

"[*Fooled by Randomness*] is to conventional Wall Street wisdom approximately what Martin Luther's ninety-five theses were to the Catholic Church." —MALCOLM GLADWELL, author of *Blink*

NASSIM NICHOLAS TALEB

New York Times bestselling author of
THE BLACK SWAN

*FOOLED BY
RANDOMNESS*



The HIDDEN ROLE OF CHANCE
in Life and in the Markets

FOOLED BY RANDOMNESS



The Hidden Role of Chance
in Life and in the Markets

SECOND EDITION, UPDATED BY THE AUTHOR

Nassim Nicholas Taleb



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Fooled by Randomness is a work of nonfiction, but certain names of nonpublic figures have been changed, and some of the private individuals described are fictionalized or composite portraits.

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PREFACE

TAKING KNOWLEDGE LESS SERIOUSLY

This book is the synthesis of, on one hand, the no-nonsense practitioner of uncertainty who spent his professional life trying to resist being fooled by randomness and trick the emotions associated with probabilistic outcomes and, on the other, the aesthetically obsessed, literature-loving human being willing to be fooled by any form of nonsense that is polished, refined, original, and tasteful. I am not capable of avoiding being the fool of randomness; what I can do is confine it to where it brings some aesthetic gratification.

This comes straight from the gut; it is a personal essay primarily discussing its author's thoughts, struggles, and observations connected to the practice of risk taking, not exactly a treatise, and certainly, god forbid, not a piece of scientific reporting. It was written for fun and it aims to be read (principally) for, and with, pleasure. Much has been written about our biases (acquired or genetic) in dealing with randomness over the past decade. The rules while writing the first edition of this book had been to avoid discussing (a) anything that I did not either personally witness on the topic or develop independently, and (b) anything that I have not distilled well enough to be able to write on the subject with only the slightest effort. Everything that remotely felt like work was out. I had to purge from the text passages that seemed to come from a visit to the library, including the scientific name dropping. I tried to use no quote that did not naturally spring from my memory and did not come from a writer whom I had intimately frequented over the years (I detest the practice of random use of borrowed wisdom—much on that later). *Aut tace aut loquere meliora silencio* (only when the words outperform silence).

These rules remain intact. But sometimes life requires compromises: Under pressure from friends and readers I have added to the present edition a series of nonintrusive endnotes referring to the related literature. I have also added new material to most chapters, most notably in [Chapter 11](#), which altogether has resulted in an expansion of the book by more than a

third.

Adding to the Winner

I hope to make this book organic—by, to use traders’ lingo, “adding to the winner”—and let it reflect my personal evolution instead of holding on to these new ideas and putting them into a new book altogether. Strangely, I gave considerably more thought to some sections of this book *after* the publication than I had before, particularly in two separate areas: (a) the mechanisms by which our brain sees the world as less, far less, random than it actually is, and (b) the “fat tails,” that wild brand of uncertainty that causes large deviations (rare events explain more and more of the world we live in, but at the same time remain as counterintuitive to us as they were to our ancestors). The second version of this book reflects this author’s drift into becoming a little less of a student of uncertainty (we can learn so little about randomness) and more of a researcher into how people are fooled by it.

Another phenomenon: the transformation of the author by his own book. As I increasingly started living this book *after* the initial composition, I found luck in the most unexpected of places. It is as if there were two planets: the one in which we actually live and the one, considerably more deterministic, on which people are convinced we live. It is as simple as that: Past events will *always* look less random than they were (it is called the *hindsight bias*). I would listen to someone’s discussion of his own past realizing that much of what he was saying was just backfit explanations concocted ex post by his deluded mind. This became at times unbearable: I could feel myself looking at people in the social sciences (particularly conventional economics) and the investment world as if they were deranged subjects. Living in the real world may be painful particularly if one finds statements more informative about the people making them than the intended message: I picked up *Newsweek* this morning at the dentist’s office and read a journalist’s discussion of a prominent business figure, particularly his ability in “timing moves” and realized how I was making a list of the biases in the journalist’s mind rather than getting the intended information in the article itself, which I could not possibly take seriously. (Why don’t most journalists end up figuring out that they know much less than they think they know? Scientists investigated half a century ago the phenomena of “experts” not learning about their past failings. You can mispredict everything for all your life yet think that you will get it right next time.)

