

# 20 Essential Skills for Dealing with a Post-Truth World



[netsixthform.co.uk](https://netsixthform.co.uk)  
the hub for sixth form leaders



# Teacher Pointers

**Audience 1:**  
A full programme  
for applicants to  
competitive  
universities eg a  
number of  
lunchtime  
sessions

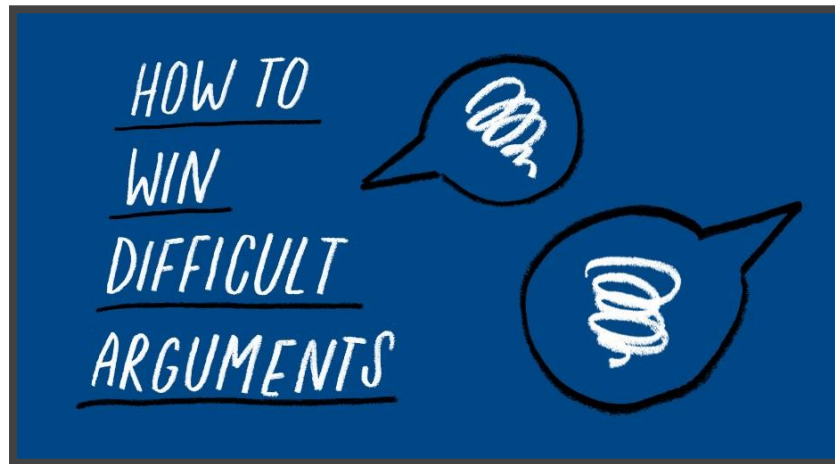
**Audience 2:**  
A number of  
sixth form  
assemblies eg  
focus on the 5  
'Using Data  
Tips' slides for  
one

**Aim:**  
Identify  
essential cross-  
curricular  
thinking skills  
which will help  
students to:

DfE Guidance:  
'You should  
...continue to  
challenge  
misinformation'

## Teacher Pointers: in these sessions we will...

1. Construct sounder arguments in: essays, assignments, debates and interviews
2. Spot/avoid the most common flaws in argument
3. Challenge the written and spoken arguments of others
4. Sharpen student's use of statistical evidence and spot flaws in statistical data in the media, in books on websites etc
5. Develop tools to confront a post-truth era and social media stresses



# What do we believe without any evidence?



3% of Britons believe the Earth is flat

37% of Americans believe in ghosts

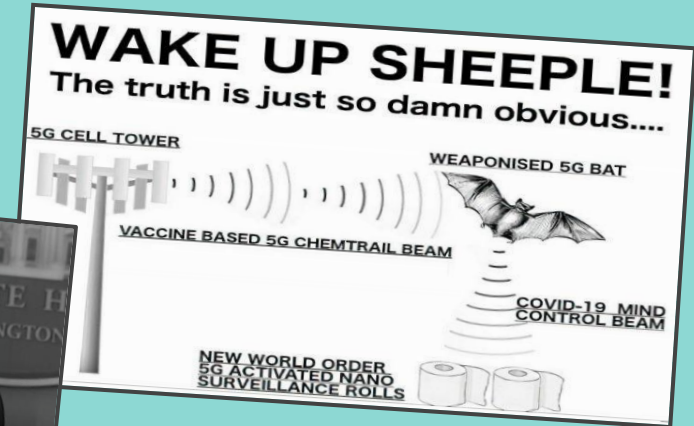
75% of Americans believe in psychic healing

# Dangerous things many people believe about COVID...

'COVID is a man made bioweapon'

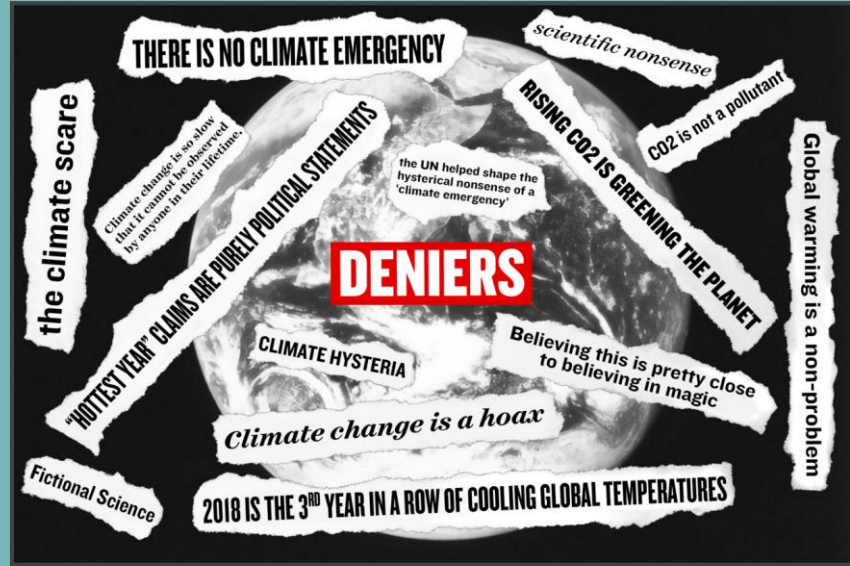
'Taking a hot bath can help prevent catching COVID'

'COVID dies in sunlight'



# Many people ignore the facts on...

## Climate Change



# Increasingly, we live in a 'post-truth' era...

**Post-truth** = relating or denoting circumstances in which objective facts are less influential in shaping public opinion than appeals to emotion or personal belief.

*Oxford English Dictionary*



# What is the cure?

**Simon Blackburn:** 'The only remedy for bad mental habits is the cultivation of better ones. We need to raise people good at distinguishing what is trustworthy from what is not.'

**Karl Popper:** 'The aim of an argument, or of a discussion should not be victory but progress'

# A sound argument is central to:

- Effective speech
- Written text
- Debate
- Assessments
- Decisions

## What is an argument?

An argument is a reasoned, logical way of demonstrating the writer's position, belief, or conclusion is valid (and well founded).

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**What is the most effective way to challenge an argument?**

