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Four arguments against "Pascal's wager": objections, rebuttal and reversal

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The historical dimension

In the way we look at the past, we must keep a sufficient critical distance.

- On the one hand, the historical description must be factual. Pascal's wager must be approached with neutrality, placing him in his own time and not judging him by current criteria. At the time, the calculation of probabilities did not yet exist. It was Pascal who took the first steps in the creation of a new chapter in mathematics, for which we are indebted to him (see [The genesis of probability calculus](#) [in French]). Pascal is a great spirit that I respect. Concerning the calculation of limits and the convergence of sequences, rigorous definitions were only established in the 19th century.
- On the other hand, I denounce a way of presenting the history of Western culture when it is imbued with a missionary spirit. In particular, certain Catholic circles have made Pascal's wager a tool for 21st century indoctrination. More generally, this attitude tends to affect all those who attribute a sacred value to spiritual traditions.

My criticism does not focus on Pascal as a historical figure, but on the belief that his wager would still be relevant today.

Reducing the scope of the Pascal's wager

The Wager is reserved for people who admit a priori the following hypotheses:

- the human soul is immortal;
- deities observe us and judge, reward or punish us;
- we can influence our future in the afterlife through appropriate behaviour;
- rituals can arouse divine favour.

For those who do not fully subscribe to it, there is nothing to save, nothing to gain, so the Pascal's wager is irrelevant.

First objection to the Pascal's wager

What kind of bets should be put on the table?

The bet is our Christian commitment

Pascal suggests that the player can participate in the wager by not putting any bets on the table. Does he mean that "Believing does not commit you to anything"? The stake is our life, our conscience, our freedom; it is infinitely precious to us; we don't want to play dice with that.

In most religions, the clergy plays a facilitating role in the relationship between the faithful and God, a kind of "religious coaching", considered useful but auxiliary. From this point of view, Catholicism is a singular religion: on the one hand, the clergy exercises a necessary and inescapable role through the sacraments; on the other hand, through the Magisterium of the Church, it exercises supreme authority over personal consciences. The relationship with God passes through the mediation of the clergy, who introduce their own demands, to which the faithful are obliged to submit.

«The Roman Pontiff and the bishops are "authentic teachers, that is, teachers endowed with the authority of Christ, who preach the faith to the people entrusted to them, the faith to be believed and put into practice." The ordinary and universal Magisterium of the Pope and the bishops in communion with him teach the faithful the truth to believe, the charity to practice, the beatitude to hope for. The supreme degree of participation in the authority of Christ is ensured by the charism of infallibility. This infallibility extends as far as does the deposit of divine Revelation; it also extends to all those elements of doctrine, including morals, without which the saving truths of the faith cannot be preserved, explained, or observed. The authority of the Magisterium extends also to the specific precepts of the natural law, because their observance, demanded by the Creator, is necessary for salvation. In recalling the prescriptions of the natural law, the Magisterium of the Church exercises an essential part of its prophetic office of proclaiming to men what they truly are and reminding them of what they should be before God. The law of God entrusted to the Church is taught to the faithful as the way of life and truth. The faithful therefore have the right to be instructed in the divine saving precepts that purify judgment and, with grace, heal wounded human reason. They have the duty of observing the constitutions and decrees conveyed by the legitimate authority of the Church. Even if they concern disciplinary matters, these determinations call for docility in charity. In the work of teaching and applying Christian morality, the Church needs the dedication of pastors, the knowledge of theologians, and the contribution of all Christians and men of good will. Faith and the practice of the Gospel provide each person with an experience of life "in Christ," who enlightens him and makes him able to evaluate the divine and human realities according to the Spirit of God. Thus the Holy Spirit can use the humblest to enlighten the learned and those in the highest positions. Ministries should be exercised in a spirit of fraternal service and dedication to the Church, in the name of the Lord. At the same time the conscience of each person should avoid confining itself to individualistic considerations in its moral judgments of the person's own acts. As far as possible conscience should take account of the good of all, as expressed in the moral law, natural and revealed, and consequently in the law of the Church and in the authoritative teaching of the Magisterium on moral questions.

Personal conscience and reason should not be set in opposition to the moral law or the Magisterium of the Church.»

Let us beware of a religion that sanctifies obedience: believing will make us captives. When I realised that I had to align my opinions with all the positions taken by the Church's Magisterium, it seemed unacceptable to me to renounce the principle of free examination. While even prisoners retain their freedom of thought, Catholics are deprived of it.

With obedience, the doctrinal background to be taken over is excessively heavy. We can legitimately refuse to submit to religious indoctrination, to chain ourselves to precepts, to practice rituals, to say prayers, to let ourselves be guided by the clergy, to take on a ready-made attitude, and to be constantly pursued by haunting preoccupations. In short, not all of us have the vocation to behave like sheep under the guidance of good shepherds.

