

BOOK REVIEW

Thoughts inspired by Nassim Taleb's 'Fooled by Randomness' and 'The Black Swan'

Fooled by Randomness, by Nassim Taleb
Texere Publishing, 2001; 223 pp, ISBN: 1587990717

The Black Swan: the Impact of the Highly Improbable, by Nassim Taleb
Random House, 2007; 400 pp, ISBN: 978-1-4000-6351-2, \$26.95 (Hardback)

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Nassim Taleb is a Wall Street trader who has written one technical book ('Dynamic Hedging', 1997) and two books for general audiences ('Fooled by Randomness' in 2001 and 'The Black Swan' in 2007a) on the impact of uncertainty—particularly about rare events—in various aspects of life, including history, finance and the arts.

Taleb's general points—about variation, randomness and selection bias—will be familiar with quantitative social scientists and also to readers of historians such as Niall Ferguson and A. J. P. Taylor and biologists such as Stephen J. Gould who have emphasized the roles of contingency and variation in creating the world we see. Selection bias is important in politics and the law (consider, e.g. the challenge of estimating the probability that the accused is guilty as charged, conditional on that person being brought to court) as well as various other domains such as education (as has been discussed by statistician Howard Wainer, among others) and even sport. (For example, sabermetrician Bill James challenged the conventional wisdom in baseball that players peak around age 30 by noting that older players have been subject to selection—the worst of them have already retired—and when looking at individual careers, he found that performance was best, on average, around age 27.) See Wainer *et al.* (1998) and Gelman & Nolan (2002, Section 10.2) for further examples.

To a statistician such as myself, Taleb's books are interesting not so much for their models, which are familiar to us. (For example, Taleb rails against the automatic use of the Gaussian (perhaps misnamed as 'normal') distribution, but we are aware that the Student's *t* family, which can be interpreted as a scale mixture of Gaussians, can be used to model outliers.) What is interesting and fun about both books is the connections they make between statistical ideas and other aspects of life, as well as the sense of a practitioner discovering the relevance of various concepts of probability.

I will honour the spirit of both books by giving my comment in scatter shot style, starting with the first book, 'Fooled by Randomness', whose cover features a blurb, 'Named by Fortune one of the smartest books of all time'. But Taleb instructs us on page 161–162 to ignore book reviews because of selection bias (the mediocre reviews do not make it to the book cover).

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Books versus articles

I prefer writing books to writing journal articles because books are written for the reader (and also, in the case of textbooks, for the teacher), whereas articles are written for referees. Taleb definitely seems to be writing to the reader, not the referee. There is risk in book-writing, since in some ways referees are the ideal audience of experts, but I enjoy the freedom in book-writing of being able to say what I really think.

Hyperbole?

On pages xiiv–xlv of ‘Fooled by Randomness’, Taleb compares the ‘Utopian Vision, associated with Rousseau, Godwin, Condorcet, Thomas Paine, and conventional normative economists’, to the more realistic ‘Tragic Vision of humankind that believes in the existence of inherent limitations and flaws in the way we think and act’, associated with Karl Popper, Friedrich Hayek and Milton Friedman, Adam Smith, Herbert Simon, Amos Tversky and others. He writes, ‘As an empiricist (actually a skeptical empiricist) I despise the moralizers beyond anything on this planet. . .’.

Despise ‘beyond anything on this planet’? Isn’t this a bit extreme? What about, for example, hit-and-run drivers? I despise them even more.

Correspondences

On page 39, Taleb quotes the maxim, ‘What is easy to conceive is clear to express/Words to say it would come effortlessly’. This reminds me of the duality in statistics between computation and model fit: better-fitting models tend to be easier to compute, and computational problems often signal problems with the model. In statistics, as in many aspects of life, conceptual advances often come from what might be called technological improvements (in this case, the technologies include methods such as the EM algorithm and the Gibbs sampler that allow us to fit selection and mixture models). When thinking about risk and the law, a key statistical technology is hierarchical modelling, which can allow, e.g. a low probability to be empirically estimated by extending from more common precursor data ([Gelman & King, 1998](#)).