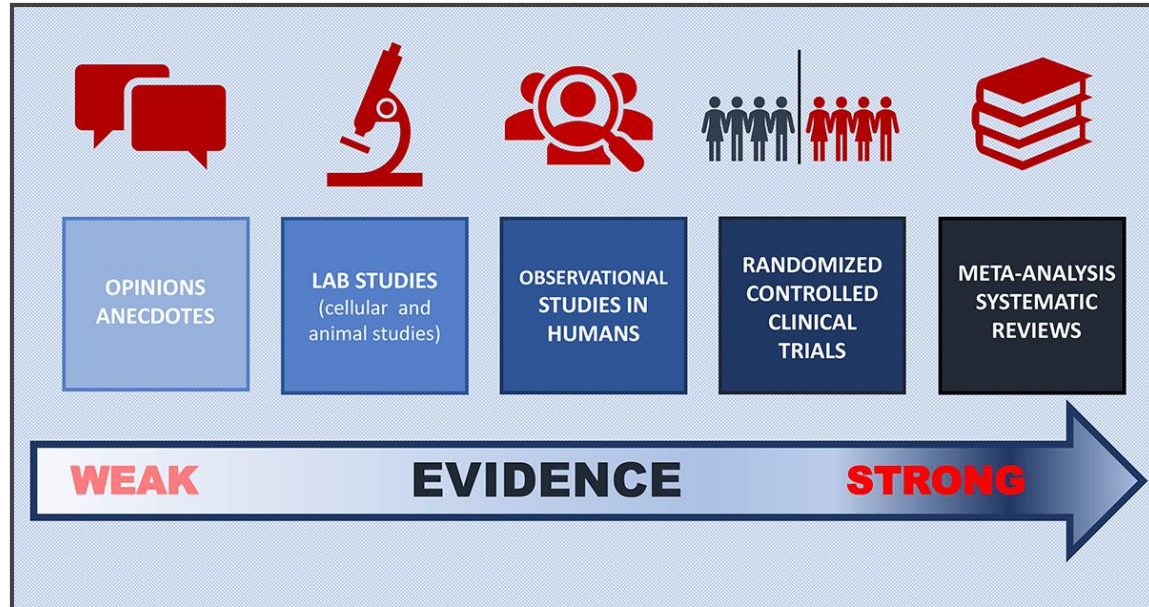


# 1. Ask questions such as...

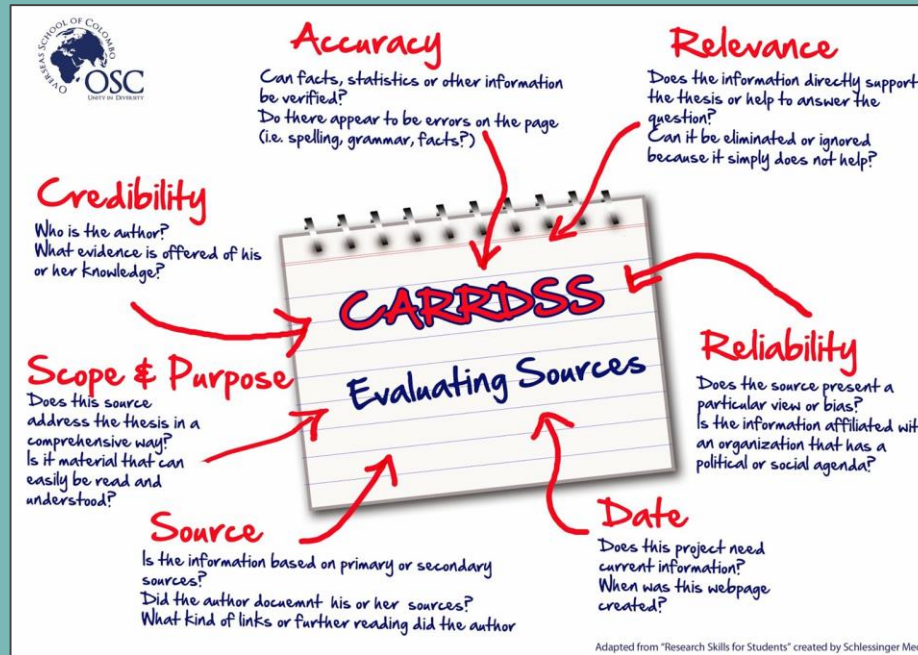
- Where is the evidence?
- What does the research say?
- Can you prove it?
- Challenge them on specifics by asking: who? when? what? how much?
- Request some examples...



...then question the quality of the evidence and use high quality evidence yourself



## 2. Ask key questions about the credibility of any source of information: **CARRDSS**



### 3. Don't base your argument on personal experience or limited examples

Anecdotes are not evidence, do not make a hasty generalisation based on personal experience...

aka hasty  
generalisation



## 4. Weigh **all** the evidence in the balance

- Just one negative outcome for choosing a particular action is not in itself a reason not to do it
- It depends whether a negative consequence is a price worth paying in the light of all possible costs/benefits of the action

aka confirmation bias





Not seeking out  
objective facts



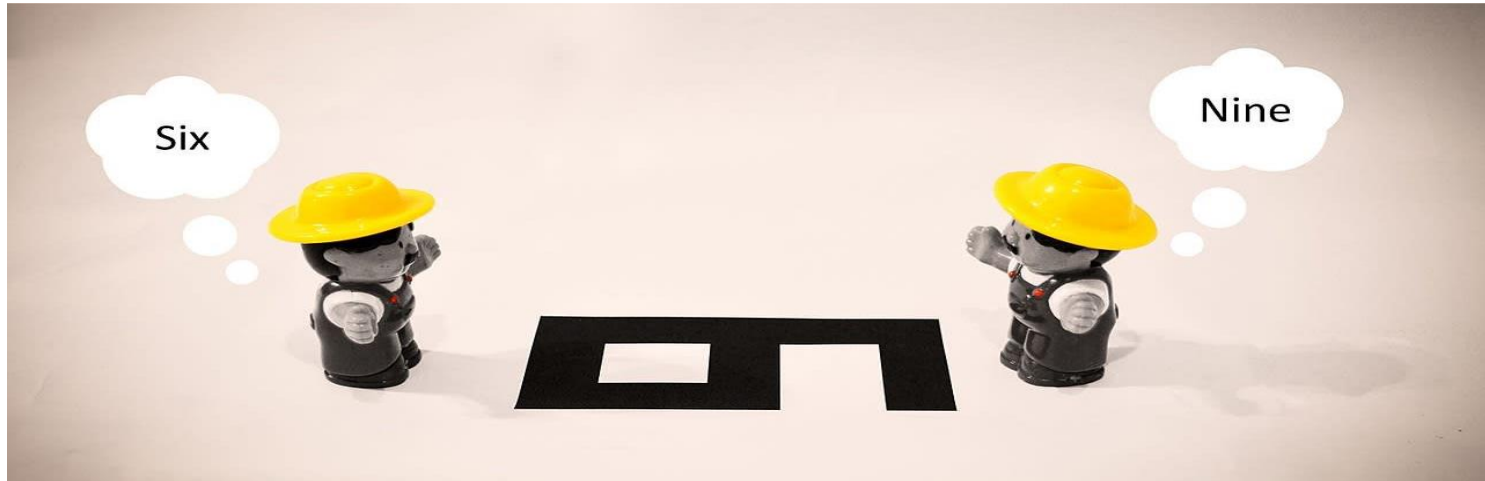
Interpreting information to  
support your existing belief



