

Critical Thinking for Students



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# Preface

#### to the Third Edition

Since this book was first published in 1996, the subject of Critical Thinking has grown very big very quickly. From being a subject that most teachers (and students) hadn't heard of to one that is studied by thousands of people in hundreds of schools and colleges, the progress of Critical Thinking has been remarkable. It gives me considerable satisfaction that this book has, with its tens of thousands of copies sold, made a contribution to this progress.

The book introduces you to the basic skills of Critical Thinking. The central feature of the subject is the study of arguments: how to analyse and evaluate them. Arguments are found everywhere. They are what goes on in adverts, with the recommendation to buy something because of some reason or other (for example, '68% of 42 women said that they thought wrinkles looked less noticeable after two weeks of using No More Wrinkles'). Arguments are also used by newspapers in their attempts to get us to believe one thing or another (for example, 'we should support the proposal to have ID-cards because the cards will help to reduce crime'). Of course, we use them ourselves every day: 'I don't agree with you because...'

Being able to see more clearly what's going on in an argument is a very useful skill. It can help you with studying pretty well any subject. It does this by helping you to look at evidence and the claims that are made about it. It also does it by encouraging you to look for alternative explanations for evidence, and to consider what effect these would have on an author's argument. In these and other ways, Critical Thinking can help you to be more competent in your studies. But it's a useful skill anyway. You can use it to see problems in your own arguments and to see problems in arguments others use.

If you're studying Critical Thinking for an assessment like the AS exam, then this book will be really useful for you in introducing the skills that you'll need. If you're looking for a short, approachable, straightforward book on Critical Thinking, then this book will fit the bill. If you're planning to do a test like the TSA, BMAT, LNAT, and the Watson Glaser Critical Thinking Appraisal, then you'll find that

this book is recommended for effective preparation for all of them.

When I first wrote this book, I was very happy to acknowledge the tolerance of my children. Since they have got older and much more prone to being argumentative, I must now thank my grandchildren for their tolerance. Hopefully, the subject of Critical Thinking can grow and flourish even more as the next generation of students takes shape. One day, then, it'll be over to Daisy, Darcey, Eleanor, Hannie, Martha, Noah, Ruby, and Thomas to carry Critical Thinking forward. Until then, those with grey hair will try to carry the baton forward.

Roy van den Brink-Budgen

People should be allowed to smoke anywhere. Smoking's not illegal, and millions of people get huge pleasure from it.

What's the difference? As you will have seen, the speaker has now given us two reasons why 'people should be allowed to smoke anywhere'. The first is that smoking isn't illegal; the second is that millions of people enjoy it. Whether or not you agree with these reasons, the point remains that this second example is an attempt to be **persuasive**. It's an attempt to get beyond simple disagreement.

It also calls out for an answer. It would not be enough to reply that you disagree. Even if you are not persuaded, the reasons have to be at least acknowledged. In responding to this argument, you would have to respond with your own reasons. In other words, an argument has to be answered with an argument.

So what have we established so far?

- Arguments have reasons.
- Arguments are meant to be persuasive.

You can see then that arguments for the critical thinker are not like arm-twisting attempts to make other people accept a particular position. They are not bullying orders to see things one way rather than another. Instead, they set up reasons in such a way that, if you accept those reasons, you are likely to be persuaded of a particular position.

#### **Concluding from reasons**

Look again at our second example. What is the function of the first sentence?

As we have seen, this is what the speaker wants to persuade us to accept. It is, if you like, the main point of what is being said. It is what we call the **conclusion** of the argument.

We usually think of a 'conclusion' as something that comes at the end. For example, we talk about the concluding part of a television series. But when we use the word 'conclusion' in

one that remains. All you have are three statements about computers. What about the next example?

Children will be able to do their school work much better if they have access to a computer at home. The price of home computers has fallen considerably over the past few years. So parents should buy a computer for their children to use at home.

This is an argument. The conclusion ('So parents  $\ldots$ ') is supported by the reasons in the first two sentences. In other words there is an attempt to persuade parents to buy computers.

#### Questions

Now look at the passages which follow and work out which are arguments. (You'll need to show which parts are reasons and which conclusions.)

- Satellite television companies are increasingly bidding for the exclusive rights to televise live sport. Most people don't subscribe to satellite television. The technology of television is changing rapidly.
- (2) Most people who visit zoos want to see lots of animals. Displays about endangered species, however well presented, can never excite us in the same way as real lions and elephants. Zoos need to concentrate on providing lots of living animals rather than displays about them.
- (3) Some zoos are trying to save endangered species in order to return them to the wild. Wildlife programmes on television are very popular. Safari parks provide an opportunity for people to see animals wandering freely.
- (4) Traffic-calming measures are increasingly necessary in residential areas. Cars are travelling much too fast along

residential streets. Imposing speed limits has not slowed down the speed at which cars travel.

#### Answers

- (1) This is not an argument. None of the sentences can serve as a conclusion drawn from the other two.
- (2) This is an argument. The third sentence is the conclusion supported by the reasons in the other two. That zoos need to concentrate on providing animals rather than displays is justified by the claim that most people want to see animals and that displays about animals can never be as exciting as the real thing. This is the only way you can construct an argument with this passage, so if you got it any other way round, look at it again.
- (3) This is not an argument. All you have are three statements about zoos, wildlife programmes and safari parks.Whichever way round you put these, none of them would work as a conclusion drawn from the other two.
- (4) This is an argument. The first sentence is a conclusion drawn from the other two. The reasoning works like this: since cars are travelling too fast along residential streets, and since speed limits have not worked, therefore trafficcalming measures are increasingly necessary. If you had this any other way round, look at your answer again.

Remember that when you are looking for arguments, you are not looking for something that *could* be argued, but for something that actually *is* argued. In other words, you are looking for material where reasons are given in support of a conclusion.

#### Making judgements

Becoming competent at a subject is much more than knowing a series of facts. Obviously, not having the factual knowledge means that you're not going to get very far, but you also need to evaluate and analyse the material you're studying. Time and time again, you will be asked to carry out tasks which involve you making judgements about your material. From a requirement to do a specific analysis of information to the openended requirement to 'discuss' a general theme, you will benefit from having critical thinking skills.

# **ARGUING, EXPLAINING AND SUMMARISING**

Before we look further at arguments, we need to stop briefly to consider the difference between explaining, summarising and arguing.

### **Explaining and arguing**

Not everything that has the appearance of an argument is actually an argument. You will remember that in addition to reasons and conclusions, an argument should be intended to be persuasive. Look at the next example:

The ship comes into port at 7.30. Passengers disembark 30 minutes later. Therefore the customs officers will be on duty by 7.55.

This example has the form of an argument, with what appear to be two reasons supporting a conclusion. But it is not a persuasive piece of writing: it is doing no more than explaining what will happen. It is not justifying one duty time rather than another for customs officers.

Thus we can distinguish between explanations and arguments in terms of the purpose for which they are produced.

This is not to say that explanations are of no interest in critical thinking. Very often, an argument will rely on a

particular explanation to support its conclusion. In such cases, you will need to evaluate the explanation to see whether or not it does provide such support. Look at the following example:

The forest fire was caused by some campers cooking on a barbecue and leaving the still-hot remains on the ground. If we are to reduce the risk of such a fire happening again, we must forbid camping in the forest.

In this example, the author is using an explanation for the forest fire in order to argue that we need to forbid camping. The explanation is not equivalent to the argument, but used as a reason for the conclusion. The explanation of the cause of the fire might be accepted, but someone might want to make the point that it is not enough to support the conclusion (for example, on the ground that one accident does not justify such a restriction).

#### Summarising and arguing

Another way of producing the form of an argument without having its persuasive purpose is in summarising. The next example will show how this works:

Buying a house will involve spending time on looking at lots of very often unsuitable properties. It will also involve spending money on things like surveys. In addition, it will require plenty of patience and determination. So housebuyers will need to have time, money, patience and determination.

As we have seen, the word 'so' often indicates the presence of a conclusion. But, in this case, the sentence beginning with this word is not a conclusion. The previous three sentences might also look like reasons for an argument, but the final sentence does not use them in this way. As you can see, the final sentence does no more with what comes before it than to summarise the

#### Reasons:

- (A) Most of the company's employees own a mobile phone.
- (B) The use of mobile phones can interfere with the company's computers.
- (C) Much of the company's business is done by fax rather than by phone.

Which of (A), (B) and (C) best serves as a reason for the conclusion?

#### Answer

The answer is (B). If mobile phones can interfere with computers, then this is a good reason for not allowing them on the premises, in that the company's business could be adversely affected.

(A) is not a good reason for the conclusion. Without other information, the claim that most employees have a mobile phone is not sufficient to conclude that such phones should be banned. (Other information could be that employees are spending too long on their mobile phones and thus not doing enough work.) You could combine (A) with (B) to give an even stronger argument than with (B) alone, but you can see that without something like the latter, (A) cannot be used as a reason for this conclusion.

