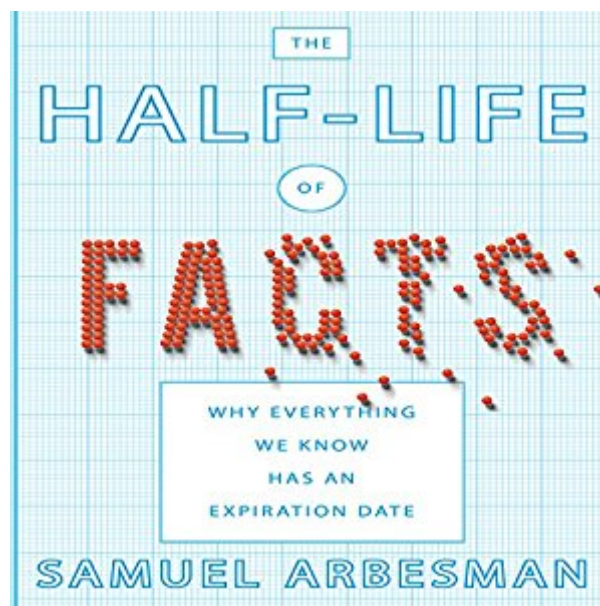




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# The Half-life Of Facts: Why Everything We Know Has An Expiration Date



## 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

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## Customer Reviews

I enjoyed this book and I believe it provides an important insight. It fits well with Thinking, fast and slow (Kahneman). The author starts with a deliberately fuzzy/loose pragmatic definition of "fact" and proceeds to explore the quantitative aspects of evolution (or temporal characteristics) of knowledge and information. He uses mathematical and statistical tools to explore patterns, suggesting common or universal mechanisms. In addition, the pitfalls and biases of dissemination of knowledge, the persistence of misinformation and the inertia for "changing our minds, when the facts change" are also explored. I learned a lot from this book. However, I found the repetition of the statement underlying regularity not an argument. I felt that the underlying potential mechanisms that lead to these regularities were tantalizingly suggested but not explored. The patterns, which I agree we do not usually consider for information/knowledge, are important but I would have liked more discussion of types of growth, graph theory (metrics and their uses), self-organized criticality, data mining etc. These are all discussed and I accept that a taste of the "unreasonable effectiveness of Mathematics" in explaining the world rather than a Mathematical book per se. This is a minor point. It reflects more my expectations than anything else. I would have liked more plots demonstrating the relationships of interest but the tables and plots did merge well with the text. Finally, I enjoyed the cover design of the dust jacket with "FACTS" created by particles with the particles disassembling and strewn on the rest of the jacket, much as sand being blown by the "winds of change", suggesting the fragile nature of facts. This was on the background of grid lines reminiscent of graph pads from school days: a reference to Mathematics facility for understanding these changes.

In the end the book didn't really live up to the title. The conclusion seemed to be: "isn't it great we're coming up with innovative ways to improve scientific knowledge?" What was left out was how this affects our views of science and policies based on science. How should we react to news stories about scientific studies knowing that even these studies will soon become obsolete? Should medical procedures take into account the possibility that they may be found to be detrimental? The author explained why everything we KNEW had an expiration date. He didn't address the obvious next

question.

The book is written in first person, a style I really do not like. Having said that I found many of his points quite convincing although overstated. I am not so sure that the facts are over time found to be false but often we think we know almost all we need to know about something so we tend to move on. Scientist tends to drift into the fields which people want sometimes because it is interesting but often because it is profitable. For example much of the science of shooting in archery is probably correct but few scientists would be involved in what most would see as a useless field. Also much research is done based on what we have now. For example an ancient navigator needs to know how to use stars, paper and a ruler, when later a clock is invented then we can study the new science involved. Overall despite this thought, I found the very book interesting.

A very interesting discussion with some details, but also limited in that the term "Fact" is not precisely defined. Almost nothing in Science is "Fact"! 99.99999999% of Scientific data supports a theory or theories through the support of evidence produced in various studies that may or may not have been designed properly to support the theory being tested. For example lack of precision in the use of the term "Fact" has led to the statement paraphrased as 'Global Warming and Climate Change Due to Rising CO<sub>2</sub> Levels is Settled Science' (blatantly false as to the "settled science" conclusion). The whole thing is a theory that has been modeled and tested to some degree but certainly not to the degree of predictive certainty. The problem in that situation is that the ability to precisely measure temperature and the necessary complete record keeping from the past allowing one to compare current temperatures to those 100-200 years ago or longer is just not available. Therefore those who study this area use proxies such as tree rings, etc. There are many variables affecting what produces our weather and climate that we know about, and likely thousands if not millions of ones we know nothing about. That makes any realistic projections based on atmospheric CO<sub>2</sub> content simple extrapolations and calling it settled science is ludicrous. That area of study is not the primary subject of this book, but the author uses the word "fact" when the more appropriate word/words would be "consensus belief", "knowledge" or "current theories" in the title and discussion would be more appropriate. The problem with using the word "Fact" is that the general public and some scientists associate "Fact" with "Truth" which is a major mistake. There are only a few absolute truths such as the value of Pi and a few other constants and very basic theorems. The political class and politically motivated scientists use the word "fact" in such a sloppy way that its meaning has been perverted. More alarmingly they are using such statements to force major laws

and policies on the entire human population worldwide using "theories" stated as "facts". The late Stephen J. Gould, PhD wrote many books and essays dealing with this subject as it applies to evolution and natural science. His writings document vividly how the "Facts" of the day were used for political purposes to the detriment of whole races of people, and in fact, set the stage for racial problems present in our country and worldwide among many other examples. The author may cite some of Dr. Gould's writings but in reading half the book I have yet to see any mention of his work. Using the word "fact" with such a loose definition is very dangerous and increasingly so because of the internet and how easy it is for people to read selectively to support beliefs and not consider the many aspects of an area of study leading to an absolute belief when it is clearly not justified. While I think this book is a good discussion of the evolution of knowledge and how "current theories" or "current consensus belief" evolves in a predictable pattern, I wish the word "Fact" was not used. The very subject of the evolution of "current consensus belief" to an entirely different place over time and the definition of a "half-life" for such things is proof that what is being discussed is not "Fact" but current theory at best. I would recommend reading this book for the theory and discussion but would always stay conscious of the false use of the word "Fact" and the need to translate its meaning to another less definitive word or phrase.

Very great book, Used it for my college class in Kindle form. Interesting read

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