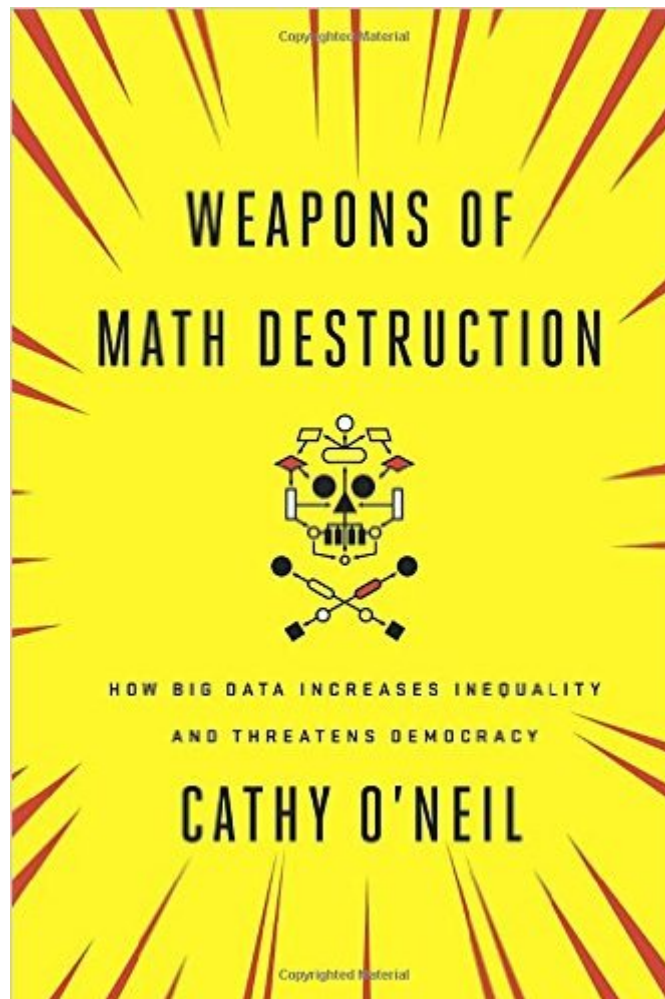


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# Weapons Of Math Destruction: How Big Data Increases Inequality And Threatens Democracy



## Synopsis

A former Wall Street quant sounds an alarm on the mathematical models that pervade modern life— and threaten to rip apart our social fabric. We live in the age of the algorithm. Increasingly, the decisions that affect our lives—where we go to school, whether we get a car loan, how much we pay for health insurance—are being made not by humans, but by mathematical models. In theory, this should lead to greater fairness: Everyone is judged according to the same rules, and bias is eliminated. But as Cathy O'Neil reveals in this urgent and necessary book, the opposite is true. The models being used today are opaque, unregulated, and uncontestable, even when they're wrong. Most troubling, they reinforce discrimination: If a poor student can't get a loan because a lending model deems him too risky (by virtue of his zip code), he's then cut off from the kind of education that could pull him out of poverty, and a vicious spiral ensues. Models are propping up the lucky and punishing the downtrodden, creating a "toxic cocktail for democracy." • Welcome to the dark side of Big Data. Tracing the arc of a person's life, O'Neil exposes the black box models that shape our future, both as individuals and as a society. These "weapons of math destruction" score teachers and students, sort resumes, grant (or deny) loans, evaluate workers, target voters, set parole, and monitor our health. O'Neil calls on modelers to take more responsibility for their algorithms and on policy makers to regulate their use. But in the end, it's up to us to become more savvy about the models that govern our lives. This important book empowers us to ask the tough questions, uncover the truth, and demand change.

## Book Information

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## Customer Reviews

A Harvard Mathematics Ph.D., a "Quant" from the most analytical of Hedge Funds, D.E. Shaw and the first author of an O'Reilly book on "Doing Data Science" Doing Data Science: Straight Talk from the Frontline, Cathy O'Neil describes some of the most important Biases in Big Data and their Human Consequences. She emphasizes the source of these biases especially in Human Facing Data Science. These include the Opacity of the Algorithms, which affect many areas of our lives including law enforcement, job placement, insurability, susceptibility to advertising, and eligibility for parole; the use of questionable "Proxies"/surrogates for unavailable or illegal to obtain data, the lack of the continuous Feedback to refine algorithms and machine choice (which in contrast to the human-facing decisions that define this book's criticisms of big data are very much applied by Google and ). In the process of telling us of the consequences of these biases in the human and social spheres, Dr. O'Neil gives a tour of many of the main areas of Big Data, Data Science and Machine Learning as well some of the avoidable areas of error. The only type of data that she omits from this survey of Big Data error is Data Science and Machine Learning from Sensors, in Industry, Science and Medicine. Certainly this survey of the sources of Error in Big Data and its real Human Consequences is alarming and very much to the point of our increasingly Data-based Society. I would say her report is slightly biased to areas of Liberal Concern and away from the useful sources of Machine Learning and Data Science in Real-Time Refinement of Science and Industry.

