



Naomi Oreskes, *Why trust science?*, Princeton: Princeton University Press, 2019

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Abstract

Review of Naomi Oreskes's *why trust science?*

When large numbers of the public distrust well-established scientific claims, the results can be deadly. By the end of 2021, sixty million in the USA were still unvaccinated against Covid-19, even though free, safe, and effective vaccines were available, and the virus had already killed 800,000 in that country. A major reason for the vaccine hesitancy was a misinformed distrust in medical expert claims about the vaccine's safety and efficacy and the dangers of Covid-19 to the unvaccinated.

Yet have scientists not been wrong about important topics before, such as in defending eugenics? If so, when should we trust or distrust scientific claims? In *Why Trust Science?*, Naomi Oreskes addresses these and similar questions. Oreskes is the Henry Charles Lea Professor in the History of Science at Harvard University. Having already stood up for science in works such as *Merchants of Doubt*, Oreskes continues to do so in her new book, which draws heavily from the social epistemology of science. She defends the trustworthiness of science by showing how science works, specifically by looking at how claims are bolstered by the social properties of scientific communities.

After an introduction by Stephen Macedo, Oreskes develops her account of when science is trustworthy in the first two chapters. In Chapter One, she gives a critical overview of historical answers to the question. She quickly rejects August Comte's view that science is trustworthy because of its method, as there is no single 'scientific method'. The empiricists' answer that science is trustworthy because its generalizations are supported by empirical evidence is likewise inadequate because of the problem of induction and the impossibility of making observations in the absence of theory. Karl Popper's falsificationism avoids many of the problems of the empiricists

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but it inaccurately portrays how science works, also leading to skepticism. While the antirealism of Ludwik Fleck, Thomas Kuhn, and David Bloor also undermines trust in science, its emphasis on science's social character is key to Oreskes's account. Similarly, Paul Feyerabend's emphasis on science's methodological pluralism is, despite his antirealism, also key for Oreskes.

Oreskes's answer for when to trust science is grounded in feminist social epistemology of science, especially Sandra Harding's arguments that objectivity comes in degrees, and Helen Longino's argument that scientific objectivity is a social achievement. Oreskes's position is that scientific claims are trustworthy when they reflect a consensus in scientific communities that is structured in the right way—for example, by being diverse, open to democratic norms like transparency, and serving as a venue for the critical uptake of ideas. Trust in science for Oreskes is rooted in science's social character. This trust is informed rather than blind, as it allows outsiders to assess claims by judging the character of the scientific communities making the claims.

Yet why accept what science today tells us when past well-established scientific claims were overturned? Oreskes addresses this in Chapter Two. She first examines five examples of supposedly well-established claims that skeptics have used to undermine trust in science: (1) Edward Clarke's limited energy theory, used to challenge higher education for women; (2) American geologists' rejection of continental drift; (3) eugenics; (4) the supposed initial lack of evidence connecting hormonal birth control and depression; and (5) recent reports claiming that flossing does not improve oral health. All these examples had red flags that were evident when they were proposed, such as dissenting experts, poor supporting evidence, and failure to consider available data.

In the second half of Chapter Two, Oreskes articulates five themes from the examples. The first is consensus. Since there is no independent measure of what scientific knowledge is, consensus functions as a proxy. In past cases when a consensus was formed about a false claim, there was usually empirically informed dissent and therefore no actual consensus. The second is method. In some cases, scientists unjustifiably fetishize one method over other fruitful techniques. For example, one cannot exclude evidence from non-double-blind studies when such studies are not possible (e.g., the benefits of flossing). The third theme is that some examples of science gone awry were due to poor empirical evidence, such as the limited energy theorem, which was supported by a study of only seven women. The fourth is values. Science is infused with values, sometimes to its benefit. For example, feminist values influenced critiques of the limited energy theorem. The fifth is humility. Scientific claims have been proven wrong before, especially when informed by crude social prejudices, when evidence was ignored, or when certain methods were unjustifiably fetishized. Oreskes ends Chapter Two with a version of Pascal's Wager: we should consider the risks of accepting false scientific claims against rejecting true ones.

In the second half of the book, leading scholars comment on Oreskes's argument and she responds. In the first commentary, Susan Lindee argues that appealing to trust in technology can restore trust in science. Science and technology were cleaved and considered distinct domains during the Cold War, as scientists developing weapons wanted to keep science untainted. Re-tethering them could restore public trust in

science. Oreskes responds that Americans do not distrust science simpliciter. Rather, they reject particular scientific claims that clash with other beliefs, usually religious or political. Cognitive psychologists show that a more fruitful strategy involves explaining how disinformation works. Oreskes also argues that Lindee conflates utility with truth. Technology's usefulness does not entail its underlying theories. Some technologies—such as airplane flight—contradicted existing theories.

In the second commentary, Marc Lange argues that you cannot non-circularly appeal to experts to judge who is an expert. Nonetheless, he offers a strategy to combat distrust in science. While one cannot justify science as a whole, one can non-circularly use particular scientific findings to justify other particular scientific claims. Even when whole bodies of theory are challenged, such as in a Kuhnian case of crisis in science, Lange argues that there is still common ground to appeal to. In response, Oreskes argues that expertise is not necessarily circularly defined. There are markers of expertise available to non-experts, such as credentials. Furthermore, there are reliable indicators when something is amiss. Most influential climate change deniers, for example, are not climate scientists.

In the third commentary, Ottmar Edenhofer and Martin Kowarsch point out that scientific consensus does not entail policy consensus. Instead, policy decisions also involve value judgments. For example, the Trump administration accepted climate science but rejected climate mitigation policy. Hence, Oreskes must further defend the trustworthiness of scientific policy assessments. In response, while Oreskes agrees that scientific consensus does not entail policy consensus, she focuses on trust in science because in recent years, individuals and groups have actively tried to undermine that trust to avoid policies threatening their interests. Science does, after all, tell us what happens if nothing is done about climate change.

In the fourth commentary, Jon A. Krosnick argues that numerous reforms are needed in science to address fake results, the replication crisis, and questionable research practices such as p-hacking, using small samples, and bad statistical analysis. He attributes the problems to both individual causes (e.g., the desire for fame) and systemic causes (e.g., obsessions with metrics). In response, Oreskes notes that the replication crisis and questionable research practices are mainly found in psychology and biomedicine, fields where statistics play a large role. However, this does not indicate a problem with science overall. Furthermore, most troubling examples come from single studies. Oreskes argues that we should trust scientific consensus resulting from many studies.

Oreskes's inclusion of both cognitive and social features of consensus in addressing when to trust scientific claims is a major strength of her argument. Solely cognitivist accounts of when scientific consensus are trustworthy emphasize factors such as inductive support, predictive success, resistance to falsification, consistency of evidence, and explanatory success. While such features are crucial, they are not sufficient to establish the trustworthiness of consensual scientific claims. Suppose there was a scientific consensus that second-hand smoke does not increase the risk of cancer and the claim had inductive support, etc. Yet suppose as well that all the researchers studying this were tobacco company employees. In that case, the claim would still be suspicious unless corroborated by scientists not funded by tobacco companies. Hence, social features—such as diversity of funding—are also important

when assessing the trustworthiness of scientific consensus. Oreskes rightly emphasizes such social features.

Why Trust Science offers a very sophisticated answer to a question that has only become more relevant during the ongoing Covid-19 pandemic and the continual challenges posed by climate change. Scientists will benefit from Oreskes's explanation of key developments in social epistemology of science. The book will also be of interest to laypersons and undergraduates in philosophy of science courses who want to better understand how science works and when to trust science in this age of rampant misinformation-induced distrust.

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