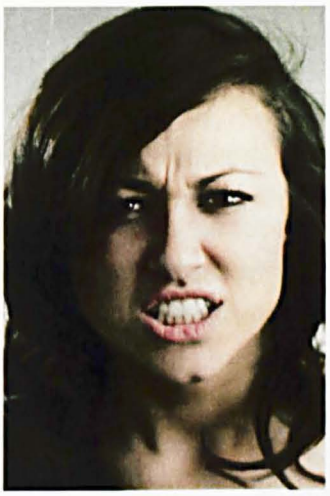
In this next section, I would like to discuss Kahneman's understanding of human cognitive systems and how we make decisions in practice. I will then use this to show why the Wager has immediate appeal on first hearing, but then faces a wide range of objections. I will also explain why I believe that objectors rarely seem to follow through the logical consequences of their objections. In Chapter 3 I systematically demonstrated that none of those objections can actually carry through against the Wager when examined in depth, yet clearly their original

[526] Ibid., 364.
[527] Ibid.

authors believed that they did. I will therefore examine why people raise objections of this nature, using Kahneman's models and examples as a basis for my argument.

System 1 and System 2

To illustrate different types of thinking, Kahneman asks us to look at an image such as the one below.



He suggests that without conscious effort you will have recognised that it is the face of a young woman and that she appears to be angry.

Now consider the following sum:

14 x 17 = ?

Kahneman says that you will have recognised immediately that it is a multiplication problem and that you were probably dredging up into your memory of how to perform long multiplication, or possibly reaching for a calculator. You would be quick to realise that 120 and 8,765 were unlikely to be the correct answers, but being sure that 258 is wrong would be much harder. If an experimenter were observing your reactions, they would have seen that your blood pressure rose, your pupils would have dilated and your heart rate would have increased. Getting the actual result (238) requires more effort and concentration that recognising an angry face.[528]

Psychologists have recognised these two modes of thinking for some time and Keith Stanovich and Richard West dubbed them System 1 and System 2.[529]

- System 1 operates automatically and quickly, with little or no effort and no sense of voluntary control.

[528] Ibid., 19.
[529] Keith E. Stanovich and Richard F. West, "Individual differences in reasoning: Implications for the rationality debate?," *Behavioural and Brain Sciences* 23(2000).

- System 2 allocates attention to the effortful mental activities that demand it, including complex calculations.

Kahneman admits that he uses the terms System 1 and 2 rather more fluidly than a psychologist might. He suggests that it is System 2 that we identify with, when we consider our sense of self. It is the one that makes conscious choices, holds beliefs and decides what to think about and what to do.[530] We believe that we are rational, thinking creatures and thus we consider ourselves to be primarily System 2 beings, rather than reactive animals.

Pascal was well aware of a level of duality within the human psyche as he writes:

> *"For we must make no mistake about ourselves: we are as much automaton as mind. As a result, demonstration is not the only instrument for convincing us. How few things can be demonstrated! Proofs only convince the mind; habit provides the strongest proofs and those which are most believed".*[531]

Pascal holds that it is our habits (or System 1) which form our strongest beliefs, the ones we simply believe without having to consider them at all. As he notes: "Whoever proved that it shall dawn tomorrow and that we shall die?"[532] System 1 provides our basic beliefs about the world and presents them to System 2. When we need to make a conscious choice, we will invoke System 2, but our everyday, unthinking actions are governed by System 1. It is System 1 which is the automaton that Pascal mentions and it is much a part of ourselves as the rational, thinking activities of System 2.

Kahneman lists some tasks (in increasing order of complexity) which are System 1 tasks:

- Detect that one object is more distant than another
- Orientate to the source of a sudden sound
- Complete the phrase "bread and ..."
- Make a disgust face when shown a horrible picture
- Detect hostility in a voice
- Answer the question: "2 + 2 = ?"
- Read words on large billboards
- Drive a car on an empty road
- Understand simple sentences

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[530] Kahneman, *Thinking*: 19-21.
[531] Pascal, *Pensées*: 247. L821
[532] Ibid. L821

These are automatic tasks, for we are born ready to recognise objects, react to sounds and avoid losses.[533] Other, more complex tasks can be added to the automatic set by means of training and practice. Reading is a learned skill. No-one is born able to read, but with sufficient repetition recognising the words on a poster becomes part of System 1. However, reading this thesis still requires the engagement of System 2 (even for me!). Likewise the rote learning of "two twos are four..." makes multiplication of simple numbers a System 1 activity, but once outside the range of learned values, even by a little, a calculation like 12 x 13 requires the involvement of System 2. It may still draw upon System 1, such as by breaking it down into a known multiplication and an addition (e.g. 12 x 12 = 144 + 12 = 156), but this is still significantly slower.

