Critical Thinking

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CONTENTS

Answers to and discussion of exercises 79-102

CHAPTER 1: FROM CLAIMS TO ARGUMENTS

Critical thinking is a term that is used in so many different situations by many different people. It's been described as an essential skill for employment, as the key to learning, as good thinking, and in many other ways. Lots of things are claimed for it (for example, that it will increase exam grades and that it encourages teamwork). But, like other things that are seen as good (such as truth, happiness, and honesty), we can't get very far in using the term unless we have some idea of what it is. It is only when we do that that we can say 'we're doing critical thinking' and 'we are critical thinkers'.

When critical thinking is described, it is often explained in terms of 'arguments' (as in 'critical thinking is concerned with the analysis and evaluation of arguments'). Though this is pretty accurate, it isn't a very good place to start. Apart from the issue of the meaning of 'analysis and evaluation', there is the crucial question of what is meant by the word 'argument'? We'll look at all these things in due course, but to start us off, we're going to ignore 'arguments' for the time being and focus instead on 'claims'.

Claims and their significance

Put very simply, critical thinking is all about claims.

By 'claims' we mean nothing more than when someone says 'this is the case' (whatever this is). This could include 'this should (or shouldn't) be supported' and 'this will (or won't) or did (or didn't) happen', and 'this is (or isn't) the best'.

You will easily be able to find lots of examples. Here are some.

- Qatar is the country with the highest amount of carbon dioxide emitted per person (49.1 tonnes).
- Belgium is the country which has the highest number of robberies committed per 100,000 in the population (this number is 1762).
- Tokyo is the biggest city in the world (with a population of 13.23 million).
- In what's called the 'Democracy Index', the top four countries are all European. (The fifth is New Zealand.)
- India is the country with the highest number of cinema attendances.
- What are called 'driverless cars' will be on our roads in the next ten years.
- It is cruel to use animals for medical research.
- Jupiter is the biggest planet in the Solar System (and has a mass 318 times that of Earth).
- Sir Humphrey Davy discovered sodium in 1807.
- You should try bungee-jumping.
- Spain is the best football team in the world.

You will see that claims can be statistical (for example, the information on Qatar, Belgium, and India), descriptive (Tokyo, Jupiter), historical (sodium), value-judgements (animals in medical experiments), predictive ('driverless cars'), definitional (what is meant by 'democracy' in the 'Democracy Index'?), evaluative (in what way is the Spanish football team the best in the world?), and recommendations (bungee-jumping).

At one level, claims such as these literally have no significance. They are just what we might call 'raw' in that they, so to speak, simply sit there in the same way that the claim 'today is Tuesday' sits there . It's only when someone takes a claim and does something with it, that claims take on what

we can see as a significance. Think of claims like ingredients in a recipe. Until someone takes the ingredients and does something with them, they remain merely separate ingredients. When someone starts doing things with the ingredients, then things move on: we get something happening. It's the same with claims. When someone takes a claim (or more than one), then things start to happen, things move on.

Let's look at an example of how this works. We'll use one of those given above.

What are called 'driverless cars' will be on our roads in the next ten years.

So what might be the significance of this claim? It could possibly be significant in the following ways.

- People might not need to learn how to drive in the future.
- The road accident rate will be greatly lowered as human driving error is eliminated.
- The design of roads might need to change.
- Disabled people (and the very frail elderly) will be able to travel more easily.
- Fuel consumption of cars will go down, as 'driverless cars' will drive more economically than many drivers do.

As you can see, all of these could be consequences of the prediction about 'driverless cars'. At the point that someone does something like identify a (possible) consequence of a claim, then they have given it a significance. They have given it a meaning by literally saying 'this claim means (or might mean) this'. We can see this clearly when we put the original claim with one of the above.

What are called 'driverless cars' will be on our roads in the next ten years. People might not need to learn how to drive in the future.

You can see how the suggested meaning given to the claim now becomes a claim itself. 'People might not need to learn how to drive in the future' is a prediction-claim. In turn, someone could give this prediction-claim a further significance or meaning.

What are called 'driverless cars' will be on our roads in the next ten years. People might not need to learn how to drive in the future. The job of driving instructor will disappear in the future.

We can start to see how, in giving claims a significance, connections are being made between one claim and another (and so on). As a result, when we are given a claim (or we give one), we need to ask the question 'What *can* it be used for?' For example, can it be used to support a position, to (help to) explain something, to encourage further questions, to prove (or disprove) something? You will remember another claim we noted above.

It is cruel to use animals for medical research.

Given this claim, does it follow that 'we shouldn't ever use animals for medical research'? In considering the significance or meaning of the original claim, we need to focus on how far this claim allows us to go. Here are examples of some of the questions we might need to ask.

- Can using animals in medical research ever be anything but cruel?
- What sort of animals are covered by the claim?
- What about using animals that are experimented on under anaesthetic?
- What if the cruelty is a rare feature of medical research?
- What do we mean by 'cruel'?

- Is cruelty to animals a problem?

You can see that the same claim can be seen by different people as having a different significance.

It is cruel to use animals for medical research. Medical researchers must never use animals.

Though it is cruel to use animals for medical research, such research is too important not to use animals.

This shows something that will take up a lot of our attention later. This is that someone might see a claim as having a significance or meaning that others won't.

This way of looking at how claims are given a significance has led us towards what is termed 'reasoning' or 'arguments'.

But before we move in that direction, have a look at some further evidence-claims.

Highest male life expectancy (in years)

Andorra	80.4
Iceland	80.3
Switzerland/Hong Kong	80.2
Japan	80.1

Highest female life expectancy (in years)

Denmark	87.4
Japan	87.1
Hong Kong	86.4
Canada	85.3
France	84.9

As you can see, the ten claims just sit there. Any significance they might have is something that needs to be added to (or, as we can say, drawn from) them. It might well be that you could do this, or at least ask questions about the claims. For example, why does Andorra have the highest male life expectancy in the world but not the highest female life expectancy (it is 7th = for the latter)? Is it because…? (Now you're starting to give the claim a possible significance.) Why has Denmark got the highest female life expectancy but is not even in the top twenty for male life expectancy? (Indeed why is there a 10.7 year difference between the life expectancy of males and females in Denmark?) And what are the explanations for the impressive figures for Japan and Hong Kong?

You will no doubt see the evidence on life expectancy as having a significance, as telling us something. And, once we take that step of giving it a significance, we're on our way to look at explanations and then on to arguments. In other words, we try to explain why some countries have very high life expectancies and then try to take things further. Taking 'things further' here is getting us to look at 'arguments'.

Claims and arguments

The meaning of 'argument'

The word 'argument' has already been mentioned a few times. So it's necessary now to focus on what we mean by this term in critical thinking. Let's just clear the decks first: we're all familiar with the term 'argument' to mean dispute or disagreement.

A: People shouldn't be allowed to keep cats.
B: I don't agree.

Here we have a dispute, a disagreement, an argument if you like. It might be that the argument could get more heated, with lots of hostility.

A: I don't care that you don't agree!
B: And I don't care that you don't care!

We'll leave them to snarl and scowl at each other for a little while longer. As you can see, in this sort of argument there is no more than simple (though heated) disagreement. There is no way of knowing why A and B take the positions they do. So let's ask the protagonists to start again.

A: People shouldn't be allowed to keep cats. Cats kill millions of small creatures.
B: That's not a reason to stop people having cats. Many of the animals they kill are pests, like mice and rats.
A: Yes, but what about the birds? Many of those killed will be from endangered species.
B: Some of them might be, but there's evidence that cats kill only those birds that are weak, so would probably have died anyway.
A: That can't always be the case…

We'll again leave A and B to continue their dispute. But the difference between the way they were disagreeing in this second version and in the first version will be clear.

In the first version, they were simply stating their position without justifying it (or, if you like, without explaining why they held it). In the second they were indeed justifying it (explaining why they held it). As you can see, A and B still don't agree but at least there was something going on for each to respond to it beyond simple disagreement. A and B are having an 'argument' as critical thinking understands the term.

In this way, we have seen that the term 'argument' in critical thinking is more than simple disagreement. Indeed it doesn't even have to involve disagreement.

C: It is cruel to use animals for medical research.
D: I agree with you.

Clearly, at this stage, there is no argument in any sense. Not only do C and D agree with each other, but neither C nor D provides any justification for their position.

Let's see them having a conversation in which a critical thinker's argument is given.

C: It is cruel to use animals for medical research. So we must do all we can to stop medical researchers using animals in their experiments.
D: I very much agree with you.

What we see now is C using the claim about cruelty to justify his further claim that we should try to stop the use of animals in medical research. This is the argument, and remains an argument even though D agrees with it.

As you can see, technically a desert-island castaway with no other person on the island could still engage in argument. Here's one: 'There is hope for rescue from this island only if a large fire is lit to attract the attention of a passing ship. So I should collect wood to build such a fire.' Here's another: 'I know that being rescued is very unlikely, so I might as well adjust to life here.'

Arguments as 'persuasive'

You will sometimes see arguments in critical thinking described as 'persuasive'. However, there are at least two problems with seeing them in this way. First (and rather obviously), they might not persuade. Our second dialogue between A and B about cats consisted of a series of short arguments, but neither A nor B was persuaded of each other's position. Secondly, in our dialogue between C and D, there was no persuasion going on, given that they already agreed with each other. C might not even have intended to be persuasive.

Thus, though arguments might not be persuasive (or even sometimes be intended to be persuasive), they are still arguments. Furthermore, claims themselves can still be persuasive without being part of an argument.

C: It is cruel to use animals for medical research.
D: Really? Then I'm going to try to get it stopped.

In this dialogue, C's claim is persuasive though it's not in the form of an argument. We'll return to this issue of persuasiveness later when we look at explanations but, for now, we just need to continue to focus on the nature of arguments.

The components of arguments: reasons

The first thing to note is that an argument has to have a minimum of two claims, one of which is seen as being justified by the other.

Here is a claim.

Some research published in 2013 shows that fish that live in a boring environment (such as tanks with very little in them) are less intelligent than those fish that live in an interesting environment.

To turn this into an argument, we need a second claim that will be justified by the first.

If they want to increase the intelligence of their fish, people who keep them as pets should ensure that their fish tanks provide an interesting environment.

As we can see, the significance of the first claim is seen as such that it justifies the second. What happens is that the first provides a ***reason*** for the second. Why should people who keep fish as pets put their fish in tanks with an interesting environment? Because research shows that fish…

Let's look at the sequence of the **reasoning**.

Research on fish → If they want to increase the intelligence of their fish, people should provide tanks with interesting environments.

The → sign shows the sequence of the reasoning, such that we can see that the second claim is drawn from or follows from the first. It cannot be the other way round. (Try it to see.)

Looking back at the claims we had at the beginning of the chapter, we can see how they can be used to create arguments.

Belgium is the country which has the highest number of robberies committed per 100,000 in the population (this number is 1762). → People who study crime should try to explain this figure.

Jupiter is the biggest planet in the Solar System (and has a mass 318 times that of Earth). → Astronomers should try to find out as much as possible about Jupiter.

The components of arguments: conclusions

This issue of the direction of the reasoning gives us another term used in arguments. We have seen that claims can provide reasons for other claims that are drawn from them, and what are drawn from them are called ***conclusions***. The term 'conclusion' can also be given as 'inference': a claim is inferred *from* another, again showing the direction of the reasoning. For our purposes, we're going to use the term 'conclusion', though it retains the meaning of 'inference'.

We can now see that an argument has a structure that we can represent in a diagram. The simplest argument can be represented as R→C or R

↓

C

The word 'conclusion' is normally used to mean the last thing in a sequence (such as the 'conclusion' of a report or a speech). However, here it doesn't necessarily have the meaning of the last thing. In an argument it could be the first thing.

(C) If they want to increase the intelligence of their fish, people who keep them as pets should ensure that their fish tanks provide an interesting environment. This is because (R) some research published in 2013 shows that fish that live in a boring environment (such as tanks with very little in them) are less intelligent than those fish that live in an interesting environment.

As you can see, the structure of the argument is the same, even though the sequence is reversed. In addition, you can see that the text has been labelled to show the functions of each part. This is a method we shall use on many occasions.

Though the 'conclusion' of an argument isn't necessarily the final thing that's given, it can be seen as where the argument is going, so to speak, where the argument ends up, its final destination. In the end, it's what the author of the argument has tried to show (whether or not it's persuasive).

The components of arguments: language clues

The language used in arguments can often indicate what's going on in them. We saw this in the previous argument.

If they want to increase the intelligence of their fish, people who keep them as pets should ensure that their fish tanks provide an interesting environment. This is *because* some research…

The word 'because' often indicates a reason, as would the words 'given (that)' and 'since'. Words that indicate conclusions include 'therefore', 'thus', 'so', and 'in consequence'. But conclusions can also be found by looking for words like 'should', 'must', and 'ought' (and their negative forms like 'should not'). This is because conclusions are often recommendations.

(C) People who keep fish as pets *should* ensure that they make their fish tanks provide an interesting environment. This is *because* (R) some research published in 2013 shows that fish that live in a boring environment (such as tanks with very little in them) are less intelligent than those fish that live in an interesting environment.

However, it's worth noting that, though words such as 'so' and 'because' often indicate an argument, they don't always.

So that Qatar's really high CO_2 emissions can be properly explained, the climate control group have decided to look into the figures more closely.

Though the word 'so' is used here, it is used to explain why 'the climate control group have decided to look into the figures more closely' rather than as part of an argument why, for example, they should.

Arguments with two or more reasons: joint and independent reasons

We have so far considered only what are known as simple arguments. By simple here is meant those with only one reason leading to a conclusion. We've seen that arguments must have a minimum of two claims (one serving as a reason for a conclusion). But there are plenty of arguments with more than one reason. (Though there is no upper limit to the number of reasons, arguments with ten or more are very rare.)

Here's an example of an argument in which there are two reasons.

There's evidence that singing in a choir reduces stress and depression. It's also been shown that people who sing in a choir get on better with other people. More people should join choirs.

You will have spotted that the third sentence is the conclusion: the word 'should' will have highlighted this, although you will have seen that the third sentence is a recommendation that is drawn from the two reasons that come before. We can show this argument as follows.

R R
↘ ↙
C

Have a look at the next argument.

Recent research on the causes of arthritis has changed the way in which we think it is best treated. The company's drug has been based on this recent research. So the company's drug will be more effective than the old one in treating arthritis.

You will have noticed that this argument also has two reasons supporting the conclusion. (Or to put it the other way, that the conclusion is drawn from the two reasons.) So is the structure the same as the previous one?

In one important way, it is. But, in another important way, it isn't. In the argument about the benefits of singing in a choir, each of the two reasons could have been used to draw the conclusion.

There's evidence that singing in a choir reduces stress and depression. So more people should join choirs.

People who sing in a choir get on better with other people. So more people should join choirs.

However, in the argument about the arthritis drug, the conclusion cannot be drawn in this way. Neither reason can support the conclusion on its own.

Recent research on the causes of arthritis has changed the way in which we think it is best treated. So the company's drug will be more effective than the old one in treating arthritis.

The company's drug has been based on recent research. So the company's drug will be more effective than the old one in treating arthritis.

As you can see, in the first version, we cannot draw the conclusion because we don't know if the 'company's drug' is based on this recent research. In the second version, we don't know whether 'recent research has changed the way in which we think it is best treated'. As a result, the conclusion needs both reasons acting together. We can represent the structure in the following way.

R + R
↓
C

What we have here is what is called 'joint' reasoning: the reasons are needed to act together to support the conclusion (the + sign shows this). In the earlier argument about choirs, we saw that each reason could separately support the conclusion: here we have 'independent' reasoning (and the lack of a + sign showed this).

Summary

We have so far looked at how claims are given significance or meaning. We have looked at the relationship between reasons and conclusions, and we have noted the difference between joint and independent reasons. To cement your understanding, do the following exercises.

Finding arguments exercise

Which of the following passages are arguments and which are not? For those you think are arguments, work out which parts are reasons and which part is the conclusion.

(1) People who buy houses often borrow more they can afford to repay. Interest rates can go up and down. House prices have been falling over the past few years.

(2) Local representatives should serve the community. The only way to serve the community is to be independent of any political party. Local representatives should be independent.

(3) Banning the sale of ivory is not necessarily a good idea. Since the sale of ivory has been banned, the price of ivory has increased enormously. Ivory poachers are motivated solely by money.

(4) Cigarette manufacturers have to include health warnings on their packets. Another way of highlighting the dangers of smoking needs to be found. Young people who smoke are not likely to be put off by these warnings on cigarette packets.

(5) There is an increasing number of species that are becoming endangered. Most of these are declining because of human activity. This can include over-fishing, destruction of habitats, and hunting.

Joint and independent reasons exercise

In which of the following arguments do the reasons operate independently and in which do they operate jointly?

(1) Dumping toxic waste in the sea is safer than dumping it on land. It's also much cheaper. Therefore we should dump such waste at sea.

(2) Smoking can cause heart disease. It can also cause many different types of cancer. It should therefore be strongly discouraged.

(3) Smoking can cause heart disease. Heart disease costs the nation millions of pounds to treat. Therefore, tobacco companies should pay for at least part of this extra cost.

(4) Australian soap operas feature a lot of teenage romances. In addition, their story-lines are often unrealistic. It's surprising, then, that they're so popular with adults.

(5) Some members of the authority have been shown to have taken bribes. They have also falsified some of their financial claims. Therefore these members should resign.

(6) In order to reduce environmental pollution, we need to use nuclear-powered power stations rather than coal-fired ones to generate electricity. Coal-fired power stations produce high levels of environmental pollution. Nuclear power stations do not pollute the environment.

CHAPTER 2: EXPLANATIONS

You will recall that in the last chapter we listed various claims and considered the possible significance of some of them. These claims included the evidence on life expectancy. We considered that, in giving this evidence a significance, we were into the area of explanations. We will now pick this point up again.

Here's evidence for both female and male life expectancy combined into one measure.

1	Japan	83.7
2	Hong Kong	83.2
3	Andorra	82.5
	Switzerland	82.5
5	Iceland	82.0
	Israel	82.0
	Italy	82.0

So why does Japan have such a high life expectancy? Why do all these seven countries? Clearly, we're now very much into explanations.

Evidence on Japan suggests that the explanations include a history of good public health programmes, an emphasis on hygiene, a high level of affluence, a well-educated population, strong community ties, and a generous pension. The explanation for Hong Kong's high figure includes affordable health care, a population with an active lifestyle, and a good diet (including lots of vegetables, and dishes that are steamed or stir-fried).

When we look for and at explanations like this, we're often faced with the issue of *possible* explanations. For example, with regard to Japan, perhaps it is indeed a combination of the above explanations. But there might, of course, be further possible explanations (for example, the high levels of fish-eating in the Japanese diet has been suggested). A specific point about Japan is the high number of centenarians in Japan. The number is around 52,000 (although an interesting issue here is how many of these centenarians are actually alive, with the discovery of some cases of children still collecting the pension of their long-since dead parents!).

As you can see, though there might be disagreement (or, at least, discussion) on exactly why countries like Japan or Hong Kong have such high life expectancies, there is *not* a dispute as to the figures. The respective positions of these top countries might move a little from one year to the next, but nobody will be saying that Japan or Hong Kong has a low life expectancy or that Sierra Leone (with the lowest at 48.2) is actually the country with the highest. Thus explanations, unlike arguments, are (normally) concerned with what is often already accepted. Any dispute would then be about what might be the explanation. A good example of this would be a murder case. Though there is (normally) no dispute that the victim is dead, there will be different explanations of why he or she is dead.

Of course, not all explanations of claims are concerned with claims that are already accepted. Look again at two from our original list at the beginning of the first chapter.

It is cruel to use animals for medical research.
Spain is the best football team in the world.

Though in each case, the issue of explanation is very relevant, there will not necessarily be agreement on the claims themselves. In the first one, given that there will be disagreement on the claim itself, the issue of explanation has a special significance. For example, someone might want to *explain* why it is or is not cruel (using evidence on, say, the perception of pain and discomfort by animals, and the nature of the experiments). In the case of the second, someone who makes this claim would have to explain what criteria they're using to support it (such as the number of international competitions that have been won). In this way, in cases like these where the claim itself is contested, the explanation becomes an argument. For example:

There is considerable evidence that animals feel pain. The deliberate infliction of severe pain on any animal can be seen as cruelty. Therefore it is cruel to use animals for medical research.

Spain has won all the recent international football tournaments, both at senior level and in those for younger players. So Spain is the best football team in the world.

Thus it needs to be remembered that, though normally explanations are different from arguments (where the claim being explained is not in dispute), sometimes explanations can be seen as arguments themselves (where the claim is in dispute). But there is another way in which explanations and arguments can be linked. Look at the next passage.

The great nineteenth century writer Charles Dickens suffered from manic-depression. When he felt that his depression was beginning, he would take exercise. This wasn't just a short burst of exercise but would be a brisk 20-30 mile walk. This was a very effective method of dealing with his depression. This is because exercise increases the level of serotonin and, since mood is to some extent determined by serotonin, these long walks lifted his mood. Modern anti-depression drugs such as Prozac also increase serotonin levels.

As we can see, this passage contains an explanation. ('…exercise increases the level of serotonin and, since mood is to some extent determined by serotonin, these long walks lifted his mood.') You can see that it has the appearance of the form or structure of an argument with two reasons – acting jointly – supporting a conclusion that 'these long walks lifted his mood'. However, it is no more than the appearance of the structure of an argument, in that this final claim is not in dispute.

Look, however, at the next passage. This picks up after the explanation in the previous passage.

…these long walks lifted his mood. Therefore, instead of taking drugs such as Prozac, people who suffer from depression should take brisk exercise. Not only would such exercise deal with their depression, but it would also be good for their physical health.

What we now have is an argument that uses an explanation as part of its reasoning. The conclusion is drawn from the explanation of why Dickens's long walks dealt with his depression and is then further supported by a further reason.

Disputes in explanations

This example of an explanation supplying at least part of the reasoning for a conclusion shows us something of importance. This is that, because explanations might not be agreed on, arguments based on them can often be disputed.

Another example of this issue is that of the causes of the economic problems of the US and European economies after 2008. Governments such as those of the US and the UK (and some of the European Union) endeavoured to deal with what's termed 'austerity' by cutting back on governmental expenditure. This policy was based on the explanation that the reason that these economies have been in trouble is because public expenditure (on things such as education, pensions, defence, and health) was too high (and thus needed cutting back). However, an alternative explanation by Mark Blyth in his 2013 book 'Austerity' is that it was the banking system that caused the problem (by requiring governments to pay out huge sums to deal with the banks' very poor decision-making). Thus an argument on economic policy that used Blyth's explanation would come to a totally different conclusion than one that used the explanation that governments had spent too much on public services.

We can summarise the above.

Evidence-claim + explanation 1 → argument 1
Evidence-claim + explanation 2 → argument 2

This summary shows that an argument will vary according to the explanation that's given for evidence. Though the evidence itself might be accepted, explanations (and thus arguments based on these) might not.

Here's some more evidence.

South Korean female golfers are very, very good at their sport. For example, four of the top ten female golfers in the world are Korean, as are 38 of the top 100 and 144 of the top 500.This is often seen as a puzzle. After all, South Korea has only 0.7 per cent of the world's population and, because it is a very crowded country, it has very little room for golf courses. Since Se-Ri Pak won the 1998 US Women's Open in 1998, five more Korean golfers have won this tournament.

There are various explanations for the evidence. Here's one.

Korean society is very competitive. So children will be encouraged to want to win, and keep winning. (The exam system in Korean is a very good example of this big emphasis on competitiveness.)

Here's another.

Korean fathers push their daughters much more than do fathers in other countries. Se-Ri Pak was made to get up at 5.30 every morning by her father and run up and down the fifteen flights of stairs in their apartment block in order to make her stronger. He also made her practise even if her hair was filled with icicles. In order to overcome her nerves, he made her sleep all night on her own in a cemetery.

Here's one more.

Because Korea has so few golf courses, Korean golfers spend a lot of time hitting balls at driving-ranges. This is better than playing on golf courses where much of the time is spent just walking around.

And another

Korean culture puts a lot of emphasis on the need for constant repetition to achieve perfection. This emphasis works well in developing a good golf swing.

As you can see, if we were to produce an argument on the lessons to be learned from the success of Korean women in golf, then the argument would vary according to the explanation (or explanations) used. No one can dispute the phenomenal success of Korean women in golf, but the explanations can be disputed. It might be any one of the above, or any of them in combination with another (or others), or, of course, it might be none of these.

Thus we could have the following.

