The psychology of Global Warming

"We have a great deal of difficulty seeing anything other than human causation"

- J. Anderson Thomson

Peter Stallinga, University of the Algarve, 11 december 2013

Overview

- What is Global Warming?
- The catastrophic scenario meme
- Cognitive biases
- Game Theory (Pascal's Wager)

Catastrophic Scenario Meme

A **meme** (Dawkins) is an idea in society obeying Darwin's rules of survival

A meme survives if the host (society) is receptive to the idea like a virus surviving in a correct environment (Ex. human body)

Catastrophic end-of-world thoughts fit well in our society

A meme does not have to be 'true' or 'good' to propagate (just like a virus does not have to be true or good)

Catastrophic Scenario Meme

Armageddon*

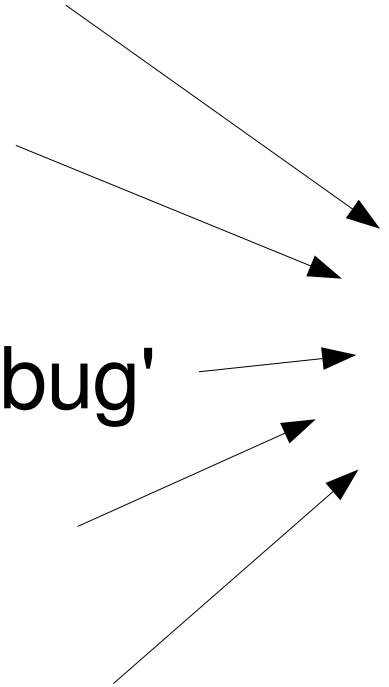
Acid Rain

Ozon Layer

Y2K 'millennium bug'

H1N1

Global Warming



CSM:
1) The world will end
2) Humans are to blame ('sin')
3) Change behavior
4) 'Priests' are exempt

Example: Global Warming. Hand over all your money to Mr. Al Gore, our savior! Or to the United Nations 'church'.

*: See Wikipedia with a list of 170 end-of-world predictions

Cognitive bias

'Cognitive bias' is a general term for a wrong estimation of the probabilities of scenarios.

There are literally hundreds of cognitive biases. The most famous one is

Cognitive dissonance

If two 'ideas' are 'contradicting' one idea is ignored.

- Global Warming

- Planet is cooling (fact ignored)

(The probability that AGW is true should be altered by the fact, but it isn't)

Remember “Science is dead” (see stallinga.org): In modern science, scientists are allowed to be non objective (p.23)

'Backfire effect'

Leon Festinger (1957). Contradicting evidence is seen as **proof** of theory.

”It was discovered in a participant observation study of a cult which believed that the earth was going to be destroyed by a flood, and what happened to its members when the flood did not happen. While fringe members were more inclined to recognize that they had made fools of themselves and to ”put it down to experience”, committed members were more likely to re-interpret the evidence to show that they were right all along (the earth was not destroyed because of the faithfulness of the cult members)”*

As an example: Iceberg in front of coast of Australia is proof of AGW (because ice 'breaks off' because of warming)

