

## DANCE WITH CHANCE

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Daniel Labrecque – President & CEO, N M Rothschild & Sons, Canada



# DANCE WITH CHANCE

Making luck work for you

SPYROS MAKRIDAKIS,  
ROBIN HOGARTH, ANIL GABA



ONE WORLD  
OXFORD

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## PREFACE

Before we begin . . .

**D***ance with Chance* was created from a meeting of minds. The minds belong to three professors with a shared interest in the human need to predict and influence the future.

It all began way back in the 1970s, when one of the professors, a statistician by training, had an unpleasant surprise. He'd noticed that business people were failing to use the latest statistical techniques in their forecasting and so embarked on some research to persuade them to become more mathematically sophisticated. But – to the professor's intellectual horror (not to mention a little shame) – the research showed that the practitioners' simple methods were better at predicting than his own clever ones.<sup>1</sup> He reluctantly began to wonder whether people should put more faith in human intuition than mathematics when predicting the future.

The statistician happened to mention this dilemma to one of his colleagues, a cognitive psychologist. "Sorry," said the second professor, "empirical findings in my field show that human judgment is even less accurate at making predictions than statistical models."<sup>2</sup> And for a long time, they both carried on thinking about this, which is what professors do best. Years later, the two men returned to the famous business school where they'd first met and got talking to a third professor. He turned out to be a decision scientist, whose research was all about reconciling theory with practice, the irrational with the rational, statistical models with gut feeling.

And so *Dance with Chance* was ignited by this intellectual spark, with the goal of helping people make better decisions in situations where accurate forecasting is just not possible. The key insight, it turns out, is to accept uncertainty and recognize exactly what can and cannot be predicted – the limits to predictability. Only then can we realistically manage the uncertainty we confront in our daily lives and avoid falling victim to the vagaries of chance.

But why, it's only natural to ask, don't people already understand the implications of these limits? The reason is that, for much of our lives, we don't need to. For example, although there are uncertainties involved in everyday activities such as eating, going to the cinema, reading, or even walking down a street, we can deal with each of these as they arise. They require neither accurate forecasts nor much advance planning. At the same time, there are many events that we *can* predict accurately – consider the times of high and low tides, sunrise and sunset, or our favorite TV shows. Regularity and predictability rule much of our daily lives.

Yet, we also have to make many important decisions under quite different conditions – where we have only limited ability to predict and lack control over outcomes. Who knows, for example, what tomorrow's or next year's stock prices will be? When will a subprime crisis develop and cost financial firms, supposedly experts in handling risk, several trillion dollars in losses? Where and when will the next major earthquake or terrorist attack occur? Will your new boss like the way you work – and will she promote you? Then there's that new product you're launching after two years of intensive preparation. Will it be successful or will it flop?

The two kinds of situations are quite different. And yet, people still tend to treat the uncertainties of the second as though they were like those of the first – that is, predictable. Doing so may be psychologically comforting but it is actually illusory. In short, we suffer from an “illusion of control” that fools us into thinking the future is more predictable and less uncertain than it really is. Or worse, we believe we can influence chance events through our own actions.<sup>3</sup>

It's tempting to believe that these kinds of misconceptions no longer exist. After all, rational thinking is supposed to drive today's educated and technologically advanced societies. But superstition is still strangely prevalent. As recently as 2004, the National Science Foundation in the US reported that

28% of Americans believe in astrology, that 15% read their horoscopes every day or “quite often,” and that 70% of students claim good luck charms help them perform better academically. On the other side of the planet, millions of Chinese people think that the color red will bring happiness, wealth, fame, and good luck. The Chinese also believe that the number 8 is super lucky. Indeed, one person paid 2.33 million Yuan, or \$280,000 (at the time), to get the super lucky 8888–8888 telephone number consisting of eight 8s.<sup>4</sup> And beliefs like these are everywhere.<sup>5</sup> Italians omit the number 13 from their national lottery, more than 80% of high-rises in many parts of the world lack a thirteenth floor, airports often skip the thirteenth gate, airplanes have no thirteenth aisle, and hospitals and hotels regularly have no room number 13. These are superstitions that have no place in the twenty-first century, yet they’re still to be found all over the world influencing the way billions of people behave.

