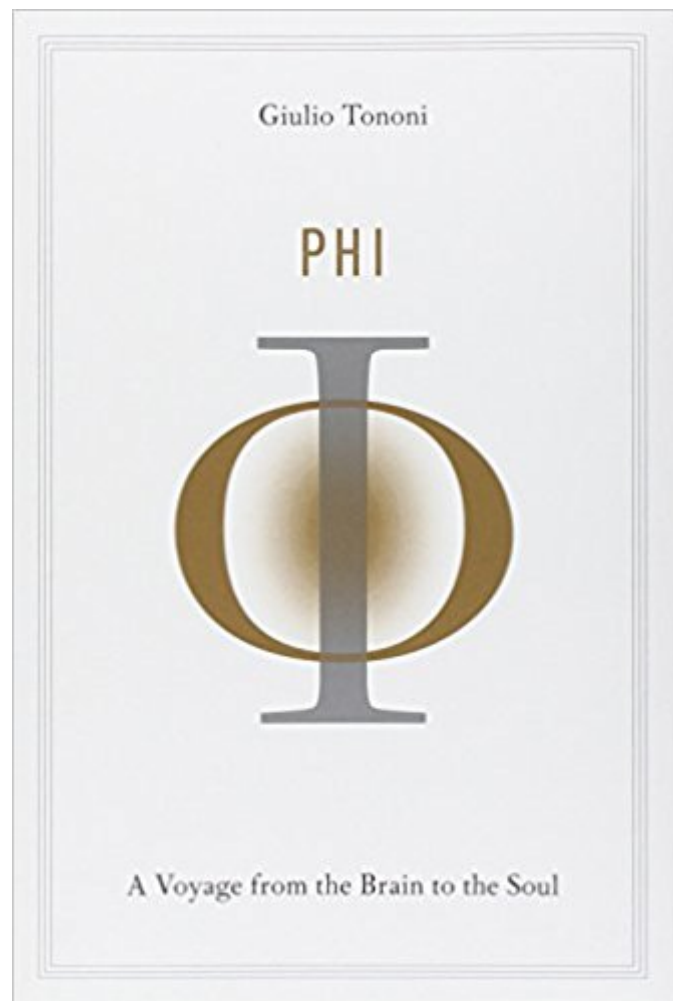




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# Phi: A Voyage From The Brain To The Soul



## Synopsis

This title is printed in full color throughout. From one of the most original and influential neuroscientists at work today, here is an exploration of consciousness unlike any other—*as told by Galileo, who opened the way for the objectivity of science and is now intent on making subjective experience a part of science as well.* *Galileo's* journey has three parts, each with a different guide. In the first, accompanied by a scientist who resembles Francis Crick, he learns why certain parts of the brain are important and not others, and why consciousness fades with sleep. In the second part, when his companion seems to be named Alturi (Galileo is hard of hearing; his companion's name is actually Alan Turing), he sees how the facts assembled in the first part can be unified and understood through a scientific theory—a theory that links consciousness to the notion of integrated information (also known as  $\phi$ ). In the third part, accompanied by a bearded man who can only be Charles Darwin, he meditates on how consciousness is an evolving, developing, ever-deepening awareness of ourselves in history and culture—that it is everything we have and everything we are. Not since Gödel, Escher, Bach has there been a book that interweaves science, art, and the imagination with such originality. This beautiful and arresting narrative will transform the way we think of ourselves and the world.

## Book Information

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## Customer Reviews

“Both playful and philosophical, this extravagant book addresses questions about the root of

consciousness in a unique way...The book is a visual delight as well as an impressive read, its lavish artwork and literary references demonstrating just how fully complementary art and science can be.

• Publishers Weekly, starred review “Giulio Tononi is a man of bold and original mind who has developed a fundamental new theory of consciousness. In *Phi*, he calls on all the resources of drama, metaphor, and the visual arts to present his scientific insights, in the form of imaginary dialogues in which Galileo meets Francis Crick, Alan Turing, and other major thinkers of the twentieth century. This is an astonishing (and risky) literary device, but Tononi pulls it off triumphantly. He makes the deepest neuroscientific insights come alive.

• Oliver Sacks, author of *Musicophilia* “You may or may not endorse Giulio Tononi’s views on how the brain generates consciousness, but you can certainly agree that his book is a garden of intellectual delights.

• Antonio Damasio, author of *Self Comes to Mind* and *Descartes’ Error* “This wonderful book reads like a popcorn novel but informs like a primer on consciousness and where it comes from. By turns exciting, challenging, and thought provoking, Giulio Tononi’s marvelous imagination explores the origin of thought, sensation, and feeling. Learning about the difference between the cerebrum and the cerebellum doesn’t sound like fun, but here you encounter them amidst fat friars shouting in vulgar Latin, nymphs of radiant beauty, and a mysterious juggler on a unicycle. I’ve always taken pride in being a conscious, sentient being; after reading *Phi*, I’m beginning to understand what it means when I say that!

