



National 5 and Higher Philosophy: arguments in action additional support

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This edition: September 2024 (version 2.0)

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Important update

Since we first published these notes, we have made some minor changes to the Higher Philosophy course. In the final exam, there will be no assessment of **soundness, cogency or hidden premises**, and candidates do not have to identify **intermediate conclusions** and put them in standard form. However, we may ask candidates to identify and create arguments with an intermediate conclusion in relation to argument diagramming of serial arguments. In candidates' analysis of arguments, they are not required to produce or interpret more **complex argument diagrams** that combine elements of linked, serial, or convergent diagrams in one argument.

Even though assessment of these concepts will not happen in the final exam, it is helpful to learn about them, to aid in the understanding of more complicated arguments in other areas of the course, and for a general understanding of how arguments work. We have identified in this document where content is no longer assessed in the final exam, but we have not removed the content.

We have also added sections on plausibility and on confirmation bias which are part of the mandatory content for Higher Philosophy. We may ask about these in the exam. We have added a section on false dilemmas — this is part of the content for the National 5 course, but not the Higher.

These notes cover the required content for both National 5 and Higher Philosophy. Where it has not been stated specifically, the content is required at both National 5 and Higher. However, where content is only a requirement of one level, it is stated in the title for that content section.

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Arguments in action: course content

The 'Course content' section of the course specifications describes the requirements for the National 5 and Higher Philosophy courses. It is important to make sure you are familiar with the most recent versions of the course specifications and the requirements for the arguments in action section.

[National 5 Philosophy on SQA's website](#)

[Higher Philosophy on SQA's website](#)

‘Doing’ philosophy

‘Philosophy, as I shall understand the word, is something intermediate between theology and science. Like theology, it consists of speculations on matters as to which definite knowledge has, so far, been unascertainable; but like science, it appeals to human reason rather than to authority, whether that of tradition or that of revelation. All definite knowledge — so I should contend — belongs to science; all dogma as to what surpasses definite knowledge belongs to theology. But between theology and science there is a No Man’s Land exposed to attack from both sides; this No Man Land’s is philosophy.’

(Russell, 2004, p1)

It can be a difficult task to explain exactly what studying philosophy involves or what it means, but a key idea is that philosophy is an attempt to resolve a question of the right sort through the use of reason, as opposed to faith, revelation, or force.

Before we can ‘do’ philosophy, we must have the courage to examine our beliefs critically, be willing to advance tentative claims, and place ‘truth’, rather than winning the argument, as the end goal.

In studying **arguments in action**, we are focusing on the method of reasoning. In so doing, the aim is to make the process of identifying ‘good’ (logical, correct) reasoning from ‘bad’ (incorrect, impermissible) reasoning more formal. In this way, we hope learners develop a critical approach to argument and debate, furthering their own positions as well as identifying the strengths and weaknesses of other peoples’ positions.

‘If an opinion contrary to your own makes you angry, that is a sign that you are subconsciously aware of having no good reason for thinking as you do So whenever you find yourself getting angry about a difference of opinion, be on your guard; you will probably find, on examination, that your belief is going beyond what the evidence warrants.’

(Russell, 2009, p232)

What is an argument?

In philosophy, the word 'argument' means something quite specific, and this can be different from how it is used in everyday language. Although it contains the ideas of a conflict, debate or discussion, that is not all that it means. It is more than simply giving your opinion. An argument in philosophy is an attempt to persuade others of a claim using a process of reasoning.

A definition of an argument is a series of statements (premises) given in support of a conclusion (the point that is being argued for).

To get our heads round this, it is helpful to understand what the different terms used mean. So we will start by looking at the concept of statements.

What is a statement?

A statement is a kind of sentence used in language that is particularly important to know and understand when studying arguments. Statements are defined as declarative sentences that can be judged to be either true or false. What this means is that statements make claims or assert that something is, or is not, the case.

Examples of sentences that are (or make) statements:

- ◆ The earth is spherical.
- ◆ A triangle has three sides.
- ◆ Edinburgh is the capital of Scotland.

Examples of sentences that are not (or do not make) statements:

- ◆ Who did that?
- ◆ Be quiet!
- ◆ Mmm, lovely.

A good test for working out whether something is a statement in English is to try and decide if it is correct to say that it is true or false. A way to do this is to add 'It is true that ...' in front of the sentence. If the resulting sentence makes sense, then it is a statement. Otherwise it is not. (Lau, J. & Chan, J. Critical thinking web, 2024)

The reason that statements are important for us is that arguments are built using statements. Other kinds of sentence usually do not have a role in an argument. However, there are exceptions to this. Occasionally, when people use ordinary language to construct their arguments, they use other kinds of sentences to imply a statement. In these cases, we need to take those implied statements into account when considering the person's argument.

For example:

'Don't you have to get up right now? If you stay in bed any longer you will be late for school.'

Here, the person arguing is using a **rhetorical question** to imply the claim that they are arguing for, which is that 'You should get up right now'.

When studying arguments, we need to look at all the sentences that are presented and consider which are statements, or imply statements, and which do not.

Activity 1

Which of the following sentences are statements?

- 1 A banana is a fruit that has a lot of potassium.
- 2 Do you like chocolate?
- 3 The sun is shining brightly.
- 4 $57 + 3 = 60$
- 5 All along the watchtower.
- 6 All statements are true.
- 7 Take this to the principal.
- 8 Wow!
- 9 I am ordering you to go to bed.
- 10 Ouch!
- 11 A brilliant piece of orange was walking on the shore.
- 12 Isn't that amazing?

Conclusions

An argument is a series of statements, which we call 'premises', given in support of a **conclusion**. The conclusion is the point that is being argued for. So, the conclusion of an argument is the claim that the arguer is trying to convince you of. They provide reasons to support this claim, which they hope will be enough to give you good reason to believe their claim. If a series of sentences doesn't have a point that it is trying to convince their audience of, then it is not an argument.

Compare these dialogues:

Dialogue 1

Ysabelle: I think that Radiohead are one of the best pop bands of all time.

Zanab: Why do you think that?

Ysabelle: I just really think that they are.

Dialogue 2

Ysabelle: I think that Radiohead are one of the best pop bands of all time.

Zanab: Why do you think that?

Ysabelle: Radiohead are constantly evolving, and their records are in the very top of every genre they visit. Other bands often seen as one of the best of all time can usually only do one genre well, so the fact that Radiohead can do every genre so well makes them one of the best.

In the first dialogue, Ysabelle is just giving her opinion about Radiohead as a band. She doesn't give any reasons for why she believes what she does. She is simply stating how she feels about them. In the second dialogue, Ysabelle gives evidence to support what she believes. She uses reasons to support the point she is trying to prove. This then counts as

an argument. The conclusion of Ysabelle's argument is that 'Radiohead are one of the best pop bands of all time'.

We use language to do lots of things, and in philosophy it is important to distinguish arguments from other types of writing. These can include giving opinions, as shown above, as well as descriptions, explanations, and summaries. To work out if an argument is present, we need to determine if the person is arguing for a particular point. It is not enough to give statements that could be true or false. An argument involves giving reasons why someone should believe a claim to be true or false. There are some helpful clues that we can use to work out if someone has presented an argument or not. Certain words are often used to indicate that a conclusion is coming. Words like 'therefore' and 'so' usually tell us that a conclusion will follow. Take the following argument:

Nearly everyone knows that smoking causes lung cancer and heart disease.
Even so, about a third of the population still smokes. Therefore, knowing the dangers of smoking is not enough to get people to stop smoking.

The use of 'therefore' tells us that the point the person is arguing for is coming next. This can be helpful for working out when arguments are present.

Other examples of words and phrases that indicate a conclusion include:

- ◆ so
- ◆ it follows that
- ◆ hence
- ◆ consequently
- ◆ suggests that
- ◆ proves that
- ◆ demonstrates that
- ◆ entails
- ◆ implies

Although indicator words can give us clues that arguments are being provided, sometimes the person arguing does not provide us with these clues. Nor do conclusions always come at the end of a process of reasoning. In fact, they often come at the start. The above argument could easily have been presented in this way:

Knowing the dangers of smoking is not enough to get people to stop smoking.
Nearly everyone knows that smoking causes lung cancer and heart disease.
Even so, about a third of the population still smokes.

Even though the conclusion comes at the start and there is no indicator word present, we can still tell that this is an argument. The key is that an argument is meant to be persuasive and when we are deciding if an argument is present, we should look at whether there is something the arguer intends to persuade us of. This can also help us to distinguish between some of the other types of writing mentioned above. Take the following example:

The bus was late, so I was late for school.

This is not an argument, even though it looks like an argument. It even uses the word 'so', which is often an indicator of a conclusion. However, if we are careful to consider what is the point of this statement, we can see that the intention is not to try to persuade us of anything. It is an **explanation** as to why the person was late. Consider the difference between the example above and the next example:

The bus is late, so it is likely that I am going to be late for school.

In this example, the author is clearly trying to convince us that they are likely to be late for school. So, identifying conclusions in an argument is not always straightforward, but we have now encountered two things that can guide us:

- 1 The presence of conclusion indicator words.
- 2 The presence of a claim for which reasons appear to be offered to try and convince us of the truth.

Premises

We already looked at some ways to identify the conclusions of arguments. Now let's look at some ways to identify the premises. The premises are the reasons, or evidence, given in support of the conclusion. So once you have identified the conclusion, it is helpful to ask, 'why am I meant to believe this claim?' The reasons given are the premises. We can also look for indicator words to help identify premises.

Words or phrases that might indicate that premises follow include:

- ◆ because
- ◆ since
- ◆ first, secondly
- ◆ in view of the fact that
- ◆ follows from
- ◆ may be inferred from
- ◆ may be deduced from
- ◆ may be derived from

Activity 2

Create your own argument, using appropriate premise and conclusion indicators, for the following conclusions:

- ◆ You should eat healthily.
- ◆ Murderers should face the death penalty.
- ◆ Telling lies is wrong.

Activity 3

Look at the following series of statements and:

- ◆ identify if they include an argument or not
 - ◆ if you think they include an argument, identify the conclusion
- 1 The percentage of young people aged 13–15 in the UK who drink alcohol each week is the highest in the world. This suggests that there should be a campaign to educate young people about the dangers of drinking.
 - 2 So it is raining heavily, and this building might collapse. But I don't really care.
 - 3 Having a pet is good for you. We know this because research shows that pet owners are less likely to be depressed than the rest of the population.
 - 4 This year the incidence of extreme snow in Scotland has been very high. The worst months were March and April with some areas experiencing as much as 20-30 inches of snow?
 - 5 Studying critical thinking can help you to analyse and evaluate arguments in a structured and reasoned way. This can help you to make better decisions and better understand your own beliefs and values. For these reasons, everyone should study critical thinking.
 - 6 No geese are felines. Some birds are geese. Therefore, some birds are not felines.
 - 7 Most examinations impose tight time limits on candidates. But this is difficult to justify. It prevents good candidates from demonstrating their ability in a subject. Most employers are happy to employ people who take a bit more time to find a well thought out solution to a problem.
 - 8 You should not give knives to young children because they are dangerous.
 - 9 Cutting the interest rate will probably have no effect on the stock market this time round. People have been expecting a rate cut all along and this factor has already been reflected in the market.
 - 10 After years of hard work and raucous shows, Biffy Clyro became overnight stars of rock in 2007. They're now one of the country's biggest acts.