(C) is also not a good reason. The significance of this might be that employees are not very likely ever to use mobile phones, but even this interpretation (and it's by no means an inevitable one) does not provide a sufficient reason for concluding that mobile phones should not be allowed.

#### Looking for relevance

When matching reasons to a conclusion, as in the above exercise, one of the things that you were looking for was **relevance**. You were asking yourself: is this evidence or statement relevant to such a conclusion? There was some relevance in all of the possible reasons, but it was limited in (A) and even more so in (C). (A)'s relevance lay in its reference to mobile phones, and (C)'s in its reference to the company's use of phones. (B) was relevant not only in its reference to mobile phones, but also by its identification of a problem with such phones.

One thing that needs to be remembered when you are assessing reasons for relevance is that sometimes a reason on its own will be irrelevant, but with others its relevance will be clear. The mobile phones example has already illustrated this point, when we noted that (A), though irrelevant on its own, became relevant when put together with (B).

In assessing (A), (B) and (C) as reasons, you were looking for something in addition to relevance. You were also looking for **adequacy**.

#### Looking for adequacy

Though (A) and (C) have some relevance to the conclusion, neither is an adequate reason for it. Even if (A) or (C) are both true, neither is sufficient (alone or together) for the given conclusion. In other words, they do not provide sufficient support for the conclusion. (B), on the other hand, is enough on its own to support the conclusion. So how do we measure the adequacy of a reason?

We look to see what the argument claims to do. If it seeks to prove something, then the reasoning must have a very high degree of adequacy. If, however, the conclusion is a fairly weak one, then the reasoning can be correspondingly weaker. To illustrate this question of adequacy, look at the next exercise.

#### Exercise

You are first of all given a set of different claims, followed by a series of possible conclusions.

most, we are justified in drawing either (2) or (3), but, of course, you are beginning to be a critical thinker, so you would, wouldn't you?

Some people are not yet at this stage. It is time to meet them.

# EXERCISES

- 1. Write the conclusion (main point) of any argument on any subject. (It'll be in the form of something like 'There should be . . .' or 'We must not . . .'.) Then come up with persuasive reasoning to support it.
- 2. Write as strong an argument as you can against a position you would normally defend. Why are you not persuaded by this argument?
- 3. Write as strong an argument as you can for a position you would want to defend. How relevant and adequate are the reasons you have used?

# Analysing Simple Arguments

#### **IDENTIFYING REASONS AND CONCLUSIONS**

Now that you can identify arguments by looking for reasons and conclusions, and you can make an initial assessment of reasoning, we need to consolidate your skills in working out which part of an argument is doing what.

When you come across arguments in books, newspapers and so on, you won't usually find them neatly organised. Sometimes those bits of a passage which make up the reasoning and the conclusion end up obscured by irrelevance and illustration. Knowing which parts of a passage are doing what will enable you to assess both the strengths and weaknesses of the argument.

We start with a short exercise to test whether you can work out which are reasons and which is the conclusion in a short argument.

#### Exercise

For each of the following arguments, identify which sentences are reasons and which is the conclusion. They are labelled (A), (B) and (C) to help in the discussion which follows.

 (A) For many victims of crime, a tougher prison regime for criminals would be welcome. (B) The Government is right to introduce tougher regimes in prisons. (C) Many offenders would not commit crime if prisons had a tougher regime.

- (2) (A) There should be no control over the right of newspapers to publish photographs and stories about public figures. (B) The lives of people who are public figures are of considerable interest to the general public. (C) People have a right to information about how public figures conduct their lives.
- (3) (A) The proposed anti-drugs campaign is unlikely to be effective with young people who take drugs. (B) The proposed anti-drugs campaign will stress the risks involved in taking drugs. (C) One of the main attractions of drugs for young people is the excitement of taking risks.

#### Answers

(1) (A) and (C) are the reasons for the conclusion (B). The conclusion that the Government is right to introduce tougher regimes is supported by the two reasons that victims of crime would support such a change, and that fewer crimes would be committed. To see how (B) fits well as a conclusion, look at the rewritten version:

For many victims of crime, a tougher prison regime for criminals would be welcome. Furthermore, many offenders would not commit crime if prisons were tougher. So the Government is right to introduce tougher regimes in prisons.

(2) (B) and (C) are the reasons for the conclusion (A). See how it reads when it is presented with (A) at the end:

The lives of people who are public figures are of considerable interest to the general public. In addition, people have a right to information about how public figures conduct their lives. Therefore there should be no control over the right of newspapers to publish photographs and stories about public figures.

could not be drawn (even if the first reason was still true).

#### SHOWING ARGUMENT STRUCTURE AS A DIAGRAM

Though you do not have to use diagrams of arguments in order to be an effective critical thinker, it can often be useful in helping you to see quickly how an argument is structured. In turn, being able to see the structure quickly will help you in evaluating an argument. This applies not only to those that you'll meet in the various texts you'll use on your course, but also to those that you use in your written work. It's a useful check that the argument is working in the way you think it is.

We start with a very simple example. It's a shorter version of an argument that we met right at the beginning:

Smoking's not illegal. Therefore people should be allowed to smoke anywhere.

In this argument, there's just one reason supporting the conclusion. To diagram its structure, we label the reason as R, the conclusion as C, and the relationship between them by  $\lfloor$ 

This gives us

If we look at the original version of this argument, we see that there were two reasons given for the conclusion:

People should be allowed to smoke anywhere. Smoking's not illegal, and millions of people get huge pleasure from it.



(2) In this argument, the conclusion appears first, followed by two reasons which support it independently.
R1: Marital breakdown is a difficult enough time without separating couples having to worry about a difficult divorce.
R2: There is evidence that if the process of divorce is difficult, then a great deal more bitterness and anger is produced than if the process had been easier.
C: Divorce should be made easier rather than more difficult.



(3) This argument has three reasons which work together to support the conclusion.

R1: Most people don't go to watch football matches.

R2: But the costs of policing them are very high.

R3: Clubs make a contribution to these costs, but most of the bill falls to us all to pay.

C: Football fans must be prepared to pay higher prices for their tickets to cover most of these costs.



# DISTINGUISHING REASONING FROM OTHER MATERIAL

In the examples we have looked at so far, the arguments have consisted of reasoning and a conclusion. You have not been asked to look for anything else. In the 'real world', however, arguments are not normally going to be presented so tidily. You might have to cut through all sorts of other material in order to get to the argument itself. Look at the next example:

The showrooms of many garages are full of tempting offers to buy cars. These offers include interest-free credit, good part-exchange deals and many free extras. Manufacturers compete with each other to sell us fast, stylish dream-machines. But what about safety? There are already all sorts of safety features available, and a lot of evidence that motorists are not only less likely to have accidents if their car has these features, but also far more likely to survive any accident they're involved in. We should demand that car manufacturers concentrate on safety to the exclusion of all else.

In this example, the argument doesn't get going until halfway through the passage. The first three sentences do no more than set the scene for the argument which concludes that we should demand that cars are made safer. The information on special offers provides something of a background for the argument but is not part of it.

#### Making appropriate responses

Why is it important to be able to distinguish between reasoning and other material?

The importance of being able to distinguish between reasoning and material such as illustrations and background information lies in your ability to make the appropriate responses to arguments. For example, faced with the passage about car

arguments. An example of a deductive argument is the following:

If enough troops can be used for the peacekeeping force, then the civil war in Bosnia will be over. The United Nations has promised that enough troops will be supplied, so the fighting in that country will end.

With this sort of argument, if the reasons are true, then the conclusion must also be true. In this example, if it is true that providing enough troops *will* end the civil war, then providing enough troops *must* end it. Look, however, at a different example of an argument on this subject:

The UN is planning to put troops into Bosnia. But, in the past, putting UN troops into countries which are fighting a civil war has not solved the problem. So this won't solve the problem.

In this second example, the conclusion (that putting troops into Bosnia won't stop the civil war) is drawn on the strength of previous experiences of putting UN troops into countries fighting a civil war. Though previous experience might well be a very useful guide to what will happen, it cannot be a certain guide, especially when it concerns the experience of different countries. You could think of all sorts of reasons why the conclusion could not be drawn. For example, the UN troops in Bosnia might be better equipped than were the previous UN troops, or the situation in Bosnia might have significant differences from other civil wars. In this sort of example, even if the reasoning is true, it does not mean that the conclusion must be.

As you can see, the conclusions of deductive arguments are true given the form of the argument itself. With our first example on UN troops in Bosnia, if you accepted the truth of the reasoning, then you had to accept the truth of the conclusion.
In other words, it would have been illogical to agree with the reasoning but disagree with the conclusion. Any dispute you had with the argument would be with the reasoning. For example, you might want to question the claim that putting enough UN troops into a civil war will stop the fighting. You would then be able to show why the conclusion could not be drawn.

