
3

SUFFICIENT REASONS

Critical thinking is reasonable and reflective thinking aimed at deciding what to believe or what to do. As we saw in Chapter 1, part of what makes critical thinking *reasonable* is that it aims at finding or providing reasons for our decisions and beliefs. It is important to have reasons for thinking that our beliefs are true, that we have chosen the proper goals, and that our plans to reach them will be effective. If we do not have any reasons, then we will be right only by luck and relying on luck is not much of a strategy. Of course, we want more than just to have any old reasons; we want to have good ones. But what does it mean to say that a belief is *based* on or *supported by* certain evidence? And how do we know how much evidence is enough? This chapter is all about what it means to have good reasons for your beliefs and plans.

We want our beliefs and decisions to be based on enough evidence.

3.1 CRITICAL THINKING AND ARGUMENTS

We can think critically about any subject matter and our thinking can take many different forms. But in every case, thinking critically about what to believe or do involves providing or considering reasons. As we saw in Chapter 1, critical thinking is also *reflective* thinking and this means in part that thinking critically requires thinking about our reasons *as reasons*. It requires making our reasons explicit and

thinking about whether they provide enough evidence for the decisions we have to make.

Whenever we are thinking critically about what to believe or do, we can formulate our reasoning in an argument that makes explicit our reasons and our belief or decision.

One technique that can help us to be reflective is to put our thinking in the form of an argument. This involves explicitly formulating the reasons we have and then assessing whether they are good reasons. The easiest way to do this is in writing. This chapter is all about analyzing and evaluating written arguments. But before we get to the details, I want to say a bit more about how arguments relate to critical thinking.

Let us start with some examples of thinking about what to believe or what to do. We look out the window to see whether it is sunny; we read a history book to learn what caused the American Civil war; we read the bathroom scale and conclude that our diet is working; we do an experiment and decide that the oxygen is causing the reaction; we conduct a survey and conclude that a majority of the population is probably opposed to capital punishment; we test different recipes to find the best way to make a pie crust; we read the newspaper to see who won last night's game; we make a scaled down model of our backyard to figure out where it makes most sense to build the new deck; we think about last night's concert to get ready to write a review for the school newspaper; we read the letters to the editor to help us decide what to think about the proposal to build a new bridge. I leave it to you to continue this list, but I trust that it is clear that it can go on for a very long time.

This very partial list gives a sense, I hope, of just how much of our ordinary, daily activity involves thinking about what to believe or what to do. What the examples have in common is that they each involve drawing a conclusion on the basis of reasons or evidence. Our belief that it is sunny out is based on what we saw when we looked out the window; the results of our tests are the evidence we use to decide how to make the perfect piecrust.

Having reasons for our decisions is essential to critical thinking. But notice that very few of the examples of thinking about what to believe or do involve reflecting on the reasons we had for our decisions. We probably do not think of what we see when we look out the window as the basis for or as evidence for our belief that it is sunny. Our thinking is not that reflective. We do not formulate the reasons *as reasons*.

I do not mean that this thinking does not involve the use of language. Reading a newspaper to find out who won the game involves using language. I mean that when we decide after reading the newspaper that our team had better start playing better defense, we probably are not (and usually do not need to be) formulating that conclusion or the reasons we have for it in words. We might be able to provide those reasons if someone asked us to. But formulating them in words is not part of the thinking itself.

When someone does offer explicitly formulated reasons in support of a claim or a proposal we say that they are offering an **argument** for the claim or proposal. We call the reasons that are being offered the argument's **premises**, and we call the

claim or proposal that is being supported, the argument's **conclusion**. If Jones is arguing that we ought to build a second bridge across the river because this is the most cost-effective way to deal with the traffic congestion, then the conclusion of his argument is the proposal that *we should build a second bridge across the river* and the argument's premise is that *building a second bridge is the most cost effective way to solve the traffic congestion*. In this sense, an argument is just a collection of assertions some of which, which we will call the premises, are meant to support one of the others, which we will call the conclusion. Thinking of an argument in this way can help us to see how reasons are related to conclusions and will help us to find some strategies for telling when we have good reasons and when we do not.

The reasons offered in support of a belief or decision are the **premises**. The belief or decision is the **conclusion**.

Sometimes arguments are written down, as in a letter to the editor of the local newspaper where the author offers reasons for thinking that more money should be spent on welfare programs. Books and articles can also contain arguments. Some history books, for instance, contain arguments about the origins of the American Civil War, pulling together evidence of different kinds and from different sources to support the author's conclusion. We can find arguments in the editorials published in the college newspaper. Argument can be spoken out loud, as when a politician offers her reasons for supporting a new bylaw prohibiting smoking in public places. So long as she is doing more than just expressing her support for the bylaw and is actually saying why she thinks the bylaw is a good one, then she is giving an argument for it. In these cases, someone is explicitly offering reasons in support of a position or belief, trying to persuade others to agree.

This use of the word "argument" is a bit unusual, since ordinarily by an argument we mean an emotionally heated dispute or disagreement. There is no doubt that discussions about what to believe or what to do can be emotional, and we are often, as we saw in Chapter 1, emotionally attached to our own beliefs, opinions, and traditions. But we also saw that emotional reasons are not reasons to believe that something is true or that some practice is good or effective. We also saw that emotion can get in the way of thinking critically. The fact that my believing something brings me a good deal of comfort does not show that the belief is true. Our focus in this book is on epistemic reasons, reasons to think that something is true or that our proposals are the best ones. So we can stick with this somewhat unusual sense of the word "argument" because it will help us to think about how good reasons are related to our beliefs and proposals.

What makes reasons good is the same for all subject matters. So if you know how to think critically about one topic, you know how to think critically about them all.

Letters to the editor, books, and speeches may contain an author's reasoning about what to believe or what to do. But usually they contain other things too. Sometimes, a person will write a letter to the editor simply to express her opinion on a subject,

and will not include her reasons. Her goal is not to try to convince anyone to agree with her, but merely to make sure that her voice is heard. This is fine, though it would of course be better if we were still undecided or if we were considering a change of mind to know her reasons. Likewise, some speeches are intended to encourage emotions or team spirit and not to provide reasons to believe something. There is no sure-fire way to know when a piece of text or a speech does contain reasoning about what to believe or what to do. We do know that it does if, but only if, the author is offering reasons in support of some conclusion.

The difference between thinking that relies on explicitly stated premises and conclusions and reasoning that does not has nothing to do with what the reasoning is about. Take the case of trying to decide what to believe about the local team's performance. One could conclude that they are in last place simply by reading the standings published in the paper; or one could reach that same conclusion by reasoning that involved explicit words with premises and conclusions. One could draw the conclusion that the compound is responsible for the chemical reaction from seeing the results of the experiments, or from reading the published report that lays out the experimental procedures and results. What is common to all cases of reasoning about what to believe or what to do, at least when that reasoning is done well, is that evidence of some sort is being offered in support of some conclusion, and this has nothing to do with whether the premises and conclusions have been explicitly formulated or not. No matter what we are thinking about, if we are trying to decide what to believe or do, then we can put our thinking in the form of explicitly stated reasons and conclusions.