Formalising arguments

To formalise an argument is to put it into the 'standard form'. The standard form of an argument is a way of presenting the argument that makes it clear:

- ◆ which statements are premises
- ◆ how many premises there are
- ◆ which statement is the conclusion

In standard form, each premise takes a new line, and the conclusion of the argument is listed last. The premises and conclusion are separated by a line called 'the inference bar'.

In standard form, an argument is presented like this:

P1 Premise 1
P2 Premise 2
P3 Premise 3, and so on for as many premises as there are in the argument

C Conclusion

For example:

P1 All deception is wrong.
P2 Lying is a form of deception.

C Lying is wrong.

When you formalise an argument, as well as setting out the premises and conclusions as above, you should also tidy the argument up, so that each statement makes sense as a standalone statement. This means getting rid of any sentences that don't contribute to the argument, such as commands or questions. You should also include statements that have been implied rather than stated, such as ones implied by rhetorical questions.

See the following worked example:

If Highers were difficult wouldn't lots of people fail them? The pass rates are very high. So Highers can't be that difficult. It's not like it was in my day!

List the statements, including those implied statements:

- 1 If Highers were difficult, lots of people would fail them. (This was written as a rhetorical question.)
- 2 Higher pass rates are very high. (We have changed 'The pass rates' to 'Higher pass rates' to make it clear what pass rates are being referred to.)
- 3 Highers can't be that difficult. (Note we have taken out the 'So' at the start of this statement in order to make it a meaningful standalone statement.)
- 4 It's not like it was in my day! (This statement does not contribute to the argument.)

Putting it in standard form:

P1 If Highers were difficult, lots of people would fail them.

P2 Higher pass rates are very high.

C Highers can't be that difficult.

Here is a checklist for formalising arguments:

- 1 List the sentences, taking a new line for each.
- 2 Eliminate unnecessary sentences that don't contribute to the argument.
- 3 Rewrite each statement so that it makes sense on its own, and where possible use the same words and phrases across your statements.
- 4 Where possible, replace pronouns with the word or phrase that the pronoun refers to.
- 5 Remove ambiguity wherever possible.
- 6 Remove indicator words.
- 7 Make sure you don't change the meaning of a statement when you rewrite it.
- 8 List the premises, giving each a new line. (Sometimes these are numbered in order.)
- 9 Draw a line (the inference bar) between the premises and the conclusion.
- 10 Put the conclusion underneath the inference bar.

Activity 4

Write the arguments out in standard form, labelling premises and conclusions accordingly.

Argument 1

Pete is either English or Scottish. Pete says that he is not English. So he must be Scottish.

Argument 2

If the Government wants to create a landfill here, they should compensate those who live in the area. Landfills are ugly and can smell very bad. These people did not choose to live next to a landfill.

Argument 3

Candidates who cram immediately before examinations usually get lower grades than those who do not. I certainly won't make that mistake. I'm not even going to open a book during the exam period. That should give me a much better chance of doing well.

Argument 4

If the suspect had been a stranger, Igor would have barked loudly when they came into the room to take the money Igor was guarding. But Igor didn't make any noise. So the suspect must be an acquaintance.

Argument 5

Darwin's theory of evolution is just that, a theory. Theories are just speculation with no evidence behind them. We don't want our children to learn theories with no evidence behind them, so we shouldn't allow the theory of evolution to be taught in school.

Argument 6

Can't you see, there is no justification for equality to be found in the nature of mankind? If each individual is unique, then to make them equal would be to destroy most of what is human in him. We do not want to destroy what makes us most human.

Analysing arguments: validity and soundness (deductive reasoning)

Important update

In the final exams for National 5 and Higher Philosophy there will be no assessment of the concept of soundness. Candidates do not need to know the definition of soundness, nor be able to give examples of sound arguments or identify whether an argument is sound or not. However, it can be helpful for an understanding of validity to learn this concept.

Analysing arguments

When it comes to analysing an argument, it can be helpful to consider what the aim of an argument is. In general, we can say that the aim is to attain truth. This leads us to two very important criteria for analysing arguments. These criteria are called validity and soundness.

For now, we focus our analysis of arguments only on deductive reasoning. We introduce inductive and conductive arguments further in this document and look at how to analyse them at that point.

Validity

To understand what logical validity is and why it is important, it is helpful to consider some examples.

Compare the following two arguments:

Argument 1

P1 No one who believes in human rights should support torture of any form.

P2 You believe in human rights.

C You should not support torture of any form.

Argument 2

P1 Torture can be mental or physical harm to others.

P2 Torturing criminals can help gain information that can prevent future crimes.

C You should not support torture of any form.

Both arguments come to the same conclusions, but intuitively there is something better about argument 1. It seems like the conclusion follows logically from the claims made in the premises. In argument 2, the premises are clearly related to the conclusion, as they are all about torture; however there does not seem to be a connection between the reasons provided by the premises and the conclusion drawn. In a valid argument, the argument is structured so that there is a connection between the premises being true and the conclusion being true.

The connection is that if you accept the premises as true, you are compelled to believe that the conclusion is true.

Let's look at a simple example:

P1 All monkeys are mammals.
P2 Arthur is a monkey.

C Arthur is a mammal.

If we accept that monkeys are mammals, and that Arthur is a monkey, then it follows using logic that Arthur would have to be a mammal, too. It is not possible for the premises to be true and the conclusion false. This means that this is a valid argument.

Definition of a valid argument

An argument is valid if, and only if, there is no logically possible situation where all the premises are true, and the conclusion is false at the same time (Lau, J. & Chan, J. Critical thinking web, 2024).

Rejecting the conclusion in a valid argument

Assessing the validity of an argument is one way to decide if an argument is good or not. If an argument is valid, then the only way to reject its conclusion is to disagree with one of the premises. Some valid arguments do not have true conclusions.

What do you think this tells us about the premises?

What we can tell is that at least one of their premises must also be false. Look again at the definition of validity. A valid argument is one where it is impossible for all of the premises to be true and the conclusion false, so if the conclusion of a valid argument is false then the only way this is possible is if some of the premises are not true. In fact, we can construct a valid argument for this claim!

Activity 5

Present a valid argument to show that if an argument is valid and has a false conclusion, there must be at least one false premise.

Proving an argument to be invalid

An invalid argument is one where we are not forced to believe the conclusion based on our premises. This means that it is possible that the premises are true, and the conclusion is false. To work out whether or not an argument is invalid, we try to think about a circumstance in which the premises could all be true and the conclusion false.

Consider this example:

- P1 All monkeys are mammals.
P2 Charlie is a mammal.

C Charlie is a monkey.

When we think about this argument, we can see that it is invalid, because even if we agree that all monkeys are mammals, and that Charlie is a mammal, we can still say that Charlie may not be a monkey. Charlie could be a human being, a cat, dog or any other kind of mammal. Therefore, we can envisage a situation where the premises are both true, but the conclusion is false.

Validity and truth

A common mistake that learners studying arguments in philosophy often make is to confuse validity with truth, so it is important to clarify just a few key points. First, the idea of validity applies to the argument as a whole and the structure of it. We don't assess premises to be valid or invalid because it is not appropriate to do so. When we assess a premise, we judge whether it is true or false. Consider the following examples of valid arguments:

Argument 1

- P1 All pigs can fly (false).
P2 A butterfly is a type of pig (false).

C Butterflies can fly (true).

Argument 2

- P1 The capital city of Scotland is in America (false).
P2 Edinburgh is the capital city of Scotland (true).

C Edinburgh is in America (false).

Argument 3

- P1 No mammals have scales (false).
P2 All tigers are mammals (true).

C Therefore, no tigers have scales (true).

Argument 4

- P1 If you eat toast with marshmallows, your head will explode (false).
P2 Millions of people eat toast with marshmallows (false).

C Millions of peoples' heads will explode. (false).

Each of the above arguments is valid, even though they have one or more false premises. The key to remember is that valid arguments are what we call truth-preserving. This means

that when we start with true premises, the truth is preserved in the conclusion. Where we start with one or more false premises, then we can have conclusions that can be either true or false.

In summary:

- ◆ 'Validity' is a concept that can only be applied to arguments.
- ◆ 'True' and 'false' are concepts that can only be applied to statements.
- ◆ Valid arguments can have false conclusions.
- ◆ False statements can be premises in valid arguments.
- ◆ Valid arguments are truth-preserving.
- ◆ Only an invalid argument can have all true premises and a false conclusion.

Activity 6

Identify which of the following arguments are valid.

Argument 1

- P1 When you miss the bus then you are late for work.
P2 You were late for work today.
-

C You missed the bus today.

Argument 2

- P1 All cows have wings.
P2 Raphael does not have wings.
-

C Raphael is not a cow.

Argument 3

- P1 The president of the United States must be 35 years of age or older.
P2 Justin Bieber is president of the United States.
-

C Justin Bieber must be 35 years of age or older.

Argument 4

- P1 Either you accept that animals have no rights or you think that medical testing on animals should stop.
P2 You don't think medical testing on animals should stop.
-

C You must accept that animals have no rights.

Argument 5.

P1 All philosophy teachers are people.

P2 Trip is a philosophy teacher.

C Trip is a person.

Argument 6

P1 Either President Lincoln was assassinated, or he was killed in an accident.

P2 President Lincoln was not killed in an accident.

C President Lincoln must have been assassinated.

Argument 7

P1 It is January.

P2 January is in the wintertime.

C It must be winter.

Argument 8

P1 It is February.

P2 February is in the wintertime.

C It must be snowing.

Argument 9

P1 If Jane has a cat, then Jane has a pet.

P2 Jane has a pet.

C Jane has a cat.

Argument 10

P1 If E.T. phones home, then blue is Enzo's favourite colour.

P2 E.T. phones home.

C Blue is Enzo's favourite colour.

Soundness

When we began looking at evaluating arguments, we agreed that it is important to keep in mind the aim of arguments: to find truth. We have seen that having a valid argument is not enough to achieve this aim, as with validity we can still have false conclusions. We also need the premises in our argument to be true. We define a **sound argument** to be one that is both valid and has true premises.

The definition of a sound argument is a valid argument with true premises.

When constructing an argument we are aiming for truth, so ideally we are aiming towards achieving sound arguments. A sound argument **guarantees** us a true conclusion. An argument can be unsound for any of the following reasons:

- ◆ it is invalid
- ◆ it has a false premise
- ◆ it is invalid and has a false premise

Activity 7

Explain why a sound argument guarantees a true conclusion.

Activity 8

1 State whether the following arguments are (a) valid and (b) sound.

Argument 1

P1 All politicians are liars.
P2 John is a politician.

C John is a liar.

Argument 2

P1 All cats are carnivorous.
P2 Pickles is carnivorous.

C Pickles must be a cat.

Argument 3

P1 Some actors are rich.
P2 Most actors are talented.

C So, at least one actor is both rich and talented.

Argument 4

P1 Most cats have tails.

P2 Most cats have ears.

C So, at least one cat has both ears and a tail.

Argument 5

P1 According to the Human Rights Act, everyone has a right not to be tortured or treated inhumanely.

P2 Asylum seekers in the UK are detained in inhumane conditions.

C Asylum seekers in the UK are having their human rights breached.

2 Pick a moral issue you feel strongly about. Create a valid argument to support your beliefs.

3 Create a valid argument to support the opposing view.

4 Explain why you believe the opposing argument is unsound.

5 Are the following statements true or false? Why?

a) All invalid arguments are unsound.

b) All true statements are valid.

c) To show that an argument is unsound, we must at least show that some of its premises are false.

d) An invalid argument must have a false conclusion.

e) If all the premises of a valid argument are false, then the conclusion must also be false.

f) If all the premises and the conclusion of an argument are true, then the argument is valid.

g) All sound arguments are true.