# Drawing different conclusions from the same reasoning

With inductive arguments, you can accept the reasoning but still question the conclusion. Thus people might come up with different conclusions from the same reasoning. For example, look again at the argument on gambling and the National Lottery which you met in the previous exercise.

### Drawing one conclusion

One of the worrying features of the National Lottery is that, following its introduction, the amount spent on gambling in the UK has gone up. The Lottery must have encouraged people to think of gambling as a solution to their financial problems.

If you were given the claim that gambling in general has gone up since the introduction of the Lottery, can we conclude that the Lottery has caused the increase in gambling? It is a conclusion that people have indeed drawn, and in some ways it could be seen as a reasonable one (in that the introduction of the Lottery is certainly relevant evidence in considering why gambling has increased). But this conclusion does not have the status of certainty. You could draw a different conclusion from the same evidence.

### Drawing a different conclusion

Following the introduction of the National Lottery, the amount spent on gambling in the UK has gone up.

Therefore more people are addicted to gambling than before.

In this second example, the author sees the significance of the evidence in the same way as in the first, but goes further in the conclusion. It is a conclusion that requires the evidence to do quite a lot of work, in that it is quite a jump from the evidence. A third example, however, sees the significance of the evidence very differently.

### Drawing another different conclusion

Following the introduction of the National Lottery, the amount spent on gambling in the UK has gone up. Therefore people who gambled before the Lottery are spending even more on it now.

In this example, the evidence is used to draw a conclusion about existing gambling rather than one about an increased number of gamblers.

In each example, the conclusion has no more than a probability of being true, such that we can accept the reasoning without accepting the conclusion. What you will have noticed is that the different conclusions are based on different explanations of the meaning of the evidence.

We will look at the general question of certainty and probability in more detail in Chapter 5. In the meantime you might have a more specific question.

Surely we can argue about some things with more certainty than we can about others. For example, arguments in science must be concerned with certainty rather than probability. Things are either true or they're not, aren't they?

Of course we can argue about some things with more certainty than we can about others. This would be where the

facts of 'the case' are not in dispute. But whether or not we can conclude something with certainty still depends on the nature or form of the argument. Arguments in science – though they're dealing with 'facts' – are very often concerned with probability rather than certainty. This is because our knowledge is very often incomplete and we have to draw a conclusion on the strength of limited information. For example, it is a fact that some of the ice-caps in Antarctica are melting. But there is a big disagreement as to whether or not you can conclude from this evidence that therefore there is global warming. Look at the argument put in two different forms:

If some of the ice-caps in the Antarctic are melting, this is evidence of global warming. Since they are melting, there must be global warming.

Some of the ice-caps in the Antarctic are melting. Therefore there must be global warming.

In the first example, the form of the argument means that if the reasoning is true, then so must be the conclusion. In the second, the reasoning could be true, but the conclusion not be.

# EXERCISES

- 1. Every time you come across an argument, try to diagram its structure.
- 2. Look at the evidence on a particular subject. What is the strongest conclusion you can draw from it?
- 3. Taking the evidence that you used in (2), now draw an even stronger conclusion. What further evidence would you need to support this stronger conclusion?

# Finding More Detail in Arguments

# FINDING MORE THAN ONE CONCLUSION

So far we have looked at fairly simple arguments in which the author uses reasoning to draw a conclusion. But you are also likely to find arguments in which there is more than one conclusion drawn. What happens is that the author draws one conclusion and then goes on to use this in order to draw another one. Here is an example:

Since some of the Antarctic ice-caps are melting, there must be global warming. So we can expect sea-levels to rise, resulting in catastrophic flooding of many of our coastal areas.

The conclusion of this argument is easy to spot ('So we can expect . . .'). But did you notice another conclusion that came just before it? Have a look again at the first sentence. It consists of an argument: some of the Antarctic ice-caps are melting, therefore there must be global warming. This conclusion is then used to draw the conclusion in the second sentence: there is global warming, so we can expect sea-levels to rise, resulting in catastrophic flooding of many of our coastal areas.

### Using a conclusion as a reason

This example shows us what seems at first sight to be a strange thing: that a conclusion can be used as a reason. The conclusion about the rise in sea-levels was drawn from the claim that there is global warming. If we extend the argument even further, you can see that the conclusion about rising sea-levels can itself be used as a reason for a further conclusion:

Since some of the Antarctic ice-caps are melting, there must be global warming. So we can expect sea-levels to rise, resulting in catastrophic flooding of many of our coastal areas. We should take action now to reduce the causes of global warming.

In order to clarify which conclusion is which, we make a distinction between a main conclusion and an intermediate one.

- The main conclusion is the one towards which the whole argument is heading; an intermediate conclusion is one drawn on the way.
- An argument can have an unlimited number of intermediate conclusions, but obviously only one main conclusion.

How would we put these intermediate conclusions into our method for diagramming the structure of arguments?

We can use our first example to show this:

(R) Since some of the Antarctic ice-caps are melting, (IC) there must be global warming. (C) So we can expect sealevels to rise, resulting in catastrophic flooding of many of our coastal areas.



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Look at the next example. Can you find an intermediate conclusion in it?

The pollution in our rivers is increasing at a fast rate. The more polluted a river is, the more damage is done to the animals that live in it. Unless we soon do something about river pollution, the numbers of many water creatures in our rivers will decline. However, there are no effective plans to reduce the amount of river pollution. Therefore, many of the creatures that live in our rivers will not survive.

The third sentence is the intermediate conclusion, with the first two serving as reasons for it. If you are unsure of this, read the first three sentences again, ignoring the final two. This intermediate conclusion, together with the fourth sentence, is then used to draw the main conclusion. Look again at how this works:

Unless we soon do something about river pollution, the numbers of many water creatures in our rivers will decline. However, there are no effective plans to reduce that amount of river pollution. Therefore, many of the creatures that live in our rivers will not survive.

**Fitting intermediate conclusions into the structure** As you can see, the intermediate conclusion acts as a reason supporting the main conclusion. We would diagram it in the following way:

(R1) The pollution in our rivers is increasing at a fast rate. (R2) The more polluted a river is, the more damage is done to the animals that live in it. (IC) Unless we soon do something about river pollution, the numbers of many water creatures in our rivers will decline. (R3) However, there are no effective plans to reduce the amount of river

expenditure. However, the number of people being imprisoned is increasing. Prison staff will find it increasingly difficult to cope with the increased numbers. The Government could make savings elsewhere. Clearly, it should not reduce its expenditure on prisons.

(3) There are laws against the ill-treatment of farm and domestic animals. The reasoning behind these laws is that animals should not be allowed to suffer needlessly. But there are no differences in their capacity to suffer between wild animals on the one hand and pets and farm animals on the other. We cannot justify treating wild animals differently from any others. It follows that we should have a law against ill-treating wild animals.

### Answers

(1) The intermediate conclusion is the first sentence. It's drawn from the content of the second sentence:
(R1) The plan for the new bypass isn't supported by the majority of local people. (R2) It would spoil many notable beauty spots. (IC) Therefore it should be rejected. This intermediate conclusion is then used together with a further reason to support the main conclusion:
(IC) The plan should be rejected. (R3) A recently developed alternative scheme is very popular with local people. (C) Therefore the Government should reopen the public enquiry.



(2) The intermediate conclusion is the third sentence, and is

supported by the reasoning in the first two. The reduction in expenditure and the increase in numbers lead to the conclusion that staff will find it difficult to cope: (R1) The Government has told the Prison Service to reduce its expenditure. (R2) However, the number of people being imprisoned is increasing. (IC) Prison staff will find it increasingly difficult to cope with the increased numbers. This intermediate conclusion is then used with the claim that the Government could make savings elsewhere (R3) to draw the main conclusion (C) that the Government should not reduce its expenditure on prisons. As you can see, the structure is identical to that in the previous argument.

(3) The intermediate conclusion is the fourth sentence. It is supported by the reasoning in the first three (note how the argument is built up step by step):
(R1) There are laws against the ill-treatment of farm and domestic animals. (R2) The reasoning behind these laws is that animals should not be allowed to suffer needlessly.
(R3) But there are no differences in their capacity to suffer between wild animals on the one hand and pets and farm animals on the other. (IC) Therefore we cannot justify treating wild animals differently from any others. This intermediate conclusion that we cannot justify treating wild animals differently is then used as the reason for the main conclusion:

We cannot justify treating wild animals differently from any others. (C) Therefore (in that we have a law protecting farm and domestic animals) we should have a law against illtreating wild animals.

In this example, we have an intermediate conclusion being used as a reason on its own to support the main conclusion:

other explanations for the results. For example, it must be assuming that there are no relevant differences between the children in the different schools. It has to assume this because, if it didn't, the conclusion could not be drawn (without showing why this assumption was irrelevant). You will probably be able to think of other assumptions being made in this argument.

