Book Notes

Why Trust Science?
by Naomi Oreskes
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> When I was growing up, autism wasn't really a factor. Now all of a sudden, it's an epidemic. Everybody has their theory. My theory, and I study it because I have young children, my theory is the shots. We've [sic] giving these massive injections at one time, and I really think it does something to the children.
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> *Donald Trump (2007)*[1]

Anti-vaxxers are one highly visible and hyper-important example of American distrust of science, but skepticism of scientific studies is present in every aspect of our lives. The study you read about last month said that coffee is good for you; the study this month says it's not. We are not sure who we can trust. And if we cannot trust scientists, why trust science?

This is the question Naomi Oreskes sets out to answer in *Why Trust Science?* In her previous academic work, she examined the relationship between scientific knowledge and public policy. She has written more than fifty op-eds on this topic in major news outlets and journals. But Oreskes takes on a different and perhaps more difficult question in *Why Trust Science?* Instead of an additional historical examination, the book provides a compelling epistemological argument about why we should trust science.

The book is divided into four sections. The first section offers an excellent introduction to the history of knowledge and changing conceptions of science, an important topic for both education researchers and teachers in the classroom who are constantly questioned by scholars in other fields and by students and society. She traces the authority of science from the Enlightenment, when it was the men who belonged to scientific societies who had authority, to the twentieth century, when it was the scientific method that had authority, and to the scholars who pushed back against this conception of an objective scientific method by showing that science is a social activity conducted by people. Oreskes believes that neither of these perspectives captures the inherent strengths and weaknesses of the practice of science. Scientists may claim that their work is value free, and social scientists provide many examples of the values present in scientific research. Yet, the fact that scientific work is conducted by people with values is not a strong enough argument to discount sci-

ence entirely. She turns to Helen Longino, a feminist philosopher of science, for a more compelling answer to where we should look to scientific authority. Longino argues that the scientific community will always have blind spots because of its context, but a diverse community of scientists helps prevent and mitigate these blind spots. Oreskes argues that science is not value free, and it should not aspire to be, because the values of the people who conduct science are not a weakness in the scientific process. What we need is a wide variety of viewpoints representing diverse values in the scientific community. By expanding the geographical, national, racial, and gender diversity in science, the biases of scientists will balance each other out. Oreskes believes this is not a perfect process, but it is the foundation on which we should build scientific authority.

In the book's second section, Oreskes guides readers through five examples of empirically informed dissent within the scientific community to theories with strong support. The first three examples are covered relatively quickly and focus on the first fifty years of the twentieth century. In the two decades preceding World War I, female scientists and their allies used scientific evidence to challenge the limited energy theory, the argument that women should not receive an education because they needed to conserve energy for childbirth. These women used the scientific tools of the time, and especially surveys, to prove that there was no negative connection between education and women's health. The second example is eugenics, an extension of Darwin's theory of evolution into human society, which had strong scientific opposition even at the height of its popularity in the interwar years. Many contemporary social scientists argued that the evidence of racial weakness had more to do with the conditions they were forced to live in. Bad nutrition, little education, lack of linguistic skills, and overt discrimination were responsible for the evidence touted by eugenicists. The third example discusses how American geologists took longer to accept the theory of continental drift than did their colleagues in Europe. The American skepticism of the theory ultimately came down to differences in what scientific evidence is legitimate. Prominent American scientists argued that in science, observation always has to precede theory, and the theory of continental drift was therefore unscientific. Other historians have argued that this difference is connected to the American ideals of pluralism, egalitarianism, and democracy. If theory cannot be observed by everyone, then it must be authoritarian. Their European counterparts did not have the same reaction to this theory. Oreskes uses the examples of limited energy theory, eugenics, and continental drift to make a similar argument. If the American scientific community was more diverse, she asserts, and included women, people of color, and international scholars, these theories would have received more scrutiny and would have been viewed differently.