Complex arguments: hidden premises (not required content)

Important update

In the final exams for National 5 and Higher Philosophy there will be no assessment of hidden premises. Candidates will not be asked about hidden premises, nor will they need to identify hidden premises in an argument. It can, however, be helpful in developing a deeper understanding of validity and the structure of arguments to learn about hidden premises.

Hidden premises

So far, most of the arguments we have looked at have been simple arguments with two premises and a conclusion. Some arguments can be more complicated. This is the case when the arguer uses a hidden premise or assumption in their argument that they have not explicitly stated. Look at this argument.

'You should not give whole grapes to babies because whole grapes can be a choking hazard.'

As it stands, this argument is not valid. It requires an assumption, which is important to draw its conclusion. This assumption must be something that ties the premise to the conclusion. In this case the statement 'You should not give choking hazards to babies' links the premise provided to the conclusion. If we add this premise into the argument, then it looks like this:

P1 You should not give choking hazards to babies.
P2 Whole grapes can be a choking hazard.

C You should not give whole grapes to babies.

This argument is valid, and it is reasonable to assume that the arguer was making this assumption in presenting the argument in this way. In everyday life, the arguments we normally encounter are often arguments where important assumptions are not made explicit. It is an important part of critical thinking that we should be able to identify such hidden premises.

So, how should we go about identifying hidden premises? There are two main steps involved. First, determine whether the argument is valid or not. If the argument is valid, the conclusion does follow from the premises, and so the premises have shown explicitly the assumptions needed to derive the conclusion. There are then no hidden premises involved. But if the argument is not valid, you should check carefully what additional premises should be added to the argument that would make it valid. Those would be the hidden premises. Usually they are left unstated because the claim is so obvious that the arguer feels it is unnecessary to state it. Sometimes this is not the case and hidden premises may be less certain or obvious claims. So, even when we have identified a hidden premise that makes an argument valid, we can still ask if the assumption is true or false, or if it is an acceptable assumption to make. In this way, we are also considering the soundness of the argument.

Activity 9

Identify a hidden premise required to make the following arguments valid.

- 1 If women have a right to their body, then abortion should be legal. Therefore, abortion should be legal.
- 2 Traces of ammonia have been found in Mars' atmosphere. So there must be life on Mars.
- 3 Cannabis should be legalised. After all, it does not harm anyone.
- 4 Takeshi is a lizard, so Takeshi is a reptile.
- 5 Creationism is not the best explanation for our observations. Therefore, evolution is the best explanation for our observations.
- 6 The death penalty is wrong because murder is wrong.
- 7 My bag of candy is better than yours, because mine has more red pieces.
- 8 Everyone should drink raw cow's milk because it is natural and not processed.
- 9 You won't like my banana loaf because it has walnuts in it.
- 10 No one wants to kiss a person with bad breath; therefore you shouldn't smoke.

Complex arguments: intermediate conclusions (not required content)

Important update

In the final exams for National 5 and Higher Philosophy, candidates will not be asked specifically about intermediate conclusions. However, in the Higher Philosophy exam, candidates can be asked to identify and create arguments with an intermediate conclusion in relation to argument diagramming of serial arguments.

Intermediate conclusions

Arguments are often longer and more complicated than the ones that we have examined so far. Many longer arguments contain an intermediate conclusion before the main conclusion. Have a look at this example:

'Very cold winters lead to high numbers of elderly people needing to be admitted to hospital. We are expecting a very cold winter. So we should expect high numbers of elderly people needing to be admitted to hospital. We will need to make sure that we have enough hospital beds to meet demand.'

In this example, the third statement is in the form of a conclusion, indicated by the word 'so'. However, the argument continues to a fourth statement. The third statement is in fact an intermediate conclusion, which is supported by the first two statements. Every intermediate conclusion then goes on to act as support for the next stage of the argument — it acts like a reason for the main or overall conclusion.

The definition of an intermediate conclusion is a conclusion that is meant to serve as a premise for a later conclusion (possibly the final conclusion of a complex argument).

Here's another more complex example to look at:

'Don't you agree that eating meat is just wrong?'

'After all, it involves harming animals. I think it is wrong to harm any life because all life is created by God, and anything created by God is sacred. Surely it is wrong to harm something that is sacred.'

- P1 All life is created by God.
 - P2 Anything created by God is sacred.
 - P3 It is wrong to harm something sacred.
-
- IC It is wrong to harm any life.
 - P4 Eating meat involves harming animals.
-
- C It is wrong to eat meat.

Activity 10

Write these arguments out in standard form, showing the main conclusions (C), intermediate conclusions (IC) and premises (P) involved. For the first one, the main conclusion has been identified for you.

Argument 1

I better get my umbrella (C). If it is raining, then I will get soaked without an umbrella. It is raining, so I will get soaked without an umbrella. Since I don't want to get wet, I better get my umbrella (C).

Argument 2

Guns are dangerous so you should keep them away from young children. Therefore, if you keep a gun in the house, you should keep it in a safe place away from young children.

Argument 3

To stay healthy, you are advised to have five portions of fresh fruit or vegetables each day. You have only had four so far today so you should have a piece of fruit. We only have apples and oranges and you do not like oranges, so you should have an apple to maintain your good health.

Argument 4

Drinking coffee before going to bed may cause you to feel tired in the morning. This is because coffee contains caffeine, which is a stimulant. Taking any stimulant before going to bed stops you from sleeping soundly and so drinking coffee before going to bed will stop you from sleeping soundly. A poor night's sleep may lead you to feel tired in the morning. So, drinking coffee before going to bed may mean you are tired when you get up in the morning.

Inductive and deductive reasoning and arguments (Higher only)

Important update

In the final exam, there will be no assessment of the concept of cogency. Candidates do not need to know the definition of cogency, nor be able to identify or give examples of cogent inductive arguments.

Reasoning

Let's begin by investigating the concept of reasoning. Reasoning is the process of constructing thoughts into arguments. This is something you probably do every day. When you make a decision, you are using reasoning: taking different thoughts and making those thoughts into reasons why you should go with one option over the other options available. When you construct an argument, that argument will be either valid or invalid. A valid argument involves reasoning that is logical, where the conclusion is drawn from the premises alone.

Deductive reasoning and arguments

In the process of deduction, you begin with some statements, called 'premises', that are assumed to be true. You then determine what else would have to be true if the premises are true. For example, you can begin by assuming that God exists, and is good, and then determine what would logically follow from such an assumption. You can begin by assuming that if you think, then you must exist, and work from there. In mathematics, you can also start with a premise and begin to prove other equations or other premises. With valid deductive arguments, you can provide absolute proof of your conclusions, given that your premises are taken to be true. The premises themselves, however, remain unproven and they must be accepted on face value, or by faith, or — for the purpose of exploration — as part of the argument.

Examples of deductive arguments

Argument 1

P1 All men are mortal.

P2 Joe is a man.

C Therefore Joe is mortal.

Argument 2

P1 A Bachelor is an unmarried man.

P2 Bill is an unmarried male.

C Therefore, Bill is a bachelor.

If the first two statements in these arguments are true, then the conclusion must be true.

Inductive reasoning and arguments

Now consider the following inductive argument:

'Every day this year the number 47 bus has come to my bus stop around 7:15am. Therefore, this morning the number 47 bus will come to my bus stop around 7:15am.'

It should be immediately obvious that this argument is not valid because there is clearly a possibility that the number 47 bus has been delayed or cancelled today for any number of reasons. Yet, it seems like a perfectly good argument for believing that the number 47 bus will come to the bus stop around this time today. It seems highly probable that if the bus has come at this time regularly in the past that it will do so today as well. This kind of reasoning is called inductive reasoning.

When it comes to inductive reasoning (as opposed to deductive reasoning) the premises are seen as providing strong evidence for the truth of the conclusion. While the conclusion of a deductive argument can be certain, the truth of the conclusion of an inductive argument may be at best probable. Inductive reasoning is very important in ordinary life and science. We believe lots of things on the basis of limited evidence. The evidence might not logically guarantee that the belief is correct, but the belief can still be reasonable. For example, we see dark clouds in the sky and think it is likely to rain because that is what dark clouds have meant in the past. So we bring an umbrella with us, and this seems like a very reasonable action. We see mould on our bread and know that bread with mould often makes people sick so think we will be sick if we eat it.

It can sometimes be difficult to determine whether an argument is meant to be taken as inductive reasoning or is simply a badly presented invalid deductive argument. The key difference between deductive and inductive arguments in such cases is in the relationship the arguer takes there to be between the premises and the conclusion:

- ◆ If the arguer believes that the truth of the premises establishes the truth of the conclusion, then the argument is intended to be deductive and should be taken as such.
- ◆ If the arguer believes that the truth of the premises provides only good reasons to believe the conclusion is probably true, then the argument is intended to be inductive and should be taken as such.

What makes a good inductive argument?

Evaluating an inductive argument is obviously going to have to be different from evaluating a deductive one. It is not appropriate to evaluate on its validity or soundness, because we have already said that inductive arguments provide only probable conclusions, and valid deductive arguments provide certain conclusions. Thus inductive arguments cannot be valid, nor sound.

Activity 11

Discuss with a partner how we might evaluate an inductive argument. It may be helpful to remember that deductive arguments are assessed on whether or not they are valid or sound. What criteria might there be for judging inductive reasoning as good or bad?

Strong and weak inductive arguments

One factor we might consider is how much evidence we have for the conclusion drawn. An inductive argument which provides a lot of evidence for the conclusion seems like it would be better than one that has only a little evidence. An inductive argument with lots of evidence for its conclusion is said to be **strong** while an inductive argument that provides only a small amount of evidence is said to be **weak**. The strength of an inductive argument is not an absolute judgement in the way that deductive arguments are either valid or invalid. Rather, the strength of the argument is relative, and we can say that one inductive argument is stronger or weaker than another. For example:

'I have seen 10 cats with tails; therefore all cats have tails.'

is a weaker argument than

'I have seen a thousand cats with tails; therefore all cats have tails.'

Cogent inductive arguments

Although strong inductive reasoning is good, it is not very helpful if the premises of the argument are actually false. If a scientist has fabricated lots of data to support their theory, then we would not think that they had provided very good reason to believe the conclusions they have drawn. So, a further criterion for assessing inductive arguments is to look for the premises to be true. A strong inductive argument which also has true premises is said to be cogent.

The definition of a cogent inductive argument is a strong inductive argument with true premises.

So, false premises or premises that can provide only weak evidence for the conclusion make the argument either not cogent or less cogent.

Activity 12

Create a revision sheet which shows the differences between inductive and deductive reasoning. Give examples of each type to illustrate the differences. Make sure to explain how we assess how good they are:

Remember:

- ◆ deductive: valid and sound
- ◆ inductive: strong and cogent

Activity 13

Make up your own examples of:

- ◆ a strong inductive argument that is not cogent
- ◆ a weak inductive argument
- ◆ a cogent inductive argument

Conductive arguments (Higher only)

A further kind of argument we are going to look at is a conductive argument. We encounter these arguments a lot in everyday life. They are quite similar to inductive reasoning in that they provide only probable conclusions, rather than certain conclusions. Indeed, there is debate amongst philosophers as to whether they count as a form of inductive reasoning or are a separate class of their own. An easy way to understand conductive arguments is to look at examples. This will help us to see how they differ from standard inductive reasoning.

'I have a number of reasons for believing capital punishment is wrong. First, the risk of making a mistake and killing an innocent person is one that needs to be taken seriously. Second, it goes against the right to life that I believe all people have. It also can lead to a brutalisation of society, and finally it is very expensive, usually costing more than life sentences.'