The features of System 2 are many and various, but they have two things in common: they require attention and they are disrupted when attention is drawn away. Examples include:

- Focus on the voice of a particular person in a crowded and noisy room
- Look for a woman with white hair
- Try and identify a surprising sound
- Maintain a faster walking speed than is normal for you.
- Tell someone your own telephone number.
- Park in a narrow space (unless you are a garage attendant)
- Check the validity of a complex logical argument[534]

System 2 can alter the way that System 1 works to some extent by programming the normally automatic functions. For example, while waiting at a busy railway station for your grandmother, you can will yourself to look for a white-haired lady and thus increase your chance of recognising her in the crowd.[535] Thus, System 1 can spot someone with white hair (or something that looks like white hair) and it then alerts System 2 to examine the candidate more closely for other characteristics. In optimum operating conditions the two systems complement each other, but they also compete. It is System 1's role to note surprising incidents and to draw them to the attention of System 2 for further analysis, although System 1 may initiate action on its own, particularly for threatening events. A loud bang might have us diving for cover long before System 2 recognises the sound of a gunshot, or an explosion. System 1 is about survival and takes over when an instant response is required. However, its vigilance can be blunted if we are engaged in a heavy System 2 task at the time.

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[533] Kahneman, *Thinking*: 21-22.
[534] Ibid., 21.
[535] Ibid., 22-23.

One of the most telling examples of this appears in Christopher Chabris and Daniel Simons' experiment dubbed "The Invisible Gorilla".[536] They constructed a short film of two teams playing a game of basketball.[537] One team was dressed in white shirts, while the other wore black shirts. The viewers of the film were instructed to count the number of passes made by the players in white shirts and to ignore those made by the players in black. This task is difficult and requires complete concentration. Halfway through the video, someone wearing a gorilla suit enters, walks between the players, stands in the middle of the game, which continues. The gorilla turns towards the camera, thumps its chest visibly and then continues on. The gorilla is in view for nine seconds and is in very close proximity to the players. Many thousands of people have watched the video and about half do not notice anything unusual.[538] It is the counting task and also the instruction to ignore one of the teams that causes the blindness. Seeing unusual things and orienting are tasks of System 1, but they depend upon some attention being given to the presence of the relevant stimulus. The complete absorption of System 2, plus the deliberate ignoring of other factors contributed to a blindness that was as surprising to the participants as to the researchers. Many of the candidates refused to believe that such a thing could have happened while they were watching. Kahneman notes that we are not only blind, but we are blind to our blindness.[539] Pascal would agree:

> *"Let us therefore not look for certainty and stability. Our reason is always deceived by fickle shadows. ... If man made himself the first object of study, he would see how incapable he is of going further."*[540]

Although System 1 is essential for staying alive in a hostile world and it is very useful in everyday life, it can be problematic under other circumstances. For example, Kahneman suggest that it has the disadvantage that it cannot be switched off. If you are shown a word on the screen in a language that you understand, you will read it, unless your attention is totally focused elsewhere. To demonstrate this, he suggests that we attempt the following task:

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[536] Christopher Chabris and Daniel Simons, The Invisible Gorilla: And Other Ways Our Intuition Deceives Us, (HarperCollins, 2010).
[537] A fuller account of the experiment and the video can be seen at http://www.theinvisiblegorilla.com/
[538] http://www.theinvisiblegorilla.com/videos.html
[539] Kahneman, *Thinking*: 23-24.
[540] Pascal, *Pensées*: 63-64. L199

First, go down both columns below, saying out loud whether each word is printed in lowercase or uppercase.

LEFT	upper
left	lower
right	LOWER
RIGHT	upper
RIGHT	UPPER
left	lower
LEFT	LOWER
right	upper

Next, go down both columns again, saying whether each word is printed to the left or right of centre:

The task is difficult in each case because System 1 is fighting with System 2. In the first example, it was much easier to say whether the words "left" or "right" were in upper or lower case, because deciding whether a word is in upper or lower case is unfamiliar as an activity and is thus a pure System 2 task. However, when you encountered the words "upper" and "lower" in that task, it became much harder because System 1 was supplying a conflicting answer based upon reading the word itself. The opposite occurred in the second part of that exercise, because the words "left" and "right" potentially conflicted with the task which was to identify where the word was printed.[541]

A similar difficulty exists if we try to say for each of the following words the *colour* that the text is printed in:

Upper	**Lower**
Green	**Red**
Blue	**Black**
Green	**Purple**

You can usually feel your mind grinding to a standstill, especially when looking at some of the words. You may experience considerable difficulty in even recalling the name of the colour, let alone saying it out loud.

Kahneman suggests that System 2 is effortful, but one of its main characteristics is laziness and a reluctance to invest more effort than is strictly necessary. As a result, the majority of our actions and decisions are actually driven by System 1, even though System 2 might try to claim the credit. There are vital tasks that only System

[541] Kahneman, *Thinking*: 25-26.

2 can perform, because they require effort and self-control in which the intuitions and impulses of system 1 are overcome. In order to experience System 2 at full throttle, he suggests the following experiment:

> Make up several strings of 4 digits, all different and write each one on an index card. Place a blank card on top of the pile then start a metronome beating at one tick per second. Remove the blank card and read the four digits aloud. Wait for two beats and then say the string with each digit incremented by one (3 becomes 4, 6 becomes 7 and 9 becomes 0), so that 5793 becomes 6804. Keep going for as long as you can.[542]

Thinking with System 2 is hard work, which is why we generally prefer the intuitive leaps that System 1 is able to offer, even if these might be less accurate at times. People who live without a wristwatch are generally able to tell the time of day at a single glance and without much consideration. I can do so and will usually be accurate to within 15 minutes during the day. This is entirely accurate enough for most of my purposes, because System 1 is able to take in the angle of the sun, the time since the last meal and so on without any conscious effort. If we only want to know if it is time for a cup of tea, then this margin of error is acceptable. It is less useful when trying to catch a train, or to attend a business meeting because those events are usually less tolerant.

