

Effective Presentations Using Applied Logical Fallacies



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Open Source Bridge 2017



strawman

Misrepresenting someone's argument to make it easier to attack.

By exaggerating or representing, or just completely fabricating someone's argument, it is much easier to present your own position as being reasonable, but this kind of dishonesty serves to undermine rational debate.

After 9/11 and that we should never forget our health and education. When responded by saying that he was surprised that Will hates our country so much that he wants to leave it deteriorates by cutting military spending.



false cause

Presuming that a real or perceived relationship between things means that one is the cause of the other.

Many people connect correlation things happening together or in sequence for causation. One thing actually causes the other to happen. Sometimes correlation is coincidental or it may be attributable to a common cause.

Proving to be a fancy chair. Roger Bannister was the first person to break the four minute mile. When he was asked how he managed to do it, he said that he was not the first person to break the four minute mile. He was the first person to break the four minute mile.



slippery slope

Asserting that if we allow A to happen, then Z will consequently happen too, therefore A should not happen.

The problem with this reasoning is that, besides engaging with the issue at hand, and instead of addressing the benefits of doing so, it is to argue that the original argument is then taken by unsubstantiated conjecture.

Colin Coote asserts that if we allow same sex couples to marry then the next thing we know will be allowing people to marry their parents, their cars and even monkeys.



ad hominem

Attacking your opponent's character or personal traits in an attempt to undermine their argument.

Ad hominem attacks can take the form of openly attacking somebody or casting doubt on their character. The result of an ad hominem attack is to undermine someone without actually engaging with the substance of their argument.

After Sally presents an eloquent and compelling case for a more equitable taxation system, Sam asks the audience whether we should believe anything from a woman who isn't married was once arrested, and smells a bit weird.



special pleading

Moving the goalposts or making up exceptions when a claim is shown to be false.

Humans are funny creatures and have a foolish aversion to being wrong. Rather than accept the benefits of being able to change one's mind through better understanding, many will invent ways to cling to old beliefs.

Edward John's claim to be psychic, but when his abilities were tested under proper scientific conditions, they negatively disappeared. Edward explained his saying that one had to have faith in his abilities for them to work.

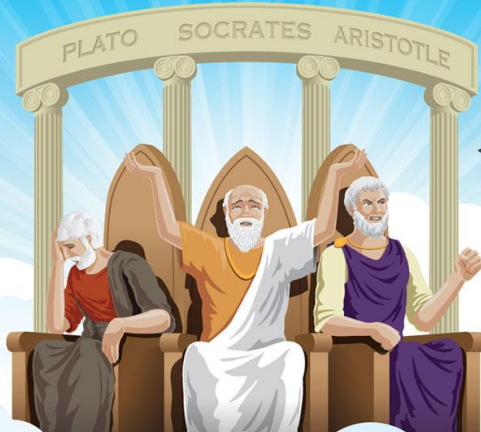


loaded question

Asking a question that has an assumption built into it so that it can't be answered without appearing guilty.

Loaded question fallacies are particularly effective at disabling rational debates because they are often framed in a way that is designed to lead the questioner to defend themselves and may appear flustered or on the back foot.

Grace and Helen were both romantically interested in Brad. One day, with Brad sitting with them, Grace asked in an inquisitive tone whether Helen was having any problems with a fungal infection.



appeal to emotion

Manipulating an emotional response in place of a valid or compelling argument.

Appeals to emotion include attempts to lure army hatred, pity, guilt, and more. Though a valid and reasoned argument may sometimes have an emotional aspect, one who would base their entire argument on emotion is not a reason.

Luke didn't want to eat his spaghetti brains with chopped bone and broccoli sprouts, but his father told him to think about the poor, starving children in a third world country who weren't fortunate enough to have any food at all.



tu quoque

Avoiding having to engage with criticism by turning it back on the accuser - answering criticism with criticism.

Literally translating as 'you too', this fallacy is commonly employed as an effective means of avoiding the issue at hand by the accused turning it back on the accuser.

Nicole identified that Hannah had committed a logical fallacy, but instead of addressing the substance of her claim, Hannah accused Nicole of committing a fallacy earlier on in the conversation.



burden of proof

Saying that the burden of proof lies not with the person making the claim, but with someone else to disprove.

The burden of proof lies with someone who is making a claim, and is not upon anyone else to disprove it. The fallacy of this is to avoid the burden of proof by making it someone else's responsibility to disprove it.

Bernard declares that a sceptic is, at this very moment, in orbit around the Sun because of the Earth's orbit, and that because no one can prove him wrong his claim is therefore a valid one.



the fallacy fallacy

Presuming a claim to be necessarily wrong because a fallacy has been committed.

It is entirely possible to make a claim that is false yet agree with logical coherence for that claim, just as it is possible to make a claim that is true and justify it with logical fallacies and poor argument.

Recognizing that Amanda had committed a fallacy in arguing that we should eat healthy food because a nutritionist said it was popular. Aylee said we should therefore eat bacon double cheeseburgers every day.



personal incredulity

Saying that because one finds something difficult to understand, it's therefore not true.

Subjects such as biological evolution via the process of natural selection require a good amount of understanding before one can understand it. This fallacy is usually used in place of that understanding.

Ken drew a picture of a fifth and a human and with effusive details asked Richard if he really thought we were stupid enough to believe that a fish somehow turned into a human through just, like, random things happening over time.



ambiguity

Using double meanings or ambiguities of language to mislead or misrepresent the truth.

Politicians are often guilty of using ambiguity to mislead and will later point to how they were misunderstood not carefully lying if they come under scrutiny. It's particularly tricky and premeditated fallacy to commit.

When the judge asked the defendant why he hadn't paid his parking fines, he said that he should have to pay them because the sign said 'Fine for parking here' and so he naturally presumed that it would be fine to park there.



the gambler's fallacy

Believing that 'runs' occur to statistically independent phenomena such as roulette wheel spins.

This commonly believed fallacy can be said to have helped create a city in the desert of Nevada, USA. Though the overall odds of a spin having made that city in the desert of Nevada, USA, would be very small, it is still a possibility.

Neil had come up six times in a row on the roulette wheel, so Greg knew that it was close to certain that black would be next up. Suffering an economic form of natural selection with this thinking, he soon lost all of his savings.



bandwagon

Appealing to popularity or the fact that many people do something as an attempted form of validation.

The flaw in this argument is that the popularity of an idea has absolutely no bearing on its validity. If it did, then the world would have made that fall for most of human history and it would be a very different world.

Shamus pointed a drunken finger at Sean and asked him to explain how so many people could believe in something if they're only a silly old superstition. Sean, however, had had a few too many Guinness himself and fell off his perch.



appeal to authority

Saying that because an authority thinks something, it must therefore be true.

It is important to note that this fallacy should not be used to dismiss the claims of experts or scientific consensus. Appeals to authority are not valid arguments, but nor is it reasonable to disregard the claims of experts who have a demonstrated depth of knowledge unless one has a similar level of understanding.

Not able to defend his position that evolution isn't true, Bob says that he knows a scientist who also questions evolution (and presumably isn't heard of). Unfortunately, despite the things said, he lost the game of hide and go seek.



composition/division

Assuming that what's true about one part of something has to be applied to all, or other, parts of it.

Often when something is true for the part it does also apply to the whole, but because the truth about the case is often presumed to be true. We must show evidence for why a conspiracy will end.

Denise was a precious child and had a talent for it. He reasoned that atoms are invisible, and that he was made of atoms and therefore invisible too. Unfortunately, despite the things said, he lost the game of hide and go seek.



no true Scotsman

Making what could be called an appeal to purity as a way to dismiss relevant criticisms or flaws of an argument.

This fallacy is often employed as a measure of last resort when a point has been lost. Seeing that a criticism is valid, yet not wanting to admit a new criteria are involved in something surrounding something or some argument.

Angus declares that Scotsmen do not sugar on their porridge, to which, Lillian points out that he is a Scotsman and puts sugar on his porridge. Furious, he shrugs, Angus protests that no true Scotsman sugar his porridge.



black-or-white

Where two alternative states are presented as the only possibilities, when in fact more possibilities exist.

Also known as the false dilemma, this fallacy is based on the experience of forming a logical argument, but under closer scrutiny it becomes evident that there are many possibilities that the fallacy either ignores or dismisses.

Whistling support for his plan to fundamentally undermine others' rights, the Supreme Leader told the people they were either on his side, or on the side of the enemy.



begging the question

A circular argument in which the conclusion is included in the premise.

This logically invalid argument often arises in situations where people have an assumption that is very ingrained, and therefore taken in their minds as a given. This fallacy is often used to avoid the issue at hand.

The world of Zorbo the Great is flawless and perfect. We know this because it says so in The Great and Infallible Book of Zorbo's Best and Most Trustworthy Things are Definitely True and Should Not Ever Be Questioned.



appeal to nature

Making the argument that because something is 'natural' it is therefore valid, justified, inevitable, good, or ideal.