Unlike in a standard inductive argument, in conductive arguments the support for the conclusion converges. Each premise works independently of the others to support the conclusion. If we investigated and found out that capital punishment was not actually more expensive than a life sentence, that would not stop the other reasons against capital punishment from being true. It could still be a good argument. It would, however, be slightly less strong than it was previously, because we had one less reason for the conclusion.

Equally, if we added some additional reasons against capital punishment — such as the fact that the evidence suggests it is not really a deterrent against serious crimes — this would add greater support for the conclusion, even though each reason works independently of the others. In standard inductive arguments, the premises are all providing evidence of the same kind, such as having experienced a similar kind of event many times in the past and so assuming that it will be the same again in the future. In conductive arguments, the premises can be giving completely different kinds of evidence for the conclusion.

The premises in a conductive argument count separately in favour of the conclusion; they are put forward as separately relevant to it and need not be linked together to offer support. The argument weighs these factors to provide a basis for the conclusion. Conductive arguments are common in everyday reasoning, such as when we draw up a list of pros and cons, plusses, and minuses, to make a decision (reach a conclusion). In a conductive argument, the more relevant premises given to support the conclusion, the greater the conductive strength of the argument.

Counter considerations

Unlike other arguments, conductive arguments may include in their premises counter considerations — that is, factors that are negatively relevant to the conclusion.

There is usually an assumption that the supporting factors outweigh the negatives, such as in the following example:

- 'Glasgow is a big, bustling city, which is full of life.'
- 'Glasgow has an efficient underground, bus and train network.'
- 'The flats in Glasgow are nice and not too expensive.'
- 'Living there is not so expensive.'
- 'I know some of my future colleagues and they are nice.'
- 'The weather is not great — it rains quite a bit.'
- 'There is easy access to lots of beautiful countryside outside of the city.'
- 'I should take the job in Glasgow.'

If one of the above premises turns out to be false, or there are other negative considerations we have to include, then the argument may still lead to the conclusion, but it would be considered a weaker conductive argument.

Activity 14

Come up with conductive arguments with at least three premises for the following claims:

- 1 It is more important to focus on building good relationships in life, rather than developing your career.
- 2 Dogs are great pets.
- 3 We need to take care of the environment.

Argument diagrams (Higher only)

Important update

In the final exam, there will be no question that requires the ability to create or identify complex argument diagrams in the analysis of arguments.

Complex argument diagrams combine elements of linked, serial, or convergent diagrams in one argument.

What is an argument diagram?

An argument diagram is a diagrammatic representation of an argument showing the premises, the conclusion, and the relationship between them. Argument diagramming is a technique that makes a visual representation of an argument, to make the structure clear. Various different methods of diagramming arguments exist. The first method is to provide a key for each statement included in the argument — the premises and the conclusions. These numbers show the structure of the argument. For example, take this simple argument:

'Death is inevitable. So life is meaningless.'¹

First, we provide a key with each statement that is part of the argument:

1 = Death is inevitable

2 = Life is meaningless

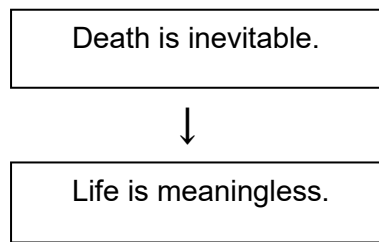
1
↓
2

In the argument diagram, the arrow performs the same function as the inference bar in standard form; it identifies that a conclusion is being drawn. The direction of the arrow points towards the conclusion. It can be helpful to imagine the arrow as representing the word 'therefore'.

Another way that argument diagrams are constructed is to include the statements inside a box. This then does not require a key.

¹ <http://philosophy.hku.hk/think/arg/complex.php>

The above argument can be represented in an argument diagram as follows:



In Higher Philosophy, candidates are expected to be able to recognise, explain and construct diagrams that represent three different kinds of arguments as an argument diagram:

- ◆ linked arguments, where the premises are dependent
- ◆ convergent arguments, where the premises give independent support to the conclusion
- ◆ serial arguments, where there is at least one intermediate conclusion

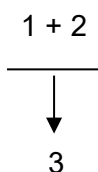
Here are some examples of each of these types of argument to show how they should be represented.

Linked arguments

'Edinburgh is in Scotland. Scotland is in the UK, so obviously Edinburgh is in the UK.'

- 1 Edinburgh is in Scotland.
- 2 Scotland is in the UK.
- 3 Edinburgh is in the UK.

Here is the corresponding argument diagram:



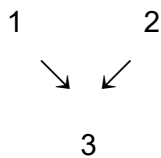
Note that the two premises work together to form the conclusion. If you take one of the premises away, then the argument does not lead us to the conclusion which is drawn.

The plus sign indicates that the two premises are co-premises which work together to support the conclusion. In other words, they do not provide independent reasons for accepting the conclusion.

Convergent arguments

'Dogs are loyal and friendly pets. There is also evidence that people who have a dog tend to live longer and healthier lives than those who do not. Therefore dogs are great pets to have.'

- 1 Dogs are loyal and friendly pets.
- 2 There is evidence that people who have a dog tend to live longer and healthier lives than those who do not.
- 3 Dogs are great pets to have.



This diagram tells us that 1 and 2 are **independent** reasons supporting 3. In other words, without 1, 2 would still support 3, and without 2, 1 would still support 3. (Although the argument is stronger with both premises.)

Serial arguments

'You are allergic to most nuts, so you are probably allergic to walnuts. For that reason, you should probably not eat this cake with walnuts in it.'

- 1 You are allergic to most nuts.
- 2 You are probably allergic to walnuts.
- 3 You should probably not eat this cake with walnuts in it.



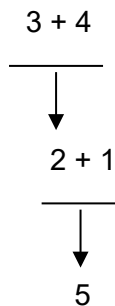
Note that 2 is an intermediate conclusion in a serial argument. It follows from 1 and leads to 3.

Complex arguments

Complex arguments may combine elements of convergent, linked and serial arguments, as in this example:

'Today is either Thursday or Friday. But it can't be Friday, because we get Philosophy on a Thursday and we are getting Philosophy today. So it must be Thursday.'

- 1 Today is either Thursday or Friday.
- 2 It can't be Friday.
- 3 We get don't get Philosophy on a Friday.
- 4 We are getting Philosophy today.
- 5 It must be Thursday.



In this diagram, there are two linked arguments joined by an intermediate conclusion.

Activity 15

Create argument diagrams for the following arguments:

Argument 1

Paris is in France, and France is in Europe. So obviously Paris is in Europe.

Argument 2

Since the solution turned red when the indicator was added, I conclude it is acidic, as acidic substances react with this indicator to form a red colour.

Argument 3

A life of crime is a poor career choice, because sooner or later most criminals get caught and even if you were to get away with a crime you would eventually come to despise yourself for it.

Argument 4

Be a doctor! You've got the talent, you would enjoy the work, and you could help a lot of people. Plus, you could make a lot of money.

Argument 5

All expensive things are desirable. All desirable things make you feel good. All things that make you feel good make you live longer. So, all expensive things make you live longer.

Argument 6

Using animals for scientific research without a clear necessity is morally impermissible for the following reasons: Inflicting unnecessary suffering is morally wrong, and scientific research often involves subjecting animals to pain and distress. So it is obvious that scientific research on animals that is unnecessary is not morally permissible.

Different methods of argumentation: analogical arguments (Higher only)

Analogical explanations

An analogy is a comparison in which a concept or a thing is compared to something else that is similar to it in some way. It aims at explaining that concept or thing by comparing it to something we are already familiar with. Metaphors and similes are tools used to draw an analogy that you may have encountered in English.

To give an analogy is to claim that two distinct things are alike or similar in some respect. Here are two examples:

- ◆ That's as useful as rearranging deck chairs on the Titanic: it looks like you're doing something helpful but really it will make no difference in the end.
- ◆ Life is like a box of chocolates — you never know what you're gonna get: an often-used analogy from the movie *Forrest Gump* shows that life has many choices and surprises, just like a box of chocolates.

Analogical arguments

The analogies above are not arguments. But analogies are often used in arguments. To argue by analogy is to argue that, because two things are similar in a certain respect, what is true of one thing is also true of the other. Such arguments are called 'analogical arguments' or 'arguments by analogy'. Here are some examples:

Argument 1

Europa might support life because it has an atmosphere that contains oxygen just like the Earth.

Argument 2

This novel is supposed to have a similar plot like the other one we have read, so probably it is also very boring.

Argument 3

The government campaign against illegal drug use is like a literal war with shooting and bombing. You can't win a real war without shooting at the enemy, so the government won't win the drug war without a 'shoot on sight' order against drug dealers.

Analogical arguments are based on the belief that something unfamiliar is similar in some way to a familiar thing and that, because of this similarity, we might assume that it also resembles the familiar thing in another respect.

So if we present an analogical argument explicitly, it should take the following form:

P1 Object X and object Y are similar in that they both have property A.

P2 Object X also has property B.

C Object Y probably has property B.

Activity 16

See if you can rewrite the analogical arguments above in this explicit form.

Evaluating analogical arguments (Higher only)

When evaluating analogical arguments, it is important to consider how similar the two things that are being compared actually are. It is also important to look at how relevant the similarities are to the conclusion being drawn. For example, both dogs and electric fans move, but does that make it likely that you can use a dog to cool down? The answer is almost certainly not. The reason is that the movement alone is not all that makes a fan cool. The kind of movement involved is just one of the other factors that relates to how good the object is at making things cool.

So how should we evaluate the strength of an analogical argument? Here are some relevant considerations:

Truth: We need to check that the two objects being compared are similar in the way it is claimed they are.

Relevance: We also need to make sure the things being compared are similar in a way that is relevant to the conclusion. For example, the fact that my winter coat and my summer rain jacket are both red has little relevance to how warm they are. However, if they are both made of the same material, then I might be able to conclude from the fact that one is warm that the other might also be.

Number: An analogical argument could be a conductive argument, so it is stronger if there are several relevant similarities between the two things being compared. Imagine I was comparing two films, one which I have seen and really liked and another I have not yet watched. Several relevant factors might affect the likelihood I will also enjoy the other film:

- ◆ the movie was directed by the same director
- ◆ the leading characters were played by the same actors or actresses
- ◆ it was from a similar genre
- ◆ they both reviewed well by critics

Then we can justifiably be more confident in concluding that I will enjoy this other film.

Disanalogy: Even if the things being compared are similar in many relevant ways, there may be particularly relevant differences, or disanalogies, between the two things. If these are significant, they can make the argument weak.

Activity 17

Evaluate these arguments from analogy:

Argument 1

We should not blame the media for deteriorating moral standards. Newspapers and TV are like weather reporters who report the facts. We do not blame weather reports for telling us that the weather is bad.

Argument 2

Democracy does not work in a family. Parents should have the ultimate say because they are wiser, and their children do not know what is best for themselves. Similarly the best form of government for a society is not a democratic one but one where the leaders are more like parents.

Argument 3

The world around us resembles the artefacts of human creation in that they both display complexity. The complexity in human artefacts comes from having been designed and made by intelligent beings (humans). Therefore, the complexity in the world around us comes from having been designed and made by an intelligent being (God).

Argument 4

Dolphins and sharks have many similarities. They are both shaped very much the same and are optimized for fast swimming. They are also both built with strong dorsal, ventral and caudal fins. Finally, they both live the same way, by chasing down and eating smaller fish. So the fact that sharks have gills leads to the conclusion that dolphins must also have gills.