One interesting phenomenon that was observed when digital watches first came into fashion was that it became harder to read the time at a glance. Those of us who grew up with analogue clocks can take in the time simply by the relative position of the hands and so be able to say "it is about quarter-to-five" without thinking. However, when faced with the numbers "16:46" we have to recognise them, turn the 24-hour clock into a more familiar form and then convert the overly-precise 46 minutes into a human-friendly form. Telling the time became a System 2 activity, which is why many people reverted to analogue faces as soon as they could.

While System 2 prefers to be idle whenever possible, System 1 is eager and willing to provide a solution, even if it is the wrong answer. Please attempt the following question[543] before moving on:

> A bat and a ball together cost £1.10.
> The bat costs £1 more than the ball.
> How much is the ball?

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[542] Ibid., 31.
[543] Adapted from ibid., 44.

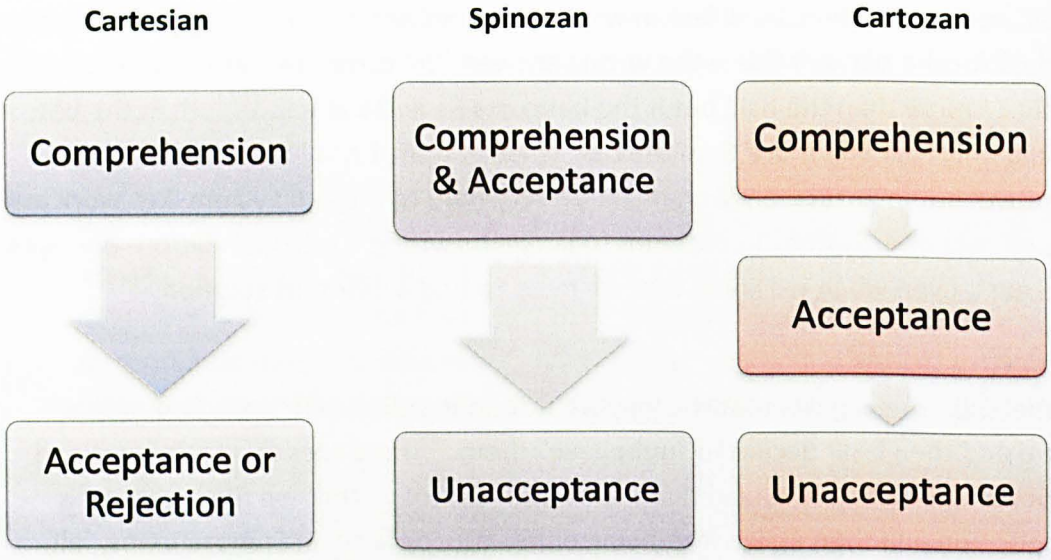
Most people's System 1 will kick in with the immediate answer of 10p for the ball and £1 for the bat, but this is the wrong answer. The question states that the bat costs £1 *more* than the ball, but if the bat costs £1 and the ball 10p, then the bat would only cost 90p more than the ball. Once System 1 has jumped in with an intuitive, but incorrect, answer, it can be very hard to engage System 2 to work out the correct one. System 1 continues to jangle its wrong suggestion before our eyes and ears, even when we know that we need to find a different solution.[544]

Forming beliefs

Daniel Gilbert, suggests that the way we form our beliefs is that we first accept them and then later decide to "unbelieve" them.[545] He traces this to Spinoza and opposes this view to the traditional Cartesian approach that we first evaluate a proposition and then assign it to being either true or false. In Spinoza's view, all propositions are first treated as true as part of their comprehension. William James summed it up as "All propositions, whether attributive or existential, are believed through the very act of being conceived".[546] Kahneman argues that this is exactly what we see in System 1 and 2. Our initial action is to accept a proposition using system 1 to intuitively grasp it and then, if necessary, we allow the suspicion of System 2 to examine the facts in more detail and may then come to reject the proposition as being false. Gilbert then proposes a hybrid of the two models (the Cartozan approach), allowing that comprehension might be a separate first stage which leads on to acceptance as the default conclusion, followed by a later rejection.

In diagrammatic form, we can compare them as follows:

[544] The correct answer is that the bat costs £1.05 and the ball costs 5p.
[545] Daniel Gilbert, "How Mental Systems Believe," *American Psychologist* 46, no. 2 (1991): 108.
[546] William James, Principles of Psychology, (1890), http://books.google.co.uk/books?id=TMrJfcaC8bYC. 280. referenced in Gilbert, "How Mental Systems Believe," 108.



Gilbert argues that we can test what process is going on by placing the person under cognitive stress and seeing what conclusions emerge. If Descartes is correct, then a person under stress ought to randomly accept or reject propositions, while if Spinoza is correct, we ought to find that they tend to accept propositions. If either the Cartesian or Cartozan systems are in place, then subjects ought to have some sense that they had not yet made up their minds on a proposition, while if the Spinozan system applies, they would simply assent to propositions which they had not fully considered.