Evaluations based on luck

More generally, we can gain insights by moving from deterministic to probabilistic thinking. For example, people have written books with titles such as ‘The Thirteen Keys to the Presidency’ ([Lichtman & DeCell, 1990](#)) coming up with a simple formula to predict national election outcomes. But the past 50 years have seen four Presidential elections that have been, essentially (from any forecasting standpoint), ties: 1960, 1968, 1976 and 2000. Any forecasting method should get no credit for forecasting the winner in any of these elections, and no blame for getting it wrong. Also in the past 50 years, there have been four Presidential elections that were landslides: 1956, 1964, 1972 and 1984. (Perhaps you could also throw 1996 in there; obviously the distinction is not precise.) Any forecasting method better get these right, otherwise it is not to be taken seriously at all. What is left are 1980, 1988, 1992, 1996 and 2004: only five actual test cases in 50 years! You have a 1/32 chance of getting them all right by chance. This is not to say that forecasts are meaningless, just that simple Yes/No measures are too crude to be useful. This point might seem obvious but it has been missed even by expert reviewers ([Samuelson, 2004](#)).

Turing Test

On page 72, Taleb writes about the famous Turing test: ‘A computer can be said to be intelligent if it can (on average) fool a human into mistaking it for another human’. I do not buy this. At the very least, the computer would have to fool me into thinking it is another human. I do not doubt that this can be done (maybe another 5–20 years?). But I would not use the ‘average person’ as a judge. Average people can be fooled all the time. If you think I can be fooled easily, do not use me as a judge, either. Use some experts.

Lotteries

I once talked with someone who wanted to write a book called *Winners*, interviewing a bunch of lottery winners. But my response was to write a book called *Losers*, interviewing a bunch of randomly selected lottery players, almost all of whom, of course, would be net losers. (At the time, I did not realize that statisticians, economists and others have extracted useful information from studies of lottery winners, using the lottery win as a randomly assigned treatment; see [Sacerdote, 2004](#).)

Finance and hedging

When I was in college I was interviewed for a summer job for an insurance company. The interviewer told me that his boss ‘basically invented hedging’. He also was getting really excited about a scheme for moving profits around between different companies so that none of the money got taxed. It gave me a sour feeling, but in retrospect maybe he was just testing to see what my reaction would be.

Forecasts, uncertainty and motivations

Taleb describes the overconfidence of many so-called experts. Some people have a motivation to display certainty. For example, auto mechanics always seem to me to be 100% sure of their diagnosis (‘It’s the electrical system’), then when they are wrong, it never bothers them a bit. Setting aside possible fraud, I think they have a motivation to be certain, because we are unlikely to follow their advice if they qualify it. In the other direction, academics researchers have a motivation to overstate uncertainty, to avoid the potential loss in reputation from saying something stupid. But in practice, people seem to understate uncertainty most of the time.

Some experts are not experts at all. I was once called by a TV network (one of the benefits of living in New York?) to be interviewed about the lottery. I am no expert—I referred them to [Clotfelter & Cook \(1989\)](#). Other times, I have seen statisticians quoting in the paper on subjects they know nothing about. Once, several years ago, a colleague came into my office and asked me what ‘sampling probability proportional to size’ was. It turned out he was doing some consulting for the U.S. government. I was teaching a sampling class at the time, so I could help him out. But it was a little scary that he had been hired as a sampling expert. (And, yes, I have seen horrible statistical consulting in the private sector as well.) The implications for expert witnesses and the court system are obvious.

‘The Black Swan’

Taleb’s most recent book is about unexpected events (black swans) and the problems with statistical models such as the normal distribution that do not allow for these rarities. From a statistical point

of view, multilevel models (often built from Gaussian components) can model various black swan behavior. In particular, self-similar models can be constructed by combining scaled pieces (such as wavelets or image components) and then assigning a probability distribution over the scalings, sort of like what is done in classical spectrum analysis of $1/f$ noise in time series or by [Wu et al. \(2004\)](#) and others with ‘texture models’ for images.

A chicken’s way of making another egg

That said, I admit that my two books on statistical methods are almost entirely devoted to modelling ‘white swans’. My only defense here is that Bayesian methods allow us to fully explore the implications of a model, the better to improve it when we find discrepancies with data. Just as a chicken is an egg’s way of making another egg, Bayesian inference is just a theory’s way of uncovering problems which can lead to a better theory. I firmly believe that what makes Bayesian inference really work is a willingness (if not eagerness) to check fit with data and abandon and improve models often.

