Critical thinking

Introducing critical thinking

What is critical thinking?

It's likely that you have come across the word *critical* before; possibly in a negative context, for example: "The judges' comments were highly critical of her singing ability".

You might have even come across this word as used to describe something of high important, for example: "The mission was critical to peace between the two nations."

However, at University, the word *critical* takes on a slightly different meaning, as being critical in your assignments is to question everything, and not accept anything on face value. Critical thinking encapsulates several cognitive processes that humans use to reason or evaluate evidence, before accepting something. The ability to think critically is a very valuable skill, as it demonstrates our ability to think clearly and rationally, make logical connections between ideas, detect inconsistencies and mistakes, and reflect on our own justifications and beliefs (Chatfield, 2018; Lau & Chan, 2019).

Put simply, critical thinking includes:

- **Identifying** other people's positions, arguments and conclusions
- **Evaluating** evidence for alternative points of view
- **Weighing up** opposing arguments fairly
- **Reading between the lines** of arguments, seeing below the surface and identifying faulty arguments
- **Recognising** techniques that are used to make certain arguments more persuasive such as rhetorical devices and false logic
- **Reflecting** in a structured way to consider logic and insight
- **Drawing conclusions** on arguments, including whether they are justifiable, based on good evidence and assumptions
- **Synthesising information** by drawing together pieces of evidence, judgments and pulling these together to create your own argument
- **Challenging** our own assumptions and testing these in a systematic, well-reasoned manner

(Cottrell, 2017, p. 2-3)

When do we need critical thinking?

As humans, we think critically every day, in lots of different scenarios. Critical thinking isn't exclusive to your academic assignments; you also think critically in everyday situations in order to make well-reasoned, logical decisions. Take this example:

Crossing the road

Evaluate the road – is it safe to cross? If there are cars coming will you make it in time?

Reason – if cars are coming, is it worth the risk?

Drawing conclusions – Using this information to determine when it is safe to cross.

It's also important to realise that we do not think critically all of the time. For instance, emotions can affect our ability to think critically and may skew our understanding. Therefore, our ability to think critically will vary according to our current mindset (Skills You Need, 2019).

Why do we need critical thinking?

Good critical thinking skills have many benefits in terms of academic progress and beyond. Here are some reasons to determine why critical thinking is beneficial and useful to you.

Critical thinking hones the human ability for decision-making

As humans, we tend to believe what we hear, or assume we have the full story even though this isn't necessarily the case (Cottrell, 2017). This can lead to mistakes in our understanding: some will be minor or insignificant, but some will have major consequences. Critical thinking allows humans to consider their own thinking process and fully consider options before drawing a conclusion.

Critical thinking is an employability skill

Critical thinking is considered a 'domain-general skill' (Lau & Chan, 2019) meaning that the ability to question is a valued skill by potential employers in any discipline. The ability to question is vital to critical thinking and it is actively sought by potential employers. Critical thinking encompasses the ability to analyse complex information quickly and problem solve, which is a trait that is often tested for in job interviews or required on a person specification.

Critical thinking allows us to truly evaluate our own skills and abilities

When used well, critical thinking can allow us to evaluate our own skills, abilities and trains of thought. This can help us make decisions on areas we excel in and areas to improve, which in turn can influence our choices for education, training, work or other ventures.

Critical thinking enables emotional management

Reasoning requires us to decide upon a line of argument which may challenge our own feelings or opinions, especially if the evidence is contrary to our own beliefs. Critical thinking is not completely devoid of emotion, as often we can make passionate arguments or disagree with a point of view. Engaging critically allows you to regulate emotional responses and reconsider them in terms of logic and good reasoning (Cottrell, 2017).

Critical thinking is essential for academic study and practice

Objectivity underpins all academic practice. In order to be objective, a student or an academic must carefully consider and weigh up all perspectives and arguments, in order to make a well-reasoned judgment. When a judgment is made, this judgment must be conveyed in an argument that persuades the reader in an objective way. All of these activities constitute critical thinking, and the ability to think critically is absolutely essential to academia.

Sometimes, to understand what something is, we need to identify what it is not. The Open University (2019) gives the following advice:

Critical thinking is **not**:

- restating a claim that has been made
- describing an event
- challenging peoples' worth as you engage with their work
- criticising someone or what they do (which is made from a personal, judgemental position).

Critical thinking and analysis are vital aspects of your academic life – when reading, when writing and working with other students.

Writing critically

Description vs critique

When completing an assignment, you will need to strike a balance between descriptive and critical writing. Many students find that they lose marks because their assignments are overly descriptive. Description is needed in your assignments, especially to provide essential background details to aid your reader's understanding, but this should not be included instead of critical writing. Critical writing is where you begin to analyse and evaluate what you have learned and build you own academic arguments to add to the debate. Here are some key differences between the two styles:

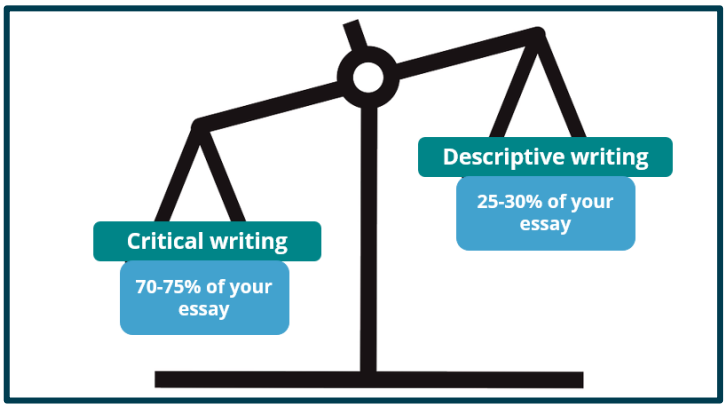
Descriptive writing	Critical/analytical writing
States what happened	Identifies the significance
States what something is like	Evaluates strengths & weaknesses
Gives the story so far	Weighs evidence against each other
States the order of occurrence	Makes reasoned judgments
States how to do something	Argues an evidence-based case

Explains what a theory says	Discusses how it is applicable to a context
Describes the different components	Evaluates the components
States options	Justifies why options have been selected
Lists in any order	Structures information in order of significance
States links between items	Shows the relevance of relationships
Gives broad information	Draws conclusions

Table adapted from Cottrell (2019, p. 268)

[How much should be critical?]

The image makes a suggestion, but this is by no means definitive in terms of percentages; one thing that is true of most assignments is that the critical writing should outweigh the descriptive writing. This is because a large portion of the marks available will be offered for your ability to critique in terms of an assignment brief, and successfully interlace description amongst your critiques to contextualise your argument.