Counterexamples (Higher only)

A counterexample is something we can use to show that a universal statement is false. This could be a way to show that a conclusion in an inductive or conductive argument can't be true. We can also use it to dispute a universal statement used as a premise in any kind of argument. Counterexamples show that claims such as 'All Fs are Gs' are false.

Consider the claim 'all swans are white'. We can disprove this by giving a counterexample — a single black swan. If there exists a single case of a swan that is not white, then the claim that 'all swans are white' must be false. Also consider the claim 'no mammals lay eggs'. We can disprove such a claim with the example of a platypus.

In both cases, the initial claim is universal — it has to do with all entities of a certain group.

The counterexample shows that at least one entity of that group doesn't fit the description, and so the universal claim must be false.

Activity 18

Come up with counterexamples to deny the following general claims:

- 1 Adultery is always morally wrong.
- 2 It is wrong to kill someone who wants to live.
- 3 Breaking the law is always wrong.
- 4 All dogs have four legs.
- 5 Divorce is always wrong
- 6 Pleasurable experiences are always good.
- 7 Without memory there can be no person.

Confirmation bias (Higher only)

Important update

Knowledge and understanding of confirmation bias has been a requirement of the Higher course since 2016.

What is confirmation bias?

Confirmation bias is a cognitive bias that we, as philosophers, need to be aware of, because it affects our ability to process information in a rational way. It is a tendency to look for, or interpret, information in a way that fits with our existing beliefs, and to ignore information that suggests that something else might be true. It is an unconscious bias, and so we are not normally aware that we are being biased. However, we can learn to manage this through education and training in critical-thinking skills. Being open minded when it comes to looking at new theories or information is the best way to avoid this bias. Confirmation bias is particularly strong when dealing with information around issues that we feel strongly about, or where it affects us very personally. People are usually much less susceptible to confirmation bias when it is about an issue that they feel neutral about. However, even in such cases, we can still be susceptible to this bias.

A series of experiments done by Peter Wason in 1960 showed how when people are trying to test out a hypothesis, they tend to seek information that confirms what they think they know, rather than looking at whether the evidence could be explained in other ways. (You can find a description of the methodology of Wason's Rule Discovery Test and the results on the [confirmation bias page of explorable.com](#) [accessed September 2024]. The video on the page demonstrates an example of this experiment.)

One example of confirmation bias is in the medical profession. Often when a person sees the doctor with some health concerns, there will be several possible explanations for what might be wrong with them, because there may be more than one thing that could cause their symptoms. The doctor will usually do some tests to see if any of these can be eliminated and which of the range of possible conditions might best explain what is going on. They will then proceed to treat the patient on the best explanation of what they think is wrong. However, if the doctor does later tests that suggest that something different from their initial diagnosis is the cause, they might ignore these results as simply a mistake or an anomaly, rather than seeing them as a sign that their diagnosis was wrong. They also may do more tests that are likely to support what they think is going on rather than looking for an alternative explanation. For this reason, medical professionals are trained to be aware of confirmation bias, so that they take steps to consider all explanations for a condition and not ignore information that might change their diagnosis.

When it comes to arguments in philosophy, we should always consider if we have looked at all the available evidence to draw our conclusions, or if we have ignored important information that might suggest something else is true. We also need to think about if the conclusion we have drawn based on the evidence is the most appropriate, or if we are being biased because that is what we already thought was true. We need to be aware of this bias when it comes to premises in arguments as well, because we may be relying on biased evidence there as well.

Activity 19

Answer the following questions:

- 1 In what two ways does confirmation bias affect how we deal with new information?
- 2 Why do we as philosophers need to be aware of confirmation bias?

Acceptability, relevance and sufficiency (Higher only)

When it comes to evaluating arguments, there are many different approaches that philosophers have taken. We already know that validity and soundness are criteria that can be used to analyse deductive arguments, and that we can analyse the strength and cogency of inductive and conductive arguments. Another way we can judge arguments is by analysing and evaluating the relationship between the premises and the conclusion using the criteria of acceptability, relevance, and sufficiency. We will now look at each of these criteria in turn to see how they can be applied to the premises in different arguments.

Acceptability

A premise is taken to be acceptable if it is reasonable to take it to be true. Any premise that is known a priori to be true is a completely acceptable premise. An example of such a claim could be that 'the shortest distance between two points is a straight line'. In an ideal world, all arguments would only be based on a priori, necessary truths, because then it would be really straightforward to determine whether they were true or not. In reality, most arguments are based on less than absolutely certainly true premises and this is why we look at the criteria of acceptability. Where the premise is not an a priori truth, a number of other factors will also contribute to how acceptable we take the premises to be:

- ◆ Is the premise a matter of common knowledge (is it something that most people would agree with)?
- ◆ If it is not common knowledge, is it at least plausible (would it be reasonable to take it to be true)?
- ◆ Is the premise unambiguous?
- ◆ Does the premise appeal to an appropriate authority?
- ◆ Does the premise properly represent the facts pertaining to the conclusion?

Relevance

In arguments from analogy, not all premises are relevant to the conclusion drawn. With analogical reasoning, the premises need to identify relevant similarities to the conclusion. In other arguments, the premises can be more or less relevant to the conclusion. If we take a valid deductive argument, then the premises will be completely relevant to the conclusion. When it comes to inductive and conductive reasoning, the relevance of the premises to the conclusion may be more a matter of degree.

In general, premises are relevant to the conclusion if they meet one of these conditions:

- ◆ they provide some justification to support the conclusion
- ◆ they give support to another relevant premise
- ◆ they contain an appropriate analogy
- ◆ they attack a claim rather than the person putting forward the claim

Sufficiency

We apply the criterion of sufficiency to ask whether the premises provide enough evidence for the conclusion being drawn. If the premises are sufficient to draw the conclusion, then they are enough to engender a well-founded confidence in the conclusion, provided that the premises are acceptable.

As you may have noticed, these criteria are progressive. First, we should look at how acceptable the premises of an argument are. If we consider them acceptable, then we should look at how relevant they are to the conclusion drawn. If they are relevant, then the next stage is to consider if they are sufficient for the conclusion.

Fallacies (National 5: informal fallacies; Higher: formal and informal fallacies)

When we are assessing arguments, we will encounter many fallacies. These are common errors in reasoning that we come across often in everyday reasoning and arguments. These errors are so common that they have specific names.

You should note that sometimes the word 'fallacy' is used in a more general sense to mean any error in reasoning.

There are two main categories of fallacy: formal and informal fallacies. Formal fallacies are fallacious due to an invalid structure or form in the argument. Informal fallacies may or may not be presented in a valid way. They are called informal because it is the content of the argument that is problematic, and not because of the form the argument takes, even though they may well have a bad structure too.

Issues primarily relating to acceptability (Higher only)

Important update

We have added a section on **plausibility** below. Knowledge and understanding of the plausibility of claims has been a requirement of the Higher Philosophy course since 2016.

Plausibility (Higher only)

We can define plausibility as ‘seemingly or apparently likely, or acceptable; credible, for example a plausible excuse.’ A plausible claim is one that it is reasonable to take to be true.

When judging how acceptable a claim is, first we should consider if we know the claim to be true for certain. Often, we do not know for certain if a claim is true or false. When this is the case, we can judge whether the claim is at least plausible. Plausible claims are seen to be more acceptable than implausible claims.

Activity 20

Consider the following statements. List them in order of which are most likely to be true:

- 1 The name Jessica was created by Shakespeare in the play Merchant of Venice.
- 2 Cleopatra lived closer to the invention of the iPhone than she did to the building of the Great Pyramids.
- 3 Russia has a larger surface area than Pluto.
- 4 Hippo milk is pink.
- 5 The heart of a blue whale is so big, a human can swim through the arteries.
- 6 If you started working for a penny a day with the stipulation that your pay doubled each day, you'd be a millionaire in less than a month.

All these claims are in fact true, but how plausible they seemed to us may be dependent on what knowledge we already had in relation to these facts. How plausible something seems to be is affected by our knowledge. So, while a claim being plausible rather than implausible makes it more acceptable, it does not guarantee its truth.

Ambiguity (Higher only):

A statement is ambiguous if it has or expresses more than one possible meaning. If we are trying to decide whether a premise is acceptable or not, we need to know what the premise means. If there could be more than one meaning, one which is acceptable and one which is not, then this would be important to consider when assessing an argument. There are different ways in which a statement could be seen to be ambiguous. There are two types of ambiguity we are going to look at: lexical (or semantic) ambiguity; and syntactic ambiguity.

Lexical ambiguity occurs when a single word or phrase has more than one meaning.

Syntactic ambiguity, also called amphiboly or amphibology, is where a sentence may be interpreted in more than one way, due to its ambiguous sentence structure.

Look at the following argument. What is the nature of the ambiguity?

P1 It is silly to fight over mere words.

P2 Discrimination is just a word.

C It is silly to fight over discrimination.

To fully assess this argument, it is helpful to learn about the fallacy of equivocation.

Equivocation is an error in reasoning that occurs when the meaning of an ambiguous term is switched during the process of reasoning. This is a way in which semantic ambiguity often affects arguments and can lead to an argument appearing to be valid when in fact it is not. If we consider the argument above, the word discrimination can have one of two meanings.

One meaning is an action or policy based on prejudice or partiality, and this seems to be the way that we are meant to interpret it in the conclusion of the argument. The other meaning is simply the word 'discrimination' itself. If we think the argument is using the latter meaning for both premise and conclusion (the word itself) then this is valid and probably sound, but perhaps a bit odd to speak of fighting over a word. If we take the first meaning for both premises and conclusion, then although valid the second premise is definitely false.

It seems most likely that the arguer intends 'discrimination' to mean the word in the premise and the action or policy in the conclusion, so the argument is invalid.

Activity 21

In the following examples, identify any arguments in which the fallacy of equivocation is committed. Explain where the equivocation occurs. Remember that if a passage does not contain an argument, it cannot contain a fallacy of equivocation.

- 1 When he was asked to find the cube root of 27, he got the answer wrong. He simply wasn't right about that. He was wrong, which means there was something wrong with him. You can see this man is a flawed human being.
- 2 The poet refused to explain his work because he said that his poems would speak for themselves. But that can't be true. Why not? Poems are composed of words, and no words can speak for themselves. People have to speak words by using them in speech or in writing.
- 3 Your language and your arguments are garbage, and garbage only deserves to be thrown out.
- 4 A dispute that cannot be settled by the committee within the institution will be taken to an arbitrator, who will be selected by our president and his advisors. The arbitrator will hear all sides and reach her decision, which will be final.
- 5 The idea of God exists, so God exists in my mind. Therefore, God exists.

Amphiboly (Higher only)

The **fallacy of amphiboly** occurs when a sentence, because of its grammar, structure, or punctuation, can be interpreted in multiple ways. Unlike equivocation, which is due to multiple meanings of a phrase, amphiboly is due to syntactic ambiguity; ambiguity caused by multiple ways of understanding the grammar of the phrase.

Here is an example: in a cartoon, two elephants are driving their car down the road in India. They say, 'We'd better not get out here,' as they pass a sign saying: 'Elephants please stay in your car.'

The argument would look like this:

P1 Elephants stay in your car.

P2 We are elephants.

C We better not get out here.

Upon one interpretation of the grammar, the pronoun 'your' refers to the elephants in the car, but on another it refers to those humans who are driving cars in the vicinity. According to the first interpretation, the above argument is valid, but with the second it is invalid.

