Fallacies and Biases

how NOT to think logically



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press "h" for help on keyboard controls

How logical are we really?



We may all be *capable* of listening to reason but...

- We get fooled by fallacies.
 - Fallacies are bad arguments that can look good if we are not paying attention
- Our thinking gets short-circuited by cognitive biases.
 - Cognitive biases are "bugs" in our mental operating systems that convince us that we know what just isn't so.

types of fallacies

Fallacies of relevance

• Rely on irrelevant information to push the argument along.

Fallacies of ambiguity

• Depend on multiple meanings of key terms to fool us.

Fallacies of presumption

• Rely on hidden assumptions to establish their conclusions.

NOTE: fallacies are typically invalid arguments that rely on tricks to close the gap between premises and conclusions.

types of cognitive biases

Hot biases

• Motivated irrationality: ways in which our thinking goes off the rails when its results would conflict with what we want.

Cold biases

• *Unmotivated irrationality:* mistakes in reasoning that are by-products of the way our minds are built.

NOTE: cognitive biases are the result of the complexity of our mental "software" and the fact that our reasoning minds are not entirely separate from our emotional and perceptual minds.

fallacies of relevance

fallacies of

fallacies of presumption

hot biases

cold biases

appeal to authority

Stephanie is a scientist and she says that vaccines cause autism.

Thus vaccines are not as safe as the doctors are telling us.

While we often have no choice but to rely on experts, simply appealing to their expertise is never a good idea. Instead we should actually see what their claims are based on, otherwise we still have no real reason to believe what they tell us.

fallacies of relevance

fallacies of ambiguity

fallacies of

hot biase

cold biases

ad hominem

My trainer has me on a strict diet and says that my health will be better if I lose some weight.

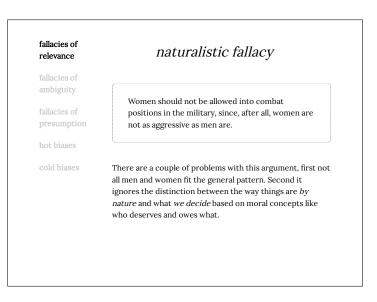
But I saw him binge eating ice cream the other day, so I guess his advice is worthless.

Even if we might attack someone for not "praticing what they preach," that is really irrelevant in that the same argument might have been uttered by someone else.

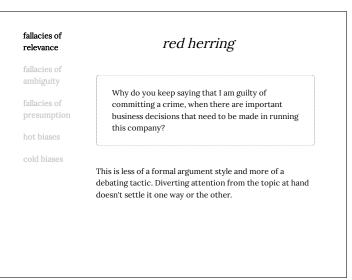
fallacies of relevance popular appeal Segregation laws were once popular in the American south, they were democratically enacted. Therefore segregation was acceptable. The majority of course might be wrong, no matter how numerous they are. This is why democratic societies are not only based on the principle that the majority gets to decide but instead we all have rights that protect us from the majority.

fallacies of relevance fallacies of ambiguity fallacies of presumption hot biases cold biases Threats might be effective as a way of getting people to do what you want, but they don't really provide us with any reasons for belief.

fallacies of relevance fallacies of ambiguity fallacies of presumption hot biases cold biases Therefore evolution must be wrong. While we may not like the consequences of a theory, if the evidence really supports it, we'll just have to get used to them.



fallacies of relevance fallacies of ambiguity fallacies of presumption hot biases This fallacy is a generalization of the last one -- it appeals to the origins of something to determine the basic nature of that thing. Like other fallacies of relevance this argument mistakes the messenger for the message -- isn't what is said decisive, not who says it?



fallacies of relevance fallacies of ambiguity fallacies of presumption hot biases Cold biases Analogies can help us illuminate obscure or abstract concepts, but they can also mislead us since they only go so far. We may wonder in this case about any relevant differences between taxation and theft.

fallacies of relevance

fallacies of ambiguity

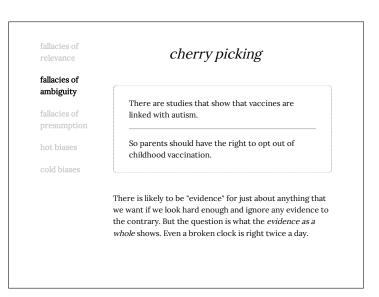
fallacies of presumption

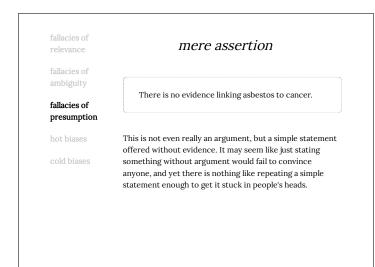
hot biases

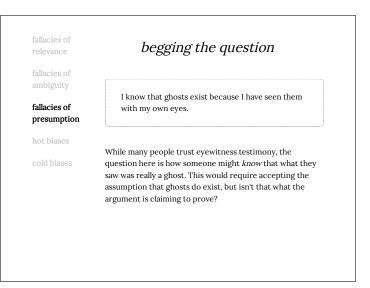
cold biases

This argument overlooks important differences between the meaning of "faith" in these two contexts. Science is based on public evidence, religion is not.