This logically invalid tactic is often used to avoid the issue at hand. But naturalists often don't make something good or bad. For instance, the Great and Infallible Book of Zorbo's Best and Most Trustworthy Things are Definitely True and Should Not Ever Be Questioned.

The medicine man rolled into town on his bandwagon offering nothing natural remedies, such as very special plain water. He said that it was only natural that people should be very of artificial medicines like antibiotics.



anecdotal

Using personal experience or an isolated example instead of a valid argument, especially to dismiss statistics.

It is often much easier for people to believe someone's testimony as opposed to understanding stronger across a continuum. Scientific and statistical measures are almost always more accurate than individual perceptions and experiences.

Jason said that when all said and everything but his grandfather smoked, like, 30 cigarettes a day and lived 97 - so don't believe everything you read about meta analyses of mouse studies showing proven causal relationships.



the Texas sharpshooter

Cherry-picking data clusters to suit an argument, or finding a pattern to fit a presumption.

This fallacy is often used to avoid the issue at hand. But naturalists often don't make something good or bad. For instance, the Great and Infallible Book of Zorbo's Best and Most Trustworthy Things are Definitely True and Should Not Ever Be Questioned.

The makers of Superdumb Candy Drinks point to research showing that in the five countries where Superdumb Candy is the most units, three of them are in the top five healthiest countries on Earth, therefore Superdumb Candy is healthy.

thou shalt not commit logical fallacies

A logical fallacy is a flaw in reasoning. Strong arguments are void of logical fallacies, whilst arguments that are weak tend to use logical fallacies to appear stronger than they are. They're like tricks or illusions of thought, and they're often very sneaky, used by politicians, the media, and others to fool people.

Don't be fooled! This poster has been designed to help you identify and call out dodgy logic wherever it may raise its ugly, incoherent head. If you see someone committing a logical fallacy online, link them to the relevant fallacy to school them in their inthickness e.g. yourlogicalfallacies.com/strawman

One may consider the effective use of a fallacy by an orator as *clever* but by the same token the reasoning of that orator should be recognized as *unsound*

“

https://en.wikipedia.org/wiki/List_of_fallacies



The conscious or habitual usage of fallacies as rhetorical tools are *prevalent* in the desire to *persuade people*, where the focus is more on *communication* and *developing common agreement* rather than the correctness of the reasoning.

“

https://en.wikipedia.org/wiki/List_of_fallacies



Social Engineering Gold



A few Science Communication Pitfalls

- Not enough time
- Too much information
- Poorly organized information
- Conclusions unclear
- Story seems random
- Sound bites, twitter, grant proposals, press releases



Why logical fallacies?

- Not enough time
- Audience not interested in details
- “Sketch of a proof”
- Want to be convincing without detracting from the point



You don't need all the puzzle pieces to intuit the **big picture**

Logical fallacies can help guide you on what you can **leave out** and still be convincing.



**And now for an
example...**

How does biology explain the low numbers of women in computer science?

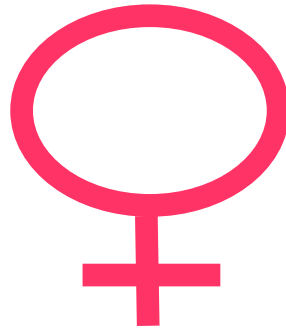
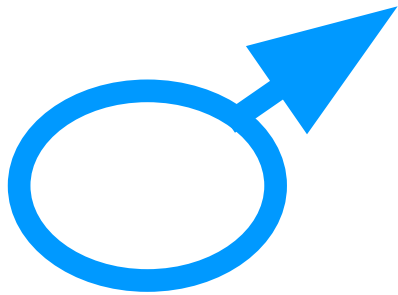
Hint: It doesn't.

My name is Terri.
I'm a mathematician.

I'm also female.

Nowadays, I work as a computer scientist.
There aren't that many women in CS.

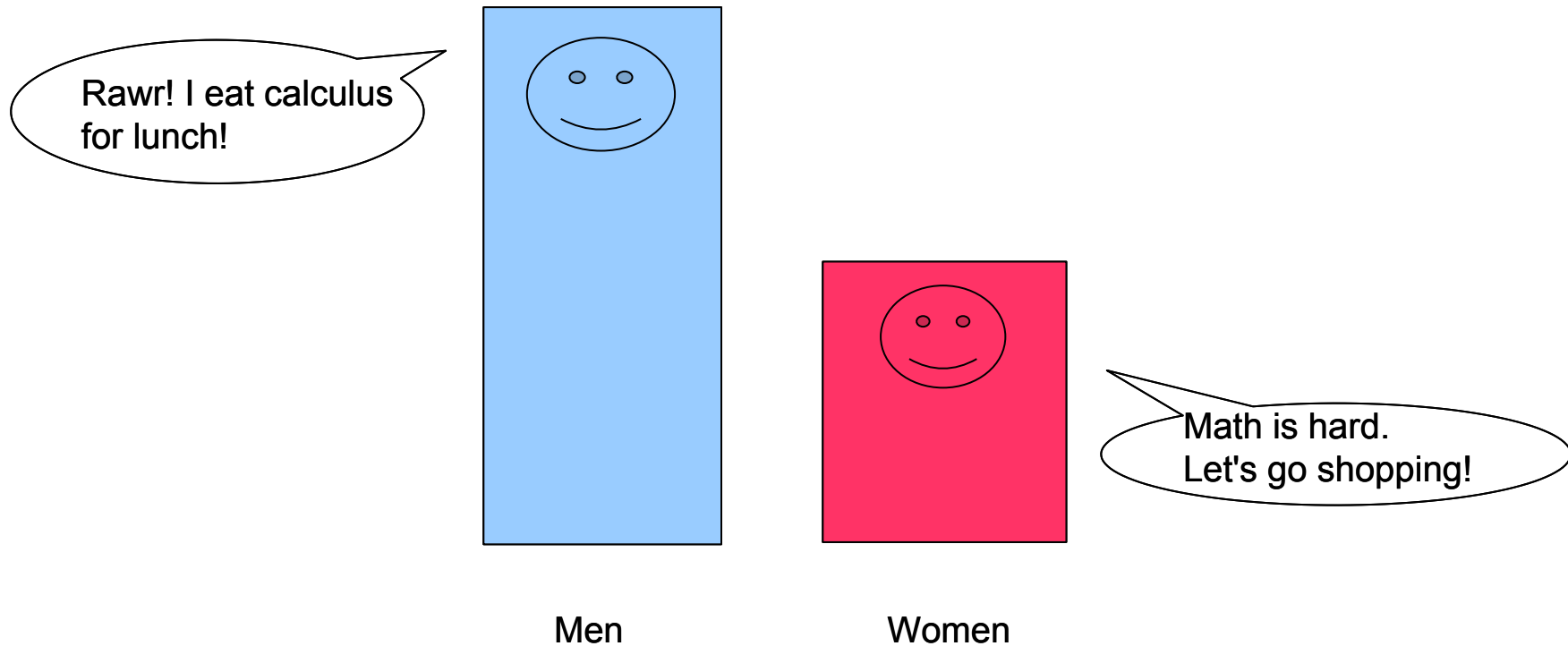
People like to say this is due to
biological differences in math ability between men and
women.



