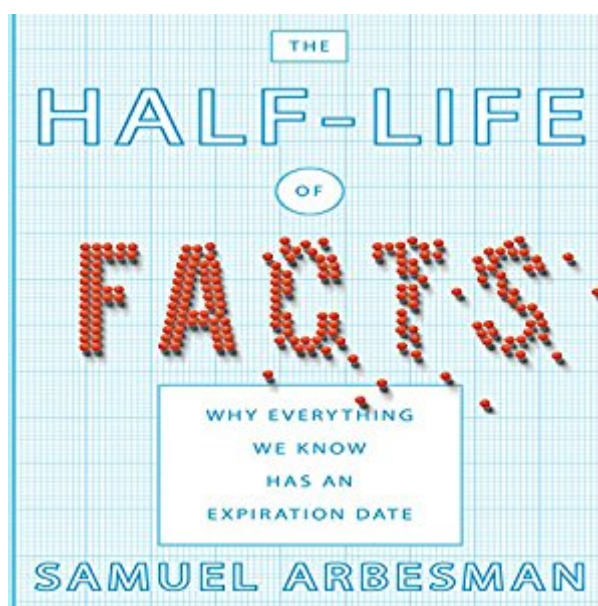


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# The Half-life Of Facts: Why Everything We Know Has An Expiration Date



## Synopsis

New insights from the science of science.... Facts change all the time. Smoking has gone from doctor recommended to deadly. We used to think the Earth was the center of the universe and that Pluto was a planet. For decades, we were convinced that the brontosaurus was a real dinosaur. In short, what we know about the world is constantly changing. But it turns out there's an order to the state of knowledge, an explanation for how we know what we know. Samuel Arbesman is an expert in the field of scientometrics - literally the science of science. Knowledge in most fields evolves systematically and predictably, and this evolution unfolds in a fascinating way that can have a powerful impact on our lives. Doctors with a rough idea of when their knowledge is likely to expire can be better equipped to keep up with the latest research. Companies and governments that understand how long new discoveries take to develop can improve decisions about allocating resources. And by tracing how and when language changes, each of us can better bridge generational gaps in slang and dialect. Just as we know that a chunk of uranium can break down in a measurable amount of time - a radioactive half-life - so too any given field's change in knowledge can be measured concretely. We can know when facts in aggregate are obsolete, the rate at which new facts are created, and even how facts spread. Arbesman takes us through a wide variety of fields, including those that change quickly, over the course of a few years, or over the span of centuries. He shows that much of what we know consists of "mesofacts" - facts that change at a middle timescale, often over a single human lifetime. Throughout, he offers intriguing examples about the face of knowledge: what English majors can learn from a statistical analysis of *The Canterbury Tales*, why it's so hard to measure a mountain, and why so many parents still tell kids to eat their spinach because it's rich in iron. *The Half-life of Facts* is a riveting journey into the counterintuitive fabric of knowledge. It can help us find new ways to measure the world while accepting the limits of how much we can know with certainty.

## Book Information

Audible Audio Edition

Listening Length: 7 hours and 54 minutes

Program Type: Audiobook

Version: Unabridged

Publisher: Gildan Media, LLC

Audible.com Release Date: September 27, 2012

Whispersync for Voice: Ready

Language: English

ASIN: B009EDCRN2

Best Sellers Rank: #63 in Books > Audible Audiobooks > Science > Mathematics #1861

in Books > Science & Math > Mathematics > Applied > Probability & Statistics #2388 in Books > Science & Math > History & Philosophy