*: http://www.simplypsychology.org/cognitive-dissonance.html

Backfire: Australian ice

DN CIÊNCIA

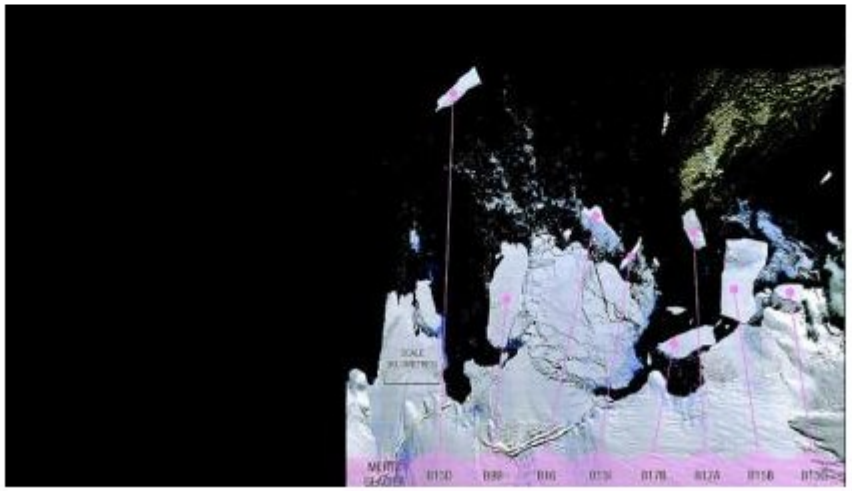
INÍCIO DESPORTO CARTAZ BOLSA GENTE ESPECIAIS GALERIAS ARQUIVO

Saúde Biosfera Sabia Que Tecnologia

Portugal Globo Economia Ciência Artes TV & Media Opinião Pessoas

Icebergue colossal navega na direcção da Austrália

10 Dezembro 2009



FERRAMENTAS

"According to Australian scientists, it is a rare event that since XIX has not been observed"
" ... it is interpreted as a consequence of global warming"

Ice forms at low temperatures! Duh!
It is as cold/warm now as in XIX century. No warming! Duh!

Cognitive biases

Pessimism bias: Tendency to overestimate likelihood of negative outcomes. (Catastrophic scenarios. AGW)

Positive bias: Ignore possibility negative outcome

Backfire effect: Disconfirming evidence is seen as proof (ex. Aus. ice)

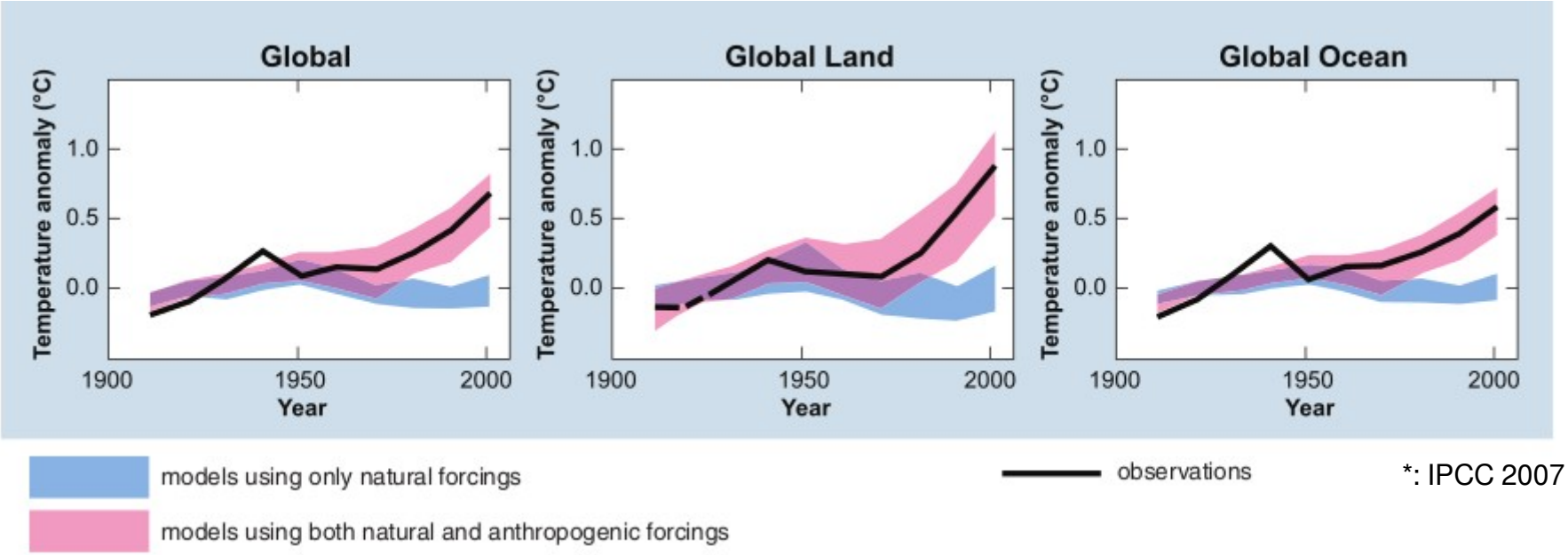
Irrational escalation: Justify increased investment in a decision based on cumulative prior investment despite new evidence suggesting the decision was wrong. (ex. Austerity)