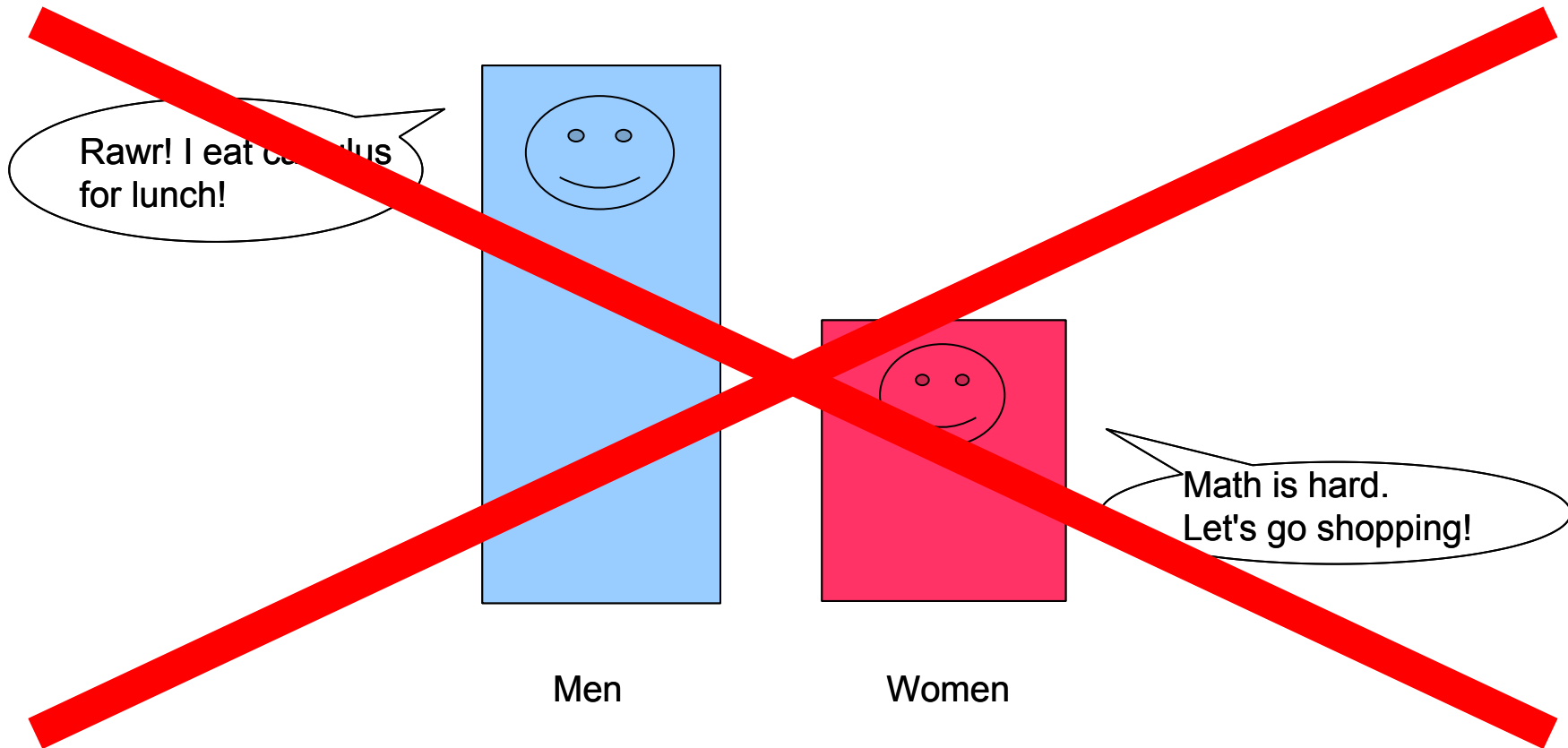
Turns out,
people really suck at math.

Let me explain.

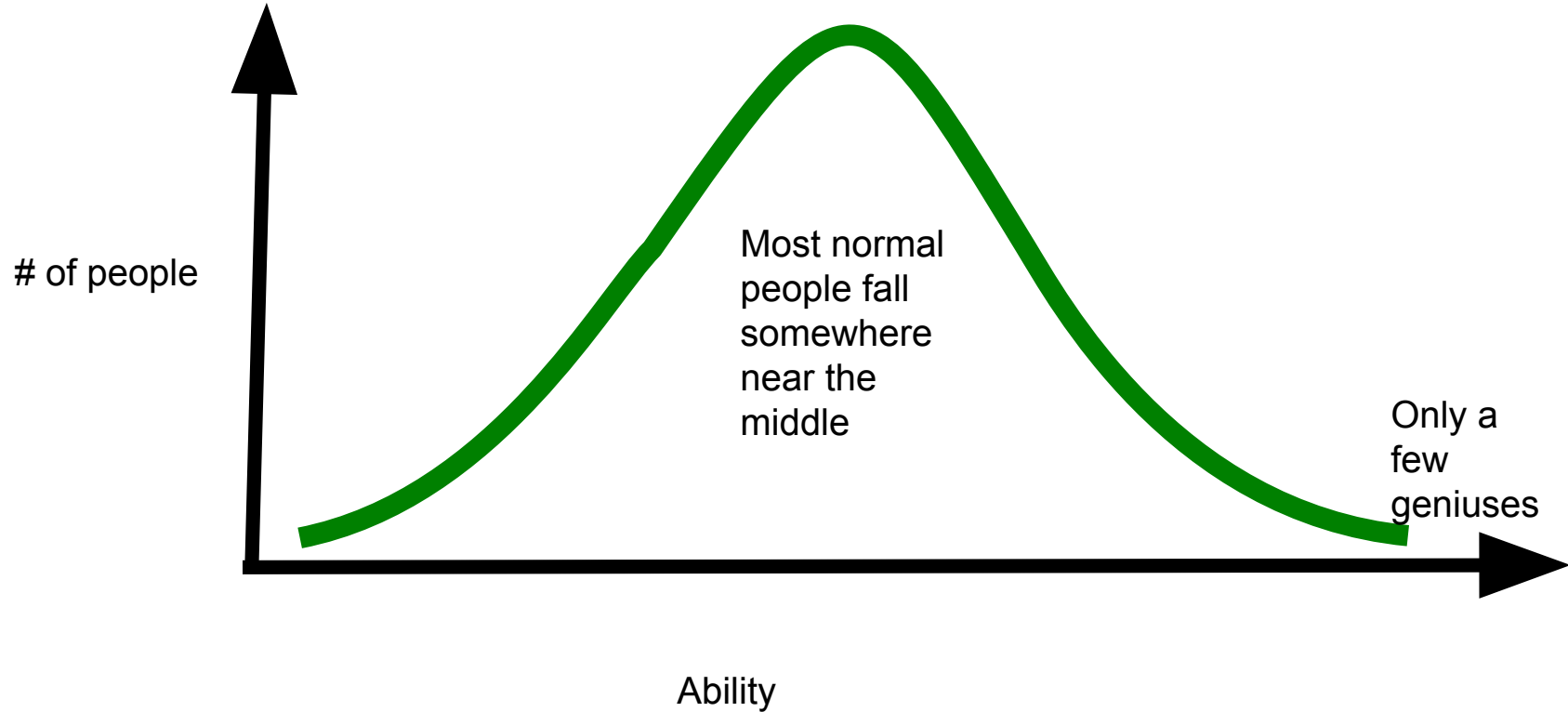
People claim the biological differences go like this:



