6. Analysing complex arguments

Independent and co-dependent premises

The premises of an argument can fit together in many different ways to support a conclusion. In this chapter we will look at some of these different *argument structures*. To begin with, consider this example once again:

1. Lightning causes fires and damages electronic equipment.
2. Lightning rods can prevent any major damage caused by lightning.
Therefore:
C. Every building should have a lightning rod.

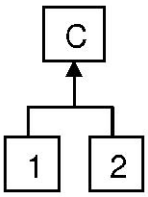
Notice that both premise 1. and premise 2. must be true together if they are to support the conclusion. No one putting this argument forward would think that premise 1 by itself was sufficient to justify the conclusion. Nor would they be suggesting that premise 2 by itself was sufficient either. Rather, they would be saying that both premises *together* support the conclusion. Premises that provide support for their conclusion in this way are called, *codependent premises*, because they rely on each other to support to the conclusion. Such premises are also sometimes called *linked* premises, or *joint* premises.

Co-dependent premises are premises that rely on each other to jointly support their conclusion.

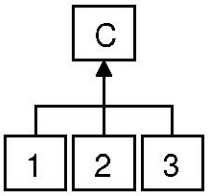
Co-dependent premises are sometimes called **linked** or **joint** premises.

To indicate that the premises supporting a conclusion are co-dependent, they are always shown linked together on an argument map diagram. In this example, the diagram would look like this:

1. Lightning causes fires and damages electronic equipment.
2. Lightning rods can prevent any major damage caused by lightning.
Therefore:
C. Every building should have a lightning rod.



Premises 1 and 2 are here shown joined together, with a single arrow pointing to the conclusion. It is quite possible for arguments to have three or even more co-premises supporting a conclusion. An argument with three co-premises supporting a conclusion would be represented on a diagram like this:



As you might expect, premises do not always provide joint support for their conclusion. In some arguments, the premises provide independent grounds for accepting the conclusion. Here is an example:

> It is right to ban cigarette advertising because it encourages young people to start smoking. But even if it had no such influence, it would be right to ban it because advertising would make it harder for existing smokers to kick the habit.

In this example, two reasons are given for the conclusion that it is right to ban cigarette advertising:

1. Cigarette advertising encourages young people to start smoking.
2. Cigarette advertising makes it harder for existing smokers to kick the habit.

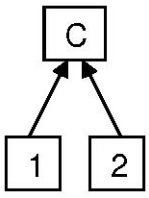
In this case, unlike the previous example, either premise by itself provides a reason for thinking that the conclusion is true. Anyone putting this argument forward would consider the conclusion established if just one of the premises were true. This is made clear by the use of the phrase 'even if it had no such influence'. The idea is that *even if* premise 1 was false, premise 2 would support the conclusion by itself. The truth of both premises is not required. Premises that provide independent support for their conclusion in this way are called – you guessed it – *independent* premises.

Independent premises are premises that support their conclusion without relying on each other. Each premise by itself provides some support for the conclusion.

Independent premises are also sometimes called **convergent** premises.

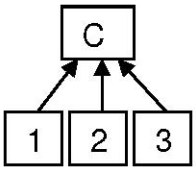
In standard form, we would represent this argument as follows:

1. Cigarette advertising encourages young people to start smoking.
2. Cigarette advertising makes it harder for existing smokers to kick the habit.
Therefore:
C. It is right to ban cigarette advertising.



Notice that in the diagram for this argument, two separate arrows have been drawn from each premise to the conclusion. That is how we indicate that the premises are independent, rather than co-dependent. Notice how the arrows appear to 'converge' on the conclusion, which is why some authors call independent premises *convergent* premises.

It is quite possible for an argument to have three or even more independent premises, all converging on the same conclusion. A diagram for an argument with three independent premises would look like this:



Combining linked and independent premises

It is also possible for an argument to have a *mixture* of linked and independent premises. Here is an example:

> There are two reasons why interest rates should now be reduced. Firstly, economic growth has been slowing and lower interest rates will lead to higher growth rates. Secondly, many companies are in great difficulties and lower interest rates will allow them to borrow money more easily which will help them to survive.

