



**Numbers Rule Your World: The Hidden Influence
of Probabilities and Statistics on Everything You
Do**

Kaiser Fung

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WHAT ARE THE ODDS YOU'LL WIN THE LOTTERY?

How long will your kids wait in line at Disney World?

Who decides that "standardized tests" are fair?

Why do highway engineers build slow-moving ramps?

What does it mean, statistically, to be an "Average Joe"?

NUMBERS RULE YOUR WORLD

In the popular tradition of eye-opening bestsellers like *Freakonomics*, *The Tipping Point*, and *Super Crunchers*, this fascinating book from renowned statistician and blogger Kaiser Fung takes you inside the hidden world of facts and figures that affect you every day, in every way.

These are the statistics that rule your life, your job, your commute, your vacation, your food, your health, your money, and your success. This is how engineers calculate your quality of living, how corporations determine your needs, and how politicians estimate your opinions. These are the numbers you never think about—even though they play a crucial role in every single aspect of your life.

What you learn may surprise you, amuse you, or even enrage you. But there's one thing you won't be able to deny: *Numbers Rule Your World...*

"An easy read with a big benefit."

--Fareed Zakaria, CNN

"For those who have anxiety about how organization data-mining is impacting their world, Kaiser Fung pulls back the curtain to reveal the good and the bad of predictive analytics."

--Ian Ayres, Yale professor and author of *Super Crunchers: Why Thinking By Numbers is the New Way to Be Smart*

"A book that engages us with stories that a journalist would write, the compelling stories behind the stories as illuminated by the numbers, and the dynamics that the numbers reveal."

--John Sall, Executive Vice President, SAS Institute

"Little did I suspect, when I picked up Kaiser Fung's book, that I would become so entranced by it - an illuminating and accessible exploration of the power of statistical analysis for those of us who have no prior training in a field that he explores so ably."

--Peter Clarke, author of *Keynes: The Rise, Fall, and Return of the 20th Century's Most Influential Economist*

"A tremendous book. . . . If you want to understand how to use statistics, how to think with numbers and yet to do this without getting lost in equations, if you've been looking for the book to unlock the door to logical thinking about problems, well, you will be pleased to know that you are holding that book in your hands."
--Daniel Finkelstein, Executive Editor, *The Times of London*

"I thoroughly enjoyed this accessible book and enthusiastically recommend it to anyone looking to understand and appreciate the role of statistics and data analysis in solving problems and in creating a better world."
--Michael Sherman, Texas A&M University, *American Statistician*

Numbers Rule Your World: The Hidden Influence of Probabilities and Statistics on Everything You Do Details

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From Reader Review Numbers Rule Your World: The Hidden Influence of Probabilities and Statistics on Everything You Do for online ebook

Raktim Majumdar says

I would say this is a very good book for anyone who wants to start on statistics and be hooked on to the subject. Thoroughly analyzing few hand-picked case studies the author does a fabulous job of driving in the influence of numbers, statistics and probability in our daily life. To us SAT may be an examination to judge the student abilities but the tremendous amount of data churned by statisticians to make the examination an unbiased one for all students is not visible to us. Similar is the case of traffic engineers who painstakingly work to make our commute as smooth as possible. Reading this book and getting to know all these case studies was a privilege.

I wrote an extensive review of the book here: <http://cosmicguru.blogspot.com/2018/0...>

Chris Lynch says

A fine little discussion of the impact of statistics on our everyday lives, in the tradition of Freakonomics. If I were asked to pick an alternative and more cynical title for this, it might be 'The Foolishness of Crowds' as Kaiser Fung offers a number of excellent examples of public perception being at odds with the reality revealed by statistics. Give people the feeling of being in control and they tend to see everything through rose-tinted glasses even though they may actually be better off surrendering that control to expert hands. An example of this is the impact of ramp metering on U.S. highways, which is unpopular even though it is probably successful in reducing journey times and congestion.

But institutions also ignore or misinterpret statistics at their peril, and this can lead to great harm. For instance, failure to understand the statistical balance that exists between false positive and false negative results in forensic procedures such as lie detection and drugs testing can lead to miscarriages of justice (and has done so).

All in all, a worthwhile read for anyone who wants to move beyond the over-simplified aphorism of 'There are lies, damned lies and statistics'.