Korean women golfers are very successful on the international circuit. The dedication to perfection in the Korean culture is the cause of this success. Thus any country that wants its women to do as well as Korea in this sport should emphasise the importance of constant repetition towards perfection.

Or we could have a different argument.

South Korea has produced many female international golf champions. This is because they have spent so much time at driving ranges perfecting their shots (given that Korea has so few golf courses). So girls who want to play golf should be required to put in hour after hour at driving ranges instead of playing on full courses.

We have seen that explanations can provide the link between evidence-claims and arguments. We've also seen that explanations can be disputed. In this way, understanding their significance can be very important in critical thinking.

Looking at arguments and explanations exercise

Read the following passages and, for each one, decide whether it is an explanation (without an argument), an explanation as part of an argument, or an argument (without an explanation).

(1) When people buy clothes online, they tend to be more adventurous in their choices than when they're buying them in a shop. This is because, in a shop, people feel much more self-conscious about being seen to choose something that looks less conventional. Fashion companies need to put their more unusual clothes on their websites rather than in their shops.

(2) There is an increase in popularity of what's called 'hot yoga'. This involves exercises being done in temperatures up to 40ºC. People think that the more you sweat, the better the exercise must be. There is, however, no evidence that doing yoga in high temperatures makes people any healthier or helps them to lose more weight than doing yoga at normal temperatures. Sweating is not necessarily the same as burning calories.

(3) Supermarkets and other large shops are more and more introducing automatic checkouts. There has also been a huge increase in online retail sales. Both of these developments are leading to hundreds of thousands of people being pushed out of the retail industry. Given that the retail industry is normally one of a developed economy's biggest employers, this process will lead to big increases in unemployment in many countries around the world.

(4) TVs, laptops, tablets, and smartphones typically give out illumination rich in blue light, the light that our eyes recognise as daylight. (By contrast, traditional room lighting uses a much 'warmer' light with much less blue light.) This blue light interferes with our sleep-patterns by stopping the release of the hormone that aids sleep (melatonin) and activates the brain's neurons that boost alertness, In order to help with having a proper sleeping pattern, people ought to switch off all this 'blue light' equipment long before they go to bed.

(5) Factory farms kill 1,600 animals a second worldwide. Conditions in which animals bred for meat are reared in these 'farms' will normally be very unpleasant. The announcement that a laboratory has been able to create meat using animal stem cells can be seen as offering a much more acceptable way of producing meat for human consumption.

CHAPTER 3: ASSUMPTIONS

The last argument we considered in the previous chapter was this one.

South Korea has produced many female international golf champions. This is because they have spent so much time at driving ranges perfecting their shots (given that Korea has so few golf courses). So girls who want to play golf should be required to put in hour after hour at driving ranges instead of playing on full courses.

Let's suppose someone looked at this again and responded along these lines.

I know that there aren't a lot of golf courses in South Korea, so Korean girls who wanted to play golf *would* have to use driving ranges for much of the time. But this isn't the explanation for why Korea has so many top-level female golfers. You're just taking it that there's no other explanation. But there is. This is that Se-Ri Pak has become a role model for other girls.

Whoever is right in this (and it could be neither of the versions), the above response has got some value. Though the second writer is not necessarily right to say that the first writer just takes it 'that there's no other explanation', they are making a useful point. This is more accurately given as the first writer is taking it 'that there's no other useful explanation'.

Of course, we can see that the first writer hasn't actually said this. They've just argued *as if they had said this*.

Here's an argument we considered in Chapter 1.

There's evidence that singing in a choir reduces stress and depression. It's also been shown that people who sing in a choir get on better with other people. More people should join choirs.

We saw that the conclusion was drawn from two reasons. But what happens if someone comes along and says that (however unlikely this is) 'what if people don't want to reduce stress and depression, and don't want to get on better with other people?' If this is the case, then the conclusion loses its support. As with the argument about female Korean golfers, the author had taken something for granted, had argued without giving us all the reasoning.

What we can see is that arguments are very often more than what has been said. In the first example, the author had to accept as part of their argument that there was no other useful explanation for the success of female Korean golfers. In the second, the author had to accept that people who are stressed or depressed would rather not be, and that people would prefer getting on with others rather than not getting on with them.

Put simply, arguments normally consist of reasoning that we can see and that which we can't. The first type is the *explicit* reasoning: it is that whose structure we can identify and label (R1, R2, R3…). The second type is *implicit* reasoning, that which the author hasn't (for whatever reason) stated.

This implicit reasoning is known as **assumptions**. The author has *assumed* it rather than stated it. It's clear that this use of the word 'assumed' or 'assumption' is different from familiar everyday usage. Look at the next example.

A: Dolphins can remember the calls of other dolphins they once knew even after being apart for twenty years.
B: You can't say that. You're just assuming it.

Here B uses the word 'assuming' in a familiar way, to mean something like 'you haven't given any evidence for this'. Indeed, as we can see, B is using it in a way that is the exact opposite to how we have been using it. A does not assume the claim they make about dolphins' long memory of other dolphins' calls: they have very clearly stated it. In a critical thinking context, B's response should have been something like the following.

B: You'll need to give some evidence for what you've just claimed.

A could possibly then provide this. There is indeed a study that was published in 2013 that shows that dolphins do have this remarkable memory for the sounds of other dolphins they once knew, even after twenty years apart.

Let's recapitulate then. Assumptions are reasons that are not explicitly stated in an argument but which are necessary for the conclusion to follow.

You will sometimes see assumptions given as examples of weaknesses in argument. This is simply not the case. If an author does not make part of their argument explicit, this is nothing unusual. Look at the next example.

Your interview is at 11 o'clock. So, to be there on time, you need to get the 9 o'clock train.

This is a very simple argument, with one reason supporting the conclusion. But, though it has only one reason, this does not mean that there aren't many others assumed here.

- You don't want to be late for your interview.
- You want to go to the interview.
- You want to go by train.
- The 9 o'clock train will be running.
- The 9 o'clock train will get you to where you need to be for your interview in time.
- You have the money to be able to afford to travel by train.

And so on…

As you can see, the original simple argument requires all of these other reasons for the conclusion to be drawn. But we would not think it odd that the original argument hadn't included them. In fact, we would have thought it odd if the author of the argument had included them (or, at least, many of them). The argument would become far too cumbersome if they had been included.

This example shows that finding assumptions in an argument is not in itself equivalent to finding weaknesses in the argument. It is simply laying bare more of the reasoning. Think of it like using an X-ray machine. When a body is X-rayed, we see further parts of this structure, parts that are not normally visible but which are an intrinsic part of this structure. The only time when there might be a problem would be if the argument relies on assumed reasoning that can be questioned. (For

example, the author of the argument that saw the explanation for the success of female Korean golfers took it that there were no other useful explanations. As we saw, there could be others, so this assumed reason was a source of weakness in the argument.)

We have seen that assumptions in arguments are reasons that are not stated. But we've also seen something else about them. This is that, though they're not stated, they are *necessary* for an argument. The simple argument about getting a train for an interview shows this well. The conclusion simply can't be (usefully) drawn without the assumed reasons being in the argument. For example, let's take out 'You want to go to the interview' and say that we don't need to know this one way or another. Clearly, if the person who's got the interview doesn't want to go to the interview, then any argument about which train to catch becomes unnecessary. In other words, this assumption had to operate as a reason.

This does not mean, however, that whatever is not made explicit in an argument has to be assumed. For example, what about this?

- You will need to dress smartly for your interview.

Though this might be the case, it is not required for the conclusion about getting on a train around 9 o'clock to be drawn. Here's another one.

- You need to prepare for your interview.

Again, this might be useful advice, but is not needed for the conclusion to be drawn.

The negative test for finding assumptions

The feature of assumptions that they are necessary for an argument gives us a very useful test to see if what we think might be an assumption is indeed one. Look again at the argument we've just been considering.

Your interview is at 11 o'clock. So, to be there in time, you need to get the 9 o'clock train.

We identified some assumptions that were needed in this argument.

- *Y*ou don't want to be late for your interview.
- You want to go to the interview.
- You want to go by train.
- The 9 o'clock train will be running.
- The 9 o'clock train will get you to where you need to be for your interview in time.
- You have the money to be able to afford to travel by train.

Given that we saw these as necessary for this argument, what happens when we turn them into their opposite?

- *Y*ou *want* to be late for your interview.
- You *don't* want to go to the interview.
- You *don't* want to go by train.
- The 9 o'clock train will *not* be running.
- The 9 o'clock train will *not* get you to where you need to be for your interview in time.

- You *don't* have the money to be able to afford to travel by train.

As we can see, the argument no longer works.

Your interview is at 11 o'clock. You want to be late for your interview.
So, to be there on time, you need to get the 9 o'clock train.

Your interview is at 11 o'clock. The 9 o'clock train won't be running. So, to be there on time, you need to get the 9 o'clock train.

Your interview is at 11 o'clock. The 9 o'clock train will *not* get you to where you need to be for your interview in time. So, to be there on time, you need to get the 9 o'clock train.

What we're using here is what's known as the **negative test**. This is a way of testing to see if a claim is or is not assumed in an argument. It works in a simple way. Given that we expect the author of an argument not to be self-contradictory (or, at the very least, not to be inconsistent), a claim that goes against the direction of the argument is not going to be used in the argument itself. (As we shall see later, there might be a reference in an argument to an opposing claim, but only in order to reject it.)

You will remember the point we considered above, that just because something is not explicitly included in an argument does not necessarily make it an assumption. Using the negative test, we can put in the negative version of one of the unnecessary claims we considered earlier.

Your interview is at 11 o'clock. You will not need to dress smartly for your interview. So, to be there in time, you need to get the 9 o'clock train.

It's clear that the negative version makes no difference to the argument, so we can see that it's not assumed.

Here's another argument.

Doing gymnastics in schools results in thousands of injuries to students a year. PE teachers need to be trained better in order to reduce the risk of injury to students as a result of doing gymnastics.

We'll use it to find assumptions, to consider claims that are not assumed, and to use the negative test. There are many assumptions being made here. Here's one.

- Injuries to students are a bad thing.

This might be so obvious as to not be worth mentioning but you can see that the author has to believe this to be true in order to draw the conclusion! Try the negative test, and see what happens when the claim 'Injuries to students are not a bad thing' is put into the argument. Quite simply, the conclusion no longer follows.

Here are some others.

- The number of injuries from students doing gymnastics can be reduced.
- Improving the training of PE teachers can reduce the risk of injuries from gymnastics with their students.
- Students doing gymnastics will do what their teachers tell them.

- PE teachers will put their improved training into practice when teaching students gymnastics.
- Gymnastics is taught by PE teachers.

Here are some claims that, though they are not explicitly stated, are not assumed. (Try the negative test to check.)

- Gymnastics has the highest rate of injuries for students.
- The number of students doing gymnastics is increasing.
- PE teachers do not know that gymnastics can cause injuries.

Finding assumptions exercise

Identify assumptions required in the following arguments.

(1) The amount of vandalism in the park has increased recently. So more people should be employed to patrol the park.

(2) The number of people coming to the zoo is much lower this year than it was last year. The zoo should therefore reduce the entrance charge.

(3) The number of people who are vegetarian has increased substantially over the past few years. There has also been a lot of evidence that vegetarian diets are healthier than those which include meat. People must have been persuaded by this evidence.

(4) The number of people taking holidays in the UK this year is much higher than it was last year. The UK had very good weather this year, so if the weather is good next year, the number of people holidaying in the UK will be just as high.

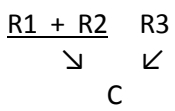
(5) Teachers are complaining about the size of classes, saying that they are too big. However classes were on average much bigger about forty years ago, and teachers didn't complain then. So we shouldn't take their complaints too seriously.

CHAPTER 4: UNRAVELLING MORE STRUCTURE IN ARGUMENTS

We have so far looked at arguments in which one or two reasons are used to draw or support a conclusion. In Chapter 2 we noted that there is no upper limit to the number of reasons an argument can have. We'll now look at arguments with three reasons.

Using genetic modification, what's called 'golden rice' has been created such that it can provide 60 per cent of a child's vitamin A daily requirement. According to the World Health Organisation, 170 million to 230 million children (and 20 million pregnant women) are vitamin A deficient. The companies that produce 'golden rice' are prepared to let rice farmers have the seeds for free. For the sake of the health of millions of children, 'golden rice' should be licensed for use as soon as possible.

We can see that the first two reasons (the first two sentences) act jointly and provide very useful support for the conclusion in the fourth sentence. The third reason (the third sentence) provides support from a completely different direction (and is thus an independent reason). The structure can be shown in this way.



Counter-claims

Here's another example, although with something different about it.

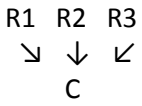
Many people see wind power as the perfect solution to our energy needs. However, we should build no more wind turbines and take down the ones that have been built. Each year millions of birds and bats are killed by these wind turbines. (In Spain, the number could be as high as 18 million each year.) Endangered species, such as wedge-tailed eagles and Egyptian vultures, could well become extinct because of wind turbines. The amount of energy generated is very, very small (for example, only one per cent of the UK's energy is met by wind power).

What's going on in this argument?

This, like the previous one, has three reasons. We'll show these.

Many people see wind power as the perfect solution to our energy needs. However, (C) we should build no more wind turbines and take down the ones that have been built. (R1) Each year millions of birds and bats are killed by these wind turbines. (In Spain, the number could be as high as 18 million each year.) (R2) Endangered species, such as wedge-tailed eagles and Egyptian vultures, could well become extinct because of wind turbines. (R3) The amount of energy generated is very, very small (for example, only one per cent of the UK's energy is met by wind power).

The three reasons are independent reasons. Though the first two are concerned with the same point about birds being killed by wind turbines, they operate independently. Either could be taken out, leaving the other, and the argument would still stand. The third reason, of course, supports the conclusion from a totally different direction.



What else was going on? Two things were. Let's look at the first of these. This is the opening sentence.

Many people see wind power as the perfect solution to our energy needs.

It has not been labelled as part of the reasoning. This is because it isn't part of the reasoning. It's pretty clear that it presents the other side of the argument. But why would anyone present the other side of the argument? Quite simply, to knock it down. The author's argument is meant to show that wind power is a far from 'perfect solution to our energy needs', so the original claim is rejected. This type of claim is referred to as a **counter-claim** (or a 'counter-assertion').

A useful way of spotting that a counter-claim has been given is to look for the word 'however' (or an equivalent such as 'on the other hand', 'alternatively', and so on). We can see this in the above argument. What happens is that 'however' (or something similar) indicates that the author is going to argue against what's just been given, so finding this or a similar wording is often an indication that an argument is about to start. This is not always the case, so you'll still need to read a passage with care. For example, look at the next one.

The cost of building more motorways (or increasing the size of existing ones) is very, very high. However much we might want more and bigger motorways, the country can't afford them. So we need to look at alternative solutions to our congested roads.

In this argument, the word 'however' does not indicate the beginning of an argument in response to a counter-claim. It serves here as a word like 'though'.

Counter-arguments

In the argument against wind turbines, we saw that a counter-claim had been given. In the next version of that argument, the counter-position is given a little differently.

Many people see wind power as the perfect solution to our energy needs, given that it's pollution-free. However, we should build no more wind turbines…

In this version, the author argues against the other side in the same way, but there is a difference. Rather than giving no more than a counter-claim, we have here a counter-argument: 'Wind power is pollution free, therefore it's the perfect solution to our energy needs'. If a counter-argument is given, we might expect that the argument should respond to the reasoning in the counter-argument.

Many people see wind power as the perfect solution to our energy needs, given that it's pollution-free. However, if we see 'pollution-free' as meaning having no adverse effect on our environment, then wind power doesn't fit this category.

Each year millions of birds and bats are killed by these wind turbines. (In Spain, the number could be as high as 18 million each year.) Endangered species, such as wedge-tailed eagles and Egyptian vultures, could well become extinct because of wind turbines. The amount of energy generated is very, very small (for example, only one per cent of the UK's energy is met by wind power). We should build no more wind turbines and take down the ones that have been built.

This argument responds directly to the counter-argument by attacking the specific reason used in it. Of course, the previous version of the argument could still have been used, by providing a general response to the claim that 'wind power is the perfect solution to our energy needs'.

Evidence and examples

When we identified a counter-claim in the original version of the argument, we noted that this was the first of two things that were going on in it. The second is the sentence 'In Spain, the number could be as high as 18 million each year'.

Many people see wind power as the perfect solution to our energy needs. However, we should build no more wind turbines and take down the ones that have been built. Each year millions of birds and bats are killed by these wind turbines. (In Spain, the number could be as high as 18 million each year.) Endangered species, such as wedge-tailed eagles and Egyptian vultures, could well become extinct because of wind turbines. The amount of energy generated is very, very small (only one per cent of the UK's energy is met by wind power).

Here we have a specific piece of evidence, an example of the 'millions of birds and bats… killed by these wind turbines'. It doesn't provide an additional reason in this argument, but acts to support the first reason. In this way, it strengthens the possible force of this reason in the argument. However, evidence (including examples) can not only provide support for reasons, but can also operate as a reason itself. You will remember the first argument in this chapter, about why 'golden rice' should be made available as soon as possible. In this the first reason was a piece of evidence.

170 million to 230 million children (and 20 million pregnant women) are vitamin A deficient.

Thus, when we're looking at the *function* of evidence (and examples) in arguments, we need to see whether it directly supports the conclusion or one of the reasons. If it is the former, then it is a reason itself.

Intermediate conclusions

There is another feature of argument-structure that we need to look at. Have a look at the next argument.

Recent studies have shown that exposure to sunlight reduces blood pressure. This is because the UV light releases nitric oxide from the skin which dilates the arteries and so reduces blood pressure. A lowering of blood pressure will lead to a lowering of the risk of heart attacks and strokes. Thus exposure to sunlight is good for our health. So people should ensure that they don't avoid this exposure.

Something interesting is happening here. You will no doubt have spotted the explanation in the second sentence. You will also have noticed some reasons. But there's something going on at the end of the argument that is different from what we've seen before. It would seem that we have two conclusions.

…*Thus* exposure to sunlight is good for our health. *So* people should ensure that they don't avoid this exposure.

The simple response is that there are indeed two conclusions. But how can that be? A conclusion, you were told earlier is '…where the argument is going, so to speak, where the argument ends up, its final destination. In the end, it's what the author of the argument has tried to show (whether or not it's persuasive).' So how can an author end up in two different places, have two final destinations?

What is happening in this argument is that the author uses two reasons to support the first conclusion and then goes on to use this conclusion as a *reason* to support a further one. The first part of the argument has this structure.

(R1) Recent studies have shown that exposure to sunlight reduces blood pressure. (Expln)This is because the UV light releases nitric oxide from the skin which dilates the arteries and so reduces blood pressure. (R2) A lowering of blood pressure will lead to a lowering of the risk of heart attacks and strokes. (C) Thus exposure to sunlight is good for our health.

The second part has this structure.

(R) Exposure to sunlight is good for our health. (C) So people should ensure that they don't avoid this exposure.

What is going on, then, when we have more than one conclusion, is that the author does indeed end an argument with one conclusion, but then goes on to use this end as the beginning of another one. Such conclusions used as reasons are referred to as **intermediate conclusions** to show that they are conclusions drawn *on the way* to the end of the argument. The very end of the argument is then described as the **main conclusion** (although it would be labelled simply as the 'conclusion').We can now label the above argument fully.

(R1) Recent studies have shown that exposure to sunlight reduces blood pressure. (Expln) This is because the UV light releases nitric oxide from the skin which dilates the arteries and so reduces blood pressure. (R2) A lowering of blood pressure will lead to a lowering of the risk of heart attacks and strokes. (IC) Thus exposure to sunlight is good for our health. (C) So people should ensure that they don't avoid this exposure.

You will have noticed that the first two reasons act jointly to support the intermediate conclusion, so the structure is this.

R1 + R2
↓
IC
↓
C

In the above argument, you will have seen that, though the explanation was labelled in the text, it did not appear in the diagram. This is because, in this argument, the explanation does not play a role in the

argument itself: it could be removed without the sequence of the argument being affected. We might say that it is useful to know the explanation but that would be all.

Just as there can be any number of reasons, so too can there be any number of intermediate conclusions. For example, the previous argument could have been continued.

…Thus exposure to sunlight is good for our health. So people should ensure that they don't avoid this exposure. Therefore they need to be told about these health benefits from being in the sun.

This would then labelled as

…(IC1) Thus exposure to sunlight is good for our health. (IC2) So people should ensure that they don't avoid this exposure. (C) Therefore they need to be told about these health benefits from being in the sun.

This argument would then be diagrammed as follows.

<u>R1 + R2</u>
↓
IC1
↓
IC2
↓
C

This very much shows that intermediate conclusions are conclusions that act as reasons. Of course, the argument could continue, with the main conclusion becoming a third intermediate conclusion.

…Thus exposure to sunlight is good for our health. So people should ensure that they don't avoid this exposure. Therefore they need to be told about these health benefits from being in the sun. It's clear that a public health campaign should be introduced as soon as possible.

Finding the structure of arguments exercise

Work out the structure of the following arguments, finding reasons and conclusions (of whatever type), and identify any other features.

(1) Food and drinks marketed for children by supermarkets are higher in fat, sugar, and salt and are lower in nutritional value than general food and drinks products. This will mean that the products for children will be much less healthy than general products. It's clear that parents shouldn't buy food and drinks marketed for children by supermarkets.

(2) There is a huge concern that we should change the way we live because of the issue of global warming. But we should stop being so obsessed with it, at both the governmental and the individual level. There is considerable evidence that, if global warming is taking place, it is at a much lower rate than was originally predicted. Policies to deal with the

supposed problem restrict energy use. Restricting energy use harms economic growth. Harming economic growth sacrifices present generations for unborn future ones. This sacrifice can't be justified.

(3) The retirement age should be raised to at least 72 (and preferably 75). Retirement, we hear, is something that should be looked forward to, because of its years of comfortable leisure. The evidence on the negative effects of retirement, however, contrasts strongly with this view. Retired people have a much higher level of reporting themselves as not having good health than those people who continue working beyond the retirement age. This includes having much higher rates of depression. There is considerable benefit in people working beyond the retirement age (at present, anything as low as between 60-65). There's the advantage of a higher income. Travelling to and from work can provide a useful source of exercise. In addition, work provides a good social network for many people.

Scene-setting

There's one more feature of arguments that we can note. Technically, this is not a feature of arguments themselves, but more one of passages in which arguments are found. Have a look at the next example.

There is a big debate as to how people who commit violent crimes should be dealt with. However, there is some recent evidence that suggests that punishment might well be wrong. Brain scans of not only psychopaths, serial killers, and murderers, but also of people convicted of much lesser offences show that 'criminals' can't necessarily control their behaviour, and that they can't learn from what we might see as previous mistakes. We must therefore approach people with such brains in a way that recognises that, in a real sense, they're not to blame for what they have done.

In this argument, though the word 'however' introduces the argument itself, the previous sentence is not a counter-claim or a counter-argument. As you can see, it doesn't take a position on the subject but merely introduces it. What we have here is what is called **scene-setting**. It is neutral with regard to the nature of the argument. We can contrast this with the following, in which a counter-argument is presented.

In some countries (especially the US), violent offenders are punished very severely (including the death penalty and life without parole, even for young offenders). This is because such punishments are seen as necessary in order to deter others from committing violent crimes. However, there is some recent evidence that suggests that punishment might well be wrong…

CHAPTER 5: SOME COMMON ISSUES WITH INFERENCE

We've so far looked at arguments in terms of what they're made up of. We've focused on the sequence of reasoning, in order to lay bare its structure. But critical thinking is concerned with much more than this. It is also very much concerned with looking at the *quality* of the argument. Think of it in terms of a dish that's been prepared for your lunch. You might want to know what's been put in the dish and how the ingredients have been prepared, but you very much (perhaps even more so) want to know what it tastes like. Put simply, the critical thinker is concerned with whether an argument is a good one or not. In doing this, we are centrally asking the question 'Does the conclusion (usefully) follow from the reasons?' If not, why not?

Deduction and induction

Look at the following simple argument.

Cats need to eat meat in order to live. Billy is a cat. So Billy needs to eat meat in order to live.

Though it isn't an argument that's going to set the world on fire, it is still an argument. As you can see, it's got two reasons and a conclusion. The two reasons operate jointly.