Negative bias: Pay more attention to negative items (weather disasters). Used for filtering of data. (ex. Philippines storm)

Reactance bias: “Even though I know I should act, I prefer to chose to not act (to have the idea of freedom of choice)”

Affect heuristic: “For sure planet will heat up” vs. “with 95% certainty, planet will heat up”. (By second statement is considered more likely the planet will heat up). Technique used in brainwashing population.

Backfire: Temperature



*: IPCC 2007 report

In 2000: Natural effects: zero. Human effects: 100%
In 2013 (after cooling): “Pause in AGW”

Remember: Bayesian adjustment of model is not science. Science is about making a prediction to falsify a model°

°: http://www.stallinga.org/AcadActiv/Presentations/ScienceIsDead.pdf

Gambler's Fallacy

After 20 times red. “Next it **must** be black!”

Hindsight bias

Hindsight bias = Opposite of Gambler's Fallacy. The I-knew-it-all-along fallacy

After 20 times red: “Roulette tables must be biased, next will be red again!”

This, is the basis of **empirical forecasting**. Parameters of distribution are based on past data (without model!) and prediction of future is done on these parameters

Always leads to extrapolation of trends
Climate forecasting has always been mere extrapolation of trends

Hindsight bias

Always leads to extrapolation of trends

Climate forecasting has always been mere extrapolation of trends

1973: Global Cooling (CSM)

The Cooling World

There are ominous signs that the earth's weather patterns have begun to change dramatically and that these changes may portend a drastic decline in food production—with serious political implications for just about every nation on earth. The drop in food output could begin quite soon, perhaps only ten years from now. The regions destined to feel its impact are the great wheat-producing lands of Canada and the U.S.S.R. in the north, along with a number of marginally self-sufficient tropical areas—parts of India, Pakistan, Bangladesh, Indochina and Indonesia—where the growing season is dependent upon the rains brought by the monsoon.

The evidence in support of these predictions has now begun to accumulate so massively that meteorologists are hard-pressed to keep up with it. In England, farmers have seen their growing season decline by about two weeks since 1950, with a resultant over-all loss in grain production estimated at up to 100,000 tons annually. During the same time, the average temperature around the equator has risen by a fraction of a degree—a fraction that in some areas can mean drought and desolation. Last April, in the most devastating outbreak of tornadoes ever recorded, 148 twisters killed more than 300 people and caused half a billion dollars' worth of damage in thirteen U.S. states.

Trend: To scientists, these seemingly disparate incidents represent the advance signs of fundamental changes in the world's weather. The central fact is that after three quarters of a century of extraordinarily mild conditions, the earth's climate seems to be cooling down. Meteorologists disagree about the cause and extent of the cooling trend, as well as over its specific impact on local weather conditions. But they are almost unanimous in the view that the trend will reduce agricultural productivity for the rest of the century. If the climatic change is as profound as some of the pessimists fear, the resulting famines could be catastrophic. "A major climatic change would force economic and social adjustments on a worldwide scale," warns a recent report by the National Academy of Sciences, "because the global patterns of food production and population that have evolved are implicitly dependent on the climate of the present century."

A survey completed last year by Dr. Murray Mitchell of the National Oceanic and Atmospheric Administration reveals a drop of half a degree in average ground temperatures in the Northern Hemisphere between 1945 and 1968. According to George Kukla of Columbia University, satellite photos indicated a sudden, large increase in Northern Hemisphere snow cover in the winter of 1971-72. And a study released last month by two NOAA scientists notes that the amount of sunshine reaching the ground in the continental U.S. diminished by 1.3 per cent between 1964 and 1972.