Julia says

You don't need to be a "numbers person" (read: geek) to enjoy the fantastic and mind-boggling things some really smart people do with them. Fung manages to make the book an entertaining and speedy read while still bogging your mind with the secret statistics behind life's regular events.

And more importantly, this book could finally put the lottery debate to bed once and for all. Meaning, yes - it is silly to waste money on lotto tickets because the chances of winning or so, so slim.

Michael says

I have to say that I thought this "pop statistics" book was much better than others I have previously read (Super Crunchers and the Freakonomics series). (Disclaimer: I have read Kaiser Fung's blog Junk Charts for a few years, so I was predisposed to think positively of his book.)

I found this book to be less into the sensational aspects of using data to make decisions and more about the challenges of doing so. Also, it explored the fact that context makes a difference. Each chapter was set up to have two examples of data analysis based on a theme of statistics, but the context of the two problems would dictate different approaches to each problem. For example, one chapter deals with the "correlation does not imply causation" theme of statistics. Fung gives two examples: credit scoring and food recalls. In the credit scoring situation, the analysts do not even care about the causes of good or bad creditworthiness as long as their models are accurately predicting the risk of default on a loan. Conversely, epidemiologists involved in food recalls must worry about causation so they know precisely which food to recall. For this, Fung also discusses ways that statisticians work with other professionals to solve a problem.

All in all, I enjoyed this book and the structure of the chapters. The tone was less sensational than others, and I think that made it easier to read and take seriously. Also, I really liked that Fung did not create any new proper nouns (like "Super Cruncher").

Erik says

I hear about this book in a completely random way, as I had turned by TV on to CNN where Fareed Zakaria was finishing up his program, GPS, and he ended it by recommending Fung's book. Coming in at just under two hundred pages, Fung – an Ivy League educated mathematician and statistician – has a remarkable and singular capacity to make statistical theory both applicable and astonishingly clear for the layperson to grasp.

Not only does he mathematically debunk the irrational fear of flying because of infinitesimally small chance of a plane crash, but also the equally minuscule and absurd chances that any one of us could win big in a state lottery. Although he doesn't cover new territory here, Fung does go on to take apart the so-called validity of lie detector tests – the bane of the legal establishment when law enforcement recklessly insist on using them in the courtroom against criminal suspects – by noting not just the number of false negatives that get away with murder (so to speak), but also the false positives. In short, 99% reliability is simply not good enough, no matter how nice that sounds at first.

Sadly, many of the mistaken beliefs that Fung mathematically dissembles with his easy to understand use of statistics are still all too common. "Statistical thinking is hard" ... The subject matter is not inherently difficult, but our brains are wired in such a way that it requires a conscious effort to switch away from the default mode of reasoning, which is not statistical." If I was granted any wish, I would hope that his ideas were explored in all high school math classrooms. Can you imagine what a well-informed electorate we could and would have?

Frank says

Great sections on PED tests in cycling and baseball and on polygraph testing. Other sections were a little dry. The book is about statistics though, so don't expect a smooth read.

Regarding baseball, because the USADA/WADA and MLB are so overly paranoid of the false positive drug test, Fung argues that they knowingly use less stringent testing standards. This not only minimizes the number of true positives and false positives, but also increases the false negatives. In other words, more cheaters get off cleanly. This is because overturned false positives humiliate organizations like WADA and diminish their credibility. Of course, the point is well-taken that if the test were only 99% effective, since there are over 700 MLB players, seven innocent players could have their careers ruined.

It does seem as though the science behind these tests hasn't really improved much in the last century. With all the money tied to professional sports and if ensuring the integrity of the game was paramount to all else (maybe it's not), one would think a better, more full-proof test would have been requisitioned long ago. It's also likely that a test of 100% certainty is completely unrealistic.

Additionally, the polygraph testing section highlights the use of polygraphs in Iraq and Afghanistan. It gives some credence to the oft-cited claims that a significant number of insurgents are being held without any evidence of wrongdoing. Because the polygraphs used to process these suspected combatants are setup to minimize the false negative result, Fung suggests that thousands of innocent individuals are implicated for every major security violator correctly identified. In other words, statistically speaking, we're locking up a lot of innocent people just in case.

