

## INTRODUCTION

In late 1772 Joseph Priestley was wrestling with a mundane problem.

Over a period of just a few years, Priestley had transformed himself from a little-known minister and teacher in towns of northern England into one of the most important scientists of his day. He had published the *History and Present State of Electricity*, the first compendium of scientific knowledge in this new field, and the dominant textbook for the next hundred years. His recent investigations had revealed one of the most profound aspects of life on earth: that plants make the air fit for us to breathe. This work earned him the Royal Society's Copley Medal, the Nobel Prize of his day. Soon he was to isolate the substance that plants were providing, thereby playing a crucial role in the discovery of oxygen.

Yet the dilemma causing him so much anxiety was of a kind any of us might recognize. Should he move with his young family from Leeds to Wiltshire? He had been offered a kind of patronage by William Petty, the controversial Earl of Shelburne. Shelburne would house the Priestleys at his estate, Bowood, and provide Joseph with a laboratory and time for research. In return Joseph would be required to act as tutor to Shelburne's sons and advisor to Shelburne himself. Priestley had to resolve a personal conundrum laced with unknowns and incommensurabilities. Would he be sufficiently free to pursue his intellectual passions? Would his experimentation continue to bear fruit in the new environment? Did he owe it to his family to accept the greater comfort and security attached to the new position?

Eventually Priestley turned for help to his friend and scientific colleague, the great American scientist and statesman Benjamin Franklin. Franklin replied in a letter which has become a classic in the theory of decision making:

*My way is to divide half a sheet of paper by a line into two columns; writing over the one Pro, and over the other Con. Then, during three or four days consideration, I put down under the different heads short hints of the different motives, that at different times occur to me, for or against the measure. When I have thus got them all together in one view, I endeavor to estimate their respective weights; and where I find two, one on each side, that seem equal, I strike them both out. If I find a reason pro equal to some two reasons con, I strike out the three. If I judge some two reasons con, equal to three reasons pro, I strike out the five; and thus proceeding I find at length where the balance lies; and if, after a day or two of further consideration, nothing new that is of importance occurs on either side, I come to a determination accordingly. And, though the weight of the reasons cannot be taken with the precision of algebraic quantities, yet when each is thus considered, separately and comparatively, and the whole lies before me, I think I can judge better, and am less liable to make a rash step, and in fact I have found great advantage from this kind of equation...*

Franklin called this method a “moral algebra”: a kind of calculation, but one suited to human affairs, where often the stakes are large, the alternatives many, the considerations diverse and uncertain, and where your choice will be a test and reflection of your character.

Such as whether to get married, and in particular whether to marry your cousin.

One of the few scientists who could eclipse Priestley and Franklin was Charles Darwin. Having returned from his famous five year journey on the Beagle, and now 29 years old, Darwin felt obliged to consider matrimony. It seemed he might be able to wed Emma Wedgwood, the daughter of Darwin’s aunt and an heir to great wealth created by her grandfather, pottery industrialist Josiah Wedgwood.<sup>1</sup> He could see the attractions of marriage, but how would this affect his career?

Darwin, like Priestley, deployed the moral algebra. Literally dividing a sheet of paper in two, he wrote Marry and Not Marry atop the columns, and under them he listed the salient considerations:



Marry	Not Marry
Children (if it Please God)	Freedom to go where one liked
Constant companion (and friend in old age) who will feel interested in one	Choice of Society and little of it
Object to be beloved and played with.	Conversation of clever men at clubs
Better than a dog anyhow	Not forced to visit relatives and bend in every trifle
Home, & someone to take care of house	Expense and anxiety of children
Charms of music and female chit-chat	Perhaps quarrelling
These things good for one’s health— but terrible loss of time	Loss of Time
My God, it is intolerable to think of spending one’s whole life, like a neuter bee, working, working, and nothing after all—No, no, won’t do	Cannot read in the evenings
Imagine living all one’s day solitary in smoky dirty London House	Fatness and idleness
Only picture to yourself a nice soft wife on a sofa with good fire and books and music perhaps	Anxiety and responsibility
Compare this vision with the dingy reality of Great Marlboro Street, London	Less money for books etc.
	If many children forced to gain one’s bread (But then it is very bad for one’s health to work too much)
	Perhaps my wife won’t like London; then the sentence is banishment and degradation into indolent, idle fool

The method appears to have worked a treat, with Darwin emphatically scribbling *Marry, Marry, Marry QED* at the bottom of the page. He and Emma promptly formed what turned out to be a long and rewarding union, their ten children not preventing Darwin from producing some of most momentous scientific texts of all time.