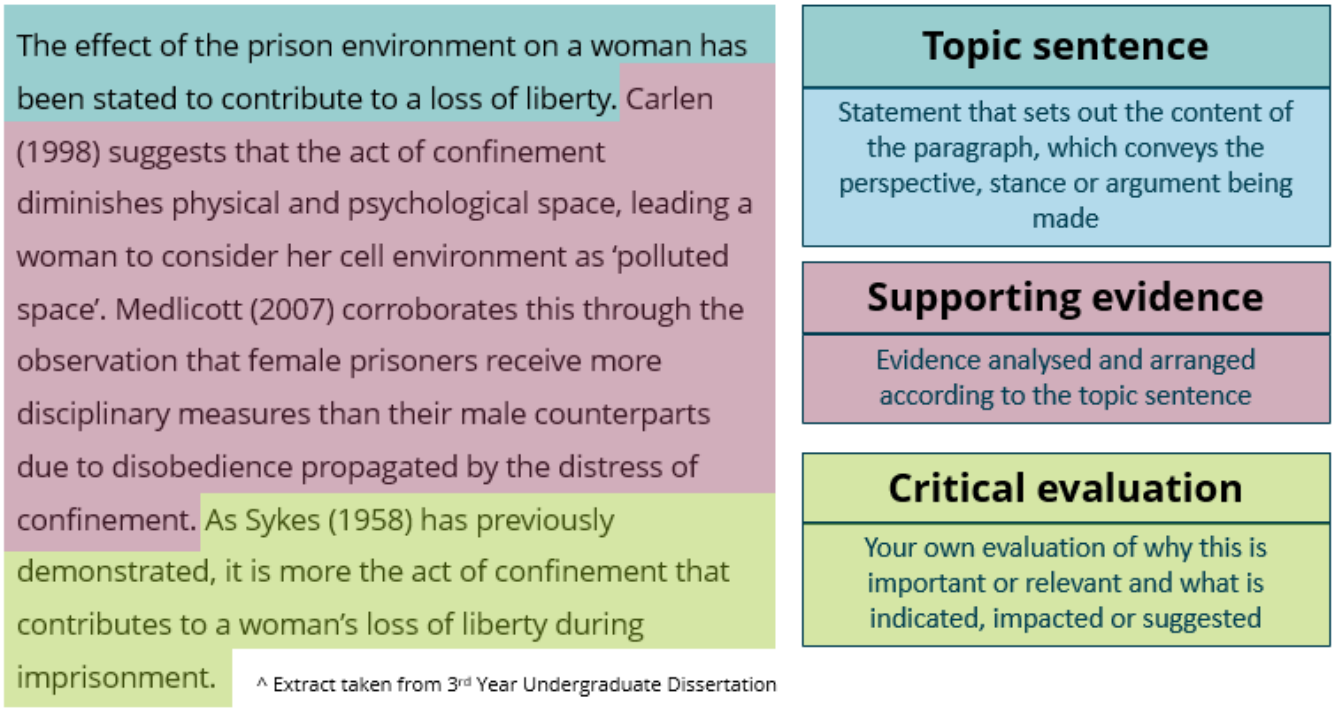
Paragraph power

Paragraphs perform a number of major functions in your assignments:

- Break the text into manageable chunks so the reader can navigate it clearly
- Provide a unit for your ideas so that all linked information is contained in the same place
- Providing a flow for your argument by creating links between ideas

(University of Birmingham, 2014)

Paragraphs provide a framework for critique and analysis in your assignments. They can be structured throughout an assignment to make sure an argument moves logically from point to point, but also structure the argument contained within them. This can be achieved through the PEE model (**P**oint, **E**vidence, **E**valuation), which is demonstrated in the example below.



Various reasons and arguments can be linked together by the use of signposts. Signposts are the stepping stones between paragraphs, or words used to signal links, relationships or actions to your reader, so they can follow the flow of an argument. This is especially important in critical thinking, as often, concepts overlap, and topics are complex, so you need to be able to refer to previous or subsequent information in order to note the importance of the relationship.

Click here for the Marjon Study Skills guide to Signposting

Critical style

Your academic assignments need to be written in a critical style so that you can present an argument to your reader that is supported by evidence and well-reasoned analysis and evaluation. Critical writing is characterised by several features. A critical style can be achieved in your writing through a balance of the following characteristics:

Content	What background information do you need to include to contextualise your argument? How much description do you need to frame your argument?
Audience	Who will be reading your assignment? Who do you need to persuade with your argument? How will you counter the most contentious issues to persuade the audience of your argument?
Clarity	Have you clearly expressed your argument in simple language with as few words as possible? Have you revisited your work to make sure your writing is unambiguous? Have you avoided jargon, emotive language and long sentences?

Analysis	Have you analysed your evidence in terms of strengths and weaknesses? Have you made these strengths and weaknesses clear to your reader? Will your reader know how you have arrived at your judgments?
Selection	Have you selected the most important points to analyse, including the controversial? Have you tried to incorporate too many points to cover? Have you made good use of summaries to covey points in a succinct way?
Sequence	Have you clearly laid out points in the argument? Have you grouped similar points together? Have you made appropriate links between points?
Structured	Have you considered which information your audience will need to read first? Have you presented both sides of an argument and made judgments on both?
Signposted	Have you signposted your argument clearly to show the direction of your reasoning? Have you used clear language to demonstrate your evaluation and conclusion?

(Adapted from Cottrell, 2017, p. 148-149)

Arguments

What is an argument?

According to Chatfield (2018, p. 23), an argument is "an attempt to persuade someone through reasoning that they should agree with a particular conclusion". Reasoning and conclusions are characteristics of an argument and can be identified by certain words or phrases. Look for these in your reading to identify and decide if the writer is making an argument or use them in your assignments to make your argument clear to your reader.

Phrases that indicate a line of reasoning		Phrases that indicate a conclusion	
Given that	Based upon	Thus	Overall
Considering	Since	Therefore	In conclusion
Because	As for	And so	Which shows that

Further reading: The University of Manchester. (2019). Being critical. Retrieved from http://www.phrasebank.manchester.ac.uk/being-critical/

Types of argument

Contributing argument

Contributing arguments are individual reasons provided to justify the main argument.

Main argument

A main argument or an overall argument represents the position of the author and is comprised of contributing arguments or a line of reasoning.

For example:

Main Argument	Contributing Arguments
Dog ownership is beneficial to mental and physical health.	Dogs encourage sensory stress relief through touch
	Dogs produce Oxytocin when around their owners
	Dogs are good companions and combat loneliness
	Dogs provide structure and routine to your day

Ambiguous arguments

This refers to arguments that are unclear. These are easily questioned in speech, as we can ask the speaker what they mean or to elaborate, but we are unable to do this when reading an argument. The argument might be complex and require close reading or might take time to uncover what is being argued. With these arguments, critical thinking skills are key, as you have to decipher what is intended and make a judgment, without being able to ask the author what was intended (Cottrell, 2017).

Non-arguments

According to Chatfield (2018, p. 28) a non-argument is "any element of a piece of writing that does not attempt to persuade you of a conclusion through reasoning, and thus doesn't qualify as part of an argument." Non-arguments are still used in academic writing in order to contextualise evidence or arguments. These include:

Descriptions	Information without evaluation, persuasion or critical commentary
The dogs in the study were predominantly smaller, muscular breeds such as Staffordshire Bull Terriers, French Bulldogs, Boston Terriers and Pugs.	
Summaries	An outline of key information in a piece of work or writing
The study took place in the South West of England with 20 dog owners and 20 non-dog owners from different ages. The main objective was to observe whether physical activity was more prevalent amongst dog owners than non-dog owners.	
Opinions	A point of view without reasoning based on a personal judgment of facts. This includes advice or warnings, which are opinions on how one should act.
Dog ownership is a huge responsibility, so you need to be prepared before taking one on.	
Beliefs	A conviction based on morality, faith or culture
Dogs shouldn't be left outside overnight as this is inhumane and cruel.	
Clarifications	An explanation of the meaning intended behind a thought, idea or phrase

This study considers dog ownership to mean anyone who has a pet dog on a permanent or semi-permanent basis.	
Illustrations	A specific example provided to demonstrate a general point
Some breeds are thought to be more sociable than others for instance Labradors, Retrievers and Spaniels.	