There is a real advantage to putting our thinking in the form of an argument, an advantage that ties arguments very closely to critical thinking. Critical thinking is not just reasonable thinking, it is also *reflective* thinking. Part of what this means is that thinking critically requires paying careful attention to the acceptability and strength of the reasons one is considering. It is true that for a lot of our reasoning we do not reflect very much on whether the evidence is acceptable or strong enough. I look at the bathroom scale and draw conclusions about my weight without reflecting on just what the evidence is that I am relying on, or about under what conditions that evidence is trustworthy. I read the newspaper and draw conclusions about the local politics without thinking very much about what makes that a reliable or reasonable way to form beliefs.

Putting our reasoning in the form of an argument helps identify our reasons, assess whether they are true, and determine whether they support our conclusion.

But unless we are able to think about these questions our thinking will not be critical thinking. We will be engaged in thinking that we do not fully understand, trusting somewhat blindly, not fully in control of our beliefs and decisions. By reflecting on how reading the newspaper can be a source of evidence, we can take greater control of our beliefs. Instead of letting our beliefs be formed on their own, we will become responsible for them in knowing what their grounds are. By thinking

about how standing on a scale can give me evidence for my weight I can become more sensitive to the conditions when that method will provide unacceptable or insufficient evidence. Not only will this help me avoid mistakes about my weight, which is always a good thing, but these lessons may even be transferred to other domains, helping me to develop better and more reliable methods.

Thankfully, we will not always need to formulate our reasons and conclusions in words in order to be thinking critically. But there is almost no harm in doing it periodically and much to be gained from knowing how to do it. The form that our thinking takes and the questions we will need to ask about whether the reasons are acceptable and sufficient may vary from one subject to another. In later chapters we will consider some of this variation in more detail. In this chapter I want to stay focused on what all cases of reasoning about what to believe and what to do have in common: that they involve offering reasons in support of a conclusion.

EXERCISE 1

Comprehension Questions. (When you answer these questions, pretend that you are explaining or teaching the answer to a friend who is not in the class. Doing that will force you to put in LOTS more background information than you would if you were trying to answer them for your instructor.)

- a. What is an argument?
- b. What is the difference between a premise and a conclusion?
- c. Could an argument have more than one premise? If so, give an example.
- d. Could an argument have more than one conclusion? If so, give an example.

3.2 IDENTIFYING PREMISES AND CONCLUSIONS

We have seen that critical thinking is *reflective* in part because it involves thinking about one's reason as reasons, and considering whether they are **acceptable** and whether they provide **sufficient** support for one's beliefs and decisions. But distinguishing reasons from the conclusions they are meant to support is difficult. In this section we will look at how to analyze very simple arguments into premises and conclusions.

Unfortunately, there is no foolproof, sure-fire method for doing this. People who write editorials may give reasons without saying that they are reasons, or might state their conclusion without saying that it is the conclusion. Sometimes, they even leave their conclusions or reasons unstated and leave it up to the reader to figure out what they are. (Perhaps they do this because they have not themselves reflected enough on the nature of their reasons.) Knowing how to figure out what the reasons are and what the conclusion is supposed to be is one of those skills that is acquired mostly through careful training and repeated practice. There are lots of examples throughout

this chapter to help you practice. But let us look at some examples to bring out some helpful bits of advice.

Consider the following bit of reasoning.

The city should build a second bridge to cross the river, for this is the cheapest solution to the traffic congestion and we should adopt whatever is cheapest.

The first step in analyzing an argument is to **identify all of the assertions it contains**.

It might already seem pretty obvious what the conclusion is here. But let us approach the analysis of the text very slowly and methodically, in order to be as reflective as we can. The first thing to keep in mind in analyzing an argument is that reasons and conclusions are always **asserted** in the text. (Well, almost always. Sometimes conclusions or premises are left out altogether. But we will ignore that for now.) So it is helpful to begin the analysis of an argument by identifying all of the assertions it contains. (It might help to look back at the assertion test, discussed in Chapter 2.) In the text above, we can identify three assertions. The first one is expressed in the very first sentence of the text.

Remember to always analyze conjunctions into their conjuncts. Each conjunct is a separate assertion.

1. The city should build a second bridge to cross the river.

The next sentence in the text is a **conjunction**, and you will remember from Chapter 2 that a conjunction makes at least two assertions. So we ought to break this sentence into two. (Our goal at this stage in the analysis is to identify all the assertions that are made. Later we can decide which assertion is the conclusion and which are the premises.)

2. Building a second bridge across the river is the cheapest solution to the traffic congestion.
3. We should adopt whatever solution is the cheapest.

There are several things to notice.

When analyzing an argument, replace pronouns like “it,” “he,” and “she” with what they are pronouns for.

First, I left the word “For” out of the second assertion. That word is not really part of the assertion. Rather, it plays a special role that I will return to in a moment. Second, notice that I replaced the word “It” with the phrase “Building a second bridge across

the river.” I did this because I want each assertion that I identify to be as complete as possible. Even though I know what the word “it” refers to in that sentence, it will be helpful later on if we replace pronouns like “it,” “he,” “she,” etc. with appropriate names or descriptions. I also left off the word “and” from the third assertion, because it simply forms a conjunction, and is not really part of the assertion.

To identify an argument’s premises and conclusion, look for premise and conclusion indicator words.

Now that we have analyzed that text into three assertions, we can ask which one is the conclusion. Look back to the word “For,” which I left out of the second assertion. The author used the word “For” to let us know that what comes next is a reason for accepting or agreeing with the point that came first, namely that the city should build a second bridge. The word “For” is a **premise indicator**, because it indicates that something is a premise. More specifically, it tells us that the next thing asserted is going to be a premise. But it also tells us that we just got a conclusion. So the presence of that word in that part of the text tells us a lot about the identity of the conclusion and the premises. We know that the first assertion is the conclusion, and the next one is a premise. As it turns out, the third one is a premise too. Eventually we will want to know how those premises are related to each other, but that can wait.

Here is a second text.

A second bridge should not be built, since building one will only encourage more people to drive across the bridge than already do now. What is more, if we build two bridges, then we will end up with traffic congestion troubles on two bridges instead of just one.

We can apply what we just learned to this text. The very first sentence has two parts, separated by the word “since.” We can pretty easily identify two assertions; so let us separate them.

1. A second bridge should not be built.
2. Building a second bridge will only encourage more people to drive across the river than already do now.