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<sup>1</sup> Charles Darwin’s grandfather, Erasmus Darwin, as a close friend and business associate of Josiah Wedgwood. Erasmus Darwin and Josiah Wedgwood were both members of the Lunar Society in Birmingham, as was Joseph Priestley. Benjamin Franklin visited the society on several occasions. Did Charles Darwin know of the Franklin’s moral algebra through these connections that Charles Darwin?

## The Moral Algebra – A tool for everyone

The starting point of this book is the simple idea that Franklin’s method can serve all of us well. Bluntly put, if it worked for the likes of Joseph Priestley, Benjamin Franklin and Charles Darwin, it will probably work for you and me as well.

We all have to make weighty decisions. Sometimes these are personal matters, affecting only ourselves and perhaps those immediately around us. Often, however, they are of wider consequence, whether in business, politics, government, war or religion. Sometimes we must make these decisions alone; often we are part of a team or committee. Sometimes the decisions are simple “binary” choices (accept or reject Shelburne’s offer; marry or don’t marry). More often, we must choose from range of possible actions and variants on those actions.

But in all such decisions we are striving to select the best path, or at least an acceptable path, by identifying and weighing up various advantages and disadvantages. That, after all, is the heart of decision. Franklin’s method, suitably extended and supported, can help us do it. This book proposes and explains a method – decision mapping – which is a contemporary elaboration of Franklin’s wisdom.

The moral algebra embodies at least six fundamental insights about decision making. First, it recognizes that weighty decisions are generally made by *deliberation*, i.e. articulating and weighing up the relevant *arguments*. To be sure, there are times when decisions are made without deliberating (see Ch. []). Overwhelmingly, however, important decisions are made by reflecting on the qualitative considerations pointing in one direction or another. From Darwin’s decision to propose to Emma Wedgwood, to the decision by President Obama and his team to escalate the conflict in Afghanistan, people usually tackle their most important challenges by working through the arguments.

Second, Franklin knew – as do we all, from our own experience – that deliberation can be a fraught affair. Left to our own devices, deliberations are often chaotic, incomplete, confused and stressful, with the baneful consequence that we too often end up making the wrong call, or not really deciding at all. The moral algebra gently introduces much-needed discipline into the decision process, requiring that we follow certain steps in a particular order and with a recommended timing.

Third, the moral algebra was designed to help us *make explicit* the various considerations bearing on the issue. When we first reflect on a difficult problem, we will usually be aware of only a few of the relevant considerations. Others may be swimming around in our subconscious, surreptitiously pushing us in one direction or another. Others still may be as yet unknown; identifying them takes effort and, usually, help from others. Once the relevant considerations have been articulated, then we can attempt to factor them into our decision appropriately, according them the significance they deserve.

Fourth, the moral algebra recognized that it can be hard for us to get our minds around all the considerations involved in a weighty decision. Franklin’s method compensates for our inherent mental limitations by requiring that we lay out the arguments in two columns on a sheet of paper.

The essential insight here is that we need external displays to enhance our brains' capacities. The moral algebra trades on this insight in a modest way, using a simple technology (pen and paper) that is always ready to hand. But as we'll see, the better the technology, the more our natural cognitive powers can be leveraged to our advantage.

Fifth, Franklin realized that we're not very good at "weighing up" a large number of diverse considerations. Unless we make special efforts, we're prone to misjudge the overall weight of a range of arguments, just as when shopping can be surprised by the total cost of our selections even though we knew the price of each individual item as we selected it. Thus the moral algebra gives us what may be the simplest way of systematically reckoning the balance of considerations – i.e. "cancelling out" considerations of equal weight, and observing where any remainders lie.

Finally, the moral algebra reflects the reality that if a decision method is going to be useful for – and used by – most people, it has to be simple. For better or worse, we just aren't going to adopt a method if we need to take college courses to understand what it is and how to use it correctly. The method must also be natural, allowing us to do the kind of thing we would normally do in making a decision, albeit in a better way, rather than demanding that we force-fit our thinking into alien cognitive routines. The beauty of Franklin's method is that it works with us rather than against us; it constrains, guides and supports our natural way of thinking rather than replacing it.

