

Behavioral Decision Making

Behavioral Decision Making

Edited by
George Wright

*City of London Polytechnic
London, England*

PLENUM PRESS • NEW YORK AND LONDON

Library of Congress Cataloging in Publication Data

Main entry under title:

Behavioral decision making.

Bibliography: p.

Includes index.

1. Decision-making. I. Wright, George, 1952-

BF441.B393 1985

153.8'3

84-26612

ISBN-13: 978-1-4612-9460-3

e-ISBN-13: 978-1-4613-2391-4

DOI: 10.1007/978-1-4613-2391-4

©1985 Plenum Press, New York

Softcover reprint of the hardcover 1st edition 1985

A Division of Plenum Publishing Corporation

233 Spring Street, New York, N.Y. 10013

All rights reserved

No part of this book may be reproduced, stored in a retrieval system, or transmitted, in any form or by any means, electronic, mechanical, photocopying, microfilming, recording, or otherwise, without written permission from the Publisher

Contributors

Dina Berkeley • Social Psychology Department, London School of Economics and Political Science, London, England

Barbara G. Brown • Department of Atmospheric Sciences, Oregon State University, Corvallis, Oregon

Lawrence C. Currie • Department of Psychology, City of London Polytechnic, London, England

Jack Dowie • Faculty of Social Sciences, The Open University, Milton Keynes England

Hillel J. Einhorn • Director, Center for Decision Research, Graduate School of Business, University of Chicago, Chicago, Illinois

William R. Ferrell • Systems and Industrial Engineering Department, University of Arizona, Tucson, Arizona

Robin M. Hogarth • Center for Decision Research, Graduate School of Business, University of Chicago, Chicago, Illinois

Patrick Humphreys • Decision Analysis Unit, London School of Economics and Political Science, London, England

Daniel Kahneman • Department of Psychology, University of British Columbia, Vancouver, British Columbia, Canada.

Roger King • Department of Behavioural Sciences, Huddersfield Polytechnic, Huddersfield, West Yorkshire, England

A. John Maule • Department of Behavioural Sciences, Huddersfield Polytechnic, Huddersfield, West Yorkshire, England

- David M. Messick** • Department of Psychology, University of California, Santa Barbara, Santa Barbara, California
- Allan H. Murphy** • Department of Atmospheric Sciences, Oregon State University, Corvallis, Oregon
- John W. Payne** • Fuqua School of Business, Duke University, Durham, North Carolina
- Humphrey V. Swann** • Department of Psychology, City of London Polytechnic, London, England
- Amos Tversky** • Department of Psychology, Stanford University, Stanford, California
- David Weeks** • Department of Sociology, City of London Polytechnic, London, England
- Sam Whimster** • Department of Sociology, City of London Polytechnic, London, England
- James A. Wise** • Department of Architecture, College of Architecture and Urban Planning, University of Washington, Seattle, Washington
- Ayleen D. Wisudha** • Decision Analysis Unit, London School of Economics and Political Science, London, England
- George Wright** • Decision Analysis Group, Department of Psychology, City of London Polytechnic, London, England

Preface

This book is not a set of conference proceedings. In fact, it is the book that I wish was available when I started my own postgraduate research on decision making! It consists of a set of 17 chapters; 14 were specially commissioned, and the remaining 3 are selected reprints of journal articles. The book presents an overview of research and theory in behavioral decision making. Disciplines covered include cognitive psychology, social psychology, management science, sociology and political science. Each of the chapters is written by an established authority, in a manner that should make the content easy to understand. The book reveals that individual, small-group, organizational, and political perspectives are necessary to achieve a full understanding of the decision-making process. An additional multidisciplinary emphasis in the book is on ways of improving aspects of decision making.

We assume that you, the reader, have some elementary knowledge of behavioral decision making. If you do not, then I suggest as a first step that you read Wright (1984) or Hogarth (1980). With this grounding, the entire book should become accessible to you.

John W. Payne investigates how individuals make decisions under risk in the first part, *Individual Decision Making*. He argues that decision making is sensitive to small changes in the decision task and that the decision task is the major determinant of the type of decision taken. Task complexity, time pressure, the way information is displayed, and the type of response required all appear to change information processing and subsequent decision making. Payne evaluates alternative theoretical frameworks for explaining these task and context effects on risky decision making.