• Leonard Mlodinow, author of *Subliminal* “An original, provocative tale of a scientist’s quest to understand how the brain generates consciousness | A challenging, rewarding read that will undoubtedly alter your consciousness.

• Kirkus “Charming.

• CultureLab “Tononi has pushed the study of consciousness forward | the book is lavishly illustrated with paintings and scientific images, poetically written, and unashamedly speculative, weighing some of the meaning of life’s questions Tononi has been thinking about during his long career as a consciousness researcher. It’s a fascinating celebration of the complexity of the brain and mind.

• Boston Globe “

Giulio Tononi is a professor of psychiatry, the David P. White Professor of Sleep Medicine, and the Distinguished Chair in Consciousness Science at the University of Wisconsin. In addition to the major scientific journals, his work has appeared in *New Scientist*, *Science Daily*, and *Scientific American*. His research has been the subject of articles in *The New York Times* and *The Economist*.

He is the coauthor, with Nobel laureate Gerald Edelman, of *A Universe of Consciousness*.

==== Context ====For the sake of context, I am a student in the biomedical sciences. I have taken a few psychology and neuroscience classes. I wanted to read this book because I am interested in learning more about the human consciousness and how it is related to the biological brain.

However, I have never had any formal introduction to it and none of my classes have focused very much on this topic.==== Overall ====Overall, I enjoyed this book. It was an unique reading

experience, but it was definitely not what I expected. This book has a lot to offer beyond just the biological connection to consciousness (which was my expectation). However, there are sections where the author tends to get bogged down in discussion and musings, and to me, this detracts from the overall experience. Not everyone will enjoy this type of book, but the ideas and theories offered by Dr. Tononi on this field are fascinating to think and debate about.=== Synopsis ===

"Phi" is a story about the famed astronomer and scientist, Galileo. Similar to "guided enlightenment" theme of "A Christmas Carol", Galileo is helped by three scientists on his journey to understand our consciousness. In the first third of the book, Frick (based on Francis Crick, the geneticist who also spent a great deal of time studying the consciousness) takes our protagonist on a series of encounters to help him answer Galileo's original question: "How could mere matter generate mind?" Once Galileo is convinced of the soul-brain connection, he faces more difficult questions regarding consciousness - questions that can't be explained by simply looking at research and clinical findings. In this second part, Alturi (based off of Alan Turing, whose namesake Test has implications in consciousness and artificial intelligence), demonstrates to Galileo a series of thought experiments, that, along with the facts presented in his first journey, present a theory of consciousness based on Phi. The third part, hosted by a man modeled around Darwin, shows Galileo's understanding the overarching implications of the "phi" theory. Each chapter of the book is meant to convey one big idea or theme regarding consciousness that Galileo and the reader. Most of the time, the bulk of the chapter is spent on a story, discussion, or metaphor that will be presented to the audience in order to emphasize that idea. Every chapter also has many pictures, paintings, or photos dispersed through it, each adding a visual element to the argument being made or evidence being presented. Lastly, a "Notes" section concludes every chapter, where the author provides his own commentary, explains minor characters, translates quotes, elaborates on evidence, provides references for the art, etc.==== What I Liked ====There are many aspects of this book that I really liked. Since I am interested in the brain and the mind, the content had an obvious appeal for me. And the content is really what this book is about. All the other parts of the

story are just a way for Tononi to get his point across. I thought the neurological evidence and basic neuroscience was presented in a very clear and intriguing manner. Dr Tononi did a great job with his explanations of the biological background and brain deficits and disorders by presenting them in interesting anecdotes and with relevant historical characters and factual references. The material is definitely accessible to someone new to the field of neuroscience. And for those with a neuro background, it was presented in such a way that it was still interesting and instructive. The structure of the book made it a very unique and enjoyable reading experience. The chapters are often a balance of subjective discussion with a connection to a more objective element, such as neurological evidence, such as when Tononi uses Tale of the Two Cities to explain the difference between the cerebrum and the cerebellum, and why one is involved in consciousness and the other isn't. Likewise, Tononi uses a balance of both scientific evidence and relevant art, history, culture, and mythology. This balance can also be seen in the illustrations used: alongside stunning photographs of stained hippocampal neurons will be Renaissance paintings. Besides photos of Classical Greek sculptures, Tononi will place a hand-sketch of the corpus callosum, the bridge between the brain hemispheres. Yet both elements, the objective brain MRI scans and the subjective portrait of Copernicus, are skillfully woven together by Tononi to illustrate an idea about consciousness. I also really liked the "Notes" section at the end of each chapter. These aren't just references and citations. Rather than write as the author, Dr. Tononi does something unique and adds commentary to Galileo's journey as if he is a detached observer, discussing a journey he is witnessing himself. This definitely adds an interesting perspective to an already engrossing chapter, and you will definitely want to read every "Notes" section. One of the most obvious elements of the book is the language and writing of Tononi. He writes in a very flowing and eloquent manner that makes it easy and pleasant to read through. It is almost as if you're reading a poem. The dialogue of the characters is also very well written. Frick's lines, such as: "You are empty, Galileo, and have no spirit: nothing enters your immature body at conception and nothing leaves your carcass at death" and "You are merely another beast in the great zoo of the universe" convey his character - that of scientific certainty and arrogance - artfully and make him a far more relatable part of the journey. Tononi's writing style is definitely an enjoyable and attractive part of this tale. Other things I liked include the minor characters, often pulled from literary or historical contexts. I enjoyed reading about their contribution (often counter-argument) to the discussion and how Tononi decided to portray them. And if you don't know much about them, the author talks about them in his "Notes".

