

# Towards a Frequentist's Approach to Pascal's Wager

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## Abstract

Pascal's wager attempts to provide a mortal with a proper choice of believing or not believing in a god, based on the expected reward of a given belief. It is essentially a Bayesian approach to the existence of a supreme being, as it deals with a *degree of belief* approach to probability. However, given the ineffability of a supreme being, the idea of finding a Bayesian prior for performing inference is impractical. However given the high population of observable mortals, a frequency probability would be a more obvious choice. Therefore, we present a systemized frequentist approach to the problem of a supreme being.

	CHICKEN SERVED	STEAK SERVED	
BRING WHITE WINE	7	-2	GOD DOES NOT EXIST
BRING RED WINE	3	11	GOD EXISTS

  

	BELIEVE GOD EXISTS	DO NOT BELIEVE
BELIEVE GOD EXISTS	$k+a$	$\infty$
DO NOT BELIEVE	$k$	$k$

Figure 1: Diagramming the utility in situations where there is a choice you have control over (&) and another choice you do not have control over ( $\otimes$ ). On the left, bringing wine when fish or steak may be served. On the right, believing in God when God may or may not exist.

# 1 Introduction

## 1.1 Pascal’s Wager

We follow Giden Rosen’s description of Pascal’s Wager [7], also known as Pascal’s Gambit. First, we note that it is possible to draw a chart that describes the different choices available to an actor on the y-axis and the different possible states of the world (which are assumed to be unknown to the actor) on the x-axis. As with most problems in life, this problem can be recast in terms of alcohol [8]; in particular a situation in which the actor has the option of bringing red or white wine to a friends’ house without knowing whether chicken [6] or wine will be served for dinner.

As everyone knows [1], chicken with white wine is pretty good, but chicken with red wine is so so, whereas steak with red wine is freakin’ amazing but white wine with steak is no good. By assigning a numerical value to the utility of each of these combinations, we can obtain the graph in Figure 1. A risk averse actor would be inclined to bring red wine unless there was no possibility of steak being served; however, the behavior of a fully rational actor will be determined by the probabilities they assign to the different possibilities. Presuming that there is an equal probability of either possibility, then the expected utility of bringing white wine is  $7 \times .5 + -2 \times .5 = 2.5$ , whereas the expected utility of bringing red wine is  $3 \times .5 + 11 \times .5 = 7$ , and the rational actor will bring red wine, as the expected gain for doing so is 4.5 units. On the other hand, if the rational actor thinks that there is an 80% chance of chicken being served, then the expected utility of bringing white wine is  $7 \times .8 + -2 \times .2 = 5.2$ , whereas the expected utility of bringing red wine is  $3 \times .8 + 11 \times .2 = 4.6$ , and the rational actor will bring white wine, as the expected gain for doing so is .6 units.

Pascal’s Wager seeks to extend this ordinary and legitimate reasoning to the case for belief in a deity. One version of the argument imagines that there is an inherent utility of a human life,  $k$ , and that the value of  $k + \alpha$  is the value of a life lived acting under the belief in the existence of God. Some versions of Pascal’s Wager take  $\alpha$  to be positive, some negative, typically depending on how much people like guilt and/or Gregorian chant. Then, posit that either no God exists, or else there is a God who rewards His believers with eternal bliss – we will describe this God as a “rational rewarding” God. Definitionally, we can assume that the utility of “eternal bliss” is infinite, and seeing as  $k + \alpha + \infty = \infty$  as long as  $k$  and  $\alpha$  are finite, we end up with the chart on the right-hand side of Figure 1.

At first glance, we must expect an actor to assign some probability of the existence of God, and some other probability to the non-existence of God, and proceed by the same analysis we used for deciding whether to bring wine. If we assign that God exists with probability  $p$ , then the expected utility of non-belief is  $k \times (1 - p) + k \times p = k$ , and the expected utility of belief  $(k + \alpha) \times (1 - p) + \infty \times p = \infty$ , and so a rational actor should believe in God, as the expected gain for doing so is a rather persuasive  $\infty$  units.

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\*The results contained herein reflect neither the opinions of the authors, nor those of the National Science Foundation.