That is an impressive list of virtues. It is hardly surprising that Franklin's short letter to Priestley is acclaimed as a landmark in the theory of decision making. Most textbooks make some mention of it, and variants of the method are widely recommended (e.g., de Bono's "Plus, Minus, Interesting" method).

And yet, it seems that the moral algebra is not often used. There are no reliable statistics on this, but consider briefly your own experience of important decisions being made, by you or by others. How often were all relevant Pros and Cons explicitly and compactly listed, and considerations of equal weight "cancelled out"? How often was some more haphazard and "intuitive" process of deliberation used instead?

Why is this?

## Limitations of the Moral Algebra

One obvious explanation for the general neglect of Franklin's method is that most people have never heard of it. Despite its fame amongst decision theorists, most people indeed are unaware that such a handy technique is available to them. This reflects a wider problem, which we'll discuss more in Chapter [ ]: rarely are people provided with even basic training in decision making.

However ignorance cannot be the whole story, because it seems that Franklin's method is not always used even by those who know of it and have been trained to use it. If even the cognoscenti generally prefer to handle their decisions in other ways, we have to suspect that the moral algebra has critical drawbacks or limitations.

Indeed the moral algebra, as described by Franklin, doesn't quite fit with the decision challenges we face on a regular basis. One of its great strengths is its simplicity, but in a couple of key respects it is just too simple. Consequently, while it may in some cases work quite well, the classic moral algebra cannot really be used for most of our important decisions.

First and most obviously, the moral algebra is by design only able to handle yes/no or "binary" decisions, i.e. whether to take a particular action or not. However major decisions usually involve selecting from *many* possible actions. For example, when John F. Kennedy decided to blockade Cuba, he selected blockading as the best (least bad) of a range unattractive alternatives which also included invading Cuba, launching airstrikes, and doing nothing.

Further, as we'll discuss in Chapter [], possible actions will often have many particular variants. In the Cuban missile crisis case, airstrikes might have been restricted to the Soviet nuclear missile base, extended to a range of military targets, or comprehensively destroyed Cuba. Or consider a more homely decision, where to send your child to school. At the top level your choices might be a government school, a religious school, or a private school. Within each of these categories there may be a number of choices; your government school options might include Shady Street High and Lincoln High. As both these examples show, the many options available often fall into a kind of hierarchical structure. The classic moral algebra, with its two-column format, just can't be extended to these kinds of complex choices.

A second major limitation of Franklin's method is its inability to handle lower level arguments. These are arguments which bear not on the options, but rather on their alleged Pros and Cons. These arguments help us decide what to do, but only indirectly, by helping us assess the supposed advantages and disadvantages of each contemplated action. For example, in choosing a school, you might think that private schools generally have the best instruction. In other words, under the Pros of private schools, you might list "superior tuition." But is this really true? What evidence do you have? What objections would state or religious school advocates raise? Are they valid? Why not? These questions all point to lower-level or "subordinate" arguments. It is by working through these subordinate arguments that we determine whether an option really does have a claimed Pro or Con, and how significant it is.

When we're struggling with an important decision, a great deal of our time and effort goes into this lower-level deliberation. Indeed, choosing an option in the light of some established set of Pros and Cons is often the easy part. It can be much harder to establish what the Pros and Cons really are, and how seriously we should take them. This is where we may need the most help, but Franklin's moral algebra leaves us unsupported. It just asks us to *list* Pros and Cons and balance them against each other. It doesn't help us articulate the arguments on which this listing and balancing depends, and provides no space to do so.

## Decision mapping

In these two respects, then, the moral algebra doesn't support what we actually need to do in making an important decision. What we need, it seems, is something like the moral algebra, but

without its limitations. That, in essence, is decision mapping. It is Franklin's method of considering the Pros and Cons, extended to encompass the full complexity of deliberative decision. Instead of being restricted to just yes/no, "do it?" decisions, we can consider and compare the full range of options and their particular variants. And instead of merely listing Pros and Cons, we can articulate, organize and evaluate the complex body of arguments and evidence underpinning a properly rational assessment.

However, when we open up the method in this way, we must leave behind Franklin's simple two-column format. To "divide a sheet of paper by a line into two columns" is easy, fast and elegant, but in reality, for most decision problems, framing the issues this way inadvertently conceals far more than it displays. You just can't squeeze complex hierarchical option sets and even more complex masses of lower-level argument into two columns, or indeed any number of columns. In decision mapping, we use of course the *map*, meaning here a box-and-arrow or node-and-link diagram, much like a mind map or concept map. Each "entity" relevant to a decision – Question, Option, Pro, etc. – is recorded in its own box, and arrows or lines show exactly where that entity fits into the larger structure. These maps can be just as elaborate as is needed to display the complexity inherent in the decision challenge we're facing.