Only remembering details  
that uphold your belief

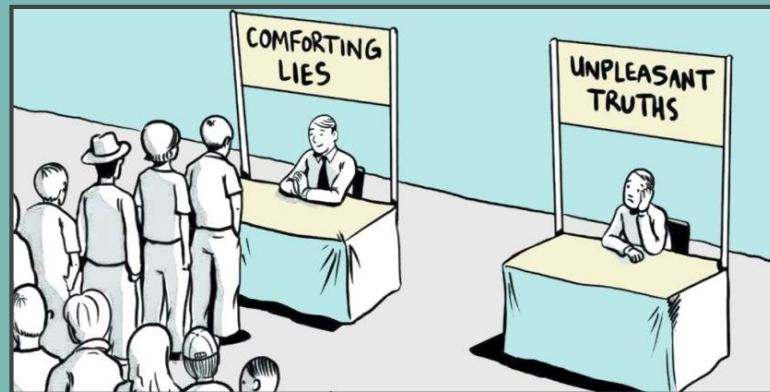


Ignoring information that  
challenges your belief



## 5. Your argument will be stronger if you avoid looking only for supporting evidence

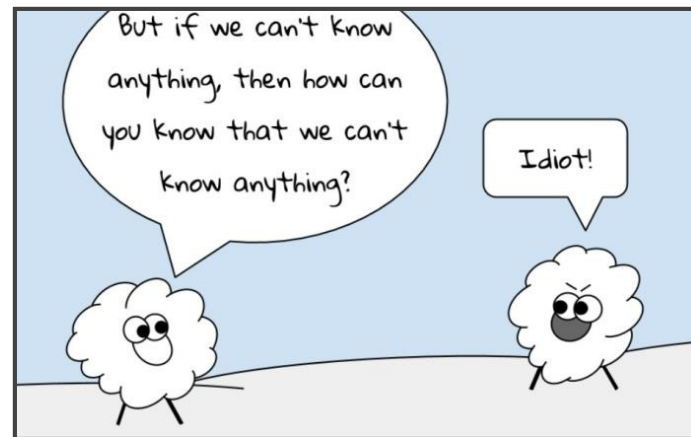
1. Mix with people different from you who have different opinions from you.
2. Successful people usually have different experts and advisors around them with different opinions and insights.
3. Make sure you have someone who is always challenging your thinking
4. Don't ignore inconvenient evidence, take account of it



## 6. Don't attack the person, **challenge** what the have to say...

Respond to what people say  
or write not to their: age,  
gender, ethnicity, nationality,  
occupation, political party etc

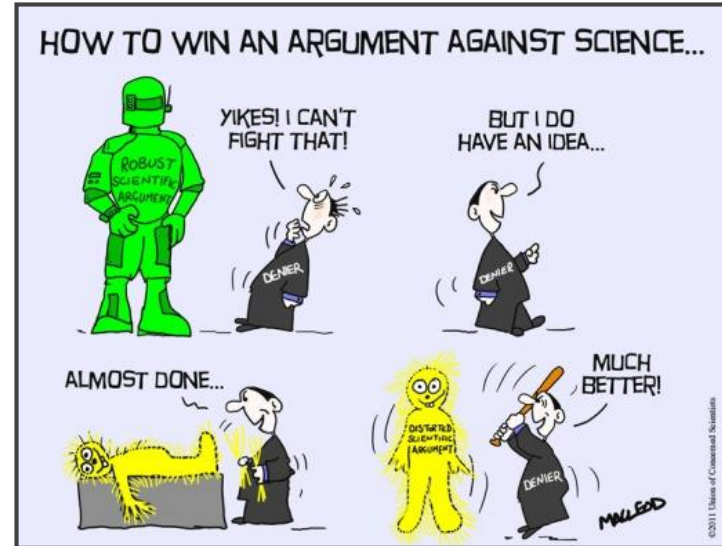
aka ad hominem argument



# 7. Don't misrepresent someone's argument to make it easier to knock it down

'Greenpeace will not be happy until the world is covered with windmills as the source of all our energy.'

aka straw man argument



## 8. Beware of the **endorsement** of an (irrelevant) authority or celebrity

The person making a claim is presented as an expert who should be trusted when his/her expertise is not in the area being discussed or they may have a vested interest in it.



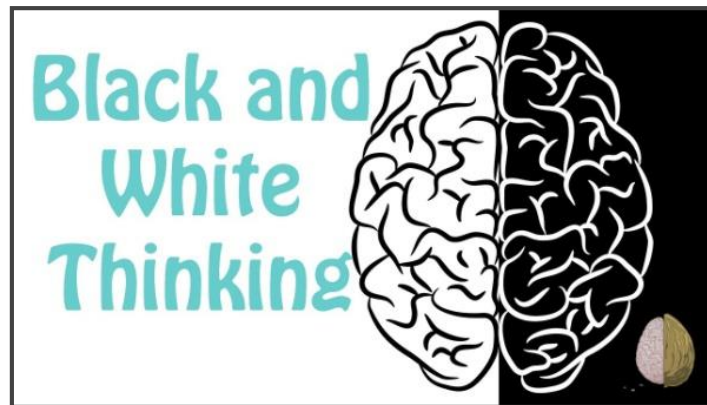
aka appeal to authority

## 9. Don't reduce an argument to only two alternatives when there are several

'When marital conflict breaks out either you split up or go to a supportive marriage guidance counsellor.

The argument is worded so that we are only given two alternatives, one of which is completely unappealing, making the second appear to be more acceptable.

**aka false dilemma**



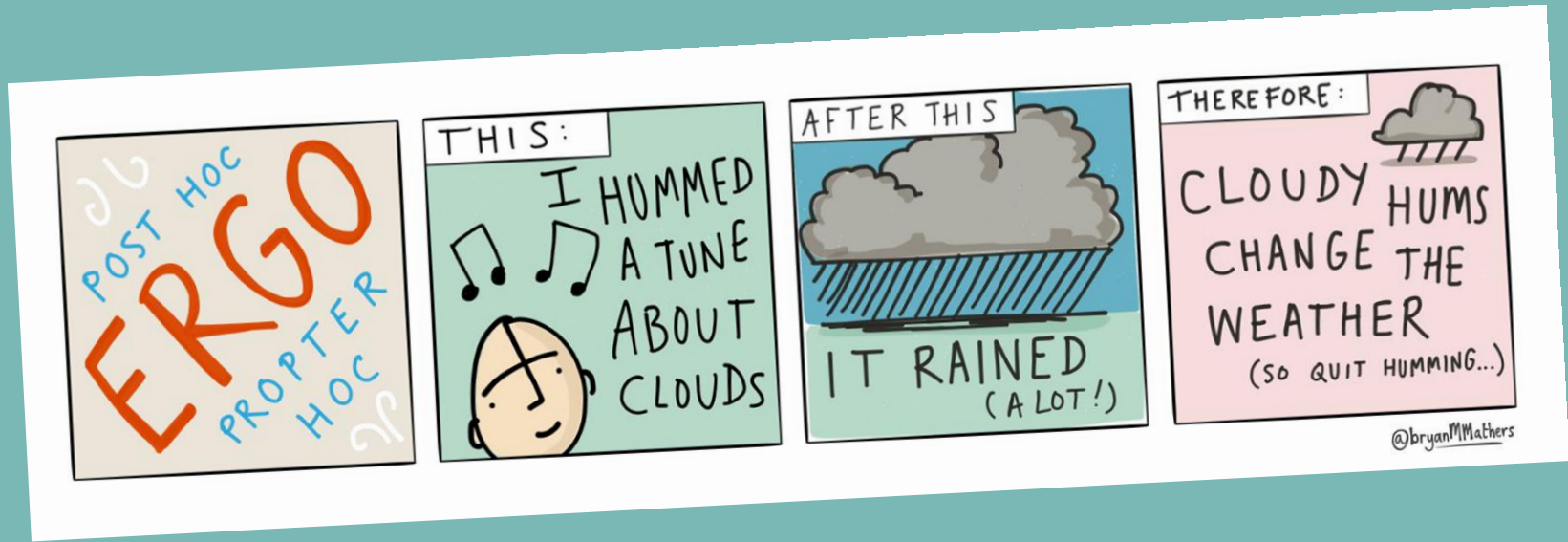
## 10. Avoid unfair appeals to negative emotions such as fear or pity

