Ritter, F. E. Foreword. In: Thagard, P. (2019). *Brain-mind*. xii-xiii. New York, NY: Oxford University Press.

Foreword to *Brain-Mind* by Paul Thagard

Frank E. Ritter
7 oct 18

Three decades ago, Newell, Anderson, and Simon shared a desire for a unified theory of how cognition arises and what a mechanistic explanation would look like. Today, much still remains to be done to pursue that desire, but much has been accomplished.

Allen Newell talked about narrow and deep theories, and broad and shallow theories, and that theories could differ in these ways. Many psychology theories are deep, explaining a few phenomena in great detail, but not explaining many phenomena nor how they interact and mutually constrain each other.

In this trio of books making up his treatise, Paul Thagard creates a much broader and more accessible explanation of what a mechanistic explanation of mind and human behavior would look like than we have seen before. These books explain the cognitive science approach to cognition, learning, thinking, emotion, social interaction—much of what it means to be human—and what this means for a wide variety of sciences and philosophy. His treatise provides a good overview of cognitive science and its implications. Different readers will be drawn to the treatise in different ways. It does not matter where they start.

In this book, *Brain-Mind,* Thagard explains how the Semantic Pointer Architecture (SPA) by Chris Eliasmith, Thagard's colleague at the University of Waterloo, can be used to explain the mind, cognition, and related concepts. The SPA architecture is a very useful dynamic theory that can do multiple tasks in the same model; and it is explained in journal articles and by Eliasmith's (2013) book in the Oxford Series on Cognitive Models and Architectures. Most of the implications based on SPA are also supported by and have lessons for other computational models of cognition, so these books can be useful to users of other cognitive architectures.

In his book, *Mind-Society,* Thagard examines what this approach means for social science and related professional fields, and the mechanisms account for successes and failures of major professional activities. In his book, *Natural Philosophy,* he examines what this approach means for philosophy, including important topics of philosophy of mind and of beauty. This book provides a useful and engaging overview of philosophy, particularly for those interested in cognitive science or working in cognitive science.

These books introduce several useful theories and methods about how to do science as well. Beyond allowing and using explanations via multilevel mechanisms, particularly helpful are Thagard's introduction and use of 3-analysis for definitions and coherence. The 3-analysis definitions are a way to explain concepts without using simple definitions. They define a concept using *Exemplars*, *Typical features,* and *Explanations.* This approach resolves several problems with simple dictionary definitions.

Also valuable is the development of coherence as a concept for reasoning. Coherence is used in this book as a way to describe the quality of theories—that theories are not just good when they predict a single result, but how they cohere with multiple sources of data

and with other theories. Coherence is hard to quantify itself, but it is clearly useful. But the use of coherence is not just normative—we should use it—it is also descriptive in that scientists and laypersons appear to already use it, at least implicitly. Making the use of coherence explicit will help us to apply, teach, and improve the process.

Not only will these books be helpful to cognitive scientists and those interested in cognitive science, they will appeal to those who simply want to learn more about the world and cognition—they offer one of the best and broadest explanations we have for cognition. Thus, humanists and social scientists interested in knowing how cognitive science works will find some answers here.

These books contain powerful ideas by one of the most highly cited living philosophers. They can change the way you think about the world, including brains and mind, and how you might think that the mind works and interacts with the world. Thagard calls these trio of books a treatise, and I found them so compelling that I've decided to use them in a course this next semester.

References [for *Brain-mind*]

Eliasmith, C. (2013). *How to build a brain: A neural architecture for biological cognition.* New York, NY: Oxford.

Ritter, F. E. Foreword. In: Thagard, P. (2019). *Mind-society*. xv-xvii. New York, NY: Oxford University Press.

Foreword to *Mind-Society* by Paul Thagard

Frank E. Ritter
6 oct 18

Three decades ago, Newell, Anderson, and Simon shared a desire for a unified theory of psychology, that is, how cognition arises, and what a mechanistic explanation would look like. Today, much still remains to be done to pursue that desire, but much has been accomplished.

Allen Newell talked about narrow and deep theories, and broad and shallow theories, and that theories could differ in these ways. Many psychology theories are deep, explaining a few phenomena in great detail, but not explaining many phenomena nor how they interact and mutually constrain each other.

In the trio of books making up his treatise, Paul Thagard creates a much broader and accessible explanation than we have seen before of what a mechanistic explanation of mind and human behavior would look like for psychology and also areas related to psychology. These books explain the cognitive science approach to cognition, learning, thinking, emotion, social interaction—nearly all of what it means to be human—and what this means for a wide variety of sciences and philosophy. These books provide a good

overview of cognitive science and its implications. Different readers will be drawn to the treatise in different ways. It does not matter where they start.

The lessons in these books are based on the Semantic Pointer Architecture (SPA) by Chris Eliasmith, Thagard's colleague at the University of Waterloo. SPA is a very useful dynamic theory that can do multiple tasks in the same model, and it is explained in journal articles and by Eliasmith's book in the Oxford Series on Cognitive Models and Architectures. Most of the implications based on SPA are also supported by and have lessons for other computational models of cognition, so these books can be useful to users of other cognitive architectures, particularly related architectures. *Mind-Brain,* another book in Thagard's treatis, focuses on what SPA means for brain and mind.