To the layman, the relatively small changes in temperature and sunshine can be highly misleading. Reid Bryson of the University of Wisconsin points out that the earth's average temperature during the great Ice Ages was only about 7 degrees lower than during its warmest eras—and that the present decline has taken the planet about a sixth of the way toward the Ice Age average. Others regard the cooling as a reversion to the "little ice age" conditions that brought bitter winters to much of Europe and northern America between 1600 and 1900—years when the Thames used to freeze so solidly that Londoners roasted oxen on the ice and when iceboats sailed the Hudson River almost as far south as New York City.

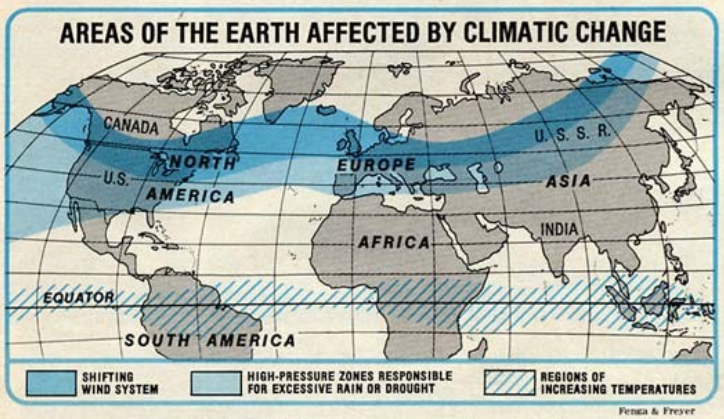
Just what causes the onset of major and minor ice ages remains a mystery. "Our knowledge of the mechanisms of climatic change is at least as fragmentary as our data," concedes the National Academy of Sciences report. "Not only are the basic scientific questions largely unanswered, but in many cases we do not yet know enough to pose the key questions."

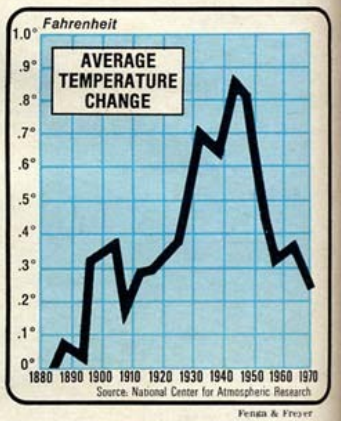
Extremes: Meteorologists think that they can forecast the short-term results of the return to the norm of the last century. They begin by noting the slight drop in over-all temperature that produces large numbers of pressure centers in the upper atmosphere. These break up the smooth flow of westerly winds over temperate areas. The stagnant air produced in this way causes an increase in extremes of local weather such as droughts, floods, extended dry spells, long freezes, delayed monsoons and even local temperature increases—all of which have a direct impact on food supplies.

"The world's food-producing system," warns Dr. James D. McQuigg of NOAA's Center for Climatic and Environmental Assessment, "is much more sensitive to the weather variable than it was even five years ago." Furthermore, the growth of world population and creation of new national boundaries make it impossible for starving peoples to migrate from their devastated fields, as they did during past famines.

Climatologists are pessimistic that political leaders will take any positive action to compensate for the climatic change, or even to allay its effects. They concede that some of the more spectacular solutions proposed, such as melting the arctic ice cap by covering it with black soot or diverting arctic rivers, might create problems far greater than those they solve. But the scientists see few signs that government leaders anywhere are even prepared to take the simple measures of stockpiling food or of introducing the variables of climatic uncertainty into economic projections of future food supplies. The longer the planners delay, the more difficult will they find it to cope with climatic change once the results become grim reality.

—PETER GWYNNE with bureau reports





Illusionary correlation

See correlation between things that are uncorrelated or inversely correlated.

'Cause and effect'

If temperature has gone up, and the only observable parameter that seemingly has changed is CO2, then CO2 must be responsible for these temperature changes!