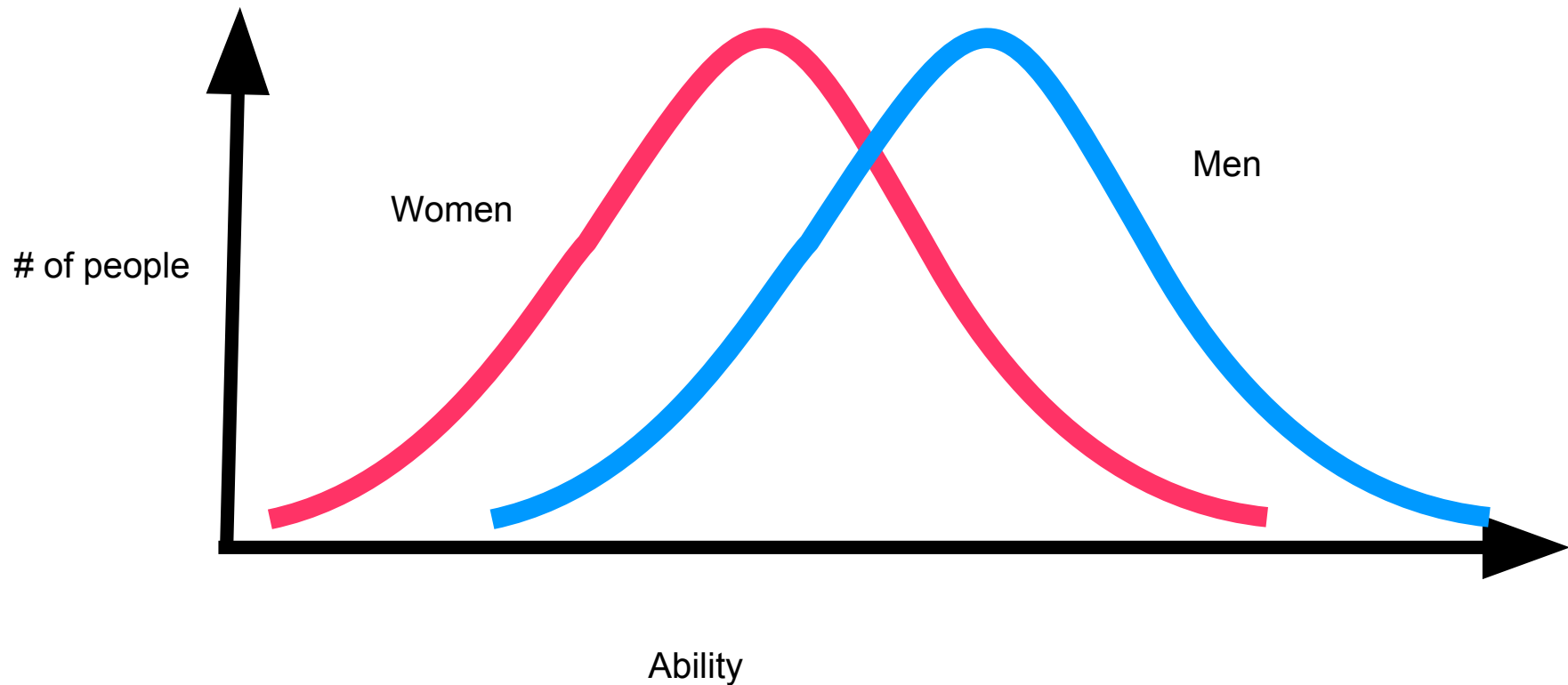
That's not how it works



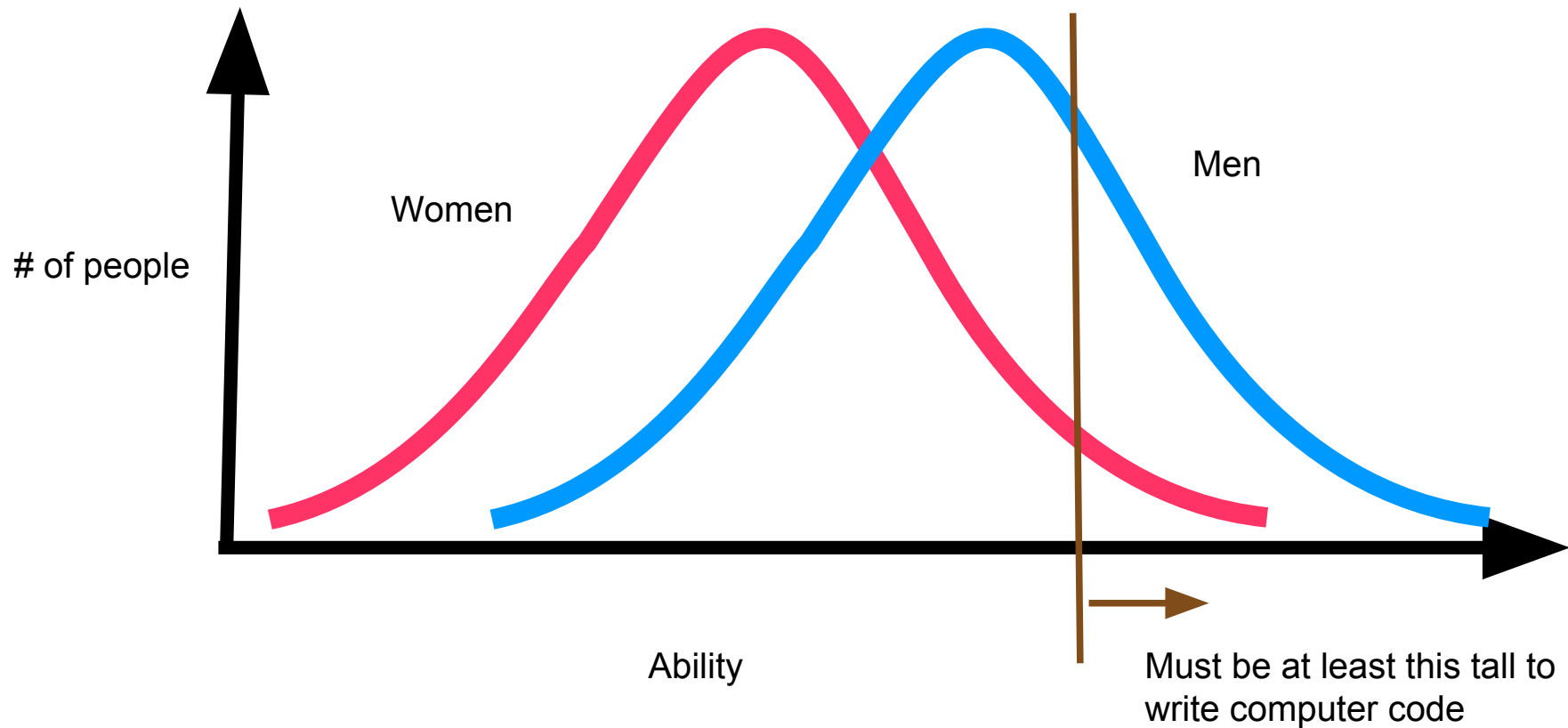
Ability graphs look more like this:



When they hear men have higher math scores than women, people guess math is like this:



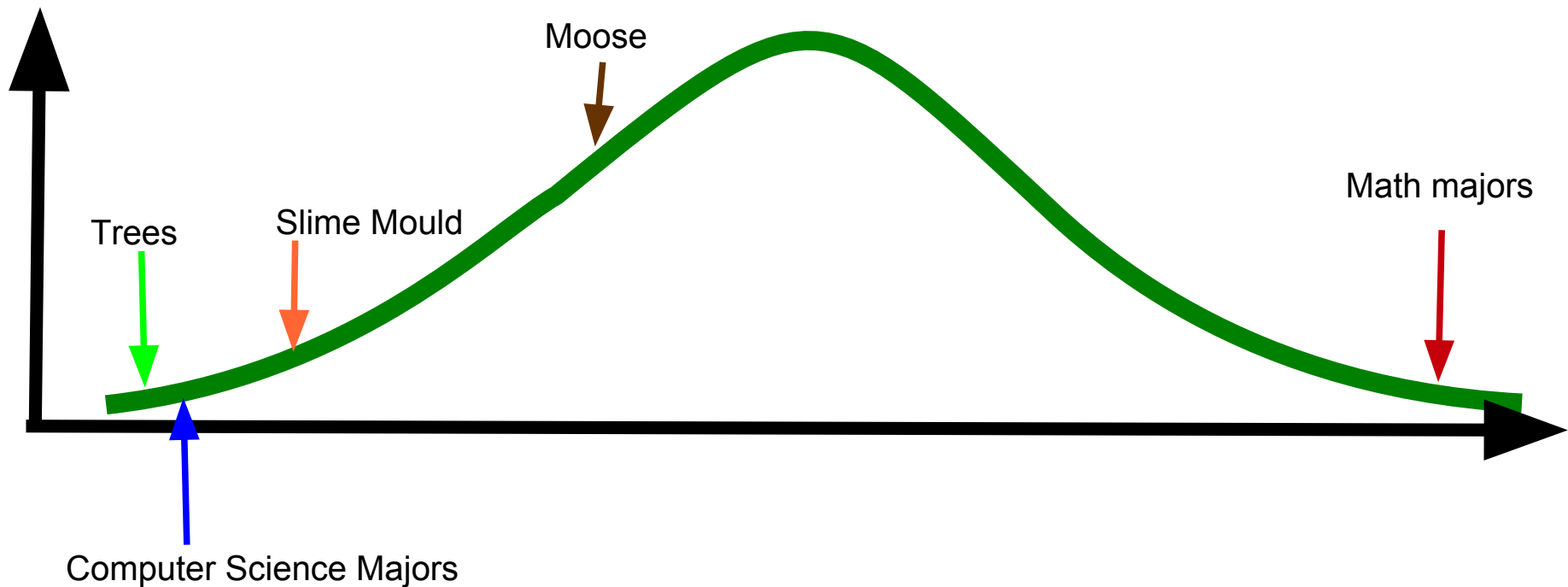
Which *could* explain why computer science is around 75% male...



...except that it's a lie.

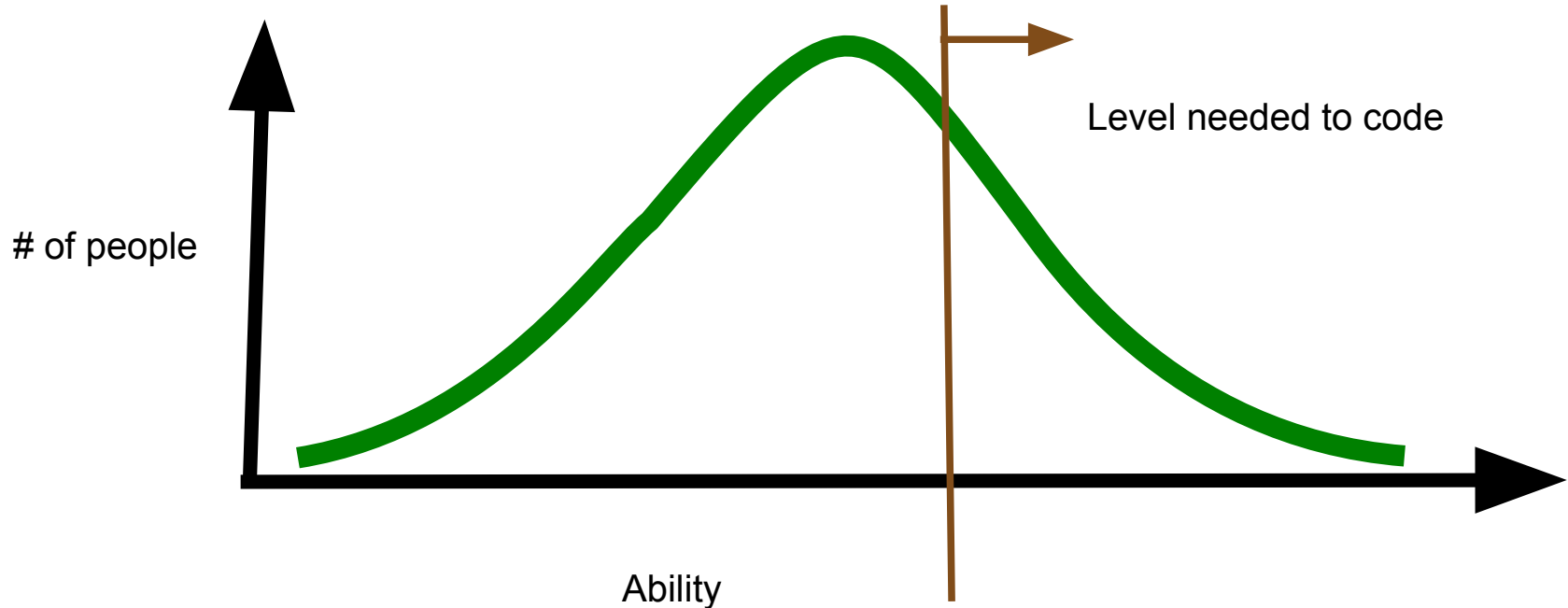
Lies, damned lies, and statistics, eh?