Gilbert's experiments indicate that it is in fact the Spinozan system which operates and Kahneman agrees, developing his own acronym for System 1 dominance, which he dubs WYSIATI or "What You See Is All There Is".[547] Thus, if people are stressed, such that they do not have time to adequately consider propositions, then they simply believe them to be true and are generally unaware that any other option was open to them. System 1 is good at jumping to conclusions.

Pascal intuitively understands System 1 and System 2. He identifies System 1 as our "habits" arguing that:

> *"habit provides the strongest proofs and those that are most believed. It inclines the automaton, which leads the mind unconsciously along with it" (my underlining)* [548]

Pascal sees the mind as being led by the automaton, or System 1, just as Kahneman does. Although System 2 believes itself to be the master, it is too lazy to enforce this state of affairs for the most part and relies instead on System 1 to do the bulk

[547] Kahneman, *Thinking*: 85.
[548] Pascal, *Pensées*: 248. L821

of the work. Pascal recognises that System 2 is less able to respond quickly and also less available than System 1. He writes:

> *"Reason works slowly ... Feeling does not work like that, but instantly and is always ready"*[549]

System 2 is only engaged when System 1 alerts it to the need for effort and under pressure System 1 takes over our entire decision-making process, defaulting to believing everything it hears. Pascal therefore suggests that we must train System 1 in order that it may make better decisions automatically.

> *"It is the habit that convinces us ... we must resort to habit once the mind has seen where the truth lies in order to steep and stain ourselves in that belief ... for it is too much trouble to have the proofs always before us."*[550]

System 2 is effortful and lazy and it would be too hard to have to engage it on every decision. Pascal is quite right that it would be too much trouble to have to work through the proofs for every evaluation. As Gilbert notes, we have to trust our eyes (and visual cortex) because

> *"the human eye is an exceptionally reliable instrument and it would be expensive, even foolhardy to regularly question what it tells us."*[551]

We simply could not function if we had to consciously process all the visual information before us at any time. We could certainly never catch a ball if we had to evaluate the trajectory, change in perspective, parallax and so on that are part of our automatic systems. Learning to catch is an acquired skill, but it builds upon a large body of existing visual habits, fine motor control and proprioception. Even the eye, though, can be fooled by effects such as the Müller-Lyer illusion below:

It is very difficult to believe that the two central lines are the same length, even when you know it to be the case. Our System 1 for distance estimation is continually telling us the one on the left must be longer, no matter how many times we have seen this particular illusion and know the correct answer.

Pascal also recognises this tension between System 1 and System 2 and he asserts that it is System 1 (the automaton) which will dominate if there is conflict. He writes:

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[549] Ibid. L821
[550] Ibid., 247. L821
[551] Gilbert, "How Mental Systems Believe," 117.

> *"When we believe only by the strength of our conviction and the automaton is inclined to believe the opposite, that is not enough. We must therefore make both parts of us believe: the mind by reasons, which need to be seen only once in a lifetime, and the automaton by habit"*[552]

Pascal therefore suggests that we must inform our habits, if we want to make good decisions, because we will not always engage our reason and if in doubt, System 1 thinking will triumph. That is why he phrases his remedy for unbelief as he does in the Wager.

> *"But at least learn your inability to believe, since reason brings you to this, and yet you cannot believe. Endeavour then to convince yourself, not by increase of proofs of God, but by the abatement of your passions."*[553]

The proofs of God are an appeal to System 2, as is Pascal's extended discourse on probability and infinity. The detailed exposition of the Wager is a System 2 proposition, because it involves conscious thought and the careful application of reason. Pascal knows that this will not be effective in convincing anyone, because they will revert to System 1 thinking as soon as their concentration wavers. System 2 may be convinced by the arguments put forward and may even want to believe (or at least want to learn how to believe), but this will be to no avail unless the automaton is re-programmed with a new world-view. Pascal holds that once the reasons have been seen, they do not need repeating, because we are consciously aware of the logical processes and can replay them in our minds at will. However, our actual decision-making is taking place out of sight of our mind and the automaton needs to be conditioned by habit, rather than argument. Thus, Pascal suggests a retraining of one's habits as the way forward:

> *"Follow the way by which they began; by acting as if they believed, taking the holy water, having masses said, etc. Even this will naturally make you believe, and deaden your acuteness."*[554]

The domestication of our minds to the new reality is achieved through cognitive behavioural therapy, which has as its goal the changing of our core beliefs. These reside within System 1. Pascal knows that once we have habituated ourselves into the Christian pattern of life, then the intellectual objections of System 2 will be informed and shaped by the re-programmed System 1. As he argues:

> *What are our natural principles, apart from our accustomed principles? ... A different custom will produce different natural principles.*[555]

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[552] Pascal, *Pensées*: 248. L821
[553] Ibid., 125. L418
[554] Ibid. L418

Discourse on the machine

In this light, the title of the passage in which the Wager is located, "Discourse on the Machine", perhaps becomes a little clearer. The machine that Pascal is talking about is the automaton. He recognises that the automaton is little more than a machine, even if it performs important menial tasks that make complex thought possible. To describe it as a machine is not derogatory, for we need its machine-like speed and repeatability in order to keep up with the pressures of being alive. Below the level of the automaton, there are even more basic homeostatic systems in operation which make our heart beat, control our body temperature and tell us when it is time to eat. The automaton is the first responder which deals with threats, challenges and surprises and alerts us to situations which need our attention. Although it is not under our direct control, for it houses the core beliefs which shape our conscious thought, the machine can be re-programmed by means of habituation. It is this process which Pascal recommends to us as therapy for our defective belief systems.