To be saved, believing in God is not enough. God vomits up the lukewarm ones¹. A docile and total commitment is required. In particular, the following people are in an irregular situation and have to worry about their eternal salvation:

- those who deliberately miss Mass or the Sunday Eucharist²;
- the divorced and remarried³;
- homosexuals;
- people living with a partner;
- couples using artificial means of contraception.

One understands why "*many are called, but few are chosen*"⁴.

Whoever asserts that in Pascal's wager there is nothing to engage - this is the Church's interpretation - would deserve to have his nose lengthened like that of Pinocchio.

To overcome the constraints, many contemporaries chose to be believers, but to keep their freedom from dogmas and their independence from the clergy. This state of partial emancipation is generally not enough to free them from the guilt of living in disobedience. They spend a lot of energy convincing themselves that they can still obtain eternal salvation.

What should be optimised? The example of the game of the 10 farms

For all good, a farmer owns a farm that allows him to feed his family. He is offered the chance to flip a coin on his farm. If he wins, he will receive 10 farms similar to his own in the region where he lives. If he loses, he must give up his farm.

Although the expected benefit is clearly favourable, it would be foolish to accept this game: **if we are offered to bet something irreplaceable, we are not looking for a maximum winning, but for minimum losses!**

1 Revelation 3:16 «*So, because you are lukewarm, and neither hot nor cold, I will spit you out of my mouth.*»

2 Those who deliberately fail to attend Mass or the Sunday Eucharist commit a grave, i.e. mortal, sin.

3 Divorce is a serious offence against natural law. The fact of contracting a new union, even if it is recognised by civil law, adds to the seriousness of the rupture: the remarried spouse is then in a situation of public and permanent adultery. Adultery is a mortal sin.

4 Matthew 22:14

Do you have to wager?

Each culture builds the divinity or deities that symbolize its aspirations⁵. Is it worth sacrificing one's life for a hypothetical reward? Popular wisdom has created the aphorism:

One "This is for you" is, it is said, better than two "I will give it to you".

One is sure, the other is not.

[La Fontaine, Fables, The Little Fish and the Fisherman]

⁵ See the second objection p. [5](#): *The likelihood that a given religion is true.*

Second objection to Pascal's wager On the likelihood that a given religion is true

If God is, who is?

One of two things: "God is, or he is not." This is an irrelevant, even smoky way of approaching the question of God's existence. It can only be reduced to an alternative if one specifies which God one wants to talk about. Between "a Creative Force", pantheism and the "God of Christians", an infinite number of distinct divinities can be envisaged. However, for Pascal's wager to make sense, it is necessary to admit that it is quite probable that the soul is immortal, that we can influence our future in the afterlife from now on, that there are deities who observe us, judge us⁶, reward or punish us, that rituals can arouse divine favours. This is, roughly speaking, what Pascal calls the god of philosophers. These implicit assumptions, which seemed weak at the time, are now perceived as rather far from the obvious. In order to complete his reasoning and reach the God of the Christians, Pascal then devotes almost half of his Thoughts to the apology of Christianity in order to build a fragile bridge between the god of the philosophers and the God of the Catholics. It is a question of overcoming a new pitfall: the longer the list of dogmas - and Catholicism is not stingy about it - the greater the probability of being wrong.

In the exploitation of the Pascal's wager for propaganda purposes, the approach is often simplified. Since believing in God is not enough to win paradise, the real issue is the faith that saves, hence Catholicism. Under a disguise, the question asked is in fact "Do you adhere to the true faith?"

Monotheisms

Pascal suggests that the probability of God's existence is $\frac{1}{2}$. This assessment, conceded to people who might have doubts, is questionable. While the question of divine existence can be answered with a single word, it takes an entire library to describe each monotheism, which consists of a multitude of assertions whose veracity raises so many questions.

Christianity is only the fourth monotheism, after

- the cult of Aten of Pharaoh Akhenaten,
- Zoroastrianism, preached by Zarathustra, whose creator god is called Ahura Mazda,
- and Judaism, whose god, called Yahweh, is said to have revealed himself to Moses⁷.

He is not the last since the fifth is Islam, whose god is called Allah. Why should the fourth be truer than the first or the fifth? By making God the creator of Evil, monotheisms are tainted by internal contradictions that discredit them and make them unlikely [see [Is God good or paradoxical?](#)]

It was not God who created the world in seven days, but men created five different unique Gods! Christianity is divided into many different religions: Catholicism, Orthodoxy, Anglicanism, as well

⁶ This psychological tendency is probably based on our ability to observe and judge ourselves, which may give us the impression of being observed and judged.

⁷ The use of the written form is an advantage over cults that are transmitted by oral tradition. The Torah - that is, the Old Testament - is a syncretism: the myths of creation and the flood were borrowed from the Babylonians; the angels, the archangels, the Apocalypse and the Last Judgement come from Zoroastrianism; the immortality of the soul comes from ancient Egypt; the resurrection of the body appears in the Greek version of the Book of Job. The use of "divine interventions" is purely mythical.

as a multitude of Protestant currents and various sects, which leaves much more room for error than for truth.