First, CS doesn't require that much math ability.
When I was an undergrad,
we drew the graph like this:



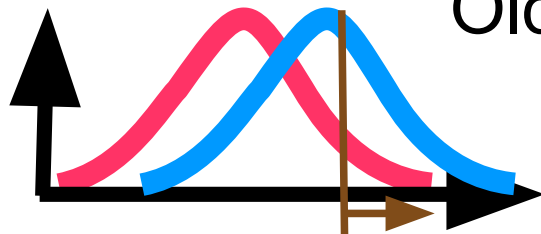
Heh.

But degree rivalry aside,
I've been teaching CS for 7 years.
You only need moderate math skills to code.

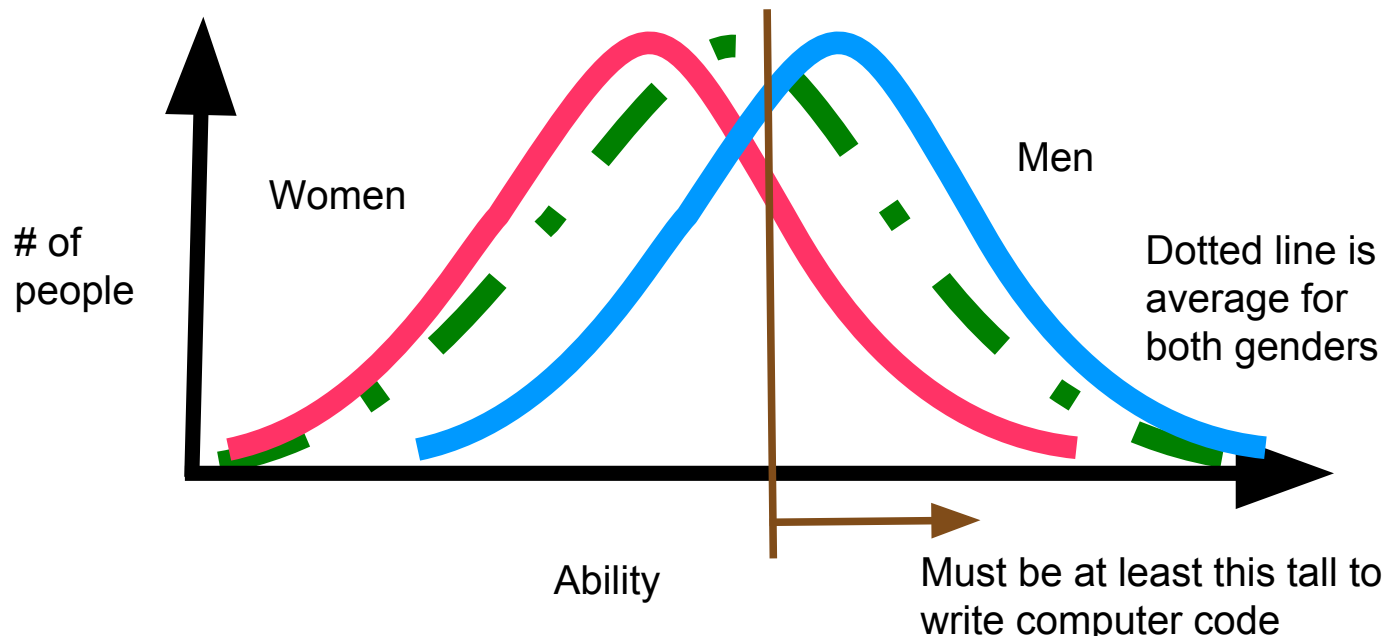


So that'd be something like this...

