Exercise 2.1 Assessing the truth of claims

1. Those who go swimming less than one hour after eating will get a cramp and drown.

FALSE
http://www.snopes.com/oldwives/hourwait.asp
Could find out about this by (a) trying the experiment, (b) you might know someone who has eaten and then swam without getting cramps etc.

2. Chewing gum takes seven years to pass through the human digestive system.

FALSE
http://www.snopes.com/oldwives/chewgum.asp
Ask an expert? Do some research? A nasty experiment?

3. The Nobel Foundation does not confer a prize for achievement in mathematics because the man who established it, Alfred Nobel, was upset that his wife was carrying on an affair with an eminent mathematician.

FALSE
http://www.snopes.com/science/nobel.htm
Two claims; there is no Nobel prize for maths and a supposed explanation of this fact. The first would be easy to verify – look it up (on the Nobel website if there is one). The second harder to verify: a biography of Nobel?

4. Tapping the side of a soda can will prevent its contents from foaming over when you open it.
FALSE
http://www.snopes.com/science/sodacan.htm
Try various experiments; shaking the can, tapping it at various points. What other factor might be relevant? Temperature? What would the result of the experiment prove in each case?

5. Left to the reader to investigate

6. The Great Wall of China is the only man-made object visible from the moon.

FALSE
http://www.snopes.com/science/greatwal.htm
Obviously, going to the moon and having a look is not very practical. What alternatives are there? Are there any photos taken from space that you could look at? Is it possible to work out how likely it is to be true? How long and wide is the great wall? How does that compare to other things, known to be visible (or not) from the moon?

7. A penny placed on the tracks can derail a train.

FALSE
http://www.snopes.com/science/train.htm
You could try it out, but you might get into trouble if it was true. Is it likely though? Suppose it was true. What would follow? If a penny can derail a train, why doesn't it happen more often? Why do terrorists bother with bombs?

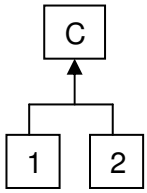
8. A tooth left in a glass of Coca-Cola will dissolve overnight.
http://www.snopes.com/cokelore/tooth.asp
Again, various experiments you could try out – the problem might be getting hold of a tooth. What alternatives are there? Suppose you left a piece of chalk in a glass of coke overnight and it did not dissolve? What would that show? What if the chalk did dissolve?

9. Plastic chopping boards are more hygienic than wooden ones.
Left to the reader to investigate

Exercise 2.2 Assessing support for conclusions

1. Most antidepressant drugs cause weight gain. While dieting can help reduce the amount of weight gained while taking such antidepressants, some weight gain is unlikely to be preventable. It follows that at least some patients taking antidepressant drugs gain weight as a result of taking them.

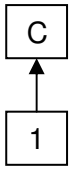
1. Most antidepressant drugs cause weight gain.
2. While dieting can help reduce the amount of weight gained, some weight gain is unlikely to be preventable.
Therefore:
C. At least some patients taking antidepressant drugs gain weight as a result of taking them.



The premises support the conclusion. If antidepressant drugs cause weight gain which is unlikely to be preventable, then people taking them are likely to gain weight.

2. Since children who read voraciously are more likely to have defective vision than children who do not read very much, it follows that children who do not like to read usually have perfect vision.

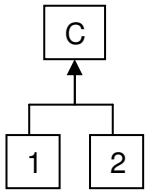
1. Children who read voraciously are more likely to have defective vision than children who do not read very much.
Therefore:
C. Children who do not like to read usually have perfect vision.



The premises do not support the conclusion. Children who do not like to read might have defective vision for some other reason (they might have been born with bad eyesight for example).

3. There are a growing number of organisations which have been set up to deal with bullying. So bullying must be on the increase.

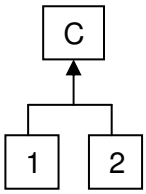
1. There are a growing number of organisations which have been set up to deal with bullying.
Therefore:
C. Bullying is on the increase.



The premise does not support the conclusion: There could be many other plausible explanations for the growing number of organisations set up to deal with bullying. Perhaps although bullying is not increasing, people are more likely to report it. Or perhaps there is a greater awareness of the seriousness of the problem now.

4. All mammals are herbivores and dogs are mammals. Therefore, dogs are herbivores.

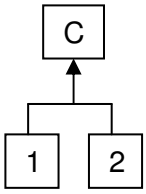
1. All mammals are herbivores
2. Dogs are mammals
Therefore:
C. Dogs are herbivores



The premises support the conclusion even though the conclusion is false. IF both premises were true the conclusion would have to be true too. The problem with this argument is not that the conclusion does not follow from the premises. The problem is that the first premise is not true.

5. Some flowers have thorns and roses are flowers. Therefore roses have thorns.

1. Some flowers have thorns
2. Roses are flowers.
Therefore
C. Roses have thorns.



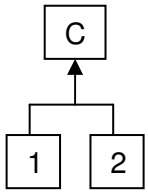
The premises do not support the conclusion, even though the all the premises are true. The first premise only tells us that *some* flowers have thorns. So the conclusion does not follow – the premises leave open the possibility that roses are among the flowers that do not have thorns. Note that the conclusion is actually true; roses do have thorns (well, almost true, there are a few varieties of thornless rose). So this is an example of a 'bad argument for a true conclusion'.

Because the conclusion (and all the premises) are not only true but 'common knowledge', when you evaluate this argument you are more likely to fall prey to the 'myside bias' discussed in this chapter. Since you already believe the conclusion, you might have found it harder to see that the premises fail to support the conclusion.