In this book, *Mind-Society,* after explaining the use of SPA, Thagard examines what this approach means for social science and related professional fields. This book provides a very broad, singular framework for explaining the breadth of human behavior.

Is this framework useful? Very much so. This three-book treatise starts to address some problems that I have seen in various fields by using multi-level analyses, with a cognitive architecture at its middle level. These topics include how cognitive limitations can be addressed by legislation and professional practice. This treatise also notes how the Semantic Pointer Architecture (SPA) provides explanations naturally for many phenomena directly, and that many similar cognitive architectures also provide. While this treatise does not note the linkages for other cognitive architectures, many architectures can be seen to provide most (but not all) of the support for this framework to explain how minds work in society.

In his book, *Natural Philosophy,* Thagard examines what this approach means for philosophy, including important topics of philosophy of mind and of beauty. It provides a useful and engaging overview of philosophy, particularly for those interested in cognitive science or working in cognitive science.

These books introduce several useful theories and methods about how to do science as well. Beyond allowing and using explanations via multilevel mechanisms, particularly valuable are Thagard's introduction and use of 3-analysis for definitions and coherence. The 3-analysis definitions are a way to explain concepts without using simple definitions. They define a concept using *Exemplars*, *Typical features,* and *Explanations.* This approach resolves several problems with simple dictionary definitions.

Coherence is a valuable concept for reasoning and is used in this book as a way to describe the quality of theories. Theories are not just good when they predict a single result, but how they cohere with multiple sources of data and with other theories. Coherence is hard to quantify itself, in some ways, but it is clearly useful. But the use of coherence is not just normative—we should use it—it is also descriptive in that scientists and laypersons appear use it in everyday life, and that even scientists use it in their work. Making this often implicit reasoning process explicit will help us to apply, teach, and improve the process.

These books will be useful to cognitive scientists and those interested in cognitive science. They will also be useful to those who simply want to learn more about the world and cognition. They offer one of the best and clearest explanations we have for cognition

and how it would apply to the humanities and to the social sciences. Pieces of liberal education are sprinkled throughout because this book draws examples and support from a wide range of material. Thus, humanists and social scientists interested in knowing how cognitive science works will find some answers here.

These books contain powerful ideas by one of the most highly cited living philosophers. They can change the way you think about the world, including brains and mind, and how you might think that the mind works and interacts with the world. Thagard calls these trio of books a treatise, and I found them so compelling that I've decided to use them in a course this next semester.

References [for *Mind-Society*]

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In this trio, Paul Thagard creates a much broader and accessible explanation than we have seen before of what a mechanistic explanation of mind and human behavior would look like. These books explain the cognitive science approach to cognition, learning, thinking, emotion, social interaction—nearly all of what it means to be human—and what this means for a wide variety of sciences and philosophy. These books provide a good overview of cognitive science and its implications. Different readers will be drawn to the treatise in different ways. It does not matter where they start.

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SPA are also supported by and have lessons for other computational models of cognition, so these books can be useful to users of other cognitive architectures.

In his book, *Mind-Society,* Thagard examines what this approach means for social science and related professional fields and how the mechanisms account for successes and failures of major professional activities. This book provides a very broad, singular framework for explaining the breadth of human behavior.

In this book, *Natural Philosophy,* Thagard examines what this approach means for philosophy, including important topics of philosophy of mind and of beauty. It provides a useful and engaging overview of philosophy, particularly for those interested in cognitive science or working in cognitive science. In this book he connects philosophy with current theories in psychology and neuroscience and with the best current computational theories of mind based on cognitive architectures, using these computational theories as the core of its own theory.

Is this three-book treatise useful? It is very much so. It starts to address some problems that I have seen in various fields by using multi-level analyses, with a cognitive architecture at its middle level.

This treatise also provides a detailed theoretical explanation of how the Semantic Pointer Architecture (SPA) provides explanations naturally for many phenomena directly, and that many similar cognitive architectures may also provide. While this treatise does not note the linkages for other cognitive architectures, many architectures can be seen to provide most (but not all) of the support for this framework to explain how minds work in society.

These books introduce several useful theories and methods about how to do science as well. Beyond allowing and using explanations via multilevel mechanisms, particularly valuable are Thagard's introduction and use of 3-analysis for definitions and coherence. The 3-analysis definitions are a way to explain concepts without using simple definitions. They define a concept using *Exemplars*, *Typical features,* and *Explanations.* This approach resolves several problems with simple dictionary definitions.

The books also champion coherence as a useful concept for reasoning. Coherence is used in this book as a way to describe the quality of theories—that theories are not just good when they predict a single result, but how they cohere with multiple sources of data and with other theories. Coherence is hard to quantify itself, but it is clearly a useful concept. But the use of coherence is not just normative—we should use it—it is also descriptive in that scientists and laypersons appear to already use it, at least implicitly. Making the use of coherence explicit will help us to apply, teach, and improve the process.

I particularly enjoyed the liberal education available through carefully reading Chapter 9 on beauty, checking the visual and audio references from online sources, and then reflecting on how the SPA cognitive architecture explains the different experiences.

These books will be useful to cognitive scientists and those interested in cognitive science. They will also be useful to those who simply want to learn more about the world and cognition. They offer one of the best and clearest explanations we have for cognition. Thus, it will be useful for humanists and social scientists interested in knowing

how cognitive science works. There are, sprinkled throughout, pieces of liberal education because this book draws examples and support from a wide range of material.

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