(We can now do very sophisticated third-quadrant, neural network, principal component, statistical backtracking, non-linear regression optimization, Diqhead-Eediot fitting procedure, but CO2 will still be responsible)

Especially dangerous when you only look at CO2 and for instance refuse to observe the sun activity that might have explained it as well. Search for proof instead of science!
(Remember: In the Scientific Method, you have to convince people your model is the only model that explains the data*)

*: http://www.stallinga.org/AcadActiv/Presentations/ScienceIsDead.pdf

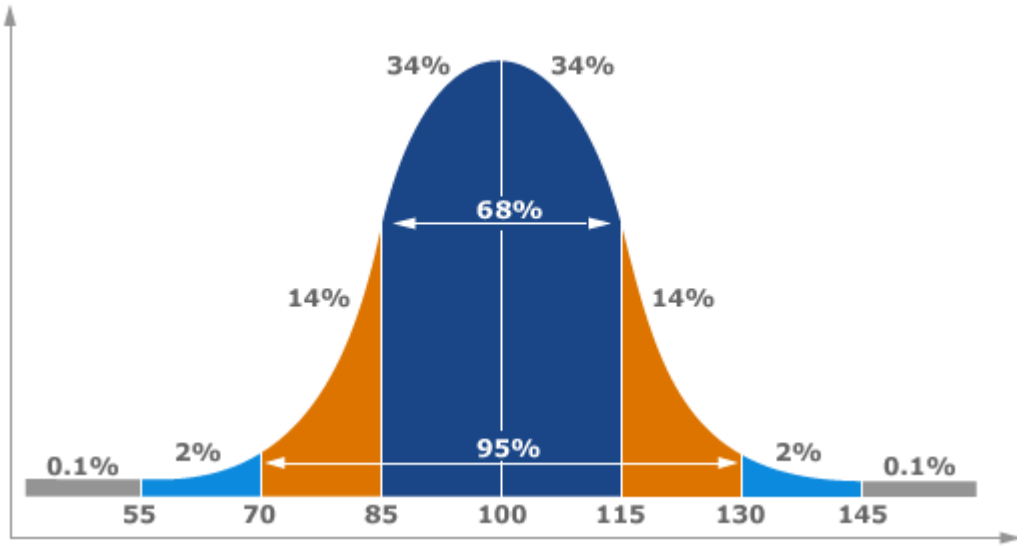
Ludic Fallacy

Nassim Nicholas Taleb, The Ludic Fallacy, "Deluded by the simplicity of the bell curve"

Falsely assuming nature is a stochastic process. Like 'throwing dice' / 'flipping coins'

Reality is not a bell curve (combination of a large number of 'coin flips') but a scalable function

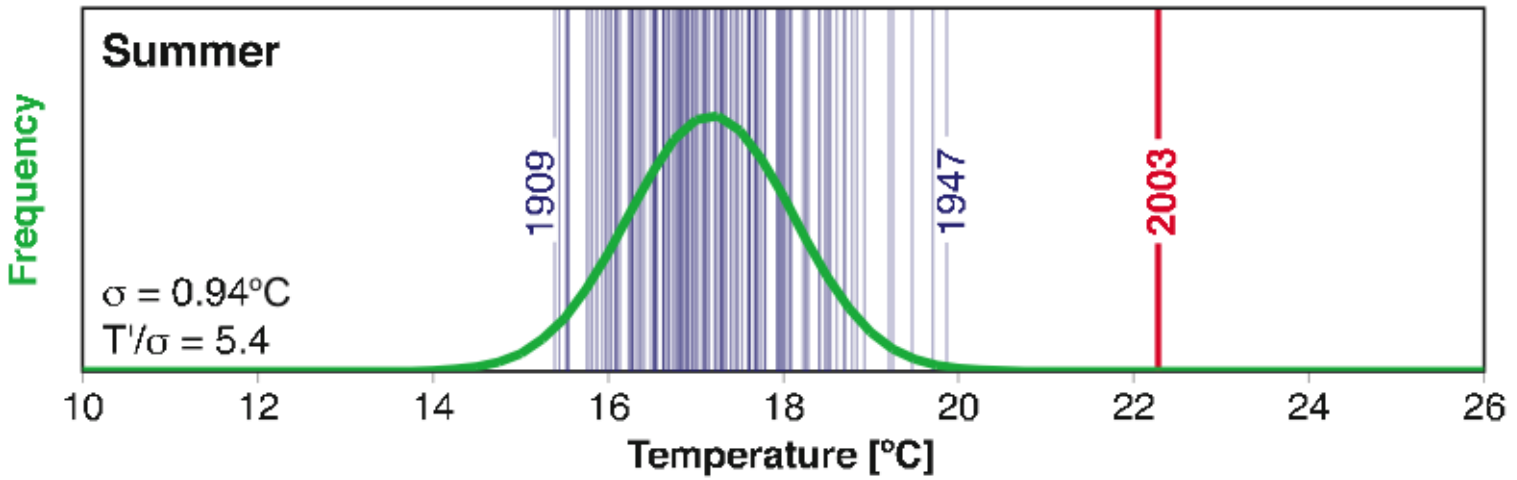
Result: every now and then an 'impossible' event, 'Black Swan', occurs that destroys everything (Ex. Stock market crash)