Old Graph: Very few women

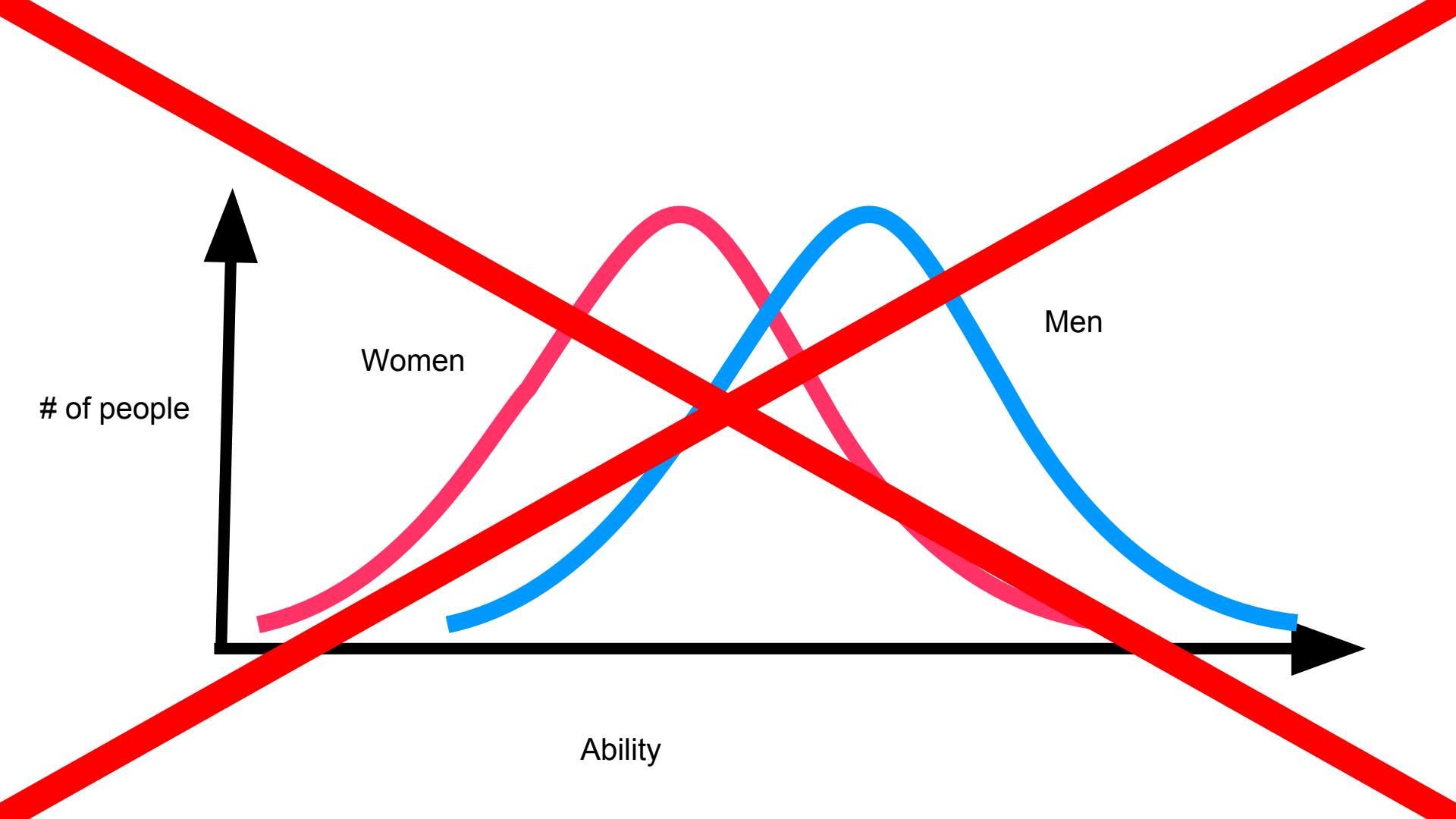


New Graph: Lots more women

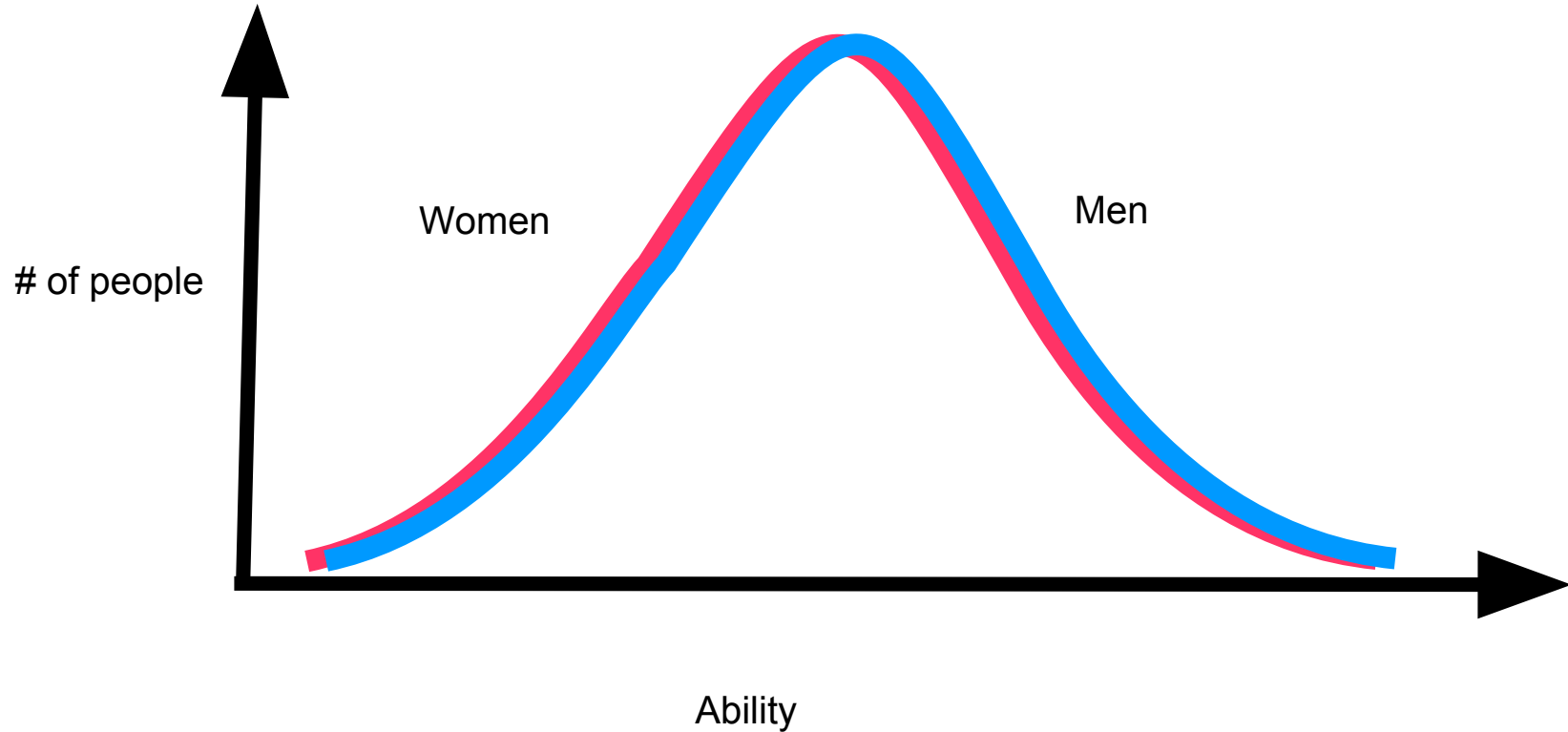


Except...

Remember how I said the graph is a lie?



The population difference looks more like this:



Don't believe me?
Here's the graph from a paper on the subject.

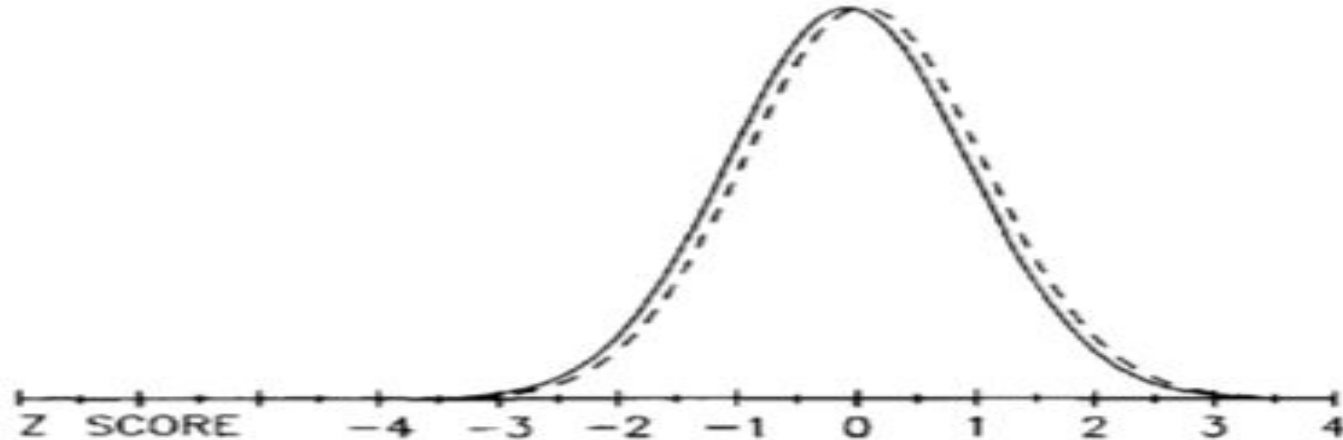
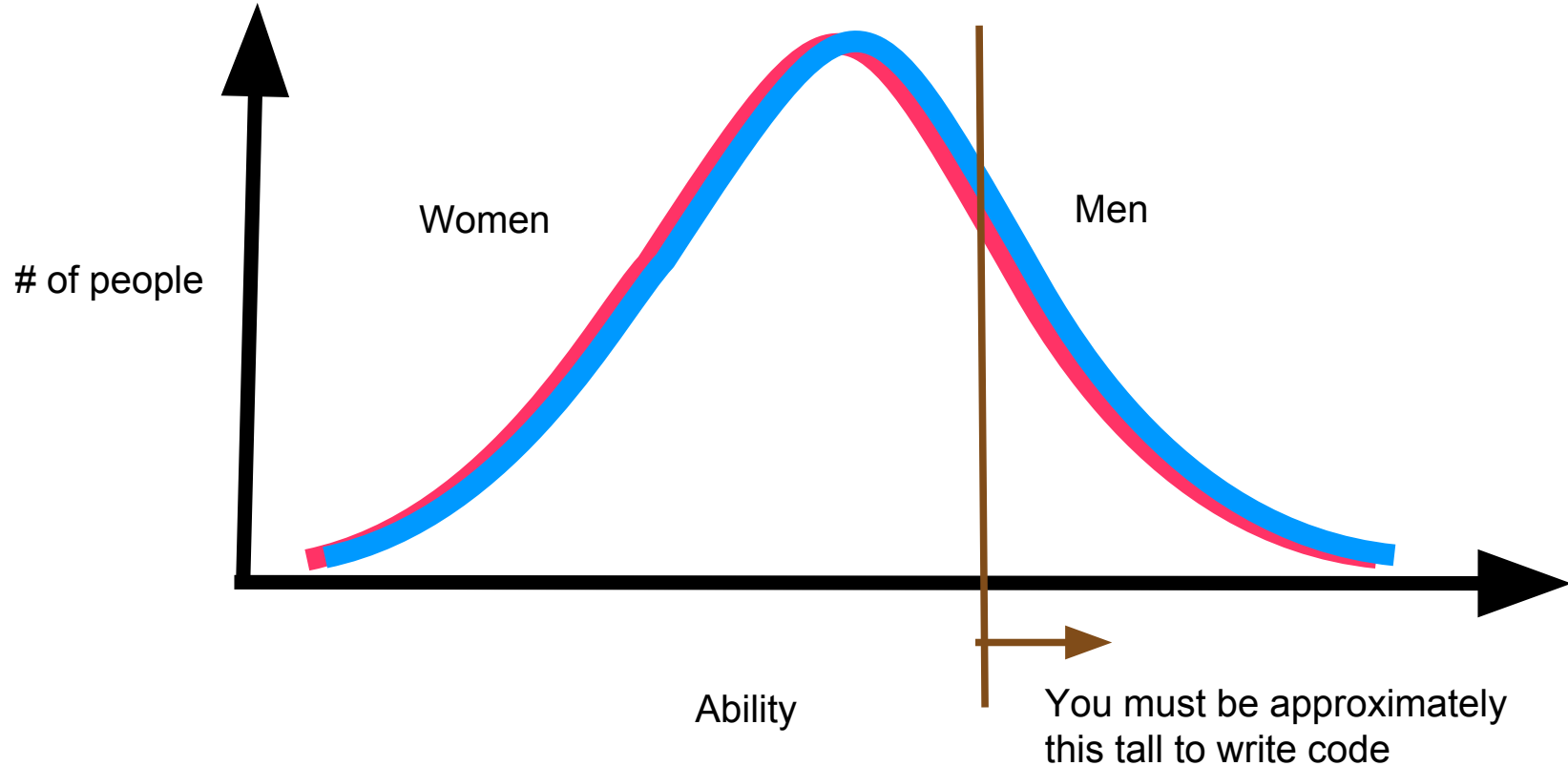


Figure 1. Two normal distributions that are 0.15 standard deviations apart (i.e., $d = 0.15$. This is the approximate magnitude of the gender difference in mathematics performance, averaging over all samples.)