Are we crazy? Absolutely not. We have an innate desire to control our environments and, in order to do so we need to predict the future. This has helped us evolve as a species over the centuries. But it can also lead us astray. Above all it prevents us from recognizing the substantial and irreducible role of chance in our lives and leads us into making irrational decisions, often based on superstitious beliefs. This is true in practically all important aspects of our lives and work. Even if you *think* you are immune to all superstition, even if you *think* you are an expert in your field, even if you *think* you never behave irrationally, you can’t help being human. You’re born with an instinct to deny chance its rightful place – and your emotions only make this instinct stronger.

The advantage of superstition is that it comforts us into believing there are things we can do to control the uncontrollable. This is important because failure to feel in control of our lives is psychologically disturbing; it leads to both anxiety and stress. It’s no wonder people succumb to the “illusion of control,” which assumes predictability, ignores uncertainty, and minimizes the role of luck. Why be realistic and worry when it’s much easier to believe that our own ability and actions can overcome the effects of chance?

In this book we show that being realistic and giving up the illusion of control actually increases the *genuine* control we have over our lives. We call this the “paradox of control.” To dance with chance is to accept the role and

importance of chance and to take advantage of the opportunities it creates while avoiding its negative consequences. Although psychologically discomfoting, we will show you that this is actually beneficial and increases your control over your destiny. It lets you harness the role of luck to improve your personal well-being or – as we call it – your “personal Fortune.”

Consider, for instance, the following questions:

- Why do banks use simple computer programs to assess the creditworthiness of potential customers rather than trusting the judgments of their managers?
- Why do the investment portfolios created by blindfolded monkeys throwing darts at stock listings often outperform those chosen by professional money managers earning six-figure salaries?
- Why did a study in a major metropolitan hospital show that more accurate decisions would have been made in admitting patients to the cardiac unit if, instead of trusting physicians’ judgments, decisions had been made using a simple statistical rule?
- Why are the richest Americans (as identified by *Forbes* magazine’s list of billionaires) no happier than the Inuit people who live in the polar cold of northern Greenland?
- Why do countries that control their economies through central planning fare worse than those that don’t?

As we will discuss in this book, the answers to all of these questions illustrate how giving up illusory control actually increases control and results in substantial benefits.

The illusion of control pervades almost all aspects of our lives and can have serious negative implications for our well-being. Ideally, we would like to have covered all the important issues affecting our lives in this book. But this is impossible. So, heeding our own advice, we ceded control to our potential readers by conducting a survey to find out what was most important to them. This revealed four critical areas that we’ll cover extensively in this book. We then asked our respondents to estimate how much of what happens to them in these areas is due to their own abilities or actions as opposed to chance. Their answers revealed strong illusions of control and translate into

the sad fact that our friends, families, students, and colleagues stand to suffer many unnecessary disappointments. Our goal, then, is to help them – and, of course you – overcome the illusion of control. Once you accept the inherent limits to predictability, we will show you how the paradox of control actually allows you to gain more control.

In short, this book was conceived to help you avoid costly mistakes and to exploit the role of luck in the most important aspects of your life. You should not be afraid to “dance with chance.” Instead, you should seek both beauty and opportunity in randomness and take some life-enhancing steps of your own.

Spyros Makridakis  
Robin Hogarth  
Anil Gaba

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## THREE WISHES FROM A GENIE

*Those who have knowledge don't predict.*

*Those who predict don't have knowledge.*

*Lao Tzu, Ancient Chinese Philosopher*

**T**he tragic events of 9/11 are embedded in humanity's collective consciousness. The authorities have adjusted the official death toll of 2,974 a few times, but it remains close to the original estimates that we all listened to with horror on that September day. This much is well known. *All too* well known.

Statisticians, however, think the real death toll is much, much higher. The official count ignores the thousands of people who, influenced by 9/11, literally gambled with their lives. Perhaps, unwittingly, you too were one of the gamblers: one of the lucky ones, that is. Let's explain . . .

