

# Developing critical thinking skills through active engagement

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# What will we cover

- Context of critical thinking teaching at Loughborough University
- Basic principles
- Explore some activities to get participants thinking about their critical thinking skills
- If we have time we'll discuss the use of such activities in stand alone workshops

# Context

- ‘Develop your Critical Thinking’ – part of an open programme. Generic content aimed at all undergraduates
- Critical thinking seminars for 3<sup>rd</sup> year Psychology undergraduates – centred around a specific assignment

# Activity 1 – self-audit

How good a critical thinker are you?



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# Critical thinking - defined

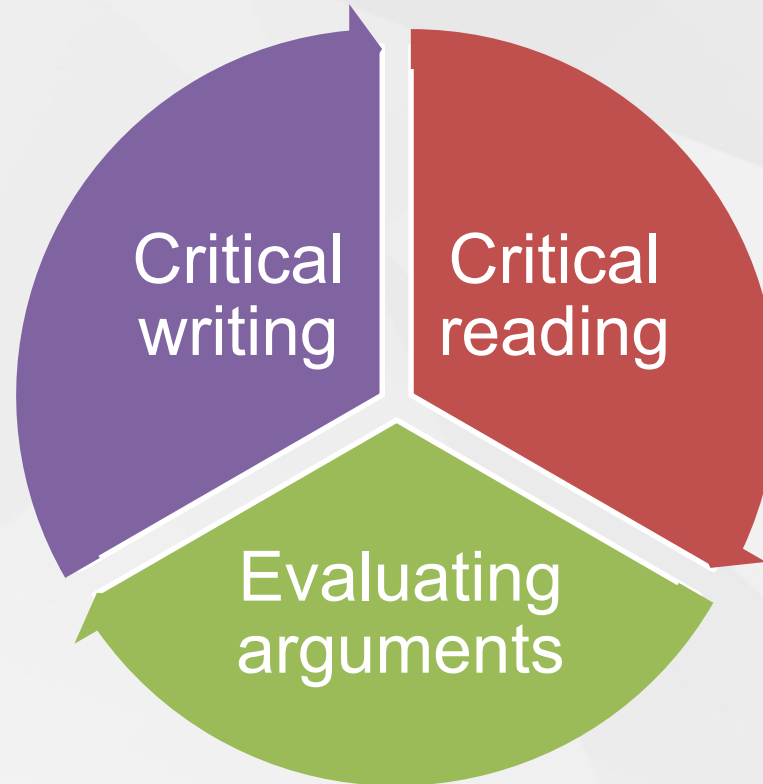
“Objective analysis and evaluation of an issue in order to form a judgement”

(Oxford Living Dictionaries)

“Capacity to work with complex ideas whereby a person can make effective provision of evidence to justify a reasonable judgement”

(Moon 2005).

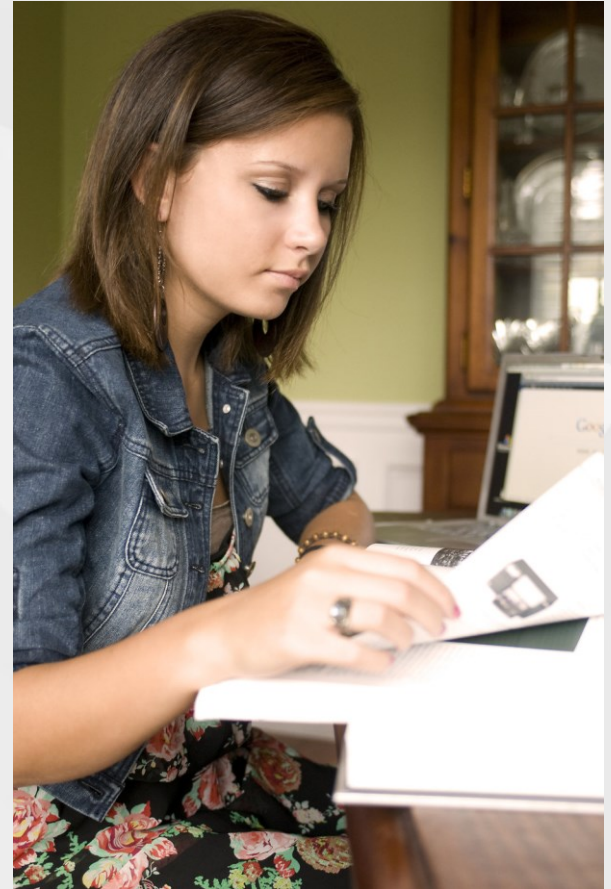
# Critical thinking



# Activity 2 – am I a critical reader?

How do you read?

Do you read critically?

