

Book Reviews

Faith," I expect they will find this book hard going and possibly disappointing.

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SCIENCE IN SOCIETY

SCIENCE DENIAL: Why It Happens and What to Do about It by Gale M. Sinatra and Barbara K. Hofer. New York: Oxford University Press, 2021. 208 pages. Hardcover; \$35.00. ISBN: 9780190944681.

Science denial and scepticism are not new; however, the COVID-19 pandemic has brought the issue to the fore with an importance and an intensity that seems unmatched in recent history. While Galileo's theorem that the earth rotated around the sun may have shaken up the church and intelligentsia, it did not have the widespread effect on the daily lives of average people in the same way as COVID-19 vaccination or mask-wearing have had.

In their book, *Science Denial: Why It Happens and What to Do about It*, Gale Sinatra and Barbara Hofer draw on their own work, along with that of other experts, to attempt to identify the factors that influence science doubt and denial and to outline strategies for addressing these at individual and societal levels. Sinatra is Professor of Education and Psychology at the Rossier School of Education at the University of Southern California and Director of the Motivational Change Research Laboratory. Hofer is Professor of Psychology Emerita at Middlebury College.

As the authors point out early on, the book is unlikely to be read by "hard-core science denier(s)." It also is not solely aimed at scientists or academics, although it makes some very helpful points and can be useful to people actively engaged in scientific research and teaching. The authors state that the book is also aimed at readers who are interested in trying to understand how they themselves evaluate scientific issues, what cognitive biases they may have, and how to understand and interact with others who have different opinions or feelings about science or scientific issues. Most chapters end with calls to action addressed at individuals, educators, science communicators, and policy makers, with steps that can be taken to improve understanding and address science denial.

The book is arranged in two sections. The first section addresses the current situation, sets out definitions for science denial and doubt, and addresses two important venues where individuals obtain informa-

tion about science in general and specific issues in science: the online world and science education. The second section delves into the psychology of science denial: cognitive bias, epistemic cognition (ideas about knowledge and knowing), motivation, emotions, and attitudes.

The first chapter outlines several aspects of science denial in the modern context, outlining the role of science and scientific advances in modern life and touching on some of the pertinent scientific issues of the time: climate change, the dangers of smoking, genetically modified organisms, and of course, the COVID-19 pandemic. The chapter on navigating the online universe of information about science is frightening yet important reading. There are key discussions of how predetermined factors such as biases and algorithms may influence what one finds during an internet search and how digital literacy involves not just being able to find information but also being able to evaluate the information found. The chapter on science education provides valuable points about teaching science in a way that is engaging, fosters an openness to science, develops deeper understanding of the way that science is conducted, and shows how science is useful in everyday life.

The second section moves on to explore more deeply the psychological principles involved in how we come to terms with scientific information and the factors that influence acceptance, denial, or resistance. As a physician and a medical school faculty member in the middle of a global pandemic, I found this section more useful in trying to understand the roots of some of the controversy and the extreme reactions I have been seeing in the hospital and in the news.

Chapter 4, the first chapter in this section, explains cognitive biases and how even the most rational person has biases, ways of making decisions (fast reflexes vs. slower analysis and reflection), and how intuition, anecdotes, confirmation bias, and our own estimation (or misestimation) of what we already know can block impartial thinking about evidence.

The following chapter, "How Do Individuals Think about Knowledge and Knowing?," dives into epistemic cognition: how one recognizes and thinks about what knowledge is. The discussion of absolutism, multiplism, and evaluativism will be familiar to anyone who has ever stumbled into an argument about science over social media or at a family gathering. This is followed by a discussion of what people know about how science is done, the concept of uncertainty, and the role of trust in science

and scientific methods. Science and underrepresented populations, which is mentioned in the first chapter, is again mentioned very briefly here with examples illustrating how trust in science might be compromised.

Chapter 6 discusses how motivation and social identity can affect how one evaluates and takes a position on scientific findings. How information technology is influenced by, and in turn influences, these factors, particularly how we sort ourselves into groups online and the rise of “fake news.” The point about communication strategies being more effective from someone “in” the group and trying to foster identification can be an effective strategy when thinking about communicating or addressing conflict regarding scientific issues.

The chapter about emotions and attitudes is probably one of the most challenging for scientists, as it goes beyond focusing on facts and evidence, exploring how feelings and emotions affect how one thinks. The example they use is the demotion of Pluto from full planet status—an issue that does not have a lot of effect on daily life, unless you are a planetary astronomer, but which generated much public attention. It is a good example of how an emotional response can affect what one thinks about the immutability of scientific findings and science in general. Another crucial discussion addresses how emotional responses to studying science in school or interacting with less-formal science education at institutions (museums, zoos, etc.) can make some science knowledge easier or more difficult to think about.

The book concludes with a summary of the main points and a list of action points identified as “Solutions: A Field Guide to Addressing Science Denial, Doubt, and Resistance.” As with the end of the earlier chapters, these are divided into sections for individuals, educators, science communicators, and policy makers, with some expanded points and details.

Overall, the book is well written at a general level and is easy to follow. The examples illustrate rather basic dilemmas in science denial and doubt, and the discussions are not very formal and are often personalized (frequently using the authors’ studies and anecdotes). Although the chapters in the second section do go deeper into the psychological theories and evidence for looking at how we think, or don’t think, about science, the information is still at an introductory level. For more detail, each chapter is very thoroughly referenced and there are extensive

citations for further background, exploration, and deeper detail.

Although the book is not a difficult read, I must admit that it took me some effort to pick it up and get through it. As a physician and an educator, I am used to discussing difficult questions about vaccinations, use of medications, clinical trials, as well as known unknowns and unknown unknowns, in medicine. During the pandemic, however, the amount and fervency of public, private, and professional controversy and discussion has been at times overwhelming. One point of the book is that as individuals each of us needs to examine how we look at science, how we think about what we know and what we don’t know, and how we try to understand others who don’t share our opinions or evaluation of evidence. I recognized a few of my own emotional responses and cognitive biases. While this book will not eliminate science denial, it does lay out some steps to having a positive impact, both on the individual and societal level.

With regard to spiritual or Christian doctrinal issues and how these have sometimes clashed with science, the authors present examples (i.e., evolution and a Christian university student) thoughtfully and without judgment, while still standing strong on the importance of science and understanding how these are not mutually exclusive and how the conflict can be addressed.

As I write this, I had been hoping that the pandemic would be over by now and that there would be less need for a book like this. After the pandemic, there will continue to be climate change and other important issues requiring scientific thought and attention. Having read the book through and thinking about where my own responses were coming from, I do feel more optimistic and better prepared to go out there and be an advocate, not an adversary, when trying to work through situations that involve science denial.

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THE ROBOT WILL SEE YOU NOW: Artificial Intelligence and the Christian Faith by John Wyatt and Stephen N. Williams, eds. London, UK: SPCK Publishing, 2021. 256 pages. Paperback; \$31.99. ISBN: 9780281084357.