# *Clarifying the effect of an assumption* Here is another argument:

If people had invested their money in antiques 20 years ago, they would have found it difficult to make a profit on their investment until very recently. So people who cannot afford for their savings not to increase should invest their money in something other than antiques.

What assumption is being made here? In that there is only one reason and one conclusion, you can see that any assumption being made must be a further reason operating between the two. The missing reason required for the conclusion to be drawn is that 'the price of antiques over the past 20 years is a useful guide to their price in the future'. Without this assumption, the conclusion could not be drawn. To see this more clearly, try putting the opposite of this assumption ('... is not a useful guide') into the argument. The effect is the same as turning the explicitly stated reason (the first sentence) into its opposite: the conclusion would simply not follow.

Thus, when you are producing or evaluating arguments, you need to look at the assumptions which are being made in the same way that you look at the reasoning that the author makes explicit. Exercise

Identify any assumptions required in each of the following arguments.

- (1) Marco Polo is best known as the first person from the West to have visited China. But in his writings about his visit there, he nowhere mentions the Great Wall, tea or porcelain. Therefore he can't ever have visited China. His book about his travels to that country must have been written using information he'd picked up from those people who had been there.
- (2) In schools where special 'enrichment' classes are given to gifted children, we find that such children do particularly well at all of their subjects. Society needs highly intelligent and talented people. Thus we need to ensure that enrichment classes are provided in all our schools.
- (3) All animals being brought into Britain used to be subject to a period of quarantine to ensure that they were not carrying rabies. This system of preventing rabies from entering the country worked very well for many years, such that we had no cases of the disease. The new system of allowing pets into Britain without a period of quarantine must lead to the introduction of rabies into the country.
- (4) For 20 years, children have been treated to all sorts of programmes on television which are supposed to help them become better at skills such as reading and maths. These programmes have presented the learning of skills such as counting and recognition of letters as nothing but fun, to be accompanied by such things as rainbows and jumping frogs. But no improvement in children's abilities in literacy and numeracy has been observed. These fun ways of teaching such skills obviously don't work.

(5) Boxing is the only sport whose main purpose is to render the opponent unconscious. Indeed it is the only sport in which each player is licensed to injure the other. It must then be the most dangerous of all sports. Various solutions to this problem have been proposed – such as the use of head-guards and changing the gloves – but none of these would solve the problem of the danger of serious injury. So boxing should be banned.

### Answers

- (1) The structure of the argument is as follows:
  - R1: Marco Polo is best known as the first person from the West to have visited China.
  - R2: But in his writings about his visit there, he nowhere mentions the Great Wall, tea or porcelain.
  - IC: Therefore he can't ever have visited China.
  - C: His book about his travels to that country must have been written using information he'd picked up from those people who had been there.



A: This is needed between R2 and IC. The assumption required is that 'travellers to China would have seen the Great Wall, tea and porcelain'. If this assumption is

- R2: This system of preventing rabies from entering the country worked very well for many years, such that we had no cases of the disease.
- C: The new system of allowing pets into Britain without a period of quarantine must lead to the introduction of rabies into the country.



- A: An assumption is necessary for the author to be able to draw the conclusion. This is that 'quaratine is the only system of rabies control that can work'. Unless this assumption is made, the author cannot move from the claims about the previous system to the conclusion about the new one.
- (4) The structure of the argument is as follows:
  - R1: For 20 years, children have been treated to all sorts of programmes on television which are supposed to help them become better at skills such as reading and maths.
  - R2: These programmes have presented the learning of skills such as counting and recognition of letters as nothing but fun, to be accompanied by such things as rainbows and jumping frogs.
  - R3: But no improvement in children's abilities in literacy and numeracy has been observed.

C: These fun ways of teaching such skills obviously don't work.



A: You will probably have found at least one assumption in this argument. Perhaps the most obvious is that which must be slotted in between R3 and the conclusion. This is that 'the absence of any evidence of improvement is sufficient evidence of the ineffectiveness of the fun methods'. Without this assumption, the move from the reasoning to the conclusion cannot be made, in that the evidence might be interpreted in other ways. For example, we might say that the evidence shows that we need to have even more of such fun programmes in order to get the level of children's skills to rise.

Another assumption which you might have identified fits between R2 and R3. In order to claim R3, the author has to assume that any improvements in children's skills will be found using existing tests of such skills. If the fun method had changed the way children approach reading and maths, then the existing tests might not be able to identify this change.

- (5) The structure of the argument is as follows:
  - R1: Boxing is the only sport whose main purpose is to render the opponent unconscious.
  - R2: It is the only sport in which each player is licensed to injure the other.

### Looking for similarities and differences

In assessing an analogy used in an argument (whether it is our own or someone else's) we need to look at it in terms of the similarities and differences between the two things being compared. If the similarities are much stronger than the differences, then the analogy is a good one; if the differences dominate, then it is a weak one. A strong analogy lends good support to the conclusion; a weak one lends little, if any, support. But it needs to be stressed that, however good the analogy, it can never make the conclusion beyond doubt. Before you move on, take a critical look at the children/animals analogy used in the first example: how effective is it?

Here is another argument containing an analogy:

There has been a huge growth in the number of alcoholic drinks – such as alcoholic lemonade – which are designed to look as if they are no more than 'fun' drinks. These drinks are marketed as drinks for young people, in a campaign which stresses the fun more than the alcohol. The sales and marketing of these drinks must be much more rigidly controlled than they are now. We wouldn't tolerate a campaign by tobacco companies which targeted the young with chocolate-flavoured cigarettes.

In this example, the conclusion that the 'fun' drinks sales and marketing must be controlled more than they are at present is drawn from only one reason. This is that we wouldn't tolerate what is taken to be similar action by tobacco companies. Of course, the word 'similar' is the crucial one here. An analogy is being drawn between 'fun' drinks such as alcoholic lemonade (which are already on sale) and chocolate-flavoured cigarettes (which are not). As you can see, the argument depends upon the strength of this analogy: if it is not a good one, neither is the argument.

assumptions being made. Do you accept all of these assumptions?

2. 'Arguing that tobacco advertising encourages people to smoke is equivalent to saying that pet food advertising encourages people to buy pets.' To what extent is this an effective analogy?

In other words, even if it could be shown that having a beard was something you had to have to be great thinker – a *necessary* condition for greatness – it does not follow that having a beard is enough for greatness – a *sufficient* condition.

This somewhat frivolous example of a bad argument has illustrated a very important point. Let's look at the different relationships involving necessary and sufficient conditions in more detail.

### X might have no association with Y

If X and Y are found together, this association could be nothing more than coincidence, X being neither a necessary nor a sufficient condition for Y. You could think of many examples of this type of association. With regard to the bearded great thinkers argument, if we could find an instance of Y (great thinker) without X (beard) – either the beardless Isaac Newton or Einstein would be enough – this would destroy it utterly.

### X is a necessary condition of Y

In these cases, when X is not present, Y cannot occur. We assume that beards are not a necessary condition for great thinkers, otherwise, if there is no beard, there is no great thinker. An example of a necessary condition is 'if you want to run the full distance of the London Marathon, you have to be fairly fit'. In this example 'being fairly fit' is the necessary condition: nobody could run the full distance of the London Marathon without meeting this condition. In the shorthand form used earlier, when X (being fairly fit) is not present, Y (running the full distance) cannot occur.

As you can see, being fairly fit is certainly a necessary condition for running the full distance of the Marathon, but it is not a sufficient condition. In other words, it is not enough for being able to run the full distance: you could be fairly fit but still not be able to complete the length of the course.

### X is a sufficient condition for Y

In other words, where X is present, Y **must** occur. The author of the great thinkers argument, it will be remembered, believed that having a beard was a sufficient condition for greatness of thought. This was, of course, incorrect. So what could be an example of something being a sufficient condition?

The heir to the throne is the eldest son of the reigning monarch.

As you can see, being the eldest son of the reigning monarch is enough to make you heir to the throne: no other quality is needed. You don't have to be of a certain age, educational level, marital status or whatever: being the eldest son is a sufficient condition. In practice, however, there will be some exceptions – the most obvious being when the reigning monarch has no children or only has daughters – and thus one could say that being the eldest son is a sufficient but not a necessary condition.

# Distinguishing easily between necessary and sufficient conditions

The difference between necessary and sufficient conditions can be summarised very simply:

If a necessary condition for X is absent, then X won't occur (or will be false); if a sufficient condition for X is present, then X must occur (or be true).

You will have seen that necessary and sufficient conditions apply both to causes and definitions. Our example of who meets the conditions required to be heir to the throne is one of definition; the example of beards and great thinkers was one which showed muddled thinking on conditions and causes.