### THE ILLUSION OF CONTROL

After September 11, 2001, many people feared further terrorist attacks and chose to travel by car instead of flying. To put it simply, the number of airline passengers in the fourth quarter of 2001 fell by 18%, by comparison with the

last three months of the year 2000. In other words, influenced by 9/11, close to one in five travelers decided not to fly. Let's look at some other numbers now: in 2001, there were 483 deaths among commercial airline passengers in the USA, about half of them on 9/11. Interestingly, in 2002 there wasn't a single one. And in 2003 and 2004 there were only nineteen and eleven fatalities respectively. This means that during these three years, a total of thirty airline passengers in America were killed in accidents. In the same period, however, 128,525 people died in US car accidents. That's an estimated 5% more than expected, based on past driving patterns. The statisticians have concluded that as many as 5,000 deaths would probably have been avoided if people had carried on taking the plane as usual. In addition, up to 45,000 people would have been spared serious injuries and up to 325,000 less serious ones.<sup>1</sup>

Why did so many people take their car instead of the plane after 9/11? The simple explanation is that, behind the wheel of your own automobile, it's natural to feel in control. Try telling drivers that they have no influence over the skills of other road users, the weather, the condition of the road, mechanical problems, or any other common causes of accidents – and they will agree. But they still *feel* in control of their destiny when they drive. They can't help it. Put them on a plane, and they think their life is in the hands of the airline pilot or, worse, a bunch of terrorists.

Psychologists call this the “illusion of control.” It makes sense from an evolutionary point of view. The desire to stamp our authority on our environment explains much of our progress as a species – from the beginnings of agriculture to missions to Mars and beyond. The problem is that we don't know when to stop. For instance, experiments show that people think they're more likely to win the lottery if they pick their own numbers. They also think they'll do better in a game of chance if they throw the dice themselves. The truth is that they can make no difference whatsoever. These are games of pure luck.

In the case of the post-9/11 drivers, most of the deaths were caused by *bad* luck. But those who chose their cars over the plane can't be blamed entirely for their folly, as our inbuilt illusion of control is often magnified by media coverage. Plane crashes are turned into video images of twisted wreckage and dead bodies, then beamed into every home on television screens. It's no wonder so many of us dread flying – and did so even before 9/11.

Meanwhile, the thousands of airplanes which arrive safely at their destination every day hold no media interest. This isn't news. So even the most logical of us are led to believe that the chance of a passenger dying in an airplane accident is much, much higher than it really is.<sup>2</sup>

Car crashes, on the other hand, rarely make the headlines, unless they're multiple pile-ups with mass fatalities (which are also statistical exceptions). Meanwhile, smaller-scale road accidents occur in large numbers with horrifying regularity, killing hundreds of thousands of people each year worldwide and seriously injuring many more. We just don't hear about them. Again, this lack of awareness prevents our logic from over-riding our instincts.

As the months and years that followed 9/11 show, the illusion of control – magnified by media sensationalism – can occasionally be fatal. The rest of the time, it can be dangerous to our health, wealth, success, and happiness in varying degrees. After all, for every death in a car accident, there are about nine serious injuries. That's partly why we've written this book – to show that we can't predict most of what happens to us, let alone control it. But there are things we can do to minimize the negative consequences of our inability to predict. Most of all, it's essential to understand the relative roles played by chance and our own actions in shaping our lives.

## FROM ILLUSION TO PARADOX

We believe that one of the biggest challenges facing us both individually and collectively is to accept the full extent of uncertainty that surrounds our decision making without being paralyzed by hesitation.<sup>3</sup> Being hit by a car while crossing a road, being struck by a coconut while on vacation in a tropical paradise, or getting incurable cancer is something that can happen to anyone. Yet the illusion of control makes us believe that such events only happen to others, never to us.

In this book we go beyond simply dispelling the illusion of control. Our message is both more subtle and more compelling. As human beings, we can never shake off our basic desire to eliminate uncertainty. But ironically, it's by realizing and accepting that we *don't* have control that we actually gain *more* control over what happens to us. This can make a big difference in the way we face the future and the decisions we take. Sometimes, we might avoid bad

surprises by shaking off our illusion of control (say, by continuing to fly rather than driving). In other cases, we might be able to take out appropriate insurance to cover the risks we've identified (say, by taking out life insurance to protect our family in the event of tragedy, or simply wearing a seat-belt every time we travel by car).