It's significant to note here that we can say, with confidence, that the conclusion is *drawn from* the reasons. In other words, in an important sense, the inference that is made is already contained in the two claims. It's not just that the two reasons act jointly, it's that this conclusion must follow from them. Given that cats must eat meat, and that Billy is a cat, then Billy must eat meat (not that perhaps he should, perhaps he'd like it, or such like). The claims might, of course, be questioned. Someone one counter-claim 'Cats don't need to eat meat in order to live' (and even that Billy isn't a cat), but we can say, with certainty, that, if the claims are indeed true, then the conclusion must also be true. (Our counter-claimer would have to allow that.) In arguments like this, we have what is called **implication**. The claims *imply* the conclusion drawn from them.

Let's look at a different argument about cats.

Cats make very good pets. Old people who live alone should have a pet. So old people who live alone should have a cat.

In this argument, though the conclusion is one that can be supported by the reasons, it does not *have* to be drawn from them: in contrast to the previous argument, the content of the reasons does not require the conclusion. This is because either or both of the reasons could be true, without the conclusion having to be drawn from them. For example, though the first reason could be true, so too could be 'dogs make very good pets', 'parrots make very good pets', and so on.

In the first argument, the first claim was a general claim about cats, with the second one about a specific cat (that his name is Billy). This enabled us to draw a conclusion about the specific cat. In the second argument, the first claim is again a general claim about cats, but the second one makes no reference to cats, therefore we cannot draw a required conclusion about them. (Similarly, the second reason is a claim about old people, who are not referred to in the first claim, with the same effect on the conclusion.)

The first argument is an example of what are called **deductive arguments**, in which the form of the argument requires a specific conclusion (and no other) to be drawn. The second argument is an example of what are called **inductive arguments**. In critical thinking, we are normally concerned with these inductive arguments. This is because most arguments we come across are like this. Arguments in newspapers, on TV, in adverts, in everyday discussions are not dealing with certainties but, at best, possibilities. This might not seem the case when we hear people like politicians arguing – 'This policy is the only way of solving the economic problems of the country' (when it isn't) or 'The figures tell us very clearly what we need to do' (when they don't).

Thus, when we look at an argument, we not only need to be clear about what is being argued for (the structure, including the assumptions). We also need to ask questions of the relationship between the reason(s) and the conclusion(s). This is where we're moving next.

Interpreting evidence in arguments

We'll start by focusing on evidence used in arguments. By evidence, we include examples, in that these are no more than specific instances of wider evidence. (And sometimes, the only evidence we might have is one example of something.)

As in Chapter 1, we're going to focus on the issue of the possible significance of evidence-claims. In an argument, someone will use evidence in such a way that it is taken to support their argument. In other words, they will present the evidence in terms of this given significance. Our task is very often to consider whether the evidence does (or, at least, might) have this significance.

Not surprisingly, we'll start with a piece of evidence.

In international league tables of alcohol consumption per person in different countries, South Africa is found around the middle. This shows that they don't have a serious alcohol problem.

The inference that's drawn from the evidence seems reasonable. But is it? Perhaps we need to know more before we can make that judgement. Here's some more evidence on South Africa.

Between 50 and 66 per cent of the South African population are teetotal (drink no alcohol).

Now we have something that makes us look at the original piece of evidence in a different light. Those in South Africa who do drink are anything from a half to a third of the population, so we need to look at overall consumption divided by the number in this group rather than the full population. When we do this, we find that South Africa moves up to fifth in the international league table. Its annual consumption is the equivalent of 35 litres of pure alcohol per head (twice as much as the UK, and more than twice as much as the US).

This evidence on South Africa provides a cautionary tale. It reminds us that we need to often look behind evidence that's used in arguments to see if the author's interpretation can be justified. Here's some more evidence. This is from a 2011 US study of 14-18-year-olds.

Drinking more than five cans of non-diet fizzy drinks a week increases levels of aggression. In a study in the US, only 23 per cent of those drinking only one can or no cans in a week carried a knife or a gun, but the figure was 43 per cent for those drinking fourteen or more cans.

As you can see, an argument has already been created, with the first sentence as an inference from the evidence. A further argument could then be created.

Since teenagers' levels of aggression increase, the more non-diet fizzy drinks they consume, we should look at restricting their intake of sugar and caffeine (both of which are found in these drinks).

But does the evidence on fizzy drinks have this significance? Might there not be another explanation (beyond the effect of sugar and/or caffeine) that would fit the evidence? In other words, might neither sugar nor caffeine (or both) be relevant here? (Or, if one of them is, which one is it?)

There is also the point that the evidence tells us no more than the difference between the two groups of teenagers in terms of the percentage who carried a knife or a gun. This is taken to be an indication of 'aggression'. But we don't know how many in each group *used* (rather than just carried) a knife or a gun. It could even be that the group who didn't drink many or any fizzy drinks were more aggressive with their knives and guns!

Further questions could be asked about the evidence. Does evidence from the US apply to other countries? (One thing that could be raised here is that the carrying of guns is much more prevalent in the US than in most other countries.) Is the same claimed aggressive effect found with other sources of sugar and caffeine? You could probably think of other questions.

As you can see, the possible significance of evidence is a very important area for us to investigate when evidence is used in an argument. However, sometimes claims are made as if they're based on evidence, when there is no such evidence. This is even though there needs to be some to support an inference that is made from the claim. Here's a notorious example.

We should drink at least two litres of water a day. So children at school should be required to bring water bottles with them to school.

Oddly, the controversial part of this argument is not so much the inference as the first claim. Where is the evidence for this claim? There appears to be none at all. In 1945, the US Food and Nutrition Board of the National Research Council recommended an intake of 2.5 litres daily, but (it would seem) there has been no research that shows that healthy people in a temperate climate not engaged in strenuous exercise need to drink two litres of water a day.

This example shows that we need to ask questions about both evidence and also claims that are presented as being evidence-based (because they might not be). Another good example is the following.

Sugar makes children hyperactive, so parents should avoid giving their children sugary drinks and treats.

The conclusion is based upon no more than an evidence-claim. Unfortunately for the argument, the evidence-claim is one that's not been supported by studies of children being given sugar. It's just one of those claims (like the one about water above) that's made so often that it's just taken to be true. (Oddly, what evidence there is suggests the exact opposite: in one study, 9-11-year-olds given glucose drinks were better able to concentrate and scored higher in memory tests.)

Thus, when we're faced with evidence in arguments, we need to ask two general questions of it and how it is used.

- Is the evidence-claim one that we can accept?
- If we accept the evidence, can we accept the author's use of it?

These two questions can then generate various sub-questions.

Is the evidence-claim one that we can accept?

- Where has the claim been reported?
- Is it a believable claim?
- Is it from a reliable source?
- How was the evidence collected?

Some of these questions will be looked at again later in this chapter.

If we accept the evidence, can we accept the author's use of it?

- Is the significance that the author gives the evidence one that we can accept?
- If not, what other significance might the evidence have?

Generalisation

One of the major issues about an author's use of evidence is that of relevance. We've already met this when we looked at the evidence on fizzy drinks.

Drinking more than five cans of non-diet fizzy drinks a week increases levels of aggression. In a study in the US, only 23 per cent of those drinking only one can or no cans in a week carried a knife or a gun, but the figure was 43 per cent for those drinking fourteen or more cans.

You will recall that a question we raised at the time was whether or not the evidence had a significance for countries beyond the US. We have here the issue of **generalisation**. When someone generalises, they are claiming that evidence of one specific context (or of some specific contexts) is (are) relevant to contexts beyond it (or them). The central question here is this: when is evidence in one context relevant to another context? (By context, we could mean historical time, country, gender, age-group, species, and so on.) It's a hugely important question, especially as so much argument involves generalisation.

Here's some evidence from 2011 that illustrates the issue of generalisation.

The children's TV programme SpongeBob SquarePants has been criticised for having a negative effect on young children's thinking and behaviour. In a US study, 60 four-year-olds were observed after watching nine minutes of SpongeBob, nine minutes of an educational cartoon 'Caillou', and nine minutes of drawing. There was no difference between the children's behaviour after Caillou and drawing. But after watching SpongeBob the children were less able to pay attention, solve problems, and control their behaviour. The American Academy of Pediatrics has used this evidence to argue that parents should restrict the amount of TV that their young children watch.

There are at least four generalisations going on here:

- from this group of sixty four-year-olds to 'young children' generally;
- from four-year-olds to 'young children';
- from watching nine minutes of SpongeBob to TV programmes generally;
- from the SpongeBob programme to TV programmes generally.

Not surprisingly, the makers of SpongeBob SquarePants, Nickleodeon, reject the given significance of the findings. They focus on what they see as two central problems of generalisation. The first is, as above, that of using evidence of watching only nine minutes of the programme such that this evidence 'would not provide the basis for any valid findings that parents could trust'. They make the further point about the problem of generalising from a study of four-year-olds, given that (they claim) SpongeBob is targeted at children between six and eleven.

Interestingly, this evidence also involves an explanation. Those who did the study suggested that the effects of SpongeBob could be due to the fast-moving action of the cartoon in which the characters are all the time moving from one thing to another. There was also the issue that children's ability to concentrate was diminished after watching a programme in which the characters do things that don't make much sense in the real world. If these explanations are accepted, we would presumably have to look at the possibilities of generalising to other cartoons (and fantasy games) which have similar characteristics.

As we can see, the evaluation of this evidence requires that we ask questions of whether we can usefully generalise from it.

- Can this study be used to generalise to a recommendation about all TV-watching for young children?
- Can we usefully generalise from a group of four-year-olds to younger (and older) children?
- Can we usefully generalise from SpongeBob SquarePants to other fast-moving, fantasy-based entertainments (programmes and games)?
- Can we usefully generalise from a US study of four-year-olds to the same group in other countries?

After all this talk of issues with generalisation, it needs to be remembered that generalisation in itself is not necessarily a problem. Look at the next argument.

If we look at the prices for work by post-1945 male and female artists, we find a very clear difference. This is that the price of work by male artists has been consistently and noticeably higher than that by female artists. For example, the top ten art works (by price) by male artists go from a piece by Mark Rothko (at $86,882,496) to one by Jeff Koons (at $25,765,204). However, the top ten (by price) by female artists go from a piece by Louise Bourgeois (at $10,722,500) to one by Lee Krasner (at $3,177,000). It is clear that people who have art work by famous post-1945 artists will make much more money if they have work by male rather than female artists.

The conclusion of this argument seems pretty reasonable, given the striking difference in price between male and female artists. But, of course, a generalisation is being made here, from the past (and present) to the future. It might be that something will make this generalisation a less useful one but, until then, we would see it as providing support for the conclusion.

Interestingly, this example highlights how generalisations used in arguments involve assumptions. The conclusion is supported by the evidence only if the author believes that past sales of modern artists are a reliable guide to the future (or, at least, the immediate future). This is not stated but must be

accepted by the author. As you can see, without this assumption, the argument doesn't work. Try the negative test to see why.

This point about assumptions and generalisations comes up frequently. As with the previous argument, predictions have to rely on an assumption that the relevant aspects of the past and/or the present are a reliable guide to the future. In addition, studies that involve the use of a sample of a wider group (people, dogs, moon rocks, or whatever) must make the assumption that the sample is sufficiently similar to the wider group. We sometimes take these assumptions as given, without thinking critically about them. Here's an example.

The 1997 film 'Titanic' shows the ship's officers seeking to enforce the captain's instruction of 'women and children first' in the evacuation of the ship. We take it that this was normal procedure when a ship was sinking. However, in a 2012 study of maritime disasters between 1852 and 2011, the Titanic was shown to be unusual in having this order made by the captain. Of the 18 disasters, only five (one of which was Titanic) were evacuated using the order of 'women and children first'.

This example shows that we need to be careful of assuming that particular evidence is sufficiently typical of the wider picture. Thus it is what is called **over-generalisation** that is a source of weakness in reasoning. As the name indicates, it is when the significance of an evidence-claim is taken further than is reasonable that we see a problem. We can put this another way: the problem of over-generalisation is one of relevance. When evidence is used in a way that it is over-generalised, we can say that the evidence is not sufficiently relevant to the inference that's drawn from it. (It might, of course, be relevant to a different inference: this could be one where the scope of the inference is less big.)

Issues of correlation and causation

There's another important area of evaluation that comes out of this issue of relevance. Let's look again at the earlier argument about fizzy drinks.

Drinking more than five cans of non-diet fizzy drinks a week increases levels of aggression. In a study in the US, only 23 per cent of those drinking only one can or no cans in a week carried a knife or a gun, but the figure was 43 per cent for those drinking fourteen or more cans.

When we evaluated this before, we asked some questions about the possible significance of the evidence used. One of the issues was to do with explanation. What is the relationship between the consumption of fizzy drinks and the carrying of knives and guns? In this version of the argument, the author has taken it that drinking non-diet fizzy drinks in some way 'increases levels of aggression'. In other words, we're looking at the issue of causation.

More specifically, we're looking at the relationship between correlation and causation. If two things are positively correlated, they increase or decrease (or do neither) together. Similarly, if they're negatively correlated, as one thing increases, the other decreases. Here is an example.

A 2013 study shows that the longer that people spend on Facebook, the more unhappy and lonely they feel. So to stop themselves feeling unhappy and lonely, people should spend little time on Facebook.

In this argument, the evidence of the 2013 study is taken to show that spending time on Facebook (beyond a certain amount of time) *causes* feelings of unhappiness and loneliness. This might well be

the case, but importantly perhaps it isn't. It could be that the correlation could be interpreted the other way round, such that lonely and unhappy people spend a lot of time on Facebook. (Incidentally, not forgetting the issue of generalisation, the study was carried out with 82 young people. Is this enough in order to be able to usefully generalise to all the many millions of Facebook users?)

The relationship between things that are correlated (whether positively or negatively) is something that is of considerable interest in critical thinking. This is because so many arguments include evidence that is used to present not just a correlation but also a causal relationship. Here's an example.

Suicide in Britain fell by 40 per cent between 1963 and 1975. This was because of the phasing out of carbon monoxide in the domestic gas supply. So, if we want to lower the suicide rate, we should seek to reduce the opportunities for people to kill themselves. (An example could be to prevent easy access to the electric track of underground trains.)

In this example, two things are positively correlated (the decline in the suicide rate and the phasing out of carbon monoxide). Furthermore, the second is seen as the cause of the first, and inference is drawn from this (assumed) causal relationship. Now it might seem that the conclusion is pretty straightforward. But it needs to be noted that, in this argument, it is drawn from no more than this assumed causal relationship. We could respond by suggesting that the decline in the suicide rate between 1963 and 1975, though positively correlated with the phasing out of carbon monoxide, was not actually caused by it. There might have been other factors such as changes in social conditions, the increase in young people going to university, the availability of the contraceptive pill (so reducing the worries about unwanted pregnancy), changes to the divorce law (making it easier), the increased availability of television, and so on. Put simply, perhaps people were less unhappy.

This example nicely illustrates the point that, just because there is a positive correlation between two things, it does not mean that there must be a causal relationship between them. A further example also uses evidence on suicide. In 1960, the then US President, Eisenhower, argued that there was something significant in the fact that Sweden had both extensive welfare services and a high suicide rate. He saw the first as the cause of the second (by, for example, taking away people's initiative). Though the Swedish suicide rate was indeed relatively high, it had been declining in the 1950s (during the time of the setting up of extensive welfare services), a point ignored by President Eisenhower. Here we have a simple case of taking correlation to mean causation. However, not only did Eisenhower distort the significance of the evidence on the suicide rate (by not mentioning the decline in the rate), he also ignored the possibility of other explanations for the suicide rate. It could even be that the welfare services helped to reduce the suicide rate (by, for example, keeping people out of poverty and reducing the level of poor health). (Incidentally, the Swedish suicide rate continued to decline and is now lower than that of the US, perhaps showing that a lack of widespread welfare services is a cause of higher suicide rates?)

At this stage, it's useful to disentangle the various ways that the correlation-causation issue appears in critical thinking. The first is illustrated by the following.

As the unemployment rate goes up, so too does the level of property crime. It's clear that unemployment is a cause of property crime.

This short argument is an example of when the occurrence of one thing is taken to be, at the same time, the cause of another. In other words, unemployment simultaneously causes property crime. This is known by the Latin term ***cum hoc***, which translates as 'with this'. (The full term is *cum hoc, ergo propter hoc*, meaning 'with/at the same time as this, therefore because of this'.) In this example, we have 'with the increase in unemployment comes an increase in property crime'. (Incidentally, we'll be

using various other Latin terms. That we use them is an indication of the fact that critical thinking has, through logic, a very long history.)

Cum hoc arguments need to be approached in the same way as any other correlation-causation reasoning. Just because property crime goes up at the same time as unemployment increases doesn't have to mean there is an established causal link going in one direction. For example, perhaps an increase in property crime contributes to an increase in unemployment. Businesses could be being burgled (and shops could be losing stock because of shoplifters), causing the loss of stock. This has an economic impact on them (perhaps including having to pay higher insurance payments), so they have to lay staff off, so increasing unemployment. This increase in unemployment could then, as in the original version of the argument, lead to more people stealing in order to pay their bills, leading to… We can see how *cum hoc* arguments rely on causation going one way (A causes B) but they can be seen as B causes A, A and B are causes of each other, and though A and B are correlated, there is no causal relationship between them. This last one will reappear below.

Here's a second version of the correlation-causation issue.

Of those high school students getting mostly As in their work, only 32 per cent had been involved in a sexual relationship, compared to 69 per cent for those getting Ds, Es, and Fs. The A students were also much less likely to drink alcohol. It's clear that abstinence is part of what's needed for students to get good grades.

Here we have evidence from a 2011 US study being used to argue that abstinence is a cause of a student getting good grades. This is a little different from the *cum hoc* type of argument. This one is a ***post hoc*** argument. The term *post hoc* means 'after this'. The full name (as with *cum hoc*) is *post hoc ergo propter hoc* which means 'after this, therefore because of this'. As with *cum hoc* arguments, a correlation is seen as a causal relationship, going one way: A causes B.

In the above example, can it be clear that students' grades are caused (in part) by abstinence? Once again, we could reverse the possible causation. It could be that students who want good grades want to focus on their work so don't drink alcohol or have a sexual relationship. In this version, the good grades and abstinence are both caused by another factor. Perhaps students getting good grades are more intelligent than those who don't, with intelligence being correlated with abstinence. Perhaps students who get good grades are more likely to be in single-sex schools with a strong anti-alcohol policy. And so on.

As we can see, we have to be on alert for these correlation-as-causation arguments. All sorts of things could be correlated without there being any necessary causal link between them. Look at another example.

In 1965, Australia consumed 52.3 kg of cane sugar per person (with an additional 2.7 kg of non-sugar sweeteners). Obesity and diabetes were at a low level. Now Australia consumes 39.6 kg of cane sugar per person per year (with an additional 8 kg of sweeteners), and the rate of both obesity and diabetes have significantly increased.

Do we infer from this evidence that cutting back on sugar causes an increase in the rate of obesity and diabetes? The correlation would certainly support this inference. However, such an inference ignores other possible explanations. Perhaps Australians simply eat more, so have a much higher calorific intake. Perhaps they take less exercise. Perhaps increasing the consumption of sweeteners is the problem. Perhaps it is all of these explanations acting together.

There is another point that we need to consider. It could be that, on occasions, a correlation does indicate causation. Indeed, we would not be able to make much sense of the world if this was not the case. We can see a correlation between people drinking alcohol very heavily and feeling ill the next day. In this situation, we would be happy to see the correlation as also indicating a justifiable *post hoc* relationship. We could also see a justifiable *post hoc* relationship between a serious accident on a road and traffic delays that followed it.

Here's an odd correlation-causation example. What do you make of it?

The English Premier League footballer, Jermaine Defoe, was once asked by a journalist why he had had all his hair cut off. 'I had to,' Defoe explained. 'I only ever seem to get injured when I have longer hair.'

Though, as critical thinkers, we might want to dismiss Defoe's explanation as indicating nothing but irrational thinking, the correlation between hair and injury might have some causal element in it. Perhaps, given that he had had been injured only when he had hair, he had started to play differently without it (having confidence that he wouldn't get injured now that he had none), and this different style of play led to him not being injured. As you can see, we have another example of needing to look at the significance of claims.

Credibility of evidence

We have so far looked at claims in terms of what significance has been given to them. More specifically, we've been looking at this question.

Does claim x mean that claim y can be drawn from it?

Though we have raised some questions about the significance of claims, there are some further questions that we sometimes need to ask about evidence-claims. These are credibility questions.

But what if we need to ask questions about claim *x* itself, because we're not entirely sure that it's accurate? Asking questions about the claim itself gets us into the area of credibility. To what extent is an evidence-claim credible (believable)? There are various criteria that we can use to judge credibility, to judge whether or not there is (for whatever reason) some bias present.

Motive

The first of these is **motive**. Somebody or some organisation could have a motive to present evidence in such a way that their position is accepted or strengthened (or, and it need not be the same thing, that the other side is weakened). An example would be a company advertising a product that they claim is better than that of (one of) their rivals. Another example would be a defendant in a court of law having a motive to present their evidence in such a way that is favourable to them. In addition, of course, there could be a motive to tell the truth. Perhaps the person or organisation values truth-telling and/or has a reputation for it; perhaps they fear the consequences of not telling the truth (such as the penalty for perjury – lying under oath – in a court of law).

Vested interest

This criterion of motive could be seen in some of these situations as one of **vested interest**. Telling or not telling the truth could, as we have seen, be of benefit (the 'vested interest') to people and organisations. This vested interest can be seen as getting in the way of the truth (or, if the truth is

being told, of reinforcing the judgement that the claims are true). The novelist H G Wells once said that 'advertising is legalised lying'. Though this is an exaggeration, it does point to the possible issue of the vested interest in a company's claims in its adverts. For example, what are called 'price comparison sites' that claim to show the best deals in such areas as insurance and credit cards are often owned by a company whose 'price' is, as result, compared favourably. In addition, insurance companies, for example, will sometimes give a false impression of the real cost of their policies by giving a low price based on all sorts of exclusions.

Expertise

Another relevant criterion is **expertise**. Does the source of the evidence have particular knowledge, training, and experience in the relevant area? For example, if the evidence is medical evidence (on, say, the value of a specific treatment), then we are likely to value this evidence more highly if it has come from someone or an organisation with the right medical credentials. However, there are times when the criteria can conflict with each other.

Dr Andrew Wakefield wrote a study in 1998 in which he claimed that his research showed that there was a link between the MMR vaccine given to young children and the development of autism in children. Following the publication of the study, thousands of parents refused to consent to their children being given the MMR vaccine. However, it was subsequently shown that Wakefield had been funded by lawyers who represented parents trying to claim that the vaccine had caused their children's autism.

In this example, it was judged that there was a significant problem in Wakefield's research such that the significance of his medical expertise was reduced by his vested interest in showing a link between the MMR vaccine and autism. (The possibility of such a link is now widely rejected.)

Look at the next argument.

Recent research by the Woods Hole Oceanographic Institution in Massachusetts has shown that we can answer the question of what whales eat in a very simple way. This is to examine their faeces and look at what DNA it contains. This shows that the Japanese government's claim that their whale-hunting programme is necessary in order to find out what whales eat is simply not true. It's done in order to put whalemeat on Japanese plates. Thus the Japanese whaling programme should be strongly opposed.

In judging the evidence presented in this argument, we have to consider the expertise of the Woods Hole Oceanographic Institution (WHOI) in Massachusetts. A check on their website tells us that it is 'the largest non-profit oceanographic institution in the world.' We also learn that it's been going for almost eighty years. So the evidence-claims from the WHOI should be based on considerable expertise. So the argument looks to be a useful one.

Sufficient access/ability to perceive

Furthermore, this example also provides support for another criterion. This is the **ability to perceive**. (This can also usefully be seen as 'sufficient access'.) An individual or individuals that have the ability to perceive can see or hear or feel or smell what is being considered, given that they have sufficient access to it. (Of course, this need not involve people directly observing etc. the event: it could be a

CCTV camera or other such recording device.) The evidence of those who have sufficient access will normally be seen as, at least, relevant to coming to a judgement. In the case of the WHOI research, we would say that its expert evidence also has the significant benefit of the researchers' ability to perceive.

Of course, thinking back to the discredited Wakefield research on autism, here we have an example in which sufficient access (and, in this case, expertise) is seen as being trumped by vested interest. Another example would be the issue of the use of chemical weapons in Syria in September 2013. Though the Syrian government claimed that it did not use such weapons, evidence from United Nations inspectors pointed to the judgement that it had done. Here we have the criteria of the ability to perceive and expertise strengthening the case against the Syrian government, whose own case is strengthened by their ability to perceive but very seriously weakened by obvious vested interest.