Like the word “for,” the word “since” is a **premise indicator**. It tells us that we are about to get a premise. When the word “since” occurs, as it does in this case, in the middle of a text, it also tells us that a conclusion was just asserted. So we know that the first assertion is a conclusion and the second one is a premise. Sometimes the word “since” occurs at the very beginning of an argument. There are examples of this in the chapter exercises. In that case, it tells us that what comes next is a premise, but it does not tell us what the conclusion is.

Look now at the final sentence. How many assertions does it contain? (Hint: it is a conditional, and we discussed what they assert in Chapter 2.) There is only one. Neither the sentence after the “if” (which we call the antecedent), nor the sentence

after the “then” (which we call the consequent) is asserted. So we must not separate them into two. This is REALLY important, for reasons that we will see later.

3. If we build two bridges, then we will end up with traffic congestion troubles on two bridges instead of just one.

Once again, I left out the words “what is more,” since they are used to indicate the presence of a premise. Using them is like saying “here is another reason to believe me.”

When analyzing a text into assertions, never analyze a conditional into its parts. For neither the antecedent nor the consequent is asserted.

Now that we have analyzed the text into its assertions, we can ask which are the premises and which is the conclusion. We have in fact already answered that. Once again, the very first assertion is the conclusion, while the next two are premises.

Here is one last example.

It would be too expensive to replace the bridge with a tunnel and tearing the current bridge down will harm all the businesses that rely on cross-border traffic. We should simply build a second span across the river.

Once again, the very first sentence is a conjunction and so should be separated into two assertions. The final sentence is an assertion on its own. So we have three assertions.

1. It would be too expensive to replace the bridge with a tunnel.
2. Tearing the current bridge down will harm all the businesses that rely on cross-border traffic.
3. We should simply build a second span across the river.

Notice that in this case there are no indicator words. There are no words to tell us what the premises are or what the conclusion is. We need to figure it out some other way. The only way left is to use our own judgment. There are different approaches to try. You might start by pretending that you were the author, and asking yourself: If I had written this, which of the assertions would I be trying to convince someone to believe? Which would I want a reader to consider the big take-home message?

Another strategy is to insert an indicator word in between the assertions and see which makes most sense. For this strategy to succeed, it is important to have on hand indicator words that you feel very comfortable with. My own favorite indicator word is “therefore,” which I know tells me that I was just given reasons and am about to given a conclusion. Consider the following.

It would be too expensive to replace the bridge with a tunnel; therefore, we should simply build a second span across the river.

We should simply build a second span across the river; therefore, it would be too expensive to replace the bridge with a tunnel.

To identify the premises and conclusion in an argument without indicator words, try inserting one between the assertions. This can help reveal what the author intended.

When I consider these it seems clear to me that the first one makes much more sense than the second. This suggests that the first assertion on our list is a reason to accept the third assertion. If we tried the same experiment using the second and third assertions we would get the same result. All of this suggests, what might have already seemed a bit obvious, that the third assertion in this text is the conclusion. I call this strategy for identifying premises and conclusions, the *Therefore Test*.

PREMISE INDICATORS

Premise indicators show which assertions are the premises in an argument. Here is a partial list of premise indicators:

Since, because, for, after all, for the reasons that, given that.

CONCLUSION INDICATORS

Conclusion indicators show which assertion is the conclusion in an argument. Here is a partial list of conclusion indicators:

Therefore, so, it follows that, this shows that, in conclusion, this proves that.

It is a good idea to find one premise indicator and one conclusion indicator that you feel really comfortable with, in the sense that you know exactly how to use it to indicate to someone when you are about to give them a reason or a conclusion. Having them on hand will help when we are analyzing a text that does not contain them. It will also prove helpful when we try to figure out the relations among multiple premises.

PRACTICAL STRATEGY: HOW TO IDENTIFY PREMISES AND CONCLUSION

- (i) Identify all the assertions.
 - Analyze conjunctions into their conjuncts.
 - DO NOT analyze conditionals, disjunctions, or sentences with non-asserted noun clauses.
- (ii) Look for indicator words.
- (iii) If there are no indicator words, use your own judgment or the *Therefore Test*.

The word “because” is a tricky indicator word. It can be used to give a reason for doing or believing something, as in the following.

We should build a bridge rather than dig a tunnel, because bridges are cheaper.

Jones must be the murderer, because he was at the scene of the crime and owns a gun just like the one used to kill the victim.

In these cases, the word “because” works in the same way as the word “since.” It indicates that what comes next will be a reason to believe or do what was mentioned first. So the word “because” can be a premise indicator.

But the word “because” can also be used to indicate that one event caused or helped to cause another. Consider the following.

The window broke because the ball hit it.

This sentence contains two assertions: that the window broke and that the ball hit the window. In this way, this sentence is like a conjunction, with the word “because” linking two assertions. But this sentence asserts more than just that two things happened. It also asserts that one caused the other. It asserts that the ball’s hitting the window caused the window to break. A sentence like this is not formulating an argument. We know this because it has no premise or conclusion and nor is it trying to convince us to believe that the window broke or that the ball hit the window. Rather, this sentence formulates a **causal assertion**. A causal assertion is just an assertion that one thing caused another. We will return to causal assertions in Chapter 5. We will have more to say about what they mean and about how to tell when they are true. But for now, the point is simply that we need to be a little careful when we see the word “because,” for it can be used in two ways: to indicate a premise in an argument, and to indicate a cause in a causal assertion.

The word “because” is used in two ways: sometimes to indicate a premise in an argument; sometimes to indicate a cause in a causal assertion. Causal assertions are not arguments.

EXERCISE 2

A. Comprehension Questions.

- a. What is a premise indicator word?
- b. What is a conclusion indicator?
- c. Why do not we want to analyze a conditional into two assertions when we analyze an argument?
- d. Why is a word like “since” not really part of an assertion? What roles does it play?