Since, on a global scale, each religion is clearly a minority, the vast majority of believers are necessarily in error. But, naturally, it is the other beliefs that are wrong. All other religions were created by man, but ours is exceptional because it was created by God himself. Mired in a network of cultural conditioning, the believer allows himself to be carried along by religious conformism. Wearing doctrinal glasses greatly narrows his field of vision.

Faith in absolute truth⁸ is the expression of an excessive pretension. Pascal's approach is typical of philosophers who bring everything back to certain peculiarities of the culture in which they are immersed. A widespread form of ethnocentrism consists in making the whole world revolve around one's religion, in the way Ptolemy made the sun and the celestial spheres revolve around the earth. In order to gain objectivity, one has to step back.

Ongoing globalisation also affects cultural conceptions. In the long term, a more relative perception of religions will necessarily have to be established. One might wonder why the majority of gods are sexist. I can see only one explanation: religions were created by male human beings.

The number of religions is unlimited

The human imagination has filled the sky with the most diverse deities. Each particular culture honours its own and blames others. Is God single⁹ or multiple, personal or impersonal, unchanging or evolving, caring or indifferent, all-powerful or limited, distinct from or confused with the universe?

After death, will we live eternally, temporarily, cyclically in reincarnations, or will we disappear? Will we live in the Kingdom of the Dead, the Kingdom of the Ancestors, the Kingdom of the Underworld, the Kingdoms of the gods, the Kingdom of God, or are there other outcomes, e.g. a Paradise Democracy, a Perfect City?¹⁰ Will we preserve a body, a sensibility, an affectivity, an individuality, a conscience, a freedom? Can we influence our fate in the afterlife from the earth? By what rites, by what practices? For example, in Buddhism, there is neither God nor gods: the question of Pascal is unrelated to the ultimate meaning of existence, which is the management of suffering and evil¹¹.

How many distinct and incompatible religions are there? Taking into account past, present and future religions, they are innumerable. Like civilisations, religions are also deadly¹². The first monotheism, the cult of Aten of Pharaoh Akhenaten, was ephemeral. The second, Zoroastrianism, after having developed in ancient Persia, was considerably weakened. The third, Judaism, was divided into fratricidal factions which included the different forms of Christianity and Islam.

8 See [Absolute truth has the major defect of being multiple](#), with a note on Thomism.

9 The oneness of God does not prevent the furnishing of Heaven with a whole supernatural bestiary that can rival polytheistic religions; besides the Trinity, we can see angels, guardian angels, archangels, seraphim, cherubim, thrones, Satan, devils, incubi, succubi; their diversity is further multiplied by the fact that each of them can take on different appearances such as serpents, goats, etc., and each of them can also take on different forms.

10 Perfection has the defect of being multiple, as the diversity of the gods shows us.

11 Methodologically, we should have started with "*Is the question of God's existence relevant*" and then seen that it is possible to answer it in the negative.

12 Variation on an idea by *Paul Valéry*.

In view of the fact that human beings (*homo sapiens*) have existed for 300,000 years, today's religions are extremely young (Christianity is only 2,000 years old). The rate of renewal of religions is sufficiently high to raise doubts as to whether any of them are immortal. A radical change in the economic system upsets the value system. In the Neolithic period, the practice of agriculture upset religious practices in order to bring Heaven into line with the new way of life. Today, the development of science and technology may be such a revolution that it could durably transform cultures, civilisations and religions.

To those who claim that religions are limited in number, I challenge them to make an exhaustive list: on the one hand, the beliefs of the Palaeolithic and Neolithic eras could not be reconstructed; on the other hand, new religious currents¹³ are constantly emerging. In addition, many people distance themselves from the doctrine they have been taught¹⁴, so that the belief system they adhere to is personal to them.

Finally, why shouldn't the ultimate explanation be hidden among possibilities that humans can't even consider? How can the religions of extraterrestrial civilisations be taken into consideration? Is their number nil, finite or infinite? There is no guarantee that the list, even when extended in this way, contains the true faith. Man has great difficulty in accepting his ignorance. The number of religions is potentially infinite¹⁵.

The likelihood that a given religion is true

The probability in question here can be broken down into a number of conditional probabilities, as outlined below:

A1 = event "Our soul is immortal";

$p(A1)$ = probability that our soul is immortal.

A2 = event "God exists as a personal being endowed with intelligence, conscience, freedom and power";

$p(A2 | A1)$ = probability that God exists, knowing that our soul is immortal.

A3 = event "Our moral behaviour has an influence on our future in the afterlife, and God judges, rewards or punishes us";

$p(A3 | A1 \text{ and } A2)$ = likelihood that our moral behaviour will influence our future in the afterlife, and that God will judge, reward or punish us, knowing that our soul is immortal and that God exists.