Activity 22

Discuss the following two arguments with a partner and identify how amphiboly affects the acceptability of the premises.

- 1 Last night I caught a prowler in my pyjamas. Therefore, it is important to keep your pyjamas locked up securely where no one else can get them.
- 2 John told Henry that he had made a mistake. It follows that John has at least the courage to admit his own mistakes.

When we look at the examples above, the fact that there is equivocation and amphiboly taking place is obvious and it seems highly unlikely that anyone would actually be convinced by the conclusions drawn. When ambiguity affects arguments presented by philosophers, the ambiguity is usually much more subtle and hard to identify and so we need to be on our guard to notice ambiguity in arguments.

Appeals to authority

In the section on acceptability, we saw that basing a premise on the say so of an appropriate authority can be a way of judging it to be acceptable. Similarly, if we take a claim to be true on the say so of an inappropriate authority, this can make the claim unacceptable.

Illegitimate appeals to authority

An illegitimate appeal to authority is an informal fallacy. An illegitimate appeal to authority happens when a claim (X) is accepted because some person or group asserts that X is true, without justifying the right of that person or group to be regarded as authoritative in this matter. An example of an illegitimate appeal to authority is the following:

‘My best friend told me nobody ever checks if you have your phone with you in your exams, so I think it will be fine to bring your phone with you.’

Your best friend is not an appropriate authority on this matter. They may have information from other sources not mentioned in your argument, but just going on their say so here is not acceptable (it is also likely to get you into a lot of bother if you act on this claim and take your phone into your exam!).

To know what counts as an illegitimate authority, it can be useful to consider what counts as a **legitimate** authority. A number of factors affect how legitimate an authority is seen to be. These are just some of the things we might look at.

A legitimate authority will:

- ◆ be making a claim within their area of expertise
- ◆ have sufficient expertise in a relevant subject
- ◆ be making a claim on which there is an adequate degree of agreement with other experts
- ◆ be free of significant bias
- ◆ be making a claim within a legitimate discipline
- ◆ have a reputation of being reliable
- ◆ not have a vested interest in you believing a particular claim

It is worth noting that citing a legitimate authority as a reason to believe claim X would give us good reason to believe the claim, but it would not guarantee the claim’s truth.

Activity 23

Make up a short dialogue where someone commits the fallacy of appealing to an illegitimate authority.

Slippery slope fallacies

Another kind of fallacy where the premises of the argument might be seen to be unacceptable is in the slippery slope fallacy. This fallacy is committed when an argument is given that suggests that one thing will inevitably lead to another, with insufficient evidence. It claims that once one step has been taken in a particular direction there is nothing to stop further steps in that direction. Thus the name, slippery slope, as we can imagine that once you start sliding down a slippery slope, you are unable to get back up again, whether you want to or not. Here's a very simple example that you might have heard from some of your teachers before.

'I'm not giving you candidates any more exam tips or, the next thing I know, you'll be expecting me to sit the exam for you!'

While it is possible that giving candidate's exam tips might lead to candidates expecting that their teachers sit the exam for them, it is clearly more likely that teachers simply give exam tips and leave it there.

Take another more complicated example:

'We should not legalise cannabis for medical use in the UK. If it is made legal for medical use, then the use of cannabis will become normalised in people's eyes, and it will soon lead to legalising cannabis for recreational use. This will make it more difficult to justify criminalisation of other drugs for recreational purposes, such as heroin and cocaine. Before you know it, we will have a country full of drug addicts!'

Even though some of the claims in this argument may be acceptable, we can imagine many scenarios in which legalising cannabis for medical use would not lead us to the final claim that the country will be full of drug addicts. It is important to recognise that in slippery slope arguments, the first step is rejected on the basis that the final step is unacceptable. It is seen to involve unacceptable premises because we can imagine situations where the first step need not lead us to the final step (or to the bottom of the slope, metaphorically speaking).

There are two main types of slippery slope argument.

- 1 Those of the form 'If P then Q; If Q then R; if R then S; if S then T; T is undesirable; So not P'. P might involve some kind of commitment or concession, with Q, R, S and T being further but related commitments or concessions. This general form of argument is valid, but is fallacious if any of the conditional statements are false.
- 2 Those of the form 'P increases the likelihood of Q; Q increases the likelihood of R; R increases the likelihood of S; S increases the likelihood of T; T is undesirable; So not P'. Here, P, Q, R, S and T may be events. This form of slippery slope argument is often fallacious because even though the likelihood of Q is increased by P, etc, Q is not guaranteed by P. This means that P can be far enough removed from T for the conclusion (that P should be rejected on the grounds that it will increase the likelihood of T) to be insufficiently justified. Just because P increases the likelihood of Q, it is not a foregone conclusion that Q will follow P, and so on.

The definition of a slippery slope fallacy is a fallacy that is committed when an arguer claims that one thing will inevitably (very likely, in the second form of the argument) lead later to another, worse, state of affairs, without further argument or evidence. The first thing is rejected on the basis of not wanting the final state.

Activity 24

Make up an example of a slippery slope fallacy for the following conclusions:

- ◆ The age at which people can legally drink should not be lowered.
- ◆ Scientists should not be allowed to engage in research on stem cells.
- ◆ Alcohol should not be advertised on television.
- ◆ Euthanasia should not be legalised.

False dilemmas (National 5 only)

A false dilemma is a fallacy which always contains a stated or assumed false premise. It is called a false dilemma because it is characterised by claiming that there are only two options in a given situation, when in fact the situation is more complex and there may be a wide range of options that have not been considered. The arguer claims that because one of the options is not possible, is undesirable or unacceptable in some way that we will have to choose the alternative. Here is an example:

- P1 Either you ban animal testing altogether or you are committed to letting every makeup product and household item be tested on poor innocent creatures who don't deserve it.
P2 We can't have every makeup product or household item being tested on innocent animals.
-
- C We must ban all animal testing.

In this argument, the claim in premise 1 is not true. There are many alternative positions that you could take here. It may be possible to accept some cases of animal testing, for example for certain medicines where alternative ways of testing may not be possible and for medicines that are likely to have significant benefits. We could accept animal testing, but only on certain animals — perhaps those that have been shown to show less stress and anxiety in the process of testing, for example. And there are many other possible nuanced stances that we could take beyond the ones suggested above. With this in mind, we are not committed to the conclusion, even if we agree with premise 2.

The form of all false dilemma arguments can be simplified to the following:

- P1 Either A or B
P2 Not A
-
- C B

You may have noticed that this form of argument is valid, and so the only way to deny the conclusion in this argument is to show how one of the premises is false.

It is also worth pointing out that an argument of the above form is not a false dilemma if there are genuinely only two options available to you, for example:

- P1 You can either complete the assignment on time and to the required standard or you will fail the task.
P2 You don't want to fail the task.
-
- C You should complete the assignment on time and to the required standard.

The above argument is not fallacious because it is probably true that completing the assignment according to the requirements and on time is necessary to pass and not doing so will mean you fail, so really these are the only options you have. Even still, the situation might be slightly more nuanced than is stated, because there may be circumstances where you could be given an extension to your assignment that would allow you to complete it beyond the deadline. However, assuming these don't apply to you, then the statement in

premise 1 of this argument is probably true and thus this argument would not constitute a false dilemma.

Activity 25

Decide whether you think the following arguments are false dilemmas or not. Explain your choice.

- 1 Vote for Ms. Polly or your taxes are going to go up. You obviously don't want your taxes to go up, do you? It's an easy choice — you have to vote for her!
- 2 You can either go to bed on time or you can lose your screen time for tomorrow. I don't think you want to lose your screen time, so you better get ready for bed now.
- 3 Either you believe in God, or you believe that the Big Bang explains everything we need to know about how the universe came to be here. Aliida doesn't believe in God, so she must accept that the Big Bang theory explains the origins of the universe.
- 4 I thought you cared about other people, but I didn't see you at the fundraiser for the local foodbank. I guess you don't care much after all.
- 5 You can either follow the rules and leave your mobile phone out of the exam hall, or you risk losing all your marks for that exam. You don't want to risk getting nothing for any of your exams so you really must make sure you leave your phone outside the exam.

Issues primarily relating to relevance (Higher only)

Various ways in which the premises of an argument might be relevant to the conclusion were noted in the section on relevance. The main idea is that a premise is relevant if it provides a certain amount of justification for believing the conclusion. We previously recognised that arguments for analogy may suffer from issues of relevance if the similarities that we identify between the known and unknown entities are irrelevant to the conclusion being drawn. In this section, we look at two kinds of fallacious arguments that suffer from issues relating to relevance, **ad hominem** and **appeals to emotion**.

Ad hominem

Ad hominem are informal fallacies, which are also known as ‘attacking the person’. Ad hominem fallacies are committed when someone rejects a particular claim based on something about the person putting the claim forward, rather than addressing the claim itself. The argument against the person occurs in three forms: the **ad hominem abusive**, the **ad hominem circumstantial**, and the **tu quoque**.

In the **ad hominem abusive**, the second person responds to the first person’s argument by verbally abusing the first person. Ad hominem abusive arguments are prevalent in political debates. They are also sometimes used in criminal trials to try and suggest a witness is making a false statement. For example, a lawyer may try to establish that a witness has lied in the past, and use this to suggest that they are lying in their current testimony. In some circumstances this will not be fallacious, if the point that is being made is that the witness is unreliable, but the fact that the witness has not always been honest in the past does not mean we can know that they are lying now. Here is an example of the kind of ad hominem we might see in political debate:

‘My opponent suggests that lowering taxes will be a good idea — this is coming from a person who is currently on their fourth marriage. How can we really trust them on taxation when they obviously have such low moral standing!’

As it stands, this isn’t clearly an ad hominem fallacy, because the conclusion they are implying has not been stated explicitly. But what they are suggesting is that lowering taxes is not a good idea. The argument in standard form would look like this:

- P1 My opponent says that lowering taxes would be a good idea.
P2 My opponent has no morals because they are on their fourth marriage.
-
- C Lowering taxes is not a good idea.

An **ad hominem circumstantial** is when one attempts to attack a claim by asserting that the person making the claim is making it simply out of self-interest. In some cases, this fallacy involves substituting an attack on a person’s circumstances (such as the person’s religion, political affiliation, or ethnic background). Here is an example:

‘I think that we should reject what Father Jones has to say about the ethical issues of abortion because he is a Catholic priest. After all, Father Jones is required to hold such views.’

An **ad hominem tu quoque** is a type of ad hominem that attacks a person by focusing on their past words or actions, instead of the truth of their current claims. In an ad hominem tu quoque, the person's claims are attacked because they are not consistent with his or her current or past behaviour. Here is an example:

Ariadne: 'You should not be eating that ... it has been scientifically proven that eating burgers are no good for your health.'
Barnaby: 'You eat burgers all the time, so that can't be true.'

In some cases of the ad hominem fallacy, such as the ad hominem abusive example above, the particular aspects of the person are totally irrelevant to whether the claim is true or false. In less obvious cases, there may be aspects of the person that do undermine the credibility of their claims to an extent. In the ad hominem circumstantial example above, we would expect the Catholic priest to take a particular stance on abortion; however, it would not be appropriate to reject everything they have to say about the issue just because that is the case.

Activity 26

- 1 Construct ad hominem arguments against the following people: remember that ad hominem fallacies always conclude that the claim being made by the person or group that is being discredited is false:
 - Politicians making a speech on the dangers of drug use.
 - Teachers telling candidates to work harder.
 - Tabloid newspapers accusing a politician of trying to stir up controversy.
 - Doctors telling people that smoking is bad for your health.
- 2 Explain why these arguments are bad forms of reasoning.
- 3 Can you write the general form of the ad hominem argument using X to denote the claim that is being put forward?