Amos Tversky and Daniel Kahneman take a similar task-oriented point of view and argue that the way in which a decision problem is conceptualized or “framed” is often one of several possible representations. They make a com-

parison with subjective perspectives on the same visual scene. Outcomes of a decision are perceived as positive or negative in relation to a reference point, and the reference point can vary to such an extent that a given outcome may be evaluated as a gain *or* as a loss.

By contrast, George Wright reviews the literature on decisional variance in the psychological and management journals and identifies two distinct lines of research and theory. Decision making is sometimes held to be contingent on changes in the task, but it has also been conceptualized to be the expression of a cognitive style or trait. Wright argues that a methodology taken from personality psychology could be used to resolve the cognitive style/contingent decision-making issue and allow the relative variance contributed by person, situation, and an interaction of these to be evaluated.

A. John Maule takes the viewpoint of a cognitive psychologist and evaluates research that has importance for understanding individual decision making. His primary concern is the identification of processing stages, and he analyzes some problems with the notion of *limited capacity*, a catchall often used to explain why decision makers do not perform normatively.

David M. Messick, in Part II, *Small-Group Decision Making*, views decision making as a socially interdependent process. He argues that we are sensitive to the outcomes received by others. Another's good fortune can elate or depress us. Envy is relative! He analyzes the consequence of allowing people to have free access to a valuable but scarce resource that grows at a constant but small rate. If individuals extract too much of the resource, it becomes depleted and so is useless to everyone. Should a superordinate authority replace the system of free access?

William R. Ferrell investigates whether quantitative judgements obtained from small groups are "better" than those obtained from individuals. Judgments can be combined behaviorally or mathematically, and he evaluates methods of aggregating individual judgments to produce a group judgment with the aim of increasing judgmental quality.

In Part III, *Organizational Decision Making*, George Wright bridges this section of the book with the previous sections by evaluating the effect of cultural influences on organizational, small-group, and individual decision making. He pays special attention to research that has compared Japanese and American organizational decision making.

David Weeks and Sam Whimster analyze sociological conceptualizations of organizational decision making and go on to argue that "rational" decision making is necessarily linked to an analysis of power, control, and social context. The individual is often part of a small social grouping within a larger organization, and individual, group, and organizational interests may conflict.

Roger King focuses on "power" and poses the question of whether the exercise of power always involves a conflict of interests. He argues that the su-

preme exercise of power may involve the powerful defining a situation in such a way that the powerless may not be aware of any conflict. This silent view of power leads to a conclusion that an absence of overt political participation by business in no way denies political influence.

Humphrey V. Swann addresses the question of whether quantitative decision theory is useful to an organization. He poses this question from the point of view of an occupational psychologist involved with personnel selection and payment schemes. Swann pays special attention to the problems of implementing decisions once they have been taken.

In Part IV, *Improving Decision Making: The Role of Decision Aids*, Ayleen D. Wisudha assesses the role of computerized decision aids within the decision-making process and proposes guidelines for the development of these aids. She addresses the question to the extent to which a decision aid should contain substantive problem knowledge or should be adaptive to the decision maker's own problem representation.

Patrick Humphreys and Dina Berkeley argue that uncertainty pervades decision making. Uncertainty enters into the way a decision problem is conceptualized and in the extent to which the decision maker has influence over the future as it is modeled in decision analytic representations. The decision maker may also have reservations about quantitative problem representation *once* the acts and events in the representation begin to unfold as reality. Humphreys and Berkeley analyze the potential of decision support systems to aid resolution of all types of uncertainty.

James A. Wise reviews the role of decision aids for design decision making. For an architect, specifying probabilities and utilities may be of little use in hypothesizing a spatial form. However, Wise shows that a complex design, once formulated, can be evaluated by techniques related to multiattributed utility theory.

Hillel J. Einhorn and Robin M. Hogarth in Part V, *Judgmental Forecasting*, analyze judgmental forecasting and evaluate the relationship between predictions, actions, and outcomes. They emphasize the probabilistic nature of cues to causality and the uncertainties associated with inference. Causal thinking is examined in detail, and Einhorn and Hogarth discuss the implications of their analysis for improving forecasting.

Allan H. Murphy presents the results and analysis of forecasting in a real-world setting—weather forecasting. Weather forecasters make use of objective guidance forecasts, based on numerical statistical procedures, to help them produce subjective forecasts. In some situations, subjective forecasts are an improvement on objective forecasts; sometimes they are not. Murphy discusses the problems of evaluating the precise role of objective forecasts in the subjective forecasting process.