However, the post-9/11 road fatalities suggest that relinquishing control can be even more powerful. If governments had diverted just a little of the colossal spending on increased airport security into raising awareness about the comparative risks of flying versus driving, they might have saved thousands of lives and even more serious injuries. The traveling public doesn't necessarily need a detailed understanding of probability theory or banks of statistics. Sometimes simple facts can be sufficient. Just knowing that in 2002 not a single airline passenger died as a result of a commercial airline crash in the USA, while car accidents killed 43,005 people (and seriously injured many more), can change behavior. The beauty is that, by giving up their perceived control and placing their well-being in the hands of an airline (over which they have no control whatsoever) travelers reduce their chances of having an accident. Paradoxically, by accepting that their previous sense of control was largely illusory, they gain greater control. This "paradox of control" is at the heart of this book.

### YOUR WISH IS YOUR OWN COMMAND. OR IS IT?

Imagine briefly that something very strange has just happened. Instead of revealing these very words and sentences, the act of opening this book has released a friendly genie who promises to satisfy any three wishes you desire. What will your wishes be? But wait . . . don't answer yet. Like all the best genies, this one has a few reasonable rules to follow, not to mention a little sound advice.

First, let's be both sensible and selfish. Your wishes should cover the long term in order to provide the most benefits for you – and you alone. Second, let's be realistic about what we're imagining here. Your wish can't exceed existing physiological limits. So, no, you can't live to the age of 500 or become twenty years younger. Third, let's think it through and not make the same kind of mistake as Midas, the mythical king who asked for everything he

touched to turn into gold. It did – including his food, drink . . . and daughter. Fourth, bear in mind that you're not the only person to have access to a genie. (There's an imaginary one free in every copy of this book, after all.) So, by all means go ahead and ask to become the richest person in the world. Just don't expect to stay the richest for long, as someone else is bound to make the same request. Finally, no cheating. Your wish shouldn't contain double demands. To be rich *and* famous counts as two wishes, not one. And rest assured that the age-old trick of wishing for more wishes won't work either.

So take some time to reflect and write down your wishes below.

1. \_\_\_\_\_
2. \_\_\_\_\_
3. \_\_\_\_\_

Before we reveal how your wishes compare to those of others, here's another question: just how much control do you have over achieving your three wishes through your *own* actions? This time we ask you to indicate the degree of control you think you have by assigning a number between 0 and 100 to each of your three wishes, where 0 indicates no control at all (or total dependence on luck) and 100 indicates that fulfilling your wish depends entirely on your actions (and not at all on luck).

1. The control I have over achieving my first wish is (please enter a number between 0 and 100): \_\_\_\_\_
2. The control I have over achieving my second wish is (please enter a number between 0 and 100): \_\_\_\_\_
3. The control I have over achieving my third wish is (please enter a number between 0 and 100): \_\_\_\_\_

Now, you may have entered some pretty strange or unusual wishes. How do these compare with the responses of others? We've conducted several genie surveys – involving some 750 people, mainly business executives and MBA students, but also academics. Most of their answers turn out to be variations on the following four themes.

1. I wish to be happy.
2. I wish to live a long life – or at least a healthy one.

3. I wish to be wealthy.
4. I wish to be successful – for example, an entrepreneur who gets rich, an artist who becomes famous, an author who is published, a sportsperson who wins medals . . . you get the picture.

Of course, there are many requests for love too, but as this is notoriously difficult to measure, let's steer clear of it for now.

As for the degree of control people think they have over making their wishes come true, the answer depends greatly on the wish concerned. On average, our respondents score their control over happiness at about 64%, health and longevity at around 52%, for wealth it is 53%, and for success 63%. But are these answers realistic?