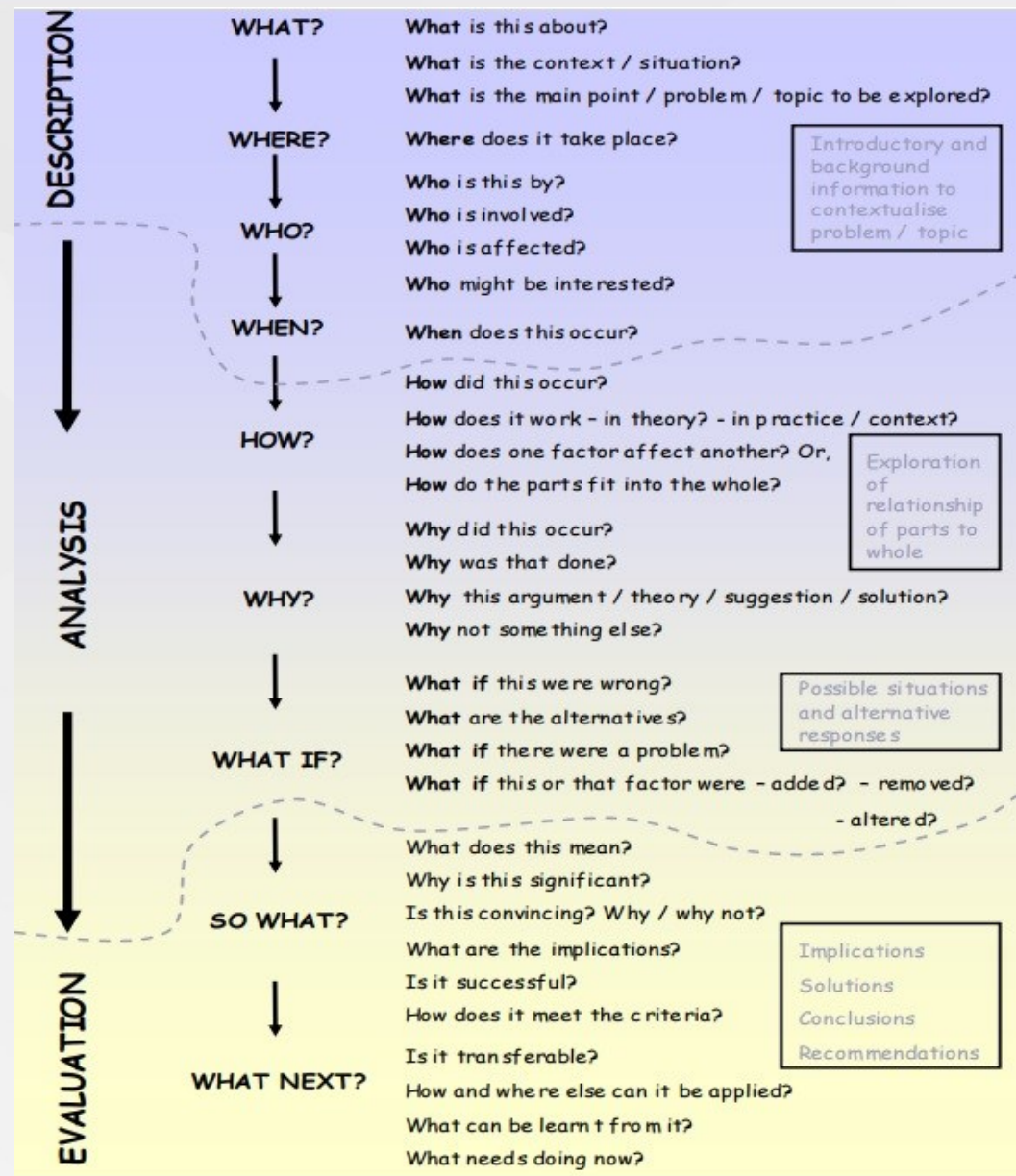


# Reading critically – question the writing:

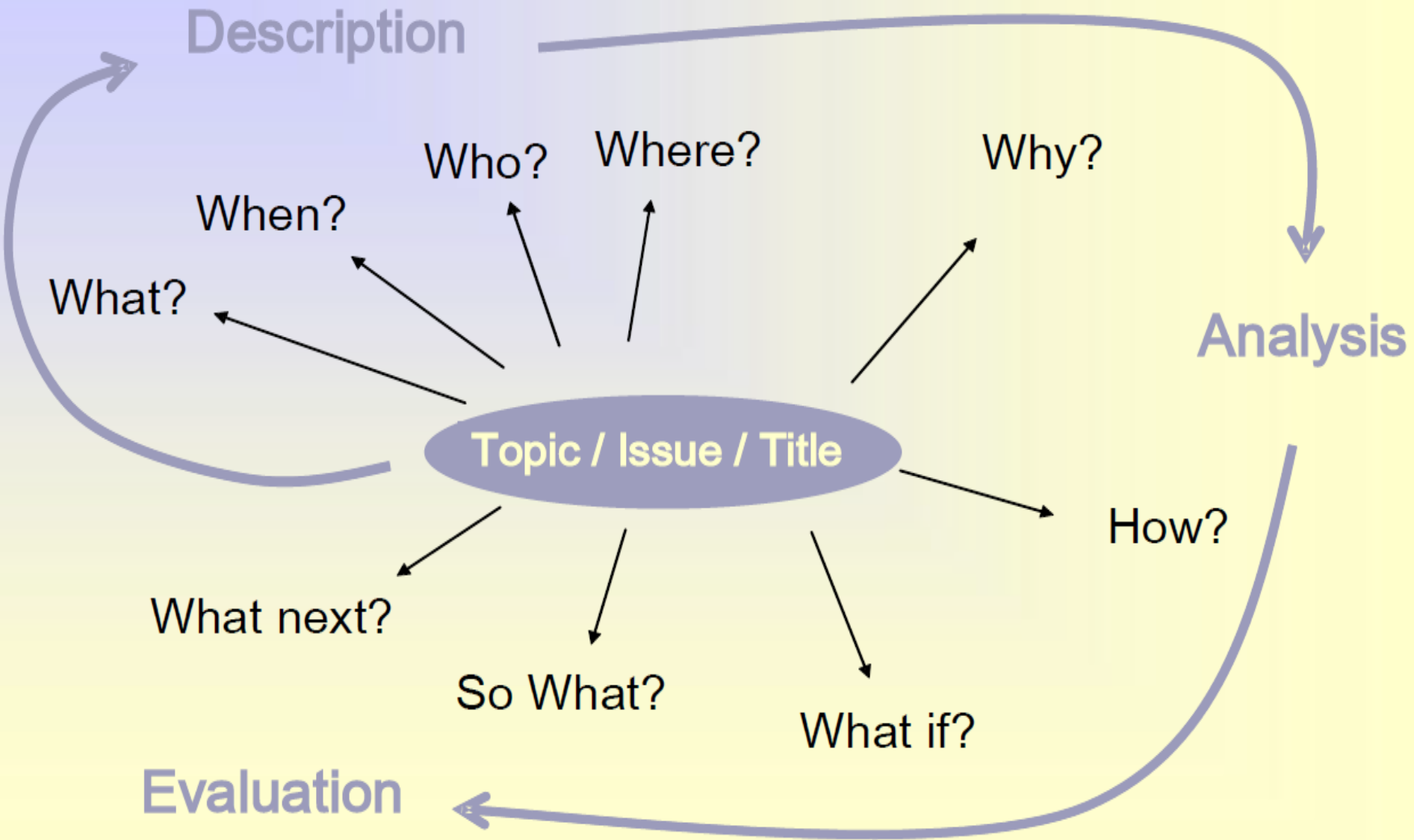
- what is the essence of the author's argument?
- are the author's ideas evidenced effectively?
- what are the limitations or flaws in the evidence?
- what examples would prove the opposite theory?
- can the theory be disproved or is it too general?
- is this convincing?
- what are the implications?
- what are the alternatives?



Critical reading can help us identify descriptive, analytical and evaluative writing.



# Model to Generate Critical Thinking



A suspension bridge with a metal grate deck and wire railings stretches across a dense, misty forest. The bridge is suspended by thick cables from a large tree branch above. The forest is lush with green foliage, and a light mist hangs in the air, creating a serene and somewhat ethereal atmosphere. The bridge leads the eye from the foreground into the distance, disappearing into the trees.

**Listen to two short talks  
about a bridge.**

**Make notes on whether  
you think descriptive,  
analytical and evaluative  
has been used.**



**Who**

**What**

**Where**

**When**

# Description

What is it?

Who is involved?

When did it happen?

Where did it take place?

## “Setting the Scene”

*The ‘surface’ of the issue*

*What are the key features (e.g. of a theory, a case study, a journal article)?*

*Who developed these ideas (reference) and in what context?*

*Should be apparent from reading and/or reflection*



**Why**

**How**

**What  
if...**

# Analysis

Why?

How?

What if...?

“Relating the whole to the parts  
and the parts to the whole”

*“Under the surface”*

*Not typically apparent from a text – you have to develop your own analytical questions*

*Involves an element of speculation (thinking, imagining, ‘thought experiments’)*

*May require further reading or reflection (different perspectives brought together = synthesis)*

*Your thinking needs to be expressed in your writing (‘show your working’)*



**So  
What?**

**What  
Next?**



# Evaluation

So what?  
What next?