### Exercise

For each of the following, work out the relationship between X

necessary condition for Y. (Of course, we have to assume that the legal system convicts only those who are guilty of an offence, an assumption which we shouldn't really make. As a result, you would also be right if you'd used this reasoning to produce the answer that X is neither a necessary nor a sufficient condition for Y.)

- (3) Unfortunately, having three A-Levels does not guarantee a place on a degree course, so X is not a sufficient condition for Y. Furthermore, degree course staff offer places to people with two A-Levels (and with one or with no A-Levels at all), so X is not a necessary condition for Y.
- (4) If the Labour Party were to win a large majority of the seats in the House of Commons, then it would be called upon by the monarch to form a Government. No other realistic outcome would follow (we can discount a coalition between parties other than Labour, because of the effect of the word 'large'), and so in this example X is a sufficient condition for Y. However, it is not a necessary condition in that the Labour Party could form a Government without a large majority and without a majority at all (if it was still the largest party in the House of Commons or as part of a coalition).
- (5) If you have a valid ticket with all six numbers, then you are guaranteed to be at least one of the winners of the jackpot prize. Without such a ticket, you will not be one of the winners (however much you might dream). In this way, then, having such a ticket is both a necessary and a sufficient condition for being a jackpot winner.

# CONFUSING CAUSES AND CONSEQUENCES

Some arguments put together evidence or claims in such a way as to conclude that one thing causes (or some things cause)

# Looking for different assumptions

There is another aspect of the argument which needs to be considered. The conclusion is drawn on the assumption that people are planning to take holidays (even if they're not booking foreign holidays through travel agents). If you take this assumption out, then the conclusion simply doesn't follow. Are there any other assumptions that are being made? The author must assume that the present level of bookings is a good guide to people's intentions (people could have various reasons for postponing making a decision). This example shows again how important an examination of the assumptions of an argument can be.

Look at another example and apply your critical skills to it:

Cigarette advertising on television was banned 30 years ago. Since then we have seen the level of smoking fall. If we banned all cigarette advertising, then the level would fall even more.

How would you respond to this argument? Is the conclusion justified by the evidence? Is this merely a *post hoc* argument? Think of other possible explanations for the consequence that the level of smoking has fallen. What assumptions does the author need to make for the conclusion to be drawn?

### Assessing the strength of causal arguments

Though arguments which use a causal explanation are not always justified, sometimes they might be very strong. Look at the following pair of arguments. Which is the stronger?

Over the past few years, we have seen an increase in the number of cars which are fitted with 'bull bars'. Over the same period there has been an increase in the number of fatal road accidents involving pedestrians. Clearly the fitting of 'bull bars' should be banned. The fitting of 'bull bars' to the front of cars should be banned. Accidents involving pedestrians and those cars which have them fitted show a much higher rate of fatal injuries than in accidents involving cars without them. It is the rigidity of the bars which is responsible for the fatal injuries.

### Looking at the evidence critically

In the first argument the conclusion is drawn from two items of evidence: the increase in the number of cars with 'bull bars' and the increase in the number of fatal accidents involving pedestrians. The conclusion that 'bull bars' should be banned is drawn on the assumption that the second piece of evidence is a consequence of the first. The weakness of the argument, of course, lies in its having failed to explain why there is a causal relationship between the two.

In the second example, two pieces of evidence are again put together to support the conclusion that the fitting of 'bull bars' should be banned. The first is that fatal accidents involving cars with 'bull bars' and pedestrians are at a higher rate than those involving cars without them. An explanation of this higher rate is given ('the rigidity of the bars') and the same conclusion drawn. But this argument is much stronger than the first. Unlike in the first, there is an attempt to show why there is a causal explanation. Furthermore, the two items of evidence do have a common link: the rate of fatal accidents in two situations in which the difference might well be highly relevant (and whose relevance is given emphasis by the explanation).

### Asking questions about the evidence

As you can see, then, you should creatively evaluate arguments in which relationships between pieces of evidence are used to draw conclusions.

• Consider whether the evidence is sufficient to draw the conclusion.

harshness in prisons are attacked and this attack is used to reject their argument. As you can see, their argument is not, however, touched: the author gives us no (relevant) reasons why we should conclude that we must ensure that prisons are not places of harsh punishment. Even if it is true that proponents of harsh conditions are happy to avoid paying income tax or are drinkdrivers, these qualities cannot be used to dismiss their argument that harsh prison conditions would reduce crime.

You will sometimes see this type of argument referred to as an *ad hominem* argument, the Latin phrase meaning 'against the man'. Though such personal attacks are very often irrelevant in an argument, there might be occasions when they are relevant.

### Relevant attacks upon the arguer

The managing director insisted that the company would not be making any compulsory redundancies this year, but she has made other similar promises in the past and has never kept them. Given that she has a long history of not being truthful with the workforce, her assurances about redundancies should not be believed.

In this argument, the conclusion that the managing director's assurances should not be believed is based on the reason that she has lied about the subject before. This attack on her sincerity is relevant in this argument in that it gives a good reason for the conclusion. In the following argument, however, it doesn't:

The managing director insisted that the company could not increase its pay offer since profits were expected to fall substantially over the coming year. But she has been convicted of drink-driving twice in the past three years, so the union should not believe her profits forecast. They should press ahead with the strike.

In this second example, the managing director's sincerity is

dismissed on a pretty obviously irrelevant ground. This attacks the arguer without attacking the argument, in that there is no good reason given for not believing her profits forecast. (You'll find this type of obviously irrelevant reasoning in some tabloid newspapers. It's a frequently-used method of discrediting someone with whom the paper disagrees.)

# **GOING ROUND IN CIRCLES**

Some arguments might seem as if they've gone somewhere, but in reality they've gone nowhere. These are the arguments that conclude no more than the reasoning they use. An example will clarify this:

Differences between the roles that males and females are expected to play are not fixed by our genetic make-up but are learned in each individual's social development. Thus gender is something that is learned rather than something which has a biological cause.

In this argument the author starts with the claim that gender roles are not biological in origin ('not fixed by our genetic make-up'), but are learned in social development. The conclusion does no more than repeat the claim. The argument has not moved from a reason to a conclusion: it has ended where it started.

Although in some cultures mere repetition of a point strengthens an argument, these circular arguments should not persuade us to accept the conclusion in that there is no reasoning which enables us to draw the conclusion.

# **Checking for reasoning**

Sometimes an argument might look suspiciously circular, but closer examination reveals that some reasoning has been provided:

The history of human society is full of examples of males being the hunters. Therefore there must be some truth in the biological explanation of males being hunters.

In this example the conclusion about males being the hunters is drawn from evidence on males as hunters; though there is a similarity in the words used, you can see that there is a shift in the argument from reason to conclusion.

# **RUSHING DOWN SLIPPERY SLOPES**

The problem with circular arguments is that they don't go anywhere; the problem with slippery slope arguments is that they go too far too quickly. An example will show you the problem:

The present proposal to allow ramblers greater access over private land needs to be resisted. If we were to allow this measure – small though it might seem – then we would end up having to allow far more extensive measures. What is to stop the principle of ramblers' rights of access being applied to small pieces of land such as a small orchard? Then, if you allow free access to such small pieces of land, the next step is access to people's gardens whether large or small. And there is a very small step from free access to people's land – however small the plot – to similarly free access to their homes. The whole idea of private property, indeed of privacy itself, will be threatened.

In this argument the author concludes that the proposal to allow ramblers greater access over private land should be resisted. The reasoning for this conclusion goes down a slippery slope from having to allow access to small pieces of land such as orchards to a threat to private property (and privacy) via having to allow access to gardens and homes. As you can see, the reasoning takes us a very long way from allowing ramblers access to land. The weakness of the argument is that any of the steps taken down the slippery slope can be challenged and, if they are challenged, then what follows is unconvincing.

The slippery slope is a set of interconnected reasons, each of which is necessary for the whole structure. As a result, if we could show that the author of the above argument could not even make the first step in the reasoning – the shift to 'small pieces of land' – then what follows cannot be used to support the conclusion. The problem with slippery slope arguments therefore lies in their taking too many too big steps.

### **BUILDING STRAW MEN**

In order to attack an opponent's arguments, we sometimes present it in a way that more effectively fits our critical purpose. We highlight what we take to be its weakest elements and then exploit these weaknesses. Sometimes our own arguments are presented and attacked in this way. This is all to do with persuasiveness, the basis of argument. But when arguments are *distorted* in order to exploit weakness we have what is often referred to as a 'straw man' argument. The significance of the term is that instead of dealing with the real argument (with all its substance and strength), we are dealing with a flimsy version of it (with none of the original's substance and strength). The distorted version is then attacked *as if* the real version had been. Here is an example.