- B.** Compose an argument with two premises using “therefore” as a conclusion indicator.
- C.** Compose an argument with two premises using “since” as a premise indicator.
- D.** Compose an argument with two premises using no indicators.
- E.** In the following texts, identify all of the assertions made and then identify the premises and conclusion.
- a.** The infection is getting worse, for the fever is staying high.
 - b.** Dinosaurs were animals and they roamed the earth before humans did. This shows that humans were not the first animals.
 - c.** The leaves are drooping and the petals are falling off. This means that the flower is dying.
 - d.** The dress is too short and the color is all wrong. So, you should not buy it.
 - e.** Jones was at the party last night. Jane said so.
 - f.** The traffic on the highway is really terrible. So we should take a side road.
 - g.** Voting makes no difference. Politicians always do whatever they want and one vote can never make a difference.
 - h.** That plant will die. It never gets any light and it is bone dry.
 - i.** Inflation is rising and so are interest rates. A recession is approaching.
 - j.** The American Civil War was good for the United States. It clarified the powers of the states in relation to each other and to the Federal Government, and it highlighted the importance of the constitution’s bill of rights.
 - k.** 85% of students we surveyed are in favor of some legal limitations on gun ownership. Therefore, most people are in favor of gun control.
 - l.** Cars are nothing but a money sink. I have owned three cars in the last six months and all of them required really costly repairs.
 - m.** If we eat the bananas, then we will not have any fruit left. And if we have no fruit then we have to go to the store. So, if we eat the bananas we have to go to the store.
 - n.** Either we drive to Florida or we fly. But flying is now really expensive and is also bad for the environment. So, we had better drive.
 - o.** Investing in the stock market is like throwing money down the toilet. And we can all agree that that is a bad thing. So investing in the market is bad too.
 - p.** The acting was wooden, the scenery was cheap and the dialogue was empty. That was a terrible movie.
 - q.** If you save your money in a bank account you will gain interest. If you gain interest you will become richer. So, saving money in your bank account can make you richer.
 - r.** We have to fire that worker. He is incompetent, always in a bad mood, and he just left early.

- F.** Using the following sentence as a conclusion, “Tofu is very delicious,” compose three arguments with different premise. Use premise and conclusion indicators. (Note: the arguments do not need to be persuasive, and do not worry about making sure that the premises are true. The argument could be crazy, if you like. So long as they are arguments.)

3.3 DEPENDENT AND INDEPENDENT PREMISES

Thinking critically about what to believe or do requires having or finding reasons for the decisions we make. Sometimes, we have more than one reason when we make a decision. And sometimes, the reasons we have work together in complicated ways to support our decision. In this section we will study the different ways that reasons can work to support a belief or an action.

When I decided to write this textbook, I thought that the challenge of writing a book would be fun and rewarding. I also thought that I could say things in a helpful and clear way. Oh, and I was hoping to retire early on the enormous profits I would make. (It has been fun and rewarding. One out of three is not bad!) In this case, the reasons were independent of one another, in the sense that each of them would have been a reason to write the book even in the absence of the other two. Looking forward to the challenge would have been a reason to write it even if I was pretty sure that I could not say things clearly and would not be able to retire on the proceeds. In analyzing an argument it is important to figure out whether the premises are independent of one another in this way.

Here is another set of arguments.

Sam robbed the bank, and robbing a bank is a criminal act, so Sam is a criminal.

Sam robbed a bank, and he sells illegal drugs, so Sam is a criminal.

Both arguments have two premises. But the relation between the premises in the first argument is very different than the relation between the premises in the second argument. In the first argument, the premises are working together—each needs the other to support the conclusion. In the second argument, the premises are independent of one another. Each supports the conclusion all on its own. This difference, the difference between dependent and independent premises, is the topic of this section.

3.3.1 The Words Test

The first strategy I call the *words test*.

THE WORDS TEST

To tell whether premises are dependent or independent, see whether some of the conclusion’s key words occur only in one premise and other key words only in another. If so, then those premises are probably dependent.

To see how it works, consider the following argument.

John should not become a doctor. After all, he really hates to be around sick people, and doctors spend their whole day around sick people.

The premises in an argument are dependent on each other if none of them would be a reason to accept the conclusion if the others were false.

We can analyze it into three assertions.

1. John should not become a doctor.
2. John really hates to be around sick people.
3. Doctors spend their whole day around sick people.

(Notice that I replaced the pronoun “he” from the second assertion with the name “John.” The words test works properly only if we always do that.) We know from what we learned in the previous section that the first assertion is the conclusion. The words “After all” are used here as **premise indicators**. So we know that the second and third assertions are supposed to provide reasons to accept the conclusion. What we now want to know is whether they are dependent on each other, or whether they provide independent support for that conclusion.

We can see that the conclusion contains two key words: “John” and “doctor.” But the word “John” only occurs in the second assertion and the word “doctor” only occurs in the third assertion. This suggests pretty strongly that those two assertions are working together—that is, dependently—to support the conclusion.

The idea behind the **words test** is this: *there should not be more information in the conclusion than there is in the premises*. If an argument’s conclusion does contain more information than there is in the premises, then this means that a logical leap is needed to get from the premises to the conclusion. In other words, the conclusion does not really follow logically from the premises. (We will look more closely at just what that means in a little while, but for now we can stick with a pretty intuitive grasp of that idea.) One way to see whether there is more information in the conclusion is to compare the key words used in formulating it with the words in the premises. That is why the *words test* works pretty well for figuring out whether premises are dependent or not.

3.3.2 The False Premise Test

But the words test cannot always help us. Here is an argument where the words test will not help.

Sam robbed the bank. And he sells illegal drugs. So he is a criminal.

We can analyze it into three assertions:

1. Sam robbed the bank.
2. Sam sells illegal drugs.
3. Sam is a criminal.

We know that the first and second assertions are premises and the third one is the conclusion. Are those premises independent of one another? The **words test** is not going to help us here, since one of the key words in the conclusion, “Sam,” occurs in both premises and the other one, “criminal,” occurs in neither one. In this kind of case, it is better to use a somewhat more complicated, but much more reliable test.

THE FALSE PREMISE TEST

To test whether premises are dependent or independent, suppose that one were false, and ask whether the other one would still provide some support for the conclusion. If it would, then the premises are independent. If not, then they are dependent.

To use this test, we need to suppose for the sake of the test that one of the premises is false. So let us suppose that Sam did not rob the bank, but that he does sell illegal drugs. Just to help us suppose this, let us imagine that his friend Michael robbed the bank. Now we ask: would the fact that Sam sells illegal drugs still be some reason to accept the conclusion that Sam is a criminal? Clearly it would. Selling illegal drugs makes someone a criminal, even if he never robbed a bank.

Let us do the test on the other premise. Let us suppose that Sam does not sell illegal drugs, but that he did rob the bank. Would the fact that Sam robbed the bank be some reason to accept the conclusion that Sam is a criminal? Again, the answer is clearly yes. What this shows is that those two premises do not depend on each other to be a reason to accept the conclusion. Each is on its own a reason to accept that conclusion. In other words, they are independent premises.

Let us use the **false premise test** on the argument for the conclusion that John should not go to medical school. Let us suppose that John *does not* hate being around sick people, but that it is true that doctors spend a lot of time around sick people. Would the fact that doctors spend a lot of time around sick people be a reason to think that John should not go to medical school? No. It is a reason to think that *only if* it is also true that John does not like being around sick people. Try it the other way. Suppose that it is not true that doctors spend a lot of time around sick people, but that John hates being around sick people. Would that fact about John be a reason for him not to go to medical school? Again, no. It would be a reason for him to avoid becoming a doctor only if doctors spent a lot of time around sick people. So this shows that these premises are dependent on each other: neither premise would be a reason to accept the conclusion if the other premise were false. So we get the same result using the false premise test as we got using the words test.

