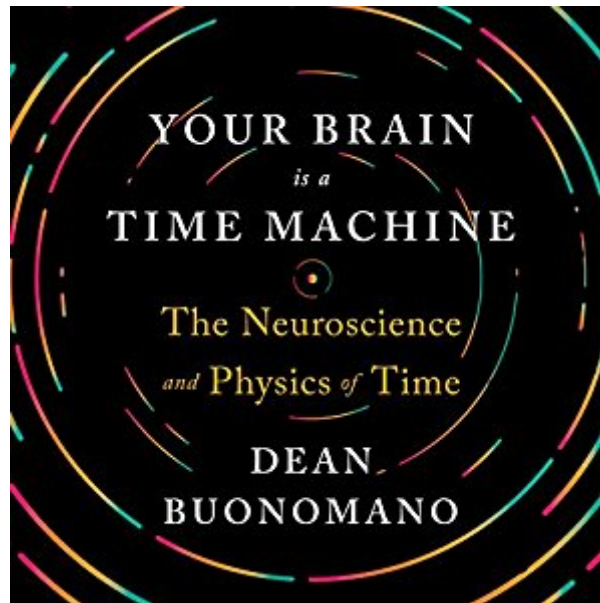




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Your Brain Is A Time Machine: The Neuroscience And Physics Of Time



Synopsis

A leading neuroscientist embarks on a groundbreaking exploration of how time works inside the brain. In *Your Brain Is a Time Machine*, brain researcher and best-selling author Dean Buonomano draws on evolutionary biology, physics, and philosophy to present his influential theory of how we tell and perceive time. The human brain, he argues, is a complex system that not only tells time but creates it; it constructs our sense of chronological flow and enables "mental time travel" - simulations of future and past events. These functions are essential not only to our daily lives but to the evolution of the human race: without the ability to anticipate the future, mankind would never have crafted tools or invented agriculture. The brain was designed to navigate our continuously changing world by predicting what will happen and when. Buonomano combines neuroscience expertise with a far-ranging, multidisciplinary approach. With engaging style, he illuminates such concepts as consciousness, spacetime, and relativity while addressing profound questions that have long occupied scientists and philosophers alike. What is time? Is our sense of time's passage an illusion? Does free will exist, or is the future predetermined? In pursuing the answers, Buonomano reveals as much about the fascinating architecture of the human brain as he does about the intricacies of time itself. This virtuosic work of popular science leads to an astonishing realization: Your brain is, at its core, a time machine.

Book Information

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Customer Reviews

I feel obliged to admit that, like the author, I am a scientist working on the neuroscience of timing.

There are not many non-fiction books about time, behavior and neuroscience and therefore I simply had to read this book. And I am glad I did. The book begins with a summary of the psychology, philosophy, pharmacology and physiology of time. The author has an excellent grasp of the issues at stake and the importance of doing research on these topics. How do humans measure short and long time intervals? What is the shortest time interval that we can detect? How does our body know when to go to bed and get up again, and how accurate is this circadian clock? How do drugs affect our time perception, and what does that tell us about the brain? How can neurons or neural networks detect measure time? I don't agree with everything he says about the neuroscience of timing. However, it was a joy to read these chapters and, on their own, these six chapters justified the time and money spent on this book. During my own studies, I have read tons of studies on timing employing a broad spectrum of different techniques. This book helped me connect the dots and get a bird eyes view which is something that can get lost in science. The book sidetracked a bit in chapter seven where Buonomano takes on the physics of time and the philosophical implications. Does time even exist, or is it (like many other things), a persuasive illusion that the brain construes to give us an advantage in evolution? Is presentism (only the now exists) or eternalism (time is another dimension and is to time what space is to space) the correct model of the universe? What does our subjective sense of time tell us about time itself? These more philosophically oriented questions are taken on, at depth, and Buonomano even gets into the shooting particles in moving trains thought experiments to explain the implications of Einstein's theory of relativity. I, perhaps naively, did not expect to encounter so much of Einstein in this book, but in the author's defense, he does an excellent job of explaining the implications of relativity, and he even manages to link it back to the psychology and neuroscience of timing. In the last chapter, the author returns to the core issues. He discusses whether animals plan for the future (they clearly do) and whether they reflect on the future in the same way that we do (debatable). We also get to meet the Pirahã tribe who, according to an anthropologist/missionary who lived with them, lives in the here and now. They were, for instance, quite unimpressed with Christianity when they realized that their visitor had never actually met Jesus. In the last chapter, the author also takes on free will. If time is just another dimension that we can, at least in theory, travel across, then that should logically mean that everything that is going to happen has already happened which presumably means there is no free will. Free will, the author suggests may only be the feeling associated with making decisions - just like we feel pain when we get painful stimulation. All in all, if you are interested in time and its relation

to human behavior - then this book is the book is for you.

Great book. I enjoyed it very much.

very interesting

This book does an excellent job of juxtaposing the "eternalist" view (implicit in Einstein's general theory of relativity) that the universe is a four-dimensional "box" in which all of time, past, present, and future exists (I want to say "simultaneously", but that's misleading) with the Presentist view most of us share, that only the present moment exists. The eternalist view is that the past is over and vanished and the future is yet to be. Our brains are both Presentist (Buonomano argues) in the sense that we see time as linear and unidirectional, and Eternalist in the sense that we can mentally "time travel" to the past and the future, and do so often. The writing is extremely accessible, engaging, and sometimes very funny. I thoroughly enjoyed this read.

Interesting and informative. Despite lacking all but a superficial knowledge of physics and having a significant aversion to mathematical formulae, I found this book extremely readable. The author writes clearly and engagingly, using both humor and concrete examples to enhance the reader's understanding of a fascinating and complex subject.

This book is interesting as far as it goes, but given the expansive nature of the subject, it doesn't go nearly far enough. The author relies heavily on neurology, experimental psychology, and physics, and the limited scope of this perspective becomes apparent early on, when he asserts that the only adaptive value of time comes from the ability to predict the future accurately. Psychologically and socially, perceptions of time have many other adaptive functions, such as the formation and maintenance of individual and collective identity. Studies of constructions of time in such areas are available, but Buonomano's work does not consider them. The author also fails to consider widely reported differences as to the character of time. He takes great care to document the foundations of the perception of chronological time, but doesn't get into much detail about the experience of non-chronological time, that which anthropologists refer to as liminal, and which the ancient Greeks named Kairos. Though the author notes distortions and errors in the perception of time, he fails to adequately consider the adaptive characteristics of this kind of experience of time-outside-of-time. What's more, this book's considerations of the eternal block universe failed to

deal with the possibility of branching versions of reality as a way to consider a quantum role in the development of free will - a weakness that became especially apparent in the final chapter. The discussion of morality in a predetermined universe flopped as the author failed to grasp the difference between a universe of true responsibility and one in which there is only a feeling of choice. This book is a welcome opening of a fascinating topic. It doesn't fulfill its promise of a bridge between scientific disciplines and philosophy, however, because it lacks adequate grounding outside of experimental science.

For me, the designation "popular science" can be rather pejorative because of its connotation of dumbing down scientific information; however, while *Your Brain is a Time Machine* is indeed popular science in that it is accessible for those of us who lack an extensive knowledge of physics and math, it most certainly does not dumb down the fascinating material that Prof. Buonomano presents. This book actively deals with provocative questions and is well written with clarity and humor. I do not purport to understand every word that is written or every argument that is made; however, I found myself actively engaged and wanting to further discuss some of what Buonomano posits and will recommend *Time Machine* to my book club.

Very good. Makes "time" accessible to a layman. Some very interesting viewpoints you probably have not thought of!

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