### Weaving a straw man

The urban cyclist is increasingly intolerant of other forms of urban transport. In their campaign to get more cycle lanes in our cities they use every opportunity to attack the private motorist. They see the car as the cause of a vast range of respiratory diseases, and of a host of other urban problems, including crime. But they ignore all the positive contributions which the private car has made to modern life. It has given people freedom: to go out with their family, to visit friends and relatives, and to make things such as shopping much easier. Therefore, until the cycle lobby is prepared to approach the subject of urban transport in a more reasonable way, its plea for more cycle lanes should be rejected.

The straw man in this argument is fairly easy to spot. The urban cycle lobby is described as having a campaign to get more cycle lanes in cities. If we accept that this is true, then we would expect to find some sort of argument against an increase in cycle lanes, giving the conclusion ('the cycle lobby's plea . . . should be rejected'). But there is no such argument. All we find is an attack upon a position ascribed to the cycle lobby: 'They see the car as the cause . . . they ignore all the positive contributions. . . '. This position is described as unreasonable (an unreasonableness which is easy to defend), but the reasonableness (or otherwise) of the cycle lane issue is not considered. In this way the cycle lobby is attacked by means of a straw man.

You might think that the straw man type of argument is very similar to the attacking the arguer rather than the argument method. There is a similarity in that the real argument is not dealt with, but the method is different.

# **TURNING TWO WRONGS INTO ONE RIGHT**

We are all familiar with this line of argument in that it's one which children tend to use:

It's not fair that I got into trouble for forgetting my books. Lots of kids in my class forget their books.

In this argument, the reasoning for the conclusion that 'it's
rain forests reply that the industrialised world is much more guilty than they are of using up scarce resources and of damaging the environment. So the rich industrial countries should stop going on about the destruction of the rain forests and look at their own behaviour.

#### Checking for relevance

In this argument you will have spotted the counter-accusation in the fourth sentence. It has an obvious 'you too' quality to it. But is the counter-accusation irrelevant? In the politician example, the irrelevance of the counter-accusation lay in its complete failure to deal with the accusation of lying. Quite simply, *even if* the Leader of the Opposition has told lies in the past, this point does not answer the accusation. However, in the argument about the rain forests the counter-accusation has some relevance. If the central point of the complaint by the industrialised countries is a concern for the environment, then evidence that they are being inconsistent in their approach to environmental issues is relevant. In other words, the 'you too' accusation is a relevant response to the initial accusation, identifying a sniff of hypocrisy.

This example shows us that there is room in argument for an appeal to consistency. In the rain forest example, the argument against the industrialised countries is that, given their position – the protection of the world's environment is the most important problem now facing humanity – their right to complain about the destruction of the rain forests has to be considered. (In the above example about whether the Leader of the Opposition can accuse the Government of lying, the argument would have had some merit if it had been one about consistency. In other words, if the Leader of the Opposition had taken up a position in which no politician should ever lie, and had been known to lie.)

#### **RESTRICTING OPTIONS**

You will remember that the problem with the 'straw man'

#### MAKING IRRELEVANT APPEALS

There are many examples of arguments in which the arguer seeks to strengthen their argument by making an appeal to something that's irrelevant. We'll look at two of these types of appeal and show why they do not work.

#### Appealing to popularity

Some arguments are based, at least in part, upon reasoning which appeals to popularity. Here is a simple example:

Most people believe in one or more superstitions such as bad luck following a walk under a ladder or if a single magpie is seen. So there must be some truth in superstitions.

In this argument, the conclusion that there must be some truth in superstitions is based only on the evidence that most people believe in them. There is no further reasoning. But we need much more evidence than most people's belief in superstitions before we can conclude that 'there is some truth' in them. In this sort of example, truth is a matter of evidence of a causal link between the superstition and events which follow it. Even if everybody believed in such causal links, the truth is still a matter of evidence for these links.

## But are there not some types of argument in which an appeal to popularity is relevant?

Yes, there are. In the previous example an appeal to popularity was irrelevant in that people's belief, however widespread, was not relevant to the conclusion. This is because truth in a case such as this is established by evidence not by belief. But there are arguments in which widespread support for something is relevant to drawing a conclusion. An obvious example is the following argument:

irrelevant). Here is an example in which an appeal to pity is relevant:

The National Poetry Fund has recently received a bequest from Lady Fiona Grant's estate to provide bursaries for young poets to enable them to develop their work. The Fund has narrowed their choice of who should receive the first bursary down to two people: George Hamilton and Lucy Chapman. Both have shown considerable promise in their work but Hamilton has to work long hours in a factory in order to live whilst Chapman does no more than a bit of part-time teaching. It's obvious that the bursary should go to George Hamilton.

This argument uses an appeal to pity (in the form of an appeal to need as the primary consideration) to draw its conclusion. Why is this appeal relevant? Because, unlike in the first example, the criteria used to decide on who should get what include that of need. Again, then, we are evaluating arguments according to relevance.

There are many other examples of arguments based on irrelevant appeals. Use your critical skills to assess them when you meet them.

#### Exercise

Identify the weakness in each of the following arguments:

(1) Those who argue that the rain forests should be protected from further development are the sort of people who don't want to see progress. Progress has brought us all sorts of benefits, such as medical care and rapid transportation. People's lives would be much poorer if our predecessors had stood in the way of progress. We should not therefore listen to those who oppose the proper development of the rain forests.

relationship between the two. The increase in the price of cigarettes might have caused the decline in the number of smokers, but the decline could be explained in other ways, unrelated to the changes in price (for example, the health education campaign).

- (4) You will have spotted the *ad hominem* argument here. Whether or not the elderly parents of Michael MacGregor are living in luxury does not affect his argument that he will not approve an above-inflation increase because the country can't afford more. His argument needs to be addressed in terms such as showing that we could afford more (by savings elsewhere, for example) or that we should increase taxes to pay for the increase. Attacking MacGregor on the grounds that he doesn't understand the problem of poverty amongst the elderly is partly relevant to an argument about whether or not old people need more money, but it is not relevant to his argument about the economics of the problem.
- (5) This is another *post hoc* argument. Though the evidence is consistent with special diets and massage being the cause of people 'feeling healthier', we cannot say that they are that cause. There are many things which we can say about this evidence. For one thing, it could be that either diets or massage was responsible for the 'feeling healthier', not the two together. It could be that 'health farms' also have other features which were the true cause (for example, a fitness centre). It could be that just being away, being rested and pampered, is enough to make people feel healthier. As it stands, this argument suffers from the weakness that the evidence does not unequivocally support the conclusion (even though it is relevant, it is not adequate).
- (6) This is an example of restricting the options. The author presents no more than one option following the predicted

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### **Finding Strengths**

#### LOOKING FOR CERTAINTY

In Chapter 2 we briefly considered the distinction between **deductive** and **inductive** arguments. You will remember that the first type provided arguments in which, if the reasoning was true, the conclusions must also be. In inductive arguments, on the other hand, even if the reasoning is true, the conclusion will only be at best probably true. In virtually all of the arguments we have looked at so far, the conclusion – even if it was supported by both relevant and adequate reasoning – was never more than probably true.

#### Making the conclusion follow

We now look at a few further examples of arguments in which their form rather than their content gives them their strength (although the first will remind you of a type of argument which we met when looking at weaknesses in reasoning). There we considered the problem of arguments in which options are restricted. Now look at an example of an argument in which if the restriction of options is not a distortion of the truth, the conclusion must follow:

With such a small majority, the Prime Minister must either abandon the Government's legislative programme or try to attract support for it from members of other parties. He is determined to press ahead with the programme, so he must start to attract support for it from the other parties. In this example, if the two options *are* the only true options available, then the conclusion *must* follow: it is not probably true but certainly true. Thus, when evaluating arguments, you need to consider arguments in which alternatives are presented. If the alternatives exhaust the possibilities, then the conclusion must follow. But if you can show that the author has failed to consider at least one other possibility, then the conclusion does not follow with certainty (and indeed might well be a case of an argument with restricted options).

#### **Considering alternatives**

This highlights an important part of how you will use your critical thinking skills. When dealing with an argument whose reasoning depends on a restricted number of options, you need to consider whether the options presented (or which you present) are exhaustive. If they are, then the conclusion can be drawn with certainty. If they are not, any conclusion drawn (including any you draw) can have only a degree of probability.

#### Looking at the form of an argument

The truth of its reasoning is central to the strength of an argument. In a deductive argument, one could not have true reasons supporting a conclusion which is false. Similarly, in an inductive argument, truth links the reasons with the conclusion in that their truth increases the probability that the conclusion is true.

But as well as looking at the content of an argument we should also look at its form or structure. This will often tell us a lot about the argument's strength or weakness. The example above highlighted to us that, if the options were exhaustive, then the form of the argument required that we accept the conclusion. This alerts us to the potentially persuasive quality of deductive arguments. We can now look at some other forms. One of these builds up a chain of reasoning.