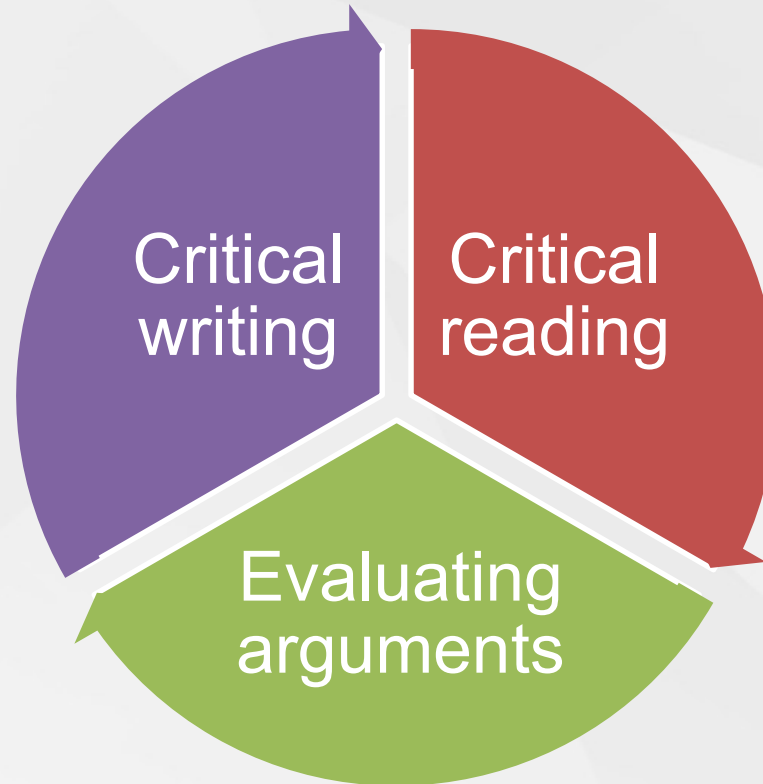
## “Making a value judgement”

*An attempt to give description and analysis some meaning: “This is important because...”*

*Only you can make the judgement – any ‘experts’ you bring in (references) are there to back you up*

*Crucial to get good marks – it’s what you think, and the basis for thinking that way (this demonstrates your understanding of a topic or issue)*

# Critical thinking



# Activity 3 - checking credibility

Read '*Why chocolate is good for teeth*'. As you read it decide:

Which organisation is the more credible?

In your judgement does the article convince you that chocolate is good for teeth?



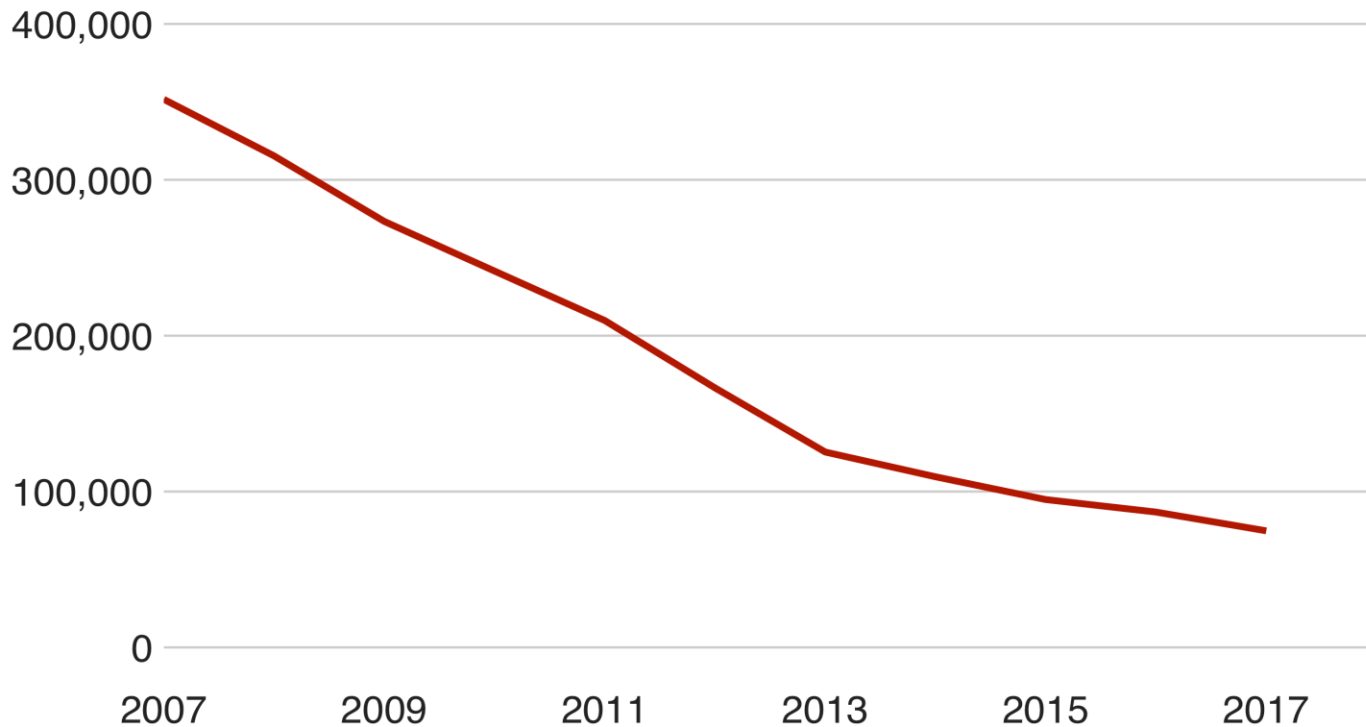
# Your judgement might be:

Cadbury is using research about substances in cocoa to argue that chocolate is 'not as bad' for teeth as believed. Chocolate, however, also contains lots of sugar which is harmful for teeth. It is therefore probable that Cadbury is interpreting the research for its own purposes (marketing), but that the research does not support Cadbury's position.