More on black and white swans

My own career is white swan-like in that I have put out lots of little papers, rather than pausing for a few years like that Fermat’s last theorem guy. Years ago, I remarked to my friend Seth (a psychologist who does animal learning experiments but has published only rarely in recent decades) that he is followed the opposite pattern: by abandoning the research grant, paper-writing treadmill and devoting himself to self-experimentation, he basically was rolling the dice and going for the big score—in Taleb’s terminology, going for that black swan. Seth just came out with a popular weight-loss book ([Roberts, 2006](#)) so maybe it is actually happening.

On the other hand, you could say that in my career I am following Taleb’s investment advice—my faculty job gives me a ‘floor’ so that I can work on whatever I want, which sometimes seems like something little but maybe can have unlimited potential. (On page 297, Taleb talks about standing above the rat race and the pecking order; I have tried to do so in my own work by avoiding a treadmill of needing associates to do the research to get the funding, and needing funding to pay people.)

In any case, I have had a boring sort of white-swan life, growing up in the suburbs, being in school continuously since I was 4 years old (and still in school now!). In contrast, Taleb seems to have been exposed to lots of black swans, both positive and negative, in his personal life.

Chapter 2 of ‘The Black Swan’ has a (fictional) description of a novelist who labours in obscurity and then has an unexpected success. This somehow reminds me of how lucky I feel that I went to college when and where I did. I started college at MIT during an economic recession, and in general, all of us just had the goal of getting a good job. Not striking it rich, just getting a solid job. Nobody I knew had any thought that it might be possible to get rich. It was before stock options, and nobody knew that there was this thing called ‘Wall Street’. Which was fine. I worry that if I had gone to college 10 years later, I would have felt a certain pressure to go get rich. Maybe that would have been fine, but I am happy that it was not really an option.

95% confidence intervals can be irrelevant, or, living in the present

On page xviii, Taleb discusses problems with social scientists’ summaries of uncertainty. This reminds me of something I sometimes tell political scientists about why I do not trust 95% intervals: a 95% interval is wrong 1 time out of 20. If you are studying U.S. Presidential elections, it takes

80 years to have 20 elections. Enough changes in 80 years that I would not expect any particular model to fit for such a long period anyway. (Mosteller & Wallace (1964) made a similar point about how they do not trust p -values less than 0.01 since there can always be unmodelled events. Saying $p < 0.01$ is fine, but please please do not say $p < 0.00001$ or whatever.)

More generally, people (or, at least, political commentators) often live so much in the present that they forget that things can change. An instructive example here is Richard Rovere's (1965) book on Barry Goldwater's 1964 campaign for president. Rovere, a respected political writer, wrote that the U.S. had a one-and-a-half-party system, with the Democrats being the full-party and the Republicans the half-party. Yes, Goldwater lost big and, yes, the Democrats did have twice the number of Senators and twice the number of Representatives in Congress then—but, actually, from 1950 through 1990, the Republicans won or tied every Presidential election (except 1964). Hardly the performance of a half-party.

Knowing what you do not know, and omniscience is not omnipotence

The quotes on page xix of 'The Black Swan' remind me of one of my favourites: 'It ain't what you don't know that gets you into trouble. It's what you know for sure that just ain't so' (Mark Twain?). I actually prefer the version that says, 'It's what you don't know you don't know that gets you into trouble'. Also Earl Weaver's 'It's what you learn after you know it all that counts'.

On page xx, Taleb writes, 'What you know cannot really hurt you'. This does not sound right to me. Sometimes you know something bad is coming but you cannot dodge it. For example, consider certain diseases.

Creativity is not (yet) algorithmic

On page xxi, Taleb says how almost no great discovery came from design and planning. This reminds me about a biography of Mark Twain that I read several years ago (Kaplan, 1966). Apparently, Twain was always trying to create a procedure—essentially, an algorithm—to produce literature. He tried various strategies, collaborators, etc., but nothing really worked. He just had to wait for inspiration and write what came to mind.

Also on page xxi, Taleb writes 'we don't learn rules, just facts, and only facts'. This statement would surprise linguists. It has been well demonstrated that kids learn language through rules (as can be seen, for example, from over-generalizations such as 'feets' and 'teached'). More generally, folk science is strongly based on categories and natural kinds—I think Taleb is aware of this since he cites some of the relevant cognitive psychology in his references. (A recent example of naive categorization in folk science is in the papers of Satoshi Kanazawa, who claimed (with poor evidence) that nurses are more likely to have daughters and engineers are more likely to have sons; see Gelman, 2007.)