#### Building a chain of argument

In this form of argument, each reason links with the others. Here is an example:

If the Government doesn't implement the recommendations of last year's report on the transport of oil by oil tankers, then another accident at sea will happen soon. Were such an accident to happen, then the marine and coastal environment will be further damaged. Therefore, if the Government doesn't implement the report's recommendations, we can expect further environmental damage.

In this example, two parts of the reasoning are linked together into a hypothetical conclusion. As you can see, the entire argument is a series of hypothetical statements ('if . . .') in which a chain is built up: if A is true, then B is true; if B is true, then C is true; therefore if A is true, then C is true (check this shorthand against the argument to see how it works). In this type of reasoning, if the initial links in the chain are true, then the conclusion can be drawn with certainty.

In assessing (and using) this type of argument, you need to look at whether the links in the chain are properly equivalent. In other words, given its structure, you have to be sure that those parts which are meant to be the same really are. Look at the next example:

If the Government doesn't implement the recommendations of last year's report on the transport of oil by oil tankers, then another accident at sea will happen soon. Were such an accident to happen, then the marine and coastal environment will be further damaged. Therefore, if the Government doesn't have an answer to its critics, we can expect further serious environmental damage.

In this second version of the oil pollution argument, there is

no equivalence between 'doesn't implement the recommendations . . . oil tankers' and 'doesn't have an answer to its critics'. The argument is not a chain in that there is no longer a continuous series of links between the components of the argument. There has been a sleight of hand shift in the argument, in which the conclusion might at first glance seem to be OK. But with your critical evaluation skills, you can quickly see the problem.

#### Denying what comes after

Another type of argument in which the form provides its strength is one which is often referred to as 'denying the consequent'. You need not worry about using the proper term, but being able to recognise (and use) this form will be useful. An example will show you how it works:

If the penguin population is not to be seriously threatened, then we have to stop the oil companies from drilling near the penguins' breeding grounds. But the campaign to stop the oil companies has failed, so there is now a significant threat to the penguin population.

In this example, the form of the argument provides its strength. If you translate it into the terms we used earlier, you get 'if A is not to happen, then B must happen; B has not happened, therefore A will happen'.

#### Denying what comes before

You will need to be on your guard for arguments which look as if they might have a structure which gives them strength, but whose structure is crucially different from those which do. Look at the next argument for an example of this:

If the new theory of the explanation of life on Earth had been accepted, our understanding of the nature of evolution would have needed to be substantially revised. But the new theory has not been accepted, so our understanding of evolution is correct.

This argument might have the appearance of strength. It looks as if it has a good tidy structure whose conclusion follows with certainty. But it has a crucial weakness. Quite simply, the conclusion does not follow. Even if the new theory has not been accepted, we might still have to revise our understanding of evolution in the light of other explanations. In other words, the rejection of this one theory does not enable us to conclude that we do not need to revise our understanding of evolution. To emphasise the difference between this argument and one in the previous form, look at another version of it:

If the new theory of the explanation of life on Earth had been accepted, our understanding of the nature of evolution would have needed to be substantially revised. Since our understanding of evolution does not need to be changed, the new theory cannot have been accepted.

In this version, the conclusion must follow: if an acceptance of the new theory *requires* a revision in our understanding of evolution, then if our understanding does not need to change, the theory can't have been accepted.

#### **INCREASING PROBABILITY**

In the previous section we looked at how the structure of an argument can sometimes enable us to conclude with certainty. Of course, the proviso was, as always, that the reasoning must be true. We now look at how we can strengthen arguments in which we draw conclusions not with certainty but with some degree of probability.

You will remember that we use the tests of relevance and adequacy in determining whether an argument's reasoning can support the conclusion. In the same way, we can use these tests

committing crime by the prospect of being shown on national television'.

Each of these items of further reasoning would strengthen the argument by providing more support for the conclusion. Each is relevant to the conclusion and each increases the degree of adequacy of the reasoning. If you added all of them into the argument, it would be considerably strengthened.

#### Limiting the range of the conclusion

The conclusion of the above argument was that court proceedings should be televised. This is a general recommendation. What happens if we reduce the range of this conclusion, by making it less general?

Our courts are open to the public because 'justice should be seen to be done'. But most people have never been to a court, especially one in which a case is being heard. Clearly, therefore, we should try an experimental scheme in which the proceedings of some courts are televised.

The conclusion is narrowed in two ways. Instead of a general recommendation that court proceedings should be televised, there is one for an experimental scheme only. This less general recommendation strengthens the argument by cutting off some of the possible lines of counter-argument. In particular, it deals with the objection that there might be all sorts of problems with televising court proceedings. The second way in which the less general conclusion strengthens the argument is in its specification of 'some courts' rather than simply 'courts'.

Again, this specification cuts off the counter-argument that it might not be appropriate for some cases to be given such widespread public coverage.

As you can see, limiting the range of the conclusion has the effect of making the conclusion less demanding of its reasoning. It allows the reasoning to be less comprehensive, to be (as you

('bonuses would be paid if we got the job done on time'), but denies that they would have cut corners on safety because it was too risky. (D) admits that (W) was often in trouble and that 'he liked his drink', but insists that he was a very good worker. The architect (A) says that, about an hour before the accident, she had been on the part of the scaffolding from which (W) fell, and had seen nothing which seemed wrong with its construction. However, the paramedic (P) who treated (W) after the accident has explained that she has been called to a Meridew's site on a couple of previous occasions in order to treat accidents.

#### Separating facts from judgements

The first thing that we can do is to separate what are facts from what are judgements. The following is a fact which is not in dispute:

(W) fell from part of the scaffolding and has injured his leg, although fortunately not seriously.

There are some other claims that might, in the real world, be able to be checked.

(W)'s apparent history of disciplinary problems (including having been drunk on site).

(A)'s claim that, about an hour before the accident, she had been on the part of the scaffolding from which (W) fell.

(P)'s claim that she had been called to a Meridew's site on two previous occasions in order to treat accidents. (Although the significance of this fact, if true, needs examination.)

What remains in the passage is material that needs our evaluation. Let us look first of all at the evidence provided by (W) himself. He blames Meridew's for the accident and gives as the reason that 'in order to increase profits' workers had been told to 'cut corners' in their work. There are four possible responses to this claim.

- (1) Meridew's are to blame for the accident because of workers cutting corners with safety.
- (2) Meridew's did ask workers to 'cut corners' but this did not affect the safety of the scaffolding.
- (3) Meridew's did not ask workers to 'cut corners'.
- (4) Meridew's did ask workers to 'cut corners' but the workers didn't (as (D) claims).

#### Looking for motive

Let us look at (W)'s claim and evaluate it. What sort of criteria should we use? An obvious one is **motive**. Why would (W) make this claim? One response is that his motive is to shift the blame for the accident from himself to the company. Why might he want to do this? The need to avoid dismissal is one motive: if he was to blame for the accident (perhaps as a result of his drinking), he would try to shift the blame from himself. Another reason why he might want to shift the blame to the company is to get compensation for the accident. Of course, another motive for saying what he does might be that he is telling the truth (perhaps to highlight the deficiencies in the health and safety policies of the company).

#### **Checking corroboration**

How do we assess these different versions of (W)'s motive for making his claim? Another criterion we need to use is **corroboration**. Is there someone else who supports his claim? What about (D)? As you can see, (D) provides support for only one part of (W)'s claim: the company, (D) claims, had told the workers that the job should be done quickly (with the promise

is a useful way of checking what sort of judgements you are making. For example, if you think that (A)'s evidence is very likely to be reliable because (A) is an architect, then you are making a whole host of assumptions about the truthfulness of architects. (The same would apply if you argued that (F) should be believed because (F) is a foreman.)

#### Coming to a judgement

We have spent some time looking at this scenario about the accident on the building site. Hopefully you will have seen that what started off as an apparently simple task of working out who was to blame for the accident has become more complex as a result of all the criteria that you have to consider. What this exercise should have shown you is that critical thinking is not just an activity that goes on in academic contexts, but that it also has relevance whenever and wherever there is evidence used to support conclusions.

In our Meridew's scenario, we can isolate many arguments going on. For example, there is (W)'s argument:

Meridew's had made the workers 'cut corners' on safety.

(Therefore) the scaffolding was less safe than it should have been.

#### T

(Therefore) Meridew's are to blame for the accident.

There is also (F)'s argument. This has two lines of reasoning:

(R) Meridew's had not asked the workers to 'cut corners' on safety.

 $\downarrow$ 

(IC) (Therefore) the scaffolding was as safe as it should have been.

 $\downarrow$ 

(C) (Therefore) Meridew's are not to blame for the accident.

# **7** Applying Your Skills

There was a book available in the 1920s which taught children to swim without them ever having to get into water. It did this by showing them all the strokes that were needed for both arms and legs, strokes that they were asked to practise whilst lying on the bedroom carpet. The assumption which is crucial to this teaching technique is that the skills learned on the bedroom floor are able to be transferred to the rather different reality of the swimming pool. There is little point in being able to execute a perfect breast-stroke on the bedroom carpet if all is forgotten in two metres of water.