# Activity 4 - data check!

## Fewer young people are getting arrested

Arrests of people aged 10 to 17 in England and Wales



Source: Ministry of Justice and Youth Justice Board for England and Wales

BBC



## strawman

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

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

After Will said that we should cut more money into health and education, Warren responded by saying that he was surprised that Will hates our country so much that he wants to leave it defenceless by cutting military spending.



## 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 it starts engaging with the issue at hand and instead indulges in leaving extreme hypotheticals. The merits of the original argument are then buried by unsubstantiated conjecture.

Colin Crowe argued that if we allow same-sex couples to marry, then the next step we're going to be allowing people to marry their parents, their cars and even monkeys.



## special pleading

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

Humans are funny creatures and have a habit when it comes to being wrong. Before they appreciate the benefits of being able to change one's mind through better understanding, many will invent ways to cling to old beliefs.

Edward Teller claimed to be psychic, but when his 'abilities' were tested under proper scientific conditions, they magically disappeared. Edward explained this saying that one had to 'have faith' in his abilities for them to work.



## the gambler's fallacy

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

The commonly believed fallacy can be said to have helped create city in the desert of Nevada USA. Though the odds would be a big 'no' happening more or less each spin of the wheel is still entirely independent from the last.

Red had come up on the line in a row on the roulette wheel so Doug knew that it was due to come that black would be next up. Suffering an economic form of natural selection with the thinking, he soon had all his savings.



## 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, the medical tactic has the appearance of forming a logical argument, but under close scrutiny it becomes evident that there are more possibilities than the either/or choice that is presented.

While offering support for his plan to fundamentally undermine citizens' rights, the Supreme Justice said the people they were either on his side, or on the side of the enemy.



## false cause

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

Many people confuse correlation (things happening together) or coincidence for causation (that one thing actually causes the other to happen). Sometimes correlation is coincidental, or it may be attributable to a common cause.

Reading in a fancy chair, Roger didn't know temperatures have been rising over the past few centuries, whilst at the same time the number of states have been decreasing. This price tag for the world and global warming is a hoax.



## 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 directly attacking somebody or casting doubt on their character. The result of an ad hominem attack can be to undermine someone without actually engaging with the substance of their argument.

After Sally presents an important 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 smokes a bad weed.

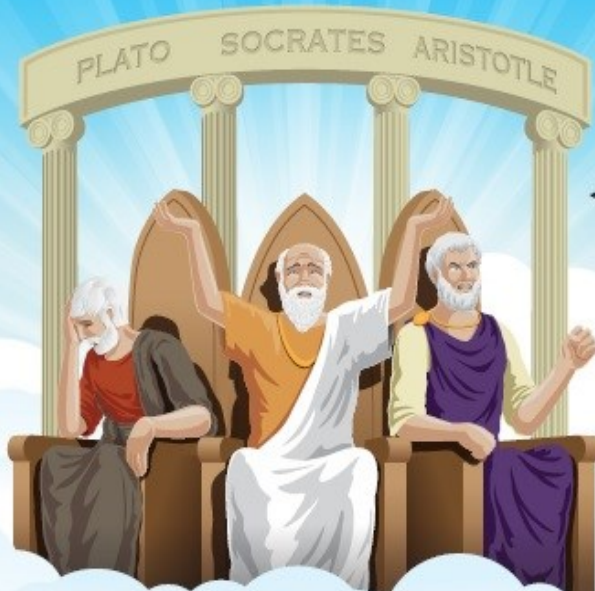


## loaded question

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 creating rational debate because of their inflammatory nature. Questions of a loaded question are compelled to defend themselves and may appear flustered or on the back foot.

Coco and Helen were both romantically involved in 1960. One day with Helen sitting within earshot, Coco asked in an inquisitive tone whether Helen was having any problems with a legal relation.



## appeal to emotion

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

Appeal to emotion include appeals to love, envy, hatred, pity, guilt, and more. Though a valid, and rational, argument may sometimes have an emotional aspect, emotional bias cannot (or shouldn't) obscure or replace reason.

Luke didn't want to let his nephew Brian with cheap beer and frankly, great food, but he later told him that about the poor, starving children in the 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 criticisms with criticism.

Literally translating as 'you too!' the fallacy is commonly employed as an effective means of turning the heat of the attack around to deflect themselves and shift the focus back onto the accuser themselves.