Hyde, J; Fennema, E; Lamon, S. "Gender differences in mathematics performance: A meta-analysis." *Psychological Bulletin*. Vol 107(2), Mar 1990, 139-155.

So if we put that line back in...
We should have nearly 50% women



Therefore,
Biological differences do **not** account for the gender
disparity in computer science.

They can't.
They just aren't that significant.
Not even close.

Also...

You know who *really* sucks at math?

People who think biology explains why there aren't more women in CS.

Now you know.

Thanks for listening.



So what's wrong?

My name is Terri.
I'm a mathematician.

False Authority?





Why False Authority?

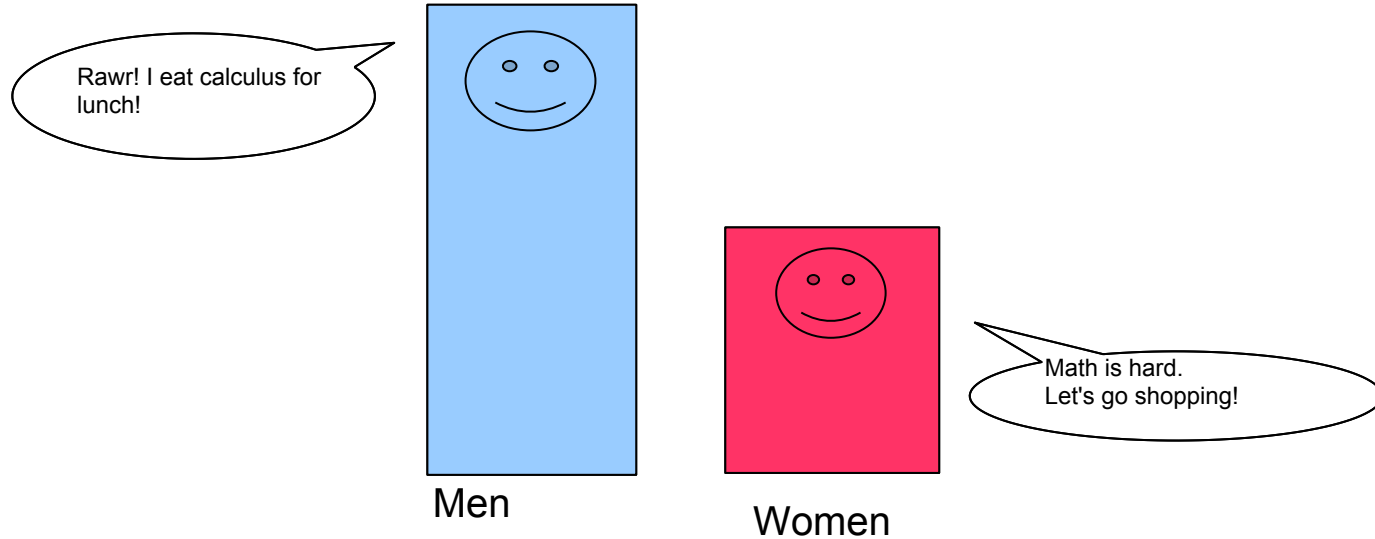
Reasons

- No one can verify your credentials anyhow
- Detailed credentials take time
- There are no proven authorities
- You want to get to the point faster

Mitigations

- Show minimal set
- Fake it 'till you make it!
- Provide links for others to research credentials

People claim the biological differences go like this:



Strawman





Why Strawman?

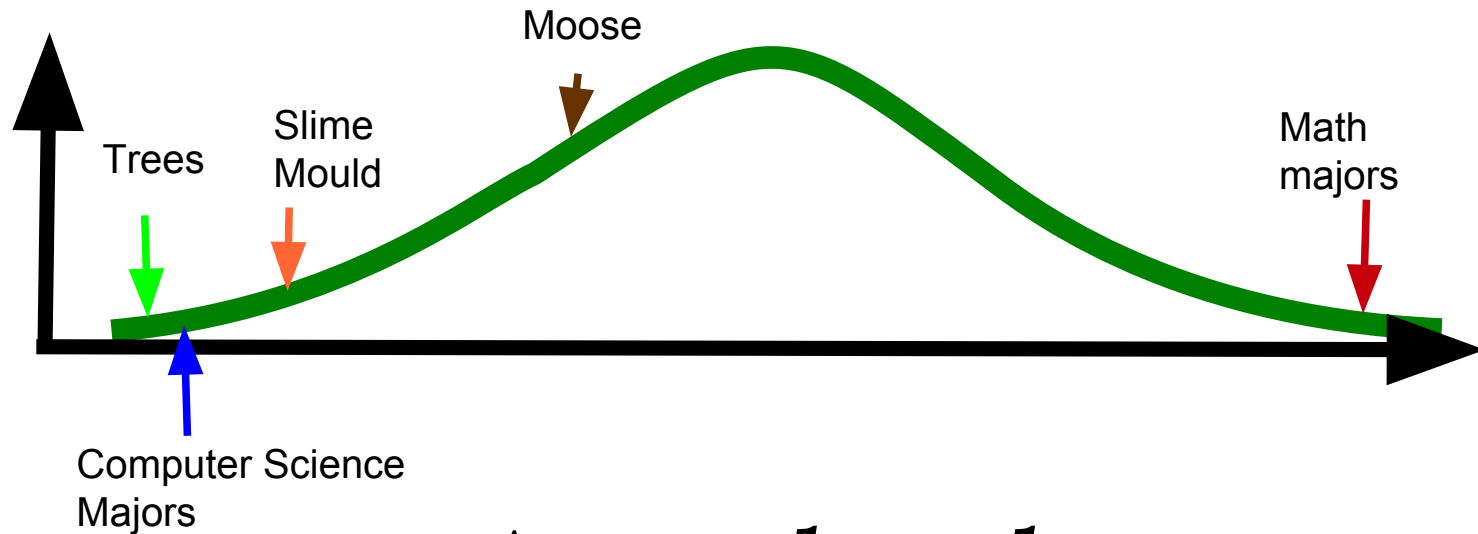
Reasons

- Easier, faster argument
- Argument is used by some people (it's just not best in breed)
- Need to start somewhere

Mitigations

- Be honest about strawman nature of argument
- Refine arguments as you go

First, CS doesn't require that much math ability.
When I was an undergrad,
we drew the graph like this:



Anecdotal





Why use Anecdotes?

Reasons

- Full data doesn't exist or is highly debated
- Laziness
- Need a starting premise
- Humans are wired for stories

Mitigations

- Be honest about nature of “data”
- Treat as hypothesis to be proven
- Provide pointers to research

Therefore,
Biological differences do **not** account for the gender
disparity in computer science.

They can't.
They just aren't that significant.
Not even close.

Fallacy of the single cause



Also...

You know who *really* sucks at math?

People who think biology explains why there aren't more women in CS.

False Dichotomy





Why Fallacy of Single Cause and False Dichotomy?

Reasons

- Laziness
- Lack of time
- Want to avoid muddying the waters
- Want a simpler argument

Mitigations

- Be honest
- Treat this as a “sketch of an argument”
- Point to more nuanced arguments



A few more fun fallacies

Appeal to probability – is a statement that takes something for granted because it would probably be the case (or might be the case).

“

Mitigations: Be honest, treat as hypothesis

https://en.wikipedia.org/wiki/List_of_fallacies

Nirvana fallacy (perfect solution fallacy) – when solutions to problems are rejected because they are not perfect.

“

Mitigations: Weigh solutions, tread lightly, re-evaluate

https://en.wikipedia.org/wiki/List_of_fallacies

Argument from fallacy – also known as fallacy fallacy, assumes that if an argument for some conclusion is fallacious, then the conclusion is false.