Appeals to emotion (Higher only)

This is a category of fallacies that uses emotion in place of reason to attempt to win the argument. It is a type of manipulation used in place of reasoning. It attempts to arouse the emotions of its audience to gain acceptance of its conclusion. The emotion may be one of many, for example pity, pride, fear, envy, or hatred.

Take this example:

'Luke didn't want to eat his sheep's brains with chopped liver and brussels sprouts, but his father told him to think about poor starving children in the world who weren't fortunate enough to have any food at all.'

Although this argument might make us feel bad about children who don't have any food at all, Luke eating his sheep's brains with chopped liver and brussels sprouts will not have any impact on the children who don't have any food. The fact that the children are starving is not relevant to whether Luke should eat his food or not. There are, however, some cases where appealing to emotion is appropriate. Take this example:

'You should bring me to the hospital, because I just broke my leg, and it is really painful. I feel awful.'

This is not an inappropriate appeal to pity. It is really the case that you should take the person to the hospital. The fact that their leg hurts and they feel awful is relevant to this conclusion, whether it appeals to your sense of pity or not.

Activity 27

Explain why the following arguments involve issues to do with relevance:

- ◆ There must be life after death, otherwise it's just emptiness.
- ◆ Of course she didn't do it. How can you believe that? You love her, don't you?

Issues primarily relating to sufficiency (Higher only)

An argument where the premises are sufficient is one where the premises are enough to engender a well-founded confidence in the conclusion. Arguments that are deductively valid have premises that are sufficient to prove the conclusion. With inductive arguments, inductive strength is a matter of degree. However strong the argument, the conclusion is never guaranteed in the same way that it is with deductive reasoning. When it comes to inductive strength, although the premises will be assessed individually regarding acceptability and relevance, they are considered together with regard to sufficiency. The addition of premises strengthens an argument, while the removal of premises weakens an argument. We are going to look at three types of fallacy that have issues primarily relating to the sufficiency of the premises. These are the informal fallacy of post hoc ergo propter hoc and the formal fallacies of denying the antecedent and affirming the consequent.

Post hoc ergo propter hoc

This informal fallacy is falsely assuming that, because some event followed another, it was caused by the first event, for example that because X and Y occur one after the other that the one causes the other. Here is an example:

You do badly in an exam and later discover that you had forgotten to bring your lucky rabbit's foot and conclude that you did badly because you forgot the rabbit's foot.

The key idea here is that the fact you did badly after forgetting your lucky rabbit's foot is not sufficient evidence to assume that was why you did badly. Indeed, there are many more plausible explanations, including that you did not work as hard as you could have prior to your exam.

Although the example above uses bad reasoning, there are cases where X is a plausible cause for Y, and so assuming X is the cause of Y may be a reasonable inductive argument. For example, it might seem reasonable to think eating food after its best before date is a plausible cause of you feeling sick, especially if more than one person ate it and now feels unwell. So, whether we consider it a fallacy may depend on whether X being before Y is offered as proof of it being the cause of Y or as evidence of a causal connection between X and Y.

Activity 28

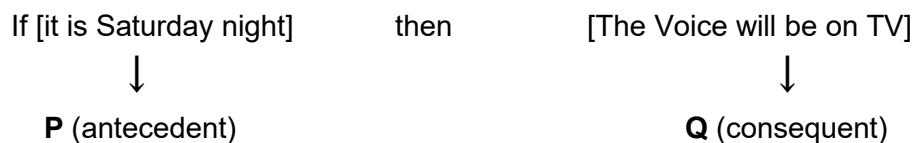
Create arguments that commit the fallacy of **post hoc ergo propter hoc** involving the following statements:

- 1 All humans are born; all humans die.
- 2 Spider Man's spider sense tingles; Spider Man gets into a fight.
- 3 The candidates sat the course; the candidates sat the exam.

Formal fallacies (Higher only)

All the fallacies we have looked at so far have been informal fallacies. We are now going to look at two formal fallacies. As mentioned previously, they are identified by their structure alone. The two formal fallacies in the Higher Philosophy course are **denying the antecedent** and **affirming the consequent**. These are both invalid forms of arguments. To help us to understand these fallacies, it is helpful to introduce a bit of terminology.

Conditional statements are ones that are of the form [if P then Q]. An example would be 'If it is Saturday night then The Voice will be on TV'. Conditional statements are made up of two statements P and Q, joined by 'If ... then...'. The first part [P] is the antecedent, and the second part [Q] is the consequent. Here is an example:



Affirming the consequent

This is any argument that has the form [if P then Q], [Q], therefore [P]. It is the error of mistaking a necessary condition for a sufficient condition. In this argument, the second premise states that the consequent of premise 1 is true, which is where the name 'affirming the consequent' comes from.

Its structure is as follows:

P1	If P then Q
P2	Q (consequent affirmed)
<hr/>	
C	P

Given the truth of the conditional statement, we know that if P is true then Q must be true. If the first premise is true, it is logically impossible for P to be true and Q false; and for Q to be false and P true. What we can take from this is that the truth of the antecedent is a sufficient condition for the truth of the consequent, and that the truth of the consequent is a necessary condition for the truth of the antecedent. In the formal fallacies, denying the antecedent and affirming the consequent, the mistake that gets made is that these conditions get mixed up.

This is best shown with an example:

P1	If I get a flat tyre then I will be late for work.
P2	I was late for work (consequent affirmed).
<hr/>	
C	Therefore, I got a flat tyre.

Assuming that the first premise is true, we know that if I get a flat tyre, I will be late for work. As we have seen above, what the truth of this premise actually commits us to — logically — is that it is not possible for me to get a flat tyre unless I am also late for work. However, the fact that I am late for work, despite being a necessary condition for me getting a flat tyre

(because remember, Q cannot be false and P true), is not enough on its own for anyone to be able to establish that I got a flat tyre. I might have slept in, or got caught up in traffic, or had to take my dog to the vet. In other words, my being late for work is not a sufficient condition for my having a flat tyre. It can be true that I am late for work even if it is not true that I got a flat tyre. The fact that I can imagine the conclusion being false while both premises are true demonstrates that this is an invalid argument.

Denying the antecedent (Higher only)

This is an argument that has the form [if P then Q], [not P], therefore [not Q]. In this argument the second premise states that the antecedent of premise 1 is not true, which is where the name 'denying the antecedent' comes from.

Its structure is as follows:

P1 If P then Q.
P2 Not P (antecedent is denied).

C Not Q.

In this form of argument, the assumption is made that because P is false, Q cannot be true. But the fact that (from the first premise) the truth of P guarantees the truth of Q does not mean that Q cannot be true unless P is. P is a sufficient condition for the truth of Q; it is not a *necessary* condition.

This is demonstrated in the following argument:

P1 If I get a flat tyre then I will be late for work.
P2 I did not get a flat tyre (antecedent is denied).

C I will not be late for work.

The fact that I did not get a flat tyre does nothing whatsoever to establish that I was not late for work. As we know already, there are various other things that could have made me late.

Again, the fact that I can imagine being late for work even though I did not get a flat tyre establishes that the argument is invalid — the premises can be true and the conclusion false.

Activity 29

For the following arguments, you should:

- 1 decide whether they are valid or invalid
- 2 if invalid, say whether they are **denying the antecedent** or **affirming the consequent**
- 3 if invalid, explain one reason why the conclusion could be false

Argument 1

P1 If one candidate gets swine flu then we will have to quarantine the school.

P2 The school has been quarantined.

C At least one candidate has swine flu.

Argument 2

P1 If a defendant is guilty, then they will deny being guilty.

P2 The defendant denied being guilty.

C Therefore, the defendant is guilty.

Argument 3

P1 If a painting makes you feel strong emotions then it must be brilliant.

P2 This painting makes me feel very angry.

C This painting must be brilliant.

Argument 4

P1 If you wear dungarees then you are cool.

P2 You are cool.

C You wear dungarees.

Argument 5

P1 If you are caught chewing gum in school then you will get a detention.

P2 You were not caught chewing gum in the school.

C You will not get a detention.

Argument 6

P1 If you think racism is funny then you have no sense of humour.

P2 You have a sense of humour.

C You don't think that racism is funny.

Argument 7

P1 If you get squashed by an elephant then you will break some bones.

P2 You have not been squashed by an elephant.

C You have not broken any bones.

Argument 8

P1 If you eat lots of carrots you will see well in the dark.

P2 You do not eat a lot of carrots.

C You do not see well in the dark.

Argument 9

P1 If you eat a lot of carrots you will see well in the dark.

P2 You do not see well in the dark.

C You do not eat a lot of carrots.

Activities answers

Activity 1

Which of the following sentences are statements?

- 1 It is a statement.
- 2 Not a statement — a question.
- 3 It is a statement.
- 4 It is a statement.
- 5 Not a statement.
- 6 It is a statement — albeit a false statement.
- 7 Not a statement — a command.
- 8 Not a statement — an exclamation.
- 9 It is a statement — This is a statement about a command, and it could also be taken as a command.
- 10 Not a statement — an exclamation.
- 11 It is a statement — albeit one that is a bit weird but could nonetheless be either true or false.
- 12 Not a statement — a question. However, this question does imply the statement 'that is amazing.' In an argument, we would include the reworded statement if it was intended to contribute to the reasoning.

Activity 3

- 1 It is an argument. Conclusion: there should be a campaign to educate young people about the dangers of drinking.
- 2 Not an argument.
- 3 It is an argument. Conclusion: having a pet is good for you.
- 4 Not an argument.
- 5 It is an argument. Conclusion: everyone should study critical thinking.
- 6 It is an argument. Conclusion: some birds are not felines.
- 7 It is an argument. Conclusion: it is difficult to justify imposing tight time limits on candidates in examinations.
- 8 It is an argument. Conclusion: you should not give knives to young children.
- 9 It is an argument. Conclusion: cutting the interest rate will probably have no effect on the stock market this time round.
- 10 Not an argument.

Activity 4

Argument 1

- P1 Pete is either English or Scottish.
P2 Pete is not English.
-
- C Pete must be Scottish.

Argument 2

- P1 Landfills are ugly and can smell very bad.
P2 These people did not choose to live next to a landfill.
-

C If the Government wants to create a landfill here they should compensate those who live in the area.

Argument 3

- P1 Candidates who cram immediately before examinations usually get lower grades than those who do not.
P2 I'm not even going to open a book during the exam period.
-

C I should have a much better chance of doing well.

Argument 4

- P1 If the suspect had been a stranger, Igor would have barked loudly when he came into the room to take the money Igor was guarding.
P2 Igor didn't make any noise at all.
-

C The suspect must be an acquaintance.

Argument 5

- P1 Darwin's theory of evolution is just a theory.
P2 Theories are just speculation with no evidence behind them.
P3 We don't want our children to learn theories with no evidence behind them.
-

C We shouldn't allow the theory of evolution to be taught in school.

Argument 6

- P1 If each individual is unique, then to make them equal would be to destroy most of what is human in him.
P2 We do not want to destroy what makes us most human.
-

C There is no justification for equality in the nature of man.

Activity 5

- P1 An argument is valid if and only if there is no logically possible situation where all the premises are true and the conclusion is false at the same time.
P2 This argument is valid and also has a false conclusion.
-

C This argument must have at least one false premise.

Activity 6

Argument 1: invalid — there could be other reasons for you being late.