In the same way, this book will not have achieved its purpose if, having worked through it, you cannot apply in your own work the skills it has tried to give you. In other words, when you have to write an essay or report, when you have to give a presentation, when you have to assess information for whatever purpose, you should do it using your critical thinking skills. (Those of you who are preparing for the AS exam should hopefully be able to apply your skills to answering the questions).

#### **ASKING THE RIGHT QUESTIONS**

When you are assessing a passage which contains at least some argument, you need to ask the right evaluative questions. But before you can do this, you need to work out what the argument is:

- What reasoning does the author use to support this conclusion?
- What assumptions are necessary for this conclusion to be drawn?

These are the basic questions which you need to ask before you can begin to evaluate the argument. Unless you can see what the argument is, you can't assess its strengths and weaknesses. Having found the argument, now ask questions to evaluate it:

• Does the reasoning support the conclusion?

This is a general question, one which you will always have to be asking. In practice, this general question will become a series of specific questions:

- Does the evidence have the significance that the author intends?
- Are there explanations for the evidence which would change its significance for the argument?
- If the author uses any analogies, do they work?
- What happens if different assumptions are made?
- What sort of evidence would strengthen the argument?
- What sort of evidence would weaken the argument?
- Does the reasoning support a different conclusion?

Try this questioning technique with the following short arguments. Though they have the same heading, they are very different arguments. Read version 1 first and think about its

#### Looking at the significance of evidence

As you can see, these two arguments come to completely opposite conclusions. But, in doing so, they used some reasoning which was common to both. This is the 1962 report of the Royal College of Physicians which highlighted the dangers involved in cigarette smoking. In the first version, the author used the report to argue that manufacturers shouldn't have produced cigarettes; in the second, it's used to argue that people shouldn't have bought cigarettes. Can this evidence be used for such completely different purposes? The answer is 'yes, it can'

The 1962 report does support both arguments in that, if the knowledge about the effects of smoking was widespread, then we can argue that both manufacturers and smokers were at fault for ignoring this information. Thus this evidence is a good example of how one can provide more than one significance for it. In consequence, an argument which was based on no more than such a piece of evidence is weakened by our being able to show the other significance.

What about some of the other reasoning used? In version 1, we find the claim that 'smoking is addictive', whereas in version 2 we find 'Nobody is forced to either start or, having started, to continue. Furthermore, half of all smokers manage to give up smoking.' Does the evidence in the second version overwhelm the evidence in the first? Or does that in the first significantly weaken the significance of that in the second? They both have the effect of weakening each other, and provide good examples of how one can think of responses to evidence.

#### **Checking analogies**

What about the analogies used in the second version? Do they work? Can you think of any analogies that would work for the first version?

#### Thinking of further reasoning

Can you think of further reasoning for both versions? In addition, can you think of how you could extend the conclusions

cent by weight, volume, or by number of seizures?). Again, as with the conviction rate, it could be explained by the targeting of cannabis. (An interesting argument could

be developed here in which, since the figures show that cannabis is the 'main problem', it is the drug that should be targeted - and therefore is.)

The author uses the intermediate conclusion that 'cannabis is the main drugs problem' to further conclude that 'we need ... a coherent policy on how to deal with it.' You could usefully respond that having a coherent policy is necessary whether or not cannabis is the main problem with drugs (coherence being a necessary – though not sufficient – condition for any useful policy).

The second paragraph contains much useful material for evaluation. The first part of the paragraph fails to make any distinction between 'hard drugs' and 'drug-taking', a failure that you might want to highlight, especially with the claim that the latter is 'part of growing up in the UK'. In addition, you could question the huge claim that the author makes about young people's use of drugs. For it to be 'part of growing up in the UK', there would have to be the assumption that a significant majority of young people use drugs (and regularly use them?) You could examine this assumption in terms of what it must mean with regard to both the frequency and the quantity of usage.

The author claims that young people reject the assumed link between cannabis and heroin usage, a claim that is supported by an analogy of beer and meths consumption. You could make a number of responses to this claim. For example, you could argue the point that, even if young people reject the link, it does not follow that there is still not a problem with cannabis usage. Another response might be to agree with the author that the slippery slope argument from cannabis to heroin usage is very weak, but that there could be less dramatic shifts in usage (from

also has dangers in over-usage and in non-medical contexts.) Another argument could be that the therapeutic benefits are in particular situations (such as the treatment of severe pain or of multiple sclerosis) and are therefore not such that one could advocate widespread use (the example of something like morphine could be used again here). This could be made as a general point that, just because something has therapeutic qualities, it does not follow that its use ought not to be restricted. After all, a lot of drugs used in medical care are useful in treating the sick but should never be used by the well. A further point you could make about the argument in this paragraph is to question the rather vague way in which 'therapeutic benefits' is used, almost as if cannabis can be seen in the same way as vitamin tablets.

The author uses this claim about young people's knowledge of the therapeutic benefits of cannabis to argue that health education programmes which highlight the dangers of drugs (without distinguishing between them) risk 'young people rejecting the whole message'. You could argue again that, even if the therapeutic benefits are known, it does not follow that there are not also dangers. There is also further mileage to be obtained in linking this part of the author's argument with the second paragraph in which the author argues that drug-taking is part of growing up. Thus, if there are dangers in using cannabis, then health education programmes need to emphasise them.

The first sentence of the last paragraph can be shown to have both strength and weakness. Its strength lies in its statement of a problem which supports the author's conclusion. If many of our young people are being turned 'into criminals' by the present law on cannabis, then (if the present law is unjustifiable by other criteria) it should be changed. However, the weakness is that one does not need to change the law to avoid the problem. You could respond by raising the issue of enforcement – if the law is not enforced widely then the number of young people turned 'into criminals' might be relatively small. This question of enforcement might also be used with the second sentence, in
that the police could deal with 'the serious problem of hard drugs' by specifically targeting this problem. (You might want to use examples from other areas of the law which illustrate the point about the police not enforcing it. For example, the majority of motorists who break the speed limits are never detected, because the police don't invest heavily in speed detection.)

The conclusion has to be the subject of some explicit evaluation. To what extent is this conclusion supported by the author's reasoning? In addition, you should consider the specific meaning of the conclusion. What does 'decriminalised' mean? Is such a recommendation compatible with the author's intermediate conclusion that we need 'a coherent policy' on cannabis. For example, is a coherent policy one in which the law is unchanged but enforcement is? You might take another line of evaluation by arguing that the author has failed to distinguish between supplying and using cannabis. This will raise many issues. For example, if something can be consumed legally, why should it not be sold legally? Should there be any restrictions on quantity and location of sale? Should there be re strictions on who can buy it? In this way, you can argue that the author has failed to provide the detailed content of the recommendation that cannabis should be decriminalised.

Further arguments on this subject should be plentiful. You could argue for different solutions to the problems described by the author. For example, if the problem is one of inadequate resources to deal with the problem of hard drugs, then the Government should provide more resources rather than switch those used in dealing with cannabis. Interesting developments of the author's argument could include those which turn it on its head: if cannabis was to be decriminalised, then young people would not be attracted to it (with the rebellion involved in taking it now gone) and so they would either not use it or would use an illegal drug (with all the extra dangers that are involved). Arguments which provide variations on decriminalisation might fill out some of the detail of the policy which the author fails to

- (b) If there are intermediate conclusions, do they fit as a useful sequence heading towards the main conclusion?
- (c) Is there a more effective way of presenting the argument, such that some parts should be expanded and others contracted?
- (d) As you read through what you have written, can you see that what you are trying to argue – what you are trying to show or prove – is actually argued for? Does it read in a convincing way?

Being a critical thinker doesn't just mean being able to identify the strengths and weaknesses in other's arguments; it also means being able to produce greater strengths and avoid weaknesses in your own. If you can do both, you have learned to swim not only on the bedroom carpet but also in the imaginative possibilities of any ocean.

# **Further Reading**

There are many books on Critical Thinking, so you might want to read beyond this one in order to further develop and practise your skills. In this connection, there is another one that I have written that I hope you will find very useful for this purpose.

*Critical Thinking for AS Level* (How To Books). This covers *everything* that you will need if you are taking the OCR AS Level examination. But, despite its title, it should also provide a thorough introduction to the skills involved in Critical Thinking for those of you who want to use them in any course of study. There are lots of examples and exercises.

A more advanced book for those of you who want to take this subject further is the next one.

*Critical Reasoning*, Anne Thomson (Routledge). A very useful guide to a number of critical thinking issues written by someone who is very experienced in both teaching and assessing students in the subject. It is illustrated by using a wide range of the sort of arguments that you find in newspapers and magazines.

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