“

Mitigations: Be honest, be clear

https://en.wikipedia.org/wiki/List_of_fallacies



A few dangerous logical fallacies

Ad hominem – attacking the
arguer instead of the argument.

“

https://en.wikipedia.org/wiki/List_of_fallacies

Cherry picking (suppressed evidence, incomplete evidence) – act of pointing at individual cases or data that seem to confirm a particular position, while ignoring a significant portion of related cases or data that may contradict that position.

“

https://en.wikipedia.org/wiki/List_of_fallacies

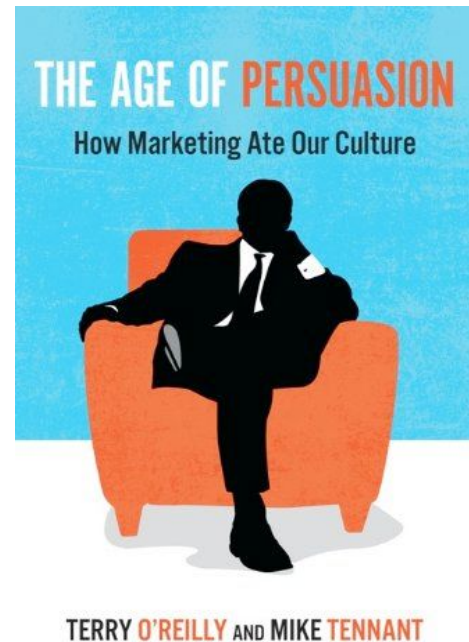
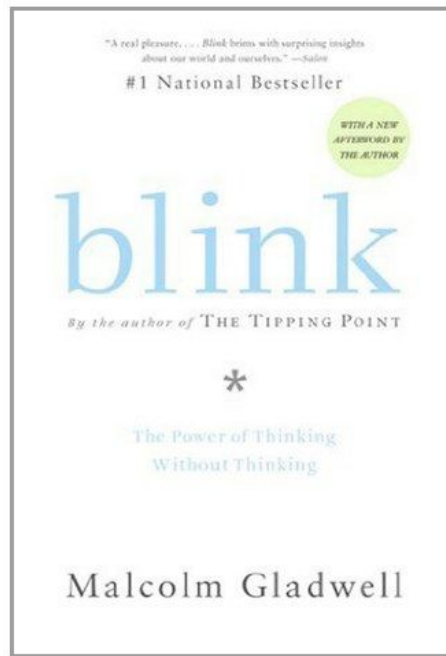
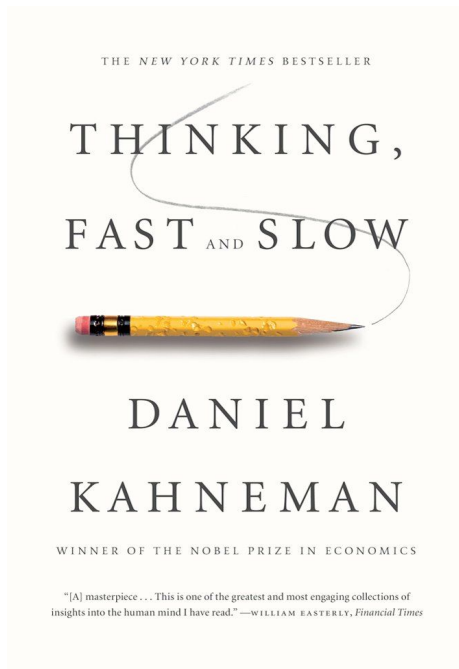
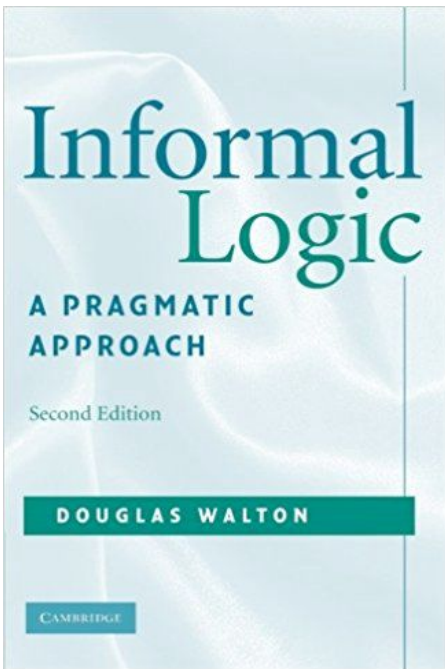
No true Scotsman – makes a generalization true by changing the generalization to exclude a counterexample.

“

https://en.wikipedia.org/wiki/List_of_fallacies



In Summary



There are *lots* of logical fallacies and brain shortcuts.
It's worth learning them.





You don't always want every single piece





Ethical Logical Fallacies

Be honest, cite sources,
provide links to more reading



More resources

- <https://yourlogicalfallacyis.com/>
- https://en.wikipedia.org/wiki/List_of_fallacies
- https://en.wikipedia.org/wiki/List_of_cognitive_biases
- <https://www.coursera.org/learn/logical-fallacies> or your local university!
- <http://www.cbc.ca/radio/undertheinfluence>
- DEFCON 19: The Art of Trolling (unethical fallacies!)
<https://youtu.be/AHqGV5WjS4w>

Contact me: Terri Oda email: <terri@toybox.ca> twitter: @terriko



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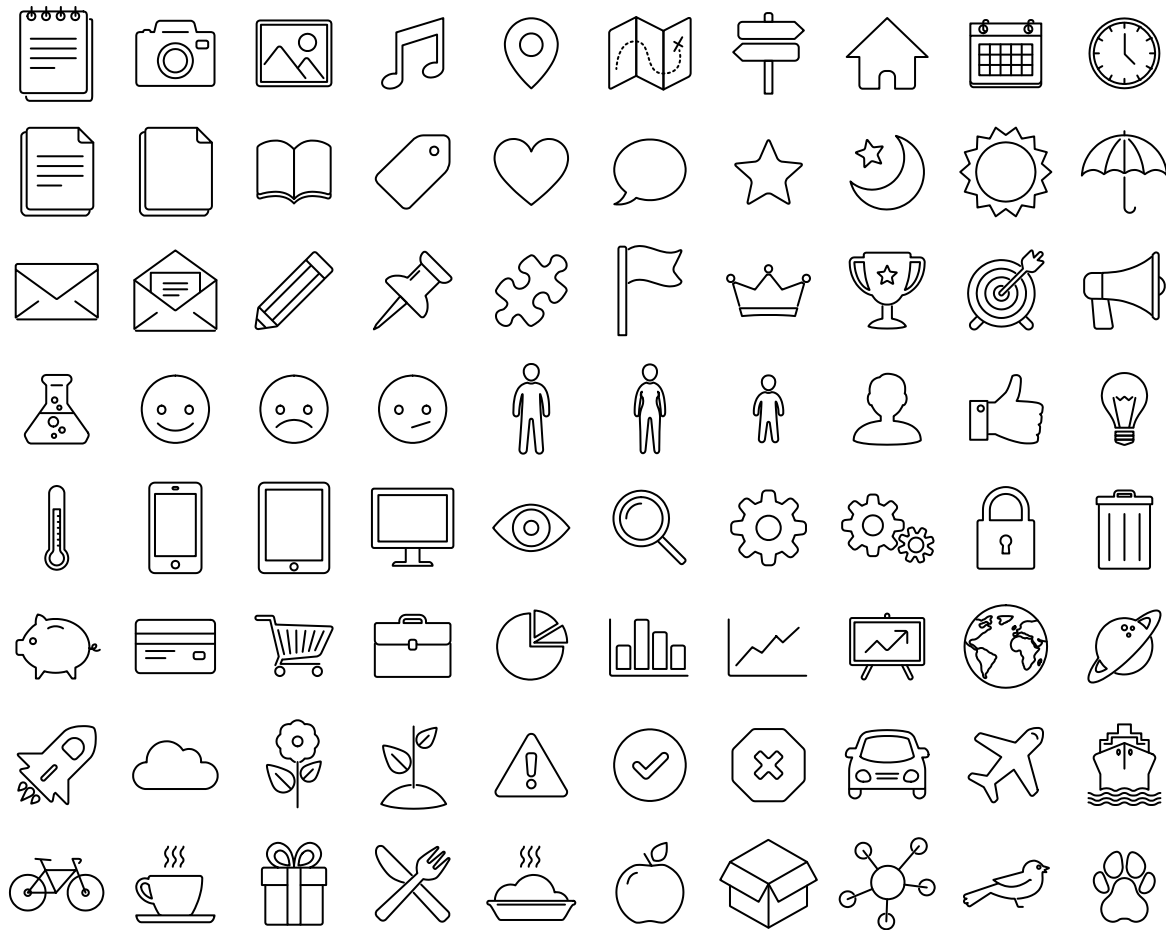
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This means that you can:

- Resize them without losing quality.
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Isn't that nice? :)

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