The last two cases are examples of what Oreskes calls "methodological fetishism," when scientists or society reject evidence because it is collected through a new or alternative method. For example, individual doctors and

therapists knew for years that some of their female patients who went on birth control experienced depression, but the medical community did not accept this because there was no "hard data" to prove it. There was no hard data because the sample size of any given doctor's office was too small. It was not until the publication of a large Danish study that the scientific community triumphantly shared that there was a connection between contraception and depression. Many women's response was, "How is this news?" Oreskes's second example of methodological fetishism is the media coverage of a 2016 study that pointed to weaknesses in research on the efficacy of dental floss. Journalists misinterpreted this study, suggesting to their readership that flossing has no benefit. Oreskes argues that absence of evidence that meets the "gold" standard (e.g. randomized clinical trials or double-blind trials) is not the same as no evidence at all. There is statistically significant evidence that there is a reduction in gingivitis among patients who floss as well as brush. Methodological fetishism can lead to ignoring this evidence (journalists) or downplaying it (some scientists).

In the last sections of *Why Trust Science?* four academics from different disciplines critique Oreskes's argument, and she responds. This format is more typically seen in anniversary editions, when the impact of the work is well established, not in a book's first edition. This format, however, offers Oreskes the opportunity to address some of the most salient concerns to her argument on why we should trust science. Hopefully, we will see more books that adopt this practice, as it offers the reader an opportunity to see the issues that other experts take with an argument, and it serves as a model of how colleagues can respectfully disagree with each other's work.

Oreskes effectively addresses each of the questions raised in the commentary, though some more completely than others. For example, she does not fully address the point raised by Jon Krosnick, a professor of political science at Stanford, who argues that some of the distrust in science is due in part to the pressure to publish scientific research. Krosnick believes that it is not the source of the funding that leads to issues with science but the current environment in which scientists conduct their research. When a scientific career depends on publishing novel and surprising findings, he notes, scientists from all fields are incentivized to use any technique available to manipulate the data to produce a result worth publishing. Oreskes's response is that Krosnick's examples of questionable science are from psychology and biomedicine, two fields that do not have a strong track record of reliability and that rely heavily on statistics, which can be misused (e.g., p-hacking). These concerns should not be generalized to science as a whole, she argues, pointing to a low retraction rate across science fields as proof of the efficacy of the peer review process. Yet, this does not adequately account for the more important part of Krosnick's argument: If we were to ask scientists from other disciplines about whether they thought this was an issue in their field, what would they say? Is this another example of something that many know but is still not accepted? If

so, this is reminiscent of Oreskes's example about the link between birth control and depression as common knowledge among women, even if there was no published proof of its existence. Krosnick argues, albeit anecdotally, that many scientists are aware of this problem and that it exists regardless of what retraction rates may be. Perhaps Krosnick does not provide the best evidence to support his argument, but it is still a line of reasoning worth following, even if we do not currently have "hard data" to support it. While I do not think that Oreskes would disagree with this statement, her response to Krosnick feels incomplete. If the reason we should trust science is peer review by a diverse scientific community, it is worth asking if there is a shared flaw in the way the entire scientific community conducts and reviews its work.

Why Trust Science? is a must-read for those interested in the competing ways that scientists and their allies have advocated for trust in science. It is not an instruction manual on how to make others trust the work of science, but it is an empirically driven argument about how scientists should think about their work and how they should present that science as trustworthy to others in their community and to society at large. Oreskes argues that science is not value free and that it should not be, because passionate people are driven by their values to add to human understanding. Instead, we should include as many people as possible from different perspectives in the scientific community so that our human biases somewhat balance each other. Her presentation is compelling and well written. And while it may not be an easy read for those who are new to the history, philosophy, or sociology of knowledge, it's worth taking the time to work through it.

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Reference

Hafenbrack, J. (2007, December 28). Trump: Autism linked to child vaccinations. *South Florida Sun-Sentinel*. https://www.sun-sentinel.com/sfl-mtblog-2007-12-trump_autism_linked_to_child_v-story.html

International Aid to Education: Power Dynamics in an Era of Partnership

by Francine Menashy

New York: Teachers College Press, 2019. 141 pp. $37.95 (paper).

Calls for greater participation of education actors in the Global South have gained traction in an effort to ameliorate power asymmetries, increase country ownership of education programming, and improve aid effectiveness. In *International Aid to Education: Power Dynamics in an Era of Partnership*, Francine Menashy explores discourse and practice around collaboration between the Global North and South in international aid. Through a layered examination of how power is structured in the international aid architecture, she shows