	NO GOD EXISTS	RATIONAL, REWARDING	PERVERSE, ACTIVE	RATIONAL, PUNISHING	RANDOM, REWARDING
BELIEVE GOD EXISTS	$k'$	$\infty$	$-\infty$	$k'$	$\infty (.8)$ $-\infty (.2)$
DO NOT BELIEVE	$k$	$k$	$\infty$	$-\infty$	$k$

Figure 2: A philosopher-mathematician’s critique of Pascal’s Wager

## 1.2 A Mathematical Critique

The historical critique of Pascal’s Wager, as described by Giden Rosen [7], falls into two categories. The first is a theological critique; in a world where multiple religions teach eternal punishment or reward for belief/nonbelief in their god, Pascal’s construction gives little-to-no guidance for the problem of picking “the right God.” This problem will not be considered in this paper due to restrictions [4], and in any case, this critique of Pascal’s Gambit is well-understood.

A more basic mathematical critique begins with the idea that the infinities in present in Figure 1 are suspect from a mathematical point of view. We can drive this concern home by assigning non-zero probability to a God which we call “perverse, active” and which Rosen describes as philosopher-friendly. “I didn’t give them any evidence of existance,” this God thinks, “and by golly, those non-believers, they stuck to their guns. I’ll give them eternal bliss, and give the believers eternal punishment.”

Now the non-believer has an expected utility of  $\infty$ , and the expected utility of the believer is... one must suppose, impossible to calculate. We can add even more absurdity to the Pascal argument by positing the existence of a God that sends believers to heaven or hell with probability .8 and .2, respectively, whilst leaving nonbelievers alone. The analysis used in descriptions of Pascal’s Wager becomes completely inadequate in this environment, though one must assume in such a universe non-belief and risk aversion would have to be linked.

## 1.3 A Frequentist Critique

Since the question of using Bayesian or frequentist approaches to statistical analysis is a nearly religious debate in the field ??, the obvious extension is to apply it to religious matters. Furthermore, it assumes the “gambling god” to be introduced later— or, more generally, a god that does not consider gambling a punishable sin.

On the other hand, we do have billions of observable mortals, so assigning a frequency probability to the existence of a supreme being would be a more natural way of going about things in the supernatural realm.

## 2 Methodology

In order to determine an appropriately frequentist, we needed a sample space of universes. We wanted to investigate a wide variety of possible of potential God-models, including Gods that behave rationally (consistently rewarding those that believe in them), perversely (consistently punishing, or failing to reward, those that believe in them), or arbitrarily (meting out eternal reward or punishment in a manner that is only rational with some probability, which may or may not be contingent on belief).

### 2.1 Sampling

#### 2.1.1 Rapture-Recapture

We introduce a novel method of sampling for supernatural experiences, which we call *Rapture-Recapture*. We first chose at random 100 people from each of 6 universes: Earth, Bizarro, World of Warcraft, Star Trek, Star Trek Mirror Universe, and the Buffyverse. We surveyed each subject regarding their beliefs in god, humanity, and their own sins. We then tagged the right ear of each subject and euthanized them. After some period of time we performed a re-capture and again surveyed each re-captured subject on their posthumous experiences.

#### 2.1.2 Entrance survey

Before euthanization, we presented each subject with an extensive survey with questions regarding their faith, time spent on earth, and other necessary information to obtain before euthanization. The survey is included in Appendix A.

#### 2.1.3 Euthanization

We then attempt a re-capture through wireless transmission. As we assume that everyone in heaven gets a free iPhone, and everyone in hell gets a Bluetooth Ouija Boards, we ensure that our hardware is compatible with both.

Zombieification was also used as a backup method of obtaining posthumous survey data. It was only used as a backup, as the IRB would not approve the proposal to use zombieification and revive people already in heaven.

#### 2.1.4 Exit survey

Of the re-captured subjects, we obtained a completed survey from each, shown in Appendix B.

## 3 Results

Results from some of the universes sampled are presented.



Figure 3: One of the huntards that nearly killed the undergrad we hired to gather data from Azeroth. (picture courtesy of [www.figurerealm.com](http://www.figurerealm.com))

### 3.1 World of Warcraft

The World of Warcraft (WoW) universe, termed *Azeroth*, has a number of interesting differences that often were an advantage for our experiment. A resurrection (*rez*) system is in place, in which players spend some amount of time essentially dead while their disembodied soul has to run from the *graveyard* back to the place they were *ganked*; this is known as a *corpserun*. During this time they are still able to use *voice chat* to communicate, which made our devices described earlier unnecessary.

Several difficulties arose in performing the rapture-recapture. It was difficult to get an unbiased sample, as whenever we tried to use subjects from *parties*, particularly *pick-up-groups* that included *paladins* (sometimes *priests* and *shamans*, because those were usually *n00bs* (or *n00badins*) with no respect for science and tended to interfere by casting healing spells upon our subjects or prematurely rezding them. Secondly, on several occasions some *huntard* would sic their *pet*, usually a tiger, on the experimenters (see Fig. 3). Thirdly, occasionally *warlocks* stole the souls of dead characters and captured them in *soulstones*. Since we considered that to be an interruption of the normal rapture-recapture experiment, we were unable to use those data.