Neutrality

It's clear that the ideal source of evidence-claims should be those with no bias from vested interest. This would bring in the criterion of **neutrality**. For example, though we would hope that scientific evidence was based on neutrality, we might worry about possible bias when this evidence is carried out by cosmetic companies or drug companies. Even if the evidence itself is collected without bias, it could be that it is presented in a selective way by ignoring that which doesn't support a particular (favoured) position.

This cherry-picking of evidence is a frequent issue in arguments generally and, no doubt, we're all guilty of it. Picking the evidence that supports our existing position and rejecting that which doesn't (or interpreting it to make it 'fit') is done to enable us to confirm our beliefs. Just test this out with some evidence that doesn't support your position on something you believe in.

When we're looking at the believability of any evidence, we're asking questions about meaning.

- What meaning has been given to this evidence?
- What other meaning might it have?
- Is the source of the evidence significant?
- Would a different source give the evidence a different meaning?
- Is one criterion of credibility more significant than others?

Looking at the use of evidence in arguments exercise

(1) In 1971, during the Vietnam War, the US engaged in Operation Popeye against their enemy North Vietnam. This operation was an experiment designed to alter the weather over North Vietnam, by significantly increasing rainfall in order to create problems for the enemy's supply lines through flooding. The method was simple. Having used satellite photographs to find weather systems with the potential for heavy rain, the US then used aircraft to drop silver iodide crystals into the atmosphere to encourage the formation of water droplets. Heavy rain and unexpectedly severe typhoons subsequently devastated North Vietnam. Given this ability to control the weather, we should encourage its use for peaceful purposes, such as creating rainfall in some areas affected by drought.

Which one of the following is the best statement of the weakness in the above argument?

(A) The ability to control the weather could be used again for military purposes.

(B) Not all areas affected by drought, such as desert regions, would benefit from rainfall.

(C) The scientific knowledge about weather-creation might be much greater now than it was in 1971.

(D) The heavy rain and severe typhoons experienced by North Vietnam in 1971 could have occurred without the US action.

(E) Reducing rainfall in areas suffering from flooding could be at least as valuable as creating it in areas suffering from drought.

(2) If people who claim to have been abducted by aliens really have been abducted, then we would need to take reports of UFO sightings very seriously. However, such claims are very suspect. There are many possible explanations for such apparent abductions ranging from obvious untruthfulness on the part of those claiming abduction to hallucinations and temporary paralysis. Given that we can explain these apparent abductions in ways that do not involve aliens, we do not need to take reports of UFO sightings seriously.

Which one of the following is the best statement of the weakness in the above argument?

(A) Reports of UFO sightings rarely also include reports of apparent abductions by aliens.

(B) The explanations for apparent abductions by aliens are not accepted by those who claim to have been abducted.

(C) People who suffer hallucinations and temporary paralysis do not often claim that they have been abducted by aliens.

(D) Explanations for apparent abductions by aliens are not normally used to also explain reports of UFO sightings.

(E) Explanations for apparent abductions by aliens are insufficient evidence to dismiss the significance of UFO sightings.

(3) Each year about 100 million sharks are killed by fishing nets, causing many species of shark to be endangered. Populations of some species are lower than 20 per cent of the figure for the 1970s. It is odd then we have seen an increase in the recorded number of unprovoked shark attacks on humans. The increase has happened at the same time that the practice of shark-watching dives has developed. In these dives, a mixture of meat and blood (called 'chum') is thrown into the sea to attract sharks. As a result, sharks associate people with food. Such dives should be discouraged if we are to reverse this increasing risk of unprovoked attacks by sharks.

Which one of the following is the best statement of the weakness in the above argument?

(A) Some species of shark are more dangerous than others.

(B) Sharks can be attracted by other means than using the mixture called 'chum'.

(C) The monitoring of shark attacks on people has increased over recent years.

(D) People who go surfing are the most likely group to be attacked by sharks.

(E) The risk of being attacked by sharks is lower than many other risks that people face in the sea.

(4) The outstanding success of Adam's company, which was launched against the advice, and without the support, of bankers, business consultants, and financiers, just goes to show that one person's vision can prove all the experts in the world wrong. Anyone thinking of setting up a business, therefore, should trust their own judgement, and not be influenced by the advice of others.

Which one of the following is the best statement of the weakness in the above argument?

(A) It takes Adam's company as a typical example of all such companies.

(B) It claims that bankers, business consultants, and financiers don't know what they're talking about.

(C) It claims that Adam would have been less successful if the experts had given him their support.

(D) It fails to tell us whether Adam had any business experience before launching the company.

(E) It suggests that to be successful in life you have to go into business.

(5) Read the following argument, and consider whether the evidence given enables the author to draw their conclusion. In doing so, consider the issue of generalisation, of alternative explanations, of correlation and causation, and also consider what assumptions the author will be making.

It's often argued that it is a good thing to allow older children (those between the ages of 12-15) to have a small glass of wine with their dinner at family meals. This argument claims that the 'Mediterranean way' of doing things (like in Italy, Spain, and France) ensures that children develop a healthy attitude to alcohol, seeing it as something to be enjoyed sensibly.

But this argument doesn't stand up to recent evidence. In a joint US-Australian study*, almost two thousand 12-13 year-olds were studied. Those in the US were in Washington State, a state that recommended parents use a zero-tolerance policy towards this age-group drinking. Those in Australia were from Victoria, a state that used a 'harm-minimization' policy which sees alcohol as part of normal adolescent development and thus encourages parents to supervise their children's drinking as a way of promoting responsible drinking.

After one year almost twice as many of the Australian teenagers (67 per cent) had drunk alcohol in the presence of an adult than had those in the US group (35 per cent). The study also looked at what it called 'alcohol-related consequences' (including vomiting, passing out, and fighting). After a further year, it was found that 36 per cent of the Australians had experienced these consequences, compared to only 21 per cent of the Americans.

It is clear from this study that the policy of 'harm-minimization' doesn't work. So adults should adopt a strict zero-tolerance approach to alcohol with younger teenagers.

*'Influence of family factors and supervised alcohol use on adolescent alcohol use and harms: similarities between youth in different alcohol policy contexts', *Journal of Studies on Alcohol and Drugs*, Vol. 72, issue 3, May 2011

CHAPTER 6: FLAWS IN ARGUMENTS

In the previous chapter, we saw how the way in which evidence used in arguments can be a source of weakness. The central issue in an argument that has a weakness is that the reason is or the reasons are insufficient for the conclusion that has been drawn. A simple way of describing this is to use a word from banking. If we take out more money than we've got in our bank account, then we are 'overdrawn'. Similarly, then, if the conclusion is drawn such that it needs more than the reasons can support, then we can say that the conclusion is 'overdrawn'.

In the previous chapter, we looked at the difference between deductive and inductive reasoning. You will remember that, in deductive arguments, conclusions are not overdrawn in that they do not go further than the reasons already contain. Inductive arguments cannot provide this certainty and so need to be judged differently. At most we can say that a conclusion is, given the reasoning, probably true. So, with inductive reasoning, there are degrees of the conclusion being overdrawn. We have already seen how over-generalisation and inappropriate correlation-as-causation (*post hoc* and *cum hoc*) can be sources of conclusions being overdrawn.

In this chapter, we're going to look at more types of overdrawn arguments. We've referred so far to 'weaknesses' in arguments. Such weaknesses can also be described as **flaws** in arguments. (The word 'flaw' is used in many contexts to mean, as here, a defect.)

Slippery slopes

The first of such flaws is a further example (like over-generalisation and inappropriate correlation-as-causation) of overdrawn arguments in which the reasoning is inadequate. Look at the next argument.

If we give money to people begging in the street, then we will not only encourage them to continue begging, but we will also encourage those on low wages to do the same. 'Why should we work?' these others will say, when they see beggars with their tins full of money. Then, as these people take up begging, further people will wonder why they're working for their money. In the end, thousands of people will leave their jobs in order to sit on the streets and beg. The economy will suffer, and vital services will be under threat. It's obvious that, to prevent serious economic decline, people should not give any money to beggars.

As you can see, this argument consists of a series of steps or shifts in the reasoning. It is important in evaluating it that we consider each of these steps. Here's the first.

If we give money to people begging in the street, then we will not only encourage them to continue begging, but we will also encourage those on low wages to do the same. 'Why should we work?' these others will say, when they see beggars with their tins full of money.

Does this follow? Does giving to people who are begging have this consequence for those on low wages? It might be that one can say that giving money encourages beggars to keep begging, but it is not obvious that there is a *necessary* consequence for those on low wages. Given that this first step can be challenged, the next step ('further people will wonder why they're working for their money…') can't be taken. But, even if it could, there's nothing inevitable about the one after that ('The economy will suffer, and vital services will be under threat.').

You can see why this sort of argument is called a **slippery slope** argument. The author of such an argument seeks to take us step by step to a situation which is often extreme (or, as we might think, absurd). The point of doing this is to seek to persuade us not to take the first step. The 'logic' (note the inverted commas) of the argument is meant to be that, once you take the first step, then steps two, three, four…are inevitable, so that first step should not be taken.

Here's another one.

If we don't punish young offenders very severely for minor crimes (such as small thefts from shops), then they'll end up committing bigger crimes (like burglary and street-robbery). They'll then move on to be more and more violent such that committing murder will become for them the norm. So young offenders should always be sent to prison for at least two years and made to suffer a very unpleasant regime whilst they're there.

As with the previous example, the first step isn't necessarily one that we have to agree to. Perhaps it isn't the case that young people who commit minor crimes will go on to commit much more serious crimes if they're not sternly punished. (The evidence, in fact, indicates that most young offenders grow out of offending – so to speak – such that by their early twenties they've stopped committing offences.)

The central problem with slippery slope arguments is that though the author argues that step one *requires* step two, which *requires* step three, and so on, the steps are not necessarily required. In other words, the slippery slope that the author says we will be on if we take that first step is not one at all. We don't have to head down it at all. Step one might have a very different step two, and so on.

This is not to say that all arguments that involve such stepped reasoning lead to unjustified extremes. Such reasoning is often used in arguments about international affairs. Here's an example.

If North Korea is not stopped from acquiring nuclear weapons, then Iran will seek to acquire them. If Iran were to have nuclear weapons, then Saudi Arabia will want to have them in order to protect itself from possible attack from Iran. This will then lead to many other countries wanting to have nuclear weapons to protect themselves from possible attacks (as well as to threaten other countries). So we should ensure that North Korea doesn't acquire nuclear weapons.

This is a familiar argument and it might be that the steps in it are more justifiable than in the previous two. Whether or not this is the case, you can see that some slippery slope arguments are less problematic than others. In evaluating them, we need to look at the steps that make up the argument and judge whether they are required (or even likely).

Straw man

A different flaw can be found in the next argument.

Animal rights campaigners say that animals should never be used for any type of research. But we need to use animals in developing new and better pet foods: how can we know what foods cats or dogs like best if we're not allowed to involve them in experiments on pet nutrition? It's obvious that the animal rights campaigners' case is fundamentally flawed.

The central problem in this argument, as you might have seen, is that the description of the animal rights campaigners' position is not an accurate one. They are opposed to experiments in which animals are caused pain and distress including being operated on without anaesthetic in experiments to test cosmetics, household cleaners, and drugs. They would not be opposed to 'experiments' in which pet dogs and cats are given new foods to try to see if they liked them.

In this argument, we have what is called a **straw man**. This type of argument presents the opponent's position in a *deliberately* weak form. This is done in order to be able to knock it down with ease, hence the term 'straw man'. Because of the deliberate distortion of the opponent's position, this weakness can be seen as an example of more than inadequate evidence. Given that it misrepresents the opponent's position, it is more accurately an example of *irrelevant* evidence: the opponent's position is not as it is described, so the description is straightforwardly irrelevant.

Be careful, however, of seeing a straw man when there isn't one.

In the 1950s, there was a group (called the Seekers) who believed that their leader (Dorothy Martin) had received messages from the planet 'Clarion' announcing that the world would end on 21 December 1954. The people in the group, however, would be saved by the arrival of a flying saucer that would rescue them. Having given up jobs and possessions (and sometimes left spouses), they waited for the arrival of the craft to take them to Clarion. As we know, the world did not end on that day, and the announcements of Dorothy Martin were obvious nonsense. So we should always be very suspicious of those who believe that some entity or other is going to come to save them from the Earth's destruction.

In this example, the description of the belief of the Seekers might seem an unbelievable one. Surely people would not believe such things? But it's a real example. It was made famous by the work of the social psychologist Leon Festinger. He looked at how the people in the cult dealt with the survival of the world and the non-arrival of the craft from Clarion. Dorothy Martin explained that she had received a message from Clarion just before the deadline saying that the God of Earth had been so impressed by the goodness of the Seekers that he had decided to spare Earth from its end. Here we have an example of what Festinger called 'the reduction of cognitive dissonance': the followers of Dorothy Martin dealt with the problem of the prophecy being simply wrong by interpreting it in another way.

In the above argument about the Seekers, as we have seen, there is no straw man problem, given that information is not being presented in a deliberately distorted way in order to show weakness. However, there is a (possible) weakness. This is that the author (perhaps) over-generalises from the Seekers to all 'those who believe that some entity or other is going to come to save them from the Earth's destruction'. But some of you would think that the author's conclusion is entirely reasonable.

Ad hoc

The account of the Seekers illustrates another potential weakness in argument. In this example, Dorothy Martin's explanation of why her prophecy turned out to be wrong (Festinger's book was called 'When Prophecy Fails') is one that was used to respond to the simple facts that the Earth did not end and the spacecraft from Clarion didn't arrive. This is an example of an ***ad hoc*** argument. (The words *ad hoc* mean 'to this': the specific argument is addressed to what is otherwise a problem in a position.) Such *ad hoc* arguments are often used in astrology or other dubious attempts at prediction: 'this didn't happen as I had predicted because of other factors…'. Of course, *ad hoc* arguments might

not necessarily be an indication of a weakness, just an indication of lack of knowledge. An example would be Alfred Wegener's theory of continental drift. He proposed this theory at the beginning of the twentieth century but could not explain why land masses moved. Various *ad hoc* explanations were suggested without being the correct one.

Ad hominem

From straw men and *ad hoc* arguments, we can move to another type of argument that has the problem of relevance. Look at the next example.

The people who demonstrate against the live exports of animals say that this trade always involves great cruelty. This is clearly not true. These people are just intent on stopping a lawful trade, if necessary by acting illegally and sometimes violently. They can't have any regard for the law and their behaviour is just like that of hooligans and criminals.

In this argument, that which is argued for is 'it is not true that the trade in live export of animals involves great cruelty.' (The second sentence is the shorthand version of this.) But, instead of providing reasoning to support this conclusion, the author attacks the character and motives of the people who hold the position being attacked. As you can see, *even if the accusations were true*, the argument does not work: there is no reasoning to support it, no reasoning to show that the live export trade does not involve great cruelty. If the arguer wanted to attack this position, they would have to do something like the following.

It is not true that the live export trade always involves great cruelty. In many cases, animals are monitored by vets, ensuring that the animals' welfare is given appropriate consideration. The animals are given frequent rests.....

In this type of weakness, the irrelevance comes not from (we take it) a misrepresentation of the opponent's position, but by the way the opponent, rather than their argument is attacked. This is known by another Latin name ***argumentum ad hominem*** (or just *ad hominem*). This means 'argument at/to the man' or, in simple terms, 'attacking the arguer, not the argument'. You can see why.

Ad hominem arguments are not uncommon. They could be used in a court by a lawyer seeking to show that a witness's evidence is unreliable because the witness can be seen as not having a good character. They are used by politicians to attack each other rather than their arguments.

This is not to say that all information about someone is irrelevant in an argument.

Of all the people who have applied for the job of Head of Nursing Care, Mrs Imelda Grinn must be the last we should think of appointing. In her previous post, she had to be disciplined on a number of occasions for ill-treating the old people in her care, including two occasions when she tied patients to their chair. She has also lied about her nursing qualifications.

In this example, the evidence of Mrs Grinn's cruelty and deception is relevant to (and probably adequate for) the conclusion that she should not be given the job of Head of Nursing Care. The reasons are being used to reject an argument Mrs Grinn is, in a sense putting forward ('I am the best candidate for this job'), and they are relevant to a rejection of this argument. If, on the other hand, we were to use the same reasons to attack a different argument of hers, we might be guilty of attacking her rather than her argument.

Mrs Imelda Grinn says that, since the number of old people is going to grow enormously over the next twenty years, the present system of residential care will have to change. This can't be true. If you think of her record in caring for old people in residential care, it is so bad that anything she says about the subject must be suspect.

In this example, Mrs Grinn's argument that the system of residential care for old people will have to change because of the pressure of numbers is not dealt with at all. Her poor record of care is irrelevant to this argument.

Look at the three arguments in the following exercise and work out whether or not they are weak, that is whether they *unjustifiably* use an *ad hominem* argument.

Attacking the arguer not the argument exercise

(1) The Chief Executive of the Council, Mr Tom Busby, has recommended to the Council that the contract for the building of the new shopping centre should go to AB Construction, since they do the best job. However, since AB Construction is owned by Arthur Busby, the Chief Executive's brother, we should question whether his judgement has been coloured by his personal link with the company. Therefore, his recommendation should not be accepted until the Council has been able to look at all the other bids for this job.

(2) Mary Seacroft, the leader of the Progressive Party, has been calling for the return of corporal punishment in schools. Unless we bring back the cane, she argues, children won't learn self-discipline and respect for others. However, her own children are hardly good examples of how to behave. Her daughter Zelda has been convicted of possessing illegal drugs, and her son Jake has been fined for careless driving. Her argument in favour of bringing back the cane looks very shaky when all the facts are known.

(3) The organisation Men Against Divorce (MAD) has opposed the present proposals on the reform of the divorce laws as failing to provide ways of keeping couples together. But MAD - how well that title fits - has attacked all other proposals on divorce reform, so we shouldn't seek to change the reform proposals in order to fit in with their demands.

Tu quoque

Yet another example of a weakness due to irrelevance is found in the next argument.

When Charles Black was accused of driving at 105 mph, and of driving without due care and attention (he was using his mobile phone at the time), he told the court that thousands of people broke the speed limit every day and also he'd seen thousands of people using a phone while they were driving. So, he argued, the case against him should be dropped.

The argument used by Charles Black is a simple one.

I am accused of speeding and using a phone while driving. Many other people do these things. Therefore the case against me should be dropped.

As we can see, the only reason used in support of his conclusion is that 'many other people do these things'. It might be unlucky for him that he has been caught and others haven't, but the claim that others are doing what he's been accused of does not enable him to say that the case against him 'should be dropped'. He has not disputed what he's been accused of. This type of argument also has a Latin name: ***tu quoque***. This is pronounced 'tew kwokway' and it translates simply as 'you too' or 'you also'. It is often presented to mean 'others too', and you can see how this term fits with the Charles Black argument: 'you accuse me of *x*, but others do *x*, so I should not be punished for doing *x*.'

We can see that *tu quoque* arguments can be seen in simple terms as 'two wrongs do make a right'. The objection that two wrongs *don't* make a right is the familiar response to such reasoning. Here's another example that shows this.

The teacher said that I was going to be disqualified for cheating in the exam. But I told her that I was sure others had been cheating as well, so she shouldn't disqualify me.

It should be noted that sometimes *tu quoque* arguments are not weak. Look at the next argument.

All the students in the class had been shown to have cheated in the test. The teacher decided to punish only one boy (Joshua) and one girl (Emily) as an example to the others to show that cheating is always wrong. Both Joshua and Emily complained bitterly that they shouldn't be the only ones punished, given that all the other students had cheated too.

Joshua and Emily's argument is simple: 'All the other students cheated too, so we should not be the only ones who are punished.' This seems entirely reasonable in that it uses an argument for consistency. The teacher, they say, is being unjustifiably inconsistent in punishing only them. (It's not as if they cheated more extensively, or led the cheating by giving out the answers, or whatever.) It is an acceptable form of *tu quoque*: others have done it too, so we shouldn't be the only ones who are punished. (It's not as if they're arguing that they shouldn't be punished because others have also cheated.)

Of course, if we take the literal meaning of *tu quoque* as 'you too', then we would have an argument like the next one. Here's Joshua arguing with his mother.

I might have cheated in the school test but you lied about your qualifications when you got your job. So you can't say that I did anything wrong.

Obviously, the conclusion (as Joshua's mother could point out) does not follow.

Restricting the options

The next type of weakness is another example in which the reasoning is inadequate (rather than irrelevant). Look at the next argument.

When a couple's marriage is in trouble, they can do one of two things. They can just stand back and let their relationship fall apart, ruining not only their lives but also their children's. Or they can get help from a trained counsellor. A counsellor will help them talk through their problems, getting both of them to face up to the need to change their behaviour. So it's pretty obvious what couples should do: get a counsellor before it's too late.

What is wrong with this argument? As you can see, it considers only two options: just standing back and doing nothing to save the relationship or getting help from a counsellor. It is not surprising (particularly how the options are presented) what the conclusion is. But the main problem with the argument is that it restricts the choice for unhappy couples to only two. In reality, there are many more. Not letting their relationship fall apart but talking to each other about their difficulties is one of them. Getting amicably divorced is, of course, another.

So it's not surprising that this type of argument is labelled as having the problem of **restricting the options**. It's also known as **false dilemma**, given that, as in this example, two options are given as the only options available when there could be at least one more. In this connection, it needs to be noted that restricting the options is a problem in argument only if the author has inappropriately restricted the options. In the next argument, we have an example in which the options have been appropriately restricted.

In 2010 a new book 'The Grand Design' by the famous physicist Stephen Hawking was published. In it Hawking argued that the theory of the origin of the universe known as the 'Big Bang' is an inevitable consequence of the laws of physics, so that, he argues, 'it is not necessary to invoke God to light the blue touch paper'. Though this provoked considerable debate, it is clear that there is God or there isn't. Thus, in the end, one side of the debate on the existence of God will be right and the other will be wrong.

As you can see, there is no false dilemma, no inappropriate restriction of options: there is not a third position (God sort of exists or God both exists and doesn't).

Criminal courts can normally decide between only two verdicts: guilty or not guilty. (The exception is in Scotland where courts can decide that the case has inadequate evidence one way or the other, so the case is 'not proven'.) Thus there is no inappropriate restriction of options in saying that a verdict in a trial will be either guilty or not guilty. However, we need to be careful of arguments that appear to be based on such an appropriate restriction of options.

After hours of questioning, the detective made it clear to the suspect what she needed to do. 'Plead not guilty and then risk being given a long prison sentence when you're found guilty. But, if you plead guilty, I'll make sure that you get a lesser sentence to reflect the fact that you've spared the police's and the court's valuable time. So you've got only two options: a long prison sentence or a much shorter one.'

The detective's logic might look appealing but, of course, the critically-thinking suspect will see the weakness in his reasoning. She could answer him like this.

You say that I've got only two options but I have at least one more. I can plead not guilty, be found not guilty, and get no prison sentence at all.

Going round in circles

In the next example, we have another type of weakness that is due to the inadequacy of the reasoning.

Of all the 'natural' healing methods, homoeopathy is the one which is best able to provide a wide range of medicines for all types of disorders. These include digestive disorders, muscular problems, and allergies. Thus, compared to other

'natural' healing methods, homoeopathy offers the most extensive set of options for any medical condition.

The question being addressed is 'Of the "natural" healing methods, is homoeopathy best able to offer a range of medicines for all types of conditions?' The first sentence claims that it is. The second sentence provides no further reasoning, merely filling out 'all types of disorders' with examples. (If you stop and think about this, you will see that 'all types of disorders' *must* include what follows. The author could have listed any number of such disorders and still not have strengthened the argument.) The third sentence provides the conclusion and, as you can see, repeats the claim in the first sentence. The argument does no more than go in a circle. A **circular argument** is a problem because the conclusion merely repeats the reason. It is not like a deductive argument in which, though the reasons already contain the content of the conclusion, the latter does bring this content together into a further claim. In this type of circular argument, there is no drawing of a conclusion, merely restating an existing reason. As you can see, it's the most complete form of a weakness due to inadequate reasoning, given that, in the end, there is none.

Conflation

Another source of weakness can be found in the next argument.

It is unacceptable that people in prisons who have committed murder should be able to have access to gyms. Why should we want these people to be kept fit? So that they can live long and healthy lives, unlike their victims? It's time that we closed the gyms in prisons so that no criminal can get fit and strong at our expense.

