IN THIS CHAPTER

- Getting the big picture on thinking skills
- Picking up cool tips for problem-solving
- Steering clear of common misconceptions

Chapter 1
Entering the Exciting World of Critical Thinking

Never underestimate the power of the "killer fact"! Often used to prove a point, facts are often what it all seems to come down to. But facts are powerless outside of an argument.

What do I mean by this? I mean a logical structure, not a slanging match. And whether pronounced gently or used to close an essay, the logic of real arguments is heady stuff, because, well, you can't argue with logic. However, critical thinking is about much more than being logical, as Captain Kirk used to remind Mr. Spock in episodes of the much-loved TV show *Star Trek*. Critical thinking is about pressing points, sniffing a bit more skeptically at issues, and generally looking more closely at everything. Not only at factual claims but also, and most importantly, at the *ways* in which people arrive at their views and ideas. That's why critical thinking requires not just a cool head but also imagination and indeed a bit of heart — an underpinning helping of emotional intelligence.

You may think, why bother? Good question! I've failed plenty of job interviews in my time by being a critical thinker. Bosses, heads of department, guys in the bar, and many other folks really like people who agree with them, because for many that's the whole point of becoming the boss! At the same time, the world has no shortage of successful people who scrupulously avoid any appearance of not only thinking critically, but thinking at all. So my short answer to "why be a critical thinker" is that being a critical thinker is the best kind of thinker to be, even if it does sometimes mean that you're the odd one out on many issues. Critical thinkers are on Mission Truth, and the rewards of that go beyond essay grades and job promotions, but let's be optimistic — it can surely help there too!

In this chapter I provide an overview of critical thinking and what you can find in the rest of this book. I also cover the importance of "reading between the lines" and set the record straight on what critical thinking isn't.

Opening the Doors to the Arguments Clinic

You may well have been brought up not to argue. At school you were probably encouraged to sit quietly and write down facts; I know I was. When I was five, one teacher even used sticky tape to shut children's mouths up in class! (Yes, I was one of them.) Since then I've had some very enlightened teachers who encouraged me to use my imagination, to solve some problems, or do research. But still not to argue.

So welcome to a very different way of seeing the world: critical thinking. This is truly the "arguments clinic" in which punters can pay for either five-minute or hour-long arguments (as the famous Monty Python sketch has it). No, it isn't. Yes, it is. Still say that it isn't? But yes, it is! (Check out Chapter 17 now to discover ten of the world's most influential arguments — don't worry, I'll still be here when you get back!)

Of course, as the sketch says, this isn't proper argument at all, merely contradiction: nothing like a connected series of statements intended to establish a proposition. If an ability to contradict

people is all you come away with after reading this book then you, like the man in the sketch, would be entitled to your money back. Don't worry, here you will find so many new ways of looking at issues that you'll soon be having the full, hour-long arguments on everything under the sun.

My aim by the end of this section is to give you the big picture of critical thinking.

Defining Critical Thinking

If you look up critical thinking in a dictionary, you see that it's called the philosophical examination of arguments, and I'm a philosopher. But — at the risk of annoying the Ivory Tower experts straight away — I say that this kind of philosophy isn't the sort most of them do or have a clue about. Yes, as Chapter 12 shows, critical thinking does have one foot in the realm of logic, in tidily setting out arguments as premises followed by conclusions. But if that were all it was, you may as well give the job to a computer, to Chat GPT maybe.

REMEMBER

No, critical thinking is really about a range of skills and understandings, including an ability to play with words, a sensitivity to context, feelings, and emotions, and (the hardest skill to develop) the kind of open-mindedness that allows you to make creative leaps and gain insights.

I know that developing these skills sounds rather like a tall order for one book to achieve. But critical thinking is also team thinking, and I draw on the ideas of many other thinkers, including a lot of input from my editors at Wiley. As a result, you don't get my opinion of critical thinking skills, but a carefully researched and lively introduction to the subject.