Further reading: The Royal Literary Fund. (2019). Different types of argument. Retrieved from https://www.rlf.org.uk/resources/different-types-of-argument/

Explanations vs arguments

The difference between explanations and arguments isn't always obvious; but it is an important distinction to make! An argument attempts to persuade through a line of reasoning, whereas an explanation assumes the truth and provides a reason, without any persuasion. An explanation assumes something, then asks *why* something is the way it is. Consider this explanation:

I stopped eating cheese because it could lead to heart disease

This statement assumes you will take it as the truth.

This is the explanation or reason for acting.

An explanation reasons backwards from something that is assumed to be true (Chatfield, 2018, p. 34). However, explanations and arguments use similar wording: so, what sets them apart? Consider this argument:

It's wrong to eat meat because animals live in overcrowded, poor quality conditions.

This is a conclusion as it is justified by the reasons following it.

These are the reasons provided to persuade you of this assertion, which in turn transform the assertion into an argument.

This example provides reasons for an opinion: it doesn't assume that the reader will accept the first statement as fact and therefore attempts to persuade by providing some reasons for the opinion to be agreed with. The difference is subtle but can be used to integrate more critique into your descriptions!

Assumptions

An assumption is anything that is taken for granted in an argument, as they aren't stated explicitly, but underpin the argument being made for the conclusion to be made (Cottrell, 2017). This is technique used by authors that requests the reader to accept something as fact rather than proving or explaining it, to build an argument around more salient information. This is often since authors have time constraints and word count limits that restrict them from providing detailed explanations, so a decision is made to assume that the audience understands. In your discipline, it is perfectly legitimate to make an assumption that your reader will have some basic background knowledge on the subject, so not every concept

needs to be explained. However, you should aim to strike a balance in your writing between assumption and explanation to make your assignments accessible and understood. In the wider context of academic writing, research should transcend international barriers and disciplines, and this is achieved by being mindful of the balance between assumption and explanation. This is a good habit to get into, as your undergraduate dissertation will rely heavily on this distinction when you are writing about a focused topic.

Developing arguments

Arguments can be constructed in various ways. The following advice looks at how you can develop a basic argument into a complex argument, with your own voice and insight. Austin (2019) states:

> *You can have a point of view, a position, an argument without feeling that you would sell your soul to defend it. In fact, in an assignment you might play around with a position, and argument, while still leaving room to allow for other points of view. … Really good assignments find an unusual or original position from which to argue something – drawing on evidence to present a different way of looking at something. (p.47)*

According to Booth, Columb and Williams (2003, p. 115) every argument is a lot like a conversation and is always composed of the same five elements:

1. What do you **claim?**
2. What **reasons** support this claim?
3. What **evidence** supports those reasons?
4. Do you **acknowledge** this alternative/ complication/ objection, and how do you **respond?**
5. What **warrant** justifies the connection of your reasons to your claim?

Claims

A claim (also known as a premise in critical thinking literature) is a debatable statement based on the interpretation of evidence on what is best, good or appropriate: not a mere statement of fact. The following advice demonstrates how claims can be formed or manipulated for use in your argument.

Fact	Arnold Schwarzenegger starred in *Terminator 2: Judgment Day.*
Turn facts into claims	*Terminator 2: Judgment Day* is arguably the best film in the series.
Acknowledge limiting conditions	*Terminator 2: Judgment Day* is the best film in the Terminator franchise; although, newer instalments have yet to be appraised.

Use hedges to limit certainty	For many, *Terminator 2: Judgment Day* is arguably the best film in the *Terminator* franchise; although, newer instalments have yet to be appraised.

(Peterson, 2019)

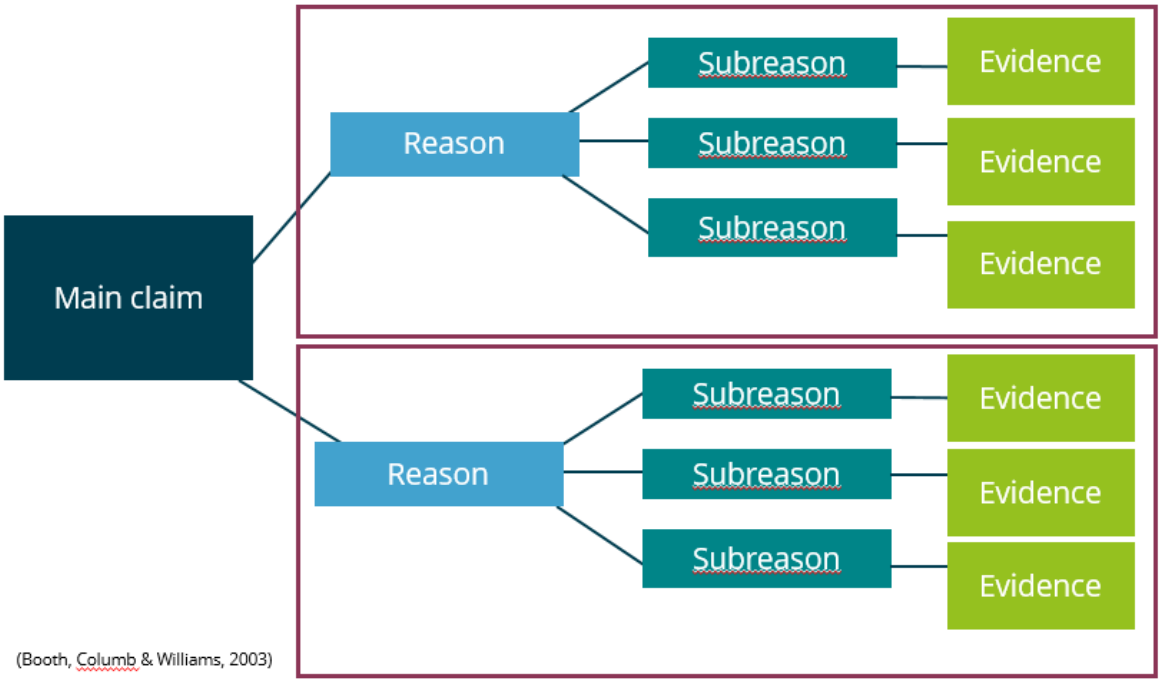
Claims can be explicit or implicit depending on the conclusion. (See 'Reasoning & logic' for more on this). Claims need to be made clearly in your writing, so your reader knows exactly what you are referring to and so your reasons can be linked unambiguously.

Reasons

Reasons are the statements we provide to a reader in our writing in order for them to accept our claims (Booth, Columb & Williams, 2003). The diagram below demonstrates that reasons can be divided into subreasons, as a reason may require elaboration before the support for the argument is made clear. Reasons are often expressed by the word *because,* for instance:

> Students are spending more time studying in the Library during Freshers' Week than in the Student Union bar *because* they are driven by a wish to succeed in gaining employment after University.

You can use the diagram below to see how an argument is broken down into parts and use it as a template for building your own arguments.



(Booth, Columb & Williams, 2003)

In a conversation, a claim followed by a reason is enough; but in academic writing, we can't provide reasons without evidence from the literature. The Royal Literary Fund (2019) explores this difference in more depth here. Be careful, as there is a slippery distinction between reasons and evidence. Reasons state why you believe your reader should accept your claim and can be created; whereas evidence is empirical and objective and can't be invented.

Evidence

Unlike a conversation, a written argument cannot rely on visual cues or pragmatics to infer meaning. Therefore, reasons must be supported by carefully selected evidence in order to add credibility to your argument. Reasons can also be used to explain evidence, so you can use these interchangeably when crafting your argument (see the diagram below for an overview).