Nickie identified that Hannah had committed a logical fallacy, but instead of addressing the substance of her claim, Hannah accused Nickie 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 it is not upon anyone else to disprove. The reality is that disproof is a claim does not make it valid; however, we must always go by the best available evidence.

Barney declares that a leopard is, at the very moment, in orbit around the Sun between the Earth and Mars, 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 argue with logical consistency for that claim, but as it is possible to make a claim that is true and justify it with various fallacies and poor arguments.

Recognising that Amanda had committed a fallacy in arguing that we should eat healthy food became a rationalised fallacy in itself. Also, you can't see should therefore it's not double-checking 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 is able to properly grasp them, the fallacy is usually said in place of that understanding.

We know a lot about a fish and a human and with infinite data, asked Richard if the reality though we were stupid enough to believe that a fish somehow turned into a human through just, like, certain 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 take pains to how they were technically not caught lying if they come under scrutiny. It's a particularly tricky and unresolvable fallacy to commit.

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



## appeal to authority

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

It is important to remember that the fallacy should not be used to dismiss the claims of experts, or scientific consensus. Appeals to authority are not valid arguments, but not all authorities to disregard the claims of experts who have a demonstrated depth of knowledge in an area are too a similar level of understanding.

Not able to defend the position that evolution isn't true, Richard says that he knows a scientist who also questions evolution and presumably still hasn't a geneticist.



## 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 not apply to the whole, but because the part always the case it can't be presumed to be true. Without other evidence for why a consistency will exist.

Daniel was a precocious child and had a strong liking for eggs. He was said that eggs are inedible, and that he was made of eggs and therefore inedible too. Unfortunately, despite his thirty odd, he had the general idea and got sick.



## no true scotsman

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

The fallacy is often employed as a means of last resort when a point has been lost. Saying that a criticism is valid, yet not wanting to admit it, new criteria are invoked to disqualify oneself of one's argument.

Angus declares that Scotswomen do not put sugar on their porridge, but which Lachlan points out that he is a Scotswoman and puts sugar on his porridge. Finally, like a true Scot, Angus tells that no true Scotswoman eats porridge.



## genetic

Judging something good or bad on the basis of where it comes from, or from whom it comes.

To appeal to genetics surrounding something's origin is another red herring. The fallacy has the appearance of forming a logical argument, but applies instead to perceptions surrounding something's source or origin.

Accused on the Goldfish news of corruption and lying before the senate, he said that he shouldn't be any way of the things we hear in the media, because we all know how very unreliable the media can be.



## appeal to nature

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

Many 'natural' things are also considered 'good', and this can bias our thinking, but substances that don't make anything good or bad. For instance, murder could be seen as very natural, but that doesn't mean it's justified.

The medicine man rolled into town on his horse and offering various natural remedies, such as very special daisy water. He said that it was only natural that people should be wary of 'artificial' medicines like antibiotics.



## anecdotal

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

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

Jason said that that was all cost and everything, but he gratefully smoked, like 30 cigarettes a day, and lived until 90. So, he didn't believe everything you read about toxic analysis of hard studies showing proven causal relationships.



## the texas sharpshooter

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

The Texas case fallacy is related to a metaphorical shooting at barns and then painting a bullseye target around the spot where the most bullet holes appear. Clusters naturally appear by chance, and don't necessarily indicate causation.

The makers of Superficial Candy Online went to research showing that of the few countries where Superficial diets had the most uptake, three of them are in the top ten highest countries on Earth, therefore Superficial diets are healthy.



## middle ground

Saying that a compromise, or middle point, between two extremes must be the truth.

Much of the time the middle ground is made up between two extremes points, but the fact can be as being sometimes a thing entirely either/or and a compromise of it is a blurry, halfway between and is a bit of a lie.

Healy said that vaccinations caused autism in children, but her scientifically well-meaning friend Caleb said that the claim had been debunked and proven false. Therefore Alan offered a compromise that vaccinations cause some autism.