Pascal's Wager and System 1

One of the things that I have discovered as a research student is that people feel obliged to ask what one's thesis is about. I have fallen prey to this myself with other PhD students and have observed the dismay that the poor researcher feels in trying to sum up a highly complex and abstruse point of research for a complete novice in the subject. In this respect I am very fortunate. When asked the same question, I reply "Pascal's Wager". Some people understand immediately and no more need be said. If they look quizzical I expand it as follows: "If you believe in God and you're wrong, you lose nothing. If you don't believe in God and you're wrong, you lose everything". Everyone grasps this immediately and I recall one GB Hockey player listening, nodding and thinking for a moment. Then he asked me: "So how do you make study of that last so many years?" I then had to explain how the argument was much more subtle than appeared on the surface and that there were lots of objections to deal with. However, in my formulation, the Wager is a pure appeal to System 1 and it is framed in terms of loss avoidance, which, as we have seen, is a major driver within the human psyche.

What I usually find is that people think about it for a moment and then come up with objections. These usually fall into one of the objections that I covered in Chapter 3. I do not think that I have ever heard a new objection in someone's immediate response, because they are operating from System 1. As Kahneman notes,

> *"it is rare for System 1 to be dumbfounded. System 1 is not constrained by capacity limits and is profligate in its computations. When engaged in searching*

[555] *Pensées (tr. Ariew)*: 33. S158/L125

for an answer to one question, it simultaneously generates the answers to related questions, and it may substitute a response that more easily comes to mind for the one that was requested."[556]

Thus people all leap to pretty much the same conclusions. Objectors in my experience usually invoke doxastic voluntarism (e.g Dawkins), or a variant of the Many Gods argument, occasionally throwing in a perverse God who damns those who accept the Wager. These are System 1 responses to what is seen as a System 1 proposition. As I have shown at length in Chapter 3, none of them are particularly coherent, nor do they stand up to detailed scrutiny. They are simply a knee-jerk reaction to the blow of an uncomfortable proposition. After all, the atheist is being told that he is wrong to believe as he does and that he ought to take steps to change his beliefs. The fact that it is addressed in mathematical terms does not make it any more acceptable to him.

Other immediate responses that I have encountered, often from theists, is that the Wager may be morally dubious. The System 1 response is that it must be morally deficient for such a worthy ideal (theistic faith) to be obtained or pursued because of tawdry materialistic ambitions. William James is the perfect exemplar of this outrage, declaring:

We feel that a faith in masses and holy water adopted wilfully after such a mechanical calculation lack the inner soul of faith's reality [557]

As I point out on page 170, the gospels are full of suggestions that we *should* pursue heavenly rewards for their own sake and not for some higher ideal, but these are ignored in System 1's ability to create a 'solution' to the problem.

Not all of the objections are driven by System 1. Some are clearly the work of much careful thought and both Graham Oppy and Alan Hájek, for example, have devoted considerable effort to their papers. However, there is a System 1 tendency in many published works to think that a solution which appeals superficially is somehow "good enough" and I have encountered many such objections, even in peer-reviewed journals. There seems to be more of a desire to prove Pascal wrong, than to come up with a clearly-articulated and thought-through counter-argument. Pascal might say that this is a product of the self, which

"wants to be great, but sees that it is small; it wants to be happy and sees that it is wretched; it wants to be perfect and sees that it is full of imperfections; ... The predicament in which it finds itself arouses in it the most unjust and criminal

[556] Kahneman, *Thinking*: 416.
[557] James, *The Will To Believe*.

passion that could possibly be imagined, for it conceives a deadly hatred for the truth which rebukes it and convinces it of its faults."[558]

I think I would be more cautious, merely observing that some of the most vehement critics have been the ones who seem to have paid the least attention to the text. Although I believe that Pascal's Wager succeeds against its objections, my defence still relies upon some assumptions which could legitimately be challenged.

Chapter 3 is thus my own System 2's attempt to work carefully through some of the objections, in order to examine whether or not any of them completely defeat the Wager, or at least make it seem deficient. Using the principles I established at the beginning, I hold that they do not and that when the Wager is considered as I set it out, together with the axioms I outlined, none of the extant objections succeed. That does not mean that we could not create fresh objections which might attack my axioms, or explore other possibilities and it would certainly be a valid area for further research.

Guesstimation and System 1

My Guesstimation function, described on page 104, is unashamedly located within System 1. It is an instinctive response rather than a considered one. Were someone to offer me the prospect of infinite wealth, I would not ask whether it would be an $\aleph_0$ or $\aleph_1$ infinity, nor would I consider whether there might be a 'bigger' infinity available to me. I am aware that I am incapable of imagining what such a thing might be like and would undoubtedly refer to it by a token or symbol, like ∞. That is partly because I am lazy, but also because even my System 2 would not fare much better in contemplating it. As finite beings, the concept of infinity is simply too hard for us to grasp.