The false premise test is trickier than the words test. The words test is almost mechanical: we just need to compare words in the conclusion and the premises. But it will not work for all arguments. The false premise test will always give us the right answer. But it is trickier to use, for it requires us to assume that one thing is false and then ask whether something else could be true. (Flashback: you might remember that this is the very same bit of mental gymnastics needed for the Assertion Test! Did I not tell you we would use that gymnastics move again? We will use it one more time

before the Chapter is done.) And this is especially difficult to use when the premise we have to assume is false is one that we already know for a fact is true. Using the false premise test can sometimes require a vivid imagination. But the words test will not always work, whereas the false premise test will always work.

Let us consider one more case.

Capital punishment should be banned. It is often cruel and cruelty should be banned. Moreover, our justice system sometimes makes mistakes and it would be horrific to execute an innocent person.

We can analyze this into five assertions:

1. Capital punishment should be banned.
2. Capital punishment is often cruel.
3. Cruelty should be banned.
4. Our justice system sometimes makes mistakes.
5. It would be horrific to execute an innocent person.

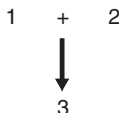
We know that the first assertion is the conclusion. This leaves us with four premises. Reading them through carefully, we can see that there are two main ideas in the premises. One has to do with whether capital punishment is cruel and the other has to do with whether our justice system might make mistakes. Using the words test, we can see that the second and third assertions work together to support the conclusion and that the third and fourth work together to support the conclusion. We can also see, using the false premise test, that these pairs of premises are independent one from the other. Even if the justice system never made mistakes, if it is true that capital punishment is cruel and that cruelty is wrong, then this would be some reason to accept the conclusion. Likewise, even if capital punishment was not cruel, if our system sometimes makes mistakes and if it would be wrong to execute innocent people, then this would be some reason to accept the conclusion. So here we have two independent sets of dependent premises!

PRACTICAL STRATEGY: DIAGRAMMING ARGUMENTS

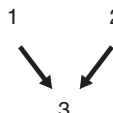
It can be helpful to construct a diagram to make the structure of an argument clear.

Give each assertion in the argument a number. Place the number for the conclusion at the bottom of the diagram and the numbers for the premises above. If the premises are dependent, connect with a “+” and then draw an arrow from it to the number of the conclusion. If the premises are independent, connect each of them directly to the conclusion with an arrow.

Dependent Premises



Independent Premises



Deciding what to do: clearly distinguish reasons for the ends and reasons for the means

Deciding what to do involves deciding on an end to try to achieve and deciding on a means to achieve it. So two kinds of reasons are important in deciding what to do. For we need to have good reasons both for the ends we are trying to achieve and for the means we are choosing to use. In constructing an argument to represent our reasoning about what to do, we should make sure that we separate out these kinds of reasons. When we analyze someone else's reasons for acting we should also be careful to distinguish the reasons to achieve that end from the reasons to choose those means.

SECTION SUMMARY

We often have different reasons for our beliefs and decisions. Reasons are independent of one another when each would be a reason even if the other was not. If we explicitly formulate our reasons as an argument with premises and conclusions, then we can ask whether some of the premises work together to support the conclusion. We can use the **words test** or the **false premise test** to determine whether they are dependent or independent.

EXERCISE 3

- A.** After section 2, the final exercise asked you to compose an argument. Were the premises dependent or independent? Compose two new arguments, one with dependent premises and one with independent premises.
- B.** In the following arguments, identify the premises and conclusions and determine whether the premises are independent or dependent. (Do not worry about whether the premises or conclusion are true.)
- a.** The math class is worth taking because it is easy and the teacher is really nice.
 - b.** North Korea is a dangerous country, because it is a dictatorship and all dictatorships are dangerous.
 - c.** Jones will probably win the race. He is the fastest skater and the fastest skater usually wins.
 - d.** Wind power is the way of the future. It is really inexpensive; it does not pollute; and there will always be wind.
 - e.** The plant is dying. The leaves are turning brown, and this is a sign of plant death.
 - f.** Raccoons are digging up the grass again, and every time they do this it is because there are grubs. So, the grass has grubs again.

- g. This camping site already has wood and it has a nice western exposure so we will get a nice sunset. This is a good site.
 - h. The new car has higher fuel efficiency and better suspension. We should buy it. Oh, it also comes in five cool colors.
- C. For the following conclusions, construct two arguments, one with two dependent premises and one with two independent premises (or two independent sets of dependent premises).
- a. The team lost the game last night.
 - b. The liquid contains salt.
 - c. Harvard University is in Cambridge.
 - d. The car is out of gas.
 - e. The rent is due tomorrow.
 - f. Honesty is the best policy.
- D. You probably have reasons in your own life for your beliefs or decisions. Here is a list of topics that are of importance. If you have an opinion, try to formulate it as clearly as you can (It might help to look back to our discussion in Chapter 2 on how to define a view or position.). Then formulate your reasons, and see whether you have multiple reasons for them. Finally, put the whole together in the form of an argument.
- a. The morality of capital punishment.
 - b. The morality of abortion.
 - c. Your decision to go to college.
 - d. Whether marijuana should be legalized.
 - e. Whether creationism should be taught in schools.
 - f. Whether it is sometimes morally OK to lie to your friends.

3.4 SUB-ARGUMENTS

Consider the following argument.

John and Peter are the only skaters left in the competition. But Peter will not win, for he just broke his ankle. So John is going to win.

We can identify the following assertions:

1. John and Peter are the only skaters left in the competition.
2. Peter will not win the competition.
3. Peter just broke his ankle.
4. John will win.

A **sub-argument** is an argument supporting a premise.

We have two indicator words to work with. The word “for” is a premise indicator and it connects assertion 3 to assertion 2. So assertion 3 is a premise for assertion 2. So, assertion 2 is a conclusion. But there is also another indicator word. The word “so” occurs right before the final assertion. That indicates that the final assertion is a conclusion. So this argument has two conclusions! Actually, it is not unusual for an argument to contain two conclusions. In the case of this argument, one of the conclusions occurs as part of a sub-argument. A sub-argument is a conclusion for a premise. In this section we will learn how to identify sub-arguments.

To identify sub-arguments in texts, we can use the very same methods we studied in the previous two sections. Consider the following text.

The restaurant was not very good. The salad was too salty and the cake was very dry. Worst of all, the service was terrible, for the waiter was slow and the hostess was rude.

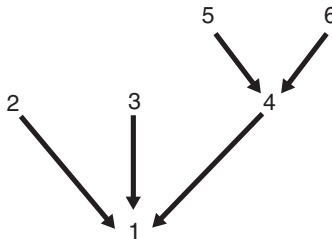
Here we find the following assertions.