Recognition, prevention and saltatory growth

On page xxiii, Taleb writes that 'recognition can be quite a pump'. Yes, but recall all those scientists whose lives were shortened by 2 years (on average) from frustration at not receiving the Nobel Prize! (See Rablen & Oswald, 2007).

On page xxiv, 'few reward acts of prevention': I am reminded of our health plan in grad school, which paid for catastrophic coverage but not routine dental work. A friend of mine actually had to get root canal, and eventually got the plan to pay for it, but not without a struggle.

On page 10, Taleb writes, ‘history does not crawl, it jumps’. This reminds me of the evidence on saltatory growth in infants (basically, babies grow length by a jump every few days; they do not grow the same amount every day; see [Lampl, 1993](#)).

Aha

I was also reminded of the fractal nature of scientific revolutions—basically, at all scales (minutes, hours, days, months, years, decades, centuries, etc.), science seems to proceed by being derailed by unexpected ‘aha’ moments. (Or, to pick up on Taleb’s themes, I can anticipate that ‘aha’ moments will occur, I just cannot predict exactly when they will happen or what they will be.)

Liberals and conservatives

On page 16, Taleb asks ‘why those who favor allowing the elimination of a fetus in the mother’s womb also oppose capital punishment’ and ‘why those who accept abortion are supposed to be favourable to high taxation but against a strong military’, etc. First off, let me chide Taleb for deterministic thinking. From the U.S. General Social Survey, here’s the cross-tab of the responses to ‘Abortion if woman wants for any reason’ and ‘Favor or oppose death penalty for murder’:

40% supported abortion for any reason. Of these, 76% supported the death penalty.

60% did not support abortion under all conditions. Of these, 74% supported the death penalty.

This was the cumulative file, and I am sure things have changed in recent years, and maybe I even made some mistake in the tabulation, but, in any case, the relation between views on these two issues is far from deterministic!

But getting back to the main question: I do not think it is such a mystery that various leftist views (allowing abortion, opposing capital punishment, supporting a graduated income tax and reducing the military) are supposed to go together—nor is it a surprise that the opposite positions go together in a rightist world view. Abortion is related to women’s rights, which has been a leftist position for a long time. Similarly, conservatives have favoured harsher punishments and liberals (to use the U.S. term) have favoured milder punishments for a long time also. The graduated income tax favours the have-nots rather than the have-mores, and the military is generally a conservative institution. Other combinations of views are out there, but I do not agree with Taleb’s claim that the left–right distinction is arbitrary.

Picking pennies in front of a steamroller

On page 19, Taleb refers to the usual investment strategy (which I suppose I actually use myself) as ‘picking pennies in front of a steamroller’. That is a cute phrase; who came up with it? I am also reminded of the famous Martingale betting system. Several years ago, in a university library I came across a charming book by Maxim (of gun fame) from 1903 where he went through chapter after chapter demolishing the Martingale system. (For those who do not know, the Martingale system is to bet \$1, then if you lose, bet \$2, then if you lose, bet \$4, etc. You are then guaranteed to win exactly \$1—or lose your entire fortune. A sort of lottery in reverse, but an eternally popular ‘system’.)

Throughout, Taleb talks about forecasters who are not so good at forecasting, picking pennies in front of steamrollers, etc. I imagine much of this can be explained by incentives. For example, those long-term capital guys made tons of money, then when their system failed, I assume they did not actually go broke. They have an incentive to ignore those black swans, since others will pick

up the tab when they fail (sort of like the Federal Emergency Management Agency pays for those beachfront houses in Florida). It reminds me of the saying that I heard once (referring to Donald Trump, I believe) that what matters is not your net worth (assets minus liabilities), but the absolute value of your net worth. Being in debt for \$10 million and thus being ‘too big to fail’ is (almost) equivalent to having \$10 million in the bank.