A4 = event "The true God is the God of the Bible and the faith that saves is Catholicism";

$p(A4 | A1 \text{ and } A2 \text{ and } A3)$ = probability that the true God is the God of the Bible and that the faith that saves is Catholicism, knowing that our soul is immortal, that God exists,

13 For example, this "ultimate religion" appeared in 2013. See [Adepts of Terminus](#).

14 Beware: refusing to believe in a single constituent element of a religion means declaring that it is not "the true" one; it also means attaching oneself to a different "religion".

15 i.e. without an upper bound.

that our moral behaviour has an influence on our future in the afterlife and that God judges, rewards or punishes us.

The probability discussed in this article is the product of these conditional probabilities

$$p = p(A1) \cdot p(A2 | A1) \cdot p(A3 | A1 \text{ and } A2) \cdot p(A4 | A1 \text{ and } A2 \text{ and } A3)$$

Each of the four factors must be non-zero for the product to be non-zero. Thus, the existence of God is not sufficient to found the argument of the Pascal's wager.

Bearing in mind that

- Eternal hell is a disproportionate and therefore unjust punishment;
- a loving mother does not engage in cruel blackmail, and it is improbable that God behaves less well than she does;
- no mother would throw some of her children into hell,

the probability that God will reward or punish us is nil:

$$p(A3 | A1 \text{ and } A2) = 0$$

As developed above, since the number of religions is potentially infinite, the probability that the Bible is true is nil:

$$p(A4 | A1 \text{ and } A2 \text{ and } A3) = 0$$

Moreover, the contradictions contained in the Bible reinforce the result:

[Matthew 13:41-42] *«The Son of Man will send out his angels, and they will weed out of his kingdom everything that causes sin and all who do evil. They will throw them into the blazing furnace, where there will be weeping and gnashing of teeth.»*

[Matthew 5:44] *«But I say to you, love your enemies, bless those who curse you, do good to those who hate you, and pray for those who spitefully use you and persecute you.»*

The precept "Do as I say, but not as I do" is hardly convincing.

The probability that a given religion is true is zero.

Religious relativism is supported by the gods themselves, who have striven to perform "miracles" in all religious communities, however diverse they may be. By choosing a doctrine at random, for example that of the family where nature gave birth to us, the probability that it is true is therefore nil. Claiming that "a given religion has a positive probability of being true" is an act of faith that does not stem from reason.

Pascal's wager.

If, as we have established, the probability of obtaining an infinite winning is nil, the expectation of winning is indeterminate, and Pascal's wager is ruined.

Rebuttal of Pascal's wager

Teaching Pascal's wager

It is legitimate to put Pascal's wager on the school curriculum. But it happens that some teachers, with little respect for secularism, develop this theme beyond what is required by the culture to make it a missionary tool, the aim being to prepare the pupils to welcome the faith¹⁶. When ideology prevails over the critical sense, the pupil must perceive it clearly. Reason then requires a counterweight to be opposed to it.

Pascal's wager

«But your bliss? Let us weigh the winning and the loss, betting that God is. Let us consider these two cases: if you win, you win everything; if you lose, you lose nothing. Wager, then, that He is, without hesitation.»
Blaise Pascal, Thoughts, 1670

The reasoning behind Pascal's wager is circular

Let us temporarily assume the value of one chance in two for the probability that God exists. If this is the case, one gains eternal life in Paradise, and the gain is infinite. If not, one loses nothing. The choice seems easy to make.

However, one must be wary of hidden assumptions. First of all, in the object of the wager, there is not only the existence of God, but also that the Catholic religion would be true and that religious practice would lead to Paradise. Secondly, it is prudent to examine what is covered by the term "infinite".

In mathematics, infinity appears as the limit of sequences. Consider for example the following suggested sequence:

in a game with a zero bet, every time you try, you win a thousand euros randomly every other time;
in a game with a zero bet, every time you try, you win a million euros randomly every other time;
in a game with a zero bet, every time you try, you win a billion euros randomly every other time,
and "so on".

However, the earth's resources are limited. To pronounce the "so on", one must admit that the supernatural exists. In other words, Pascal implicitly assumes the existence of God, which constitutes a vicious circle, a circular reasoning.

Generalised formulation of Pascal's wager

Initially, Pascal's wager was supposed to support the Catholic faith. But its central element - the possibility of a gigantic gain - is not specifically Christian and can be adapted to any doctrine that promises much. Its versatility even allows its principle to be exploited far beyond the religious realm. Its general formulation is: "The more wonderful the promise, the more justified it is to bet on it".

¹⁶ See [An example of the misappropriation of theme days for religious purposes](#).

Variations on Pascal's wager

An advertisement is displayed: *"If you buy this product, you will be happier. If you give it up, you are depriving yourself of a great service. Weigh the pros and cons, and don't hesitate to buy it!"*.

A speech by a politician: *"I'm going to improve the future of society, and you will be able to enjoy it at your leisure. It's worth betting on me: I'm counting on your vote!"*.