1. The restaurant was not very good.
2. The salad was too salty.
3. The cake was very dry.
4. The service was terrible.
5. The waiter was slow.
6. The hostess was rude.

The first assertion is the conclusion. Assertions 2, 3, and 4 are independent premises supporting that conclusion. But what about assertions 5 and 6? The presence of the premise indicator “for” tells us that they are premises. And it tells us that we just got a conclusion. This means that assertions 5 and 6 are meant to provide support for assertion 4, which in turn supports the conclusion. (Assertion 4 is thus both a premise for a conclusion and a conclusion.) If we use the false premise test, we can see that assertions 5 and 6 each provides independent support for 4.

DIAGRAMMING SUB-ARGUMENTS

Sub-arguments can be diagrammed using the “+” and arrow symbols we have already seen. The argument we have been considering would look like this:



Here is one final case to consider.

Brian is going to lose his job. He keeps showing up late. And he stole money from the cash register. I saw him take it.

Here we have four assertions.

1. Brian is going to lose his job.
2. Brian keeps showing up late.
3. Brian stole money from the cash register.
4. I saw Brian steal the money from the cash register.

The first assertion is the argument's conclusion. Assertions 2 and 3 are independent premises supporting that conclusion. But what about assertion 4? What is it doing in the argument? It is a premise for assertion 3: its role is to provide reason to believe that Brian stole money from the cash register. So, in this argument, the author is offering his own eye-witness testimony in support of one of the premises.

Searching for sub-arguments is tedious. Here is a good rule of thumb. *Unless there is a premise or conclusion indicator that clearly indicates a sub-argument, assume that there is not one.* Analyzing texts into component assertions, identifying the main conclusion, and determining whether the premises are dependent or independent is already a lot of hard work. It is pretty rare, in my experience, for authors of typical arguments—the kinds we find in letters to the editor or even opinion columns in newspapers—to provide a lot of help by using clear indicator words. Perhaps this is because most authors have not thought as much as we have about how to organize their reasons.

SECTION SUMMARY

A sub-argument is an argument for a premise. A sub-argument can consist of dependent or independent premises. We can use the same methods for identifying these sub-premises and for determining whether they are dependent or independent as we used for arguments.

EXERCISE 4

- A. In the following texts, identify the conclusions, premises and any sub-arguments.
 - a. Coke is better than Pepsi. It has more flavor and it is more popular. Survey after survey show that most Americans prefer Coke.
 - b. Joan is definitely pregnant. She missed her period, and the urine test was positive. She told me about the test herself.

- c. Slavery is odious. It prevents the slaves from becoming fully autonomous. It also prevents the slave owner from achieving this full humanity, since no one can own slaves and feel good about themselves.
 - d. If we execute Steven for his crimes, then we will set a bad precedent. And setting bad precedents is not good. For it usually leads to unintended consequences down the road. So, we should not execute Steven.
 - e. Building a new bridge is very expensive. The labor will cost a lot, and so will the steel. Moreover, because the trucking industry will have to bypass the city while the construction is going on, the city will lose that source of revenue. We cannot afford these costs. So we should not build a new bridge.
 - f. Downloading music from friends is wrong. It is like stealing from a store, and we all know that stealing is wrong. What is more, downloading music from friends is effectively robbing from the musician, and we need to support them not rob from them because they are poor and struggling.
 - g. If evolutionary theory is correct, then we would expect to see similar bone structures in different species. And we have found this. Dogs and cats have similar bone structures in their arms and paws as birds have in their wings. So, evolutionary theory is correct.
 - h. Abstinence before marriage is a good thing. It promotes more respectful relationships after marriage and before marriage. It helps prevent unwanted pregnancies, which are bad because they make it difficult for mothers and fathers to achieve their life and career goals.
 - i. Abstinence before marriage is a bad thing. It is important for partners to know whether they are sexually compatible before they marry. What is more, abstinence is just like prohibition on alcohol and that only made the urges even stronger.
 - j. The map says that the park is over the right. But the map was wrong about the museum's location. It said it was on Elm Street when in fact it is on Green Street. So I am not sure that we should trust the map.
- B.** One of the exercises at the end of the previous section asked you to identify some of your reasons for your beliefs or decisions. Look back at those, and add some sub-arguments to them.

3.5 EVALUATING LOGICAL SUPPORT

Let us quickly recap what we have done so far in this chapter. We started by noting that critical thinking is **reasonable** thinking in part because it requires us to have reasons for our beliefs and decisions. But we do not just want to have any old reasons; we want to have good reasons. We saw that to evaluate whether our reasons are good ones, it is helpful to put them in the form of an argument. And we have seen that arguments can take several different forms, with dependent and independent premises and even with sub-arguments.

Now that we know how to identify premises and conclusions, how to distinguish dependent from independent premises, and how to find sub-arguments, we are ready to look at how to evaluate what makes reasons good. We will study a relatively simple and straightforward test to tell when an argument's premises provide the best possible kind of logical support.

But first, we need to draw some important distinctions.

There are really only two questions to ask when evaluating an argument. Are its premises true? Is the argument valid? These questions are independent of each other.

Ideally, an argument should have two features. It should have true premises and its premises should support its conclusion. Here is one of the most important lessons of the entire book: whether the premises in an argument are true has **nothing** to do with whether they support its conclusion. This may seem pretty counter-intuitive, but it is true and it really is extremely important.

To see this, consider the following argument.

(1) Jon Stewart is the Prime Minister of Canada, and (2) all Prime Ministers of Canada are Martians, so (3) Jon Stewart is a Martian.

We know that assertion (3) is the conclusion and that assertions (1) and (2) are dependent on one another, as the words test or the false premise test would show. We also know that all three assertions are false. (If you do not know about Jon Stewart or Martians, or Canada, then just take my word for it that these assertions are all false!)

But suppose that the premises were true. What would that mean for the truth of the conclusion? That is, suppose that Jon Stewart really were the Prime Minister of Canada. (He is not; he is an American comedian and TV show host. But just suppose that he were the PM of Canada.) And suppose that as a matter of fact all PMs of Canada were Martians (they are not, even if some of them behave rather strangely.) That would mean that the conclusion would have to be true. If Jon Stewart **were** the PM of Canada, and if all PMs **were** Martians, then he would have to be a Martian too. So, if that argument's premises were true its conclusion would have to be true too.

An argument is **valid** when it is not possible for its premises to be true and its conclusion false. If its premises were true, its conclusion would have to be true too.

We have a special word for this: an argument is **valid** when it is impossible for the premises to be true and for the conclusion to be false. It is relatively easy to tell whether an argument is valid, just by thinking about it. We can use the **validity test**. As you can probably tell, the validity test is a lot like the Assertion test and the false premise test. All three involve the same sort of mental gymnastics. We have to

suppose that one thing is true (or false) and then consider what this would mean for the truth of something else. The test can be tricky to use, especially when the thing we are supposing to be false is something we already know is true, or vice-versa. But this sort of mental manoeuvre is at the heart of critical thinking. And like any skill, the more you do it, the better you get at it, and the easier it becomes.