Thus, I argue that my Guesstimation function is a valid System 1 heuristic, which can be used to make a complex equation more tractable to our understanding. It is a more natural fit for human cognition (at least as described by Kahneman et al) than a strict mathematical formulation would allow. This does not mean that guesstimation is irrational, or even inaccurate. It is simply the mind's way of dealing with a problem that is outside its ability to comprehend.

Kahneman rejects a model of rationality as being simple internal consistency and argues that "the definition of rationality as coherence is impossibly restrictive; it demands adherence to rules of logic that a finite mind is not able to implement."[559] I suggest that we face similar challenges when attempting to deal with the infinite. Just as we cannot escape the limits of our minds in overcoming framing, preference reversal and so on when considering economic choices, so I contend that we are

[558] Pascal, *Pensées*: 324. L978
[559] Kahneman, *Thinking*: 411.

unequipped to handle the infinite in any way that is meaningful or consistent for us. I suggest that my Guesstimation function is a much better fit for the cognitive processes actually taking place in Pascal's Wager than the rather abstruse mathematics of Hájek, Bartha or Hertzberg.

Pascal's Wager is a proposition that can be readily grasped by System 1, but which is backed by the rigour of System 2 justifications. It is a mark of Pascal's genius that he anticipated many of the common objections and built in safeguards against them, even in a text which was obviously hurriedly composed, perhaps developed solely as a curiosity for the visit of an old friend. It is the only one of the natural theological arguments which can be articulated clearly in just a couple of sentences and the only one in my view which remains convincing after careful examination.

Chapter 5 Summary and Conclusions

In the course of this thesis, I believe I have demonstrated some of the richness to be found in Pascal's thought. His Wager is simple enough for anyone to understand immediately, but reveals a profound understanding of the human psyche. While his rival Descartes hogged the limelight of psychology for many years, all the experimental evidence now points towards Pascal as having the better grasp of reality, at least as regards decision-making. In his Wager Pascal sets out the basis for decision theory and sees both the strengths and weaknesses of Expected Utility Theory at the same time.

We do not know Pascal's intentions for the Wager. It could have been an interesting sideline in the discussion, or it might have formed the cornerstone of an apologetic for the ordinary *homme moyen sensuel.* That hardly matters now, since it has taken on a life of its own and many authors debate Pascalian logic in contexts far divorced from theology, including global warming and asteroid-collision defence systems. What has been particularly fascinating is how robust Pascal's argument has been in the face of concerted opposition. In Chapter 3 I have tried to cover major exemplars of critiques of the Wager and to consider them carefully, examining exactly what assumptions are being made and also what other consequences follow from that. I show in this essay that if we treat the Wager as an exercise in personal risk-management, then it is both coherent and definitive. I accept that it cannot be water-tight in every respect, but I suggest that within the framework that I have outlined, the Wager more than holds its own against its critics.

Let us recall the principles that I outlined on page 58:

I. Principle of Accepted Immitigable Risk

> If a scenario offers no mitigation, then its risks will be deemed to be accepted and the scenario dismissed from further consideration.

II. Principle of Maximality

> Any deity to be considered must at least meet the criteria prescribed for a MaximalGod.

III. Tie-break Principle

> If two routes tie in terms of their expected utility, then other secondary factors may be used to decide between them. This includes a subjective assessment of the most likely to occur (even though this probability may already have been incorporated in the EV calculation).

IV. Principle of Disintermediation

> We will only consider cases that deal with the deity directly and not via any intermediaries.

Using these principles we can summarise the objections and the way that we should deal with them in the table below. These are necessarily heavily simplified descriptions and outcomes and the reader should refer back to the text itself in the event of any doubt.

Category	Objection	Brief description	Conclusion
Problems with infinity	Mixed strategy p81	Tossing a coin does as well as a straight bet.	Bartha, Hertzberg and my own Guesstimation function solve the problem.
Problems with the matrix (or "Many Gods")	Number-based gods p111	There are an infinite number of possibilist Gods who have unkowable requirements	The unknowability means that no mitigation is possible and is thus excluded under the Principle of Accepted Immitigable Risk.
	Evidentialist or Cliffordian god p113	Deity requires us to apportion belief to the evidence.	Evidence must be equivocal for Pascal's Wager, but the decision is forced. If we do not have an inbuilt sense of what constitutes "enough" then Cliffordian God falls short of MaximalGod and we can exclude under the Principle of Maximality. This case actually has more in common with moral objections.
	Predestining God p125	God decides who will receive salvation and it does not rely upon our actions.	No mitigation is possible and is thus excluded under the Principle of Accepted Immitigable Risk.
	Universalist deity p126	Deity gives salvation to all.	No mitigation is required and thus we will have this as a fall-back option, even if we choose a different deity.
	Reincarnation p127	Salvation depends upon progression, but failures get another chance in another life.	The scenario has inbuilt mitigation, therefore we should choose an alternative that does not, because we possess a safety-net.