Remember, it is highly unlikely that evidence will prove or disprove your claims, but you can state a level of caution or likelihood through the use of **hedged language**.

Sometimes, you can have so much evidence to support your reasons, that you might not know what to include and what to omit, in order to meet the word count. Here are some questions to guide your decision on what to include:

- Is the source a leading authority on the issue?
- Has this source changed thinking about the subject?
- Has this source challenge what has been said or provide a different way of considering the issue?

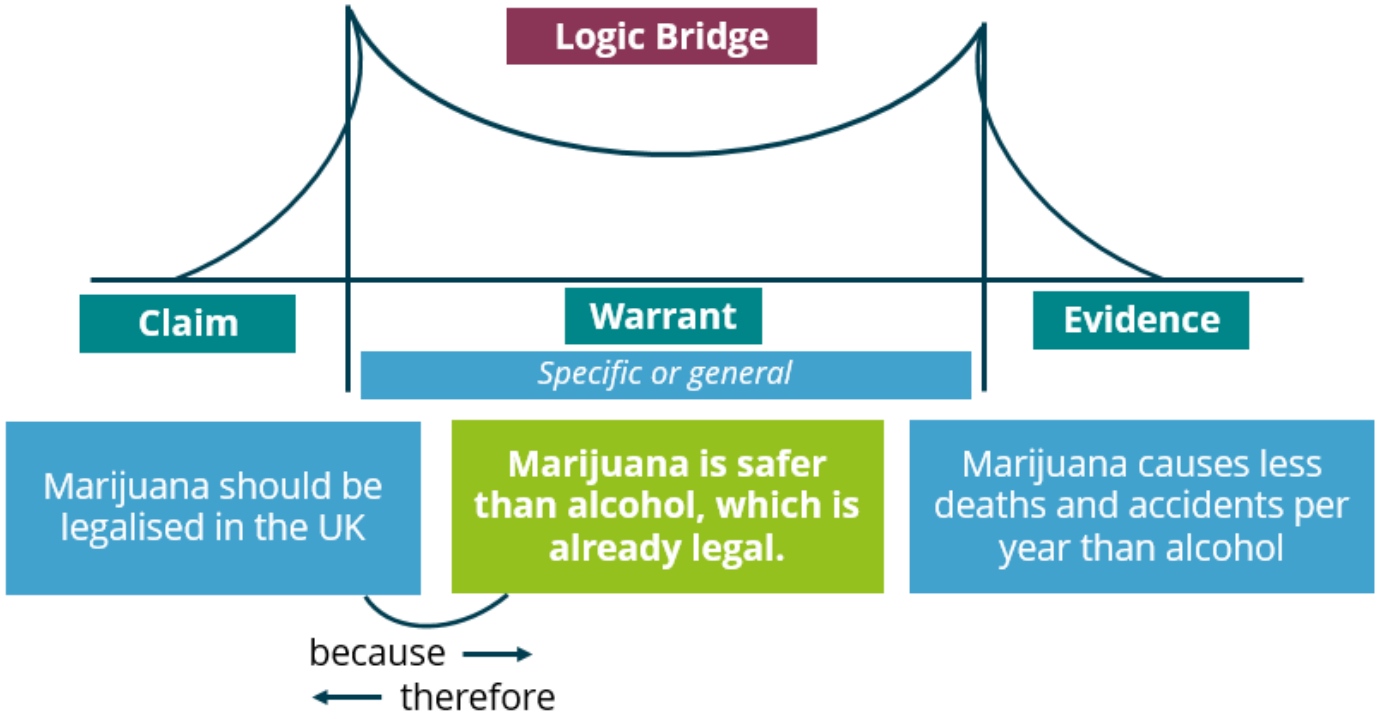
(Cottrell, 2013)

If you have answered 'yes' to any of these questions, then the evidence is contender for inclusion in your essay. However, try not to place too much emphasis on describing the research; instead, paraphrase or summarise the key points you need to critically evaluate the research and explain how it supports your claim.

Further reading: Chapter 8 Where's the proof? In Cottrell, S. (2017). *Critical thinking skills: Effective analysis, argument and reflection.* (3rd ed.). London, UK: Palgrave.

Warrants

A warrant is a 'logic bridge' (Peterson, 2019) that connects a claim to evidence. Even though your line of reasoning may be clear to you as the writer, a reader might question why they should accept a reason on the grounds of its relevance to the argument. Warrants are often used when an assumption isn't reasonable, and therefore must be clarified in order for your reader to understand the argument being made. See the example below.



(Booth, Columb & Williams, 2003; Peterson, 2019)

Acknowledge and respond

Reasons alone aren't enough to persuade your reader that your argument should be accepted, and it isn't reasonable for you as a writer to expect your audience not to question your argument. A good written argument will capture the state of play in the subject literature, which means presenting the views most commonly held, even when they oppose. A well-crafted argument acknowledges the opposition, and any prominent alternatives to the argument.

Therefore, as an essay writer you will need to anticipate your reader's questions. Although this sounds like a task for which a crystal ball might come in handy, there are ways of telling the questions your audience might ask

Go to the literature – what are the prominent alternative arguments?

Sometimes, there won't be a credible counter-claim to your argument, as the opposite view might be ridiculous! However, you might find small variations on your claim that you wish to demonstrate the importance of, particularly if they are influential or predominant (Austin, 2019).

Reasoning & logic

The standard form

The standard form is a universal method for laying out the premises and conclusions of an argument by critical thinkers and philosophers. A premise is another word for a claim; and arguments may contain more than one premise; but there can only be one conclusion per argument. Here is an example of an argument put into standard form:

The shop has run out of bread: this means you won't be able to have a sandwich for lunch.

Premise 1: The shop has run out of bread.

Conclusion: You cannot have a sandwich for lunch.

Explicit and implicit claims

An argument can have explicit and implicit claims (see assumptions). The standard form can help you identify the obvious claims from the not so obvious.

For example:

The new teacher at my daughter's school is a smoker. They never should have hired him.

Premise 1: The new teacher at my daughter's school is a smoker.

Premise 2: [Implicit] People who smoke are unfit to be teachers.

Conclusion: This person should not have been hired as a teacher.

The above example refers to the standard form which is used in critical thinking and logic studies. It can be useful to deconstruct and reconstruct arguments using the standard form for a number of reasons:

- To make sure that you are certain about the nature of an argument
- It can reveal flaws in reasoning that might have remained undiscovered
- It allows us to examine all explicit and implicit premises that might not have been discovered
- It allows you to refine your critical technique in producing convincing, well-reasoned arguments

(Chatfield, 2018, p. 46)

Evaluating information

Questioning information

Before you include evidence in your arguments, you might want to assess how reliable the information is. Some students feel reluctant to question sources as they don't feel qualified to critique the writings of others. However, part of forming an academic argument is the ability to assess evidence and make informed judgments on the information we read or hear.

