

Cambridge University Press

0521649757 - Rethinking the Foundations of Statistics

Joseph B. Kadane, Mark J. Schervish and Teddy Seidenfeld

Frontmatter

[More information](#)

Rethinking the Foundations of Statistics

This important collection of essays is a synthesis of foundational studies in Bayesian decision theory and statistics. An overarching topic of the collection is how the norms for Bayesian decision making should apply in settings with more than one rational decision maker. The essays then trace out some of the consequences of this turn for Bayesian statistics.

There are four principal themes to the collection: cooperative, non-sequential decisions; the representation and measurement of “partially ordered” preferences; non-cooperative, sequential decisions; and pooling rules and Bayesian dynamics for sets of probabilities.

The volume will be particularly valuable to philosophers concerned with decision theory, probability, and statistics, and to statisticians, mathematicians, and economists.

Cambridge University Press

0521649757 - Rethinking the Foundations of Statistics

Joseph B. Kadane, Mark J. Schervish and Teddy Seidenfeld

Frontmatter

[More information](#)

Cambridge Studies in Probability, Induction, and Decision Theory

General editor: Brian Skyrms

Advisory editors: Ernest W. Adams, Ken Binmore, Jeremy Butterfield,
Persi Diaconis, William L. Harper, John Harsanyi, Richard C. Jeffrey,
Wolfgang Spohn, Patrick Suppes, Amos Tversky, Sandy Zabell

Ellery Eells, *Probabilistic Causality*

Richard Jeffrey, *Probability and the Art of Judgment*

Robert C. Koons, *Paradoxes of Belief and Strategic Rationality*

Cristina Bicchieri and Maria Luisa Dalla Chiara (eds.), *Knowledge,
Belief, and Strategic Interactions*

Patrick Maher, *Betting on Theories*

Cristina Bicchieri, *Rationality and Coordination*

J. Howard Sobel, *Taking Chances*

Jan von Plato, *Creating Modern Probability: Its Mathematics, Physics,
and Philosophy in Historical Perspective*

Ellery Eells and Brian Skyrms (eds.), *Probability and Conditionals*

Cristina Bicchieri, Richard Jeffrey, and Brian Skyrms (eds.), *The
Dynamics of Norms*

Patrick Suppes and Mario Zanotti, *Foundations of Probability with
Applications*

Paul Weirich, *Equilibrium and Rationality*

Daniel Hausman, *Causal Asymmetries*

William Dembski, *The Design Inference*

James M. Joyce, *The Foundations of Causal Decision Theory*

Cambridge University Press

0521649757 - Rethinking the Foundations of Statistics

Joseph B. Kadane, Mark J. Schervish and Teddy Seidenfeld

Frontmatter

[More information](#)

Rethinking the Foundations of Statistics

JOSEPH B. KADANE

MARK J. SCHERVISH

TEDDY SEIDENFELD



CAMBRIDGE
UNIVERSITY PRESS

Cambridge University Press
 0521649757 - Rethinking the Foundations of Statistics
 Joseph B. Kadane, Mark J. Schervish and Teddy Seidenfeld
 Frontmatter
[More information](#)

PUBLISHED BY THE PRESS SYNDICATE OF THE UNIVERSITY OF CAMBRIDGE
 The Pitt Building, Trumpington Street, Cambridge, United Kingdom

CAMBRIDGE UNIVERSITY PRESS
 The Edinburgh Building, Cambridge CB2 2RU, UK <http://www.cup.cam.ac.uk>
 40 West 20th Street, New York, NY 10011-4211, USA <http://www.cup.org>
 10 Stamford Road, Oakleigh, Melbourne 3166, Australia
 Ruiz de Alarcón 13, 28014 Madrid, Spain

© Joseph B. Kadane, Mark J. Schervish, and Teddy Seidenfeld 1999

This book is in copyright. Subject to statutory exception
 and to the provisions of relevant collective licensing agreements,
 no reproduction of any part may take place without
 the written permission of Cambridge University Press.

First published 1999

Typeface Times Roman 10.25/13 pt. *System* QuarkXPress [BTS]

A catalog record for this book is available from the British Library.

Library of Congress Cataloging-in-Publication Data

Kadane, Joseph B.
 Rethinking the foundations of statistics / Joseph B. Kadane, Mark
 J. Schervish, Teddy Seidenfeld.
 p. cm. – (Cambridge studies in probability, induction, and
 decision theory)
 Includes bibliographical references.
 ISBN 0-521-64011-3 (hbk.). – ISBN 0-521-64975-7 (pbk.)
 1. Bayesian statistical decision theory. I. Schervish, Mark J.
 II. Seidenfeld, Teddy. III. Title. IV. Series.
 QA279.5.K36 1999
 519.5'42–dc21 98-48322
 CIP

ISBN 0 521 64011 3 hardback
 ISBN 0 521 64975 7 paperback

Transferred to digital printing 2004

Cambridge University Press
0521649757 - Rethinking the Foundations of Statistics
Joseph B. Kadane, Mark J. Schervish and Teddy Seidenfeld
Frontmatter
[More information](#)

To our families:
Caroline
Nancy, Margaret, and Meredith
Janice, David, and Adina
and to Jimmie Savage and Morrie DeGroot

Contents

| | |
|--|---------------|
| Introduction | <i>page</i> 1 |
| PART 1 DECISION THEORY FOR COOPERATIVE DECISION MAKING | |
| 1.1 On the Shared Preferences of Two Bayesian Decision Makers | 17 |
| 1.2 Decisions Without Ordering | 40 |
| 1.3 A Representation of Partially Ordered Preferences | 69 |
| PART 2 THE TRUTH ABOUT CONSEQUENCES | |
| 2.1 Separating Probability Elicitation from Utilities | 133 |
| 2.2 State-dependent Utilities | 149 |
| 2.3 Shared Preferences and State-dependent Utilities | 169 |
| 2.4 A Conflict Between Finite Additivity and Avoiding Dutch Book | 194 |
| 2.5 Statistical Implications of Finitely Additive Probability | 211 |
| PART 3 NON-COOPERATIVE DECISION MAKING, INFERENCE, AND LEARNING WITH SHARED EVIDENCE | |
| 3.1 Subjective Probability and the Theory of Games | 235 |
| 3.2 Equilibrium, Common Knowledge, and Optimal Sequential Decisions | 246 |
| 3.3 A Fair Minimax Theorem for Two-Person (Zero-Sum) Games Involving Finitely Additive Strategies | 267 |
| 3.4 Randomization in a Bayesian Perspective | 293 |
| 3.5 Characterization of Externally Bayesian Pooling Operators | 314 |
| 3.6 An Approach to Consensus and Certainty with Increasing Evidence | 333 |

Cambridge University Press
0521649757 - Rethinking the Foundations of Statistics
Joseph B. Kadane, Mark J. Schervish and Teddy Seidenfeld
Frontmatter
[More information](#)

| | |
|---|-----|
| 3.7 Reasoning to a Foregone Conclusion | 349 |
| 3.8 When Several Bayesians Agree That There Will Be No Reasoning to a Foregone Conclusion | 369 |
| <i>Index of Names</i> | 383 |
| <i>Subject Index</i> | 386 |