Jack Dowie, in Part VI, *Decision Theory: Areas of Future Impact*, analyzes

the implications of decision theory for the educational process. Should the teacher's values and uncertainties be open for discussion and criticism? Education, Dowie analyzes, is often concerned with teaching the certainties of high-value knowledge. But should we be educated for uncertainty? Dowie examines the usefulness of requiring students to give probabilistic responses to multiple-choice questions and describes the use of multiattributed utility theory in student assessment.

Lawrence C. Currie argues that Kelly's personal construct theory can be applied to aid our understanding of how people make decisions. Currie deals with the applicability of personal construct theory to the perception of danger and decision making in two-person games.

GEORGE WRIGHT

REFERENCES

- Hogarth, R. M. (1980). *Judgment and choice*. Chichester: Wiley.
Wright, G. (1984). *Behavioral decision theory*. Beverly Hills: Sage, and Harmondsworth: Penguin.

Contents

PART I INDIVIDUAL DECISION MAKING

Chapter 1

Psychology of Risky Decisions 3

John W. Payne

Introduction	3
Models of Risky Choice	4
Contingent Processing in Risky Choice	6
Task Complexity	7
Information Display	8
Response Modes	10
Quality of Option Set	12
Frameworks for Task and Context Effects.....	14
A Production System Approach to Models of Strategy Selection in Choice	16
Summary	20
References	20

Chapter 2

The Framing of Decisions and the Psychology of Choice 25

Amos Tversky and Daniel Kahneman

The Evaluation of Prospects	27
-----------------------------------	----

The Framing of Acts	30
The Framing of Contingencies	31
The Framing of Outcomes	34
Discussion	38
References	40

Chapter 3

Decisional Variance	43
----------------------------------	-----------

George Wright

Introduction	43
Personality and Decision Making	44
Cognitive Style and Decision Making	47
Cognitive Style and the Design of Decision Support Systems (DSS) ..	51
Contingent Decision Behavior	52
Decisional Style or Contingent Decision Making?: Some Useful Methodology from Personality Psychology	55
References	57

Chapter 4

Cognitive Approaches to Decision Making	61
--	-----------

A. John Maule

Introduction	61
Developments in Cognitive Psychology	62
Identification of Separate Stages	63
Complex Processing Models	67
Applications of the Cognitive Approach	70
Decision Strategies	70
Perceptual Aspects of Decision Making	76
Future Developments	79
Notions of Limited Capacity	80
Elementary Information-Processing Stages	81
Conclusion	81
References	82

PART II SMALL-GROUP DECISION MAKING

Chapter 5

Social Interdependence and Decision Making 87

David M. Messick

Interdependent Preferences 88
Empathy and Altruism 89
Envy and Social Comparison 92
The General Problem 94
Interdependence Structures: Changing the Rules 100
Conclusion 107
References 108

Chapter 6

Combining Individual Judgments 111

William R. Ferrell

Introduction 111
Why Groups? 111
Aggregation Methods 112
Mathematical Aggregation 112
Estimation of Unknown Quantities 114
Weighting Individual Judgments 117
Discrete Probability Judgments 121
Probability Density Functions for Continuous Quantities 126
Evaluative Judgments and Preferences 129
Aggregation of Verbal Judgments 132
Behavioral Aggregation 135
Group Process and the Judgment Task 135
Input Variables 136
Conformity 136
Polarization 137
Effectiveness of Behavioral Aggregation 138
Mixed and Aided Aggregation 140
Conclusion 142
References 143

Chapter 7

Organizational, Group, and Individual Decision Making in Cross-Cultural Perspective 149

George Wright

Introduction	149
Japanese versus American Decision-Making Processes	150
Managerial Communication	150
Managerial Values	153
Interaction between the Task and Decision-Making Style	155
Group Polarization	156
Individual Decision Making under Uncertainty	158
Practical Implications of Cross-Cultural Research on Decision Making	162
References	163

Chapter 8

Contexted Decision Making: A Socio-organizational Perspective 167

David Weeks and Sam Whimster

Introduction	167
Decision Making in Organizations: Conventional Analyses	169
The Social Process Critique	174
The Structural Power Critique	175
Studying Decision Making in Organizations	178
The Communicative Rationality Critique	181
Conclusion	186
References	188