This argument presents two independent arguments for the conclusion that interest rates should be reduced. They are introduced with the premise indicators 'firstly' and 'secondly'; interest rates should be reduced because 1. Economic growth has been slowing and lower interest rates will lead to higher growth rates and 2. Many companies are in great difficulties and lower interest rates will allow them to borrow money more easily which will help them to survive. Either of those considerations by itself would be relevant to the conclusion, so they are independent.

But notice how each of the two reasons consists of several separate premises. The first argument consists of two premises:

> **1.** Economic growth has been slowing.
> **2.** Lower interest rates will lead to higher growth rates.

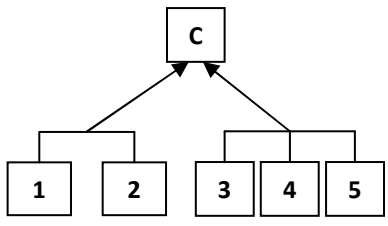
These two premises are linked; they work together to support the conclusion.

The second argument consists of three premises:

> **3.** Many companies are in great difficulties.
> **4.** Lower interest rates will allow companies having difficulties to borrow money more easily.
> **5.** Borrowing money will help companies having difficulties to survive.

Again, these three premises work together to support the main conclusion, so they are linked. Putting this all together we find we have an argument consisting of two independent reasons for accepting the conclusions, each of which consists of several linked premises. Here is what it would look like in standard form, with an argument map diagram:

> **1.** Economic growth has been slowing.
> **2.** Lower interest rates will lead to higher growth rates.
>
> **Also:**
>
> **3.** Many companies are in great difficulties
> **4.** Lower interest rates will allow companies having difficulties to borrow money more easily.
> **5.** Borrowing money will help companies having difficulties to survive.
> **Therefore**:
> **C**. Interest rates should now be reduced.



Notice how the mixed structure is shown in the diagram. Premises 1 and 2 are joined together to show that they are linked and one arrow points from them to the conclusion. Premises 3, 4 and 5 are joined together (but not joined to 1 and 2) and a separate arrow points from them to the conclusion.

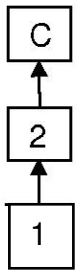
Sub-arguments

A different kind of relationship between premises can also exist: a premise (or set of premises) might be used *to support another premise*. Here is an example:

> American Sign Language is the native language of many North Americans. Therefore, it is not a foreign language, and for that reason alone, no student should be permitted to satisfy the university's foreign language requirement by learning American Sign Language.

Here is the argument in standard form:

> **1.** American Sign Language is the native language of many North Americans.
> **Therefore**:
> **2.** American Sign Language is not a foreign language.
> **Therefore**:
> **C**. No student should be permitted to satisfy the university's foreign language requirement by learning American Sign Language.



In this argument the main conclusion is directly supported by premise 2. But premise 2 is itself supported by a *sub-argument* – the argument from 1 to 2. We have here a *chain* of argument, going from 1 to 2 to the main conclusion C. Statement 2 is an example of an *intermediate conclusion* – a conclusion which is used as a premise in a further argument. Notice how this chain like structure is represented in the diagram.

A **sub-argument** is an argument used to establish a *premise* of a further argument.

The conclusion of that further argument may then serve as a premise in another argument and so on, leading to a **chain** of argument.

A conclusion of an argument which is used as a premise in a further argument is called an **intermediate conclusion** (because it occurs somewhere in the *middle* of a chain).

Further Reading

For more discussion and examples of independent premises, co-dependent premises and chains of argument, see:

Alec Fisher: *Critical Thinking: an introduction* (2nd edition), Chapter 3

Anne Thomson, *Critical Reasoning: a practical introduction*, pp. 16-25

Jill LeBlanc, *Thinking Clearly*, chapter 2, pp. 24-36.

Exercise 6.1 Independent and co-dependent premises

Put each of the following arguments into standard form and say whether the premises are independent or co-dependent.

1 If the sample is radioactive, the Geiger counter will register it. But the Geiger counter is not registering anything, so the sample cannot be radioactive.

2 The capture of a wild animal is justified only as a last resort to save that animal's life. But many wild animals are captured not because their lives are in any danger but so that they can be bred in captivity. Hence, many animals that have been captured should not have been captured.