A healer who asks to have faith in his powers: *"If you trust me, your illness will disappear and you will be able to live a long time. Why not try, since there is so much to be gained?"*

The Christian priest who speaks in the name of Jesus: *"If you follow me, you will be rewarded with eternal happiness. Become my disciple, and your gain will be infinite!"*

Beyond charlatanism

An unverified hypothesis remains a hypothesis whose confirmation or rebuttal is postponed to the future. On the other hand, an "unverifiable hypothesis" loses its status as a hypothesis to become a fable or an ideology.

The principle of Pascal's wager puts the gullible to sleep by the immediate comfort provided by the hope of a miraculous payoff. The huckster is indifferent to true and false, for he is concerned only with pleasing, to his greatest advantage. **While the promises of charlatans can be invalidated by the absence of expected results, those of religious propagandists, being absolutely unverifiable, go further than charlatanism.**

For lovers of mathematical expectation

In the context of Pascal's wager, the bet, which is the Christian commitment, is fixed, or at least capped. In what follows, we assume it to be constant. Two variables remain: the winning and the probability of winning. In all games of chance, the more you aim for a high winning, the lower the probability of winning. For example, if you bet 1 euro, it is a fair game to be able to win 1000 euros with a probability of 1/1000; in another game, if you bet 1 euro, it is a fair game to be able to win 1,000,000 euros with a probability of 1/1,000,000. In this context, we can affirm that, when the winning tends towards infinity, the probability of winning tends towards 0.

What happens if the mathematical expectation of the net winning E of the game is non-zero? The formula to be considered is as follows:

$$p = \frac{E + \text{bet}}{\text{winning}}$$

While the players to whom the wager is addressed expect a net winning expectation close to zero, i.e. a game that is not too biased, believers imagine an immense net winning expectation. But this doesn't change anything: even if E is worth a billion, when the winning tends towards infinity, the probability of winning tends towards 0.

If the probability of winning is positive, to make the winning tend towards infinity is tantamount to admitting the supernatural. But this cannot be hypothesised, since that is precisely what we want to

prove. In the context of games of chance, the two assertions "the winning is infinite" and "the probability of winning is a real positive" are incompatible.

The above principle can now be corrected: «The more wonderful the promise, the less likely it is. And, in the end, it is implausible.»

To reinforce by another argument that "the probability of obtaining an infinite winning is null", we can refer to the document The probability that a given religion is true, which brings us to the following situation:

$$E = -bet + (winning) \cdot p$$

where (*winning*) tends towards infinity and p tends towards 0.

We are faced with an indetermination of the type "*infinite times zero*". Thus the mathematical reasoning comes to an impasse, and the conclusions drawn by Pascal are unfounded.

Mathematical aspects of Pascal's wager

Pascal's wager draws its arguments from the framework of games of chance.

The mathematical model of game theory

Many contemporary commentators formalise Pascal's wager with game theory, the foundations of which were described in the 1920s by Ernst Zermelo and developed by Oskar Morgenstern and John von Neumann in 1944. As Pascal died in 1662, it is an anachronism to interpret Pascal's wager by means of game theory, and there is a great risk of betraying his thought.

Moreover, infinity is treated as an entity, which poses problems of realism that we will discuss later.

Huygens' mathematical model

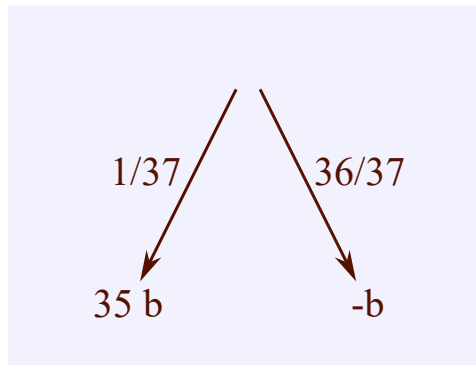
The first person to successfully pursue Pascal's work on games of chance was the Dutch mathematician and physicist Christiaan Huygens. In the period 1655 - 1657, while Pascal was still alive, he generalised Pascal's method to the case where the transition probabilities are unevenly distributed. He was also the first to use the term expectation (*Hoffnung*). It is this historical way of formalising Pascal's wager that seems relevant to me and that I have retained.

As far as infinity is concerned, it will not be treated as an entity, but as a limit.

The example of roulette wheel: bet on a single number

The play mat has 37 squares numbered from 0 to 36. Playing "single" consists in placing the bet, noted b , on a single square. If the chosen number comes up, the player wins 36 times the bet, which is the gross winnings from which the bet must be deducted to obtain the net winning. In our model, we do not take into account what the player usually leaves for the casino staff. The random variable of the game is

$$\left\{ \begin{array}{ll} -b + 36b = 35b & \text{with a probability of } 1/37 \\ -b & \text{with a probability of } 36/37 \end{array} \right\}$$



The mathematical expectation of the net winning is

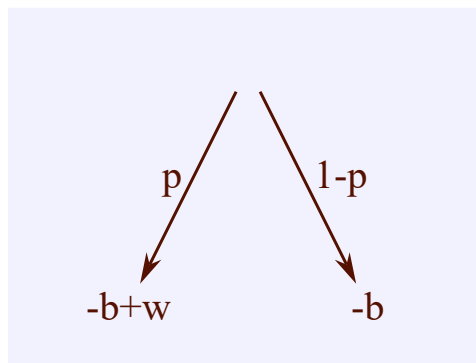
$$E = 35b \cdot \frac{1}{37} + (-b) \cdot \frac{36}{37} = \left(-\frac{1}{37}\right) \cdot b$$

This means that, over a large number of games, the player loses on average 1/37 of his bets to the casino. It is a game with negative mathematical expectation.