The CRAAP Test

The CRAAP Test was devised by the Meriam Library at California State University (2019) and was originally intended to be used to evaluate online sources to make sure they are suitable for academic use. You can use the CRAAP Test below and amend the criteria according to your information need:

Currency
When was the information published or posted online?
Has the information been revised or updated?
Does your topic require up to date information, or will older sources work too?
Are all the links on the webpage functional?
Relevance
Does the information relate to your topic or answer your question?
Is the information at an appropriate level for your needs?
Have you considered a variety of other resources before deciding to use this one?
Would you be comfortable citing this source in your work?
Authority
Who is the author/ publisher/ source/ sponsor?
What are the author's credentials or affiliations?
Is the author qualified to write on the topic?
Is there contact information available?
Does the URL reveal anything about the source?
Accuracy
Is the information supported by evidence?
Has the information been peer-reviewed, edited or refereed?
Can you verify any of the information from your personal knowledge?
Is the writing style unbiased and free of emotion?
Are there any spelling or grammar errors?
Purpose
Is the purpose of the information to inform, persuade, entertain, teach or sell?
Does the author make their intention clear?
Is the information fact, opinion or propaganda?
Does the point of view appear objective and impartial?
Are there any political, ideological, cultural, religious, personal or institutional biases?

Critical reading

Critical reading is often known as active reading too, as it involves a level of critical activity with a text, to determine any information that is open to debate, interpretation or further examination. A good place to start is to consider anything you read as the author's argument, rather than fact. This will allow you to engage with the text on another level, so you move beyond memorising facts and toward evaluation. Here are some critical questions to answer whilst reading, so you can form your argument as you read:

Explain the content:

- Who is the author?

- What is the main purpose or overall argument of the source?
- When was the text written and in which context?

Analyse the content:

- Is the author an expert or academic?
- What is their main argument?
- What reasons or evidence has the author provided for their argument?
- Are these arguments reasonable and reliable?
- To what extent are all assumptions supported by evidence?
- Has something been left out? What is the significance of this?
- Is the conclusion reasonable?

Evaluate the content:

- Is this source relevant to the assignment question?
- What is the author's position or perspective?
- What are the strengths of the argument/evidence?
- What are the weaknesses of the argument/evidence?
- How does this argument/ evidence differ from others?
- How does this argument/ evidence support others?
- How will you use this argument/evidence in your writing?
- Which aspects need to be investigated further?

(Adapted from University of Leeds, 2019).

Critical thinking and listening

A lot of information is conveyed aurally, so you might need to develop your critical listening skills. This will be helpful for you in lectures, seminars and tutorials, but also if you are watching a You Tube video or listening to a podcast. Here are somethings to be mindful of:

- Read, then listen: read up on the topic under discussion beforehand, so you are able to focus on making your own judgments.
- Identify the thread: try to focus on the line of reasoning, and don't get distracted by anecdotes or emotive stories

- Question it: don't be swayed by a nice accent, a celebrity voiceover or an emotive appeal! Remember to question everything you hear and make up your own mind on whether you agree with the argument.

(Cottrell, 2019, p. 271)

Disinformation

Disinformation, or as it is more commonly known, 'fake news', refers to information that is false or partly false, and is created with the deliberate intention of misleading. Disinformation has been around for a long time, but it has become prominent with the rise of social media, which can spread credible fake news to a wider audience. Some disinformation can be trickier to spot than others, especially when it is interspersed online. There is a large movement in the UK dedicated to combatting the spread of fake news and creating resources for individuals to use in order to detect disinformation. Additionally, being able to determine genuine news from fake news, as well as having a number of ways to identify the legitimacy of the source is an excellent study skill. After all, 'if you can recognise it, you can resist it' (DROG, 2019). Here are some resources that you might find useful:

- Snopes – The definitive fact-checking site that will give you a rating of how true or false a claim is. Good for finding legitimate examples!
- About Bad News – an online game that takes about 10 minutes to complete, that puts you in the position of a fake news creator. Good fun and easy to follow!
- The WayBack Machine – The internet archive which is useful for browsing websites revisions and researching the origins of webpages to check their reliability.
- TinEye – a reverse image searcher so you can find the origin of a photograph and/or see if it has been doctored
- Factitious – an online game that allows you to read web articles and decide whether they are fact or fiction.
- John Hopkins University 'Evaluating Information' – Information put together by the John Hopkins Library on the different definitions of information, including propaganda, misinformation and disinformation.

Bad arguments

Bad arguments are arguments that are formed illogically, use illegitimate methods of argumentation or suggest bias. The following information will look at examples of these and offer advice on how to avoid these in your own writing.

Rhetoric

Rhetoric is 'the art of persuading through means other than reasoning' (Chatfield, 2018, p. 154). There is a misconception that rhetoric is a malicious and manipulative: it can be used in this way if one chooses, but ultimately, rhetoric is a little more complicated than this. Persuasion in and of itself is not a bad thing and is not something that we can switch on and off as it is central to human communication.

Ethos, Logos and Pathos

The Greek philosopher Aristotle described successful acts of persuasion as comprised of three components: ethos, logos and pathos. *Ethos* establishes the reliability of the source of the author; *logos* demonstrates the ideas that are being conveyed; and *pathos* is the emotional appeal of the message and the way it is delivered (Chatfield, 2018). This is the final principle in the act of persuasion is *Kairos* as it refers to the opportune moment for a persuasive message to be delivered to have the biggest impact. This technique is used in persuasive industries such as advertising.

Fix it: Impartiality

- Avoid highly emotive language
- Be clear about relevant facts
- Show your awareness of the differing beliefs about significance of the facts
- Evaluate how reasonable a belief is

(Chatfield, 2018, p. 162)

Rhetorical devices

A rhetorical device is a technique that is used to make a message more persuasive and enhance its appeal (Chatfield, 2018). You need to be aware of rhetorical devices and the affects they can have on a reader or listener. Here are some of the common techniques used, with examples:

- **Rhetorical questions** – a question that is asked to emphasise a point rather than in anticipation of an answer.
    - Example: *Do you really need me to convince you why stealing is wrong?*
- **Jargon** – words that are only familiar to experts but used in a context to impress or exclude
    - Example: *Each stakeholder should be given due diligence before an action plan can commence, and a review undertaken to ascertain whether sweat equity is preferred over financial recompense.*
- **Buzzwords** – words that are popular and used to create an appeal of insight, experience and expertise, but ultimately, lack real substance
    - Example: *The team met yesterday for a think outside the box session.*
- **Smokescreens** – concealing an idea or a key point beneath a large string of irrelevant words
    - Example: *Have I ever taken drugs? I will refer you to my long, honourable career in public service and to the considerable sacrifices my wife and I have made in service to the greater good of the people.*
- **Euphemisms** – replacing negative words with more neutral terms in order to play down the severity or impact of something

    - Example: *Your father was a bit tipsy at the charity event and is feeling a little delicate this morning.*
- **Hyperbole** – deliberate use of exaggeration to convince or appeal
    - Example: *You can't listen to the Greens about global warming; everything they say is completely untrue and they can't be trusted.*
- **Litotes** – deliberate use of understatement to convince or appeal
    - Example: *He's not the smartest person I have ever met.*
- **Paralepsis** – deliberate introduction of an idea whilst claiming that you do not wish to discuss it, so it can be discussed but responsibility for the discussion is withheld
    - Example: *I refuse to call Megyn Kelly a bimbo, because that would not be politically correct.* (Example taken from Romm, 2016).

(Chatfield, 2018, p. 164-167)

Bias

Being aware of bias

Our own intuition can be an excellent tool in life; but when thinking critically, we need to know when our intuition can't be trusted. As we have seen, there are a number of times when our thinking can become biased, or when our expectations differ from reality. Alexander Pope said that 'to err is human'; therefore, in order to become competent critical thinkers, we should be wary of erroneous reasoning in order to make strong arguments and sense of the world. These biases are examined in depth in Chatfield (2018) in terms of three categories:

1. The attachment of undue significance to random events or coincidence
2. The disregard of events that have not happened
3. Believing that things are simpler and more predictable than they really are

Further reading: Chapter 10: Overcoming Bias in Yourself and Others in Chatfield, T. (2018). *Critical thinking.* London, United Kingdom, Sage.