You will be able to see that the author of this argument starts by questioning the practice of allowing convicted murderers to use gyms in prison. But the conclusion switches to all criminals. You might think that this is no more than an example of over-generalisation but, though it can be seen like this, there is something else going on. The author sees convicted murderers and criminals as the same group. We have here an example of **conflation** in which one thing is seen as the same as another, even though they are different. Here's another example of conflation.

Old people will get all sorts of benefits from owning a dog. These include companionship and the need to exercise every day by walking the dog. So it's clear that old people would suffer far fewer problems of isolation and failing health if they got themselves a pet.

In this example, the author conflates 'dogs' with 'pets'. There are clear differences between the two, given that pets can include those that don't need to be exercised every day (cats, rabbits, fish, and so on) and don't provide (much) companionship (fish, stick insects, snakes, and so on).

Confusing conditions

We'll now look at another source of weakness in arguments. Look at the next example.

In his book 'Outliers', Malcolm Gladwell strengthened the idea that real success in many areas (especially sport and music) required 10,000 hours of practice. Without putting in the 10,000 hours one would not achieve the top levels of athletics, football, violin-playing, and so on. Children and young people need to be told that success will come to those who put in these hours of practice.

There has been a lot of reference to this 10,000 hour requirement for success. But the above argument has a weakness in it. This is that putting in 10,000 hours of practice might be necessary for success, but it is not sufficient. Someone with little talent for, say, the high jump might practise it for 10,000 hours and still achieve no more than a modest level of success. Thus we can say that the above argument confused what be seen as a *necessary* condition for success with a *sufficient* condition.

Incidentally, there is a dispute anyway about the 10,000 hours. The figure came from a study of ten violinists by Anders Ericsson, and the figure, he complains, has been oversimplified and thus misrepresented. In his study, 10,000 hours was no more than the average amount of practice that the violinists had done. He doesn't say that this figure is a level that guarantees success. Of course, we might also say that that there are two levels of possible over-generalisation here: from ten violinists to all violinists and, as people like Gladwell are doing, from (ten) violinists to all other areas of success.

Confusing necessary with sufficient conditions is a further type of weakness due to inadequate reasoning. In the argument above, the author took what's been presented as a necessary condition (though we see that, from Ericsson's study, it isn't even that) and drew a conclusion as if it were a sufficient condition.

There are variations on this necessary and sufficient conditions issue.

My friend has inherited £5 million from his father. So he will be able to afford to buy a very large house.

The conclusion seems a reasonable one. In most situations, £5 million would be enough to buy a very large house. You might, of course, have spotted the assumption here that the friend doesn't have considerable debts such that the money would have to be used to pay these off. But, given this assumption, we would say that the inheritance of £5 million is a sufficient condition for the purchase of a very large house. But is it necessary? Clearly not. You could buy a very large house because you have a very highly-paid job, you have won a large lottery prize, you are already very rich, and so on.

What about the next example?

I have entered the competition to win a dream holiday in Australia. So I'm going to book my time off work for this holiday.

This argument is made by someone whose optimism we can applaud but whose critical thinking is poor. What they have done is to confuse at best a necessary condition with a sufficient one. Entering a competition is clearly not a sufficient condition for winning it, though it is a necessary one. In this case, the specific holiday in question cannot be won by someone who has not entered the competition, although, whatever is meant by 'a dream holiday in Australia', we could say that people could have one of these without entering the competition.

Look at the next example. How do necessary and conditions operate here?

Thomas Green has been convicted of a serious crime. He will therefore be legally punished in some way, possibly including imprisonment.

In this argument, being 'convicted of a serious crime' is a necessary condition for being 'legally punished in some way, possibly including imprisonment'. But it is not just necessary: it is also sufficient. The conclusion does straightforwardly follow.

Making insignificant objections

When we're faced with an argument with which we disagree, we have to be careful that we don't respond to it with the weaknesses that we've seen in this chapter. For example, we shouldn't use inappropriate *ad hominem* arguments or present a slippery slope counter-argument. One other point is that we should ensure that any counter-claim or counter-argument we make doesn't simply rely on something trivial, such that we are missing the main point(s) of the author's argument. In other words, even if the author accepted our criticism, their argument would not be greatly affected (if at all). Look at the following argument.

Recycling has to be made much more than an option to be chosen by the thoughtful few. It must be something that everybody is required to do. Not only does recycling enable us to reuse valuable scarce resources, it also solves the increasingly difficult problem of disposal (with all the pollution dangers that accompany it). For example, all vegetable waste can be composted and reused for the benefit of gardens. Cans of all types need to be seen as a valuable resource by reusing the metal from which they are made. Therefore the Government must tackle the problem of waste disposal by creating statutory powers to enforce widespread recycling of all household waste.

This is an argument in favour of making recycling a compulsory rather than a voluntary activity. If we wanted to make objections to it, we would have to produce something that showed that the reasoning did not necessarily enable us to draw the conclusion. For example, we might be able to show that possibly questionable assumptions were required for the reasoning to support the conclusion. One such line of evaluation would be to question the assumption that all household waste could be effectively recycled.

However, our concern here is not with useful objections but with those that are trivial. For example, someone might respond to this argument by pointing out that 'not everybody has a garden, so how could we all compost our vegetables?' This focuses on an illustration which the author uses to show how recycling could be both practical and useful. The author does not necessarily mean that each household has to compost *its own* vegetable waste, in that the wording is such as to mean no more than such waste could be composted and then used for the benefit of gardens in general. Thus, this objection could be accepted by the author without the argument being affected.

Appeals

Trivial objections hit the target far too weakly; irrelevance, as we have seen, doesn't hit it at all. We're now going to look at further types of irrelevance. These are examples of when the arguer uses evidence-claims that might seem to be relevant but which very often aren't.

Appeal to pity/emotion

The first is familiar from TV shows in which (normally young) hopefuls seek to win 'talent' competitions.

Jesse should have won that race. He hadn't trained as hard as the other athletes, but he had courageously come back to athletics after a long period of alcoholism. Not only that, his wife has got to go into hospital soon, and him winning would have given her just the perk she needed.

Is there anything wrong with this argument? There are two independent reasons supporting the conclusion that 'Jesse should have won that race', but the problem is that the reasons are not relevant to the conclusion. Winning a race is a matter of who runs fastest, not who, by some other criteria, somehow *deserves* to win. Though, of all the athletes, Jesse might have had the greatest claim upon our pity, he didn't have the greatest claim to win. Such **appeals to emotion or pity** provide irrelevant supports for inferences. ('I should be voted through to the next round of "the X factor" because my mother had a really tough time bringing up us seven kids, so I'd like to do this to pay her back for all the sacrifices she made…blah, blah, irrelevant blah…')

However, it is only inappropriate appeals to pity that are irrelevant. There are arguments in which pity is relevant.

All the athletes at the meeting pooled half of the money they got for competing and winning. They decided to give most of it to Lorna in that she had broken two national records that day. But Jesse had a better claim on that money. Not only had he made a comeback following his alcoholism, but also, with his wife soon to go into hospital, he very much needs the money.

In this second example, the argument is about who deserves to have the biggest share of money. In such an argument, all sorts of criteria can be used, and pity is certainly as good a candidate as any other. As you can see, Jesse's claim is actually based on two criteria: he *deserves* it because he has fought and beaten his alcoholism, and he *needs* it because his wife is going into hospital. Though these criteria are relevant to considerations of how money (or goods and services) are distributed, they are not relevant to situations such as winning a race or passing exams.

Appeal to popularity

There are other types of appeals used in argument. Here's another one.

There must be some truth in astrology. Most newspapers carry forecasts by an astrologer, and most people believe what they read in them.

In this example, the reason for the conclusion 'there must be some truth in astrology' is the claim that 'most people believe what they read in them'. This **appeal to popularity** is a familiar sort of argument and you can understand why it's used. There is an assumption being made that fits with our view of things in a number of situations. This is that 'if the majority of people support/believe in/want something, then there must be some truth in it' (or, in a stronger version, 'if everybody...'). As you can see, this is how the argument about astrology works. But you can also see that, in this case, the argument is not a good one: even if *everybody* thought that astrology was entirely true, this would not make it so. To emphasize this point, consider an argument that might have once been used.

Everybody believes that the Earth is a disk, therefore it must be a disk.

Here's a glaringly inappropriate appeal to popularity. It appeared in the UK newspaper the 'Daily Express' in December 2009. The newspaper's front page announced that there were '100 reasons why climate change is natural'. Here's reason 13.

Peter Lilley MP said last month that 'fewer people in Britain than in any other country believe in the importance of global warming. That is despite the fact that our Government and our political class—predominantly—are

more committed to it than their counterparts in any other country in the world'.

As you can see, even if it is correct that 'fewer people in Britain than in any other country believe in the importance of global warming' (which is itself doubtful), it does not follow at all that 'climate change is natural'. It is in a very important way deeply irrelevant to this issue whether or not people in Britain 'believe in the importance of global warming' (whatever that means).

However, as with appeals to pity, there are some arguments in which an appeal to popularity is acceptable. If you think about it, democratic elections are based on the belief that an appeal to popularity is very significant. Without this belief, such elections would become a nonsense. The issue of truth here is, however, a different one. With the previous examples of astrology and climate change, we have looked at appeals to popularity that are based on the assumption that what people believe is an indication of the truth. In elections (and opinion polls), appeals to popularity are looking at the significance of people's preferences. If the Conservative Party wins an election in the UK, this doesn't mean that their beliefs are more true than those of the Labour Party (even though they might want to argue that this shows that 'our policies are working'). It is just a record of people's preferences as organised through an electoral system.

Appeal to authority/expertise

In the next argument, we have another type of appeal.

Most of those who have won Nobel Prizes for Physiology and Medicine say that using animals in their experiments was necessary for their work. This shows that animal welfare should not be placed highly on the political agenda, despite what animal-rights groups say.

In this argument, the conclusion is drawn from the evidence-claim in the first sentence. This can be seen as an **appeal to authority or expertise**. Is it an appropriate one? Presumably we would agree that those who have won Nobel Prizes for Physiology and Medicine have considerable expertise in these areas (and thus could be counted as having relevant authority in them). Thus what they say about the use of animals in experiments can't be simply dismissed.

But is this evidence enough for the conclusion? One thing we can say is that we need to question the evidence further. What can we say further about these Nobel-prize winners? One thing we could note is that they would have been doing their work for which they won the prize probably at least thirty years ago. (This is because of how the system works.) Thus, when they were doing this work, there was probably no real substitute for using animals in their experiments. Now there could be many possible alternatives, such as using just cells rather than living animals, and using computer modelling.

A further issue is that the evidence is used, as you will have noticed, to draw a conclusion that goes way beyond the evidence of what these (though eminent) scientists are concerned with. The evidence does not support the big conclusion that 'animal welfare should not be placed highly on the political agenda'. It refers to only one small aspect of animal welfare (and thus, for example, ignores the issue of the welfare of farmed animals). We can see then that the appeal to authority or expertise in this example has some relevance but has various problems in the way it's used.

Appeal to history

Here's a further type of appeal. Look at the next argument.

When the UK Prime Minister Neville Chamberlain reached what is called 'the Munich Agreement' with Hitler in 1938, he allowed Germany effectively to invade what was then part of Czechoslovakia. On his return to the UK, Chamberlain claimed to have negotiated for 'peace in our time'. However, less than a year later, the UK was at war with Germany. This policy of 'appeasement' has shown that giving in to dictators is never right. Thus we should always be prepared to use whatever power we have (including military power) to resist them.

This type of appeal is termed an **appeal to history**, and you can see why. In this argument, it takes a historical example and sees it as relevant to the present (and, indeed, to the future). You will probably have seen that there is the issue of possible over-generalisation here. To what extent is Chamberlain's appeasement of Hitler relevant to the way in which we should deal with dictators? Thus is this appeal to history a relevant one? We might say that it isn't because, though Hitler's demands in 1938 should have been resisted, this does not mean that this tells us how we should deal with present-day and future dictators. Perhaps each case has its own features such that it is difficult to generalise from history, or perhaps we should look for similarities between the appeasement of Hitler and the way in which we should treat modern-day dictators.

Here's another example.

Before the invasion of Iraq in 2003, the intelligence received from various sources (but from one source in particular) was that Saddam Hussein had what were termed weapons of mass destruction (nuclear and biological weapons). When the country had been successfully invaded and Saddam deposed, it was found that this intelligence was wrong: there were no WMDs. Therefore we should not use evidence from intelligence sources as a reason to take military action again.

As with the previous argument, there is an appeal to history. It's one that's often used to support no longer taking military action. But, as you can see, like the Hitler one, this appeal to history is again a generalisation. It's saying 'here's what happened with Iraq in 2003 and because of this, we should never trust intelligence sources again'. Given that this is only one example, such an appeal to history could be countered by another one. The Cuban missile crisis of 1962 is a counter-example: since the US intelligence of what the Russians were doing (and had done) was accurate, President Kennedy was able to respond to the threat successfully.

Appeal to tradition

An appeal to history is obviously an appeal to the assumed relevance of something (such as an event or policy) or some things that happened in the past. A similar type of appeal is found in the next argument.

Apart from the years 1649-1660, the countries that make up the UK have always had a monarchy. There are some people (such as the organisation 'Republic') who want to see the monarchy abolished and replaced by an elected President (as happens in the majority of countries). However, replacing the monarch with a President as head of state flies in the face of well over a thousand years of having a monarchy. So we should keep the monarchy in the UK.

In this example, we have an appeal not so much to a specific event or policy as to a long-established practice. Here we have an **appeal to tradition**. Such appeals rely on the belief that there is something positive or, indeed, valuable in the way something has been done in the past such that we should continue doing/having this in the same way now.

As you can see, the reasoning for the conclusion in the above argument is no more than this appeal to tradition in the third sentence. The argument is no more than 'we've done it for a very long time, so we should we continue to do it'. Thus a counter-argument has to do no more than come up with at least one reason why the appeal to tradition isn't enough to support the argument.

There are those who argue that we should keep the monarchy because we've it for the vast majority of our history. However, there are good reasons why we should break with this tradition. The monarchy costs a huge amount of money, especially having to support the monarch's (often large) family. (No presidential system requires that the president's siblings and grandchildren are paid for by the public.) Having a monarch is undemocratic. However bad the monarch is, they can't be voted out of office. A monarchy might once have been necessary but it no longer serves any useful purpose.

We have seen that appeals in reasoning can be appropriate or inappropriate, such that they can be sources of both strength and weakness. We've also seen that weaknesses in arguments come in many different forms but that they are all ultimately concerned with problems of relevance or adequacy.

Weaknesses in argument exercise

(1) Which of the following arguments use a *tu quoque* method of arguing?

(A) You say that people who create graffiti should be punished more severely than they are at present. But graffiti is considered by some people to be a form of art. You have always defended the rights of artists, so you should want people to be able to create graffiti without being punished.

(B) The school says that no form of bullying will be tolerated. This is why Matthew Claxton has been excluded from the school. OK, he is very unpleasant in the way that he terrorises younger children. But making students wear school uniform could be considered to be a form of bullying. Therefore Matthew Claxton shouldn't be seen as a bully.

(C) You say that I've been greedy because I've eaten three Big Macs. But I've seen you eating more than one Big Mac. So you can't accuse me of being greedy.

(2) Jamie Oliver has written a recipe for a home-made granola with berry compote. It is described as a quick, easy, delicious, and healthy pudding. It certainly sounds healthy enough with all its nuts, seeds, oats, and yoghurt. But, if you were to eat the granola, you'd eat 912 calories per serving. (That's almost about half a woman's daily calorific needs just for one portion.) Alternatively, if you were to eat a sticky toffee pudding followed by a piece of cheesecake, then you've consumed only 750 calories. So people who think that Jamie Oliver is a good cook are going to put on a lot of weight.

What is the best statement of the weakness in this argument?

(A) People might think that Jamie Oliver is a good cook without eating his granola with berry compote.

(B) People might eat Jamie Oliver's granola with berry compote without thinking that he's a good cook.

(C) People who put on a lot of weight might neither think that Jamie Oliver's a good cook nor eat his granola with berry compote.

(3) There are over three million people aged 71 or over in the UK who have driving licences. This is an increase of 300,000 in less than two years. Half of the over-70s now hold a licence, a figure very different from thirty years ago when only 15 per cent did. The big increase in numbers reflects the fact that there are many older people who want to retain their ability to be independent. The trend for there to be many older drivers will continue.

Which of these does the author of this argument do?

(A) The author generalises from the percentage of over-70s who were driving thirty years ago to the number in this age-group who drive now.

(B) The author generalises from the recent increases in older drivers to the number in this age-group who will drive in the future.

(C) The author generalises from the number of those aged 71 or over who drive now to the number in this age-group who will drive in the future.

(4) What is the type of weakness found in the following argument?

People who argue that house prices should be allowed to continue to increase without any government action don't worry about what the average person can afford. The very rich are entirely happy that most people can't afford to live near them. After all, if you're a highly-paid football player, would you want a teacher and his family moving in next door to you? Thus the people who are willing for house prices to rise very much faster than average earnings are not looking at things from the position of the average family, just the very rich family. We should therefore oppose this 'let's not take any action about house prices' position.

(5) What is the type of weakness found in the following argument?

In many thousands of schools, scans of pupils' fingerprints are used for things such as withdrawing library books, gaining access to buildings, and even paying for lunch. The question of what happens to this fingerprint information when children leave school has not been resolved. If they are simply kept on some database, then we will find that all of the children from these schools will join the ranks of criminals who have been fingerprinted. As more and more schools end up using this method of identification, then everyone under a certain age will have their fingerprints in the company of thieves and murderers. We should stop this practice of using pupils' fingerprints for the purpose of identification in schools.

(6) What is the type of weakness found in the following argument?

Only 13 per cent of people in the 25 to 34-year-old age-group pay into a pension fund. This is a time bomb waiting to go off. When this age-group retires, either the State will have to bail them out with huge financial support or they will live lives of abject poverty.

(7) Read the following passages and answer the question below.

(i) David Irving is a historian who has questioned whether millions of Jewish people were murdered during the Holocaust in places like Auschwitz. For this, he has served a year in an Austrian prison. He also lost a libel case against a publisher and author who produced a book claiming that he denied the Holocaust. Though he still believes that he's right about the Holocaust, the evidence against him is overwhelming – from significant historians like Martin Gilbert and from the accounts of survivors. Thus we should not take seriously the views of David Irving on the subject of the Holocaust.

(ii) David Irving is a historian who in 2000 lost a libel case against a publisher who had published a book in which he was described as someone who denied that the Holocaust happened. As a result of not paying his legal costs for this case (an estimated £3 million), he was made bankrupt. In 2006, in Austria, he was sentenced to three years in prison for denying that the Holocaust happened (though he was released on probation after serving just over a year). So he's both a bankrupt and an ex-prisoner. In consequence, we should not take him seriously as a historian of the Holocaust.

Is either of the arguments above an example of an *ad hominem* argument? Are both? Are neither? Is the answer

(A) (i) only

(B) (ii) only

(C) both (i) and (ii)

(D) neither (i) nor (ii)?

(8) In Finland there was a big campaign to get people to reduce the amount of salt that they consumed. As a result, there was a very large reduction in the number of people suffering strokes and heart attacks. It is clear that a campaign in the UK would have the same result. Thus we should have a campaign as soon as possible.

How many of these must the author of the above argument assume?

(A) The amount of salt consumed per person in Finland was the main cause of strokes and heart attacks before the campaign.

(B) The amount of salt consumed per person in Finland before the campaign was similar to that consumed per person in the UK.

(C) The campaign to reduce the amount of salt consumed per person in the UK would be similar to that in Finland.

(9) Look at each of the following arguments and decide whether they include an appropriate or an inappropriate appeal to popularity.

(A) 67 per cent of people in the UK believe that all bacteria are dangerous. Therefore there should be a campaign to show people that many bacteria are necessary for our health.

(B) In a survey of 22,000 people in 21 countries in 2007, it was found that 79 per cent of these people think that human activity such as industry and transport is a major cause of climate change. Therefore governments of these countries should act to reduce the effects of industry and transport.

(C) 63 per cent of people in the UK believe that parents of young people involved in anti-social behaviour are 'a great deal to blame'. The Government should therefore introduce penalties for such parents to encourage them to keep their children under better control.

(D) In a study which looked at how much people knew about the amount of calories there are in different types of food, the majority thought that dishes in McDonald's were 35 per cent more calorific than those in Subway. In fact, even though Subway markets itself as a healthy-eating chain, some of their 'healthy' options contained 50 per cent more calories than food from McDonald's. This shows that it is very difficult for people to know what or what not to eat.

CHAPTER 7: ANALOGIES

We have looked at all sorts of examples of claims used in arguments, and we have seen that claims used to support inferences need to be judged in terms of how well they do this.

We're now going to look at a different sort of claim. Look at the next argument.

Snapchat is a very popular app used by teenagers for sending photos, videos, text, and drawings to their friends. Following worries that under-13s could use the app for both sending and receiving inappropriate images, Snapchat introduced a new feature SnapKidz for this age-group. This allows under-13s to do everything that Snapchat can do, except for sending photos and videos. This, however, will not solve the problem of under-13s using Snapchat by lying about their age. SnapKidz is like a pair of thin barely-inflated armbands. Parents think that, because their children are wearing these armbands, they don't need to watch them in the water. But the children could easily slip them off and so drown. In order for the child to be safe in the water, they need to be taught how to swim and not left on their own in the water. In the same way, for children to be safe with an app like Snapchat, they need to be taught how to use it safely and to be supervised as much as possible.

We'll just check what's going on in this argument. The first three sentences are scene-setting. The fourth sentence turns out to be an intermediate conclusion, so what is the reason? This is what follows in the fifth sentence ('SnapKidz is like a pair of thin barely-inflated armbands') and which is then expanded upon in the sixth to the eighth sentences. The main conclusion is the final sentence.

Crucially, as we can see, the whole argument depends on this comparison of SnapKidz to 'a pair of thin barely-inflated armbands'. Like with any other argument that relies on only one reason, it stands or falls depending on how relevant and adequate the reason is. Here we have an **analogy**. When an author uses an analogy, they are saying 'here is one situation; here's another one very similar to it; given the similarity, what follows in the second situation also follows in the first'. Thus our task in looking at analogies in arguments is to focus on this issue of similarity: are the two situations sufficiently similar for the analogy to work?

In this example, then, we need to look first at the degree of similarity between SnapKidz and 'a pair of thin barely-inflated armbands'. Doing this does not, of course, means coming up with differences that the author would happily accept. Any analogy is going to have dissimilarities between the two situations, so we are looking only for significant similarities and dissimilarities. For example, saying that armbands are to do with safety in the water whereas SnapKidz has got nothing to do with water isn't relevant. Nor is the point that many under-13s can swim without armbands.

We need to focus on how the author intends the analogy to be seen. In this case, the point of the analogy is that SnapKidz is not a solution to the problem of under-13s 'using Snapchat by lying about their age' *in the same way* that 'a pair of thin barely-inflated armbands' is not a solution to the problem of children being safe in the water.

So what relevant similarities and dissimilarities are there?

They are similar in focusing on the issue of the lack of safety in both scenarios. The provision of SnapKidz doesn't adequately prevent under-13s from signing on for Snapchat; the provision of 'thin barely-inflated armbands' doesn't prevent children from drowning.

A significant difference between the two is that the degrees of danger in the two scenarios are not equivalent. The author sees the lack of good armbands as risking death, whereas a child's ability to use Snapchat might lead to no danger at all, merely giving them the opportunity to send photos to their friends. (Though the issue of the subsequent possible dangers of these photos being able to be used inappropriately is not to be dismissed.) Thus a child using Snapchat unsupervised is not likely to come to any harm, whereas a child unable to swim wearing inadequate armbands in water has a much higher risk of harm.

Another difference that's worth noting is that the analogy obscures the difficulty in resolving the issue. 'Thin barely-inflated armbands' could easily be replaced by good, properly-inflated ones; preventing under-13s from using Snapchat is much more difficult. How could the company that provides this app do this? In this way, the analogy over-simplifies the issue.

Interestingly, the author develops the analogy further in the last two sentences.

> In order for the child to be safe in the water, they need to be taught how to swim and not left on their own in the water. In the same way, for children to be safe with an app like Snapchat, they need to be taught how to use it safely and to be supervised as much as possible.

It's important to note those words 'In the same way'. Here we have another aspect of the analogy. Is educating and supervising children with apps like Snapchat sufficiently similar to teaching children to swim and never leaving them on their own in water? You can see that the suggested parallels are clear: teaching/teaching; not left on their own/supervised as much as possible.

