

This is a section of [doi:10.7551/mitpress/11252.001.0001](https://doi.org/10.7551/mitpress/11252.001.0001)

The Handbook of Rationality

Edited by: Markus Knauff, Wolfgang Spohn

Citation:

The Handbook of Rationality

Edited by: Markus Knauff, Wolfgang Spohn

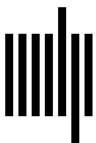
DOI: 10.7551/mitpress/11252.001.0001

ISBN (electronic): 9780262366175

Publisher: The MIT Press

Published: 2021

Funding for the open access edition was provided by the MIT Libraries Open Monograph Fund.



The MIT Press

The Handbook of Rationality

The Handbook of Rationality

Edited by Markus Knauff and Wolfgang Spohn

**The MIT Press
Cambridge, Massachusetts
London, England**

© 2021 The Massachusetts Institute of Technology

All rights reserved. No part of this book may be reproduced in any form by any electronic or mechanical means (including photocopying, recording, or information storage and retrieval) without permission in writing from the publisher.

The MIT Press would like to thank the anonymous peer reviewers who provided comments on drafts of this book. The generous work of academic experts is essential for establishing the authority and quality of our publications. We acknowledge with gratitude the contributions of these otherwise uncredited readers.

This book was set in Stone Serif and Stone Sans by Westchester Publishing Services.

Library of Congress Cataloging-in-Publication Data

Names: Knauff, Markus, editor. | Spohn, Wolfgang, editor.

Title: The handbook of rationality / edited by Markus Knauff and Wolfgang Spohn.

Description: Cambridge : The MIT Press, 2021. | Includes bibliographical references and index.

Identifiers: LCCN 2020048455 | ISBN 9780262045070 (hardcover)

Subjects: LCSH: Reasoning (Psychology) | Reason. | Cognitive psychology. | Logic. | Philosophy of mind.

Classification: LCC BF442 .H36 2021 | DDC 153.4/3—dc23

LC record available at <https://lcn.loc.gov/2020048455>

Contents

Preface ix

Overview of the Handbook xi

Markus Knauff and Wolfgang Spohn

Psychological and Philosophical Frameworks of Rationality—A Systematic Introduction 1

Markus Knauff and Wolfgang Spohn

1. Why Study Rationality? 1
2. Contours of the Concept of Rationality 3
3. Theoretical and Practical Rationality 10
4. Normative and Descriptive Theories of Rationality 18
5. Individual and Social Rationality 26
6. Rationality in a Process-Oriented and an Output-Oriented Perspective 31
7. Preconditions of Rationality 34
8. Frontiers of Rationality 44
9. Conclusion and Open Issues 50

I Origins and Key Issues of Rationality

Section 1 Origins of Rationality

- 1.1 Theories of Rationality and the Descriptive–Normative Divide: A Historical Approach** 71
Thomas Sturm
- 1.2 The Rationality Debate in the Psychology of Reasoning: A Historical Review** 87
Jonathan St. B. T. Evans
- 1.3 Evolution of Rationality** 101
Gerhard Schurz
- 1.4 Rationality and the Brain** 115
Vinod Goel

Section 2 Key Issues of Rationality

- 2.1 Reasons and Rationality** 129
John Broome
- 2.2 Practical and Theoretical Rationality** 137
Ralph Wedgwood

- 2.3 Mental Models, Reasoning, and Rationality** 147

P. N. Johnson-Laird

- 2.4 Heuristics and Biases** 159

Klaus Fiedler, Johannes Prager, and Linda McCaughey

- 2.5 Dual-Process Theories of Deductive Reasoning** 173

Karl Christoph Klauer

- 2.6 Logico-Computational Aspects of Rationality** 185

Johan van Benthem, Fenrong Liu, and Sonja Smets

II Theoretical Rationality

Section 3 Deductive Reasoning

- 3.1 Propositional and First-Order Logic** 201
Florian Steinberger
- 3.2 Natural Logic** 215
David P. O'Brien
- 3.3 Psychological Theories of Syllogistic Reasoning** 225
Sangeet Khemlani

Section 4 Probabilistic Reasoning

- 4.1 Subjective Probability and Its Dynamics** 239
Alan Hájek and Julia Staffel
- 4.2 Bayes Nets and Rationality** 253
Stephan Hartmann
- 4.3 Evidential Relevance** 265
Arthur Merin
- 4.4 Probability Logic** 277
Niki Pfeifer
- 4.5 Bayesian Rationality in the Psychology of Reasoning** 285
Nick Chater and Mike Oaksford