Heuristic Devices

A heuristic device is 'a cognitive short cut or 'rule of thumb', allowing for quick decision-making and judgment' (Chatfield, 2018, p. 199). These devices are essential for everyday thinking as they allow us to make practical decisions in time-constrained scenarios where success does not need to be guaranteed, but we can have a high level of confidence in a particular outcome. However, it is important to note that heuristic devices are useful, but when used in a situation that requires deeper critical thinking, they can produce faults and flaws in judgments, known as cognitive biases.

There are four major heuristic devices which are extremely effective in most circumstances.

The affect heuristic – using the strength of positive or negative emotional reactions as a decision-making rule. For instance, if you are in a good mood, you might be more amenable to trying new things, for instance, skydiving: whereas if you are in a bad mood, you might be more reluctant to try new things, meaning you might change your mind about the skydiving after a bad day!

The availability heuristic – using how easily something springs to mind in order to influence a decision or to assess options. For instance, people are likely to overestimate the likelihood of death through shark attacks because of the amount of media coverage these events receive, when in fact you are more likely to be killed by falling coconuts!

The anchoring heuristic – using a starting value or frame of reference to influence your subsequent judgments, even when they are unrelated. For instance, if you were haggling the price of something with a seller at a market, you would both make offers relative to the first offer. This is a technique used in the retail and food industry.

The representativeness heuristic – using the plausibility of a story to make a decision, rather than the probability or underlying facts. For instance, consider the following:

I am a young woman from the UK in her thirties who enjoys shopping, glamour, make-up and drinking cocktails. Is it more likely that I work in: a. health and social care; b. beauty therapy and hairdressing or c. finance and commerce?

If you chose option b then you are using the description given to make a decision on how closely it conforms to a **stereotype**, rather than assessing the facts. This form of mental shortcut is the representativeness heuristic. If you were to consider this logically then you might ask how many people in the UK work in each sector, and then make a decision based on this information.

What use are heuristics?

Heuristics are a useful tool for decision-making and have many scenarios when they are of use to human thinking, for example:

- Interaction on a local, human scale
- Clear choices based on reliable information
- Decision-making in particular areas of expertise

(Chatfield, 2018, p. 207)

As humans have evolved, the number of situations where heuristics are not applicable has grown, for instance, online interaction. For example, when engaging online, people are largely

unknown and at a considerable distance, information is often inadequate or overwhelming for decision-making, and are not experts, through the very nature of our evolution in an online word (Chatfield, 2018).

Cognitive bias

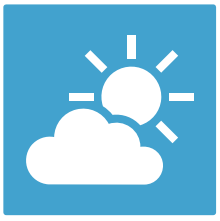
Cognitive bias does not refer to the typical notion of bias; for example, favouring a candidate at interview because you like their dress rather than whether they can do the job. Cognitive bias is "a systematic error in thinking - part of our brain's hardwiring - that causes us to act repeatedly in an irrational way. Most people are unaware of these subconscious biases but often we're all making the same irrational mistakes because of them" (Conceptually, 2019). There are many types of cognitive bias, most of which can be viewed here.

Below are a few cognitive biases that you might come across in the work of others or in your own thinking about academic assignments, and how you can take steps to avoid these in your written arguments:

The framing effect – presenting the same phenomena from specific angles in order to influence understanding through context and delivery. This cognitive bias can affect judgment and alter preference. This is used a lot in advertising; for example, consider which of the following is more appealing:

Option A	***Option B***
New spreadable cheese Organic, delicious **With 10% fat**	New spreadable cheese Organic and delicious **90% fat-free**

You can see that the same product is being described, just in two different ways. It is likely that Option B was more appealing due to the way it has been framed: the percentage is higher, so it appeals to us on an emotional level, despite being exactly the same as Option A. We have seen in heuristics that our judgments can be affected by emotional appeals, so the framing effect appeals to this, by making something seem more appealing by altering the angle of presentation. In an academic context, it is necessary to look out for the framing effect in political, media and marketing rhetoric in order to make sound judgments on arguments and the truth.



Confirmation bias – This is a tendency to pay attention to the things that confirm our pre-existing ideas or beliefs, and in turn, ignore or dismiss the ideas or beliefs that don't fit our own. This can be a common problem when putting together an academic argument, as we are likely to begin with our opinion, and only find evidence that supports this belief. You can avoid

confirmation bias in your arguments by seeking alternative views to your own and evaluating them objectively in your assignments, and through the identification of flaws in your own argument too. This creates a balanced, objective argument as you will demonstrate to your reader that you have considered and analysed other perspectives to make a stronger case for your own.

The clustering illusion – This is similar to confirmation bias, as it is a tendency to see a pattern where none exists, especially after an event, whilst ignoring whatever doesn't fit (Chatfield, 2018). This might be through the cherry-picking of data to fit a conclusion whilst ignoring evidence to the contrary; something that is easily done in research when our results do not support our conclusions. You can avoid this by presenting a true picture of results and conducting a meaningful investigation as to why the results are not consistent with any predictions; this level of critical thinking lends itself more to in-depth analysis and is likely to get you more marks. Remember, misrepresenting data is a form of academic misconduct!

The Dunning-Kruger effect – This type of bias is basically the more knowledgeable you are, the less confident you are likely to be; and vice versa. You might come across this in your reading, whereby an expert seems to be unsure or cautious of committing to an argument: but you should be mindful that this isn't necessarily an admission of lack of knowledge, but rather a realistic self-assessment of the expert's abilities. In short, "it takes some knowledge to realize how much you do not know" (Chatfield, 2018, p. 213).

The curse of knowledge – This is the tendency to believe that something is understood by everyone, when we understand it ourselves. In your work it is important to remember that some concepts might not be understood by your reader, so you might need to provide some background information to contextualise your argument, so your reader understands your motivations.

Flaws in arguments & logic

One of the best ways to critique the work of an author is to identify any flaws in their argument or logic (logical fallacies). Even the most seasoned academics make mistakes or display faulty reasoning. The world of academia is open to challenge and alternatives, so don't be afraid to challenge these. Being able to identify flaws in arguments can help build you evaluations of evidence and the works of others, but also ensure that you avoid them when building your own arguments.

Assuming a causal link

It is very easy to reason that when one event occurs alongside another, that there is an immediate cause and effect relationship; when this not always the case! For instance, whenever I make lasagne, my eyes water. Therefore, the lasagne is causing my eyes to water, right? Probably not! Let's consider this

logically. It is more likely that one of the ingredients, say an onion, is affecting my eyes, so whenever I make a lasagne, I chop onions; the onions are causing my eyes to water, not the lasagne! This may seem like an obvious error to avoid, but it's easy to jump to a conclusion when events coincide.

Assuming a correlation

Similarly, when two trends occur together, it is easy to assume that the two trends are causally linked; but again, sometimes, it is simply coincidence! For example, the per capita consumption of mozzarella cheese correlates closely with the number of civil engineering doctorates awarded in the US (Vigen, 2019). Does this mean that if I scoff mozzarella by the pound that I will become a civil engineer? No; because there is no logical **relationship** between the cause and effect, there is no third cause and they are not directly linked (Cottrell, 2017).