The discussion on page 112 of how Ralph Nader saved lives (mostly via seat belts in cars) reminds me of his car-bumper campaign in the 1970s. My father subscribed to Consumer Reports then (he still does, actually, and I think reads it for pleasure—it must be one of those Depression-mentality things), and at one point they were pushing heavily for the 5-mph bumpers. Apparently, there was some federal regulation about how strong car bumpers had to be, to withstand a crash of 2.5 mph, 5 mph, or whatever—the standard had been 2.5 (I think), then got raised to 5, then lowered back to 2.5, and Consumer’s Union (CU) calculated (reasonably correctly, no doubt) that the 5-mph standard would, in the net, save drivers money. I naively assumed that CU was right on this. But, looking at it now, I would strongly oppose the 5-mph standard. In fact, I would support a law forbidding such sturdy bumpers. Why? Because, as a pedestrian and cyclist, I do not want drivers to have that sense of security. I would rather they be scared of fender benders and, as a consequence, stay away from me! Anyway, the point here is not to debate auto safety; it is just an interesting example of how my own views have changed. Another example of incentives.

Three levels of conversation, or, why lunch at the faculty club might (sometimes) be more interesting than hanging out with chair-throwing traders

On page 21, Taleb compares the excitement of chair-throwing stock traders to ‘lunches in a drab university cafeteria with gentle-minded professors discussing the latest departmental intrigue’. This reminds me of a distinction I came up with once when talking with a colleague in the psychology department, the idea of three levels of conversation. Level 1 is personal: spouse, kids, favourite foods, friends, gossip, etc. Level 2 is ‘departmental intrigue’, who is doing what job, getting person X to do thing Y, how to get money for Z—basically, level 2 is all about money. Level 3 is impersonal things: politics, sports, research, deep thoughts, etc. When talking with Dave, I resolved to minimize level 2 conversation and focus on the far more important (and interesting) levels 1 and 3. Level 2 topics have an immediacy which puts them on the top of the conversational stack, which is why I made the special effort to put them aside. Anyway, it struck me in reading page 21 of Taleb’s book that chair-throwing stock traders have much more interesting level 2 conversations (compared with professors or even grad students), and quite possibly they have better level 1 conversations also—but I would hope that the level 3 conversations at the university are more interesting. Being on campus, I am used to having all sorts of good level 3 conversations, but I find these harder to come by in other settings. Probably it is nothing to do with the depth of these other people, just that I find it easier to get into a good conversational groove with people at the university. In any case, I try (not always successfully) to keep conversations away from ‘the latest departmental intrigue’.

Riding the escalator to the stairmaster

The story on page 54 of ‘The Black Swan’ about the people who ride the escalator to the stairmasters reminds me that, where I used to work, there was a guy who carried his bike up the stairs to the fourth floor. This always irritated me because it set an unfollowable example. For instance, one day I was on the elevator (taking my bike to the third floor) and some guy asked me, ‘You ride your

bike for the exercise. Why don't you take the stairs?' (I replied that I do not ride my bike for the exercise.)

Confirmation bias, or, should I not be reading an astrology book?

Around pages 58–59, Taleb talks about confirmation bias and recommends that we look for counter-examples to our theories. I certainly agree with this and do it all the time in my research. But what about other aspects of life? For example, I was reading 'The Black Swan', which I knew ahead of time would contain lots of information that I already agreed with. Should I instead read a book on astrology? In practice, I am sure this would just confirm my (presumably true) suspicion that astrology is false, so I am stuck here in an endless cycle of skepticism.

Rare events and selection bias

The footnote on 61 of 'The Black Swan' reminded me of a talk I saw a couple years ago where it was said that New York City is expected to have a devastating earthquake some time in the next 2000 years.

On page 77, Taleb says that lottery players treat odds of one in a thousand and one in a million almost the same way. But when they try making lottery odds lower (e.g. changing from 'pick 6 out of 42' to 'pick 6 out of 48') people do respond by playing less (unless the payoffs are appropriately increased). I attribute this not to savvy probability reasoning but to a human desire not to be ripped off.

Then, on page 126, Taleb describes a conference he attended where his 'first surprise was to discover that the military people there thought, behaved, and acted like philosophers [in the good sense of the word]. . . They thought out of the box, like traders, except much better and without fear of introspection'. He goes on to discuss why military officers are such good skeptical thinkers. But this seems like a clear case of selection bias! The military officers who are asked to an academic symposium are probably an unusual bunch.

Losers lie

On page 118–119 of 'The Black Swan', Taleb discusses of how someone with a winning streak in life can think it is skill, even if it is just luck and selection (since the losers do not get observed). I would like to add another explanation, which is that people lie. Someone who tells you he won 10 straight times probably actually won 10 times out of 15. And someone who tells you he broke even probably is a big loser (recall former Secretary of Education William Bennett and his gambling problem; see, e.g. [Roeper, 2003](#)).