Category	Objection	Brief description	Conclusion
	No deity and/or after-life p128	No eternal salvation is offered at all.	No mitigation is possible and is thus excluded under the Principle of Accepted Immitigable Risk.
Perverse gods	Anti-Pascalian deity p129	The deity rejects anyone who comes to faith via Pascal's Wager.	Deity falls short of MaximalGod and is rejected under the Principle of Maximality.
	Martin's Perverse Master p131	Deity rejects all those who believe in supernatural beings.	Deity falls short of MaximalGod and is rejected under the Principle of Maximality.
	Kaufman's God p132	Deity rejects all those who engage in religious activity.	Deity falls short of MaximalGod and is rejected under the Principle of Maximality.
	X-Theology p134	Atheists go to heaven and theists go to hell, regardless of whether God exists or not.	Cannot have a MaximalGod in this scenario, so it is excluded under the Principle of Maximality.
Problems with probability	Zero probability p140	If we assign a zero probability to God's existence, then the EV is zero.	It is not rational to assign a zero probability to anything except a logical impossibility, because it implies that no amount of evidence could ever convince.
	Infinitesimal probabilities p143	If we assign an infinitesimal probability to God's existence then the result is indeterminate.	Infinitesimal possibilities do not exist in conventional probability theory. Medical science is happy with probabilities as large as 5% for selecting treatments, so we are being unreasonable in demanding infinitely small values.
Problems with God	Janzen's Irrational God p153	God should not simultaneously hide and demand belief without being irrational.	God is not necessarily irrational in hiding and intellectual belief is not an essential component of the Wager's premisses.

Category	Objection	Brief description	Conclusion
	Penelhum's Complicity Argument p163	God's actions in saving some are unjust and we become complicit in his immorality if we comply.	A MaximalGod should entail Divine Command Theory and thus God's actions cannot be immoral. If not, then no mitigation is possible, so we reject it under the Principle of Accepted Immitigable Risk.
Problems with the process	Epistemic duty not to believe this way. p165	We should not obtain religious faith purely for self-interest.	There are numerous scriptural injunctions to do exactly that. In any case, Pascal only suggests that we try an experiment to see if genuine faith emerges.
	Wagering at all is immoral p169	Gambling is associated with organised crime and with debt, addiction and poverty. We should not encourage it.	Gambling is not of itself inherently immoral and attitudes about it have changed at different times. Pascal does not suggest that we win salvation, merely that we might choose to undergo a course of therapy as a behavioural experiment.
	Pascal's Mugger pError! Bookmark not defined.	The mugger has magic powers and can grant us additional days of happy life in return for our cash.	We can assign an equal probability to having magic powers ourselves. We could also test the proposition by experiment before handing over the wallet.
	Tabbarok's Wager p173	Tabbarok will use his influence with the deity to improve our chances of eternal reward.	Exclude intermediaries under The Principle of Disintermediation.
	Persecutor's Wager pError! Bookmark not defined.	Since eternal life is at stake, we should enforce religious faith in order to maximise the number of the saved.	Free Will/Many Errors defence.

I believe that I have made a contribution by showing how Pascal's Wager needs to be understood in terms of risk management and also by identifying how Pascal's

choice of words allows it to resonate with the human psyche, as evidenced by leading-edge discoveries in economics and psychology. Pascal's remedy for the unbeliever is a therapeutic response which is entirely in line with modern psychological practice and should not offend moral sensitivities, because it is purely an experiment to see whether faith can naturally arise once the objections are temporarily set aside. Pascal believed that the Christian life was the best option available and he invites us to sample it, because it offers advantages in our current life, whether or not there is a eternal gain to be had at a later date.

> *Now, what harm will befall you in taking this side? You will be faithful, honest, humble, grateful, generous, a sincere friend, truthful. Certainly you will not have those poisonous pleasures, glory and luxury; but will you not have others?*[560]

Pascal himself was suspicious of relying upon reason alone, arguing that

> *"it is the heart that perceives God and not the reason. That is what faith is: God perceived by the heart and not by reason."* [561]

Nonetheless, his Wager employs reason in the service of the heart. Pascal's Wager uses System 1 language that we can easily comprehend, but which is still sound when examined under rigorous System 2 enquiry.

The father of expected utility theory, John von Neumann, converted to Christianity towards the end of his life and jovially remarked that he thought that Pascal "had a point".[562] I rather agree.

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[560] Pascal, *Pensées*: 125. L418
[561] Ibid., 127. L424
[562] Norman Macrae, *John Von Neumann: The Scientific Genius Who Pioneered the Modern Computer, Game Theory, Nuclear Deterrence, and Much More* (American Mathematical Society, 1992). 379.

