

HOW TO THINK CRITICALLY



Different viewpoints give different perspectives

"Thought is great and swift and free, the light of the world, and the chief glory of man."

"Principles of Social Reconstruction" by Bertrand Russell (1916)

"You take the blue pill and the story ends. You wake in your bed and you believe whatever you want to believe. You take the red pill and you stay in Wonderland and I show you how deep the rabbit hole goes."

Morpheus to Neo in "The Matrix" (1999)

- Firstly, recognise that **thinking critically does not mean simple criticism**. It means not simply accepting information at face value in a non-critical or non-evaluating way.
- **The essence of critical thinking centres not on answering questions but on questioning answers**, so it involves questioning, probing, analysing, evaluating. In his novel "Sophie's World", the Danish writer Jostein Gaarder notes that: *"The most subversive people are those who ask questions"*.
- Remember that **prominence does not equate to importance**. A newspaper may have made its lead story the rumour of a break-up between Britney Spears and her latest boyfriend, but that does not necessarily make it the most important news item that day. Conversely, in 1914 that tiny story about the assassination of an obscure nobleman in some backwater called Sarajevo proved to have rather more repercussions that most readers first appreciated. Try an experiment: one day, buy five or six national newspapers, compare their coverage of the same stories on the same day, and note the different prominence - and the different slant - given to the same stories.
- To understand a news item, **try to give some context to the current event**. For instance, if it is reported that a group of Sunnis today attacked a meeting of Shiites in Iraq, three things are needed to make full sense of the report. First, explanation: what is the difference between Sunnis and Shiites and what proportion of the population do they constitute? Second, history: what is the

origin of the division of Sunnis and Shiites in the country and how has the power relationship altered in past years? Third, anticipation: what does the attack mean for future developments such as the formation of a government or the conduct of an election?

- **Check the source.** Who wrote the article or scripted the programme? How knowledgeable is the source? Does the source have a particular interest or 'angle' or prejudice? Is the source known to you by reputation or previous work? In the case of a Web site in particular, it may be difficult to establish the source.
- **Use different sources.** If there is a dispute over the ecological impact of oil exploration, check out the views of the 'green' pressure group and the oil company and other, more independent, sources such as scientists and commentators. If there is a government statement on health expenditure, check out the views of health authorities, doctors and nurses, and independent commentators.
- **Always prefer prime sources.** A personal, eyewitness account is to be preferred to the statement from the politician who was told by a journalist who read it on a news wire which obtained it from a company spokesman who was briefed by a senior manager on the basis of an eyewitness report from a colleague. A newspaper quote from a report may be accurate but, when you obtain and study the report itself, you might find that the quote was selective or unrepresentative of the work as a whole.
- **Check the date.** Generally speaking, the more recent the material, the more accurate it is likely to be and the more useful it is. This is especially the case in changing situations. For instance, something about Russia written after the fall of communism may well have been able to use sources not available in previous decades. In a war situation, even a few days or hours may make a significant difference to the information and perspective available. On the Web, material is frequently undated and one needs to be aware that it could be outdated.
- **Check the publisher or promoter or funder.** Many newspapers, magazines and television stations have a definite political orientation and can be expected to push a particular 'line' or interpretation. A Government source may be regarded as particularly authoritative or dangerously partial, depending on the circumstances. A report on the effect of smoking on cancer rates might be regarded with some caution if the underlying research is found to be funded by tobacco companies.
- **Be especially skeptical about surveys and polls.** Who is funding the project; how the questions are chosen, worded and posed; how those questioned are selected and the context in which the questions are put to them; how the statistical analysis is carried out and the statistics are interpreted; how the findings are presented and reported (or misreported) - all these factors can have a massive influence.
- **Make temporal comparisons.** If a company announces that it has increased revenues by 25% in the last three years, look at the rate of growth in revenues in the three previous years.
- **Make geographical comparisons.** If the government claims that it is now spending 10% of Gross Domestic Product on the health service, compare that with the percentage expenditure in other industrialised countries.