False analogies

An analogy is a comparison made between two things to note their similarities (Cottrell, 2017). The comparison of different items is a technique often used in literature to add suspense, shock or drama; but in scientific disciplines, an analogy needs to be true so that the similarities aid our understanding of both concepts. For instance, "coffee is like fuel, as it starts up the workforce in the morning" is a valid comparison, as caffeine is a stimulant, not unlike fuel for a car. However, "people who drink coffee are addicts like alcoholics" is a false analogy, as the comparison between caffeine addiction and alcohol addiction isn't valid, and this statement assumes that all coffee drinkers have a caffeine dependency.

Tautology

A tautological argument, also referred to as circular reasoning, is an argument that repeats the same points but in a different order or wording. An argument should always move forward, but in a tautological argument, the conclusion supports the premise, and the premise supports the conclusion, making it a closed argument. For example, we often use tautological arguments with our children:

Father: It's time for bed.

Child: Why?

Father: Because I said so.

This can be easily done in academic writing, so make sure you check your work to ensure that every sentence brings your argument forward.

Further reading: Chapter 7: Does it add up? In Cottrell, S. (2017). *Critical thinking skills: Effective analysis, argument and reflection.* (3rd ed.). London, UK: Palgrave.

Logical fallacies

Sometimes the reasoning behind arguments can be flawed or logically incorrect; these flaws are known as logical fallacies, and are used in the media, politics and everyday life to force conclusions that are not well-reasoned or logical yet are used because they are convincing and effective! A good critical thinker can spot a fallacious argument, as the conclusion is not logically generated or linked to the premises. Knowing the different logical fallacies can also help you identify and challenge them in the media and politics and ensure that you are not enticed by the conviction of an argument, but rather, the logic. There are several logical fallacies (see them all here) which can be divided into two major categories:

- Informal Fallacies –
    - Fallacies of relevance – these arguments offer reasons to believe or do something, but in fact turn out not to be reasons at all
    - Fallacies of unacceptable premises – these arguments attempt to introduce premises that may be relevant, but do not support the conclusion
- Formal fallacies – these arguments have the wrong form or structure, so will be invalid no matter what

(University of Auckland, 2019)

A lot of logical fallacies have Latin names; don't be put off by this! It's not important that you remember the name of the fallacy, but more importantly, that you can identify it in your own work and the work of others as unreasonable and illogical. Here are a few of the informal fallacies you are likely to encounter in your research:

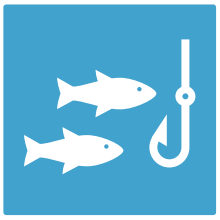
Informal fallacies

Tu Quoque or 'Who are you to talk?' - This type of fallacy counters an argument by attacking the person presenting the argument for not practising what they preach. For example:

MP: I plan to tackle the obesity problem that has been caused by fast food.

Constituent: Hypocrite! You were caught last week coming out of McDonalds!

Here, the argument made by the constituent is irrelevant to the proposition. The MP is outlining an election campaign in the interest of their constituents, not in terms of his own physical health.



Red Herrings or 'Appealing to…' - This type of fallacy side tracks an argument by relying on premises that aren't relevant or are appropriately relevant for the conclusion. These types of fallacious argument appeal to different things, such as authority, force, sympathy, popularity, nature, tradition; even the unbelievable and the ignorant (Chatfield, 2018) in order to divert attention from the true argument. Here are a few examples:

1. This lawnmower is top of the range and used by Brad Pitt (*Appeal to authority – what does Brad Pitt have to do with lawnmower quality?*)
2. The Anti-Vaccination movement has over 480 websites, so they must be right (*Appeal to popularity by suggesting that the argument is stronger by how many people believe it).*
3. The earth is flat and if you don't agree, then we can't be friends anymore (*Appeal to force by suggesting there will be forceful consequences for disbelief, so the conclusion is imposed by the person making the argument, despite it having nothing at all to do with the premise!)*
4. The Big Bang was theorised in the 1920s, whereas Christianity has been around for millennia, so the religion must be true (*Appeal to tradition by suggesting that the longer something has existed makes it more believable)*.

Red herring fallacies are used a lot in political rhetoric, especially spin campaigns, where a candidate's actions or non-response to position or policy is deflected with some sort of appeal, usually in attack of the opposition. It is important that you can spot this, especially when navigating potential fake news, to be able to sift legitimate evidence from fabrication.

Strawman - The strawman fallacy misrepresents an argument in order to weaken it, and then attacks the weakened version of the argument. For example:

MP 1: We need to do something about the CO2 emissions from vehicles; perhaps we should amend fuel efficiency standards for the next 20 years in order to reduce emissions.

MP (Opposition): That's ridiculous; she is proposing that we all get rid of our cars, so we can't get to work. It would kill the economy! (Example adapted from University of Auckland, 2019)

The opposition MP is twisting the words of MP1, who hasn't mentioned anything about getting rid of cars, and in fact, hasn't even said the word 'cars'. The opposition MP is weakening the argument of MP 1 and attacking their version of it, to make MP 1's proposal unreasonable. This tactic is used time and time again in parliamentary debates!

Ad hominem or 'At the person' - This type of fallacy rejects an argument by attacking the person making the argument, rather than focusing on the argument itself. For example:

Protestor: Doctor Lisa Webber's research tells us that vaccinations are safe for our children; but she would say that! Her research is being funded by a big pharmaceutical company. And she doesn't have children!

Here, the protestor is suggesting that the doctor is untrustworthy as she isn't a mother, and that her research circumstances (her funding from a pharmaceutical company) are unseemly. Although this may be the case, these aren't premises for a logical argument, as the protesting

is basing their rebuttal on the person making the argument, not the content of the initial argument (which is in the doctor's research). This can be a tricky fallacy to counter in assignments as we might be tempted to simply accept what is being said by an academic because of their status; but ultimately, we need to be more objective than this and make decisions based on the arguments and evidence presented. Chatfield (2018) recommends stripping these arguments right down to their content alone (so remove names, dates, organisations etc.) and then decide whether you agree or disagree. This will allow you to make a coherent counter-argument based on logic and reason.

False dilemma - This fallacy reduces a situation to two choices, creating a very 'black and white' picture of events, without demonstrating other possibilities. For example:

> Pastor: Mr Archer had been in a coma for three years when he finally woke up. That's either medicine or a miracle! I don't know about you, but I haven't see a cure for comas!

As you can see, this argument gives only two reasons to explain why the coma patient was able to recover after 3 years, without considering the possibility of other explanations. This is used to coerce the receiver into 'picking a side'. However, in an argument (especially when constrained by a word count) it isn't always possible to pick a side that represents your view entirely; nor is it probable to provide every single possibility! However, you can indicate the main options out of several possibilities: it's all dependent on the language you use to frame this. Having two options contradicts our nature as curious human beings, so false dilemmas are used to invoke a sense of urgency through oversimplification of an issue. Academia strives to break down this 'either/or' view of the world but is very unlikely that there are two simple things that contribute to or affect a phenomenon. In fact, most disciplines view the impact of events on a spectrum ('to what extent' essay questions) or consider a series of factors that could potentially have an impact. It is worth remembering this when devising a research question for your dissertation.

Formal fallacies

Formal fallacies are named as such to reflect the fact that they are failures in deduction; the invalid nature of the argument cannot guarantee the truth of the conclusion (Chatfield, 2018). To demonstrate these fallacies, it's necessary to present the arguments in standard form.

Affirming the consequent – This fallacy assumes that the presence of former will be true, when the latter is true, therefore the presence of the latter is sufficient to assume that the former is also the case (Chatfield, 2018). For example:

	Standard Form
If you want to go out with me, then you'll reply to my email.	Premise 1: If **A**, then **B**. Premise 2: **B** Conclusion: **Therefore, A**
You replied to my email, so you must want to go out with me.	