“if we don't act now to solve this terrible problem our precious children will be in grave danger”

aka appeals emotion pity/fear



# 11. Just because one event took place before another does not mean it caused it...



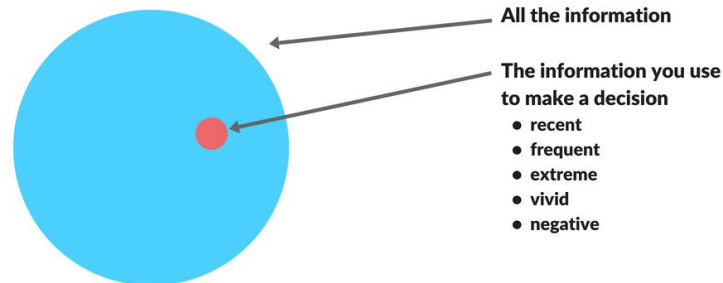
aka post hoc ergo propter  
hoc

## 12. Don't dwell too much on a recent example or event when making a decision...

- Look for facts, numbers, statistics and contrary examples.
- Pause, think, don't make a now or never decision.
- Ask for an outside view.
- The media present a negative view of the world: bad news is good news.

aka the availability heuristic

### The availability heuristic



## 13. The fact that two things seem connected does not mean one causes the other

"My child was diagnosed with autism after being vaccinated. Therefore vaccines cause autism."

"I've been wearing a crystal necklace all winter and haven't caught a cold. Thus crystals keep me healthy."

"My house sold after I buried a St. Joseph statue in the yard. So St. Joseph helped sell my house!"

aka correlation does not  
equal cause

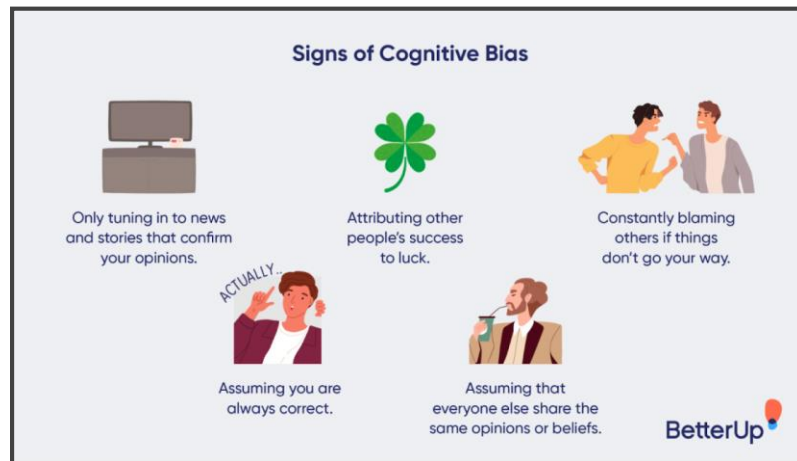
# 14. The chances of something happening are not altered by a recent event



aka The Gambler's Fallacy

## 15. Try to compensate for your cognitive biases

A cognitive bias is a systematic error in the way that we think that affects your ability to make rational decisions and judgements.



# Being Rational is Hard: 10 Cognitive Biases which can Distort Your Thinking

<https://www.youtube.com/watch?v=ZhYO68O2jWU> (8 mins)

# 5 Quick Tips When Using Numbers/Data

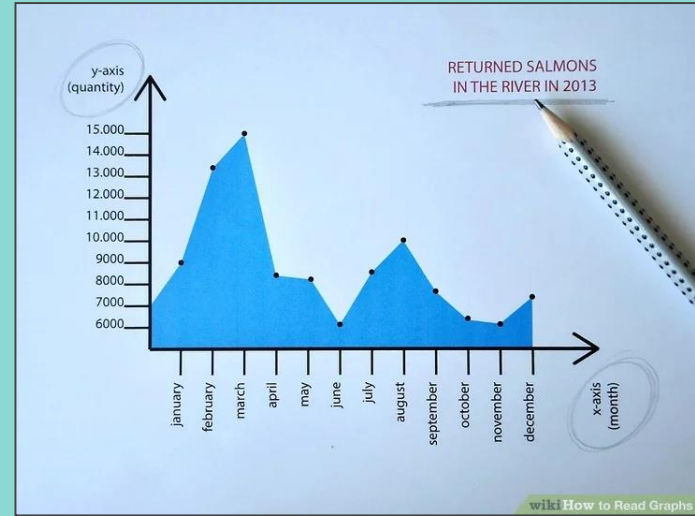


*"Just because someone quotes you a statistic or shows you a graph, it doesn't mean it's relevant to the point they are trying to make."*

Daniel Levitin - Neuroscientist and author of *A Field Guide to Lies and Statistics*

Watch this  
quick  
video from  
Tim  
Harford

# 1a. Look Carefully at Graph Labels: Title, Date and What the Axes Represent



# 1b. Ask Some Key Questions to Give Data Some Context

- Where does it come from?
  - When was it collected?
  - To when does it refer?
- Who compiled the data: individual/organisation?

# 2. 'Rates Per' Tell You More than Raw Numbers When Comparing Data Sets

These countries have the most firearm-related deaths

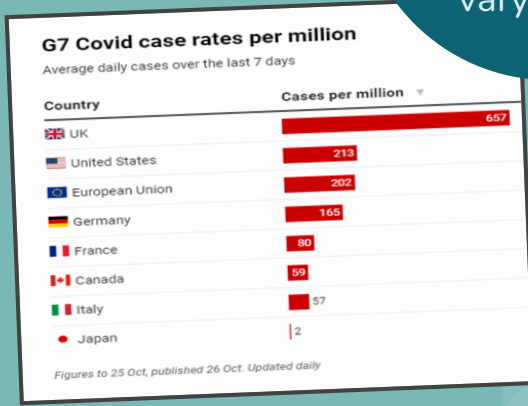
Based on IMHE aggregate data from homicides, suicides and accidental injuries, 2016

Country	Deaths
1 Brazil	43,200
2 United States	37,200
3 India	26,500
4 Mexico	15,400
5 Colombia	13,300
6 Venezuela	12,800
7 Philippines	8,020
8 Guatemala	5,090
9 Russia	4,380
10 Afghanistan	4,050