- **Always look for evidence.** The Scottish philosopher David Hume noted that "*A wise man proportions his belief to the evidence*". Many Americans believe that the attack on the World Trade Center was engineered by Saddam Hussein, while many Arabs believe that it was planned by the Israeli secret service. They can't both be right, but they could both be wrong. What is the evidence? It has been widely reported that millions of Americans believe that they have been abducted by aliens and, in many cases, subjected to sexual experiments (although the most quoted survey was deeply flawed in its methodology and interpretation). They may be right, but again what is the evidence? Are there witnesses or photographs? Are there body marks on the 'victims' or do they have souvenirs from the spaceships?
- **Be ready to change your mind if the evidence changes.** The famous British economist John Maynard Keynes once said: "*When the facts change, I change my mind – what do you do, sir?*". Before the US invasion of Iraq, many people thought that Iraq possessed weapons of mass destruction based on the then available evidence and the interpretation of it by the intelligence services. Following the invasion and extensive searches, the evidence changed, but many were reluctant to change their minds.
- **Always consider alternative explanations.** Those who believe that they have been abducted by aliens might have dreamt or fantasized it. The report of a body found in the park could mean a murder or a suicide or a heart attack or old age. The fall in crime levels could be the result of more police, better detection procedures, social changes or simply new methods of reporting.
- **Beware of making assumptions.** Someone once said that: "*Never assume, as assume makes an ass out of u and me*". So, just because a particular source is usually accurate doesn't necessarily make it accurate this time. Just because the facts can be explained by one particular scenario doesn't mean that another scenario isn't possible and maybe even more likely.
- **Don't jump to conclusions.** As Harold Acton pointed out: "*Some people take no mental exercise apart from jumping to conclusions*". Although the currently available facts may suggest a particular conclusion, other conclusions may be possible. Further facts may support an alternative conclusion and even invalidate the original conclusion. Even when this is not the case, it is always helpful to have further, supporting evidence to support the original conclusion.
- **Remember Occam's Razor** [the maxim is named after William of Occam, the philosopher who was probably born at Ockham in Surrey]. When two or more explanations are possible on the basis of the same facts, always prefer the simplest possible explanation, unless there are very good reasons for favouring a more complex - and therefore more unlikely - one. For example, the pyramids in Egypt could have been designed and constructed by the Egyptians living at the time of the pharaohs or they could have been built according to plans brought to earth by aliens. Both explanations would explain the observable phenomena, but Occam's Razor suggests that we should adopt the explanation that requires the fewest assumptions since there is simply no need to make extra assumptions unless there is good evidence to support them. Or, as the scientist Albert Einstein put it: "*Everything should be made as simple as possible, but not simpler*".

- **Look for cause and effect.** When I get up from bed, the sun comes up - but there is obviously no causality. When I go to bed, I feel refreshed - and there clearly is a relationship. Sometimes relationships are not obvious: in the movie "The Truman Show", when the Jim Carey character gets up from bed, the 'sun' does come up in a causal manner because the Ed Harris character ensures that it does.
- **Be challenging of the seemingly seductive comment "It works".** There are two problems here: agreeing a definition of what 'works' means and establishing a cause and effect relationship between action and outcome. If I perform a traditional Indian rain dance in my back garden, it may rain in an hour, a day or a month. Over what period are we going to assume the dance may have an influence? Then, can we reasonably infer a causality here? It may be that my neighbour was performing a different, more effective rain dance in her garden; it may be that the rain clouds had been seeded by a specially chartered aircraft to ensure good weather for a sports event tomorrow; it may be that I am in India in the monsoon season and it usually rains at this time of day at this time of year.
- **Be aware that, when observing a situation, the observer can sometimes change the situation.** A classic example of this has come to be known as 'the Hawthorne effect', named after the location of a factory in the USA where some studies were conducted in the 1920s. The researchers were trying to establish what change in working conditions would lead to an increase in productivity. To the astonishment of the researchers, they found that *every* change in conditions - and *even* a return to the original conditions - resulted in an increase in production. They concluded that this was because the workers were being motivated by the interest shown in them by the researchers. A similar situation occurs in experiments to test the efficacy of drugs or medical treatments and, in this case, it is known as 'the placebo response'. A placebo is a 'pill' made of sugar or a 'tonic' containing nothing medicinal which is used with a control group of patients to compare with another group taking the drug or treatment that is being tested. What researchers have found is that frequently a placebo has a positive effect because the person taking it *believes* it to be efficacious.
- **Look for 'meaningful' statements.** Often politicians and businessmen make statements which are virtually meaningless, such as "*I think that, if we tried harder, we could possibly do somewhat better*" or "*Some improvements in performance might be expected in the fullness of time*". Much more meaningful sentences - and ones therefore to be preferred - would be something like "*We will reduce recorded crimes of violence by 10% before the next General Election*" or "*If we increase our capital expenditure by 5% annually for the next three years, we should achieve a 25% increase in revenues by the end of the decade*".
- **Have at least a basic understanding of statistics.** A figure without a context is often meaningless. For instance, it might be reported that this weekend there were 10 deaths on Britain's roads. What does this mean? To obtain some context, it would be useful to know the number of deaths for each weekend in the last month, year or decade and more helpfully calculate the average figure for each of those periods. Sometimes, however, the average can be a misleading measure. For example, if there was a major motorway smash-up last weekend or a petrol shortage last month or a particularly severe winter this year, the average for a