I struggled with the star rating for this book. There are certainly aspects of the work that merit five stars. And it is VERY thought-provoking, like a good book should be. But there are flaws, significant ones, with the biggest flaw being a glaring over-simplification of many of the systems that O'Neil decries in the book. I don't know if O'Neil has personally ever had to take a psychology test to get a job, worked under the Kronos scheduling system, lived in a neighborhood with increased police presence due to crime rates, been victimized by insurance rates adjusted to zip codes, and endured corporate wellness programs. But all of those things have been a part of my life for years, and even I have to admit the many positive aspects of some of these systems. A few examples:--Kronos. Despised by the rank and file of companies that I've worked for, Kronos software contains many aspects and automates things that previously were done by people, mostly managers. I hated it, but I have to admit overall it made things more fair. Why? Well, say you have a workplace policy that mandates chronically-late employees be written up for tardiness and eventually fired if they don't shape up. What tended to happen at multiple companies I worked for was that managers would look the other way when their buddies were tardy, and write up people they didn't like. Kronos changed that, because the system automatically generated write-ups for any employee that clocked in late

too many times. Kronos has no buddies. Popular, habitually-late people suffered, but it was more "fair" in the true sense of the word. Some systems, like Kronos, have both aspects that level the playing field and aspects (like increased scheduling "efficiency") that can victimize workers. O'Neil tends to harp on the negative only, and if you have not personally seen both sides of system, you might not realize there was another side at all.--Increased police presence in high-crime areas. This one really grated me the wrong way. O'Neil positions this as something that victimizes the poor. Well I have been poor, or at least this country's version of it, and I have lived in very high crime areas where if you didn't shut your window at night chances were good you would hear a murder. And believe me when I say I was DEEPLY grateful for the increased police presence. But then, I wasn't committing crimes. Now I live in a very wealthy neighborhood (though I am not wealthy) where I have not seen a single police car drive down my street in the past four months. O'Neil argues that many crimes, like drug use by affluent college students, go unpunished because the police are busy in the poorer neighborhoods. I agree, but police resources are limited and for mercy's sake they should be sent where people are being killed, not where a college student is passed out in his living room. My current neighbors may be committing as many crimes as O'Neil implies, but I'm not terrified to walk down the street, so I don't mind the lack of police presence. I know officers have to go deal with the more life-threatening stuff, and I am grateful to them. It all depends on your perspective.--Corporate Wellness programs. These programs have never done anything for me except shower me with gift cards and educate me on behavioral sleep therapy. I love them. But, again, perspective. I am not overweight, I love to work out, and I eat healthy. The programs were a source of income for me and my family when we needed it most. I just would have liked acknowledgement that wellness programs really do have benefits for some people, instead of a chapter painting them as some sort of 1984-style nightmare where we are all forced to be thin. It's more complicated than that.--And the best for last: The psychology tests. Those things are pretty bad. Despite winning multiple Employee and Student of the Year awards in my life, I can't pass those tests. Not to save my life. I didn't think much of it, until I heard about another star employee how couldn't pass them either. Then I met a third star employee (and I am talking about an employee who won two JD Power Awards in two years) who couldn't pass them. Why? Picture holding a hundred quarters in your hands and then throwing them at a wall. Some will go off to one side and some to another, but most will probably cluster in the middle. Those tests keep the quarters in the middle, weeding out people who aren't typical. Sometimes that's good (deadbeats) sometimes that's bad (talented employees that think different). Here O'Neil misses an opportunity to convince owners of companies that the tests can cost them highly desirable employees. Offering

real, concrete ideas of how the tests could be improved to benefit both workers and company owners would have been a harder book to write, but a much more useful one. A lot of the ominous implications made in the book have to do with what MIGHT happen in the future, if certain systems become more common. O'Neil often uses blanket statements to imply that certain outcomes are inevitable, but that is far from true. Irritate enough people, and the systems change. Legal challenges are made and won. Some companies, eager to lure star workers, throw out some of the more punishing aspects of commonly-used systems (that happened at a company where I worked, where "life-style" scheduling that forbid clopening and gave you two days off in a row was used in conjunction with Kronos. Worked great, people loved it.). The biggest weapon against abuse is, as O'Neil repeatedly states, transparency. Having been in the industry that creates these algorithms, she is in a unique position to expose the finer details of how they work. But the book is short on the kind of details I personally crave and long on blanket statements and generalizations, the same kind of generalizations she denounces companies for making. Not all automated systems victimize the poor, not even the ones spotlighted in this book. I know because I lived them and I was poor. I hovered on the edge of a four star rating for this book, until a chance conversation with a Japanese woman a couple days ago. Her grandmother had lost most of her possessions and land after World War II because of land redistribution. My friend was not complaining, she thought the reforms overall a good thing, though her family had lost a lot from it. "Something may benefit 99 people of 100," she told me, "but there's always that one person...". Exactly. There's always that one person. These systems that have come to permeate our culture need to be tweaked to minimize injustice. Unlawful algorithms need to be outlawed. Bad ideas need to be replaced with good ones. And Cathy O'Neil does discuss this, especially in the conclusion, but for me the focus of the book wasn't on target. It was too slanted against systems I have seen both harm AND help. It over-simplified issues, at least for me. It's a mess out there, and solutions that work for everyone wickedly hard to come by. Because there's always that one person. GRADE: B-Interesting side-note: In Greek Mythology, "Kronos" is the name of the Titan who devoured his own children. My co-workers always found that hilarious.

This book has a great concept, and the concept itself is probably worth the book alone--namely, statistics and numbers control behavior and rule our lives. A couple examples include the method Facebook puts up advertisements and, also, how the mythical credit score science drives purchasing behavior, terms, and, really, our economy. Add that to the fact this book has a great title...it spoke to me, and if you look at society's numbers in a jaundiced way, I highly recommend

this book.

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