

# New Directions in Philosophy and Cognitive Science

This series brings together work that takes cognitive science in new directions. Hitherto, philosophical reflection on cognitive science or perhaps better, philosophical contribution to the interdisciplinary field that is cognitive science has for the most part come from philosophers with a commitment to a representationalist model of the mind. However, as cognitive science continues to make advances, especially in its neuroscience and robotics aspects, there is growing discontent with the representationalism of traditional philosophical interpretations of cognition. Cognitive scientists and philosophers have turned to a variety of sources phenomenology and dynamic systems theory foremost among them to date to rethink cognition as the direction of the action of an embodied and affectively attuned organism embedded in its social world, a stance that sees representation as only one tool of cognition, and a derived one at that. To foster this growing interest in rethinking traditional philosophical notions of cognition using phenomenology, dynamic systems theory, and perhaps other approaches yet to be identified we dedicate this series to “New Directions in Philosophy and Cognitive Science.”

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Majid Davoody Beni

# Structuring the Self

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*To my loved ones, Maaedeh, Zohre, Maryam, Ebrahim, and Milad  
(and Maaedeh's folk too :))*

# Preface

I have been busy wresting some information out of my self—about its essence, identity, properties, and modes—for the past thirty-some years. The few things that I have learned hardly make me knowledgeable about the subject, which seems to be elusive as well as intriguing. Even so, a little structured knowledge is not so bad as a lot of scattered ignorance, and giving structure to things that one learns can always pave the way to further wisdom. A great deal of the little that I know about the subject is garnered through pondering the works of great philosophers of the days of lore and recent scientific enterprises as well as introspection. The book does not aim to present a comprehensive philosophical theory that covers everything that we desire to know about the self. Instead, it seeks to give structure to a part of what we already know about the aspects and elements of the self from a scientific and metaphysical point of view. That is to say, in this book I will focus on some specific neuro-computational and informational theories of aspects of the self to flesh out a philosophical alternative to the traditional metaphysics of selfhood. My enterprise is inspired by a flourishing theory of the contemporary philosophy of science.

Structural realism (SR), as being advocated by John Worrall, Steven French, and James Ladyman among others, is a successful theory of the philosophy of science. It is a modest form of scientific realism, and it aims to account for scientific progress and continuity in the history of science

on the basis of structural relations, rather than content. It emphasises the unifying role of underpinning structures and underscores the role of commonality in the face of theoretical changes and theoretical diversity that wreak havoc with the realist (epistemological and ontological) commitments of scientific theories. SR defends scientific realism in the face of metaphysical underdetermination in physics. In this book, I draw attention to the divergence of the scientifically informed conception of the self from the orthodox substantialist picture that is usually associated with the Cartesian tradition. I also draw attention to the diversity that rules over scientific theories of aspects and elements of selfhood. From the observation of instances of divergence and diversity, I conclude that there is a state of underdetermination of metaphysics of selfhood by diverse scientific theories that represent the self and its various aspects. After stating my formulation of metaphysical underdetermination of the self, I argue that a structural realist theory of the self (SRS) presents a strategy for defending a modest form of realism about the self. It does not endorse full-fledged realism about all aspects of the self. It defends a modest version of the self about the basic structure of the self that can be specified in terms of embodied informational structures, or structures realised by mechanisms of information processing in the brain and environment.

Substantialism, or the view that portrays the self as a classical substance that retains its identity over time and is the bearer of properties, has been the orthodox theory of the self for a long time. Recent scientific (or scientifically informed) theories of the self, for example, Thomas Metzinger's eliminativism or Shaun Gallagher's pattern theory, defy substantialism. However, they do not provide a well-posed metaphysical alternative to substantialism. Actually, the domain of cognitive science abounds with a form of theoretical diversity that may distract from the appearance of a viable unified alternative to the orthodox picture. This is because theories of Metzinger and Gallagher, as well as a few other recent theories that I will review in this book, pull in different directions, to the effect that they distract from a unifying ontological account of the self. SRS aims to provide a viable alternative to substantialism. This alternative is informed by scientific accounts of different aspects of the self, but uses a new metaphysical approach (i.e., ontic structural realism) to staple these theoretical accounts into a unified structural ontology. It constructs

its ontological account of the self on the basis of the common underpinning structure that lies beneath the theoretical diversity manifested in rival and sometimes incompatible scientific accounts of the self and its aspects. I specify the basic structure of the self as embodied informational structures, that is, informational structures implemented in the mechanisms of information processing in cortical midline structures (CMS) and the Mirror Neuron System.

In the first chapter of the book, I survey four historical theories of the self and pin down the difference between substantivalism and its alternatives through some familiar philosophical examples. Two of these theories (by Aristotle and Descartes) exemplify substantivalism, whereas two others (by Hume and Kant) do not line up with substantivalism. I end the chapter by taking a fleeting look at significant breakthroughs that contribute to the formation of scientific psychology. In the second chapter, I survey SR in the philosophy of science, its origins, and its varieties. I survey the situation (in the history of modern physics) that motivated SR, and I argue that the theoretical diversity in the cognitive science, too, demands a structural realist strategy for addressing the problem of metaphysical underdetermination of the self. Chapter 3 provides more concrete examples to substantiate the last point about metaphysical underdetermination caused by the diversity of scientific accounts of the self. I mention theories of Metzinger, Gallagher, Georg Northoff, and Vittorio Gallese to show that there is indeed diversity in the field of theories of selfhood. In Chap. 4, I spell out SRS and specify the underpinning structure of the self in terms of embodied informational structures. I argue that it is possible to *represent* these structures mathematically through unifying Bayesian frameworks that are developed by Karl Friston in his statement of the free energy principle. I also argue that these structures are implemented in parts of the brain and organism (and according to an enactivist-ecological construal, the environment that situates the organism). Thus, although my philosophical account of the self is informed by scientific theories that evolved within a computational-informational framework, I explain that these structures are embodied in the brain and its world. In Chap. 5, I show how various accounts of consciousness, for example, the integrated information theory of consciousness, resting-state-based theory, and free-energy-based theory, could be