particular period may be distorted or skewed by an exceptional figure or two. In these circumstances, it is good to know the difference between mean, median and mode. The mean is the arithmetic average of a range of figures; the median is the middle figure in a range of data arranged by value; and the mode is the figure which occurs most frequently in a set of data. Sometimes the median or mode may be a better indicator than the mean by reducing the impact of 'extreme' instances.

- **'Translate' statistics.** So, convert a percentage into an absolute figure. A claim to have increased customers by 100% might simply mean an increase from two to four. Conversely, a 2.5% increase in a nation's economic growth could - in the case, for instance, of the UK or the USA - mean the availability of billions of more pounds or dollars. Similarly, convert absolute numbers into percentages. A politician might claim that expenditure on the health service has increased by £500M which seems like a massive figure to someone earning £500 a week but, when expressed as a percentage of total expenditure on health, is seen to be proportionately a mere blip in expenditure patterns. Again conversely, it could be that paying a relatively small cash sum monthly into a pension scheme results in a 25% increase in payments in 20 years time.
- **Make appropriate use of statistics particularly where subjective judgements are likely to dominate.** A classic example is the notion of risk where most people have incredibly subjective perceptions. Obviously, crossing a road is risky, because you might be hit by a car. But staying at home is risky too - you might fall down the stairs or electrocute yourself with the toaster or be attacked by an abusive husband. Obviously, travelling by aircraft is risky because occasionally there are crashes and the number involved is usually so large that it is reported in the media. However, driving a car is probably riskier and riding a motorbike even riskier but, since these accidents and deaths are happening everywhere all the time, you don't hear about most of them. *Everything* in life has an *element* of risk - what is necessary is to quantify that risk in terms which make it comparable with other risks and then take rational decisions based on reasonable probabilities of particular outcomes. This may seem a complicated manner of deciding whether to take the train or fly, but it is a technique which can be used in many other situations where emotions can blind sensible decisions, such as deciding whether to use hormone replacement therapy or where to allocate scarce resources in health care.
- **Be especially cautious of statistics where probability is concerned.** Most people with no training in statistical techniques find it very difficult to make an accurate assessment of probability. For instance, consider the tossing of a coin where the result might be heads (H) or tails (T). Which of these three outcomes is the most likely: HHHHH, TTTTT, HTHTH ? The answer is that each of these three options has the same probability because a coin has no memory and each toss of the coin has a 50-50 chance of resulting in a head or a tail. Many people would see the option HTHTH as the more typical, but this would only be true over an infinite number of tosses - not a mere five. Another example would be assessing how many people you would need in a room before it was likely that two of them shared the same birthday. In this scenario, 'likely' means with over

50% probability. In fact, the answer is only 23 - because we are talking about *any* birthday matching, not one specific birthday. See how one can so easily be misled by probability?

- **Don't rest on authority.** The scientist Albert Einstein once remarked: "*Foolish faith in authority is the worst enemy of truth*". In the early 1990s, I gave a presentation to a group of Russians using slides in Russian. At one point, I realised that I had been speaking to the wrong slide for the last five minutes. When I asked my audience why no one had told me this, I was advised that in Communist Russia no one challenged the teacher! Just because the management or the government states something does not necessarily mean that it is true. This is especially the case where there is a vested interest, so asbestos and cigarette manufacturers both claimed authoritatively for many years that their products were not damaging to health. Study the evidence and make an independent judgement based on the balance of the available evidence.
- Closely related to this, **don't necessarily rest on the received wisdom.** Galileo was excommunicated for challenging the Church's view that the sun, the planets and the stars revolved around the earth - but he was right. Today even the most fundamental rule of modern physics - Einstein's insistence that the speed of light is a constant - is being challenged (by a scientist called João Magueijo). Many management styles and political policies are the received wisdom for a time, but frequently deserve to be challenged. The important thing is to marshal the evidence and subject it to review and analysis.
- **Beware of anecdotes.** Two of your friends may have had a bad experience on holiday in India which might be interesting but is unlikely to be conclusive. India is a massive country, it has millions of visitors a year, your friends' experiences might have been years ago or be more to do with the travel company than the country. Check the information on India on the Foreign Office web site and read independent travel guides and surveys before making a more informed and balanced judgement.
- On the other hand, **trust your instincts.** If something doesn't 'feel' right, even if it is in a newspaper or a television programme, check it out. Strange though it may seem, the media can make mistakes and corrections rarely achieve the prominence of the original story.
- **Deconstruct the elements of a work.** In the case of a paper or speech, look at the arguments, the evidence, the structure, and the presentation. In the case of a novel, consider the plot, the characterisation and the language. In the case of a film, think about the script, the acting, the direction, the cinematography and the music.
- **Think about what is *not* there.** When invited to respond to material, most people confine their comments or their thinking to what they can see or hear. Sometimes what is not there is just as important. You might want to ask: Why are certain arguments missing? Why have certain sources not been used? Is this the full picture? A political manifesto will inevitably mention achievements but not failures and will often criticise another party's policy or performance but fail to offer a constructive alternative. A company's annual report will put the most favourable possible 'gloss' on activities and not mention at all financial difficulties or threats from competitors. In a job application, a missing period of time could