This is an invalid argument as the premises that are provided do not give us enough sufficient information to deduce that the conclusion is correct. If we were to pose **A** as 'if and only if you want to go out with me', this allows us to draw a more definitive conclusion that the presence of **B** affirms the truth of **A**.

Denying the antecedent – This fallacy assumes that when one thing follows on from another, the absence of the former confirms the absence of the latter. For example:

	Standard Form
If someone sneezes on the bus, then I will catch a cold.	Premise 1: If **A,** then **B** Premise 2: Not **A** Conclusion: **Therefore,** not **B**
No one has sneezed on the bus, so I won't catch a cold.	

Again, this argument is invalid as we are not provided with enough information within the premises to make an accurate conclusion. We know that there are more circumstances to catching a cold than whether someone sneezes on a bus, and we know that it isn't a guarantee. We can use the 'if and only if' principle here to make this argument logical.

Base rate neglect – This fallacy ignores the underlying frequency of one element (or the statistical evidence of an element) and potentially deduces an incorrect conclusion about the likelihood of something occurring through the application of irrelevant elements. For example:

	Standard Form
Most authors are millionaires.	Premise 1: Most **A**s are **C**s Premise 2: Few **B**s are **C**s Premise 3: **X** is a **C** Conclusion: **Probably, X** is also an **A**
You're an author, so you are probably a millionaire.	

Most authors are not millionaires, only a handful of exceptionally successful authors are. This is the problem with base-rate neglect: the exceptions are being used as representative of an entire population, rather than considering statistical evidence or investigating the relative numbers. This type of fallacy is in play when stereotyping of minority groups happens, as true probabilities are ignored.

Overcome the fallacies

Be charitable – as critical thinkers, we have the potential to go around dismissing every argument we hear. However, the principle of charity is followed by all good critical thinkers. Being charitable means to assume that the argument of another is truthful, so that we can avoid prejudice, understand their argument in it's strongest possible form and to consider the strengths of their arguments, as well as the weaknesses, in order to make our rebuttal even stronger (Chatfield, 2018).

Use the standard form – some fallacies are trickier to spot than others. Using the standard form allows you to view arguments in a logical form, so you can spot fallacious arguments in a clear way and allows you to counter any false premises.

Substitute examples – it can be useful to substitute the examples in arguments with more extreme examples to decide whether the argument is fallacious.

Hedge – academia is not built on absolutes or proof, but evidence that suggests a certain way of thinking or phenomena. Use hedged languages to indicate the likelihood of something being the case, but not fully committing to something as cold, hard proof.

Critical thinking tips

10 commandments

Chatfield (2018) provides 10 commandments of critical thinking. We've adapted these specifically for Marjon students as the main things to concentrate on if you want to be a great critical thinker!

1. Healthy scepticism over cynicism – being sceptical is the art of questioning and looking for evidence before committing to belief. Cynicism is an underlying negative outlook and belief that everybody is motivated by self-interest. The two are often confused, but scepticism is a useful tool for critical thinking; cynicism isn't.
2. If it's worth including, say why – or in other words, why have you selected one piece of evidence over the multitude of other arguments out there?
3. Be prepared to argue against your own beliefs – this can be tricky, particularly if you are arguing against something that contravenes your personal values. However, this is an excellent critical thinking skill, as the ability to see things from another perspective is a key element of a well-rounded argument.
4. Know your limits – if you don't know something, then state that it is unknown. Make it your business to find out more!
5. Criticise, but don't dismiss – remember that there's a nice way to do things! You can criticise without being deliberately offensive or hurtful, so keep your tone academic and your language objective.
6. Everything could be wrong – In academia, everything is open to challenge and further research. Never say something is proved or disproved; hedge your approximations.

7. Seek critical balance with description – your assignments can't be purely descriptive; but they can't be purely critical either! Use description to contextualise your arguments and build a picture of the state of play for your reader.
8. Don't raise your voice, improve your argument – this is a quote from the Archbishop Desmond Tutu. In our assignments, it doesn't matter how strongly we feel about something; we need to have evidence to back up our own assumptions. If more than one person is talking about something, then look at the underlying significance of this and use it to improve your argument.
9. Beware frames of reference – frames of reference are always relative, and never absolute. Always consider the perspective of an argument; is it historical, social or political, as this will inevitably affect the argument being made. This also gives you another angle of critique for your argument.
10. Correlation is not causality – remember that a similar trend between two elements does not automatically indicate a correlation. To suggest a cause, there must be a relationship between the elements; otherwise, it is simply coincidence!

Critical processes & models

There are a number of processes and models associated with critical thinking. It wouldn't be helpful to list them all here, so we have selected a few that can help you make sense of your assignments and arguments across the course of your degree.

Bloom's Taxonomy

Bloom's taxonomy is a hierarchy of skills that can increase our cognitive ability, including our critical thinking skills. The taxonomy differentiates between lower-order thinking skills (LOTS) and higher-order thinking skills (HOTS). Critical thinking skills span across the spectrum of LOTS and HOTS. You can read more about how the taxonomy can be useful for study here.

PEE

PEE stands for Point, Evidence, Evaluation and is an effective tool to guide your written assignments. This model encourages you to provide a brief descriptive background in order to contextualise your assignment, to provide evidence for the argument being made, and then to evaluate that evidence in light of its strengths, weaknesses and in comparison, to other evidence. Read more about PEE here.

Elements & Standards

The Foundation for Critical Thinking has an interactive model which considers the analysis and assessment of reasoning. It has been devised for application to real life scenarios and can be found here.

Further reading: The most useful critical thinking mental models to know about: https://www.wabisabilearning.com/blog/useful-critical-thinking-mental-models

Developing critical thinking skills

Critical thinking exercises

Silent Debate

Split into two groups with a flipchart or a whiteboard each. Start with a question (perhaps an old essay question or an issue on ProCon.org to get you started) and debate as a team in complete silence. This encourages you to work as a team and allows people who aren't comfortable with public speaking the opportunity to contribute (Macat, 2017).

> "It is the mark of an educated mind to entertain a thought without accepting it."
>
> *Aristotle*

Critical Songs

Take the lyrics of a popular song and see if you can use the evidence in the lyrics to convey the structure of an argument. Language in songs is often vague and open to a lot of interpretation, so you can use the lyrics to convey an argument. For example:

Up in the club (club) Just broke up (up) I'm doing my own little thing You decided to dip (dip) But now you wanna trip (trip) 'Cause another brother noticed me I'm up on him (him) He up on me (me) Don't pay him any attention I cried my tears (tears) For three good years (years) You can't be mad at me	→	In this extract, the author expresses that she is recently single following a break up and is seemingly angry about the fact. She lists several reasons for her actions, including her emotional state, and indicates that she is ignoring her ex-partner. This could indicate that the author wishes to move on with her life and feels that she should make this clear to her ex-partner. The lyrics indicate female empowerment, through decisive action and displays of strength and courage.

(Stewart, Nash, Howell & Knowles, 2008, disc 2, track 1)

Some extra sources for critical thinking exercises:

ThoughtCo – two online activities that are great for developing your analytical skills

The Critical Thinking Workbook – online workbook developed by Global Digital Citizen Foundation with a variety of tasks to develop all aspects of critical thinking

Learning to Learn – University of Sydney Critical Thinking exercises and general guidance on developing your critical thinking

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