Of fights and coin flips

On page 127–128, Taleb considers the distinction between uncertainty and randomness (the boxer, the wrestler and the coin flip, in the terminology of [Gelman, 2006](#)). I would only point out that coins and dice, while maybe not realistic representations of many sources of real-world uncertainty, do provide useful calibration. Similarly, actual objects rarely resemble 'the meter' (that famous metal bar that sits, or used to sit, in Paris), but it is helpful to have an agreed-upon length scale. Just to give some examples familiar to me, [Gelman et al. \(2003, Chapter 1\)](#) has some examples of assigning probabilities empirically (for football scores and record linkage).

Also, as discussed in [Gelman and Nolan \(2002, Section 7.1\)](#), when teaching probability I prefer to use actual random events (e.g. sex of births) rather than artificial examples such as craps, roulette, etc. which are full of technical details (e.g. what is the probability of spinning a '00') that are dead

ends with no connection to any other areas of inquiry. In contrast, thinking about sex of births leads to lots of interesting probabilistic, biological, combinatorial and evolutionary directions.

Overconfidence as the side effect of communication goals

On page 14 of ‘The Black Swan’, Taleb discusses overconfidence (as in the pathbreaking study of [Alpert & Raiffa, 1982](#)). As we teach in decision theory, there is actually an easy way to make sure that your 95% intervals are calibrated. You just have to apply the following rule: every time someone asks you to make a decision, spin a spinner that has a 95% chance of returning the interval (–infinity, infinity), and a 5% chance of returning the empty set. You will be perfectly calibrated (on average). The intervals are useless, however, which points towards the fact that when people ask you for an interval, you are inclined (if, for no other reason than the cooperative principle of conversation; [Grice, 1975](#)) to provide some information. In this view, much of overconfidence of probability statements can be explained by this tension between the goals of informativeness and calibration.

On page 145, Taleb discusses the fallacy of assuming that ‘more is better’. A lot depends here on the statistical model you are using (or implicitly using). With least squares, over-fitting is a real concern. Less so in Bayesian inference, but over-fitting still arises with non-informative prior distributions. An important—the important—topic in Bayesian statistics is the construction of structured prior distributions that let the data speak but at the same time do not get overwhelmed by a flood of data.

Of taxonomies and lynx

In the discussion of Mandelbrot’s work on page 269 of ‘The Black Swan’, I would also mention Mandelbrot’s models for taxonomies, which have a simple self-similar structure without the complexities of the more familiar spatial examples. Also, the story about the problems of Gaussian models reminds me of [Reilly & Zeringue \(2004\)](#), who fit a simple predator–prey model with about three parameters to the famous (within the field of statistics) Canadian lynx data and get much better predictions than the standard 11-parameter Gaussian time series models that are usually fit to those data.

It is all over but the compartmentalizin’

On page 288, Taleb discusses people who compartmentalize their intellectual lives, e.g. the philosopher who was a trader but did not use his trading experiences to inform his philosophy. I noticed a similar thing about some of my colleagues where I used to teach in the statistics department at Berkeley. On the one hand, they were extremely theoretical, using advanced mathematics to prove very subtle things in probability theory, often things (such as the strong law of large numbers) that had little if any practical import. But when they did applied work, they threw all this out the window—they were so afraid of using probability models that they would often resort to very crude statistical methods. I imagine similar paradoxes arise in research performed by law professors.

I am only a statistician from 9 to 5

I try (and mostly succeed, I think) to have some unity in my professional life, developing theory that is relevant to my applied work. I have to admit, however, that after hours I am like every

other citizen. I trust my doctor and dentist completely, and I will invest my money wherever the conventional wisdom tells me to (just like the people whom Taleb disparages on page 290 of his book).

Miscellaneous sociological thoughts provoked by 'The Black Swan'

Taleb's comment on page 155 about economics being the most insular of fields reminds me of the economist who said that economists are different than 'anthropologists, sociologists, and public health officials' because economists believe that 'everyone is fundamentally alike' (except, of course, for anthropologists, etc.). Economists often do seem pretty credulous of arguments presented by other economists!

On page 166, Taleb disparages plans. But plans can be helpful, no? Even if they do not work out. It usually seems to me that even a poor plan (if recognized as tentative) is better than no plan at all.