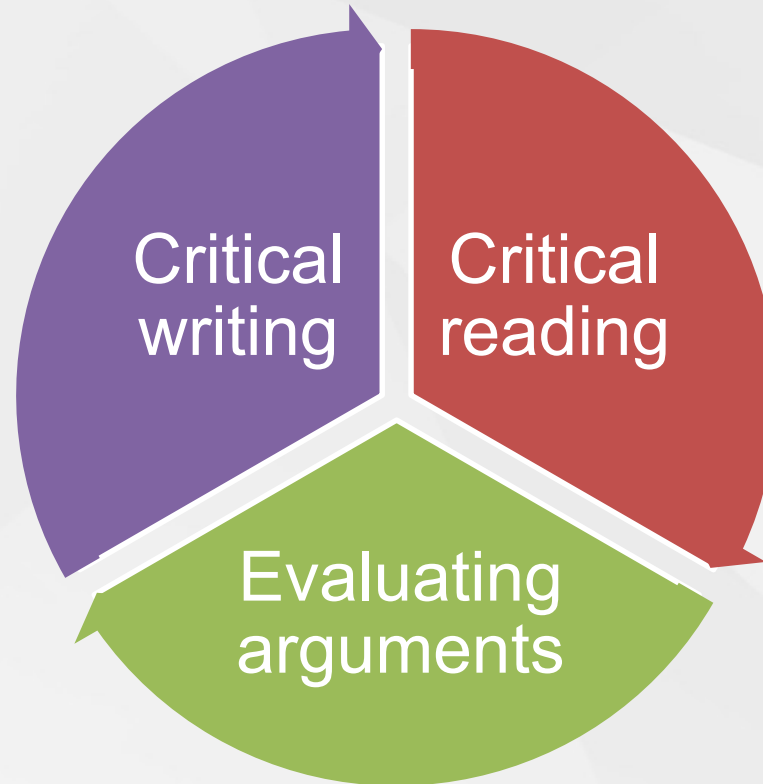
# thou shalt not commit logical fallacies



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# Critical thinking



# Activity 5: Putting it into words

Description

Analysis & Synthesis

Evaluation



# Putting it into words

Ecotourism has led to the construction of a range of large-scale projects in remote and sensitive regions. The Daintree Bridge project in North Queensland is one such project. A large canopy bridge was constructed between 2003-2005 in a section of the Daintree rainforest accessible by both road and rail (Rawlinson 2010). The bridge structure is suspended from steel struts affixed to the rock on either side of the valley. The bridge itself is made of steel cabling and steel panels. The site was chosen for its accessibility for materials and its suitability for construction and modification (North Queensland Tourism Board 2006). Major and Smith (2001) discuss site selection and note that a cost/benefit analysis needs to be undertaken in order to determine whether a sensitive site is suitable for construction and modification. While such a case of the Daintree Bridge project (Forrestal 2003) was made for construction, a later analysis by Gill and Greetham (2013) argued that it was unclear whether the longer-term impacts have been fully appraised, with litter from tourists on the valley floor below the bridge an increasing concern (Gill and Greetham 2013, p.67). This demonstrates that initial construction impacts must also be balanced with longer-term environmental impacts when assessing site suitability.

## Description

# Putting it into words

Ecotourism has led to the construction of a range of large-scale projects in remote and sensitive regions. The Daintree Bridge project in North Queensland is one such project. A large canopy bridge was constructed between 2003-2005 in a section of the Daintree rainforest accessible by both road and rail (Rawlinson 2010). The bridge was constructed using concrete piers and steel trusses affixed to the rock on either side of the gorge, with steel cabling and steel panels. The site was assessed for its suitability for construction and modification (North Queensland Tourism Board 2006). Major and Smith (2001) discuss site selection and note that a cost/benefit analysis needs to be undertaken in order to determine whether a sensitive site is able to accommodate major construction and modification. While such an analysis has been undertaken in the case of the Daintree Bridge project (Forrester 2002) and the site deemed suitable for construction, a later analysis by Gill and Greetham (2013) argued that it was unclear whether the longer-term impacts have been fully appraised, with litter from tourists on the valley floor below the bridge an increasing concern (Gill and Greetham 2013, p.67). This demonstrates that initial construction impacts must also be balanced with longer-term environmental impacts when assessing site suitability.