Once we escape the confines of the simple Franklin format, we can take advantage of any graphical tool or resource that can help us comprehend or communicate the decision logic more easily and quickly. Thus decision mapping, in addition to boxes and arrows, uses colors and icons to flag what type of an entity we're looking at, exploiting our enormously powerful visual capacities to reduce the mental effort involved in interpreting a map. As the complexity of a decision increases, so does the need for sophisticated graphical design to help make that complexity more accessible and digestible.

At the same time, we mustn't lose sight of one of the great strengths of the moral algebra, which is that it constrains and structures our thinking. Decision mapping transcends Franklin's framework but is certainly not "anything goes." It restricts us to a particular range of entities (Question, Options, etc.); it requires that we use a particular type of map (roughly, the hierarchy or "tree") to organize those entities into decision structures; and it provides rules and guidelines for the proper development of those maps. Paradoxically, it is only through conforming to these kinds of constraints that we can reap the promised benefits of rigor and clarity.

So decision mapping is just creating a map to aid deliberation. It is producing a diagram clearly displaying the logical structure of a complex decision: the various options, pros and cons, arguments and evidence, and how these pieces relate. It is the moral algebra, but expanded to accommodate the full complexity of deliberative decisions, and turbo-charged through the use of richer graphics supported by more powerful technologies.

Decision mapping can be regarded as belonging to a larger family of mapping techniques which includes mind mapping, concept mapping, dialogue mapping, argument mapping and others. All these techniques use box-and-arrow diagrams to help us "see" what we are thinking. Each has its distinctive rules and conventions, and so is suited to certain applications but not others. Decision mapping is unique in being crafted specifically to support deliberative decision. As with tools in

other domains such as carpentry and mechanics, its power and value comes from being well-designed for a particular task. Decision making is its own thing, and just as no serious mechanic uses an adjustable wrench when a socket set is available, so the serious decision maker should seek and apply dedicated decision tools.

## Overview of the book

This book is an overview of, and guide to, decision mapping. It is both theoretical and practical; it explains what decision mapping is and why we need it, and how to do it.

The first section, *Setting the Stage*, helps deepen our understanding of decision mapping as a response to the profound and ubiquitous challenge of making better decisions. It considers briefly the nature of decision making, distinguishing three major kinds of decisions – the intuitive, the technical, and the deliberative. It further explores the idea that most major decisions are and indeed should be made deliberatively. It then turns to understanding why decision making, particularly deliberative decision making, goes wrong. There are many factors at work, all compounded by the fact that most people have never had any real training in deliberative decision making. This section concludes by exploring how decision mapping can help us make better decisions by addressing the various problems.

The second section, *Decision Mapping Essentials*, is the “guts” of the book. It steps through the major activities involved in making a decision using decision mapping: asking the right question, setting out the options, identifying pros and cons, exploring the lower-level arguments, and weighing it all up. A third section, *Case Studies*, provides a selection of moderately detailed examples of decision mapping. The examples are designed to work hand-in-hand with theoretical chapters in *Decision Mapping Essentials*.

The fourth section examines a range of further topics, mostly concerned with applying decision mapping in practice. Thus it considers how decision mapping can help us overcome the special challenges involved in group deliberating, and looks at Board decision making as a special case. It reviews how decision mapping can help us capture the thinking or rationale behind decisions, particularly “design” decisions, and contribute to organizational “decision management.” And it considers how decision mapping can help us tackle so-called “wicked problems.”

A final section wraps up by considering some major issues and controversies surrounding decision mapping. It considers various objections and skeptical responses, and explains why decision mapping might be preferred to decision analysis. It concludes by taking the “long view” and setting decision mapping in a broad historical & philosophical context.

The book is not a software manual. Although decision mapping is a software-supported technique, and to be done properly requires somebody with strong skills in deploying a suitable software package such as bCisive, this book does describe how to manipulate any particular software tool. This book describes what you need to know to map decisions regardless of what software you use, if any.

The book is also not a treatise on decision making in general. It does not purport to describe everything you need to know to make any decision. Rather, it focuses on deliberative decisions, and on how to map them.