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Conspiracy theories often rely on appeals to ignorance like this. They shift the "burden of proof" to someone opposing their viewpoint as opposed to providing sufficient evidence to prove their claims to be correct.

fallacies of ambiguity

fallacies of presumption

hot biases

cold biases

This is a quote from Richard Nixon, who in the last days of his presidency, believed that everyone who was not completely on his side was completely against him. There are, of course other options. Also known as the "black or white fallacy."

fallacies of relevance

fallacies of ambiguity

fallacies of presumption

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cold biases

This is clearly too small a sample size to provide evidence for a claim about millions of people. Reliance on "anecdotal evidence" is another variety of this fallacy in that anecdotes report individual cases that may or may not show a general pattern.

fallacies of relevance

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cold biases

Alarmist claims about what will happen as a result of doing something or other are hard to avoid since we do tend to think of worst case scenarios. In this case, since a clone is nothing but an artificially produced twin, raising a clone for its parts would be illegal and immoral?

fallacies of relevance

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hot biases

cold biases

fallacies of presumption

Men the coach yells at us for losing badly, we play better the next game.

When he praises us after a great win, we don't do so well the next game.

SO negative reinforcement works, and positive reinforcement doesn't.

Isn't a better explanation here that after playing either better or worse than average, the team returns to their average?

fallacies of relevance

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cold biases

Circular reasoning

You must be mentally ill if you commit a mass murder.

This is because only mentally ill people would do such a thing.

Circular reasoning is like the question of which came first the chicken or the egg? Which explains which according to this argument: does mental illness explain mass-murder or does mass murder prove mental illness? In either case no evidence is here presented.

fallacies of relevance

fallacies of ambiguity

fallacies of presumption

hot biases

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confirmation bias

Wherever I look I see more evidence that the universe is governed by a malicious demon. Just consider the evidence of epidemics and hurricanes!

The problem here lies in not taking into account *all* of the available evidence. Good explanations of the data are not found by looking only at evidence that appears to confirm one's hypothesis.

fallacies of relevance

fallacies of ambiguity

fallacies of presumption

hot biases

cold bisees

group think

Why did we torture those prisoners? Well the leaders assured us that it was for a greater good and everyone else seemed to be going along with that too

We often forget that we are fundamentally social beings heavily invested in what (we think) others think of us. One rotten apple *can* spoil the whole barrel.

fallacies of relevance

fallacies of

fallacies of presumption

hot biases

cold biases

wishful thinking

We really can have endless economic growth and protect the enivornment at the same time!

The old saying that if it sounds too good to be true, it probably is applies here.

fallacies o

fallacies o ambiguity

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anchoring effects

This T-shirt is only 100 dollars! That is such a bargain compared to the one selling for 1000 dollars you showed me first!

Even if nobody would pay such an outrageous price for a Tshirt just asking for such a price at the beginning of negotiations raises what we might later come to accept as a fair price. This reflects a bias towards information that comes first, regardless of its independent believability.

fallacies of relevance

the fundamental attribution error

fallacies of ambiguity

fallacies of presumption

hot biases

cold biases

If I happen to be rude to someone at the store, it is because I am stressed out by work pressure, but if you are it is because you are a jerk.

When we account for our own behavior we have a (realistic) sense of the large influence of external influences, but when we asses other people's behavior we tend to overemphasize their "internal" causes, how bad decisions reflect their true feelings and intentions.

fallacies o relevance

ambiguity

fallacies of

not biases

the availability heuristic

I just heard the news about a terrorist hijacking a plane, so rather than fly to Florida I will drive.

cold biases

A heuristic is a "rule of thumb" that might work in some contexts but fails in others. In this case even if a terroristic attack sticks out in one's mind, since it is dramatic, it is far *more* likely that you will get hurt or killed in a car wreck. What is available to the mind is not always the same as what is really more likely.

find out more

Your Logical Fallacy Is: A well designed website with good examples of a variety of fallacies.

 $\underline{Your\ Bias\ Is}.$ By the creators of Your Logical Fallacy Is, this site is devoted to some important cognitive biases.

<u>Logically Fallacious</u>: a comprehensive list of hundereds of types of fallacies and biases

 $\underline{\textit{Fallacies}}\text{:} \ \textit{The Internet Encyclopedia page on logical fallacies has another comprehensive list.}$