## Analysis & Synthesis

# Putting it into words

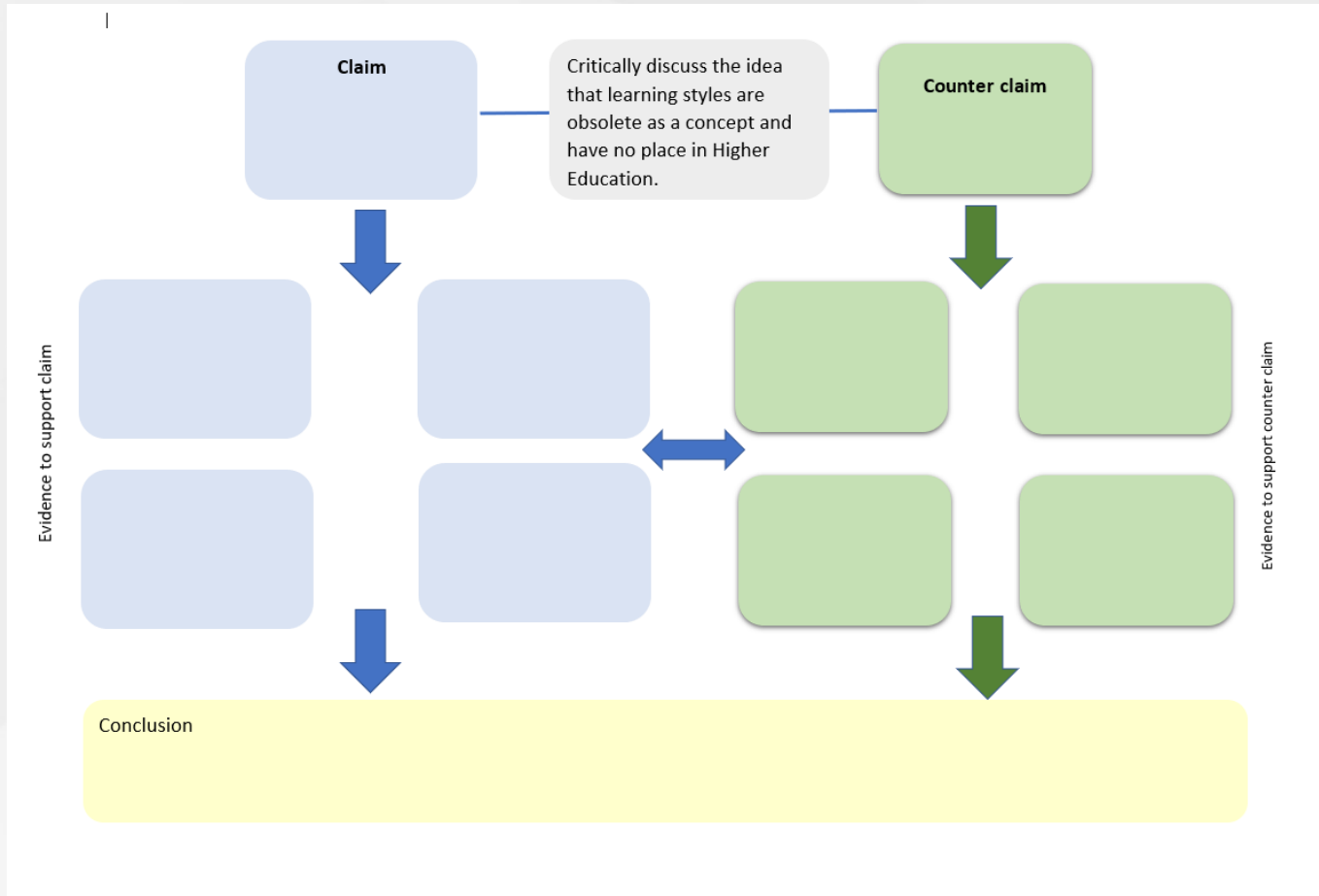
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## Evaluation

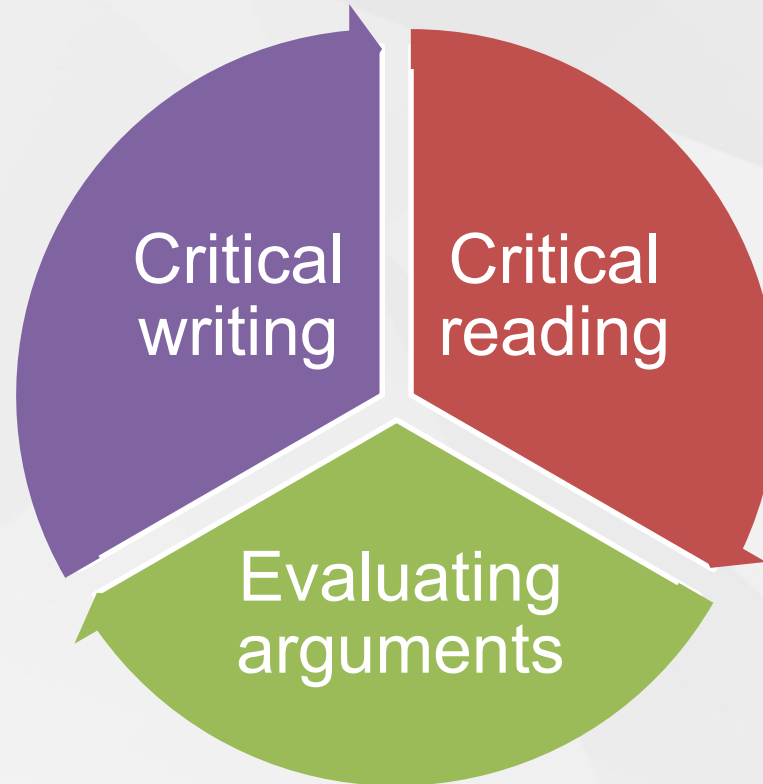
# Argument maps

- more than mind maps – not radial but tree structure with correlations
- useful in uncovering the logical structure of arguments
- help to analyse the arguments uncovered in critical reading
- help to uncover potential weaknesses
- clarify the stages of your own argument
- aid in communicating your own argument clearly

# Activity 6



# Critical thinking - summary



# Useful apps

- [Corkboard](#) and [Padlet](#) organise and storyboard your ideas and arguments
- [QSR NVivo](#) lets you analyse qualitative data
- [Argunet](#) allows you to map linked, convergent and serial arguments

# Thank you

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