Appendix A. Pascal Chronology

Year	Pascal events	Other events
1588	Étienne Pascal, father of Blaise, born in Clermont	Day of barricades in Paris and Duc de Guise seizes the city Spanish armada defeated
1616	Étienne marries Antoinette Begon	Copernicus' *De Revolutionibus* is placed on the Index of Forbidden Books
1617	Antonia Pascal born, but dies a few days after her baptism	
1619	Étienne Pascal buys Langhac mansion, which is near the abbey in Clermont	Slaves first brought to the colonies
1620	Gilberte Pascal born	Mayflower and Speedwell depart Plymouth and arrive in America.
1623	Blaise Pascal born in Clermont on 19th June.	Pope Urban VIII (Maffeo Barberini) succeeds Pope Gregory XV as the 235th pope.
1625	Jacqueline Pascal born. Mère Angélique establishes Port-Royal de Paris.	Charles I succeeds James I
1626	Antoinette Pascal (Blaise's mother) dies	Charles I dissolves Parliament
1631	Étienne Pascal moves the family to Paris and teaches his children himself.	
1635	Blaise is recognised as a mathematical prodigy by the Academie Mersenne, which is a mathematical group to which his father belonged. Saint-Cyran becomes spiritual director at Port-Royal.	France declares war on Spain
1638	Étienne goes into hiding after opposing a fiscal method of Richelieu, but the children remain in Paris. Jansenius dies. Saint-Cyran arrested and imprisoned. "The Solitaires", a semi-monastic group, set up at Port-Royal (now called Port-Royal des Champs).	Louis XIV born.

Year	Pascal events	Other events
1639	Jacqueline charms Richelieu in a play and wins a pardon for her father as well as a job for him as a tax collector in Rouen.	
1640	The Pascal family move to Rouen.	Publication of Jansen's *Augustinius* (posthumously).
1641	Blaise publishes his "Essai pour les coniques" on conic sections. Gilberte Pascal marries Florin Périer.	
1642	Étienne Périer born (who will later confirm the provenance of Pascal's Memorial. Blaise begins work on the Pascaline	Cardinal Richelieu dies English Civil War starts. Galileo dies.
1645	Pascal writes *Letter to the Chancellor* dedicating the Pascaline.	
1646	Étienne Pascal and Pierre Petit recreate Torricelli's work on the vacuum. Blaise takes over the experiments. Étienne is injured and cared for by Jansenist bone-setters who convert the family to Jansenism.	Westminster Confession of Faith published.
1647	Pascal decides to return to Paris because of his ill-health and Jacqueline looks after him. René Descartes visits him twice in September where they discuss the barometer. Pascal publishes his first work on the vacuum in October. Pascal argues with Père Noel over Aristotle and with free-thinker Saint-Ange over theology.	Torricelli dies.
1648	Pascal argues with M. de Rebours at Port-Royal then returns to Paris to write a new treatise on conic sections. Florin Périer demonstrates Pascal's barometer at Puy-de-Dôme. Pascal repeats the experiments and claims the existence of the vacuum to be proved. A number of the Paris nuns return to Port-Royal des Champs and the Solitaires set up nearby. Étienne retires back to Paris.	Père Mersenne dies. 1648-53 The Fronde of the Parlement (revolt against the regency).

Year	Pascal events	Other events
1649	Pascal family retreats to Clermont to avoid the Fronde and live with Gilberte and Florin.	Charles I beheaded.
1650		Descartes dies
1651	Étienne Pascal dies.	Thomas Hobbes publishes *Leviathan*.
1652	Jacqueline decides she can now enter the convent at Port-Royal, which causes a fierce quarrel with Blaise over the inheritance. Blaise sends a Pascaline to Queen Christina of Sweden, together with a long letter. Pascal's "worldly" period begins.	
1653	Pascal travels to Poitou and falls in with the duc de Roannez . here he meets the Chevalier de Méré and Damien Mitton who will interest him in gambling and probability. Pope Innocent X condemns the five propositions of Jansen's Augustinius.	End of the Fronde
1654	Night of Fire. Pascal writes the Mémorial and sews it into his coat. Blaise becomes reconciled to Jacqueline.	Louis XIV's coronation.
1655	Pascal takes a retreat at Port-Royal for probably three weeks. He wrote *Ecrits sur la Grâce* around the end of the year (or early 1656)	Arnaud writes an attack on the Jesuits in his *Lettres à un duc et père*.
1656	First of Pascal's Provincial Letters in support of Arnauld and against Jesuit casuistry is released to much horror and laughter. Miracle of the Holy Thorn – the healing of Pascal's niece, Marguerite Périer. Pascal starts work on his great apologetic opus.	
1657	The last of the Provincial Letters appears. Pascal writes a piece on divine grace and another on geometry, both of which will be published after his death.	

Year	Pascal events	Other events
1658	Pascal lectures at the Sorbonne on his apologetics. He also composes works on geometry and rhetoric.	Oliver Cromwell dies.
1658-1662	Pascal writes the text of his Wager	
1659	Blaise Pascal becomes terminally ill.	Richard Cromwell disbands English Parliament (and later resigns)
1660	The ailing Pascal stays in Clermont with the Périer family and then later with Roannez in Poitu.	Charles II crowned as king.
1661	Jacqueline dies. Port-Royal is officially closed because of Jansenism.	French priests are required to sign a declaration rejecting Jansenism.
1662	Blaise launches his plan for public transport in Paris. Pascal dies (August 17) in the Paris home of Gilberte.	First meeting of the Royal Society.
1663	Publication of treatises on the equilibrium of liquids and on the weight of the atmosphere.	
1670	First edition of Pensées published.	Pope Clement X succeeds Pope Clement IX as the 239th pope.

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