But, as before, does the analogy over-simplify the issues? The outcome of teaching children to be able to swim is easily observable: can the child swim and does the child put this into practice when they're in a pool, river, the sea, and so on? In addition, we would want to know if the child could swim well enough for them not to be danger in most normal situations in water. The outcome of teaching children to safely use 'an app like Snapchat' is much less concrete: what do we mean by 'safely'? Even if they're taught not to send what the author refers to as 'inappropriate images', are the guidelines such that they have definite outcomes as in swimming? For example, is a holiday picture of the child in a swimming costume an inappropriate image? Another issue here is that being able to swim is a skill that doesn't go away. Having learned how to do it, a child (and adult) can always do it. However, having learned how to use an app like Snapchat safely doesn't mean that this learning will not be abandoned, will not be suspended, as the child looks at experimenting with, so to speak, unlearning what's been learned.

The other parallel is between not left on their own/supervised as much as possible. This again has a problem. A child who has learned to swim but is left on their own in a swimming pool is likely to be safe because, as above, they are very, very likely to swim out of any possible danger. A child using Snapchat unsupervised, again as above, might decide to not use their knowledge of any possible dangers. Furthermore, in a very real sense, an under-13 will have few opportunities to be in the water with some adults not nearby, whereas an under-13 will have plenty of opportunities to be unsupervised with the internet.

This very detailed evaluation of this analogy shows that it is important to unpeel it so that its layers are revealed. These layers are then compared with those of the original scenario in order to look at relevant (and, for the argument, significant) similarities and dissimilarities. In short, an analogy acting as a reason in an argument is treated like any other argument.

Here's another argument with an analogy.

Just as a butterfly is never aware of the beautiful patterns on its wings, so a mink will wear its soft coat until death without ever appreciating it. For the mink, fur is just something that it carries around in the battle to survive, like claws or teeth. By being made into a fur coat, the mink's fur is turned into something better, just as a tree made into a violin is raised. So people should be very happy wearing coats made from mink.

This is adapted from part of much bigger argument entitled 'In defence of fur' by Josie Appleton. A mink, by the way, is a relatively small animal similar to an otter and a weasel. It is often farmed for its fur. Though Appleton compares a butterfly's wing patterns with a mink's soft coat, the analogy that we'll focus on is found in the third sentence: 'just as a tree made into a violin is raised'. This is used as the reason to support the conclusion in the last sentence.

To what extent does this analogy work? As before, we need to look at the similarities and differences between the two scenarios.

- Minks are animals that can feel discomfort and pain, a point that is relevant in the issue of killing them (probably by poison gas) for fur. Trees, as far as we know, can't feel discomfort and pain.
- A mink's fur can be obtained only by killing it. Wood for a violin does not necessarily mean having to cut the whole tree down.
- A tree could be cut down for many purposes, including violin-making. A mink will be killed only for its fur.
- Violins can provide pleasure for many; mink coats provide pleasure for very few.

In the end, of course, we need to focus on the significance of the word 'better'. Is a mink's fur better by being used (along with 35-55 others) to make a coat? Are pieces of maple and spruce better being used for making a violin, rather than being part of living trees (or being used for something else)? We might say that nobody needs a mink coat (given all sorts of synthetic materials), whereas in an important way we do need violins (although the same point could be made about alternatives, as with electric violins). We could also say that violin-making has never caused moral outrage, whereas using fur for coats very much does this. On balance, we would probably say that this is not a good analogy because it cannot usefully be said that the two sides are sufficiently similar (as the words 'just as' claim).

An analogy, as we have seen, is based on the assumption that two things are sufficiently similar to each other to enable the author using it to support the inference they've drawn. But sometimes an author uses the strong *differences* between two things to support their argument.

People should expect that some space missions don't succeed. Putting a spacecraft safely on Mars is hard and risky. It's not a trip to Grandma's house.

This argument was used by NASA in 2008. We have here not an analogy but, as the words 'it's not' indicate, the opposite. This is called a **disanalogy**. In the NASA argument, the huge difference between 'a trip to Grandma's house' and 'putting a spacecraft safely on Mars' is used to support the claim that 'people should expect that some space missions don't succeed'.

As you can see, it is not difficult to think of relevant differences here. However, someone might protest that the disanalogy uses scenarios with so many differences that it doesn't add much (if

anything) to the argument. The obvious counter-response is that nobody would think that a mission to Mars is like a trip to Grandma's house, so this doesn't in itself tell us anything about why some missions to Mars don't succeed. (There's perhaps something of a straw man here.) They might want to say that a comparison of a mission to the Moon might be more relevant. In this way, the disanalogy doesn't work to support the argument.

Analogies exercise

For each of the following, identify the analogy being used, and then assess it in terms of both similarities and differences. Finally, make an overall judgement of the effectiveness of the analogy.

(1) The use of illegal drugs is now so widespread that it's difficult to see how it can be controlled. It has become more and more acceptable, particularly among young people, such that the use of even those in the highest category of illegal drugs is increasing at a fast rate. Trying to ban these drugs would be like trying to ban cigarettes and alcohol. We know a ban on these two would be impossible, so we might as well work out a way of dealing with the drug problem which does not turn hundreds of thousands of young people into criminals.

(2) Motorists who drive fast in a built-up area are putting children's lives at risk. If they came into the area brandishing guns, knives, and other weapons, the police would be there in force to arrest them. But, though cars can kill and injure in the same way as any offensive weapon, motorists are allowed to endanger children every day. More action should be taken to stop cars coming into built-up areas.

CHAPTER 8: FURTHER WAYS OF ARGUING

This chapter deals with three further types of claims.

Principles

The first of these is illustrated in a short argument we looked at in Chapter 1.

It is cruel to use animals for medical research. Medical researchers must never use animals.

The conclusion that is drawn here is more than a recommendation. It is a **principle**. Principles are general statements of what should (or should not) happen, be allowed (or not), be done (or not). Unless they specify an exclusion ('except for/if/when…'), they are used to apply to all situations where the principle is seen to be relevant. For example, if someone accepted the above principle, they could not say '…except for research into cancer' or '…except if the animal is given an anaesthetic' or '…except if the majority of the population want this'.

In the next example, an exclusion is built into the principle.

Unless murder is committed with great cruelty, the death penalty should never be used for murder. Therefore someone who simply kills another person with just one bullet in the heart should not be given the death penalty.

You will see that, in this example, the principle acts as a reason. In the medical research example, the principle was a conclusion that was drawn. Not surprisingly, it could then be turned into an intermediate conclusion by continuing the argument.

It is cruel to use animals for medical research. Medical researchers must never use animals. Therefore they need to look at using other methods such as computer simulations, cell analysis, and even using human volunteers.

Like any other types of claim, principles can also be given as counter-claims (or used in counter-arguments).

Some people say that the death penalty should never be used, regardless of how serious and violent the crime is. But what would such people say about the execution of Rudolf Höss, the Commandant of Auschwitz, the man who (by his own admission) supervised the murder of millions of people. He clearly had lost the right to live. Given that there are examples in which the death penalty is appropriate, we should allow it in our legal system.

There could also be challenges to the meaning of a principle.

It has been argued that unless murder is committed with great cruelty, the death penalty should never be used for murder. However, it is reasonable to ask 'what does "great cruelty" mean?' Is shooting someone in each limb before giving a shot to the heart or the head an example? Is shooting in just one limb first? Is drowning someone an example? Is making the victim beg for mercy,

only to kill them anyway? Because the definition of 'great cruelty' is such a problem, we should simply ban the use of the death penalty for all murderers.

Finding principles exercise

Which of these is a principle?

(A) The United Nations should intervene in Zimbabwe in order to overthrow Robert Mugabe's corrupt government.

(B) The United Nations should always intervene in countries where the government attacks its own citizens with chemical weapons.

(C) Child trafficking can never be justified.

(D) Sheep are far more intelligent than people realise.

(E) The veal trade is a very cruel one.

(F) No group of people, whatever their history and culture, can be allowed to kill whales.

(G) Swimming with dolphins by sick children is bad both for the dolphins and the children.

Principles are not always stated in an argument. Sometimes they can be assumed. The next exercise gives us an example of where this happens.

Assumed principles exercise

There is often a debate as to which groups of sick people should be given priority when it comes to the allocation of resources. There are people with arthritis who complain that they're not allowed drugs to help them with their pain. There are families with someone with Alzheimer's disease who also complain that drugs aren't being made available to them. Yet people with other conditions are given what they need. It's obvious that the Government can't allow this situation to continue. It must increase taxes to pay for everyone who needs medical treatment to get it.

Which one of the following is assumed in the above argument?

(A) The Government must always help the sick.

(B) People should be made to pay taxes to help those in need.

(C) The medical needs of sick people should always be met.

(D) Sick people should be given priority over those who are well.

It is very common to find conflicting principles. In consequence, an argument in support of one position using a principle to support this can be responded to by using a counter-principle. A very good example of conflicting principles is the case of what are called the 'Elgin' or Parthenon marbles. Here's a little of the background.

The marbles (sculptures) once formed part of the Parthenon, the famous temple on the Acropolis in Athens. The Parthenon was built between 447 and 432 BC and was decorated with hundreds of sculptures of gods and people. It survived for about two thousand years but suffered massive damage in 1687 when Athens was under siege by the Venetians. Unfortunately the building was used as a gunpowder store and a huge explosion blew off the roof destroying many of the sculptures. The Venetians took much of material back to Venice. Lord Elgin, who was the British ambassador to the Ottoman Empire (which then included Greece) arranged for many other parts of the sculpture to be shipped to Britain at the beginning of the 19th century. These 'Elgin marbles' have been on display in the British Museum ever since. However, various Greek governments have demanded that these should be returned to Greece so that they can be re-united with the marbles, now housed in the Acropolis Museum. The British Museum, however, refuses to return them. It claims that Lord Elgin had permission to take the marbles, and that by doing so he saved them from further damage, so they should stay in Britain.

This case is an interesting clash of principles. On the side of the British Museum's case we have the following.

- That which was obtained legally should belong to whoever obtained it.
- Legal possession overrides any other claims.
- If someone removes something to protect it from (certain/likely) damage, then it is acceptable/right for them to keep it.

On the Greek Government's side, we have these.

- Permission to have/do something given a long time ago is not valid for all time.
- Important art and architecture should belong to the country where it was produced.
- Important buildings should not be dismantled.
- The historical origin of something/a work of art should take priority over the fact of possession.

The British Museum has also used the argument that, since more people will see the marbles in London than they would in Athens, the marbles should stay where they are.

This turns out to be a very complex area for arguments. The British Museum could use one argument that might be seen as a slippery slope.

If the marbles are returned to Greece using the principle that that is where they originated from, then all other museums around the world that hold objects and works of art from countries other than their own would have to hand these over.

Thus all the Rembrandts would have to be sent back to the Netherlands, all the Roman coins, statues, and other objects would have to be sent back to Italy…

This could be seen in a positive light as an appeal to consistency. But a variation of such an argument could also be seen as a *tu quoque* one.

The British Museum should not return their Parthenon Marbles to Greece because other museums such as the Louvre in Paris also have some of these marbles.

And, amongst all these principled arguments, we could even find an appeal to emotion. Here is a previous Greek Minister of Culture, arguing for their return.

'The request for the restitution of the Parthenon Marbles is not made by the Greek government in the name of the Greek nation or of Greek history. It is made in the name of the cultural heritage of the world and with the voice of the mutilated monument itself, that cries out for its marbles to be returned.'

Is reference to 'the voice of the mutilated monument that cries out for its marbles to be returned' an appropriate appeal to emotion (or pity)? Over to you…

Definitions

In the last chapter, we looked at an analogy used to justify turning a mink into a coat.

By being made into a fur coat, the mink's pelt is raised into something higher, just as a tree made into a violin is raised…

We spent some time considering whether the analogy was good or not. But there was something that was only touched on at the time. This was the meaning of the word 'higher'. For Josie Appleton, the author of the argument, the word had an obvious significance. To look at this issue, we need to ask two questions.

- In what sense is a coat made from mink fur 'higher' than a mink?
- In what sense is a violin 'higher' than a tree?

To help us further, let's ask some more questions.

- Is a chair made from wood 'higher' than the tree that supplied the wood?
- Is a pencil made (in large part) from wood 'higher' than the tree that supplied the wood?
- Is an electric chair made from wood 'higher' than the tree that supplied the wood?
- Is a violin that's used by an incompetent musician (scrape, screech) 'higher' than the tree that supplied the wood?
- Is a coat made from the fur of cats or dogs (especially Labradors and German Shepherds, as we often find coming from China or Eastern Europe) 'higher' than the cats or dogs that were used to make it?

In trying to answer these questions, we find that we keep coming up against the problem of 'it depends what you mean by "higher".'

Is it any of these?

- More valuable
- More important
- More desirable
- More necessary
- More attractive
- More useful

Josie Appleton must take it to mean the first three for her to make the link between fur coats and violins. The other three might or might not fit.

Do these three meanings help us to answer the questions that we asked about pencils and so on?

This issue of what something means (or, more specifically, what someone claims it to mean) is an important one in critical thinking. It can be important in four different ways.

- Someone might base their argument *on* a definition of something.
- Someone might argue *to* a definition of something.
- Someone might use a term which *needs* definition but which isn't defined. (As Josie Appleton did in her use of the word 'higher'.)
- Someone might *assume* a definition in the way they use a term.

We looked at two examples of principles earlier, one of which used the word 'cruel' and the other the word 'cruelty'. We paused to consider what the word 'cruelty' meant in the second one but, of course, the issue remained problematic. Let's have further thoughts about the first.

It is cruel to use animals for medical research.

We could, of course, just go to a dictionary and check for meaning. Thus the Oxford English Dictionary includes the words 'painful' and 'distressing' in the meaning of 'cruel'. But, of course, you might then respond by asking what we mean by, say, 'distressing'. Does it matter, for example, that medical experimenters would not presumably find what they're doing to the animals 'distressing'? If not, is it no longer 'cruel'?

Furthermore, would we say that doctors and dentists are 'cruel' when they carry out painful and distressing medical procedures on their patients? We probably wouldn't for all sorts of reasons, not the least of which is that the patient has probably agreed to the procedures (whereas, of course, the animals in the laboratories haven't). Anyway, there is a possible solution to all this. This is the rule of thumb method of saying that 'we know what it is when we see it'. In other words, you and I probably don't have to think too hard about the meaning of cruelty when we see a child being punched and kicked or an animal being beaten severely. This is an example of 'the bald man principle': we know whether a man is bald or not without having to count any hairs on his head. (Does a bald man have no hair, no more than one hair, no more than two hairs…? At what point is a man not bald?)

We could return to the Parthenon/Elgin Marbles issue and raise definitional points. Crucially are these an example of 'theft'? Though Lord Elgin had the agreement of the then government to remove the marbles, Greece was then part of the Turkish empire, so modern-day Greece says that a Greek government wouldn't ever have agreed to their removal, so they were indeed stolen. This is indeed a complex area but it demonstrates well that sometimes arguments are problematic because of definitional issues. Thus a response to an argument can often usefully start with 'It depends what you mean by…'

Here are some further examples of definitional issues. Think about each of them.

In 2011 the animal rights group PETA (People for the Ethical Treatment of Animals) sued the aquatic theme park group Seaworld on behalf of five performing orcas for violating the rights of killer whales under the 13th amendment of the US Constitution that deals with slavery. 'All five…were violently seized from the ocean. They are denied freedom and reduced to performing stupid tricks.'

Is this a correct use of the term 'slavery'?

Here's another argument with a definitional issue.

The US Supreme Court ruled in 2010 that, if people who are too young to vote commit crimes short of murder, they should not be sentenced to die in prison. But what sort of sentence does this rule out? When is a life sentence not a life sentence? Here is an example. Chaz Bunch of Ohio was convicted of kidnapping and raping a woman in a carjacking when he was 16. He was sentenced to 89 years imprisonment. Even assuming he becomes eligible for early release, he will be 95 years old before he can leave prison. So is this really a life sentence?

So how should we define a 'life sentence'?

Hypothetical reasoning

We've considered principles and definitions. Here's a third type of claim. It's one we've already seen many times, though we haven't explicitly talked about it. Here's an example.

If there was evidence that polar bear populations were stable or increasing, then they couldn't be seen as in danger of extinction. Fortunately, there is such evidence from Canada, so we shouldn't worry that they could be extinct soon.

We have here a **hypothetical argument**. Hypothetical arguments will include some part in which there is an 'if…then' construction. (It could be reversed such that it would have 'y if x' or to use a different form of words such as 'were x to be the case, y would follow'.) Specifically in this example, we have an argument in which there is a hypothetical reason being used to draw the conclusion.
In the next one, we have a hypothetical conclusion being drawn.

Lots of people worry that polar bears are soon going to become extinct. So, if we were to find that polar bear populations are largely stable or increasing, then we wouldn't need to worry that they will soon be extinct.

We already met hypotheticals when we looked at slippery slopes: 'if this happens, then this will follow; if that follows, then this will follow from it…' One of the things to note in particular about hypothetical arguments is that hypothetical reasons on their own can support only hypothetical conclusions. Look at a revised version of the above argument.

If there was evidence that polar bear populations were stable or increasing, then they couldn't be seen as in danger of extinction. So we shouldn't worry that they could be extinct soon.

You can see here that the conclusion cannot usefully be drawn from the reason, since the reason is inadequate for it. In the previous version, the hypothetical reason was supplemented by an evidence-claim that was needed for the conclusion to follow.

Of course, there can be more than one hypothetical reason used in an argument. Here's one with four of them. It's an adapted version of one that was used in 2012 by a Singaporean sociologist, Paulin Straughan, about Singapore's concern about its low birth rate.

If we get rid of the Primary School Leaving Examination (PSLE, an exam taken by all primary school children in their final year, and used to select children for secondary schools), then we will free schools from the obsession with testing. If we do that, then teachers can focus on teaching and learning rather than preparing children for the PSLE. If children aren't having to be judged by their performance in a test, then their parents won't have to spend lots of money in extra tuition for them. If parents won't have to spend this money, they'll be able to afford to have more children. Therefore, to increase the birth rate in Singapore, the PSLE should be scrapped.

In hypothetical arguments, we might see what appears to be a well-connected chain of reasons. (However, don't forget the issue that such a chain of reasons was a problem in slippery slope arguments.) This one might look well-connected but we shouldn't forget to look for assumptions that, as ever, connect different parts of an argument. If we look at this one, we find a crucial one between the final reason ('If parents…') and the conclusion. This is a further hypothetical: 'if Singaporean parents can afford to have more children, then they will have more'. It doesn't follow without this assumption. Thus, as we can see, we need to evaluate hypothetical arguments in terms of the links between each part, including assumed claims.

Here's another hypothetical argument.

There is no such thing as 'alternative medicine'. If remedies and procedures work, then they're simply 'medicine' and should be regulated accordingly. If they don't work, then they're not medicine, alternative or otherwise.

This is a simple argument that uses both hypothetical reasoning and the issue of definition to draw its conclusion. It's a very compact argument, centred upon a definition of 'medicine', such that, if you accept the definition, then the conclusion follows nicely. (Of course, those who support what is called 'alternative medicine' might respond by saying that it is the word 'alternative' that is the important one here: it refers to 'medicine' that is offered outside the mainstream of normally-practised Western medicine.)

It's worth noting that, though hypothetical arguments can easily be spotted by looking for the 'if…then' construction (or something similar), not all claims that contain 'if' are going to be hypothetical ones.

We should better regulate the way in which mass-market clothes are produced in factories in countries like Bangladesh, Pakistan, and India. At present, we cannot be sure if the working conditions (including wages) of those who work in these factories are at least adequate.

The above argument could have continued with a hypothetical ('If the conditions are not adequate, then something will need to done.') but, as it stood, the 'if' didn't indicate one.

Absurdity and two other things

We're now going to look at three further examples of types of argument (although, technically, one isn't a type of argument at all). Look at the next claim. As you can see, it's a principle.

No child should ever suffer pain.

On the face of it, this looks like an unremarkable claim, the sort that children's charities might use in their appeal for funds. But, being in an unsentimental mood, we want to look at this claim critically.

You say that 'no child should ever suffer pain' but that would mean that no child must ever be given an injection (because of the risk of a small amount of pain), or allowed to go on a bike (in case they fall off), or have a toothache, or have a pet (in case the pet dies, causing emotional pain), or do most of the things that a child can expect to do in the course of their childhood.

As you can see, our response shows that the initial claim has to be rejected simply because it is one that cannot avoid nonsensical consequences. There is a term for what we have done here. It's another Latin one: ***reductio ad absurdum***. It's pretty clear that this means 'to reduce to absurdity'. We have shown that the principle cannot be supported because we can show that putting it into operation would be absurd. Even variations on it can't avoid the problem of *reductio ad absurdum*.

No child should ever suffer avoidable pain.

What counts as 'avoidable' is a central problem and this problem takes us back to absurdity, with the same questions about health care, and so on.

No child should ever suffer a lot of pain.

Now we not only have the huge problem of the meaning of 'a lot of' but also the same absurdities of not treating children with medical care, and so on.

Using *reductio ad absurdum*, we can see that claims can sometimes be rejected. There are two further types of rejection of claims. The first is a common one used in debates.

A: Global warming at a rapid rate is now an established fact.
B: I refute that absolutely. Global warming at a rapid rate is anything but an established fact.

B's claim to have refuted A's claim is simply not the case. They have done no more than rejected A's claim: to use a critical thinking term, B has done nothing more than to **repudiate** A's claim. Just rejecting the other side's position doesn't get us beyond the starting blocks, so to speak. It might be a way of starting the process of counter-argument, by clarifying one's position, but it is no more than that. However, look at the next exchange between A and B.

A: Global warming at a rapid rate is now an established fact.
B: No, it isn't. There is plenty of evidence that shows that the Arctic ice-cap grew by 60 per cent in 2013. There is also evidence that indicates that the previous warnings about the speed of global warming are in fact wrong: if there is any warming at all, it's happening much more slowly than was originally predicted.
A: That's simply not the case.

In this version, B doesn't simply respond with repudiation. B opposes A's claim by giving evidence that very much questions it. B is engaged in **refutation**, seeking to show that A's claim is not just to be questioned, but is false. (You will have noticed that A responds with no more than repudiation.)

A much simpler example of refutation would be this.

A: No woman has ever won a Nobel Prize in more than one subject.
B: That's not true. Marie Curie won the Nobel Prize for Physics in 1903 and for Chemistry in 1911.

Quite simply, B has effectively refuted A's claim by showing it to be false.

CHAPTER 9: PULLING IT ALL TOGETHER

Critical thinking is best seen as a set of skills – the skills of analysis, evaluation, and production of reasoning. Like all activities that involve skills (such as playing tennis, chess, and the piano), we get better at it the more we use them. In this way, it's of little value in simply acquiring the skills: we also need to use them, actively and often.

You should therefore use them whenever you can – in school and college work, when looking at/listening to adverts, when researching material, when listening to (and participating in) discussions and debates, and so on. Critical thinking is, in this way, a combination of skills and the desire to use them, to see them as helpful, indeed as valuable.

To cement your understanding of the skills developed in this book, do the following exercises.

PULLING IT ALL TOGETHER EXERCISES

(1) TO TATTOO OR NOT TO TATTOO?

Read the following passage and answer the questions that follow it.

The increase in the number of people with tattoos is a good thing. According to a worldwide survey carried out by the HSBC bank, 46 per cent of people see tattoos as 'self expression'. However, in the UK, 30 per cent of people described them as 'down-market', compared with only 7 per cent of those in the US. It must be significant that there is a large number of US A-list celebrities who have tattoos. In the Top Twenty-Five Tattooed Celebrities list, there are fifteen females and eleven males. The top is Angelina Jolie who has at least twelve. Hugh Hefner (the owner of 'Playboy') described fourth-placed Jessica Alba as the 'Sexiest Woman Celebrity in the World' and she has many tattoos. Obviously, people with tattoos are seen as very attractive.

People like David Beckham and Robbie Williams have been responsible for an increase in people wanting tattoos in the UK, but the growth hasn't been as great as it has been in the US (where 1 in 10 adults has one). This could change, however. Given that in 2103 the UK Prime Minister's wife had a tattoo (a dolphin on her ankle), this must have contributed to an increase in the number of women having tattoos.

The third of the UK population who see tattoos as 'down-market' should remember that the upper class used to have them. For example, the Queen's grandfather and great-grandfather, George V and Edward VII, had them. (Perhaps, secretly, the torso of Prince Charles is covered with Chinese inscriptions, hearts, and raging dragons.) The increase in the number of people having them will make tattoos seem less 'down-market'.