Anusha Sridharan says

Quoting the summary of the intent of this book,

"In concluding, I review the five aspects of statistical thinking:

1. The discontent of being averaged: Always ask about variability.
2. The virtue of being wrong: Pick useful over true.
3. The dilemma of being together: Compare like with like.
4. The sway of being asymmetric: Heed the give-and-take of two errors.
5. The power of being impossible: Don't believe what is too rare to be true."

I skimmed my understanding about how numbers work in our lives and how impactful they are just based on how they look, some are deceptive, some are too true to be ignored.

Statistical thinking is a way in and looking forward for more books like these.

Josh Kopp says

Slightly deeper reading on the probabilities and statistics that affect you everyday. Author Kaiser Fung writes how you are directly changed by numbers day-by-day rather than just generating another book about the theoretical probability of something happening.

Chapter 1:

Looks at two examples of waiting time: Minnesota's road system and Disneyland's ride lines. How can the time of waiting be reduced? Author Fung proves that increasing road width and park size will do nothing. The solution lies in reducing variability and increasing reliability for drivers and guests.

We like to look at the average. But looking at the average proves that we rely on variability. It could take 30 minutes to get to work or only 7 minutes, depending on different factors. So satisfaction for us goes down. We're either too early or too late...

Disney & MN/DOT brainstormed out successful ways by reducing variability: the FastPass & "ramp metering." Ingenious creations for saving time. But then brings the argument of social injustice. "How come I have to sit here at the stop light? How come they get to cut in line?" It's all about perception! Everyone is saving time, but it doesn't feel like it on the surface.

Chapter 2:

Slightly boring chapter about a "particular breed of statisticians call modelers....Their special talent is the educated guess." The chapter compares two groups: epidemiologists & credit modelers. Epidemiologists seek to find the cause of disease outbreaks. Credit modelers determine your credit score. But how do they figure where the disease came from and how to stop it? And what variables determined my credit score (how did that guy get a higher score than me)? Modelers look at correlations to find causation. Sure, some correlations might be theoretical and wrong; but through trial and error, we can arrive at the cause.

Chapter 3:

This chapter reveals the dilemma of being lumped together in a group (focusing on test-taking analytics and the risks of Florida's home insurance). Insurance benefits high risk contributors but does little for those who live, for example, in the middle of Florida rather than the coastline. Take for instance, hurricane season...rates skyrocket. But how does that benefit the inland Floridians? Sometimes being lumped into the group doesn't help everyone.

The author compares test-taking results as well. What is fair for all demographics? Do some questions benefit one group over the other? Does lumping the group together benefit everyone? It actually doesn't. Caucasians grew up in a different environment than African Americans, and the same goes for Hispanic students. How can we create a test that is neutral to all cultures? Analysts were able to formulate SAT questions to do just this.

Author Fung wonders when this same type of equality will reach the insurance world as well.

Chapter 4:

A huge problem sits within the world of lie detection. In man's effort to seek out the "bad eggs," lie detectors falsely accuse the innocent at the same time. Fung writes about the increasing number of false positives that ruin the effectiveness of lie detection. Take drug-testing in sports...administrators blanket drug tests over all players to weed out the cheaters. From this drug-testing results many false negatives, which in turn truly end up to be false. But through the process, players reputations and careers are jeopardized. What opportunities were lost because one of these false positives came up against them? And on top of all this, the majority of drug users aren't ever caught! So is this the best method?

Fung also looks at lie detection. Instead of screening people (which could create a countless number of false negatives) with a polygraph machine, Fung argues that a police lineup would be more effective...

In the end, Fung reveals that polygraphs and data-mining detections can't help find the true wrongdoers effectively. The process produces too many false negatives. Too many people are falsely accused in an effort to find the one "bad egg." Fung offers no suggestions for improvement though, so I guess we are just left to wonder.

Chapter 5:

Great chapter revealing the honest truth behind winning the lottery and plane crashes. Both oddities rarely occur. But yet, millions of people chance their money away at the lottery ticket. Literally, the odds to win are 1 in 10 million (specifically for the Encore lottery). That statistic matches the same stat for someone to die in a plane crash. Both are freak happenings. "Yet about 50 percent of Americans play the state lotteries, and at least 30 percent fear flying." Why? It boils down to our emotions. The payoff for winning the lottery is so great! We'd love to be a part of that. But on the flip side, we could die! We don't want that...so we choose not to fly. When in reality, both occurrences will probably never affect us in this life. They would happen once every 24,000 years for us.