The answer is a resounding “no.” It turns out that we have almost no control over how long we live or how healthy we are. Certainly, we can make some valid generalizations about the types of people who last longest. Thin, active women who don't smoke tend to outlive obese, male couch potatoes who get through two packets of cigarettes a day. But at an individual level, doctors confess that their predictions are hit or miss. What's more, health is as dependent on chance as longevity is. Of course, people who die young or become seriously sick never believe it will happen to them. But somehow luck just isn't on their side.

Surely, though, we must have a lot more control over our happiness, personal wealth, or professional success? Hard work, determination, education, and experience should count for a great deal. But, again the data available suggests that luck is almost entirely responsible for *which* hardworking, determined, educated, and experienced people make it in life.

## BEING PREPARED

One reason why people fail to understand just how little influence they have over their own success is the media (yes, them again). We hear a lot about people who are successful, but very little about those who fail to realize their dreams. The press makes sure that we're all familiar with the achievements of Sir Richard Branson, Warren Buffett, Bill Gates, Tiger Woods, or Nicole Kidman. While we're dimly conscious that these people are exceptional, we

rarely hear about the entrepreneurs, sportspeople, or actors who fail – or the sheer scale on which they do so. For example, did you know that in the USA there were more than 40,000 bankrupt firms and over two million bankrupt individuals in 2006? And the great majority of those involved believed it would never happen to them. In fact, nearly all aspiring entrepreneurs are convinced they will make it in a big way.

A second source of confusion is that we know from everyday experience that many physical phenomena are perfectly predictable. If we release our hold on a ball, it will fall to the ground. The sun will also go down this evening and come up tomorrow morning. And high tide always occurs exactly when it's supposed to. So, our reasoning goes, if we can predict these phenomena with such a high degree of precision, why can't we do the same for our own lives? Unfortunately, however, we have to realize that many events in the physical world are totally impossible to forecast reliably: things like earthquakes, tsunamis, hurricanes, and floods. When the tsunami hit South-East Asia in December 2004, killing over a quarter of a million people, the villain was not terrorists but Mother Nature herself. Yet the thousands of tourists who booked their holidays for this time could not have imagined that they were buying tickets to their own deaths.

When it comes to socio-economic phenomena, our ability to make accurate predictions drops to near zero. Who could have predicted the bankruptcy of Enron or WorldCom, the stock-market crash of Black Monday in 1987 when stocks lost more than 22% of their values in a single day, the sub-prime crisis that led the world's economies into a serious recession resulting in many trillions in stock market losses and, according to the International Labor Organization, a reduction of 20 million jobs worldwide.

Now, let's be very clear. We're not advocating that you should give up aspiring to success in your chosen field – any more than you should give up listening to the weather forecast or taking exotic holidays. What we are saying is that everyone should make better efforts to *understand* and *estimate* their chances of success or failure in all that they do. Such insights would reduce bad surprises and disappointments, as well as help prepare for all-too-common failure. An unsuccessful business venture, for instance, can bring invaluable experience, or might be an excellent introduction to a new career and a network of people for the future. But without a few contingency plans,

these opportunities may well evaporate by the time the liquidators knock on the door.

In other words, the first step is to *accept* our lack of control over our environment. Although tsunamis, earthquakes, and hurricanes do not occur often, they can hit us unexpectedly and with force. The second step is to *assess* our chances of success or failure in a realistic way – without the influence of the illusion of control or wishful thinking. Only then can we take the third – and crucial – step of *augmenting* our assessment of future uncertainty to allow for the possible occurrence of events that we can't currently imagine. (Remember, the enormity of 9/11 was unthinkable before it actually happened.) In this methodical way, we can handle risk with pragmatism and clear thinking. And that's what this book is all about. If you need a little further convincing, ponder the implications of the following story.

### CHECKS IN THE CITY

Hugo is a thirty-two-year-old trader who works for a well-known investment bank in the heart of London's financial district, the "City." He has been working there for seven years now, the last five as a futures trader. It's one of those work-hard jobs with play-hard pay. The exact amount is largely dependent on performance, and last year Hugo earned a little over £400,000 (\$660,000) including bonuses – satisfyingly more than any of his old friends from Cambridge.

