

***Creatively Undecided: Toward a History and Philosophy of Scientific Agency.*** By Menachem Fisch. 2017. University of Chicago Press. (ISBN 022651451). 293 pp. Paperback, \$37.50.

In *Creatively Undecided*, Menachem Fisch attempts to create a framework to explain how scientific consensus can be shifted, such as when new evidence necessitates the revision or dismissal of a scientific theory. This framework is necessary, Fisch postulates, due to the unfinished work of Thomas Kuhn. Kuhn was a physicist who coined the term *paradigm shift*, alleging that changes in scientific fields tend to be sudden and monumental, rather than gradual and persistent. Fisch argues that Kuhn developed this idea of the paradigm shift but did not satisfactorily explain the mechanism by which such change occurs in the scientists themselves. Indeed, we all know someone who

refuses to acknowledge a new and accepted idea, clinging stubbornly to the comforting beliefs of the past. Scientists, being human, also have a tendency to suffer from this malady – which is an important issue because the main idea of science is that evidence drives our ideas and understandings, not the other way around.

Fisch organized the book into three parts. In Part I, the motivation for the construction of this framework is described, including an account of Fisch's personal journey that led him to develop this idea. He describes the influence of Karl Popper on his thinking and on this book. Popper, who is often considered one of the leading science philosophers, developed the idea of empirical falsification: that a scientific theory cannot be proven but can be falsified. In Part II, Fisch develops his philosophy of scientific agency by describing and explaining the work of a variety of philosophers. In Part III, the reader is given a case study from the history of mathematics to illustrate Fisch's view of scientific agency.

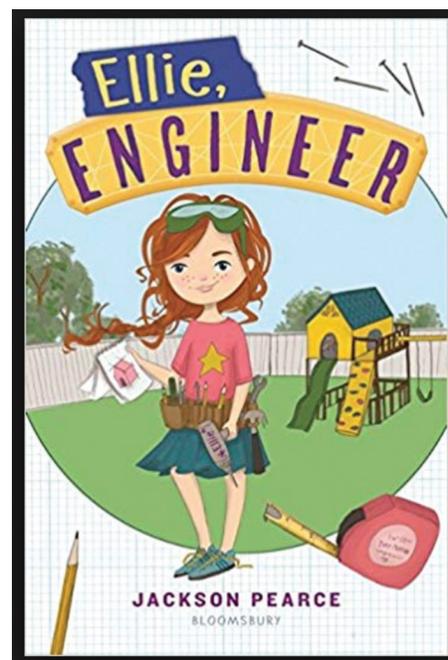
This book is a scholarly work, and the heavy use of academic jargon can make it difficult, at times, to understand what Fisch is trying to explain. I enjoyed learning about Kuhn and Popper – especially Popper, since I also subscribe to the idea of empirical falsification but was unaware of the history behind the idea. I also enjoyed delving into the philosophy of how scientific consensus is changed, but alas, I felt that Fisch did not deliver on his promises. Part II, the most philosophical section and the part of the book that lays out Fisch's argument, seemed incomplete. At the end of Part II, I did not feel that I had a clear grasp of how rational theory change occurs. In addition, I did not understand why Part III included an example from mathematics, when the book is about change in the sciences. Overall, I found myself repeatedly wondering who the intended audience was for this book and speculating about whether that imaginary

reader would be satisfied with it. I think the answer is no – although, like me, she might feel that she learned something.



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## FOR YOUNG SCIENTISTS

***Ellie, Engineer.*** By Jackson Pearce. 2018. Bloomsbury. (ISBN 9781681195193). 166 pp. Hardback, \$15.99.

This children's book is about Ellie, a natural engineer. Ellie loves to complete a variety of "builds," including time-saving devices, like a French braid machine that does not work quite as planned, and a