TESTING FOR VALIDITY

To test an argument for validity, first suppose that the premises were true. Then ask: could the conclusion still be false? If Yes, then the argument is not valid. If no, then the argument is valid.

Our argument about Jon Stewart shows that an argument can be valid and still have false premises and a false conclusion. A valid argument can also have false premises but a true conclusion.

Jon Stewart is a Martian and every Martian hosts a TV show, so Jon Stewart hosts a TV show.

In this argument, the premises are false, though the conclusion is true. If we use the validity test, we can see that just as before the argument is valid. If it were true that Jon Stewart was a Martian and that every Martian hosts a TV show, then it would have to also be true that he hosts a TV show. So this argument is valid too. This shows that a valid argument can have false premises and a true conclusion.

A valid argument can also have true premises and a true conclusion. Here is an example.

Jon Stewart is human and all humans have parents, so Jon Stewart has parents.

There is only one possibility that validity forbids: no valid argument can have true premises and a false conclusion. This simply follows from the very definition of validity. Validity means that it is not possible for the premises to be true and the conclusion false. So, if you are evaluating an argument and you know that the premises are in fact true and the conclusion is false, then you can safely conclude that the argument is not valid.

Jon Stewart is a man, and all men are humans, so Jon Stewart is the Prime Minister of Canada.

This is a silly argument, one that no one would take seriously. But it does illustrate the point that an argument with true premises and a false conclusion cannot be valid.

Whether an argument is valid has nothing to do with whether its premises are in fact true.

Keeping these points about validity in mind is more than a little tricky. I suggest that you find examples of each combination we discussed that you feel totally comfortable

with, and which you can compare to other arguments in order to see whether those other arguments are valid or not. The examples I have given might do the trick. But if they do not, then you should come up with your own.

When an argument is valid and its premises are true, then it is a **sound** argument. A sound argument is perfect.

DECIDING WHAT TO DO: EVALUATING REASONS

Evaluating reasoning about what to do requires independently evaluating both the reasons for pursuing the end in question and the reasons for adopting the proposed means. Reasons to pursue some goal or end are reasons to believe that the end or goal is a good one. Reasons to adopt some means to achieving that end are reasons to believe that those means will be effective in bringing about that end. We can make these reasons explicit in the form of an argument.

Here is how Jones might reason about becoming a lawyer.

I want a career that will bring me money and responsibility and also be fulfilling. So, I should become a lawyer or a doctor. But I do not like to see blood, so I should not become a doctor. So, I should become a lawyer.

Here is how Jones might reason about the appropriate means to achieve that objective.

The best way to become a lawyer is to get accepted at the best law school I can afford. If I study hard for the LSATs, do lots of extra-curricular activities, and volunteer on the weekends, I will have a good chance of getting into the University's law school. So, I should do that.

These arguments can be assessed as valid or not.

EXERCISE 5

A. Comprehension Questions

- a. What does the word “valid” mean?
- b. If an argument is valid, must its premises be true? Using the concepts discussed in this chapter, explain your answer. Give an example.
- c. If an argument has false premises, must it be invalid? If not, give an example?

B. Using the following proposition as a conclusion, “Tofu is delicious,” construct two arguments:

- a. One that is valid and has two false premises
- b. One that is invalid with two true premises

- C. Using the validity test, assess whether each of these arguments is valid.
- Cats are warm-blooded and warm-blooded animals are mammals, so cats are mammals.
 - The table is blue, so it is colored.
 - The War of Independence was a revolution, and revolutions are morally wrong, so the War of Independence was morally wrong.
 - If a plant dries out it will die. This plant is all dried out. So it will die.
 - I should make dinner. It is my turn and my wife and I take turns.
 - The cat is asleep. Cats always dream when they are asleep, so he is dreaming now.
 - $2 + 2 = 4$ and $4 + 4 = 8$, so $2 + 2 + 4 = 8$.
 - Lying to someone is like robbing them of the truth, and robbing is wrong, so lying is wrong too.
 - The movie was terrible. It was too long and the theatre was way too overcrowded.
 - Running helps to build cardiovascular strength and can extend your life. Anything that has these effects is good for you, so running is good for you.
- D. For each of the following, find a conclusion that follows validly and one that does not.
- The table is made of wood and wood always dries out.
 - Cats are warm-blooded, and warm-blooded animals eat meat.
 - Jones is a bachelor.
 - Frank murdered Henry.

3.6 MISSING PREMISES

As we have seen, there are two questions to ask when evaluating an argument: are the premises true and is the argument valid? If an argument is not valid, then it is not a good argument. But sometimes, a person will give an argument but leave out a crucial premise. The argument, as they wrote it, is not valid. But, by adding a premise, it can be turned into a valid argument. We can call it a missing premise. It is important when thinking critically about another person's reasons to look for missing premises when evaluating their arguments.

Here are some examples.

Miranda really wants her plants to thrive, so it will probably rain today.

It has not rained in many days; so it will probably rain today.

The bridge is too expensive. We should not build it.

The validity test makes clear that these arguments are not valid. It is not that hard to imagine a world where even though Miranda really wants her plants to thrive it still will not rain, or where even though it has not rained in many days it still will

not rain today, or where even though the bridge is too expensive it still gets built. So with these arguments it is possible for the premises to be true and the conclusion to be false.

PRACTICAL STRATEGY: BE CHARITABLE

When evaluating someone's argument, try to turn it into a valid argument. That way, you can focus on whether the premises (including the one that you added) are true, as opposed to whether the premises support the conclusion. As we know, it is easy to add a premise to make an argument valid. So be charitable by helping the other person find a valid argument for their conclusion.

There is a trick for turning any invalid argument into a valid one. Simply add to the argument as a new premise a conditional whose antecedent is the existing premise and whose consequent is the conclusion. Using our previous examples, we get the following valid arguments.

Miranda really wants her plants to thrive, and *if she really wants her plants to thrive, then it will rain today*, so it will rain today.

It has not rained in many days, and *if it has not rained in many days, then it will rain today*, so it will rain today.

The bridge is too expensive, and *if it is too expensive, then we should not build it*; so, we should not build the bridge.

These arguments are now valid, as an application of the **validity test** will confirm. In evaluating them, there is now no question of whether the premises logically support the conclusion: they provide the strongest possible kind of support.