Ludic Fallacy

Stallinga: Apply this to the weather/climate:

Nature is not flipping coins.
"30% chance of rain tomorrow" is not that tomorrow nature will flip a coin and decide if it will rain or not. The chance of rain is either 0% or 100%, but ***our*** uncertainty makes us attribute a probability.



IPCC FAQ 9.1
Using bell curve to prove climate changes in Switzerland

Cognitive biases

False consensus: Overestimate how much other people agree with you ('Emperors new clothes')

Expectation bias: Select data that agree with your theory, “Trust your model, facts can be disposed of!”

Confirmation bias: Looking for proof of your model. Also called 'affirming the consequent':
“If P then Q. Let's look for Q”. While science should be “If P, then **not** R. Let's look for R”

Sanctification bias: Thinking you are in possession of The Truth and others are flawed, evil and misguided. (Ex.: Equivalencing 'AGW skepticism' by 'denying The Holocaust')

Bias blind spot: Thinking you do not have a cognitive bias (reason why you need double-blind, triple blind research methods)

Remember: In modern (stupid) definition of science people are allowed to have a blind spot, or a bias in general*. Latest news, “referees can use 'gut feeling' to analyze manuscripts”º

*: http://www.stallinga.org/AcadActiv/Presentations/ScienceIsDead.pdf
º: http://www.nature.com/news/peer-reviewers-urged-to-speak-their-minds-1.14302

Why do people **belief** things?

- **Chemical**. It makes them feel good (guilty, etc. CSM)

- **Denial**. Denying facts. Cognitive dissonance.

Why do people **belief** things?

- **Evidence** (seeing is believing). Not always works ("it's absolutely threatening to admit you are wrong". Nylan)

One of the strongest arguments for the existence of God is that he is **not** showing his presence.

One of the proofs of conspiracies is that no evidence is visible. ("They hide it, duh!")

Why do people **belief** things?

- **Inertia** or **tradition**. “Our group have always believed X, I am a proud member of the group”

A successful propagation of belief is thus by teaching it to children as young as people.

It is very difficult to get rid of a belief, once acquired.

UN-endorsed AGW teaching packages exist for primary schools

Why do people **belief** things?

- **Faith**. Believe to believe. No reason used.

“Reason is the biggest enemy that faith has” (Martin Luther).

Why do people **belief** things?

- **Induction**. Believe because it is the logical consequence of something else believed

Why do people **belief** things?

- **Authority**. Believe because an intelligent person told me so

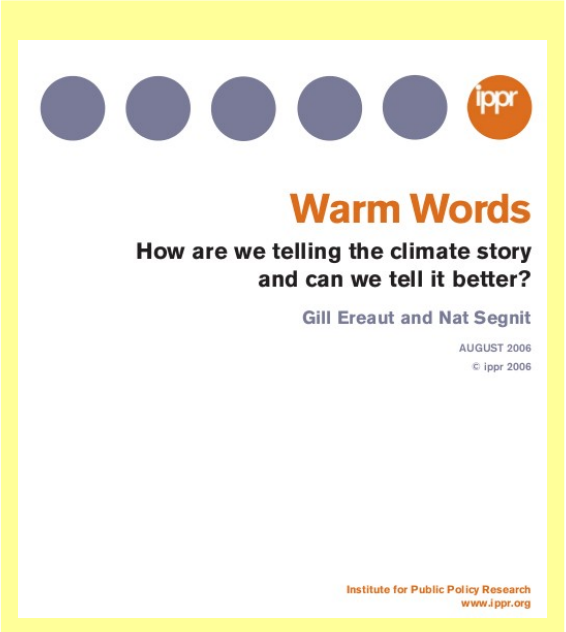
Problem: Dunning-Kruger effect. “Everyone who knows what they are talking about agrees with me, and every one who doesn't, wears a tin foil hat”