Today, there's an amusing diversion on the trading floor (which is something of a rarity). Some researchers from a business school want to see Hugo for a *very* short while (there's money waiting to be made, after all). They start by asking him a few biographical questions, and then ask him to participate in what looks like a rather old-fashioned video game. It involves an index that moves up and down across time – resembling some of the market data he monitors every day. The index starts at zero and increases or decreases every half second for fifty seconds in total. Hugo is told that the object of the game is to win points and that his score will be equal to the value of the index at the end of the fifty seconds. He is further told that the changes in the index across time are partly due to chance but that using three keys on the keyboard may have some effect on the final outcome. If he wants, he can use the keys.

Hugo plays the game four times, as requested, experimenting with the keys. He gets quite a good result on the first two attempts, a negative score on the third, and more or less finishes where he started the last time. After each round, the researchers ask him to rate, on a scale of 1 to 100, how successful he's been at using the keys to increase the index.

Hugo knew that the researchers had asked several of his colleagues to play the game too. That's what motivated him to try rather harder than he admits in their favorite wine bar that evening. What those sneaky researchers didn't tell him, however, was that using the keys had no effect whatsoever. They'd cunningly only said that the keys "may" affect the outcome. In fact, the index moved up and down totally at chance.

This story is based on a real-life study involving a total of 107 traders from four investment banks in 2003.<sup>4</sup> From our point of view, there are two particularly interesting results. First, the game was a method of scoring each trader's susceptibility to the illusion of control. The higher the traders rated the use of the keys, the greater the illusion about their own degree of control. Second, the researchers were able to relate these individual illusion-scores with characteristics of the traders, most significantly their performance-related pay. What they found was that, in general, the more the traders earned, the less they tended to succumb to the illusion of control! Averaging the salaries of the five with the highest illusion-of-control scores and the five with the lowest, they found a difference of roughly £230,000 (\$380,000).

When Hugo read the draft that the business school sent to the bank a few months later, he was disappointed to see that his illusion-score (which he'd taken care to jot down in case of future opportunities for one-upmanship) was exactly half-way between the highest and the lowest – just like his salary. Of course, that's not what he said in the wine bar that evening. But, competitive soul that he was, he did learn from the experience. He adjusted his attitude to risk and tried to moderate his innate overconfidence. It worked. In the next four years he made four million in bonuses. Using his old expertise and his new realism to invest it, Hugo was able to double his money and change his lifestyle radically. When his old friends from Cambridge (who by now really are quite envious) ask, he fully admits he got lucky. The ex-trader now lives in a chateau in the south of France and runs a successful vineyard. He is also taking piano lessons.

## AND NOW, WHAT'S NEXT?

One way of thinking about the issues in this book is that each and every one of us is managing a personal “Fortune,” representing the accumulated inflows of good and bad outcomes across our lives. Note that by “Fortune,” a concept we’ll return to many times in this book, we don’t mean just “wealth” (or the magazine of the same title), but instead the many and various factors that affect the quality of our lives, such as friendships, recognition, happiness, fun, health, success, and, yes, wealth itself.

This book is a guide for managing your own personal Fortune. We’ll focus on three broad areas: medicine, investments, and business. These areas not only provide good examples of the kind of reasoning we advocate; they also correspond, together with happiness, to the most requested wishes submitted to imaginary genies (based on our own surveys). So it’s reasonable to assume that they’re of interest to you.

Here are examples of some of the questions we’ll be asking. Why do mammography screening programs have so little impact on breast cancer death rates? Why were so many investors delighted with annual returns of 7% at a time when the stock market had been growing at an average rate of 13% a year for some decades? Why do superstar companies suddenly fail? All three questions concern our inability to accept when it’s impossible to make predictions. Often our quest for certainty leads us to believe that experts – such as doctors, fund managers, and CEOs – are able to see into the future when we cannot. This is just another example of the illusion of control. Even the best of experts aren’t equipped with infallible crystal balls. No one can predict the future accurately – except perhaps in a few situations ruled by hard science or, otherwise, by sheer luck. No one can reduce the future uncertainty in your life. To believe otherwise is to fall prey to the illusion of control with all the negative consequences we’ve talked about.