Though 75 per cent of people with tattoos regret having them done, it is right that people are allowed to make mistakes. After all, it is possible to have them removed.

Lots of people have cosmetic surgery in order to change their appearance. In this way, having a tattoo is like having cosmetic surgery. By improving their self-image, tattoos make people happier. In addition, tattoos are a good way of allowing people to be creative. They're not really any different from someone spending money on clothes as self-expression.

TO TATTOO OR NOT TO TATTOO?

Questions

(A) What is the conclusion of the above argument?

(B) What are the four reasons that are used to support the conclusion?

(C) In the first paragraph, the author sees a causal link between the 'large number of A-list celebrities who have tattoos' and what other piece of evidence?

(D) What assumptions must the author make to argue for the causal link identified in (C)? Give at least two.

(E) Evaluate the way in which the author argues at the end of the first paragraph that 'people with tattoos are seen as very attractive.'

(F) What assumption is needed for the author to argue that the UK Prime Minister's wife having a tattoo 'must have contributed to an increase in the number of women having tattoos'?

(G) In the third paragraph the author claims that 'The increase in the number of people having them will make tattoos seem less "down-market".' To what extent is this claim supported by the evidence on the upper classes?

(H) What is the significance of the fourth paragraph for the author's argument?

(I) In the final paragraph, the author uses two analogies. Identify these.

(J) Evaluate the analogies identified in your answer to question (I). You need to identify similarities and differences.

(K) Identify a principle in the passage.

(2) NO MORE CHEAP DRINK

Read the following passage and answer the questions that follow it.

It's often argued that, since most people drink only in moderation, any policy to control alcohol-consumption should not affect this sensible majority. Instead there should be a campaign which targets the drinking culture among young people.

However, the alcohol problem in the UK is far more serious than one of just drunken teenagers. A law which makes alcohol in the UK very much more expensive should be introduced as soon as possible. The price of alcohol has gone down in real terms. Compared to twenty years ago, alcohol is 70 per cent cheaper now. It cannot be coincidental that, during this time, the percentage of females binge-drinking almost doubled.

Cheap alcohol has all sorts of negative health consequences. Between 2003 and 2010, there was a 69 per cent increase in the number of admissions to hospital involving people with an alcohol-related disorder. In addition, whilst every other major cause of death (including cancer and heart disease) fell over the past thirty years, deaths from liver disease (much of it drink-related) rose.

Opponents of the policy of making drink much more expensive say that people should be allowed to make their own choices to drink or not. But making it more expensive still gives them that choice. Furthermore, when people's behaviour has serious negative social consequences, it should be controlled. The total cost to society is at least £50 billion a year. This is because of crime, public disorder, damage to families, 17 million lost working days, accidents involving drunk-drivers, and so on.

If we continue, through low prices, to encourage people to keep drinking alcohol, then we must think that people should be allowed to behave in a wide range of destructive and anti-social ways. However, we have justified restricting choice with other behaviours, such as seatbelt-wearing and smoking in public places. Iain Duncan Smith, a Government Minister, has argued that 'alcohol is every bit as dangerous as illegal drugs. You can argue that it's more dangerous than heroin because it's easier to get.' So, given that we justify restricting the use of various drugs through criminal penalties, we are certainly justified in restricting alcohol by making it much more expensive.

NO MORE CHEAP DRINK

Questions

(A) What is the main conclusion of the argument 'No more cheap drink'?

(B) What is a principle used by the author in support of their argument?

(C) What further principle could be used in support of this argument?

(D) What is the counter-argument in the passage?

(E) What is the function of the following claim (final sentence) in the argument?

'We are certainly justified in restricting alcohol by making it much more expensive.'

(F) What must be assumed by the author in order to use the evidence (in the third paragraph) on hospital admissions between 2003-2010?

(G) Explain two weaknesses (and one strength) of the evidence on liver disease (third paragraph) for the author's argument.

(H) Explain why the way the author uses the following evidence (2nd paragraph) could be a problem.

'Compared to twenty years ago, alcohol is 70 per cent cheaper now. It cannot be coincidental that during this time, the percentage of females binge-drinking almost doubled.'

(3) THE PRICE OF ALCOHOL IS NOT THE PROBLEM

Read the following passage and answer the questions that follow it.

The supermarkets' very low prices for alcohol are often blamed for people drinking. However, they don't see themselves as responsible for this. They have a point. Much of the supermarket sales are to people drinking at home rather than going to pubs or clubs where the prices are much higher. The chief executive of the supermarket chain Iceland asks what the price of alcohol has 'got to do with kids acting like hooligans and having a riot down town? The drink problem in Britain is a youth culture issue and is nothing to do with retailers selling alcohol.' The British Retail Consortium (which represents leading supermarkets) stresses that 'We already have some of the highest alcohol taxes in Europe. Pushing up prices won't make a difference.' The lack of a link between the price of alcohol and how much is drunk is important. As the Wine and Spirit Trade Association has pointed out, 'alcoholics wouldn't be deterred by price hikes.' Forcing the price up might well discourage the millions of moderate drinkers, but it wouldn't solve the problems to do with drinking.

Questions

(A) Evaluate the significance of the following claim (4th sentence).

Much of the supermarket sales are to people drinking at home rather than going to pubs or clubs where the prices are much higher.

(B) Evaluate the following reasoning in the argument (5th and 6th sentences).

The chief executive of the supermarket chain Iceland asks what the price of alcohol has 'got to do with kids acting like hooligans and having a riot down town? The drink problem in Britain is a youth culture issue and is nothing to do with retailers selling alcohol.'

(C) Evaluate the following reasoning in the argument (seventh sentence).

'We already have some of the highest alcohol taxes in Europe. Pushing up prices won't make a difference.'

(D) Evaluate the following reasoning in the argument (last but one sentence).

As the Wine and Spirit Trade Association has pointed out, 'alcoholics wouldn't be deterred by price hikes.'

(E) Evaluate the following reasoning in the argument (last sentence).

Forcing the price up might well discourage the millions of moderate drinkers, but it wouldn't solve the problems to do with drinking.

And finally…

Now that you have got this far in the book you should be a much more competent thinker in so many ways. Head out into the world and make a difference to people's often poor thinking. As Einstein said, 'Anyone who uses their own brain too little falls into lazy habits of thinking.' That's not something you want to happen to you.

So, just to finish, here's a further claim: 'Watching too much TV is as harmful as smoking'. We consider this claim here, taking it apart, looking at possibilities, and looking at issues of consistency. It's critical thinking in action: critical thinking that therefore makes a big difference.

Reading books can kill you

In August 2011, UK newspapers were full of scary headlines along the lines of 'Watching too much TV is "as harmful as smoking"' (*The Times*) and 'Is your TV killing you?' (*Daily Mail*).

The second of these headlines has an attention-grabbing effect to question whether TVs can in themselves kill us. It has the same effect as the *Daily Express* claiming 'TV a health hazard'. Both of these suggest a straightforward causal effect: the TV itself is the cause of our ill-health (or, more worryingly, our death).

The study appeared in the *British Journal of Sports Medicine* and was based on Australian evidence which had looked at diabetes, obesity, and lifestyle. The authors felt able to generalise from this evidence to the UK, given a number of similarities (including the average amount of time spent each day watching TV – four hours in the UK). But the way the evidence is reported has a distorting effect.

The central claim of the study is that being sedentary (sitting down) for long periods increases the risk of dying earlier. As we can see, this isn't the same as saying that TV watching in itself increases the risk of dying earlier.

TVs in themselves do nothing: it is the fact that one tends to watch them sitting down. This shift in significance (though pretty obvious) is a timely reminder that causal relationships might not always be as simple as they appear. (Or, more significantly, might not be as simple as they are presented.)

Given the claim that being sedentary for long periods is the problem (due to the lowered physical activity and the increased likelihood that one will eat unhealthy foods and snacks whilst doing so), it would be consistent with the claim that spending a long time travelling by car would also be a problem. The authors of the study agree. So the headline could just as easily have been 'Is your car killing you?' or 'Cars a health hazard'. But since we're used to thinking of cars as potentially dangerous, the impact would have been less.

As you can see then, the problem of long periods of being sedentary would also mean that one might be able to claim 'Office work a health hazard' and 'Office work shortens your life'. Similarly, the evidence could be consistent with 'Computers can kill you' and (very worryingly) 'Reading books a health hazard'.

The assumptions that are needed to connect the evidence on the problems of being sedentary with TV watching include the following.

- Those watching TV are not active for the rest of the day.

- Average time spent watching TV is taken in single long periods (rather than interspersed with activity).

This evidence (or, more importantly, the inferences that are drawn from it) might well be telling us something significant. But we have to careful in both drawing and evaluating these inferences.

In commenting on the coverage of this in the *Daily Mail* via the newspaper's website, a contributor called Pete made this point.

'If you switched off your TV and decided to walk along the middle of a motorway during rush hour, how much time would be knocked off your life then?'

Indeed. Now there's critical thinking for you.

ANSWERS TO AND DISCUSSION OF EXERCISES

FINDING ARGUMENTS EXERCISE: DISCUSSION – P9

(1) This is not an argument. Whichever order you put these three sentences in, you cannot find one of them which is a conclusion supported by the other two. For example, putting something like a 'therefore' or 'thus' at the beginning of the third sentence would show you that this sentence cannot be a conclusion drawn from reasoning in the two other sentences. Trying either of the other two sentences as a conclusion will show the same thing: the author hasn't intended to produce an argument.

(2) This is an argument. The conclusion is the third sentence and is supported very well by the reasoning in the previous two. In fact, the conclusion could be nothing less than that given in the passage. If local representatives should serve the community, and if the ***only*** way local representatives can serve the community is to be independent of political parties, then we have to conclude that such people must be independent.

(3) This is also an argument. The first sentence is the conclusion. Reorder it and see how it works.

Since the sale of ivory has been banned, the price of ivory has increased enormously. Ivory poachers are motivated solely by money. (Therefore) banning the sale of ivory is not a good idea.

You can see that the conclusion that banning the sale of ivory is not a good idea is supported by the reasoning in the other two sentences. Given that a ban on the sale of ivory has increased its price and that ivory poachers are motivated solely by money, we can expect that the ban has had the effect of encouraging poaching. This last part is missing from the argument as it is written but it is taken for granted by the author. We will look at this point of missing reasoning in detail in Chapter 3.

(4) This is an argument. The second sentence is drawn from the first and the third.

(5) This is not an argument. Though the second and the third sentences could provide something of an explanation for the claim in the first, there is no conclusion drawn from reasons.

JOINT AND INDEPENDENT REASONS EXERCISE: DISCUSSION – P9

(1) The two reasons act independently. Both safety and low cost support the conclusion, but it could have been drawn from either of these reasons.

(2) Again, the two reasons act independently. We could draw the conclusion that smoking should be discouraged on the strength of either its link with heart disease or with cancer.

(3) In this example, the reasons operate together. We could not draw the conclusion if one of the reasons was missing. It is the way in which the two reasons provide the link with heart disease and the cost of this disease which enables us to draw the conclusion.

(4) In this example, the conclusion is drawn from two reasons operating independently. The conclusion that it is surprising that Australian soap operas are popular with adults could be drawn using either reason.

(5) The conclusion that 'these members should resign' could be drawn from either of the reasons, so this is an example of independent reasoning.

(6) The conclusion is the first sentence. It is drawn from both reasons acting jointly. This is because it could not be drawn from each claim acting independently, given the way the conclusion needs information on the pollution from both coal-fired and nuclear power stations.

LOOKING AT ARGUMENTS AND EXPLANATIONS: DISCUSSION – P14

(1) This provides an explanation for why people are more adventurous when buying clothes online than in a shop: 'in a shop, people feel much more self-conscious about being seen to choose something that looks less conventional'. This explanation is then used to support the conclusion that 'Fashion companies need to put their more unusual clothes on their websites rather than in their shops'. In this way, this passage has both an explanation and an argument.

(2) This provides an explanation for why the popularity of 'hot yoga' is increasing: 'People think that the more you sweat, the better the exercise must be'. This explanation is then countered by a further explanation to show that people's belief is wrong: 'Sweating is not necessarily the same as burning calories'. In this way, we can see that this passage has two explanations, but no argument.

(3) In the first two sentences, the author provides an explanation for why 'hundreds of thousands of people (are) being pushed out of the retail industry'. An argument is then given in which what has been explained is used together with the claim that 'the retail industry is normally one of a developed economy's biggest employers' to support the conclusion that there will be 'big increases in unemployment in many countries around the world'. Thus this passage includes both an explanation and an argument.

(4) Again, as with (1) and (4), this contains both an explanation and an argument. How blue light 'interferes with our sleep-patterns' is explained by the stopping of the release of melatonin and by the activation of 'the brain's neurons that boost alertness'. This explanation is used to support the conclusion that 'people ought to switch off all this "blue light" equipment long before they go to bed'.

(5) This is an argument without an explanation. The first two sentences provide independent reasons for the conclusion in the third. Though the method of the creation of 'meat' in a laboratory is referred to ('using animal stem cells'), this is no more than a description of the process, rather than an explanation.

FINDING ASSUMPTIONS EXERCISE: DISCUSSION – P19

(1) This argument moves from the claim that the amount of vandalism in the park has increased, to a suggested solution to the problem: more people should be employed to patrol the park. Connecting the reason with the conclusion is an assumption that more people patrolling the park will result in a reduction in vandalism. Unless this assumption is made, the move from reason to conclusion cannot be made.

You might have come up with a different or an additional assumption: people who commit vandalism are deterred by the presence of patrols (or something like this). This is also correct and identifies an assumption which we need to slot in before the one we identified first.

A further assumption is that vandalism in the park is a bad thing. This might seem pretty obvious (surely vandalism, by definition, is a bad thing?) but it still needs to be assumed for the conclusion to follow. This is similar to the assumption, in the gymnastics argument, that injuries to students are a bad thing.

(2) In this argument the decline in the number of people coming to the zoo is used as the basis of the recommendation that the zoo's entrance charge should be reduced. The assumption connecting the two is that 'people are put off coming to the zoo because of the entrance charge'. In other words, the author is assuming that there is no other useful explanation for the decline in numbers than that the entrance charge is too high. Alternative explanations could include that the zoo is not seen as caring for its animals, and that a more popular zoo/animal park has been opened in the area. We could then specify the assumptions to include these. For example, 'The decline in visitor numbers is not due to the zoo being seen as not caring for its animals.'

A further assumption is that the zoo wants to increase the number of people visiting it. (Again, we might think, this is pretty obvious but technically it is required for the conclusion to follow.)

Another assumption is that there is no other useful way of increasing visitor numbers than to reduce the entrance fee.

(3) The author draws a conclusion about the cause of an increase in the number of people who are vegetarians from two claims about vegetarianism. To draw this conclusion, an assumption must be made that there is no other possible useful explanation for the increase. There are, of course, other explanations.

The most obvious is that many of the people who have become vegetarian might not have been influenced by the evidence on health, but by moral considerations. In this way, we could specify an assumption as 'Moral considerations are not the explanation for the increase in people become vegetarian'. Other possible explanations could be could be the increased availability of vegetarian food in supermarkets and an increase in the amount of advertising of vegetarian food. Assumptions could then be specified using these other explanations (for example, 'It is not the increased availability of vegetarian food that has caused the increased number of vegetarians.')

(4) This provides another example in which the author has to assume only one useful explanation. In this case, it is that the increase in the number of people taking holidays in the UK was caused by the good weather. Unless this causal link is assumed, the conclusion about the behaviour of people next year cannot be drawn.

As before, the author would have to reject other possible explanations for the increase in the number of people holidaying in the UK. For example, it could be that people from the UK are unable to afford foreign holidays. Thus the author would have to assume that this possible explanation is not the actual explanation.

There is also another assumption required in this argument. It's the sort that's often made so you might not have picked it out. In its general form, it's that 'the past (or the present) can be used as a guide to the future'. Without this assumption, the evidence from this year cannot be used as the basis of a prediction for next year. (You might want to question this assumption in this argument in that the evidence from one year could be seen as insufficient for a prediction for another year.)

(5) The conclusion that teachers' complaints about over-large classes shouldn't be taken 'too seriously' is based on a contrast between the size of classes now and that of 'about forty years ago'. In some ways, then, the assumption required is somewhat similar to that discussed in the previous paragraph. Specifically, the assumption required is that 'conditions in schools are (largely) the same now as they were about forty years ago.' The shift from the past to the present in this argument can be justified only if the past is relevant to the present. If we could show how conditions in the past were relevantly different from those in the present (for example, teaching techniques), then this assumption cannot be made.

A further point here is that the author has to assume that teachers today are not more willing to complain than were teachers of forty years ago.

FINDING THE STRUCTURE OF ARGUMENTS EXERCISE – P24

CA = counter-argument; Ex = example

(1) (R) Food and drinks marketed for children by supermarkets are higher in fat, sugar, and salt and are lower in nutritional value than general food and drinks products. (IC) Thus supermarket products for children will be much less healthy than general products. (C) It's clear that parents shouldn't buy food and drinks marketed for children by supermarkets.

R
↓
IC
↓
C

(2) (CA) There is a huge concern that we should change the way we live because of the issue of global warming. (C) But we should stop being so obsessed with it, at both the governmental and the individual level. (R1) There is considerable evidence that, if global warming is taking place, it is at a much lower rate than was originally predicted. (R2) Policies to deal with the supposed problem restrict energy use. (R3) Restricting energy use harms economic growth. (R4) Harming economic growth sacrifices present generations for unborn future ones. (R5) This sacrifice can't be justified.

R1 R2 + R3 + R4 + R5
↘ ↓

C

(3) (C) The retirement age should be raised to at least 72 (and preferably 75). (CA) Retirement, we hear, is something that should be looked forward to, because of its years of comfortable leisure. (IC1) The evidence on the negative effects of retirement, however, contrasts strongly with this view. (R1) Retired people have a much higher level of reporting themselves as not having good health than those people who continue working beyond the retirement age. (Ex) This includes having much higher rates of depression. (IC2) There is considerable benefit in people working beyond the retirement age (at present, anything as low as between 60-65). (R2) There's the advantage of a higher income. (R3) Travelling to and from work can provide a useful source of exercise. (R4) In addition, work provides a good social network for many people.

R1 R2 R3 R4
↓ ↘ ↓ ↙
IC1 IC2
↘ ↙
C

LOOKING AT THE USE OF EVIDENCE IN ARGUMENTS EXERCISE – P37

(1) The correct answer is (D).

The author uses evidence of 'heavy rain and unexpectedly severe typhoons' that followed the use of silver iodide crystals to encourage rain over North Vietnam in order to show that such a method gives us the 'ability to control the weather'. This is a *post hoc* argument and has the possible weakness that the heavy rain and typhoons didn't happen because of the use of silver iodide crystals, but as a result of natural events.

Though the author argues that the claimed ability to control the weather should be used 'for peaceful purposes', (A) does not point to a weakness in the argument as such. Even if the weather could be controlled for military purposes, the conclusion could still be drawn.

Though the author argues for using the silver iodide method to create rainfall, this is only in 'some areas affected by drought'. This is not weakened by pointing out that not all such areas would benefit. The author's argument would be consistent with this claim, so (B) is incorrect.

Even if 'scientific knowledge about weather-creation' is greater now than it was in 1971, the conclusion about using this for 'peaceful purposes' is not inconsistent with this. (It could be seen as being strengthened by this claim.) So (C) is not correct.

The conclusion uses the example of 'creating rainfall in some areas affected by drought' and this is not inconsistent with also seeking to reduce rainfall, so (E) is not correct.

(2) The argument has the following structure:

R_1 If people who claim to have been abducted by aliens really have been abducted, then we would need to take reports of UFO sightings very seriously.

R_2 There are many possible explanations for such apparent abductions ranging from obvious untruthfulness on the part of those claiming abduction to hallucinations and temporary paralysis.

C Given that we can explain these apparent abductions in ways that do not involve aliens, we do not need to take reports of UFO sightings seriously.

This argument has the form 'if A is true, then B is true; A is not true, therefore B must not be true.' This is a weak argument in that one cannot conclude B is not true even if it is established that A isn't. In this example of the form, if it could be established that aliens had abducted people, then this would show that alien spacecraft must have come to Earth. Given this, we would need to take very seriously UFO reportings. But even if we could explain all such claimed abductions in such a way that aliens were not involved, this does not mean that we should not take reports of UFO sightings seriously. For example, even if no abductions have ever taken place, UFOs could still be visiting Earth frequently. Thus the explanations for claimed abductions do not enable us to dismiss the significance of UFO sightings. (E) expresses this and is therefore correct.

(A) is not correct. Though this shows that the link between claimed abductions and sightings might be a weak one, it does not show why the conclusion could not be drawn. The argument is based on the reasoning that, if abductions were real, then so are UFOs.

(B) is not correct. The claim that those who say they have been abducted do not accept the explanations might be used to weaken the status of the explanations themselves. But the weakness in the argument is not the status of the explanations: it is the way in which the author moves from the reasoning to the conclusion.

(C) is not correct. This misrepresents the significance of the explanations for apparent abductions by aliens. As such, it cannot be a statement of the weakness in the argument.

(D) is not correct. Even if this were to be true, the author does not claim that the explanations for apparent abductions are also used in relation to reports of UFO sightings. Therefore (D) does not identify a weakness in the argument itself.

(3) The author contrasts the decline in the number of sharks with the 'increase in the recorded number of unprovoked attacks on humans'. They argue that this increase has been caused by the development of shark-watching dives. However, just because there has been the growth of shark-watching dives, this does not mean that they have been the cause of the decline in the number of sharks (a *post hoc* argument).

(C) provides an alternative explanation, so points to the weakness in the reasoning.

Given that the author isn't referring to specific species of sharks, the fact that 'some species of shark are more dangerous than others' is not relevant here, so (A) is not correct.

The reference to 'chum' is not saying that this is the only way to attract sharks, so (B) is not correct.

Though (D) might seem to be pointing to a problem in the argument by making the point that those on shark-watching dives are not the group most likely to be attacked, it doesn't weaken the explanation given by the author. In fact, it could be entirely consistent with the argument.

(E) is incorrect. The author is seeking to explain why the number of unprovoked attacks by sharks on humans has increased. That there are greater risks to humans at sea is not relevant to this argument.

(4) The argument uses no more than the example of Adam's company to draw the general conclusion. This is clearly a problem of over-generalisation, and so (A) is correct.

(B) is not correct. Though the author argues that Adam's company was successful despite the advice of 'bankers, business consultants, and financiers', the author is not committed to claiming that 'they don't know what they're talking about'. (For example, they might have expertise in how to run companies, how to invest in shares, and so on.)

(C) is not correct. The author's point is that Adam's company was successful despite what the experts said. This is not equivalent to saying that it would have been less successful with their support.

(D) is not correct. Though the argument does fail 'to tell us whether Adam had any business experience before launching the company', this is not relevant to the argument, so does not point to a weakness in it.

(E) is not correct. The author is not generalising from business to life, so this point does not point to a weakness in the argument.

(5) We need to ask a central question about the possible significance of the evidence. The central question is the following.

- Does the evidence show that 'harm-minimization' has a higher risk than zero-tolerance of young people not only drinking alcohol but also of having 'alcohol-related consequences'?

In asking this central question, we need to ask sub-questions about the detail of the study. These are some of them.

- Can we usefully generalise from 'almost two thousand 12-13-year-olds' in two different parts of the world?
- Can we usefully generalise from a study of US and Australian 12-13-year-olds to those in other countries?
- Can we usefully generalise from Victoria and Washington State to other parts of the world?
- Do we need to know about how 'harm-minimization' and zero-tolerance worked? (For example, how much alcohol was allowed under the first of these?)
- Do we need to know whether the young people saw their parents drinking at home?
- Do we need to know whether alcohol was available in the home?

In looking at some of the detail of the findings, there are some things that are worth focusing on in an evaluation of the evidence.

- The finding about how many of the teenagers had 'drunk alcohol in the presence of an adult' is perhaps not surprising at one level. However, there are two things that need attention. First, only two-thirds of the Australian young people 'had drunk alcohol in the presence of an adult' even though 'harm-minimization' allowed (indeed encouraged) this. Second, a third of the US group had done this, even though a zero-tolerance policy does not allow it.
- What are called 'alcohol-related consequences' are part of what the study calls 'harmful consequences' of alcohol. The ones detailed in the argument can be seen as fairly extreme (especially passing out and fighting). It would be helpful if the above argument had provided any detail on the less extreme consequences.
- As with any study on alcohol use, there are the issues of honesty in reporting. Though the figures are usefully different between the two groups, we need to know whether 'harm-minimization' is likely to lead to young people having a greater willingness to admit to drinking (and to having had its consequences) compared to those where zero-tolerance is stressed.