Insecurity and Probability

I believe that the principal asset I need to protect and cultivate is my deep-seated intellectual insecurity. My motto is “*my principal activity is to tease those who take themselves and the quality of their knowledge too seriously.*” Cultivating such insecurity in place of intellectual confidence may be a strange aim—and one that is not easy to implement. To do so we need to purge our minds of the recent tradition of intellectual certainties. A reader turned pen pal made me rediscover the sixteenth-century French essayist and professional introspector Montaigne. I got sucked into the implications of the difference between Montaigne and Descartes—and how we strayed by following the latter’s quest for certitudes. We surely closed our minds by following Descartes’ model of formal thinking rather than Montaigne’s brand of vague and informal (but critical) judgment. Half a millennium later the severely introspecting and insecure Montaigne stands tall as a role model for the modern thinker. In addition, the man had exceptional courage: It certainly takes bravery to remain skeptical; it takes inordinate courage to introspect, to confront oneself, to accept one’s limitations—scientists are seeing more and more evidence that we are specifically designed by mother nature to fool ourselves.

There are many intellectual approaches to probability and risk —“probability” means slightly different things to people in different disciplines. In this book it is tenaciously qualitative and literary as opposed to quantitative and “scientific” (which explains the warnings against economists and finance professors as they tend to firmly believe that they know something, and something useful at that). It is presented as flowing from Hume’s Problem of Induction (or Aristotle’s inference to the general) as opposed to the paradigm of the gambling literature. In this book probability is principally a branch of applied skepticism, not an engineering discipline (in spite of all the self-important mathematical treatment of the subject matter, problems related to the calculus of probability rarely merit to transcend the footnote).

How? Probability is not a mere computation of odds on the dice or more complicated variants; it is the acceptance of the lack of certainty in our knowledge and *the development of methods for dealing with our ignorance*. Outside of textbooks and casinos, probability almost *never* presents itself as a mathematical problem or a brain teaser. Mother nature does not tell you how many holes there are on the roulette table, nor does she deliver problems in a textbook way (in the real world one has to guess

the problem more than the solution). In this book, considering that alternative outcomes could have taken place, that the world could have been different, is the core of probabilistic thinking. As a matter of fact, I spent all my career attacking the *quantitative* use of probability. While Chapters 13 and 14 (dealing with skepticism and stoicism) are to me the central ideas of the book, most people focused on the examples of miscomputation of probability in Chapter 11 (clearly and by far the least original chapter of the book, one in which I compressed all the literature on probability biases). In addition, while we may have some understanding of the probabilities in the hard sciences, particularly in physics, we don't have much of a clue in the social "sciences" like economics, in spite of the fanfares of experts.

Vindicating (Some) Readers

I have tried to make the minimum out of my occupation of mathematical trader. The fact that I operate in the markets serves only as an inspiration—it does not make this book (as many thought it was) a guide to market randomness any more than the *Iliad* should be interpreted as a military instruction manual. Only three out of fourteen chapters have a financial setting. Markets are a mere special case of randomness traps—but they are by far the most interesting as luck plays a very large role in them (this book would have been considerably shorter if I were a taxidermist or a translator of chocolate labels). Furthermore, the kind of luck in finance is of the kind that nobody understands but most operators *think* they understand, which provides us a magnification of the biases. I have tried to use my market analogies in an illustrative way as I would in a dinner conversation with, say, a cardiologist with intellectual curiosity (I used as a model my second-generation friend Jacques Merab).

I received large quantities of electronic mail on the first version of the book, which can be an essayist's dream as such dialectic provides ideal conditions for the rewriting of the second version. I expressed my gratitude by answering (once) each one of them. Some of the answers have been inserted back into the text in the different chapters. Being often seen as an iconoclast I was looking forward to getting the angry letters of the type "who are you to judge Warren Buffett" or "you are envious of his success"; instead it was disappointing to see most of the trashing going anonymously to [amazon.com](https://www.amazon.com) (there is no such thing as bad publicity: Some people manage to promote your work by insulting it).

The consolation for the lack of attacks was in the form of letters from

people who felt vindicated by the book. The most rewarding letters were the ones from people who did not fare well in life, through no fault of their own, who used the book as an argument with their spouse to explain that they were less lucky (not less skilled) than their brother-in-law. The most touching letter came from a man in Virginia who within a period of a few months lost his job, his wife, his fortune, was put under investigation by the redoubtable Securities and Exchange Commission, and progressively felt good for acting stoically. A correspondence with a reader who was hit with a black swan, the unexpected large-impact random event (the loss of a baby) caused me to spend some time dipping into the literature on adaptation after a severe random event (not coincidentally also dominated by Daniel Kahneman, the pioneer of the ideas on irrational behavior under uncertainty). I have to confess that I never felt really particularly directly of service to anyone being a trader (except myself); it felt elevating and *useful* being an essayist.

