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# The Signal And The Noise: Why So Many Predictions Fail--but Some Don't

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## Synopsis

One of *Wall Street Journal's* Best Ten Works of Nonfiction in 2012 *New York Times* Bestseller *Not so different in spirit from the way public intellectuals like John Kenneth Galbraith once shaped discussions of economic policy and public figures like Walter Cronkite helped sway opinion on the Vietnam War* could turn out to be one of the more momentous books of the decade. *"New York Times Book Review* "Nate Silver's *The Signal and the Noise* is The Soul of a New Machine for the 21st century." *Rachel Maddow*, author of *Drift* "A serious treatise about the craft of prediction" "without academic mathematics" cheerily aimed at lay readers. Silver's coverage is polymathic, ranging from poker and earthquakes to climate change and terrorism." *New York Review of Books* Nate Silver built an innovative system for predicting baseball performance, predicted the 2008 election within a hair's breadth, and became a national sensation as a blogger "all by the time he was thirty. He solidified his standing as the nation's foremost political forecaster with his near perfect prediction of the 2012 election. Silver is the founder and editor in chief of *FiveThirtyEight.com*. Drawing on his own groundbreaking work, Silver examines the world of prediction, investigating how we can distinguish a true signal from a universe of noisy data. Most predictions fail, often at great cost to society, because most of us have a poor understanding of probability and uncertainty. Both experts and laypeople mistake more confident predictions for more accurate ones. But overconfidence is often the reason for failure. If our appreciation of uncertainty improves, our predictions can get better too. This is the *prediction paradox* • The more humility we have about our ability to make predictions, the more successful we can be in planning for the future. In keeping with his own aim to seek truth from data, Silver visits the most successful forecasters in a range of areas, from hurricanes to baseball, from the poker table to the stock market, from Capitol Hill to the NBA. He explains and evaluates how these forecasters think and what bonds they share. What lies behind their success? Are they good "or just lucky? What patterns have they unraveled? And are their forecasts really right? He explores unanticipated commonalities and exposes unexpected juxtapositions. And sometimes, it is not so much how good a prediction is in an absolute sense that matters but how good it is relative to the competition. In other cases, prediction is still a very rudimentary "and dangerous" science. Silver observes that the most accurate forecasters tend to have a superior command of probability, and they tend to be both humble and hardworking. They distinguish the predictable from the unpredictable, and they notice a thousand little details that lead them closer to the truth. Because of their appreciation of probability, they can distinguish the signal from the noise. With everything from the health of the global economy to our ability to fight terrorism

dependent on the quality of our predictions, Nate Silver's insights are an essential read.

## Book Information

Paperback: 560 pages

Publisher: Penguin Books; 1 edition (February 3, 2015)

Language: English

ISBN-10: 0143125087

ISBN-13: 978-0143125082

Product Dimensions: 5.4 x 1.1 x 8.4 inches

Shipping Weight: 1.1 pounds (View shipping rates and policies)

Average Customer Review: 4.3 out of 5 stars (See all reviews) (1,035 customer reviews)

Best Sellers Rank: #2,294 in Books (See Top 100 in Books) #1 in Books > Business & Money > Management & Leadership > Planning & Forecasting #5 in Books > Textbooks > Science & Mathematics > Mathematics > Statistics #7 in Books > Science & Math > Mathematics > Applied > Probability & Statistics

## Customer Reviews

This is the best general-readership book on applied statistics that I've read. Short review: if you're interested in science, economics, or prediction: read it. It's full of interesting cases, builds intuition, and is a readable example of Bayesian thinking. Longer review: I'm an applied business researcher and that means my job is to deliver quality forecasts: to make them, persuade people of them, and live by the results they bring. Silver's new book offers a wealth of insight for many different audiences. It will help you to develop intuition for the kinds of predictions that are possible, that are not so possible, where they may go wrong, and how to avoid some common pitfalls. The core concept is this: prediction is a vital part of science, of business, of politics, of pretty much everything we do. But we're not very good at it, and fall prey to cognitive biases and other systemic problems such as information overload that make things worse. However, we are simultaneously learning more about how such things occur and that knowledge can be used to make predictions better -- and to improve our models in science, politics, business, medicine, and so many other areas. The book presents real-world experience and critical reflection on what happens to research in social contexts. Data-driven models with inadequate theory can lead to terrible inferences. For example, on p. 162: "What happens in systems with noisy data and underdeveloped theory - like earthquake prediction and parts of economic and political science - is a two-step process. First, people start to mistake the noise for a signal. Second, this noise pollutes journals, blogs, and news accounts with

false alarms, undermining good science and setting back our ability to understand how the system really works.

Excellent book!!! People looking for a "how to predict" silver bullet will (like some reviewers here) be disappointed, mainly because Silver is too honest to pretend that such a thing exists. The anecdotes and exposition are fantastic, and I wish we could make this book required reading for, say, everyone in the country. During election season, everyone with a newspaper column or TV show feels entitled to make (transparently partisan) predictions about the consequences of each candidate's election to unemployment/crime/abortion/etc. This kind of pundit chatter, as Silver notes, tends to be insanely inaccurate. But there are also some amazing success stories in the prediction business. I list some chapter-by-chapter takeaways below (though there's obviously a lot more depth to the book than I can fit into a list like this):  
1. People have puzzled over prediction and uncertainty for centuries.  
2. TV pundits make terrible predictions, no better than random guesses. They are rewarded for being entertaining, and not really penalized for being wrong.  
3. Statistics has revolutionized baseball. But computer geeks have not replaced talent scouts altogether. They're working together in more interesting ways now.  
4. Weather prediction has gotten lots better over the last fifty years, due to highly sophisticated, large-scale supercomputer modeling.  
5. We have almost no ability to predict earthquakes. But we know that some regions are more earthquake prone, and that in a given region an earthquake of magnitude  $n$  happens about ten times as often as an earthquake of magnitude  $(n+1)$ .  
6. Economists are terrible at predicting quantities such as next year's GDP. Predictions are only very slightly correlated with reality.

This book was a disappointment for me, and I feel that the time I spent reading it has been mostly wasted. I will first, however, describe what I thought is \*good\* about the book. Everything in this book is very clear and understandable. As for the content, I think that the idea of Baysean thinking is interesting and sound. The idea is that, whenever making any hypothesis (e.g. a positive mammogram is indicative of breast cancer) into a prediction (for example, that a particular woman with a positive mammogram actually has cancer), one must not forget to estimate all the following three pieces of information:  
1. The general prevalence of breast cancer in population. (This is often called the "prior": how likely did you think it was that the woman had cancer before you saw the mammogram)  
2. The chance of getting a positive mammogram for a woman with cancer.  
3. The chance of getting a positive mammogram for a woman without cancer.  
People often tend to ignore items 1 and 3 on the list, leading to very erroneous conclusions. "Bayes rule" is simply a

mathematical gadget to combine these three pieces of information and output the prediction (the chance that the particular woman with a positive mammogram has cancer). There is a very detailed explanation of this online (search Google for "yudkowsky on bayes rule"), no worse (if more technical) than the one in the book. If you'd like a less technical description, read chapter 8 of the book (but ignore the rest of it).-----Now for the \*bad\*. While the Baysean idea is valuable, its description would fit in a dozen of pages, and it is certainly insufficient by itself to make good predictions about the real world.

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