Results were somewhat inconclusive. Despite the built-in ease of communicating with un-rezzed characters, usually they went *AFK* (away from keyboard), as if ordering pizza were more important than the progress of science.

### 3.2 Bizarro World

The Bizarro World of *Htrae* functions in every way imaginable opposite of planet Earth. Very pleasingly, we thereby found opposite results. While

we inferred from exit surveys that 10% of earthly subjects went to some version of eternal bliss, 90% of Bizarro subjects did.

## 4 Conclusion

We have not had time to fully analyze the results, and periodic demonic posession by our Subversion server has been a constant source of <<< mine, all mine! bwahahahaha === >>> r666 === We are confident that our data sets will be a useful for future study. Hey, we put “Towards” in the title, didn’t we?

## References

- [1] Like, duh.
- [2] [http://www.saintaquinas.com/mortal\\_sin.html](http://www.saintaquinas.com/mortal_sin.html).
- [3] <http://www.icanhascheezburger.com>.
- [4] William Kristol. Oh, the anguish!: The cartoon jihad is phony. *The Weekly Standard*, 11(22), February 2006.
- [5] Jim McCann and Ronit Slyper. A theft-based approach to 3d object acquisition. In *SIGBOVIK*, 2007.
- [6] Mary McGlohon. Fried chicken bucket processes. In *The 6th Biennial Workshop about Symposium on Robot Dance Party of Conference in Celebration of Harry Q. Bovik’s 0x40th Birthday*, April 2007.
- [7] Gideon Rosen. Pascal’s wager, 2002. Lecture, Introduction to Metaphysics and Epistemology, Princeton University.
- [8] Robert J. Simmons. A non-judgmental reconstruction of drunken logic. In *The 6th Biennial Workshop about Symposium on Robot Dance Party of Conference in Celebration of Harry Q. Bovik’s 0x40th Birthday*, April 2007.
- [9] David Steiner. Proof-theoretic strength of pron with various extensions, 2001.
- [10] Tom Murphy VII. *Name of Author by Title of Book*. Lulu Press, 2003.
- [11] Tom Murphy VII, and Tom Murphy VII. Level of detail typesetting in academic publications. In *SIGBOVIK*, 2007.

## APPENDIX

## A Entrance survey

1. How many supreme beings do you believe in? (if less than one, skip to Question 2)
  - (a) Do they insist they are the only god(s)?

- (b) Do they insist upon belief in them for a good afterlife?
- (c) **Very important for this study** What do they say about regarding the eternal fate of people dying through assisted suicide or otherwise consenting to their own death?

2. Have you participated in a study like this before?
3. Have you experienced any death or near-death experiences?
4. Did you commit any of the following? [2] Please estimate the number of times. (If no exact count is known, please give a relative term such as 'a few times', 'more than Larry King', 'did not inhale', etc.):
  - (a) **Idolatry** Includes sacrilege, sorcery
  - (b) **Pride** Includes atheism, citing your own paper [10],
  - (c) **Lust** Includes adultery, fornication, prostitution, rape, sodomy, incest, masturbation, divorce, pornography, typesetting porn [11], kitty porn [3], PRON [9],
  - (d) **Gluttony** Includes over-consumption of food and alcohol, bad table manners. See also idolatry of Ben and Jerry.
  - (e) **Sloth** Includes observing the Sabbath, not observing the Sabbath,
  - (f) **Greed** Includes theft [5], perjury, fraud, extortion, usury, more cowbell, saving a bundle on car insurance.
  - (g) **Wrath** Includes murder, suicide, abortion, terrorism, Also includes self-destructive behavior such as alcohol abuse, drug abuse, and grad school.
  - (h) **Sins of fashion** Includes blue eye shadow, Mom Jeans, dressing like a computer scientist, wearing white after Labor Day, shopping at Ikea after completing a college degree.
  - (i) **Sins against animals** Includes dog shows, eating meat, wearing leather.
  - (j) **Sins against humanity** Includes being a jerk, using passive voice, editing your own wikipedia article, off-color jokes, voting for Ron Paul.
5. Please list any atonement you performed for acts in Question 4.

## B Exit survey

1. Do you know you are dead?
2. What is your current quality of life, compared to your life on earth?
3. What is the current temperature?