Spotting how the brain likes to think

Professors may sniff, but I prefer to work on exercises that are fun or interesting, which is why I have tried hard to make the ones in this book like that. Here's a rather trivial little exercise, which nonetheless illustrates something important about how the human mind operates.

Should you say, "The yolk of the egg is white" or "The yolk of the egg are white"?

When I first saw this question, I thought for a minute — and then I gave up and looked for the answers. That's my method with written exercises; it conserves my limited brain power for things like watching TV and eating chips — at the same time! But I digress (not good in critical thinking). This question may form the subject of a five-minute argument, but it shouldn't stretch to an hour, because neither version is correct: egg yolks are yellow. Boom, boom! Caught you out?

This exercise reveals that people's normal mode of thinking is bound within the parameters of certain rules and systems, due to thousands of years of evolution. In the jargon of psychology, human thinking uses certain heuristics (mental shortcuts for solving problems and making judgments quickly).

WARNING

The trouble is that automatic and well-established ways of thinking can stop you from seeing new possibilities or avoiding unexpected pitfalls. Plus, the great majority of people's thinking goes on without them being aware of it. Although sometimes quick and efficient, in certain circumstances it can rush people to the wrong conclusions.

Critical thinking is your insurance policy against these questionable, but more or less universal, thinking habits.

Evaluating what you read, hear, and think

TIP

Critical thinking is about actively questioning not only the conclusions of what you're reading or hearing but also the assumptions — whether open or hidden — and the overall frame of reference. (Critical reading is discussed in detail in Chapter 9.)

Critical thinkers approach an issue without preconceived assumptions, let alone prejudices, towards certain conclusions. As Professor Stella Cottrell, sometime director for lifelong learning at the University of Leeds in the UK and author of a popular guide on the subject says, critical thinkers are quite prepared to acknowledge a good argument that goes against them, and will refuse to resort to a bad argument even if it looks like the only one available to support them.

INGREDIENTS THAT MAKE A CRITICAL THINKER

If you're building a critical thinker, à la Dr Frankenstein, here are the abilities and attributes you need:

- **Tolerance:** Critical thinkers delight in hearing divergent views and enjoy a real debate.
- **Analytical skills:** Critical thinkers don't accept just any kind of talking. They want properly constructed arguments that present reasons and draw sound conclusions.
- **Confidence:** Critical thinkers have to be a little bit confident to be able to examine views that others present — often people in authority.
- **Curiosity:** Critical thinkers need curiosity. It may have killed the cat, but curiosity is the essential ingredient for ideas and insights.
- **Truth-seeking:** Critical thinkers are playing for team "objective truth" — even if it turns out to undermine their own previously held convictions and long-cherished beliefs and is flat against their self-interest.

Reading between the Lines

Critical thinkers know that real debates take place between the lines, and, all too often, under the mental radar. The job of the critical thinker is to pull the real issues into plain view and, if necessary, shoot them down!

I introduce you here to some of the core skills of critical thinking: "reading between the lines," examining the evidence, and quickly deconstructing texts. (The chapters in Part 3 provide loads more info on how to do just that.)

Challenging concepts of rationality

Do you know people whose views don't seem to be based on any sort of rational assessment of the world but rather on questionable

information easily imbibed — or even on blatant prejudices? Me too. And what's more, at least some of my views — and some of your views — also fall into this rather illogical category. The fact is, even though Aristotle considered men (not women, because he was emphatically prejudiced) to be "rational animals" in the sense of being creatures with a unique ability to reason, people rarely use their rational facility in practice. (I discuss this subject in more depth in Chapter 13.)

More subtly, people often present good reasons for their positions, but in reality they arrive at their views for quite different ones. The good reasons are irrelevant, as you sometimes find out if you present some solid arguments that tend to disprove them. For example, suppose your neighbors buy a four-wheel drive sport utility vehicle and insist that it is vital for them to own it when the family goes off-grid. Yet the fact is that they rarely go anywhere more remote than the nearest supermarket and hate getting their shiny car dirty. Could the real reason be that having a tank-sized car bolsters our sense of self-importance?