The next six chapters give detailed answers to questions like those above. We’ll provide empirical evidence that reveals our inability to predict the future accurately, some strategies for coping with the resulting uncertainty – and leave you to make the right decisions (after all, no one else can do it for you). Our recurring theme is that the best way of increasing your control, and improving your personal Fortune, is by accepting your *lack* of control. As

you'll see, again and again, it is very costly to assume you have control over events when, in fact, you don't. Equally important is the fact that no expert can help you increase your control over the future.

Be warned, the right decisions may be counter-intuitive. For example, we suggest that you don't take medical tests, so long as you're healthy. We also think you should select your stocks essentially by chance, rather than relying on a fund manager whose seven-figure bonus is paid by customers like you. Success in management is a bit more complicated, if sometimes more common sense. The critical issue here is how to determine the best advice and come up with the best decision for your particular situation. This is certainly not by following the advice of gurus who write books with simplistic recipes for success. To make good business decisions in the face of mounting uncertainty and increasingly global competition requires novel thinking and innovative approaches. Sadly, we can't claim to help you find them (we'd be no better than the gurus if we said we could); though we do hope to persuade you how vital it is to think in this way.

There's not a great deal we can do directly about other aspects of your Fortune. The empirical evidence about happiness is much more slippery than in medicine, investments, and business. But (unromantic as this suggestion might be), if you take care of your health, wealth, and career success, happiness and perhaps love might take care of themselves? We'll touch on this in the last chapter of our book. Before we get there, however, we provide chapters on the theories and practice behind the issues we discuss.

In a nutshell, pragmatism in life depends on knowing what you can and cannot control. We clearly control our decisions. We can decide whether to invest our savings in the stock market, to accept a job, or to take our umbrella with us. However, we have no control over whether the stock market will go up or down, whether our new boss will be paranoid, or whether it will rain. Interestingly, the implications of our decisions are quite different in each of these cases. Carrying an unused umbrella is no big deal, while taking the wrong job can have serious consequences for our career Fortune and sometimes even for our wealth, health, longevity, and happiness. In the case of the stock market, if we invest all of our money and our shares go down in price, it's a disaster. But if they go up, we increase our monetary Fortune. And if we invest only a little money, it's not so important what happens in the markets.

In the end our success or failure is a combination of our own actions (investing in the market and choosing our stocks) and the effect of the environment (the market going up or down). And so it is with most decisions in life.

But in this book we don't just tell you about problems. We also suggest methods that can help you assess the uncertainties you face. This is often the hardest part of the process, as it's when our decisions tend to get engulfed by emotional forces. In particular, greed, fear, and hope can act as a Bermuda-style triangle that makes the best of rational intentions disappear without trace. Thanks to our suggestions, we believe you can steer clear of the dangers you face by accepting uncertainty with realistic hope and balancing greed with fear.

The book is organized as follows. We first examine empirical evidence about the limits of predictability in three domains: medicine, investments, and business (chapters 2, 4, and 6). The main goal of these chapters is to document what is truly known and thus arrive at the limits of predictability. For most people, the limits are closer than they imagine. So we also draw important conclusions about how to reap some benefits from uncertainty (chapters 3, 5, and 7). In particular, we show how failure to exploit chance can leave us much worse off than we need to be. Indeed, for financial investments, our losses can be quantified quite precisely.

In chapters 8, 9, and 10 we elaborate on the approach to managing uncertainty that we introduce in the earlier chapters and provide a general framework. Chapters 11 and 12 extend this framework by examining the apparent contradictions in our mental capacities and the pros and cons of different ways of making decisions. Chapter 13 discusses what is known about happiness while emphasizing our inability to predict it. Finally, in concluding we emphasize the limits of predictive ability.

And the genie? Well, we won't see much more of him. He's banished along with the wishful thinking that he and his sort encourage. For the rest of this book and— we hope — for the rest of your long, healthy, successful, and happy life, you're going to tackle real-life risk and uncertainty in a rational, practical, and effective way. Together let's hope that we dispel your own particular illusions of control once and for all.