The formula for mathematical expectation

To generalize, let us consider a game of chance in which, for a bet b , you can get the winning w with a probability p . The random variable is

$$\left\{ \begin{array}{ll} -b+w & \text{with a probability of } p \\ -b & \text{with a probability of } 1-p \end{array} \right\}$$



The mathematical expectation of the net winning is

$$E = (-b+w) \cdot p + (-b) \cdot (1-p) = -b+w \cdot p$$

Remember

$$E = -b+w \cdot p$$

From the latter formula is derived the expression of the probability:

$$p = \frac{E+b}{w} \quad \text{where } w > 0$$

Conditions $0 \leq p \leq 1$ result in $0 \leq (E+b) \leq w$

The case of fair games

If the mathematical expectation of the net winning is zero, the game is said to be fair. The probability of winning is then $p = b/w$. For example, by betting 1 €, it is a fair game to be able to win 1000 € with a probability of 1/1000; in another game, by betting 1 €, it is fair to be able to win 1,000,000 € with a probability of 1/1,000,000. When the winning is huge, the probability of winning is tiny. With a constant bet, if the winning tends towards infinity, the probability of winning tends towards 0:

$$p = \lim_{w \rightarrow \infty} \frac{b}{w} = 0$$

Case of games with high mathematical expectation

If the mathematical expectation of the net winning is positive, a generous sponsor is needed to contribute to the financing of the winning. While the players to whom the wager is addressed wait for a mathematical expectation close to zero, i.e. a game not too biased, believers imagine an immense mathematical expectation. Suppose for example that E is worth a billion times the bet. Since $(E+b)$ is constant, the limit probability remains zero:

$$p = \lim_{w \rightarrow \infty} \frac{E+b}{w} = 0$$

i.e. with a constant bet, however great the mathematical expectation, when the winning tends towards infinity, the probability of winning tends towards 0.

To be convinced of this, consider the following sequence of winnings: $10(E+b)$, $100(E+b)$, $1000(E+b)$, $10000(E+b)$, and so on. The corresponding probabilities will have the values:

w	p
$10(E+b)$	0.1
$100(E+b)$	0.01
$1000(E+b)$	0.001
$10000(E+b)$	0.0001
...	...
∞	0

To obtain this result, it is not necessary for the mathematical expectation to be constant, but only for its absolute value to be capped by an upper bound, i.e. there is a number E such that, for all winnings, $|\text{mathematical expectation}| \leq E$.

In the end, Pascal's wager is unfounded.

Discussion

Question or objection

I still have a doubt. For me, the probability that God exists may be small, but positive.

Answer

Let's take a specific Church that offers you salvation on the condition that you pay it, for example, €100 per month. The probability that this is true is small, but one can have a doubt and judge that this probability is not nil. If you do not make the payments, it is because you do not support to the end the idea of taking into account events of low probability. What is the reason for this? Presumably because it is impossible to take into account everything that might possibly be possible. You have to decide what is serious and credible, and reject everything else.

Personally, I don't have the kind of doubt that your question evokes, because I firmly believe that I am not endowed with immortality. So Pascal's wager is pointless.

Could it be envisaged that, with w tending towards infinity, E also tending towards infinity?

1. We would end up with an indeterminacy of the "infinity over infinity" type; the limit probability would be undetermined, and we would have failed to show that the limit probability is positive.
2. Pascal concedes that the probability of winning could be $1/2$ and decrees that the bet is zero. Thus, for him, the formula to consider is $E = w/2$. For example,
 - if a game allows you to win 1000 €, you would win an average of 500 € each time you try it with a zero bet;
 - if a game allows you to win 1,000,000 €, you would win an average of 500,000 € each time you try it with a zero bet;
 - if a game allows you to win 1,000,000,000 €, you would win an average of 500,000,000 € each time you try it with a zero bet;
 - By prolonging this family of fairy tale games to infinity, we obviously obtain a miracle, in this case Pascal's wager.

Unfortunately, as natural resources are finite, to go to the limit, it is necessary to assume that the supernatural exists. But this approach consists in assuming that God exists in order to prove that God exists. It is a vicious circle. We can conclude that, if the probability is fixed, the winning cannot be stretched to infinity.