Argument 2: valid

Argument 3: valid

Argument 4: valid

Argument 5: valid

Argument 6: valid

Argument 7: valid

Argument 8: invalid

Argument 9: invalid

Argument 10: valid — even though this argument is a bit weird, it is valid. If the first premise is true that E.T. phoning home would mean that blue is Enzo's favourite colour, then the fact that 'E.T. phones home' would guarantee that 'Blue is Enzo's favourite colour'.

Activity 7

A sound argument guarantees a true conclusion because if it is sound then it is valid. A valid argument is one that is truth preserving, which means that if your premises are true then your conclusion must also be true. In a sound argument, the premises have to be true, so this means that they guarantee that a true conclusion will follow.

Activity 8

1 State whether the following arguments are a) valid and b) sound.

Argument 1: valid but unsound (probably — without checking if every politician is a liar or not, we can't be sure, but it is reasonable to think that there are some that are not liars, so the premises are not all true).

Argument 2: invalid and so unsound.

Argument 3: invalid and so unsound. (It is possible that the many talented actors don't overlap with the rich ones, although this may seem unlikely!)

Argument 4: valid and sound.

Argument 5: valid, and it is not clear whether it is sound or not (this is because it is not an obvious matter of truth if the conditions facing asylum seekers are inhumane or not. This means we cannot clearly state whether the second premise is true or false and so cannot determine the soundness of the argument).

5 Are the following statements true or false? Why?

- a) All invalid arguments are unsound.
True — they must be both valid and true to be sound.
- b) All true statements are valid.
False — validity is not applied to statements but to arguments.
- c) To show that an argument is unsound, we must at least show that some of its premises are false.
False — we could also show that it was invalid.
- d) An invalid argument must have a false conclusion.

False — it is possible to have an invalid argument with a true conclusion, it just may not be logically connected to the premises being presented.

- e) If all the premises of a valid argument are false, then the conclusion must also be false.

False — we saw such an example when looking at validity.

P1: All pigs can fly (false).

P2: A butterfly is a type of pig (false).

C: Butterflies can fly (true).

- f) If all the premises and the conclusion of an argument are true, then the argument is valid.
False — it could also be invalid.
- g) All sound arguments are true.
False — only statements can be true or false, not arguments. Sound arguments have true premises and true conclusions.

Activity 9

Possible answers could be:

- 1 Women have a right to their body.
- 2 Traces of ammonia are a sign of life.
- 3 Things that do not harm anyone should be legal.
- 4 Lizards are reptiles.
- 5 If creationism is not the best explanation for our observations then evolution is the best explanation for our observations.
- 6 The death penalty involves murder.
- 7 Having more red pieces makes candy bags better.
- 8 We should all drink things that are more natural and not processed.
- 9 You don't like walnuts.
- 10 This one needs 2 hidden premises to make it valid:
 - You want to kiss someone
 - Smoking causes bad breath.

Activity 10

Argument 1

P1 If it is raining then I will get wet without an umbrella.

P2 It is raining.

IC I will get wet without an umbrella.

C I better get my umbrella.

Argument 2

P1 Guns are dangerous.

IC You should keep guns away from young children.

C If you keep a gun in the house, you should keep it in a safe place away from young children.

Argument 3

P1 To stay healthy you are advised to have five portions of fresh fruit or vegetables each day.

P2 You have only had four so far today.

IC You should have a piece of fruit.

P3 We only have apples and oranges.

P4 You do not like oranges.

C You should have an apple to maintain your good health.

Argument 4

P1 Coffee contains caffeine, which is a stimulant.

P2 Taking any stimulant before going to bed stops you from sleeping soundly.

IC Drinking coffee before going to bed will stop you from sleeping soundly.

P3 A poor night's sleep may lead you to feel tired in the morning.

C Drinking coffee before going to bed may cause you to feel tired in the morning. (Note: this conclusion is stated at the start of the argument and then repeated at the end.)

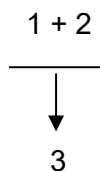
Activity 15

Argument 1

[Paris is in France] — 1

and [France is in Europe] — 2

So [Paris is in Europe] — 3

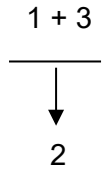


Argument 2

Since [the solution turned red when the indicator was added] — 1

I conclude [it is acidic] — 2

as [acidic substances react with this indicator to form a red colour] — 3

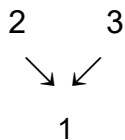


Argument 3

[A life of crime is a poor career choice] — 1

because [sooner or later most criminals get caught] — 2

and [even if you were to get away with a crime, you would eventually come to despise yourself for it] — 3



Argument 4

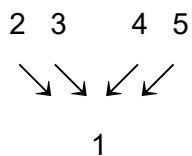
[Be a doctor!] — 1 (We would re-state this conclusion to be 'You should be a doctor' as otherwise this is a command that can be neither true or false.)

[You've got the talent] — 2

[you would enjoy the work] — 3

and [you could help a lot of people] — 4

Plus, [you could make a lot of money] — 5



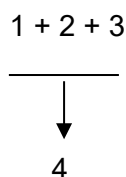
Argument 5

[All expensive things are desirable] — 1

[All desirable things make you feel good] — 2

[All things that make you feel good make you live longer] — 3

So [all expensive things make you live longer] — 4



Argument 6

[Using animals for scientific research without a clear necessity is morally impermissible] — 1
for the following reasons:

[Inflicting unnecessary suffering is morally wrong] — 2

and [scientific research often involves subjecting animals to pain and distress] — 3

So it is obvious that scientific research on animals that is unnecessary is not morally permissible — 1

(Note that the last statement is the same as the first sentence, so we use the same number again and don't introduce a fourth number.)

$$\begin{array}{r} 2 + 3 \\ \hline \downarrow \\ 1 \end{array}$$

Activity 16

Argument 1

P1 Earth and Eorpa are similar in that they both contain oxygen in their atmosphere.

P2 Earth supports life.

C Eorpa might also support life.

Argument 2

P1 This novel is similar to the other one we read in respect of the plot.

P2 The other novel we read was very boring

C This novel will probably be very boring.

Argument 3

P1 The government's campaign against illegal drug use is like a literal war in that there are shootings and bombings.

P2 You can't win a real war without shooting at the enemy.

C The government won't win the drug war without a 'shoot on sight' order against drug dealers.

Activity 17

Evaluate these arguments from analogy:

Argument 1

Although weather reports do not affect the weather, this is not the case with the media. The media does more than just reporting the facts; it can affect public opinion and thus moral standards. Here there is a relevant disanalogy that has not been taken into account.

Argument 2

There are many relevant ways in which a family is different from a society. First, the government officials need not be wiser than the citizens. Also, many parents might care for their children out of love and affection, but government officials might not always have the interests of the people at heart.

Argument 3

This is the basis of a very significant philosophical argument for the existence of God, called the Teleological Argument, or Design Argument. Hume argued that the analogy here was very weak. While there are similarities between the world and the objects of human creation, there are many differences that are relevant which make it not a great analogy.

Argument 4

Although this looks like quite a strong argument, in that there are many similarities, the most relevant factor here is the fact that sharks are fish while dolphins are mammals. While fish have gills for breathing, mammals have lungs.

Activity 19

Answer the following questions:

- 1 Confirmation bias affects how we deal with new information by 1) making us favour or seek out information that fits in with or supports what we already believe to be true; and 2) making us ignore evidence that goes against our existing beliefs.
- 2 Philosophers need to be aware of confirmation bias so that they ensure that the premises they rely on in arguments are not biased. They have to be open minded when looking at the evidence to support a conclusion to ensure that they have considered all possibilities.

Activity 20

In fact all of the claims in the list are true.

Activity 21

- 1 There is an equivocation on 'wrong'. It is especially apparent in the claim 'He was wrong, which means "there was something wrong with him"'. The word wrong is first used to refer to making a mistake, as in making an arithmetic error. The second use, in which it refers to something being wrong with a person, concerns a flaw in character of personality. Without confusing these two senses, one cannot arrive at the conclusion that this man is a flawed human being.
- 2 There is an equivocation on the idea of poems speaking for themselves. In the first statement, the meaning is clearly metaphorical; a poet who says that his poems will speak for themselves means that they do not require further explanation by him or by others. In the further statements, speaking for themselves is used with a different, literal meaning.

- 3 This is not an argument.
- 4 This is not an argument.
- 5 There is an equivocation in what is meant by 'God'. The proposition that 'God exists in my mind' is referring to an idea and a belief within the speaker's mind. In the latter use, the term God is used with the intent of referring to a real entity existing outside the mind.

Activity 25

- 1 This is probably a false dilemma – If all other candidates you could vote for are promising to raise taxes, then this makes it more reasonable, but even still there may be other ways that you could choose not to vote for Ms. Polly without the certainty of higher taxes.
- 2 This is not a false dilemma because the father is suggesting that if the child does not go to bed on time, they will lose screen privileges for the next day, so if they don't go to bed this will happen.
- 3 This is a false dilemma - there is a wide variety of perspectives you could hold that go beyond either a faith in God, or that the Big Bang theory explains everything about the origins of the universe, including believing in neither of these.
- 4 This is a false dilemma – the implication of what the person said is that 'either you go to the fundraiser, or you don't care about people' but there are many reasons why you might not have gone to the fundraiser and you could clearly still care about people even if you didn't go.
- 5 This is not a false dilemma – the exam rules are clear that mobile phones are not allowed in the exam hall so you would be risking losing all marks for that exam if you were to bring one in. It is true that you either comply with the rules or risk your exam results.

Activity 26

- 3 P1 Person or Group A says 'X'.
- P2 Person or Group A is or does Y (where Y means some negative trait or action that would discredit A in some way that would be irrelevant to us believing X).

C X is not true.

Activity 27

- ◆ The fact that the alternative to life after death may be emptiness is irrelevant to whether or not there is actually life after death, whether or not it makes us feel bad to think that this may be so.
- ◆ This could be seen as an appeal to emotion, as loving someone may not be a relevant reason as to whether you believe they did or did not do a particular thing. There may be other reasons related to the fact that you love the person that are relevant, such as the fact that you trust them and know them very well, but this is not stated in the argument given.

Activity 28

Create arguments that commit the fallacy of **Post Hoc Ergo Propter Hoc** involving the following statements:

- 1 Before all humans die, they all have to be born.
Therefore, being born causes all humans to die.
- 2 Before Spider Man gets into a fight his spider sense tingles.
Therefore, Spider Man's spider senses tingling cause Spider Man to get into fights.
- 3 Before every student sits the exam, they all sit the course.
Therefore sitting the course causes the candidates to sit the exam.

Activity 29

Argument 1

Invalid, affirming the consequent. If someone in the school contracted the Ebola virus, then the school would also need to be quarantined.

Argument 2

Invalid, affirming the consequent. An innocent person may also deny being guilty.

Argument 3

Valid.

Argument 4

Invalid, affirming the consequent. Maybe you wear a 'With Stupid' hat that would also make you cool!

Argument 5

Invalid, denying the antecedent. You may be given a detention for not completing homework as well.

Argument 6

Valid.

Argument 7

Invalid, denying the antecedent. You could have fallen in a skiing accident and broken a bone that way.

Argument 8

Invalid, denying the antecedent. You may have night vision glasses to help see well in the dark.

Argument 9

Valid.

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Administrative information

Published: September 2024 (version 2.0)

History of changes

Version	Description of changes	Date
2.0	Added information on content that has been removed from the course specification, or that applies to one level only. Updated formatting and some text to meet current house style.	September 2024

Note: please check SQA's website to ensure you are using the most up-to-date version of this document.