All or None

A few confusions with the message in this book. Just as our brain does not easily make out probabilistic shades (it goes for the oversimplifying “all-or-none”), it was hard to explain that the idea here was that “it is more random than we think” rather than “it is all random.” I had to face the “Taleb, as a skeptic, thinks everything is random and successful people are just lucky.” The Fooled by Randomness symptom even affected a well-publicized Cambridge Union Debate as my argument “*Most* City Hotshots are Lucky Fools” became “*All* City Hotshots are Lucky Fools” (clearly I lost the debate to the formidable Desmond Fitzgerald in one of the most entertaining discussions in my life—I was even tempted to switch sides!). The same delusion of mistaking irreverence for arrogance (as I noticed with my message) makes people confuse skepticism for nihilism.

Let me make it clear here: Of course chance favors the prepared! Hard work, showing up on time, wearing a clean (preferably white) shirt, using deodorant, and some such conventional things contribute to success—they are certainly necessary but may be insufficient as they do not *cause* success. The same applies to the conventional values of persistence, doggedness and perseverance: *necessary, very necessary*. One needs to go out and buy a lottery ticket in order to win. Does it mean that the work involved in the trip to the store *caused* the winning? Of course skills count, but they do count less in highly random environments than they do in dentistry.

No, I am not saying that what your grandmother told you about the value of work ethics is wrong! Furthermore, as most successes are caused by very few “windows of opportunity,” failing to grab one can be deadly for one’s career. Take your luck!

Notice how our brain sometimes gets the arrow of causality backward. Assume that good qualities *cause* success; based on that assumption, even though it seems intuitively correct to think so, the fact that every intelligent, hardworking, persevering person becomes successful does not imply that every successful person is necessarily an intelligent, hardworking, persevering person (it is remarkable how such a primitive logical fallacy—*affirming the consequent*— can be made by otherwise very intelligent people, a point I discuss in this edition as the “two systems of reasoning” problem).

There is a twist in research on success that has found its way into the bookstores under the banner of advice on: “these are the millionaires’ traits that you need to have if you want to be just like those successful people.” One of the authors of the misguided *The Millionaire Next Door* (that I discuss in [Chapter 8](#)) wrote another even more foolish book called *The Millionaire Mind*. He observes that in the representative cohort of more than a thousand millionaires whom he studied most did not exhibit high intelligence in their childhood and infers that it is not your endowment that makes you rich—but rather hard work. From this, one can naively infer that chance plays no part in success. My intuition is that if millionaires are close in attributes to the average population, then I would make the more disturbing interpretation that it is because luck played a part. Luck is democratic and hits everyone regardless of original skills. The author notices variations from the general population in a few traits like tenacity and hard work: another confusion of the *necessary* and the causal. That all millionaires were persistent, hardworking people does not make persistent hard workers become millionaires: Plenty of unsuccessful entrepreneurs were persistent, hardworking people. In a textbook case of naive empiricism, the author also looked for traits these millionaires had in common and figured out that they shared a taste for risk taking. Clearly risk taking is necessary for large success—but it is also necessary for failure. Had the author done the same study on bankrupt citizens he would certainly have found a predilection for risk taking.

I was asked to “back up the claims” in the book with the “supply of data,” graphs, charts, diagrams, plots, tables, numbers, recommendations,

time series, etc., by some readers (and by *me-too* publishers before I was lucky to find Texere). This text is a series of logical thought experiments, not an economics term paper; logic does not require empirical verification (again there is what I call a “round-trip fallacy”: It is a mistake to use, as journalists and some economists do, statistics without logic, but the reverse does not hold: It is not a mistake to use logic without statistics). If I write that I doubt that my neighbor’s success is devoid of some measure, small or large, of luck, owing to the randomness in his profession, I do not need to “test” it—the Russian roulette thought experiment suffices. All I need is to show that there exists an alternative explanation to the theory that he is a genius. My approach is to manufacture a cohort of intellectually challenged persons and show how a small minority can evolve into successful businessmen—but these are the ones who will be visible. I am not saying that Warren Buffett is not skilled; only that a large population of random investors will *almost necessarily* produce someone with his track records *just by luck*.

Missing a Hoax

I was also surprised at the fact that in spite of the book’s aggressive warning against media journalism I was invited to television and radio shows in both North America and Europe (including a hilarious *dialogue de sourds* on a Las Vegas radio station where the interviewer and I were running two parallel conversations). Nobody protected me from myself and I accepted the interviews. Strangely, one needs to use the press to communicate the message that the press is toxic. I felt like a fraud coming up with vapid sound bites, but had fun at it.