## Customer Reviews

This is a review intended for the experienced popular science reader. As someone who is fairly widely read in the popular science literature, I found this book to be refreshing. Let me explain. A problem I've had with many popular science books is that they tend to all repeat the tired "greatest hits" of science and math stories, even if they're only ever so slightly related, in a manner that makes them tired. For example, when *Graph Theory 1736-1936* brings up the 'Seven Bridges of Königsberg', this is relevant; when *Fermat's Enigma* brings it up, Singh is stretching the connection simply because it's a good story. But for frequent readers of popular science writing, it feels more like a disservice. For the well read fan of popular science, the seven bridges, the Monty Hall problem, and the birthday paradox are well known. And so, I was delighted to find Arbesman's book genuinely refreshing. He omits any discussion of Königsberg and the birthday paradox, which would have been off topic, and instead contributes a genuine thesis about the 'science of science' that is delightfully fresh. Many of his vignettes were entirely new to me: the coPub approach to discovering links between disparate domains of science, his review of Galton's more esoteric studies (apparently Galton was an early Scientometrician, the book discusses several great studies I'd never heard of), and the 'Bone Wars' that have shaped the public knowledge of dinosaurs. So, I guess what I'm trying to say is that I'm a sucker for vignettes, and where many books fail to deliver me fresh ones, Arbesman's tour of scientometrics offered wonderful portions of fresh meat. Yes, there was Pluto, and a somewhat slow discussion of exponential growth, but I'll forgive that. This was a worthy read. Note: I "read" this book as an audiobook while on a long drive. When I've recommended a book that I've audiobook'ed in the past, it has on occasion happened that people have found it slow in book form when I had no such opinion of the audiobook. This seems to be because it's easier to space out during a chapter while driving then to wade through a slow chapter of reading. I don't think that's the case here, but just a brief warning.

This is a book on a very interesting subject that mostly irritated me in the end. I think the biggest issue I had with it was the very myopic view applied to the topics. And the fact that I think that Mr

Arbesman really makes too much of the methods he relies on to tell a story. Basically the book relies on the idea that you can graph anything that you can put a number on, and then using math that is complicated compared to, say what you learn in high school, you can fit a line to any graph and a lot of times that line is a particular family of curves. He makes it sound very magical but its not really - sometimes the fit is great and you can learn a lot from it but you can do this, like I said for anything. It doesn't per se, mean anything major. It isn't really even uncovering any secrets of how things are organized in nature or the world - we're fitting the lines after all. Plus, when he talks about science he seems to ignore lots of factors that would make his "story" messier or just different. He talks a lot about citations of research papers but without seemingly understanding how people actually function in science. Finally, at the end, he has a chapter that promises to discuss the "human" aspects of knowledge generation but he doesn't really do that there either. What I mean is, he attributes the fact that few references in papers appear to have been actually read by the authors to laziness and doesn't talk at all about how social networks among scientists influence choice of citations (i.e. I cite what my boss cites, or even better, what he wrote) despite have a whole chapter on the social movement of information just earlier in the book! Lame, I say!

After I saw Samuel Arbesman speak at Tedx Kansas City a few weeks ago, I knew I had to read his book. The premise of his talk and his book is that facts are not really information set in stone, the way we usually think about them. The world is constantly changing and nothing is for certain forever. I was floored by the notion that what my kids are learning in school may contradict what I learned in school. For some reason, that notion had never occurred to me! The Half-Life of Facts is easily understood by a lay person. I found it very readable and I don't have a head for science at all. Each chapter outlines a different reason why facts may either change or be found to be untrue. Arbesman uses examples throughout, all of which I found fascinating. I would love to read even more stories about which facts have changed over time and why. I was surprised by some of the facts that are no longer true. For instance, did you know that there really isn't a dinosaur called a Brontosaurus? I had no idea and both of my boys have been through dinosaur obsessions within the past few years. The Brontosaurus was found to be a type of Apatosaurus over a hundred years ago. However, once something is out in the ether, it's really hard to circulate information modifying or correcting the original assertion. I appreciated that not only does Arbesman discuss the various ways in which untruths persist and facts change over time, he also offers suggestions of how to keep current without getting information overload. I love that in keeping with the spirit of The Half-Life of Facts, Arbesman's website has a Errata and Updates section for the book. There is already one

case listed in which Arbesman unknowingly perpetuated a myth about how spinach became known to have a high iron content. It's very rare that I read a non-fiction book that I have a hard time putting down. The Half-Life of Facts is one of those rare riveting works of non-fiction. I highly recommend it to all.

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