(People overestimate their own relative intelligence on a subject where they already have a belief)

“He has a PhD and Aggregation in physics and is a university professor, but look how stupidly he is denying the Global Warming that is obviously true, as even I can see with my BA diploma. He is completely crazy”

Why do people **belief** things?

- **Brainwashing**. Repeated exposure to an idea presented as the truth



”The task of climate change agencies is not to persuade by rational argument ... Instead, we need to work in a more shrewd and contemporary way, using subtle techniques of engagement ... The ’facts’ need to be treated as being so taken-for-granted that they need not be spoken. Ultimately, positive climate behaviours need to be approached in the same way as marketeers approach acts of buying and consuming ... It amounts to treating climate-friendly activity as a brand that can be sold. This is, we believe, the route to mass behaviour change”

*: Brainwashing is called 'persuasion strategy' in political research jargon:
“Our hope is that researchers will design persuasion strategies that effectively change people’s implicit attitudes without them having to suffer through a disaster”[o]

[o]: Rudman, Physochological Sci. (2013). DOI: 10.1177/0956797613492775

Why do people **belief** things?

- **Pascal's Wager**.

“I do not know whether God exists, but I know that I have nothing to gain from being an atheist if he does not exist, whereas I have plenty to lose if he does. Hence this justifies my belief in God”

Since we are scientists and engineers,
let's put this in a Game Theory decision table!

Ignoramus

Table I: Ignoramus

	X believing *	X not believing	probability
AGW true	+10	−1000	50%
AGW false	−1	+10	50%
Expected reward	4.5	−450	

*: winning strategy

Asymmetric rewards: “Better safe than sorry”
An ignoramus will belief, because there is no big harm in doing so, while there may be terrible harm in not believing

Active ignoramus

Table II: Passive or Active Ignoramus

	X believing Active *	X believing Passive	X not believing Passive	X not believing Active	probability
AGW true	+100	+10	−1000	−10000	50%
AGW false	−10	−1	+10	100	50%
Expected reward	+45	+4.5	−450	−4500	

*: winning strategy

The stake can be increased by trying to convince others of your belief 'Jehova's Witness behavior'. Knocking your door

Educated person

Table III: Passive or Active Academic

	X believing Active	X believing Passive *	X not believing Passive	X not believing Active	probability
AGW true	+100	+10	−1000	−10000	5%
AGW false	−10	−1	+10	+100	95%
Expected reward	−4.5	−0.45	−40.5	−405	

*: winning strategy

An educated person (with knowledge of probabilities) will be rather 'agnostic' (passive believer)

Skeptic

Table IV: Skeptic

	X believing Active	X believing Passive	X not believing Passive	X not believing Active *	probability
AGW true	+100	+10	+10	+100	5%
AGW false	−10000	−1000	+100	+1000	95%
Expected reward	−9495	−949.5	+95.5	+955	