==== What I Didn't Like =====

Back to content, which is the purpose of this book. I have one complaint about the book. It's not huge, but it did bother me and it was prevalent. I

thought that at several points throughout the book, Dr. Tononi's discussions became too abstract and too convoluted to clearly convey the point of the chapter. This was especially common problem in the latter parts of Galileo's journey, where the author is attempting to create complex theories and associations and project potential implications. It just feels as if he tries to be too complex and ostentatious, and this can unnecessarily slow down reading all throughout the book. On the last third of the book, I couldn't clearly understand some of the points Tononi was trying to make. Maybe this won't be a problem for a more experienced reader.===== Final Thoughts =====Dr. Tononi's book is not for someone who is looking to understand consciousness through a purely biological lens. In fact, only a third of the book would satisfy such an audience. Nor would I suggest this book to someone who is looking for just a layman's explanation - the biological explanations and bases are explained well and are not very technical, but the abstract discussions and thought experiments might not be what they are seeking. "Phi" is for someone who wants to view consciousness through many different lenses, both objective and subjective, but ultimately connect all those perspectives together to an understanding of the topic reached by Galileo and proposed by Dr. Tononi. As I said, this is a fascinating topic and the book has a lot to offer regarding it, but my suggestions would be to take your time reading it and understanding the ideas and arguments that are made in it. Whether or not you agree with his theories, this will allow you to get the most from this book. In summary, this is a beautiful book that is both instructive and very interesting to read and think about.

This book came along a week after a hike with a friend during which we discussed consciousness and how it occurred, and its implications for a non-physical, spiritual existence. As a physician, my friend argued that consciousness was merely electrochemical. But what does that mean for physical theories like quantum mechanics, especially string theory that requires multiple universes? Then I hear Dr Tononi interviewed on NPR, thought he might have some answers in this book and ordered it the next day. Dr Tononi has made the journey from basic neuroscience to spiritual implications fascinating at many levels. From the first chapter, you have the feeling that your experience transcends the written text; you are exposed to the material at many levels simultaneously. Consequently, the information is reinforced and learning enhanced. The author revisits complex concepts several times, linking it to the subject of the chapter at hand, further enhancing learning of sometimes difficult concepts. Even the art used to complement the text is adapted to further explanation of the concept under discussion, sometimes to the point of modifying the art! You find yourself thinking at several levels at the end of every chapter. This is a book that continues to provoke thinking about the material long after you've completed it. It neither supports nor

undermines belief systems, but offers a recasting of what "eternal life" might mean. It refreshingly avoids specific conclusions that are beyond scientific observation, leaving any spiritual conclusions to be filtered through one's personal belief system. Dr Tononi does not prescribe, only informs from his experience and intellectual curiosity. I am recommending this book to my friend and I can't wait for the next hiking discussion!

Tononi's 'Phi' attempts to discuss consciousness through the vantage point of fictionalized versions of famous thinkers, with the character of Galileo being our main protagonist who we follow through his enlightenment of what consciousness is as explained through the frame of integrated information. There are many intellectually delightful moments in these discussions, and many poetic allusions that are fun through and through, but I can't shake my disappointment that, for such a profound topic, and for such a scientifically important advancement as Tononi's IIT may prove to be, the book remains a superficial popularization without much depth. When one reads a book like this you can't help but draw comparisons to Hofstadter's GEB which masterfully blended fictional anecdotes with deep ideas, but where Hofstadter plunged the reader deep into the relevant issues, Tononi only skates on the surface, offering glances and teasing those of us who wish to learn more. In the end, I think those who know nothing of Tononi's research will still leave not knowing much, and those of us who have the necessary background will not have gained much either

I learned nothing from this book. Perhaps the fluff of Renaissance paintings are fictitious and pseudo-learned disquisitions by long-dead intellectuals will suit some, but they do not suit me. I must say that I am prone to dip into books on consciousness every few years, much as some people seek enlightenment from self-help books. I am continually disappointed. No one understands consciousness, and neuroscientists are no better equipped to do so than anyone else.

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