Source: IHME

**Unfair Comparison:**  
Murders Per 100,000 or Per Million Would Give A Different Rank Order

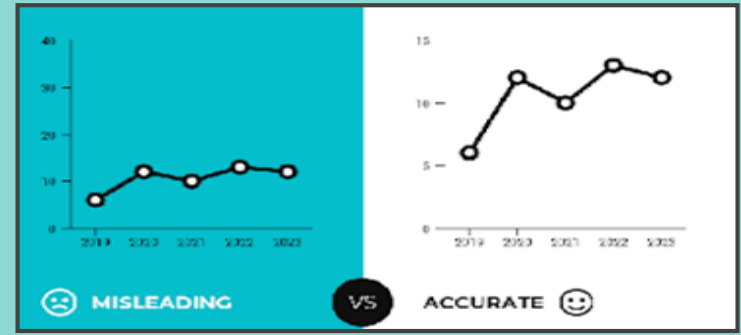
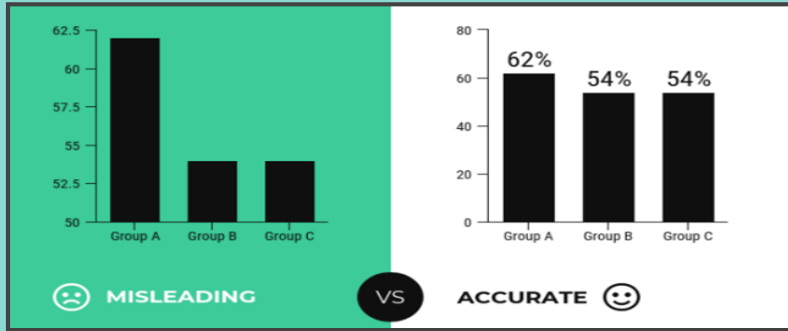
**Fair comparison:**  
Allows for fact countries vary in size



**Rates Compare Like with Like**  
Per 100,000  
Per 1,000,000  
Per capita (per person)

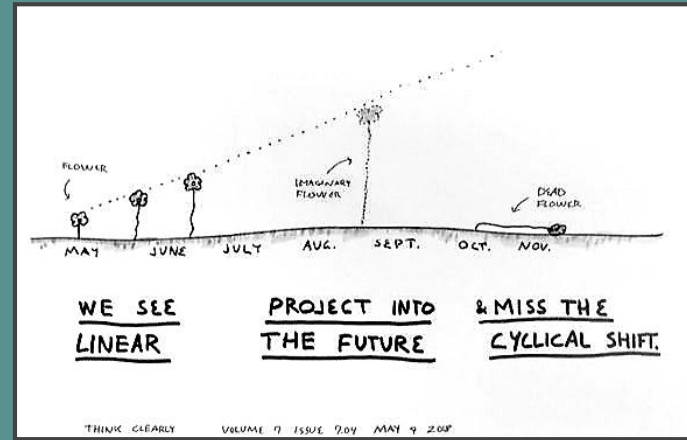
# 3. Watch Out for Data Presented in a Misleading Way

The baseline of a graph is normally 0. Sometimes it is changed to give a false impression. This is called a truncated graph



Altering the scale of a graph can also mislead

# 4. Be Aware: Trends in Data Don't Always go in Straight Lines...



...especially when projecting into the  
future

# 5. Watch out for Cherry Picked Data



realDonaldTrump • Follow  
 Thank you very much, working hard!  
 Load more comments  
 riot\_racer @figboot31977 I know your a Donald trump supporter. Kind of obvious  
 figboot31977 @riot\_racer Here's a thought for ya.... You don't know crap!!! GET a LIFE and STAY the #@&# OUT OF MINE!!!  
 riot\_racer @figboot31977 I'm not in yours. If I was then I'd have a bigger understanding of who you are. Like I said if you support  
 625,072 likes  
 JULY 28  
 Log in to like or comment

In small print it says that only Republican voters, Trump's own party, have been surveyed

Only certain data points may be included in order to mislead and support the case the writer is trying to argue

## Two 19th Century Philosophers said...

*“Members of a democracy should be able to think for themselves, evaluate information rationally, be confident enough to seek out the strongest arguments against their position and humble enough to recognise where they might be wrong” - Harriet Taylor & JS Mill*



# Activities to test your thinking skills...



# Match the Fallacy in Argument to the Statement: Round 1

## Fallacies to look out for:

- Attacks the person not their argument (ad hominem)
- Looks only for supporting evidence.  
(Confirmation bias)
- Appeals to emotion
- Generalises from limited evidence
- Appeals to emotion

# Match the Fallacy in Argument to the Statement: Round 1

## Fallacies to look out for:

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- Generalises from limited evidence
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1. Farmer Brown claims that he saw a flying saucer in his farm, but he didn't get any qualifications and can hardly read or write. He is completely ignorant of what scientists have written on the subject, so his report cannot possibly be relied upon.
1. My client is an integral part of this community. If he is sent to prison not only will this city suffer but he will be missed by his family. You surely cannot find it in your hearts to reach any other verdict than 'not guilty'.
1. John has worked hard on his project, and he will really be depressed if he does not make an A. For these reasons, you just have to give him an A on his project.
1. As I walked to the library during Freshers' Week not one person spoke to me. Swotville University is not as friendly as I was led to believe.
1. I am right about this. I have looked at 9 or 10 research studies on the causes of schizophrenia and Melville's study supports my own view of the subject

# Round 1 Answers

1. Attacks the person not their argument (ad hominem)
2. Appeals to emotion
3. Appeals to emotion
4. Generalises from limited evidence
5. Looks only for supporting evidence. (Confirmation bias)

# Match the Fallacy in Argument to the Statement: Round 2

## Fallacies to look out for:

- No evidence
- Appeal to popularity.
- Fact that two things seem to be connected (correlated) does not mean one caused the other. (False cause)
- Appeal to pity
- Generalising from a few examples

# Match the Fallacy in Argument to the Statement: Round 2

## Fallacies to look out for:

- Attacks the person not their argument (ad hominem)
- Looks only for supporting evidence. (Confirmation bias)
- Appeals to emotion
- Generalises from limited evidence
- Appeals to emotion

6. Everyone says logic is easier than maths so this must be true.
7. The best students get the best grades. Therefore, getting high grades will undoubtedly cause you to be a better student.
8. Many charges of corruption have been brought against Mr Smith MP over the past few years. He has had numerous opportunities to refute them, but he has never done so. Therefore, I think, the evidence indicates he is not to be trusted.
9. President Nixon, Vice-President Agnew and, I have heard, George Bush cheated on their income tax. I conclude that all politicians cheat on their income tax.
10. But Professor, I just have to get a B in this course or I will lose my scholarship, all I'm asking for is just this one break.