Or maybe the government says that it has to charge students tuition fees — otherwise there won't be enough money for everyone who wants to go to college in the future. Good reason! Countries like the US, Britain, and Japan all now charge students with college fees. Is that freeing up a lot of money for education? No, fees systems actually cost a lot of money to run, and in the case of the UK they actually cost *more* to operate than the previous universal grants system. (This is also a factor in the high health costs in the US.) So could the real reason for charging for services be more political?

Practical arguments may exist for charging for things like health and education, but as I say, that's straying into politics. I'm not saying one way or the other, but I am recommending the habit of looking a little harder at the reasons and explanations people give.

Dipping into the critical thinking skills toolbox

I think of critical thinking as a toolbox. Philosophers have a long tradition of seeing argument skills as tools. (Read the nearby sidebar "Adding up Aristotle's tools" for more.)

ADDING UP ARISTOTLE'S TOOLS

The most famous writings on "how to argue" are the 2,000-year-old books of Aristotle. His followers gathered them together and called the collection *Organon,* which is Greek for "tool." Interestingly, this title reflects a controversy at the heart of philosophy that has never gone away: Is logic the purest form of philosophy or merely a tool that philosophers use? So this obscure bit of ancient Greek is surprisingly political, taking sides in an educational controversy that continues to rage today.

REMEMBER

Critical thinking isn't one tool but a collection of tools. Plus, its skills can do a lot more than most of its experts seem to be aware of — because most of them come from too narrow a base.

TIP

Logic is a central critical thinking tool. You can see the kind of logic that it uses as a *mental screwdriver* with two different purposes: It enables you to take arguments completely apart *and* mend and reassemble them.

Critical thinking also has creative uses, such as *prototyping* and *brainstorming* (see Chapters 6 and 7, respectively). These hammer-and-nails skills, with plenty of glue added in, are great for creating new solutions and visualizing possibilities. Plus, don't forget the social and emotional components of critical thinking (which I cover in Chapters 3 and 4, respectively). I like to think of these as the measuring tools in the kit, and maybe as the spirit level too.

REMEMBER

Philosophical and mathematical logic is a solitary process: One person (or computer) can take on the world. After churning through a formal proof and finding a contradiction, the matter is *closed!* But critical thinking involves questioning — challenging arguments, methods, ideas, and findings and demanding the context and the background. Therefore, it's a more sociable business, where people explore and create truths collectively.

Ordering your thinking: Reason, analyze, and then argue

REMEMBER

In that order, please! Noncritical thinkers may start by arguing, and then pause to analyze and finally search for reasons, but making the argument follow the reasoning (not the other way around) is much better.

Philosophers prefer to see critical thinking as a course in *informal logic:* the study of arguments expressed in natural language, where an argument being valid isn't enough — the conclusion has to be useful too. The chapters in Part 4 are all about that and where I take a good look at the key skills of informal logic (for example, the "fallacies" that many critical thinking experts lament). But don't be too excited at the prospect of using logic to conquer the world, because as I explain, its powers are strictly limited.

TIP

The difference between a sound argument and a fallacy is often far from black and white. This isn't to imply that people don't make lots of silly mistakes and lousy arguments. Check out some logical pitfalls in Chapter 16.

On the other hand, don't let any of these concerns deter you from using logic skills in your thinking, writing (check out Chapter 10), and speaking (see Chapters 11 and 14), because a little method can go a long way to making your arguments more persuasive and demonstrating the weaknesses in other people's too.

WHICH LOGIC FOR CRITICAL THINKING?

You can encounter plenty of types of logics: Classical logic, Boolean logic, Quantum logic, Sentential logic, and how about a bit of Multi-valued logic or Predicate logic too? Sprinkled with Fuzzy logic? No! Breathe again. . . .