unified by invoking a structural realist strategy, too. I also present a structural realist account of intentionality. Finally, in Chap. 6, I present a structural realist theory of the social aspects of the self, and I take the first steps to flesh out a structural realist account of moral aspects of the self. While I consolidate this account on the basis of experimental research on the Mirror Neuron System and Default Mode Network, I show that it is in line with some classical theories of morality, for example, by Peter Railton.

In all, in this book, I show that SRS provides a scientifically informed alternative to substantivalism. It endorses a structuralist account of basic, phenomenal, social, and moral aspects of the self. I argue that it is reasonable to take a modest realist attitude towards the self on the basis of what our best theories of cognitive science reveal about it, without succumbing to substantivalism.

SRS has evolved gradually through a number of papers that I have published previously. The feedback (and encouragement) that I received on those papers inspired me to work out connections between my different engagements with the philosophy of selfhood. I have aspired to pursue the ambitious project of presenting a comprehensive structural theory of selfhood which includes basic, phenomenal, and social aspects of the self. In this vein, I have to thank Shaun Gallagher for his earlier feedback on a couple of papers, and Tim Crane for his kind reception of my engagement with his theory of intentionality. The project began with a paper in *Synthese*, which provided structural realist construal of the CMS theory. Georg Northoff received my work very kindly and provided valuable feedback. I thank Georg sincerely for our fruitful dialogue about various subjects in cognitive science and philosophy. Also, I am indebted to Karl Friston, who patiently penned insightful comments on my earlier papers on predictive coding and the free energy principle. It would have not been possible to compose Chap. 5 without Friston's comments on an earlier draft that is incorporated into the chapter. All of these debts are gratefully acknowledged. Steven French and Steve Elliot replied to some technical questions about the publishing business, for which I am grateful (the name of the book is suggested by Steve Elliot). And I thank Lauriane Piette (who, in addition to usual editorial duties, kindly helped with copy-editing), the anonymous reviewer, and the rest of the Palgrave Macmillan team for their nice treatment of the project. I thank Dr.

Hossein Karami, the director of the Science and Technology Programme at the Amirkabir University for his support during my service there. As ever, I am hugely indebted to my wife Maaedeh and my parents for their support.

Nur-Sultan city  
Summer 2019

Majid D. Beni

## Praise for *Structuring the Self*

“Structural realism is now a well-established position in the philosophy of science. Majid Beni’s rich and engaging work extends it from the physical sciences to neuroscience and from there to social relations and even our moral judgments. This is a bold and provocative move but Beni draws extensively on both recent and classic literature in philosophy and cognitive science to construct a compelling series of arguments. Structuralism has a long history spanning diverse fields of thought but here Beni breaks new ground and opens up further avenues of intellectual exploration that should be of interest to philosophers and scientists alike.”

—Steven French, *Professor of Philosophy of Science, University of Leeds, UK*

“I have never read a book like this before: it offers a relentless and compelling tide of carefully constructed philosophical arguments about the very nature of ‘self’. It bravely places philosophical arguments—well-honed over centuries—head-to-head with contemporary formulations of self-organisation in theoretical neurobiology and artificial (or perhaps artefactual) intelligence. The result is a convincing argument for a Structuralist Realist Theory of Selfhood—that neatly sidesteps the issues that attend eliminativism and substantivalism. This theory prescribes the right kind of ontological commitments to gracefully accommodate current formulations of consciousness in terms of information theory, neurobiology and the physics of sentient systems. As a physicist, I often find myself using phrases like ‘self-organisation’, ‘self-assembly’, ‘self-information’ and, latterly, ‘self-evidencing’. After reading this book, I will never use the word ‘self’ in quite the same way.”

—Karl J. Friston, *Scientific Director: Wellcome Centre for Human Neuroimaging, Institute of Neurology, UCL, UK*

“This is an impressive book about the self that fills a deep void in our conceptualizations of ourselves. Bringing together, philosophy, neuroscience, and computational modelling, Beni develops a structural realist account of self that seems highly natural and plausible in metaphysical, conceptual, and empirical terms. A wonderful book that will set new directions and standards on the eternal debate of self.”

—Georg Northoff, *EJLB-CIHR Michael Smith Chair in Neurosciences and Mental Health, University of Ottawa Institute of Mental Health Research, Canada*

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# Abbreviations

AI	Artificial intelligence
CMS	Cortical midline structures
CSR	Cognitive structural realism
DMN	Default Mode Network
ESR	Epistemic structural realism
ISR	Informational Structural Realism
MNS	Mirror Neuron System
OSR	Ontic structural realism
SR	Structural realism