# Round 2 Answers

6. Appeal to popularity.

7. The fact that two things seem to be connected (correlated) does not mean one caused the other. (False cause)

8. No evidence

9. Generalising from a few examples

10. Appeal to pity

# Match the Fallacy in Argument to the Statement: Round 3

## Fallacies to look out for:

- Appeal to (irrelevant) authority
- Just because one event took place before another does not mean it caused it (Post hoc ergo propter hoc)
- Generalising from limited evidence because an unrepresentative sample of the population
- Appeal to popularity
- Just because one event took place before another does not mean it caused it. (Post hoc ergo propter hoc)

# Match the Fallacy in Argument to the Statement: Round 3

## Fallacies to look out for:

- Appeal to (irrelevant) authority
- Just because one event took place before another does not mean it caused it (Post hoc ergo propter hoc)
- Generalising from limited evidence because an unrepresentative sample of the population
- Appeal to popularity
- Just because one event took place before another does not mean it caused it. (Post hoc ergo propter hoc)

11. Everyone is struggling to meet the deadline. They all think we should be able to take a break. You have to extend the deadline.

12. Nearly all heroin addicts used marijuana before they try heroin. Clearly marijuana use leads to heroin addiction.

13. Ely Culbertson, the outstanding bridge player, said that the UN has serious defects. The opinion of a man of his calibre should not be taken lightly.'

14. If a Democrat is elected in the next presidential election we will have one of the worst recessions in years. Recessions are always created by Democrats.

15. Judging by the opinions of people who call in to talk shows, most Americans believe the FBI is a bunch of jack-booted thugs.

# Round 3 Answers

11. Appeal to popularity.

12. Just because one event took place before another does not mean it caused it. (Post hoc ergo propter hoc)

13. Appeal to (irrelevant) authority

14. Just because one event took place before another does not mean it caused it (Post hoc ergo propter hoc)

15. Generalising from limited evidence because an unrepresentative sample of the population

# Match the Fallacy in Argument to the Statement: Round 4

## Fallacies to look out for:

- Where is the evidence?
- The chances of something happening are not altered by a recent event (Gambler's Fallacy)
- Reduces an argument to only two alternatives when there are several. (False dilemma)
- Just because one event happens before another does not mean it caused it. (Post hoc ergo propter hoc)
- The fact that two things seem to be connected (correlated) does not mean one caused the other. (False correlation)

# Match the Fallacy in Argument to the Statement: Round 4

## Fallacies to look out for:

- Where is the evidence?
- The chances of something happening are not altered by a recent event (Gambler's Fallacy)
- Reduces an argument to only two alternatives when there are several. (False dilemma)
- Just because one event happens before another does not mean it caused it. (Post hoc ergo propter hoc)
- The fact that two things seem to be connected (correlated) does not mean one caused the other. (False correlation)

16. To save the country from the dictatorship of the present government? The only choice is to vote Independent.

17. There is a correlation between films featuring Nicolas Cage and the number of people who drown in swimming pools. We should not show his films.

18. Mr. Sparkman should come before the people and make a financial statement as and he doesn't, he has something to hide.

19. I knew a philosophy student who had a breakdown and another who had mental health issues. You can see what the study of philosophy did to them.

20. A coin is flipped. The head lands face up four or five times. It is very likely (probable), therefore, that the coin will land on the tails next time. In fact, the repeated heads coin flips increase the likelihood of a tails coin.

# Round 4 Answers

16. Reduces an argument to only two alternatives when there are several.  
(False dilemma)
17. The fact that two things seem to be connected (correlated) does not mean one caused the other. (False correlation)
18. Where is the evidence?
19. Just because one event (studying Philosophy) happens before another (mental illness) does not mean it caused it. (Post hoc ergo propter hoc)
20. The chances of something happening are not altered by a recent event  
(Gambler's Fallacy)

# Misleading Use of Numbers/Data: Question 1

The claim that 80% of dentists recommend Colgate comes from a survey asking which toothpastes including (Crest, Colgate and Oral B) dentists recommend. What might be misleading about the claim in the advert?

The Herald

## Colgate censured over TV advert

20 Jun 2012

THE firm behind Colgate has been reprimanded by the advertising watchdog for wrongly implying that one of its toothpastes has the backing of health professionals. The TV ad drew seven complaints that it misleadingly implied the product was endorsed by members of the nursing profession by featuring a nurse at work.

# Misleading Use of Numbers/Data: Answer 1

- This poll used a system of approval voting, in which dentists could recommend as many toothpastes as they wanted.
- So every brand of toothpaste could have had an 80% approval rating!
- If Colgate had the highest approval rating, the ad might have read "More dentists approve of Colgate than any other brand." But the fact that it did not suggests the data does not support this claim.

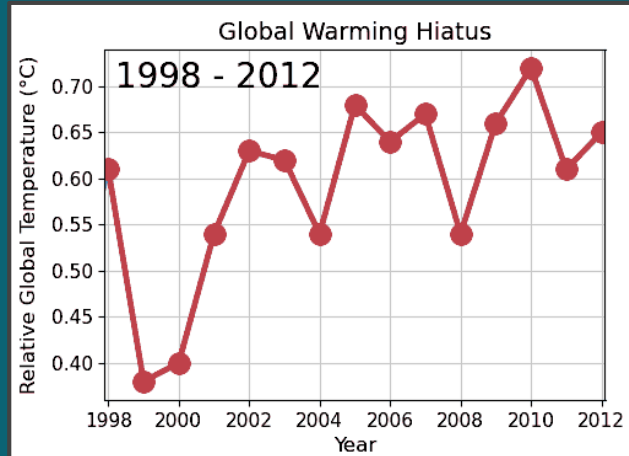
**The Actual Study**

Dentist 1	Dentist 2	Dentist 3	Dentist 4	Dentist 5
Colgate Crest Oral-B	Colgate Crest Sensodyne	Crest Oral-B	Colgate Crest Oral-B Sensodyne Pepsodent	Colgate Crest Oral-B Sensodyne

**"80% recommend Colgate"**  
**"100% recommend Crest"**  
**"80% recommend Oral-B"**

# Misleading Use of Numbers/Data: Question 2

What might be wrong with this?



*Global warming hiatus, also sometimes referred to as a global warming pause or a global warming slowdown*

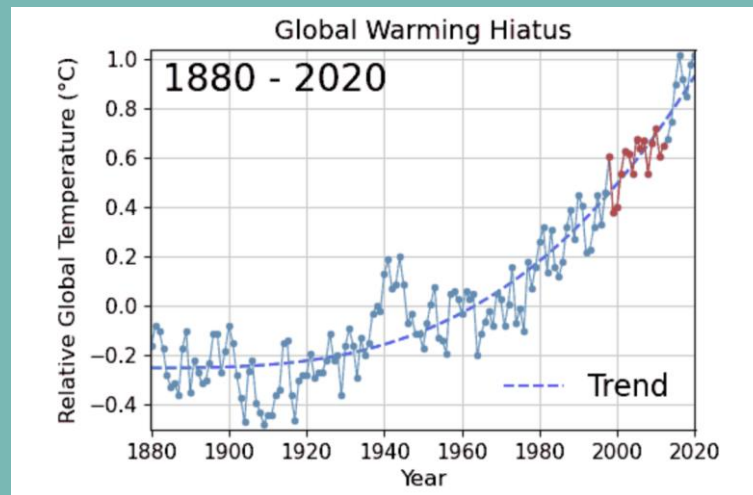
# Misleading Use of Numbers/Data: Answer 2

Cherry-picking is often used in science denial such as climate change denial. For example, by deliberately cherry picking appropriate time periods, here 1998–2012, an artificial "pause" can be created, even when there is an ongoing warming trend.