The discussion on page 171 of predicting predictions reminds me of the paradox, of sorts, that opinion polls shift predictably during presidential nominating conventions, even though conventions are very conventional events, and so one's shift in views should be (on average) anticipated.

On page 174–175, Taleb commends Poincare for not wasting time finding typos. For me, though, typo-finding is pleasant. Although I am reminded of the expression, 'there's no end to the amount of work you can put into a project after it's done'.

The graphs on pages 186–187 have that ugly Excel look, with unnecessary horizontal lines and weirdly labelled y-axes. In any case, they remind me of the game of 'scatterplot charades' that I sometimes enjoy playing with a statistics class. The game goes as follows: someone displays a scatterplot—just the points, nothing more—and everyone tries to guess what's being plotted. Then more and more of the graph is revealed—first the axis numbers, then the axis labels—until people figure it out.

I am a little puzzled by Taleb's claim, at the end of page 193, that 'to these people amused by the apes, the idea of a being who would look down on them the way they look down on the apes cannot immediately come to their minds'. I am amused by apes but can imagine such a superior being who would be amused by me. Why not?

On page 196, Taleb writes, 'a single butterfly flapping its wings in New Delhi may be the certain cause of a hurricane in North Carolina. . .'. No—there is no 'the cause' (let alone, 'the certain cause'). Presumably another butterfly somewhere else could have moved the hurricane away.

Page 198: the chance of a girl birth is 48.5%, not 50%.

On page 209, Taleb writes, 'work hard, not in grunt work. . .'. I have mixed feelings here. On one hand, yes, grunt work can distract from the big projects. For example, I am blogging and writing lots of little papers each year instead of attacking the big questions. On the other hand, these little projects are the way I get insights into the big questions. Getting in down and dirty, playing with the data and writing code, is a way that I learn.

The mention on page 210 of Pascal's wager reminds me of the fallacy of the one-sided bet. I am hoping that now that this fallacy has been named, people will notice it and avoid it on occasion.

The discussion on page 222 of capitalism, socialism and attribution errors reminds me of the saying that everybody wants socialism for themselves and capitalism for everybody else (and there is nothing more fun than spending other people's money).

The discussion on the following page of the long tail reminds me of the conjecture about the 'fat head' of mega-consumers.

The footnote on page 224 about book reviews reminds me of a general phenomenon which is that different reviews of the same book tend to have almost the exact same information. This becomes really clear if you look up a bunch of reviews on Nexis, for example. It can be frustrating, because for a book I like, I would be interested in seeing lots of different perspectives. In contrast, in more diverse journals, the implicit rules have not been defined yet, so there is more diversity (as in this non-review right here).

The comments on page 231 on the Gaussian distribution remind me that even Galton got confused about the tails of the distribution as applied to human height—a quick (and mistaken) calculation led Galton to estimate that one in a million men was over nine feet tall! (See [Wainer, 2007](#).)

On page 240, Taleb writes that Gauss, in using the normal distribution, ‘was a mathematician dealing with a theoretical point, not making claims about the structure of reality like statistical-minded scientists’. My understanding (one could check Stigler, 1986, to be sure) was that Gauss developed least squares and the normal distribution in the context of fitting curves to astronomical observations. Sure he did lots of pure math, but he (and Laplace) was doing empirical science too.

I like Galileo’s quote on page 257, ‘The great book of Nature lies ever open before our eyes and the true philosophy is written in it. . . . But we cannot read it unless we have first learned the language and the characters in which it is written. . . . It is written in mathematical language and the characters are triangles, circles and other geometric figures’. As Taleb writes, ‘Was Galileo legally blind?’ Actual nature is not full of triangles, etc., it is full of clouds, mountains, trees and other fractal shapes. But these shapes not having names or formulas, Galileo could not think of them. He chose the natural kind that was closest to hand. En el pais de los ciegos, etc.

On page 261, Taleb writes that in the past 44 years, ‘nothing has happened in economics and social science statistics except for some cosmetic fiddling’. I would disagree with that. True, I am sure you could find antecedents of any current method in papers that were written before 1963, but I think that developing methods that work on complex problems is a contribution in itself. There is certainly a lot we can do now that could not be done very easily 44 years ago.

Reading with pen in hand

To conclude: it is fun (but work) to read a book manuscript with pen in hand. A great thing about statistics is its applicability to so many areas of life. For a (current) last word on these issues, see Taleb’s (2007b) online comments on an earlier version of this review.

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