3 Economist: Interest rates should be reduced for several reasons: the economy is slowing down fast, many companies are in great difficulties and consumer demand has fallen off dramatically.

4 Dissecting creatures in the biology classroom teaches students that animal life is expendable and unimportant. Also a recent study found that companies who supply animals for dissection are careless of the suffering and pain inflicted on them. Furthermore, there are good alternatives available now in computer simulations, which teach the lessons just as well. So for all these reasons, we should no longer use dissection of animals to teach students in the biology classroom.

5 Lawn mowers powered by electricity generally require less maintenance than do lawn mowers powered by gasoline. This lawn mower is powered by gasoline, so it will probably require a lot of maintenance.

6 The government's proposal to introduce a national identity card should be rejected for several reasons. Firstly, identity cards are of doubtful effectiveness in tackling identity fraud, crime and terrorism. Secondly, the cost of a national identity card system would be staggering and wasteful.

7 Single-sex high schools work better than coeducational high schools because adolescents do better when they aren't distracted by the presence of the opposite sex. Also, the developmental needs of adolescent boys and girls are different.

Exercise 6.2 Sub-arguments

Put each of the following arguments into standard form and draw an argument map diagram to illustrate the structure of each argument. Many (but not all) of these arguments contain sub-arguments – make sure these are represented on your diagram.

1 Increasing the size of the police force is only a stopgap method of crime prevention because it does not get at the root causes of crime. Therefore, the government should not respond to rising crime rates by increasing the size of the police force.

2 Some teachers claim that students would not learn curricular content without the incentive of grades. But students with intense interest in the material would learn it without the incentive of grades, while the behaviour of students lacking all interest in the material is unaffected by such an incentive. Hence, the incentive of grades serves no essential academic purpose.

3 Lorry driver: The speed limit on major highways should not be reduced. Professional drivers spend much more time driving, on average, than do other people and hence they are more competent drivers than are other, less experienced drivers. So reducing the speed limit would have the undesirable effect of forcing some people who are now both law abiding and competent drivers to break the law.

4 Zoo director: It would be false economy for the city to cut the zoo's budget in half. The zoo's current budget equals less than one percent of the city's deficit, so withdrawing support from

the zoo does little to help the city's financial situation. Furthermore, the zoo, which must close if its budget is cut, adds immeasurably to the city's cultural climate and thus it attracts tourists and tax dollars to the city.

5 The Green Movement is mistaken in thinking we should recycle materials like paper and glass because paper comes from trees, an easily renewable resource and glass is made from sand, which is plentiful and cheap. Furthermore, in some Australian cities recycling schemes have been abandoned because they are too expensive.

6 Radioactive elements disintegrate and eventually turn into lead. So if matter has always existed there should be no radioactive elements left. But there is still plenty of uranium and other radioactive elements around. This is scientific proof that matter has not always existed.

7 Over the past ten years, there has been a four-fold increase in the number of people killed in road accidents who are found to have illegal drugs in their bodies. The rate of increase is much greater than the corresponding figure for those people killed in accidents who were found with alcohol in their blood. This shows that the campaign against drink-driving has succeeded. Consequently, the Government should now concentrate on targeting those people who drive whilst under the influence of illegal drugs.

8 New measurements suggest that clouds absorb four times as much energy as previously thought. Since existing models of how the climate functions are based on the original measurements, if the new measurements are shown to be accurate, models of how the climate works will have to be completely overhauled. Climate models are used in our attempts to measure global warming so, if the new measurements are accurate, we will have to completely revise our understanding of global warming.

9 When prisoners under sentence of death are given the choice between life in prison and execution, 99 per cent of them choose life imprisonment. This shows that they fear death more than they fear life imprisonment. Since one is most deterred by what one fears, it is evident that the threat of the death penalty is more likely to deter potential murderers than the threat of life imprisonment.

10 The proposed dam on the Merv River should not be built. Although the dam would provide irrigation for the dry land in the upstream areas, it would reduce agricultural productivity in the fertile land downstream, since the availability and quality of water downstream from the dam would be reduced. The productivity loss in the downstream area would be greater than the productivity gain upstream, so the dam would yield no overall gain in agricultural productivity in the region as a whole.