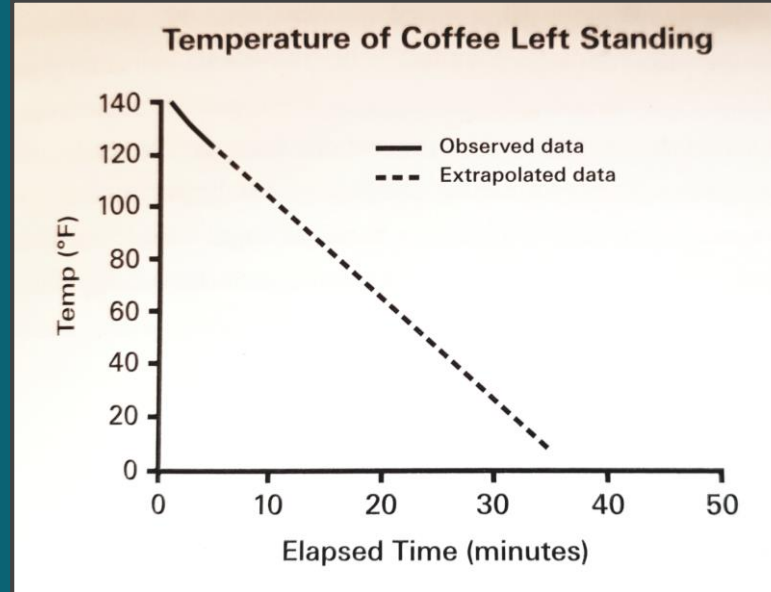
*"Just because someone quotes you a statistic or shows you a graph, it doesn't mean it's relevant to the point they are trying to make."*

Daniel Levitin - Neuroscientist and author of A Field Guide to Lies and Statistics



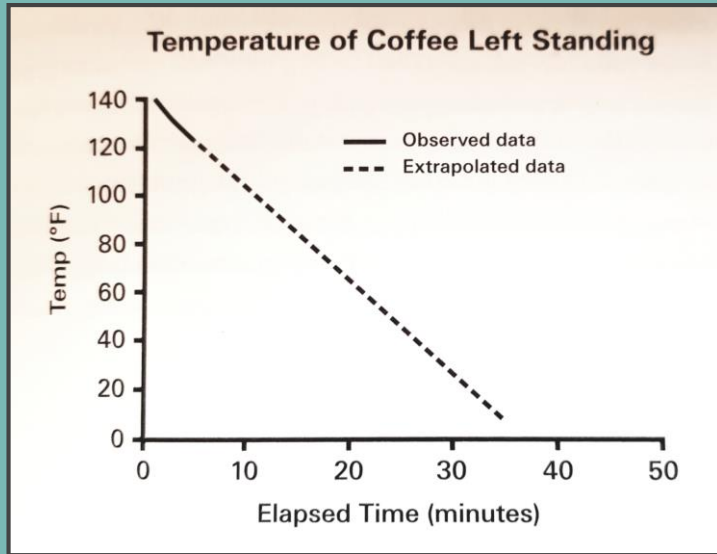
# Misleading Use of Numbers/Data: Question 3

What might be wrong with this?



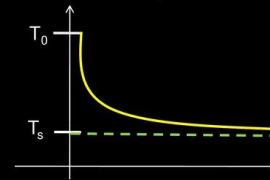
# Misleading Use of Numbers/Data: Answer 3

Assumes, wrongly, that the coffee will continue to cool at the same rate



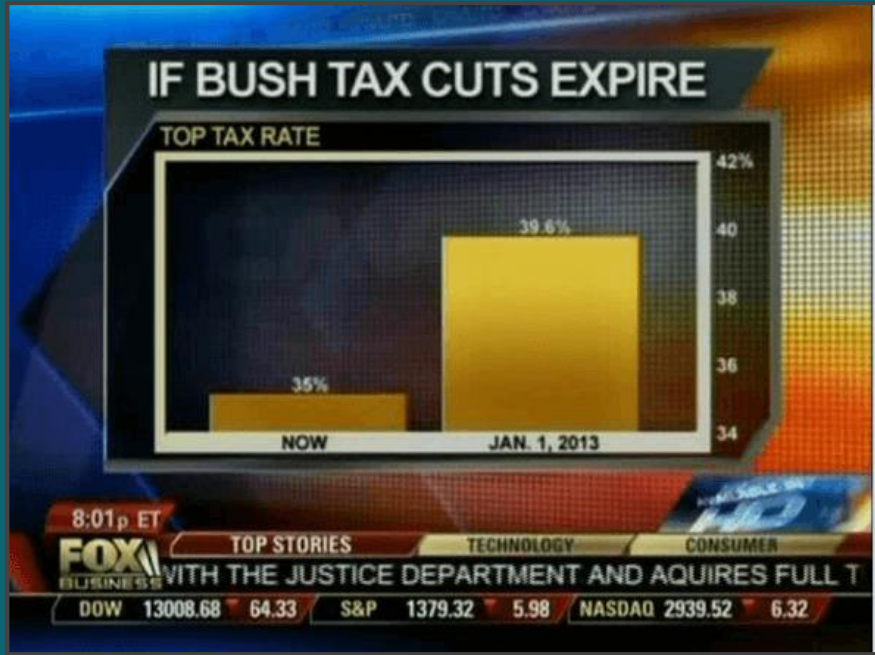
## Temperature Change

- An object's temperature over time will approach the temperature of its surroundings
- The greater the difference between the object's temperature and the temperature of its surroundings, the greater the rate of change of the object's temperature
- This change is a form of exponential decay



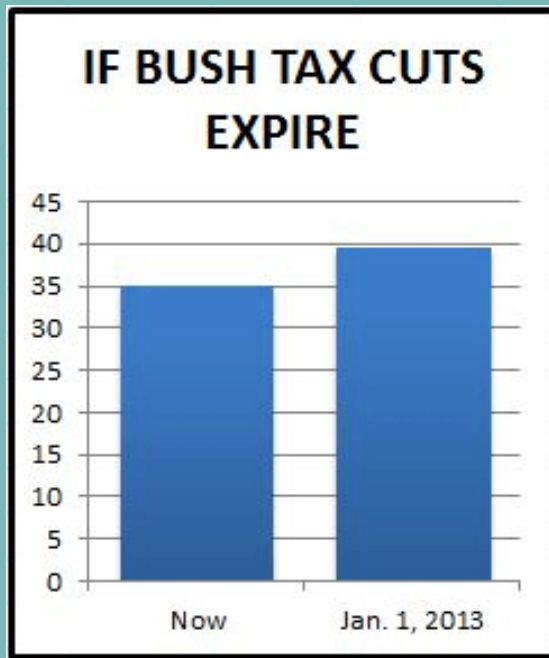
# Misleading Use of Numbers/Data: Question 4

What might be misleading about the data in the graph?