4.6	Probabilities and Conditionals	295			
	Klaus Oberauer and Danielle Pessach				
4.7	Representing Belief: Beyond Probability and Logic	305			
	Didier Dubois and Henri Prade				
Section 5 Belief Revision, Defeasible Reasoning, and Argumentation Theory					
5.1	Doxastic and Epistemic Logic	319			
	Hans van Ditmarsch				
5.2	Belief Revision	327			
	Hans Rott				
5.3	Ranking Theory	337			
	Gabriele Kern-Isberner, Niels Skovgaard-Olsen, and Wolfgang Spohn				
5.4	Defeasible Reasoning and Belief Revision in Psychology	347			
	Lupita Estefania Gazzo Castañeda and Markus Knauff				
5.5	Argumentation Theory	361			
	Ulrike Hahn and Peter Collins				
5.6	Reasoning and Argumentation	367			
	John Woods				
Section 6 Conditional and Counterfactual Reasoning					
6.1	Conditional and Counterfactual Logic	381			
	William B. Starr				
6.2	The Suppositional Theory of Conditionals and Rationality	395			
	David E. Over and Nicole Cruz				
6.3	Conditional and Counterfactual Reasoning	405			
	Ruth M. J. Byrne and Orlando Espino				
6.4	Utility Conditionals	419			
	Jean-François Bonnefon				
Section 7 Causal and Diagnostic Reasoning					
7.1	Causal and Counterfactual Inference	427			
	Judea Pearl				
7.2	The Rationality of Everyday Causal Cognition	439			
	Michael R. Waldmann				
7.3	Diagnostic Causal Reasoning	449			
	Björn Meder and Ralf Mayrhofer				
III Practical Rationality					
Section 8 Individual Rationality and Decision Making					
8.1	Preferences and Utility Functions	461			
	Till Grüne-Yanoff				
8.2	Standard Decision Theory	473			
	Martin Peterson				
8.3	Prospect Theory	485			
	Andreas Glöckner				
8.4	Decision under Uncertainty	495			
	Brian Hill				
8.5	Bounded Rationality: A Vision of Rational Choice in the Real World	505			
	Ralph Hertwig and Anastasia Kozyreva				
8.6	Reasoning, Rationality, and Metacognition	517			
	Valerie A. Thompson, Shira Elqayam, and Rakefet Ackerman				
Section 9 Game Theory					
9.1	Classical Game Theory	529			
	Max Albert and Hartmut Kliemt				
9.2	Epistemic Game Theory	543			
	Andrés Perea				
9.3	Evolutionary Game Theory	553			
	J. McKenzie Alexander				
9.4	Rationality in Economics: Theory and Evidence	565			
	Sanjit Dhami and Ali al-Nowaihi				
Section 10 Aspects of Social Rationality					
10.1	Social Epistemology	579			
	Franz Dietrich and Kai Spiekermann				
10.2	Collective Rationality	591			
	Hans Bernhard Schmid				
10.3	Rationality in Communication	601			
	Georg Meggle				
10.4	Rational Choice Theory in the Social Sciences	611			
	Werner Raub				
10.5	Structural Rationality	625			
	Julian Nida-Rümelin, Rebecca Gutwald, and Niina Zuber				
10.6	Adaptationism: A Meta-Normative Theory of Rationality	633			
	Leda Cosmides and John Tooby				
Section 11 Deontic and Legal Reasoning					
11.1	Deontic Logic	645			
	John Horty and Olivier Roy				
11.2	Deontic Reasoning in Psychology	651			
	Shira Elqayam				
11.3	Legal Logic	659			
	Eric Hilgendorf				

- 11.4 Logical Models of Legal Argumentation** 669
Henry Prakken

Section 12 Moral Thinking and Rationality

- 12.1 Rationality and Morality** 681
Christoph Fehige and Ulla Wessels
- 12.2 Moral Reasons** 693
Michael Smith
- 12.3 The Psychology and Rationality of Moral Judgment** 701
Alex Wiegmann and Hanno Sauer

IV Facets of Rationality

Section 13 Visual and Spatial Reasoning

- 13.1 Logical Reasoning with Diagrams** 715
Mateja Jamnik
- 13.2 Rational Reasoning about Spatial and Temporal Relations** 725
Marco Ragni
- 13.3 Visualization and Rationality** 735
Markus Knauff

Section 14 Scientific Rationality

- 14.1 Scientific Rationality and Objectivity** 747
Line Edslev Andersen and Hanne Andersen
- 14.2 Rationality and the Value-Freedom of Science** 757
Anke Bueter
- 14.3 Rationality and the Public Understanding of Science** 767
Rainer Bromme and Lukas Gierth

Section 15 Individual Differences, Learning, and Improvement of Rational Thinking

- 15.1 The Development of Basic Human Rationality** 779
Henry Markovits
- 15.2 Rationality and Intelligence** 791
Keith E. Stanovich, Maggie E. Toplak, and Richard F. West
- 15.3 How to Improve Rational Thinking?** 801
Stephanie de Oliveira and Richard Nisbett

- Contributors 807
- Name Index 811
- Subject Index 843

© 2021 The Massachusetts Institute of Technology

All rights reserved. No part of this book may be reproduced in any form by any electronic or mechanical means (including photocopying, recording, or information storage and retrieval) without permission in writing from the publisher.

The MIT Press would like to thank the anonymous peer reviewers who provided comments on drafts of this book. The generous work of academic experts is essential for establishing the authority and quality of our publications. We acknowledge with gratitude the contributions of these otherwise uncredited readers.

This book was set in Stone Serif and Stone Sans by Westchester Publishing Services.

Library of Congress Cataloging-in-Publication Data

Names: Knauff, Markus, editor. | Spohn, Wolfgang, editor.

Title: The handbook of rationality / edited by Markus Knauff and Wolfgang Spohn.

Description: Cambridge : The MIT Press, 2021. | Includes bibliographical references and index.

Identifiers: LCCN 2020048455 | ISBN 9780262045070 (hardcover)

Subjects: LCSH: Reasoning (Psychology) | Reason. | Cognitive psychology. | Logic. | Philosophy of mind.

Classification: LCC BF442 .H36 2021 | DDC 153.4/3—dc23

LC record available at <https://lcn.loc.gov/2020048455>