Fallacies and Biases

how NOT to think logically



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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 shortcircuited by cognitive biases.
 - Cognitive biases are "bugs" in our mental operating systems that convince us that we know what just isn't

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Types of fallacies

Fallacies of relevance

• Rely on irrelevant information to push the argument along.

Fallacies of ambiguity

 $\circ~$ Depend on multiple meanings of key terms to fool us.

Fallacies of presumption

 $\circ\,$ 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.

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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

 $\circ \ Unmotivated \ irrationality:$ 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.

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fallacies of relevance

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hot 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 see what their claims are really based on, otherwise we still have no real reason to believe what they tell us

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Ad hominem

fallacies of ambiguity

fallacies of

relevance

fallacies of presumption

hot biases

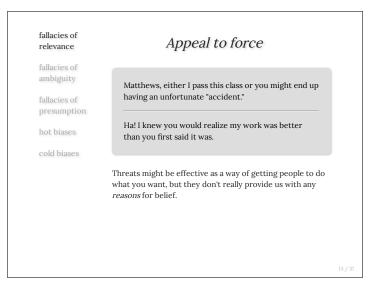
My trainer has me on a strict diet and says that my health will be better if I lose some weight.

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.

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fallacies of Popular appeal relevance fallacies of ambiguity Segregation laws were once popular in the American south, they were democratically enacted. fallacies of presumption Therefore segregation was acceptable. hot biases cold biases 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

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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 Naturalistic fallacy relevance fallacies of ambiguity Women should not be allowed into combat positions in the military, since, after all, women are not as fallacies of aggressive as men are. presumption hot biases There are a couple of problems with this argument, first not cold biases all men and women fit the general pattern. Second it ignores the distinction between the way things are $\ensuremath{\mathit{by}}$ $\it nature$ and what $\it we decide$ based on moral concepts like who deserves and owes what.

fallacies of Genetic fallacy relevance fallacies of ambiguity This study was funded by a large pharmaceutical company, so we can dismiss it as propaganda fallacies of intended only to serve the interests of the presumption corporation's stockholders. hot biases cold 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 Red herring relevance fallacies of ambiguity Why do you keep saying that I am guilty of committing a crime, when there are important fallacies of business decisions that need to be made in running presumption this company? hot biases cold biases This is less of a formal argument style and more of a debating tactic. Diverting attention from the topic at hand doesn't settle it one way or the other.

fallacies of Weak analogy relevance fallacies of ambiguity I oppose taxation because it involves taking money from me unwillingly and that is the same thing as fallacies of theft! presumption hot biases Analogies can help us illuminate obscure or abstract cold biases 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 Equivocation relevance fallacies of ambiguity Religion depends on faith in God. fallacies of Science depends on faith in observation and datapresumption analysis. hot biases Therefore science is not really very different from $% \left\{ 1\right\} =\left\{ 1\right\}$ 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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This is a debating trick that fails to address the topic at hand in the interest of scoring points with the audience.

fallacies of Cherry picking relevance fallacies of ambiguity There are studies that show that vaccines are linked with autism. fallacies of presumption So parents should have the right to opt out of hot biases childhood vaccination. cold biases There is likely to be "evidence" for just about anything that we want if we look hard enough and ignore any evidence to the contrary. But the question is what the $\it evidence$ as a whole shows. Even a broken clock is right twice a day.

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There is no evidence linking asbestos to cancer.

This is not even really an argument, but a simple statement offered without evidence. It may seem like just stating something without argument would fail to convince anyone, and yet there is nothing like repeating a simple statement enough to get it stuck in people's heads.

fallacies of Begging the question relevance fallacies of ambiguity I know that ghosts exist because I have seen them with my own eyes. fallacies of presumption hot biases While many people trust eyewitness testimony, the question here is how someone might know that what they cold biases saw was really a ghost. This would require accepting the assumption that ghosts do exist, but isn't that what the argument is claiming to prove?

fallacies of Appeal to ignorance relevance fallacies of ambiguity There is no proof that the CIA did not assassinate Kennedy and then cover it up. fallacies of presumption That's why I think that they did. hot biases cold biases 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 False dilemma relevance fallacies of ambiguity Either you are on the reservation or you are off the reservation. fallacies of presumption hot biases This is a quote from Richard Nixon, who in the last days of his presidency, believed that everyone who was not cold biases completely on his side was completely against him. There are, of course other options. Also known as the "black or white fallacy."

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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 Slippery slope relevance fallacies of ambiguity If we allow human cloning, we'll end up with a dystopian future like in the movie "The Island" where fallacies of clones are made just for "spare parts" and have no presumption rights of their own. hot biases cold biases Alarmist claims about what will happen 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

fallacies of False cause relevance fallacies of ambiguity When the coach yells at us for losing badly, we play better the next game. fallacies of presumption When he praises us after a great win, we don't do so well the next game. hot biases cold biases 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?

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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.

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 Confirmation bias relevance fallacies of ambiguity Wherever I look I see more evidence that the universe is governed by a malicious demon. Just fallacies of consider the evidence of epidemics and hurricanes! presumption hot biases The problem here lies in not taking into account all of the cold biases available evidence. Good explanations of the data are not found by looking only at evidence that appears to confirm one's hypothesis.

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Caroup 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.

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

fallacies of Anchoring effects relevance fallacies of ambiguity This T-shirt is only 100 dollars! That is such a bargain compared to the one selling for 1000 dollars you fallacies of showed me first! presumption hot biases Even if nobody would pay such an outrageous price for a Tcold biases shirt 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 The fundamental attribution error relevance fallacies of ambiguity If I happen to be rude to someone at the store, it is because I am stressed out by work pressure, but if fallacies of you are it is because you are a jerk. presumption hot biases When we account for our own behavior we have a (realistic) cold biases 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 of The availability heuristic relevance fallacies of ambiguity I just heard the news about a terrorist hijacking a plane, so rather than fly to Florida I will drive. fallacies of presumption hot 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 cold biases 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.

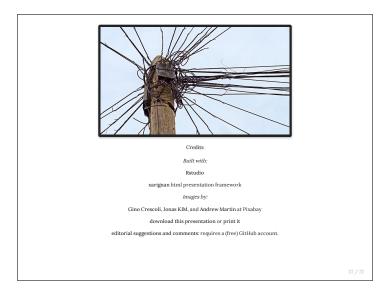
Find out more

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

Your Bias Is: By the creators of Your Logical Fallacy Is, this site is devoted to some important cognitive biases.

Logically Fallacious: a comprehensive list of hundereds of types of fallacies and

Fallacies: The Internet Encyclopedia page on logical fallacies has another comprehensive list.



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