Critical thinking isn't a sneaky way to make students study logic. It's not even reasoning boot camp! A fundamental difference exists between all the usual logics and the one that critical thinkers include as one of their tools: informal logic. All the other logics are concerned with the form of the arguments, but only informal logic, as the name suggests, is also concerned with the content of arguments — with issues and applications.

Researchers have often found that when asked, people can't really explain why they hold a particular view, or what they think would count as suitable evidence for the view. Even more worrying for society is that these same people are extremely resistant when others challenge their views. Critical thinking skills are your antidote to this very common disease.

Discovering what kind of thinking you do

Building on what you already think is vital for future growth — but maybe it requires a willingness to discard old ideas and convictions too. And most of us are happier learning new things than we are when clearing out old theories.

TECHNICAL STUFF

Nineteenth-century American philosopher C. S. Peirce identified three kinds of thinkers, which I summarize here (a *little* creatively) as follows:

- **Sticklers:** People who form their beliefs by tenaciously sticking to whichever view they liked most originally — whatever evidence is presented to them and even however circumstances change. If asked to justify their view, they can be very thorough in finding facts to support it, while also refusing to look into anything that appears likely to run against it. (I write about facts and opinions in Chapter 15.)
- **Followers:** People who respect anyone or anything that presents itself as authoritative. They form their view in a group discussion on what they think the professor is saying, or in the absence of an authority figure, on what they imagine is the consensus view. When they look something up on the internet, they head for the security of Wikipedia (as they imagine it!) and are reluctant to consult websites run by individuals.

  These kinds of thinkers, as Peirce says, are useful members of society, because they aid social harmony and cohesion (although they may also be found egging on tyrants and persecuting marginalized communities). But they aren't useful as far as ideas go.

- **System builders:** These are people who try to fit everything into a preexisting framework. They're a more sophisticated version of the sticklers. Science is obliged — in practice — to operate on a similar principle. System builders are willing to consider new information, but if it requires dismantling the preexisting structure for understanding the world, they're likely to reject it. You can read more on how people process information to build knowledge in Chapter 8.


TIP

According to Peirce, the smart way to see the world is to accept that everything you know may be wrong and start from scratch if need be. Or indeed end up with all the views on an issue demolished with no working hypothesis left. Only a true critical thinker would do such a thing.

Almost all professors of the arts and sciences are egregiously conceited, and derive their happiness from their conceit.

— ERASMUS

You can't always be sure that quotes really are true, or just apocryphal, meaning widely circulated despite no one being really sure. Bertrand Russell, a British philosopher and logician, ascribes this quote to the 16th-century Dutch humanist, and since he was himself a philosopher prepared to argue unpopular views (such as the fact that war is a bad thing) to the extent that he was even put in prison — twice! — I can see why he liked it.


TIP

Russell (refreshingly) took on professors and people in authority, but his point of course applies to everyone. Too few people are really open to new ideas, let alone able to take criticism — unless they've taken and really absorbed the lessons of critical thinking.

American philosopher William James made a similar point when he complained that many people think that they're thinking when they're *merely rearranging their prejudices.* For critical thinkers, discerning thought and prejudice is a vital distinction to make, and the first step is becoming more aware of your biases. (I examine this issue in Chapter 2.)

James also recommends that in many areas, people should decide their position on the basis of feelings, even if they have no good

or relevant arguments to support it. How logical is that? Well, not at all, but it's not a stupid position either. We might call it "emotional intelligence" In Chapter 4 I look at some distinctly nonlogical ways of approaching problems.

Professors tend to tell people to "think," and complain when they don't — but they fail to offer advice on exactly how to do it. For that, students have to rely largely on their own efforts, or maybe turn to specialist experts such as Maltese physician and psychologist Edward de Bono. He stresses that thinking is a skill that has to be learned. Critical thinking definitely owes pioneers of thinking skills like him a polite nod, even if the approach here has to be little more, well, scientific.