mean a sabbatical travelling around the world or it could mean a sentence in prison.

- **Learn to think 'out of the box'.** Albert Einstein once said that: *"Problems cannot be solved by thinking within the framework in which they were created"*. For instance, you are asked to decide whether a new product should be trialed in Manchester, Birmingham or London. But maybe it should be trialed in all three or in three different locations. Maybe it shouldn't be trialed at all, but launched straightaway, because a competitor is about to launch a similar product. Maybe it shouldn't be trialed at all because it is still an inferior product that needs more development. Maybe the whole discussion is irrelevant because the company is about to be taken over by another company which already has such a product in the marketplace. For another illustration, try this exercise [click here](#)
- If you dare, go beyond thinking 'out of the box' to **thinking the 'unthinkable'**. What does this mean? It means considering variations to the most basic of parameters and entertaining the most radical of possibilities. In the last example - trialing a new product - thinking the unthinkable might mean leaving the company, forming your own and marketing a rival product or it might involve a recognition that you are disillusioned with such products altogether and want to make a career change. Albert Einstein once said that: *"If at first an idea doesn't seem crazy, then there is no hope for it"*. As Yossarian in Joseph Heller's iconic novel "Catch-22" concludes: *"Of course it's insane ... That's why it's the only sane thing to do"*.
- **Try thinking like your competitor.** If you are in a competitive situation - even if it is just a discussion or debate, but much more so if it is a business or a sport (or a war!) - put yourself in the mind of your competitor. If you were him or her, what would you do? If he were to think 'out of the box' or even to think the 'unthinkable', what might he do? How would you respond to that? Should you make such a move first? Even if this process of thought does not lead you to adopt a new strategy, it is a useful discipline that will change the way you look at the situation and how prepared you will be mentally for the unexpected or unlikely.
- **Test your thinking on others.** Brainstorm your ideas before starting a piece of work. Show drafts of work in progress to colleagues or friends. Welcome corrections, suggestions and constructive criticism. Entertain challenge. Embrace change. Encourage diversity.
- **Practice critical thinking.** Alfred Mander asserted in his book "Logic For The Millions": *"Thinking is skilled work. It is not true that we are naturally endowed with the ability to think clearly and logically - without learning how or without practising"*. The British philosopher Bertrand Russell bemoaned that: *"Many people would die sooner than think; in fact, they do"*, while the British writer George Bernard Shaw quipped: *"Most people don't take the time to think. I made an international reputation for myself by deciding to think twice a week"*.
- **Keep practising critical thinking.** The British politician Barbara Castle once said: *"Think, think, think. It will hurt like hell at first, but you'll get used to it"*.
- **Don't worry if thinking critically initially confuses you.** Life isn't simple and the world is not black and white. As the Greek philosopher Socrates put it: *"Confusion is the beginning of wisdom"*.

- Finally, **remember that 'thinking critically' ends in 'why?'** The word 'why?' is the most powerful tool in your mental toolbox. Keep asking 'why?' Why is this person writing this story in this particular newspaper? Why is this politician making this statement now? Why has the author of this paper quoted this source and not that one? Why has she used a percentage instead of an absolute figure? Why am I asking all these questions?!?

FURTHER READING

- "The Demon-Haunted World: Science As A Candle In The Dark" by Carl Sagan (Random House, 1995) [for review [click here](#)]
- "Why People Believe Weird Things: Pseudoscience, Superstition, And Other Confusions Of Our Time" by Michael Shermer (W.H. Freeman, 1997) [for review [click here](#)]