3. If the aim is to convince sceptical players, it is unconvincing to call for an act of faith that requires accepting a priori that the game is miraculous, as this is a characteristic of scams. Since you have to be a believer for the wager to be convincing, the wager loses much of its substance: it is not intended to incite non-believers to become believers, but only believers to become practitioners.
4. One would have accepted as a hypothesis that "when w tends towards infinity, the mathematical expectation E also tends towards

infinity", which is an avatar of Pascal's Wager as described in point 2 above. Now, in a reasoning, admitting what one wants to demonstrate as a hypothesis is called a vicious circle.

5. By making a promise - paradise - which commits a third party over whom he has no control - God - the supporter of Pascal's wager implements a process similar to that of a swindler. On this subject, read the fourth objection [see p. 17: *Reversal of the wager*].

What to answer to "The probability of obtaining an infinite winning may be close to 0, but it does not tend towards 0! It is a real positive fixed"?

1. The approach consists in situating Pascal's wager among the games of chance whose winnings are gigantic, close to infinity. The expression "when the winning tends towards ..." simply means that a comparison is made with neighbouring games whose winnings are gigantic, close to infinity.
2. One should be able to approach the infinite winning through a sequence of increasing winnings and observe the impact this has on the probability of winning. Let us name ϵ the "fixed positive real". We can calculate the winning $w = (E+b)/p$ which corresponds to $p=\epsilon$: it is $w_\epsilon = (E+b)/\epsilon$. As the mathematical model produces a sequence of probabilities that tends towards zero, the consequence is that all winnings that are greater than w_ϵ correspond to probabilities of winning that are less than ϵ :

w	p
...	...
w_ϵ	ϵ
$10 w_\epsilon$	$\epsilon/10$
$100 w_\epsilon$	$\epsilon/100$
...	...
∞	ϵ or 0?

Uneasiness.

3. The limit is the continuous extension of the mathematical law of the game. When the so-called "fixed positive real" differs from the limit, it means that we are in the presence of a jump, a discontinuity, and that the mathematical law of the game is not respected to the end. **In a game of chance, the two assertions "the winning is infinite" and "the probability of winning is a positive real" are incompatible.** Pascal's wager is not in the line of games of chance, but in a break with them. Pascal's reasoning goes beyond the framework in which he placed himself. If it is a kind of miracle, it will have to be explained, preferably by reason rather than by faith.
4. Moreover, by substituting the assertions "the winning is infinite" and "the probability of winning is a real positive" in the formula

$E = -b + w \cdot p$, we obtain an infinite mathematical expectation, which can be approached by "if the promise of winning is gigantic, then one is almost certain to become immensely rich". This is an assertion that the victims of charlatans wrongly feed on.

Reversal of Pascal's wager

What minimises loss, Christianity or atheism?

God does not promise paradise, but Judgement Day. By making a promise - Paradise - that commits a third party over whom he has no control - God - the proponent of Pascal's Wager is using a process similar to that used by swindlers. Since the wager focuses on the reward of paradise, if, more honestly, we also take into account hell, we come to the opposite conclusion.

Since the number of religions is unlimited¹⁷, in order to simplify the reasoned choice, let us choose two clear-cut positions, a family of religions and an absence of religion: Christianity and Atheism, and compare them.

According to Christianity, our path of life¹⁸ ends by splitting in two: on one side purgatory¹⁹ then eternal paradise, on the other side hell and eternal suffering. Certainly the most interesting perspective is paradise. But, according to Luke 13:23-25,

"Someone asked him, "Lord, are only a few people going to be saved?" He said to them, "Make every effort to enter through the narrow door; because many, I tell you, will try to enter and will not be able to. Once the owner of the house gets up and closes the door, you will stand outside knocking and pleading, 'Sir, open the door for us.' "But he will answer, 'I don't know you or where you come from.'"

Matthew 22:13-14 says something similar:

"Then the king told the attendants, 'Tie him hand and foot, and throw him outside, into the darkness, where there will be weeping and gnashing of teeth.' "For many are invited, but few are chosen.'"

And again [Matthew 19:24]:

"Again I tell you, it is easier for a camel to go through the eye of a needle than for someone who is rich to enter the kingdom of God."

Thus, the number of losers is far greater than the number of winners. Hell is eternal and represents an infinite loss. From the Christian point of view, on statistical average, there is, in death, more to lose than to gain. For a moderate Christian, death is an infinitely unfavourable event²⁰. I'd rather not go to Santa Claus if he's going to give out more punches than presents. Many contemporaries have applied themselves to sweetening Christianity. However, to downplay the importance of sin and hell, they are no longer Christians, but followers of a personal doctrine.

The clear face of man constructs religion as a means of softening reality. At the same time, his dark side fills religion with dreadful dangers that inspire fear and dread. Salvation is reserved for a

17 See the second objection [p. 5: *On the likelihood that a given religion is true*].

18 Is the imperfection of creation a manifestation of divine solitude? Could the spectacle of life on earth be, for the Creator, only a kind of reality show intended for his entertainment? Is man only an actor forced to serve in a gigantic and cruel life-size role-playing game? It is better to think that man created God in his own image.