THINKING OUTSIDE THE BOX

Here's an anecdote that shows how redefining problems can generate new insights.

A gardening equipment company challenged a meeting of engineers to use their collective thinking power to come up with a new kind of lawn mower. After some humming and ahhing, the engineers came up with . . . not very much. Some tinkering and slightly novel refinements but nothing to create a splash in the marketplace.

Then one of the engineers suggested that they return to the original problem, only this time "go back one step" and express it in terms of function. Instead of the engineers thinking about how to redesign lawn mowers, which meant that their thoughts followed the usual paths, he said they should think about "machines to help people maintain lawns."

This small, even niggly distinction made all the difference. The engineers even created an entirely new product, based on the imaginative insight of one whose son liked playing with yo-yos. They invented the weed trimmer, which involves a nylon string whizzing around, thus adding a new annoyance to neighbors everywhere. The power of critical thinking!

You can read more about *creative brainstorming* in Chapter 7.

Speaking of which, here's a scientist to explain about how scientists think:

The mere formulation of a problem is far more often essential than its solution, which may be merely a matter of mathematical or experimental skill. To raise new questions, new possibilities, to regard old problems from a new angle requires creative imagination and marks real advances in science.

— ALBERT EINSTEIN, THE EVOLUTION OF PHYSICS (WITH L. INFELD, 1938)

Well, he has to come in sooner or later. Einstein's point about creativity is absolutely spot on. Check out the nearby sidebar "Thinking outside the box" for an example.

Understanding What Critical Thinking Isn't

The preceding sections discuss what critical thinking is, but I now detail what it isn't.

REMEMBER

Critical thinking isn't about putting arguments and debates into formal language or symbols and then spotting logical fallacies in them (despite what many books say). It *is* about how to look at issues and problems in the real world, with all their fuzziness and contradictions, and offer relevant, practical, and sharp insights into them. It's a skill that lets you, for example, distinguish right from wrong, choose the best business policy, and construct a compelling case for action.

TIP

Critical thinking is far deeper than study skills, those set ways of doing things that lecturers often teach students. Instead, it's about what to do when no obvious answers or set methods are available. Look at it this way: A study skill makes sure that you have pen and paper during lectures; critical thinking is about what to jot down.

Quantum physicist Richard Feynman said that science is grounded in the conviction that its own experts are often ignorant of what they profess to be experts about. That statement applies, even more so, to critical thinking! Pop over to the nearby sidebar for more of the famous physicist's advice.

WARNING

People who claim to be experts in critical thinking don't automatically know everything about the vast range of skills and material the subject covers or draws upon. Nonetheless, critical thinking is a skill, and so whether you're pretty hot on it or not, you can definitely improve through practice.

Critical thinking isn't about learning an endless series of "facts." Instead, it encourages people to develop their in-built thinking skills by making them active. That's why this book features lots of tricky puzzles (see Chapter 5 for more on puzzles and analogies) rather than platitudes. I want you to start thinking critically and actively from page one. Or from the start of Chapter 2 anyway!

CRITICAL THINKING IS ALL ABOUT *CURIOSITY*!

Richard Feynman, the American theoretical physicist famous for his pioneering work on quantum physics, had an infectious curiosity for understanding the world. Many children lose their inborn curiosity as they grow up. But Feynman never lost his. He loved solving puzzles and riddles. He played practical jokes. He even cracked safes and broke into file cabinets. He questioned authority and didn't care what other people thought. Why? Because he was a lifelong learner.

Feynman was also a great teacher who realized that you didn't truly understand something until you could clearly explain it to other people.

He was naturally intelligent, but it was his personality that brought him success. In his own words, Feynman was an ordinary person who studied hard. Above all, he had the curiosity to keep learning new things. And linked with that, the courage to follow his own path.