In evaluating the argument, the issue of explanation will be of central importance (as it is in any evaluation of the significance of evidence). Is it straightforwardly the case that the two different approaches are *the* explanation? In approaching this question, others could be asked.

- What about the issue of the general acceptability of alcohol in the two states? (For example, is alcohol more tolerated in Victoria than in Washington State?)
- What about the ease of availability of alcohol? (In Australia it can be legally purchased by those 18 or over; in the US, it cannot be legally purchased by those under 21.)
- What about the price of alcohol? (The relatively low price of alcohol is often used as part of the general explanation for the high level of teenage drinking in the UK.)
- What about health education programmes in the two states?

It can be seen that these alternative possible explanations focus us on the issue of correlation-causation. Do answers to any of the above questions provide an alternative cause? (Do they, in combination, provide an alternative cause?) Thus, just because the zero-tolerant Washington State had lower levels of alcohol use, does this mean that the zero-tolerance policy is the cause? (The same sort of question, of course, needs to be asked of Victoria's harm-minimization policy.)

Answers to these questions would enable us to evaluate assumptions that the author of the argument must make. One of these is the following.

- The higher level of drinking amongst young teenagers in Victoria compared to those in Washington State is caused (at least in part) by the 'harm-minimization' policy.

The other side of the coin is also, of course, assumed.

- The lower level of drinking amongst young teenagers in Washington State compared to those in Victoria is caused (at least in part) by the zero tolerance policy.

The author sees the different policies towards early-teenage drinking as the cause of the different outcomes. To what extent can we accept this? In other words, what other explanations might there be?

As we can see, evaluation of evidence (and arguments using it) is a very creative exercise. It encourages us to ask questions about what the evidence might mean, what else it might mean, and what more we might need to know.

ATTACKING THE ARGUER NOT THE ARGUMENT EXERCISE - P44

(1) In this argument, the fact of Mr Busby's family link with the company AB Construction is used to question the conclusion that the company should be given the contract. In situations like this, in which there might be a conflict of interest between Mr Busby's position with the council and his link with the company, we would expect that this information could (and indeed should) be used to question the recommendation. In this example, a personal fact is used relevantly to draw a conclusion. Furthermore, the conclusion drawn in the argument is a very moderate one: it is not saying that AB Construction should not get the contract but that all the evidence should be looked at. This argument is not, therefore, an example of attacking the arguer not the argument.

(2) Mary Seacroft's argument is that, in order for children to learn self-discipline and respect for others, we should bring back corporal punishment in schools. The arguer uses information about her apparently badly-behaved children to refute this argument. But this information is irrelevant to an evaluation of Mary Seacroft's argument: the behaviour of her own children has got nothing to do with whether or not corporal punishment would teach children the values she claims. Think of it the other way round: if her children were perfect examples of self-discipline and respect for others, would this fact make her argument any stronger? Of course it wouldn't. You would probably recognise this type of argument as a familiar one used in some newspapers. The assumption is that if you discredit the person, you discredit the argument. As you can see, in this example, the argument remains untouched.

(3) In this argument, one item of reasoning ('MAD' has attacked all other proposals') supports the conclusion ('we shouldn't seek to change the proposals'). Though the argument includes an abusive use of the organisation's title, it is not that part of the argument which is doing the work for the conclusion. In consequence, the argument does attack the arguer, but it is not this attack which attacks the argument.

WEAKNESSES IN ARGUMENT EXERCISE – P54

(1)

(A) This throws something back at the person who wants more severe punishments for those who create graffiti. But it isn't an accusation that they are just as bad as the graffiti-creators. It attacks their argument in a different way, by arguing that they might be inconsistent in attacking graffiti but defending other forms of art. Of course, the person who is being argued against could simply respond by saying that they don't agree that the creation of graffiti is a form of art.

(B) This does use a form of *tu quoque*. It argues that Matthew Claxton shouldn't be seen as a bully because the school itself could be seen as bullying by imposing school uniform. The accusation that Claxton is a bully is not answered by pointing out that the school is the same. He's a bully. That's it. There is, of course, the further issue of the conflation of 'bullying' with the requirement to wear school uniform.

(C) The accusation of greed that you have made about me can still be made even if I can argue that you have also been greedy. In this way, the author is using a *tu quoque* argument.

(2)

(A) Correct. It is not necessary for those who like Jamie Oliver to have to eat his granola recipe, thus avoiding the consequent weight-increase problem.

(B) Incorrect. The conclusion refers to those who think Jamie Oliver is a good cook, so though the content of (B) is fine, it is not relevant to an evaluation of the argument.

(C) Incorrect. The author's conclusion refers only to those 'people who think that Jamie Oliver is a good cook'. Thus the argument is not concerned with those who don't think that he is. In addition, the argument does not see that those who 'put on a lot of weight' have to have eaten the granola with berry compote.

(3)

(A) Incorrect. The author does not argue that the number who have driving licences now (over three million) is to be explained by the figure for this age-group thirty years ago. This latter figure is given to emphasise how much the figure has grown, and not to explain why it has.

(B) Correct. The author argues that 'the trend for there to be many older drivers will continue.' This is drawn from the evidence of the recent increases, with the author taking it that the increases will continue.

(C) Incorrect. The author doesn't go straight from the fact of there being over three million in the 71 or over age-group who drive to the prediction that the trend will increase.

(4) This is a straw man argument. The conclusion that we should oppose the laissez-faire attitude to house prices is based on the position that people who support this 'don't worry about what the average person can afford.' This is then developed with a reference to the very rich and to highly-paid footballers, which very

much has the look of a (deliberate) distortion of what might be otherwise an acceptable line of argument.

(5) This is a slippery slope argument. The slippery slope begins with the third sentence ('If they are simply kept on some database…'). What follows is not an inevitable consequence of using fingerprint identification, given that there is no reason for pupils' fingerprints to be kept once they have left a school.

(6) The options in the conclusion are given as only two: the State bailing people out and them living in 'abject poverty'. This is an inappropriate restriction of the options in that there could be many more things that could happen when these people retire. They could be putting their money into other profitable things rather than pensions, such as property and shares. If this is the case, then they won't need 'huge financial support' and won't live in poverty.

(7)

(A) Incorrect. The conclusion that 'we should not take seriously the views of David Irving on the subject of the Holocaust' is drawn from the reason that 'the evidence against him is overwhelming…' This reason is not an attack upon Irving himself, but an attack on his position.

(B) Correct. The conclusion that 'we should not take (David Irving) seriously as a historian' is drawn only from the reason that 'he's both a bankrupt and an ex-prisoner'. Although the reason for his being a bankrupt and an ex-prisoner are to do with his denying the Holocaust, the author doesn't present it like that. It could be that bankrupts and ex-prisoners could be very good historians of the Holocaust.

(C) Incorrect. Though (ii) is an example of *ad hominem,* (i) is not. The conclusion that 'we should not take seriously the views of David Irving on the subject of the Holocaust' is drawn from the reason that 'the evidence against him is overwhelming…' This reason is not an attack upon Irving himself, but an attack on his position.

You are, however, right to see (ii) as *ad hominem*. The conclusion that 'we should not take (David Irving) seriously as a historian' is drawn only from the reason that 'he's both a bankrupt and an ex-prisoner'. Although the reason for his being a bankrupt and an ex-prisoner are to do with his denying the Holocaust, the author doesn't present it like that. It could be that bankrupts and ex-prisoners could be very good historians of the Holocaust.

(D) Incorrect. Though (i) is not an example of *ad hominem,* (ii) is. You are right to see (i) as not an example. The conclusion that 'we should not take seriously the views of David Irving on the subject of the Holocaust' is drawn from the reason that 'the evidence against him is overwhelming…' This reason is not an attack upon Irving himself, but an attack on his position.

You are, however, wrong not to see (ii) as *ad hominem*. The conclusion that 'we should not take (David Irving) seriously as a historian' is drawn only from the reason that 'he's both a bankrupt and an ex-prisoner'. Although the reason for his being a bankrupt and an ex-prisoner are to do with his denying the Holocaust, the author doesn't present it like that. It could be that bankrupts and ex-prisoners could be very good historians of the Holocaust.

(8)

(A) Incorrect. ‘A very large reduction’ looks as if it might mean that salt was ‘the main cause of strokes and heart attacks’. But we cannot be sure of this, so the author does not have to assume it in order to generalise from the Finnish evidence. There could still have been a large reduction in strokes and heart attacks if salt consumption was the second or third cause of them.

(B) Correct. The author has to assume this for the evidence on Finland to be relevant to the UK. If the Finns had a very high salt consumption, then a successful campaign to reduce salt consumption would have had very significant results for health. If that of the UK was much lower, then a campaign would not necessarily have the same effect.

(C) Correct. The author must assume that that the type of campaign used in the UK would be similar to that used in Finland. Without this assumption, the author can’t argue that a campaign in the UK ‘would have the same result’. For example, if the Finnish campaign used TV whereas the UK one used newspapers and leaflets, then the result might well be different.

(9)

(A) Here we have an appropriate appeal to popularity, given that the campaign for greater public information about bacteria is based on evidence that shows that 67 per cent misunderstand bacteria.

(B) Here we have an inappropriate appeal to popularity. It uses evidence on what people in 21 countries believe about the causes of climate change to conclude that governments of these countries should act on the basis of this belief. Quite simply, though the figures are big (79 per cent, 22,000 people, 21 countries), the argument does not consider that people might be wrong on this issue. (For example, they might be misinformed, have insufficient understanding, and so on.)

(C) uses an inappropriate appeal to popularity. The conclusion that the Government should introduce penalties for the parents of anti-social children is based on no more than the evidence that 63 per cent of people believe that such parents are largely to blame for the problem. It could be that people’s belief is wrong, making the inference also therefore wrong.

(D) uses an appropriate appeal to popularity. The conclusion that ‘it’s difficult for people to know what or not to eat’ is drawn from evidence which shows that people both overestimate and underestimate the amount of calories there are in food. Thus people’s beliefs are legitimately used to draw an inference from them.

ANALOGIES EXERCISE – P61

(1) The analogy is that between trying to ban the use of illegal drugs and trying to ban both cigarettes and alcohol.

The relevant similarities are the widespread use of all three and the widespread acceptance of all three. Another similarity which you might have identified is that there is evidence that all of them can do harm. However, in the analogy as it used, such a similarity is not relevant: the author isn't making use of this similarity in order to make their point. (However, you might have seen a relevant similarity in the fact that attempts to reduce smoking and alcohol-consumption are being made or have been made.) The differences you might have identified would probably have included the fact that, whilst drugs are illegal, both cigarettes and alcohol are (subject to certain age conditions) legal. Thus comparing the widespread legal use of goods with widespread illegal use of goods has a problem. Linked to this legal/illegal difference is the fact that cigarettes and alcohol are, unlike drugs, by and large freely available in various shops. You might also have mentioned the factors of advertising (with alcohol) and price.

So, on balance, is the analogy a good one or not? Of course, it should be pointed out that really there are two analogies being used, one involving cigarettes, the other using alcohol. Your judgement of the appropriateness of the analogy might well have taken this into account, such that you might want to say that its effectiveness is better with cigarettes than with alcohol or vice versa. But a central difference is the legality issue and this probably makes the analogy a fairly weak one. In this example, if you were to remove the analogy from the reasoning, the conclusion could still be drawn. It would depend on the strength of the reasoning in the first two sentences but the argument does not depend on the success of the analogy.

(2) In this argument, on the other hand, the analogy is central to the argument. If we take it out, we have only the first and the last sentence. The analogy is, therefore, easy to spot: driving cars too fast is like using offensive weapons.

What similarities are there? Is the author right to claim that 'cars can kill and injure in the same way as any offensive weapon'? In one sense, this is right. Cars are as dangerous as knives and guns in the injuries they can cause. But is this similarity relevant? The author moves from the claim that driving fast in a built-up area puts 'children's lives at risk' to an analogy with people coming into the area with various offensive weapons. The difference which weakens this analogy is that of intention. We assume that, though they might be reckless in their speeding, motorists do not intend to cause injury to children. The way the analogy works is that intention plays a crucial role. People 'brandishing guns, knives, and other weapons' are presumably intending to threaten in some way (the word 'brandishing' emphasizes the force of this presumption). Whilst motorists use their cars to go from A to B (hoping not to hurt people), people brandishing offensive weapons are likely to have a less useful purpose in mind. This question of intention is given further emphasis by the author's reference to the police. Whilst the police would act against those with offensive weapons, the author argues, they do not against motorists. But, of course, it is the point of intention which is relevant here.

The conclusion is that 'more action should be taken to stop cars coming into built-up areas.' This conclusion is broader in scope than the previous reasoning (including the analogy), in that it does not restrict itself to people who drive too fast. The analogy does not enable this broader conclusion to be drawn and so the argument needs stronger reasoning to support it.

FINDING PRINCIPLES EXERCISE – P63

(A) This is certainly a recommendation for the UN to act in a certain way, but it is not a general guide to action, so is not a principle. There's only one Zimbabwe and only one Robert Mugabe. So the recommendation can't be used to justify intervening in the Sudan, Syria, and so on.

(B) Unlike with (A), this is a general guide to action. It could be used to justify intervention in any country to which the condition applies.

(C) This is a straightforward principle. It gives a general guide to action such that there are no exceptions to allow child trafficking.

(D) This provides a general description of a feature of sheep, but does not provide a general guide to action or belief. If this statement was used to lead to 'sheep should be treated with respect', then we have produced a principle about sheep.

(E) This is a statement that certainly takes a general position – that the veal trade is very cruel - but it doesn't provide a general guide to action. It could, of course, be used to supply a principle – 'people should refuse to eat veal'.

(F) This does provide a general guide to action or belief. Those cultures – such as the Makahs in Washington State – who claim historical rights to kill whales would not be able to, given the enforcement of this principle.

(G) This is a statement of a general position but falls short of being a principle in that it doesn't recommend action. The principle that could be generated from this statement could be 'Dolphins should not be used for the supposed benefits of other species.'

ASSUMED PRINCIPLES EXERCISE – P63

(A) is not assumed. This is too weak for the argument. Though the argument is entirely consistent with this as a principle, the argument requires a stronger version. This is because the Government could 'help' the sick without doing what the argument concludes: to ensure that everyone with medical needs gets their needs met.

(B) is not assumed. Though this looks as if the author must assume this as a principle, it is too broad a principle for this argument. The argument is concerned only with meeting people's medical needs. Though increasing taxation to do this is how the author concludes, it is only to ensure the meeting of these needs, not needs in general.

(C) is assumed. The author argues 'that the Government can't allow' people with medical needs not to have them met. This position requires the principle (which is assumed rather than stated) that people's medical needs should always be met.

(D) is not assumed. This is too strong a principle for this argument. It does not require that sick people should always be given priority over others, just that their medical needs should be met. It could, for example, be consistent with the argument that a public building programme would give priority to schools rather than hospitals, as long as the cost isn't at the expense of medical treatment for all who need it.

PULLING IT ALL TOGETHER EXERCISES: DISCUSSION – P72-76

(1) TO TATTOO OR NOT TO TATTOO?

(A) The increase in the number of people with tattoos is a good thing.

(B)

- People with tattoos are seen as very attractive.
- The increase in the number of people having them will make tattoos seem less 'down-market'.
- By improving their self-image, tattoos make people happier.
- Tattoos are a good way of allowing people to be creative.

(C) Only 7 per cent of people in the US see tattoos as 'down-market'.

(D)

- The proportion of UK A-list celebrities with tattoos is not as great as that in the US.
- People's perception of something being 'down-market' or not is (at least in large part) determined by the behaviour of A-list celebrities.
- People in the US are aware of the number of A-list celebrities with tattoos.
- There is no other significant explanation for the low percentage of people in the US who see tattoos as 'down-market'.

(E) The author must assume that people will see those on the Top Twenty Five Tattooed Celebrities list as attractive. Just because the fourth person on that list has been described by Hugh Hefner as the 'Sexiest Woman Celebrity in the World' does not mean that she is seen by others as attractive. But, even if she was, it does not follow that her attractiveness is enhanced by her many tattoos. (Indeed, it could be that her perceived attractiveness is reduced by her tattoos.)

(F) Women would be influenced to have tattoos by the fact that the Prime Minister's wife had one.

(G) The evidence on the upper class does not support the claim that tattoos will be seen as less 'down-market' if more people have them. The author is making two separate points which are unconnected in the argument. The first is that those who see tattoos as 'down-market' should remember that the upper class used to have them. The second is that the more people who have them, the less 'down-market' they will seem. These might well be two useful claims, but they are not connected by inference.

(H) This does not play a part in the argument as such, in that it does not link with the conclusion. It could serve as a reason supporting a conclusion something like 'we should not be too concerned about the increase in people having tattoos.' But we cannot draw the conclusion that 'The increase in the number of people with tattoos is a good thing' from the claim that they can be removed if desired.

(I)

- Having a tattoo is like having cosmetic surgery.

- They're not really any different from someone spending money on clothes as self-expression.

(J) In each example, the judgement as to how successful the analogy is will depend on what you include in your listing of similarities and differences.

Having a tattoo is like having cosmetic surgery.

Similarities

- Both can change someone's appearance (as given by the author).
- Both can make people more attractive.
- Both can make people less attractive.
- Both can be either small- or larger-scale.
- Both will be as a result of personal choice.

Differences

- There could be more dangers in cosmetic surgery. (However, this could be given as the other way round, with reference to 'back street' tattoo parlours, risk of infections, etc.)

- Cosmetic surgery is likely to be much more expensive than tattoos.

- Cosmetic surgery can sometimes be necessary (as in disfigurements). It is very unlikely that tattoos are ever necessary (although they can be used to hide disfigurements).

- Tattoos can be offensive (offensive words and images), but it is unlikely that cosmetic surgery could be.

- Cosmetic surgery is (or should be) carried out by trained and experienced people. Setting oneself up as a tattooist requires much less training and experience.

They're not really any different from someone spending money on clothes as self-expression.

Similarities

- Both clothes and tattoos can change people's appearance.

- Both can be fit with fashionable trends (for example, the fashion for Chinese script in tattoos).

- Both can be attractive (colourful, appealing design, etc.)

- Both can look unattractive.

- Both are the results of personal choice (with tattoos, the choice to have them, and their design).

Differences

- Many people have tattoos which are not designed to be shown. For example, they might be very small and/or covered by clothes.

- Clothes can easily be changed (as fashions change, as someone's weight changes, as they get older, and so on). Tattoos can be removed much less easily. (The author is a little glib in just making the point that 'it is possible to have them removed.')

- Having a range of different clothes can be relatively cheap (unlike having a tattoo).

- Tattoos can be offensive (offensive words and images), but it is perhaps less likely that clothes will be.

- Tattoos can be much more personal than clothes, as in having names tattooed.

(K) It is right that people are allowed to make mistakes.

(2) NO MORE CHEAP DRINK

(A) A law which makes alcohol in the UK very much more expensive should be introduced as soon as possible. (2nd paragraph)

(B) The correct answer is 'When people's behaviour has serious negative social consequences, it should be controlled.' (4th paragraph)

There are other principles found in the passage, but they are not used by the author in support of their argument.

- 'People should be allowed to make their own choices to drink or not.' (This is used in a counter-claim.)
- 'People should be allowed to behave in a wide range of destructive and anti-social ways.' (This is in a hypothetical which is rejected.)
- 'We have justified restricting choice with other behaviours…' (This is a statement of what has been done.)

(C) A further principle would be 'We should restrict people's ability to buy products which can be harmful/unhealthy/dangerous.'

Principles that are too general for this argument would be those like the following:

- People shouldn't be allowed to do as they want.
- Freedom of choice should be limited.

(D) Since (R) most people drink only in moderation, (IC) any policy to control alcohol-consumption should not affect this sensible minority. (C) Instead there should be a campaign which targets the drinking culture among young people. (1st paragraph)

(E) It is an intermediate conclusion.

(This is drawn from the previous five reasons and is used to enable the conclusion to be drawn.)

(F) The increase in admissions…can be explained by the low price of alcohol.
The increase in admissions cannot be explained by factors other than the price of alcohol. (Examples would include: population increase, changes in admission policy, people's greater awareness of symptoms, different diagnoses)

Admissions for non-alcohol-related disorders did not also rise by a similar percentage during this time.

The number of admissions in 2003 was not unusually/very low.

The relative price of alcohol between 2003 and 2010 did not increase significantly.

People drink unhealthily because of the price of alcohol.

(Technically, we have to assume that it isn't the same group of people who keep being admitted more frequently for whatever reason.)

(G)

Weaknesses

- The timescale of 30 years is a problem given the fact that the author hasn't given us information on the price of alcohol over the past 30 years (just the price now compared to 20 years ago). It might be that the increase in deaths doesn't match the decline in the price.

- Not all deaths from liver disease can be explained by alcohol (as the author's word 'much' indicates). So it could be that the increase (or a significant part of it) is due to other factors.

- The figures for liver-disease 'rose' and deaths from other causes 'fell' but we don't know how much in each case. It could be that they were both pretty small.

- The figures for liver-disease could now be falling, even though during the timescale they have risen.

Strengths

- The fact that other major causes have been falling emphasises the point that, given all sorts of improvements in health care, we would have expected all causes to be declining.

- The evidence is strong because the timescale is large enough for us to be able to see the significance of both the fall and the decline.

(H) The problem here is one of possibly confusing correlation with causation or you might have given it as inappropriate *post hoc* reasoning.

Though there is a correlation between a 70% decline in the price of alcohol and the doubling of the number of female binge-drinkers, the first might not be the cause (or, at least, the main cause) of the second. For example, it could be that it is now more acceptable for females to drink heavily.

(Alternative explanations could include that the number of females who binge-drink was very low twenty years ago, so the doubling isn't that great).

Though there is a correlation between a 70% decline in the price of alcohol and the doubling of the number of female binge-drinkers, the first might not be the cause (or, at least, the main cause) of the second. It could be the other way round, with more alcohol being drunk by females so enabling supermarkets to be able to reduce the price.

(3) THE PRICE OF ALCOHOL IS NOT THE PROBLEM

(A) This could be a strength – perhaps it explains why people are buying from supermarkets (so there's no increase in consumption, just a redistribution from pubs and clubs to supermarkets).

This could be a weakness in that there could be an increase in drinking rather than a redistribution and anyway it could still be young people buying it.

There's the point that, by shifting drinking away from pubs and clubs, the problem of young people drinking has been made much worse. (In pubs, there would be less alcohol drunk because of the higher cost, the unacceptability of drunken behaviour, etc.)

(B) There is the point that the chief executive of Iceland hasn't answered the point about the low price encouraging people to drink.

Perhaps youth culture includes drinking large amounts of alcohol, and the low (supermarket) price increases the quantity that is drunk.

Of course, you might have identified a strength here: if 'youth culture' is the explanation, it could be that, regardless of price, young people would still see drinking as something good. Even if the price increased, it could be that young people would still drink enough for it to be problematic.

Overall there is a lack of evidence that the problem is that of young people – both for and against. But the supermarkets present it as a young people problem, whereas perhaps those who want the price of alcohol to be increased do not see the issue of young people drinking as a significant part of the problem of alcohol consumption.

Just because it is (might be) a youth culture issue, doesn't mean that it's 'nothing to do with retailers selling alcohol'.

(C) This might have little (or no) significance. Even it is true, alcohol could still be relatively cheap (because of high disposable incomes and because of low costs of production and distribution, and high levels of sales – especially with supermarkets discounting prices.

'Pushing up prices won't make a difference' – this is merely claimed. It is meant to be seen as an inference from the claim about taxes, but it doesn't follow.

There is a contradiction between this point and what follows. The author is claiming both that 'pushing up prices won't make a difference' and that 'forcing the price up might well deter…'

(D) Any of the following points would be useful ones to make in an evaluation of this reasoning.

- There is a possible straw man here: the opposing side isn't necessarily arguing that alcoholics would be deterred by price.

- This is taking an unusual group and generalising from it (over-generalisation). This group is taken as evidence for the claim that 'the lack of a link between the price of alcohol and how much is drunk is important.' The evidence of this group is insufficient for this claim.

- It could be that the low prices contribute to the creation of alcoholics.

(E) This is again something of a straw man – the other side isn't saying that increasing prices will solve (all) the problems to do with drinking. Increasing prices could, however, solve some of them (or reduce their frequency and impact).