19 Concerns only a part of Christians, especially Catholics.

20 Fear enables the Church to strengthen its power over consciences.

highly motivated and committed elite. The common man is the loser. Overall, religion loses its saving value and becomes negative. This is the inconsistency of the Bible.

For the atheist²¹, our life ends with our definitive disappearance, our total annihilation. From the point of view of the calculation of probabilities, for death, the mathematical expectation of the net winning is nil. Atheism proposes a less unfavourable death than Christianity. Consequently, the calculus of probability recommends that we do not follow up Pascal's wager.

Let's sum up: On the one hand, if the Last Judgement does take place, the most probable final destination is hell. On the other hand, if the Last Judgement does not exist, nothing happens after death, neither reward nor punishment. In any case, there is no point in investing in faith.

While the religious tradition proposes to us to succeed in our death, contemporary man is primarily concerned with succeeding in life. Isn't one of the fundamental functions of belief to alleviate our fears? We can rightly refuse to spend our existence oppressed between the carrot and the stick.

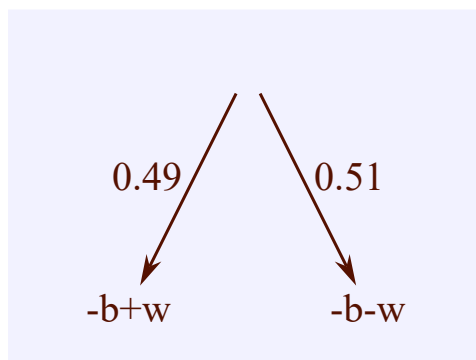
To gain freedom, all you have to do is adopt the right perspective. Since we only have one life, we don't want to play the dice: we have to make the choice that, in the worst case, allows us to live in the perspective of the least damaging end possible²². Since it is better to fall asleep forever than to risk suffering eternally, the atheist can envisage his existence in a relatively more serene and less anxious way than the Christian.

Mathematical model of the Wager that minimises losses

If the Last Judgement takes place, what is the probability of reaching paradise? 10 %? 1 %? To conduct the calculation, it is enough that this probability is lower than 1/2, let us say 49 %. The random variable is then

$$\left\{ \begin{array}{l} -b+w \quad \text{with a probability of} \quad 0.49 \\ -b-w \quad \text{with a probability of} \quad 0.51 \end{array} \right\}$$

- in $(-b + w)$, $(+w)$ designates an immense winning that will be stretched towards the infinite to represent paradise; $(-b)$ is the bet and represents the religious commitment;
- in $(-b - w)$, $(-w)$ represents an immense loss that will be made to tend towards minus infinity to represent hell.



21 A point of view of a particular current of atheism has been adopted here. Others are closer to agnosticism. Finally, some admit forms of survival in the afterlife without any relation to deities, for example in Buddhist traditions.

22 In other words, choose according to the criterion of the lesser evil.

The mathematical expectation of the net winning in the case where there is Judgement Day is

$$E = (-b + w) \cdot 0.49 + (-b - w) \cdot 0.51 = -b - 0.02 \cdot w$$

If we make the winning w tend towards infinity, the expectation of this case tends towards minus infinity:

$$E(\text{with Judgement Day}) = -\infty$$

On the other hand, in the case where there is no Judgement Day, the winning is nil, so the expectation of the net winning is equal to the loss of the bet:

$$E(\text{no Judgement Day}) = -b$$

You are therefore invited to a game with two outcomes, both of which are unfavourable. In such a situation, the best choice is to refuse to play. Pascal's wager is a game to be avoided.

Given that everyone, often by religious clan, sets its own dogmas, none of which are universal, the believers who incite me to participate in their arbitrary "game" are not credible.

Conclusion

The possibilities that cannot be excluded by evidence are so numerous and varied that a bet can only be placed on those that are solidly supported. The others must be deliberately ignored.

The probability of the existence of a personal God is too low for there to be any interest in getting involved in religion, and even lower still for a God who would have dictated guidelines to us. In Pascal's wager, the game is not worth the candle. One can, without damage, give up betting and move away from the gambling table of beliefs, because it is more useful and constructive to invest one's time and energy in the secular field.

Wisdom consists in detaching oneself from utopias, i.e. practising religious indifference.

Exploitation of the wager

The indoctrinators use the method of slippage a lot: believing in God implies - or at least we are led to believe - adhering to Catholicism, the only true faith. And, against all logic, the amalgam works: because they believe in God, many people feel morally obliged to be Christians. The state can then be committed to imprinting these "truths" in the minds of all schoolchildren.

Epilogue

What if, instead of betting on God, we wager on man: humanism inherited from the Age of Enlightenment, human rights, democracy and the quest for the common good?

What if we reserved our commitment to what is universal, away from communities of believers?

What if teaching were to be based not on the authority of the Church, but on the development of critical thinking, independence of mind and intellectual autonomy, within a secular framework?

Wouldn't reason be better served?