*: winning strategy

A skeptic knows the rewards table as well and becomes an active non-believer

Scientist

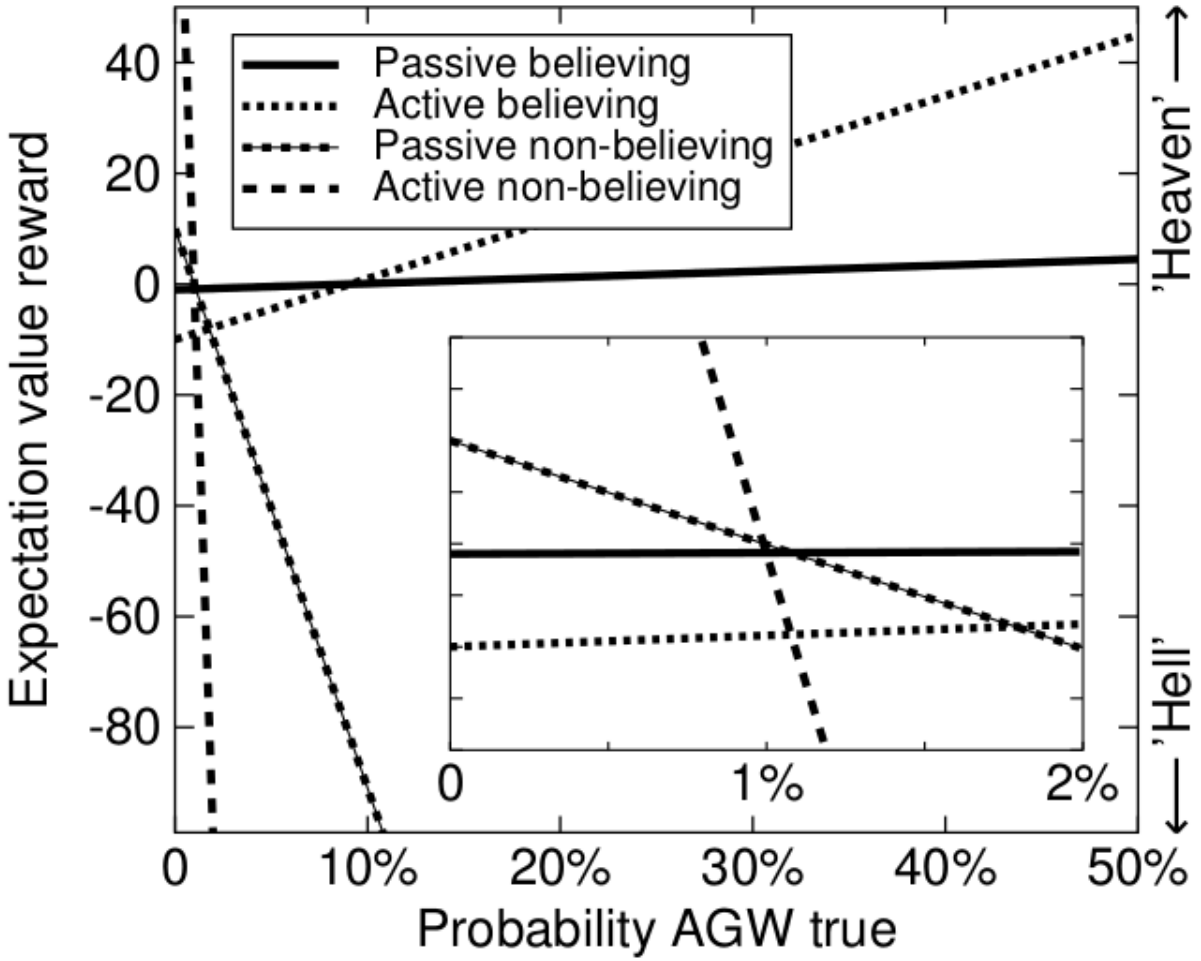
Table V: Scientist

	X believing (AGW or not-AGW)	X not believing anything *	probability
AGW true	−1000	+10	x
AGW false	−1000	+10	100%−x
Expected reward	−1000	+10	

*: winning strategy

Science: Absolutely no difference if true or false (see talk ScienceIsDead)

Overview



People (and society) will go from 'active believer' to 'passive believer' to 'active non-believer'!

Conclusions

Dawkins' Meme. Catastrophic Scenario Meme (CSM)

What are cognitive biases (wrong estimations of probabilities)?

Why people believe something?

Pascal's Wager applied to the belief in AGW:
People (and society) will go from 'active believer' to 'passive believer' to 'active non-believer'!*

Special thanks: Igor Khmelinskii, Paulo Pedro

*: Stallinga & Khmelinskii, Rev. of Psychol. & Phil. (2013)