Numbers surround us everyday. Statistics can't predict and explain some of the mysteries of the world.

Megan says

It said it was probability and statistics for everyday life, but at times it was too nerdy for even me. The author picked some very interesting case studies, certainly ones that many of us can relate to (wait times at Disney, lottery tickets, standardized testing). It was interesting but a bit repetitive. This is not a book I would recommend to just anyone.

Vishwasimhaa says

Such an interesting and fun read, since I'm both a math/numbers nerd and a psychology geek....

Really liked the device of placing 2 examples side by side to articulate the concepts....

Mr.Fung has taken serious issues that continue to make headlines, like doping among elite athletes or why

residents continue to move to disaster prone areas, and reveals the truth behind them....

I would recommend this to anyone interested in reading up on these issues or finding out why we often miss the full view of most controversial situations...and statistics is at the heart of it all....

Remo says

Libro muy, muy interesante en el que en cuatro grandes bloques el autor analiza los usos cotidianos de la estadística, más allá de lo que solemos saber. La estadística se usa cuando aparece un brote epidemiológico, cuando diseñas análisis de dopaje, o exámenes de polígrafo, cuando intentas minimizar los tiempos percibidos por los visitantes de Disneylandia o los viajeros de una red de autopistas, o cuando intentas diseñar un examen tipo test que no discrimine a los estudiantes según su origen. El autor nos muestra bastantes veces que lo que dicta nuestro sentido común es un craso error. He tenido que releer varias veces varios pasajes porque lo que leía me parecía claramente incorrecto, pero resulta que se ha comprobado que hay cosas que son como son a pesar de nuestros prejuicios. El autor se esfuerza en hacernos entender que, por ejemplo, dada una fiabilidad de un test (por ejemplo, el test de dopaje por nandrolona es fiable al 99,9%), cualquier esfuerzo que hagamos por evitar falsos negativos (es decir, por impedir que se escapen los dopados) incrementará el número de falsos positivos (gente limpia que da positivo en el test) y que según el contexto nos interesará más mejorar uno de los dos números (un falso negativo hace trampas pero no sale en los periódicos, un falso positivo es una serie de juicios y portadas en los periódicos criticando el sistema y proclamando su inocencia).

El libro es muy interesante, reitero, y va un paso más allá de la introducción a los temas, siendo en ocasiones lo suficientemente denso como para tener que dedicarle ratillos a digerir las ideas del autor. Acaba el libro con una gigantesca bibliografía comentada que da para cientos de horas de lectura adicional.

Me ha encantado.

Erikka says

Nothing too Earth-shattering. How stats run our world, how to think about stats in a non "Lies, damn lies, and statistics" mindset, and the five rules of statistical thinking accompanied by some interesting stories to emphasize points. Would probably have been more interesting if we hadn't already read about half of the stories in other books.

Liane says

I feel bad giving only one star but this book was dull and not what I expected.

It was a lot of stats (which makes sense when you look at the title!) But the chapters were VERY tedious. It felt like I was reading endless pages of nothing really to get to a conclusion that could have been wrote in a single paragraph 8 pages previously!

There are very few books that I have not been able to finish, I usually push on through to the end even when I find the book most taxing, just to try and be fair when reviewing it.

But I'm afraid I have to admit defeat and admit that I didn't make it to the end of this book.

I was overwhelmed by the droaning, drawn out, prolonged lack of directness and soon realised that I was gaining very little from this book apart from irritation.

So i quit.

If I was studying something relevant to this and I was using it as a study reference book then I am fairly sure that I would have a much more positive review to give.

But for now its time for me to leave this well alone and get back to my fiction book and chill out while i wait for normality to resume after new year madness.

Maddie says

This book perfectly spanned the gap between being too simple for more advanced statistics users, and also not so simple that you could appreciate it as a “fun read”, and as a result ended up missing the mark entirely. The author employs questionable metaphors to “explain” things, and seems to ignore rather than address and counter the most credible arguments against some topics in the book. Moreover, the last chapter and the “crossover” sections read incredibly repetitively, and as though they were deliberately long in order to meet a word count threshold rather than to actually better explain the topic.