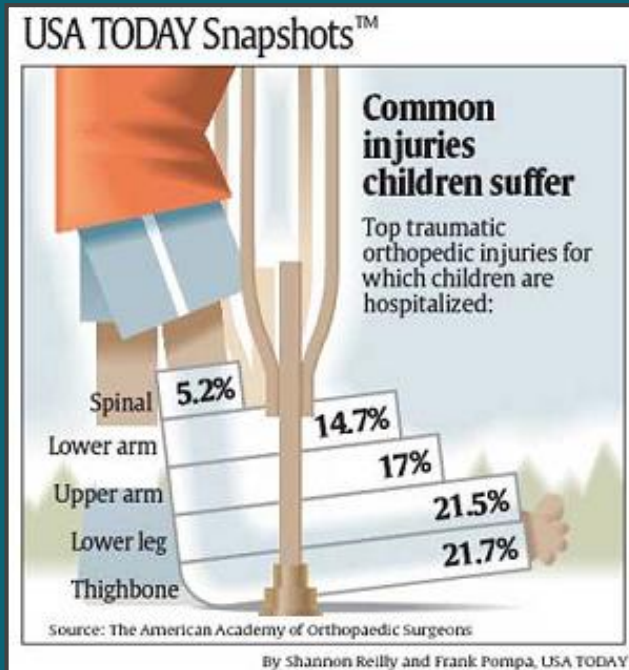
# Misleading Use of Numbers/Data: Answer 4

This is a typical example of a truncated graph which in this case makes the tax cuts look much bigger than they actually are in the actual graph on the left. The graph in the previous slide does not start on '0'



# Misleading Use of Numbers/Data: Question 5

What might be misleading about the data in the graph?



# Misleading Use of Numbers/Data: Answer 5

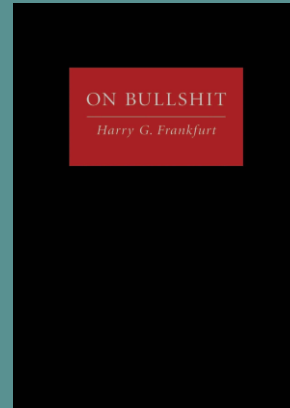
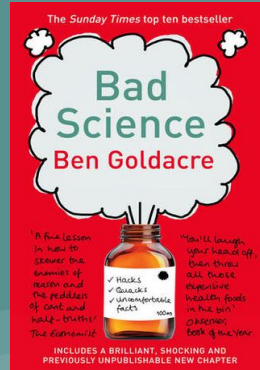
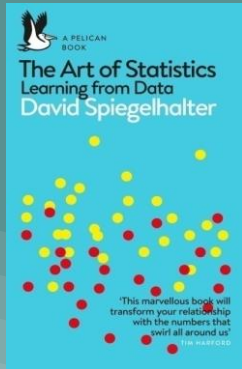
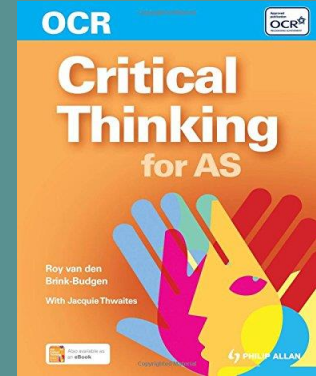
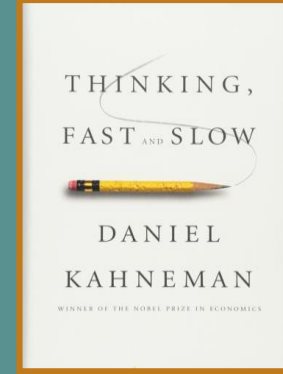
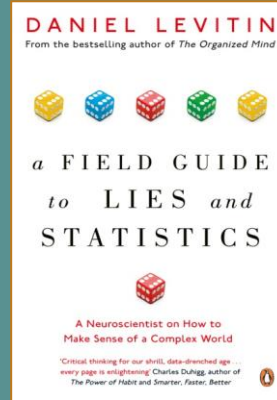
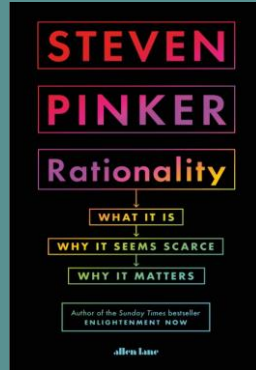
This graph has the correct figures, but the BIG HEADLINE makes you think that 5.3% of children get spinal cord injuries. This is an alarming statistic for parents

The graph actually shows: **top traumatic injuries for which children are hospitalised**

# Resources

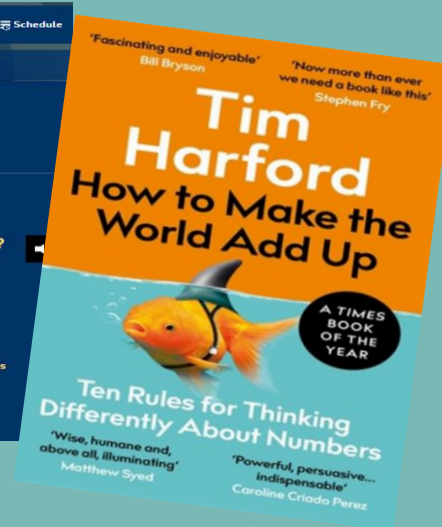


# Useful Books



# More or Less Radio 4

Tim Harford explains and sometimes debunks, the numbers and statistics used in political debate, the news and everyday life



# USEful Websites

1. <https://thinkingispower.com/logical-fallacies/>
1. <https://www.tylervigen.com/spurious-correlations>
1. [https://en.wikipedia.org/wiki/List\\_of\\_fallacies](https://en.wikipedia.org/wiki/List_of_fallacies)
1. <https://www.informationisbeautiful.net/visualizations/rhetological-fallacies/>
1. <https://blogs.lse.ac.uk/businessreview/2020/05/06/how-we-count-the-number-of-covid-19-deaths-matters/>

# Further Activities

1. <https://blog.hubspot.com/marketing/common-logical-fallacies>
  1. [http://web.cn.edu/kwheeler/logic\\_fallacies\\_exercise.html](http://web.cn.edu/kwheeler/logic_fallacies_exercise.html)
    1. [https://philosophy.lander.edu/logic/person\\_ex.html](https://philosophy.lander.edu/logic/person_ex.html)
  1. <https://www2.palomar.edu/users/bthompson/exercise%201.html>
1. <https://www.studenthandouts.com/social-studies/debate/ad-hominem-argument-worksheet.html>
  1. <https://www.geckoboard.com/best-practice/statistical-fallacies/>
  1. <https://www.geckoboard.com/best-practice/data-claim-checklist/>

# Questions?



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