

## FT SUMMER SCHOOL DAY 12: DECISION MAKING: Beware [Print](#) the pitfalls of over-reliance on rationality

By John Kay

Published: Aug 20, 2002

The classical theory of rational decision-making under uncertainty has been evolving for over 200 years, since Daniel Bernoulli and Rev. Thomas Bayes laid down the principles of probability theory. We should define the options available, measure the costs and benefits attached to each of them and assess the probabilities of success and failure. Business schools teach formal procedures for these assessments. Most large companies and public sector bodies demand formal investment appraisals based on these principles.

This is not how we make decisions in our everyday life. A possibly apocryphal story tells of a business school professor contemplating a job offer from another institution. He asks a colleague for advice. "It's easy," says his friend, "you just do what you teach: write down the pros and cons, attach weights and probabilities, and maximise your subjective expected utility." "Don't be silly," the professor replies. "This decision is serious."

Try yourself on the questions in the box below. Most people give answers which, according to the tenets of classical decision theory, are wrong. In the first problem, they choose the immediate £100 over the prospective £120: but if they have to wait a year, they are willing to wait another week for an extra £20. But this demonstrates time inconsistency: if you are unwilling to wait a week to receive an extra £20 why would you imagine you will be happy to do so a year from now?

Many people choose (b) or (c) in response to the second problem. But it is fundamental to probability theory that Linda is more likely to be a bank manager than both a bank manager and an active feminist. Event X is necessarily more likely than the occurrence of both event X and Y. And there are many, many more bank managers than chief spokespeople for the Animal Liberation Front. Not many bank managers have Linda's background, but some do. Much the most likely proposition is that Linda is a bank manager.

We resist this conclusion because we tend to look for patterns in what we see. All we know about Linda points towards a role as a prominent member of a radical organisation. The picture of Linda as a bank manager is less compelling. But the picture of Linda as bank manager and active feminist is more plausible. We are surprised that she is a bank manager, but reassured when we learn she is a somewhat unusual bank manager.

If 1,000 people are tested for the dread disease in the third question, 20 people will have false positive tests. The one who does have the disease will almost certainly test positive as well. Still, only one of the 21 positives actually has the disease. Your friend is probably perfectly healthy. Rev. Bayes's contribution to mathematics was to solve problems like these, but most other people continue to find them difficult. Most doctors, including Gigerenzer\* get it wrong.

People who teach classical decision-making theory treat these problems as mistakes we must learn to avoid. But I am not so sure. The world is usually too complicated for classical decision theory to be of much practical value. Often we don't have all the information we need, and there is too much uncertainty for us to attach probabilities to different outcomes.

That's why I would answer the first problem by taking the £100 now and the £120 in 53 weeks' time, even though I made up the problem and understand the issue of time inconsistency. Both you and I are suspicious that there is a catch: and if there is a catch it is much more likely to emerge in the first week than the 53rd. A bird in the hand is worth two in the bush, we say, and experience shows that the proverb is often borne out. There's many a slip twixt cup and lip. I

don't think it is an accident that so much folk wisdom urges behaviour which displays time inconsistency.

The reason people reveal odd behaviour in controlled experiments is that very few problems in life are as well defined as questions posed by academics in these tests. If we had a guarantee of £120, then of course we would wait the extra week for an extra £20. And we make sense of this complex experience by looking for patterns.

Gary Klein\*\* has studied the decision-maker who makes good decisions under time pressure (skilled firefighters and practised nurses). He found that they rarely followed classical decision theory: they did not weigh up alternative options. They used pattern recognition to identify situations that fitted their experience.

During the Gulf war a British gunnery officer destroyed an Iraqi Silkworm missile aimed at his ship. He had less than a minute to make the decision, and most people who have reviewed the evidence thought that the conclusion to be drawn from it was that the unidentified object was an American aircraft. This was what the unhappy ship's captain believed for an hour or two.

Perhaps the officer just got lucky. Or perhaps the environment and his personal experience enabled him to piece together bits of evidence more successfully than other people. He had discussed with colleagues how they would have felt if they had been Iraqi gunners, realising that within a few hours their port would be overrun with American ground forces. He saw a pattern in the missile's unexpected trajectory.

But three years earlier the US ship Vincennes shot down an Iranian commercial airliner. With somewhat longer to decide, its gunnery crew also saw a pattern. There were no scheduled flights due (the plane was late); the flight was slightly off-course; they received a signal that there was a military plane approaching (this probably came from another plane in the vicinity); they thought that the plane had begun to descend (this was simply a mistake). The disastrous outcome killed almost 300 innocent people and seriously aggravated tension in an explosive region of the world.

The lesson is not that intuitive decision is better than classical techniques. The person who concludes that his friend has a fatal prognosis is just plain wrong.

To act on the diagnosis without further inspection would be a serious mistake. We are usually too ready to find confirmation of what we already believe. That leads individuals to dogmatic error. And communities to madness - in medieval villages that imagined themselves plagued by witches, or among the people who plunged into technology stock in 1999.

Attempting to shoehorn complex problems into a framework of classical decision-making is a mistake. That is also true of investment appraisals based on large complex models, in which all unknown and unknowable data is made up. These assessments typically give superficial validity to a conclusion that is no more than the story everyone wanted to hear. Through that mechanism telephone companies persuaded themselves in 2000 that 3G mobile phone licences were worth several billions of pounds. The apparent objectivity of the calculation was completely spurious.

The emerging new science of decision-making is eclectic. It recognises that decision-making has many aspects, and we should approach decisions with a variety of tools. Behavioural economists look at how we actually handle risk and uncertainty instead of imposing assumptions about rational behaviour on their subjects. If we understand better the nature and origins of our intuitions, we can learn to display these intuitions more effectively.

Through much of the 20th century the US forest service adopted a zero-tolerance policy towards wilderness fires. But the problem of forest fires did not diminish, and the number of catastrophic fires increased. A combination of more tutored intuition and computer modelling seems to have found the answer to the riddle. Smaller fires mostly burn themselves out, or create firebreaks that impede the progress of further fires. When the forest service extinguished these small fires before they established breaks, the fires that did get out of control had a devastating impact.

Neither common sense nor large-scale computers suffice: neither intuition nor rationality is

enough. The world is a more complex place than we thought, and so are the ways in which real people can and do make decisions in it.

*John Kay is visiting professor at the London School of Economics*

\*G Gigerenzer, *Reckoning With Risk: Learning to Live With Uncertainty*. (Penguin Books, 2002)

\*\*G Klein, *Sources Of Power: How People Make Decisions* (MIT Press, 1997) Other reading: PL Bernstein, *Against the Gods* (John Wiley & Sons, 1996); M Buchanan, *Ubiquity* (Weidenfeld & Nicholson, 2000); RJ Shiller, *Irrational Exuberance* (Princeton, 2000)

Copyright The Financial Times Limited 2008

"FT" and "Financial Times" are trademarks of the Financial Times. [Privacy policy](#) | [Terms](#)  
© Copyright The Financial Times Ltd 2008.