It may be that I was invited because the mainstream media interviewers did not read my book or understand the insults (they don’t “have the time” to read books) and the nonprofit ones read it too well and felt vindicated by it. I have a few anecdotes: A famous television show was told that “this guy Taleb believes that stock analysts are just random forecasters” so they seemed eager to have me present my ideas on the program. However, their condition was that I make three stock recommendations to prove my “expertise.” I didn’t attend and missed the opportunity for a great hoax by discussing three stocks selected randomly and fitting a well-sounding explanation to my selection.

On another television show I mentioned that “people think that there is a story when there is none” as I was discussing the random character of the stock market and the backfit logic one always sees in events after the fact.

The anchor immediately interjected: “There was a story about Cisco this morning. Can you comment on that?” The best: When invited to an hour-long discussion on a financial radio show (they had not read [Chapter 11](#)), I was told a few minutes before to refrain from discussing the ideas in this book because I was invited to talk about trading and not about randomness (another hoax opportunity certainly, but I was too unprepared for it and walked out before the show started).

Most journalists do not take things too seriously: After all, this business of journalism is about pure entertainment, not a search for truth, particularly when it comes to radio and television. The trick is to stay away from those who do not seem to know that they are just entertainers (like George Will, who will appear in [Chapter 2](#)) and actually believe that they are *thinkers*.

Another problem was in the interpretation of the message in the media: This guy Nassim thinks that markets are random, *hence they are going lower*, which made me the unwilling bearer of catastrophic messages. Black swans, those rare and unexpected deviations, can be both good and bad events.

However, media journalism is less standardized than it appears; it attracts a significant segment of thoughtful people who manage to extricate themselves from the commercial sound bite-driven system and truly care about the message rather than just catching the public’s attention. One naive observation from my conversations with Kojo Anandi (NPR), Robin Lustig (BBC), Robert Scully (PBS), and Brian Lehrer (WNYC) is that the nonprofit journalist is altogether another intellectual breed. Casually, the quality of the discussion correlates inversely with the luxury of the studios: WNYC, where I felt that Brian Lehrer was making the greatest effort at getting into the arguments, operates out of the shabbiest offices I have seen this side of Kazakhstan.

One final comment on the style. I elected to keep the style of this book as idiosyncratic as it was in the first edition. *Homo sum*, good and bad. I am fallible and see no reason to hide my minor flaws if they are part of my personality no more than I feel the need to wear a wig when I have my picture taken or borrow someone else’s nose when I show my face. Almost all the book editors who read the draft recommended changes at the sentence level (to make my style “better”) and in the structure of the text (in the organization of chapters); I ignored almost all of them and found out that none of the readers thought them necessary—as a matter of fact, I

find that injecting the personality of the author (imperfections included) enlivens the text. Does the book industry suffer from the classical “expert problem” with the buildup of rules of thumb that do not have empirical validity? More than half a million readers later I am discovering that books are not written for book editors.

CHAPTER SUMMARIES

ONE: IF YOU'RE SO RICH, WHY AREN'T YOU SO SMART?

An illustration of the effect of randomness on social pecking order and jealousy, through two characters of opposite attitudes. On the concealed rare event. How things in modern life may change rather rapidly, except, perhaps, in dentistry.

TWO: A BIZARRE ACCOUNTING METHOD

On alternative histories, a probabilistic view of the world, intellectual fraud, and the randomness wisdom of a Frenchman with steady bathing habits. How journalists are bred to not understand random series of events. Beware borrowed wisdom: How almost all great ideas concerning random outcomes are against conventional sapience. On the difference between correctness and intelligibility.

THREE: A MATHEMATICAL MEDITATION ON HISTORY

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FOUR: RANDOMNESS, NONSENSE, AND THE SCIENTIFIC INTELLECTUAL

On extending the Monte Carlo generator to produce artificial thinking and compare it with rigorous nonrandom constructs. The science wars enter the business world. Why the aesthete in me loves to be fooled by randomness.

FIVE: SURVIVAL OF THE LEAST FIT—CAN EVOLUTION BE FOOLED BY RANDOMNESS?

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SIX: SKEWNESS AND ASYMMETRY

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NINE: IT IS EASIER TO BUY AND SELL THAN FRY AN EGG

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TEN: LOSER TAKES ALL—ON THE NONLINEARITIES OF LIFE

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ELEVEN: RANDOMNESS AND OUR MIND: WE ARE PROBABILITY BLIND

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TWELVE: GAMBLERS' TICKS AND PIGEONS IN A BOX

On gamblers' ticks crowding up my life. Why bad taxi-cab English can help you make money. How I am the fool of all fools, except that I am