But remember that an argument is good only if its premises support the conclusion **and its premises are true**. Transforming an invalid argument into a valid one will not necessarily make it into a good argument. For the premises might still be false. Indeed, it might be that the only premise that we could add to make it valid would be a false premise. In that case, the argument is hopeless. Still, by focusing our attention on the truth of the premises, rather than on the question of support, we can get clearer on the factual questions at issue, and this is (I think) always a good thing.

EXERCISE 6

- A. Using the SEEC definition method from Chapter 2, construct a definition of validity that would help someone who had never studied critical thinking understand it.
- B. Using the concepts you have learned in this chapter, explain why it is better for an argument to be valid than for it not to be valid.
- C. In Chapter 1, we saw that emotional reasons are not epistemic ones. Using the concepts from this chapter, explain why this is so.

- D.** If an argument has a false premise, might it still be valid? Using the concepts from this chapter, explain your answer, and give an example.
- E.** Using the SEEC definition method from Chapter 2, define the following:
- (i) Premise indicator
 - (ii) Independent premise
 - (iii) Sub-argument
- F.** The following arguments are not valid. Add a premise to make each of them valid. Assess whether the missing premise you added is true.
- a.** (i) The glass is full of water. I can see it with my own eyes.
(ii) The glass is full of water. Joan told me so.
 - b.** (i) The car is really low on gas. We have to stop.
(ii) The car has a flat tire. We have to stop.
 - c.** (i) The sun will rise tomorrow. After all, it has risen every day for the past million years.
(ii) The sun will rise tomorrow. For the Earth continues to spin on its axis.

3.7 PILING ON INDEPENDENT PREMISES

One final point is worth noting here. Sometimes in arguments where there are lots of apparently independent premises, the premises are actually meant to be working together producing a kind of “piling-on” effect. Here is an example.

Let’s not go to the movie tonight. I am tired, and we still have all those dishes to do. Plus, we need to save some money for lunch tomorrow and anyway we can watch a movie on TV. Let’s just stay home.

When we analyze this into assertions we find the following.

1. We should not go to the movie tonight.
2. I am tired.
3. We still have to do the dishes.
4. We need to save money for lunch tomorrow.
5. We can watch a movie on TV.

The first assertion is the conclusion and the rest are premises. If we used the false premise test, we would get the result that each premise constitutes an independent reason to accept the conclusion. This might have been the author’s intent. Maybe she thought that each on its own was sufficient reason not to go to the movie. But if so, she would have been mistaken. Each of them is some reason, but surely not a sufficient reason.

Sometimes, a large number of independent premises are actually meant to work together, with a missing premise, to support the conclusion.

But maybe she instead meant that, although none of the reasons is sufficient on its own, when you consider them all together they do constitute a good reason not to go. Maybe she thought that if the dishes did not need doing and if they did not need to save the money for tomorrow's lunch, then the fact that she was tired would not be good reason to miss the movie, but that when all of those considerations are put together, *when you pile them all in together*, then they do make up a good case. If this is what she is thinking, then there would have to be a missing premise, something like this.

Given all of these considerations, we should stay home.

This “piling on” effect is common in criminal cases, where the prosecution presents a lot of little bits of evidence of guilt, none of which is in itself conclusive, but which, when considered all together, strongly suggest guilt.

John is the robber. He was in the bank at the time of the crime. He owns a weapon of the very same kind as the one used during the crime. He has no alibi for where he was during the crime. And the money from the robbery was found in his building.

Perhaps none of this evidence on its own is conclusive. None of it on its own removes every possible reasonable doubt as to whether John is guilty. But when put together, it does make a pretty strong case. The missing premise here is something like this: If John was at the bank and owns the weapon that was used, and has no alibi, then he is the robber. This makes the argument much stronger, for reasons that we saw when we studied how to identify missing premises.

CHAPTER SUMMARY

Thinking critically about what to believe and what to do requires having reasons. We can make these reasons explicit in the form of an argument, with the reasons as premises and the belief or action as the conclusion. An argument is valid if it is not possible for the premises to be true and the conclusion false. Sometimes we have reasons that depend on each other and sometimes they are independent reasons. Sometimes, we even have reasons for our reasons, and we can make them explicit in a sub-argument. Sometimes, reasons for believing or doing something are left unsaid or implicit. Indicator words are useful in constructing and analyzing arguments.

3.8 CRITICAL THINKING IN PRACTICE

3.8.1 Critical Thinking Strategies

We discussed two strategies for deciding whether an argument's premises are dependent or independent.

The Words Test. To tell whether premises are dependent or independent, see whether some of the conclusion's key words occur only in one premise and other key words only in another. If so, then those premises are probably dependent.

False Premise Test. To test whether premises are dependent or independent, suppose that one were false, and ask whether the other one would still provide some support for the conclusion. If it would, then the premises are independent. If not, then they are dependent.

We discussed a test for deciding how much logical support an argument's premises provide.

Validity Test. To test an argument for validity, first suppose that the premises were true. Then ask: could the conclusion still be false? If Yes, then the argument is not valid. If no, then the argument is valid.

3.8.2 From Theory to Practice: Applying What We Have Learned

3.8.2.1 *Thinking Critically about Ourselves* In Chapter 1, you identified some character traits that you think are essential to being a morally good person. You picked one of them and wrote out some reasons for thinking that it really is essential. In Chapter 2, you then provided a definition of the trait. Now that we have studied the nature of arguments and the structure of reasons, do the following:

- a. Construct two arguments for the conclusion that character trait is really essential to being a morally good person. Make sure that you rely on the definition you developed in Chapter 2. Make sure that the arguments are valid.
- b. Construct an argument for the view that it is not really essential. That is, the conclusion of this argument should be that one can be a morally good person even though you lack that trait. Make sure that the argument is valid. Try to make this argument as strong as you can, by using premises that are reasonable.

3.8.2.2 *Thinking Critically in the Classroom* In Chapter 1, you developed a list of the five or six most important concepts in your chosen field of study. (If you do not have a chosen field of study yet, then just pick your favorite course.) Look for arguments in the texts you use in that course. Find five arguments. Analyze them into their component assertions. Identify the premises and conclusions. Identify any sub-arguments. Rewrite them in such a way that their logical structure is perfectly clear. Make sure that the argument is valid.

3.8.2.3 *Thinking Critically at Work* Studies show that employers value an ability to think critically more than just about any other trait in an employee. They want

their workers to be able to think critically about both day-to-day problems as well as about broader organizational performance and plans. In Chapter 1, you listed several tasks that you do at work. Pick one of them, and do the following.

- a. State what its goal is.
- b. Identify three reasons for thinking that that goal is valuable for your organization, and formulate those reasons into a valid argument.
- c. Identify reasons for thinking that the task you chose will in fact succeed at attaining that goal, or is an essential part of what it will take to attain that goal. Formulate those reasons into a valid argument. (These are challenging; do your best, and do not worry too much about accuracy here. The goal of the exercise is to get you to think critically about what you did at work.)