6. Politician: The funding for the new nationwide health-awareness campaign should come from an increase in taxes on cigarettes. It is well established that cigarette smoking causes many serious

health problems, and it is only reasonable that people whose unhealthy habits cause so many health problems should bear the costs of that campaign.

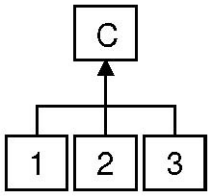
1. Cigarette smoking causes many serious health problems.
2. People whose unhealthy habits cause so many health problems should bear the costs of that campaign.
Therefore:
C. The funding for the new nationwide health-awareness campaign should come from an increase in taxes on cigarettes.



The premises do not support the conclusion. If the premises were true, then it would seem to follow that smokers should bear *some* of the costs of the health-awareness campaign. Whether that should be implemented by increasing a tax on cigarettes is a further question - perhaps there are reasons why it should not be done that way. For example, that method of raising money might be said to unfairly affect those least able to pay, since consumption taxes affect those on low-incomes more than those on high incomes. So the premises do not support the conclusion because there might be counter-considerations affecting the step from 'smokers should bear the costs' to 'cigarette tax should be increased'.

7. Physical education should teach people to pursue healthy, active lifestyles as they grow older. But the focus on competitive sports in most schools causes most of the less competitive students to turn away from sports. Having learned to think of themselves as unathletic, they do not exercise enough to stay healthy. That is why physical education should include non-competitive activities.

1. Physical education should teach people to pursue healthy, active lifestyles as they grow older.
2. The focus on competitive sports in most schools causes most of the less competitive students to turn away from sports.
3. Having learned to think of themselves as unathletic, the less competitive students do not exercise enough to stay healthy.
Therefore:
C. Physical education should include non-competitive activities.

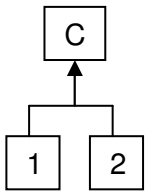


The premises are not sufficient to support the conclusion. The argument seems to assume that including non-competitive activities in physical education would encourage less competitive students to pursue healthy active lifestyles. But that is not obviously true; it might depend on how much fun the non-competitive activities were, among other things. If including non-competitive activities wouldn't make any difference to the less competitive students, then the support for the conclusion is undermined.

8. Long-standing success of a theory in physics is no guarantee that the theory will continue to be dominant indefinitely. Newtonian physics dominated science for over two centuries. It found consistently successful application, becoming one of the most highly substantiated and accepted theories in the history of science. Nevertheless, Einstein's theories came to show the fundamental limits of Newtonian physics and to surpass the Newtonian view in the early 1900s,

giving rise once again to a physics that has so far enjoyed wide success.

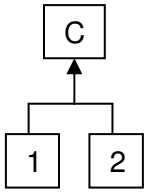
1. Newtonian physics dominated science for over two centuries.
2. Einstein's theories came to show the fundamental limits of Newtonian physics and to surpass the Newtonian view in the early 1900s.
Therefore:
C. Long-standing success of a theory in physics is no guarantee that the theory will continue to be dominant indefinitely.



The premises do support the conclusion. One counter-example is sufficient to establish the conclusion that long standing success is not a guarantee that a scientific theory will continue to be dominant.

9. The druid stones discovered in Ireland are very, very old. But this particular druid stone was discovered in Scotland, so it must be of more recent vintage.

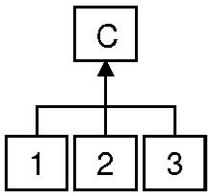
1. The druid stones discovered in Ireland are very, very old.
2. This particular druid stone was discovered in Scotland.
Therefore:
C. This druid stone is not as old as those found in Ireland.



The premises do not support the conclusion. The first premise does not rule out the possibility that Scottish druid stones are just as old as Irish ones. So the fact that this stone is Scottish does not prove that is more recent.

10. In rheumatoid arthritis, the body's immune system malfunctions by attacking healthy cells in the joints causing the release of a hormone that in turn causes pain and swelling. This hormone is normally activated only in reaction to injury or infection. A new arthritis medication contains a protein that inhibits the functioning of the hormone that causes pain and swelling in the joints. Therefore, any patient treated with the new medication for rheumatoid arthritis could sustain a joint injury without becoming aware of it.

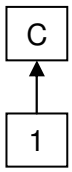
1. In rheumatoid arthritis, the body's immune system malfunctions by attacking healthy cells in the joints causing the release of a hormone that in turn causes pain and swelling.
2. This hormone is normally activated only in reaction to injury or infection.
3. A new arthritis medication will contain a protein that inhibits the functioning of the hormone that causes pain and swelling in the joints.
Therefore:
C. Any patient treated with the new medication for rheumatoid arthritis could sustain a joint injury without becoming aware of it.



The premises provide sufficient support for the conclusion. Note that the conclusion only says that it is possible that someone taking this drug could sustain a joint injury and notice. It does not say that this is certain to happen. Not all injuries are caused by obvious accidents, so some people might not know they have been injured if there is no pain or swelling. In those cases patients treated with the new medication might sustain an injury without noticing it.

11. Using rational argument in advertisements does not persuade people to buy the products being advertised. Therefore, advertisers who replace rational argument with non-rational appeals to emotion in advertisements will persuade people to buy the products being advertised.

1. Using rational argument in advertisements does not persuade people to buy the products being advertised.
Therefore:
C. Advertisers who replace rational argument with non-rational appeals to emotion in advertisements will persuade people to buy the products being advertised.



The premise does not support the conclusion. It is possible for the premise to be true and the conclusion false. Just because rational argument does not work, it does not follow that non-rational appeals will work. It may be that neither of those works.