Chapter 9

Sociological Approaches to Power and Decisions 189

Roger King

Introduction	189
Three Conceptions of Power	191
Decisional or Pluralist Accounts of Power	191
Nondecisionalism or the Two Faces of Power	194

Radical Approaches to Power	197
Conclusion: The Case of Business Power	202
References	205

Chapter 10

Decision Making in Organizations: The Effective Use of Personnel . 207

Humphrey V. Swann

A Brief Historical Background	207
Occupational Psychology’s Decision-Making Framework.....	209
Scientific Management—The Forerunner	210
Taylor’s Work in Relation to Occupational Psychology	211
Personnel Selection and Decision Making	212
Validation Studies	212
Tests and Discrimination	212
The Criterion Problem	213
Statistical Decision Methods in Selection	213
Selection Interviewing	214
Practical Recruiting and Selecting of Staff.....	215
Training Staff	217
Employee Appraisal	218
Payment for Work	220
Implementing Personnel Decisions	223
Leadership	223
Participation at Work	224
Organizational Design and Development	225
Bargaining: Conflict and Power	226
Conclusion	227
References	228

PART IV IMPROVING DECISIONS: THE ROLE OF DECISION AIDS

Chapter 11

Design of Decision-Aiding Systems 235

Ayleen D. Wisudha

Introduction	235
--------------------	-----

A Taxonomy of Decision Aids 236

 Type 1—Bootstrapping Aids 236

 Type 2—Recomposition Aids 238

 Type 3—Problem-Structuring Aids 239

Problem Representation Based on the Nature of the Structure 240

 Built-in Structure 240

 Assumed Structure 241

 Elicited Structure 242

Principal Considerations in System Design 242

 Model Selection 243

 Use of External Data Base 244

 User-System Interface 246

Monitoring the Decision Maker 246

 Decision Aids as a Statistical Monitor 247

 Control in a Decision-Making Process 247

Implementations of Decision Support Technology 249

Summary 251

References 253

Chapter 12

Handling Uncertainty: Levels of Analysis of Decision Problems 257

Patrick Humphreys and Dina Berkeley

Introduction 257

Types of Uncertainty 258

Handling Uncertainty 261

Levels of Abstraction in Representing Decision Problems 263

 Level 1: Concrete Operational: Making “Best Assessments” 264

 Level 2: Formal Operational: Sensitivity Analysis 265

 Level 3: Developing Structure within a Single Structural Variant .. 266

 Level 4: Problem-Structuring Languages 269

 Level 5: Scenarios Exploring Small Worlds 272

 Higher Levels of Abstraction 274

Implications of the Multilevel Scheme for Supporting Organizational
Decision Making 275

Implications of the Multilevel Scheme for the Study of Intuitive
Decision Making 278

References 280

Chapter 13

Decisions in Design: Analyzing and Aiding the Art of Synthesis 283

James A. Wise

Design Decisions and Design Methods	283
Decision Making in the Design Process	286
Aiding Design Decision Making	290
Extrapolations from Contemporary Decision Theory	291
Methodologies for “Open” Problems in Design	301
Conclusions	304
References	305

PART V JUDGMENTAL FORECASTING

Chapter 14

Prediction, Diagnosis, and Causal Thinking in Forecasting 311

Hillel J. Einhorn and Robin M. Hogarth

The Diagnostic Process	314
On the Psychology of Spurious Correlation	320
Implications	323
Conclusion	326
References	326

Chapter 15

A Comparative Evaluation of Objective and Subjective Weather Forecasts in the United States 329

Allan H. Murphy and Barbara G. Brown

Introduction	329
Weather Forecasting Procedures and Practices: An Overview	330
Objective versus Subjective Forecasts	332
Probabilistic Forecasts of Precipitation Occurrence	332
Categorical Forecasts of Maximum and Minimum Temperatures	336

Categorical Forecasts of Cloud Amount	338
Recent Trends in Forecast Quality	340
Probabilistic Forecasts of Precipitation Occurrence	341
Categorical Forecasts of Maximum and Minimum Temperatures ..	343
Categorical Forecasts of Cloud Amount	347
Subjective Weather Forecasting: Role and Impact of Objective Forecasts	349
Weather Forecasting and Forecasting in Other Fields: Similarities and Differences	353
Summary and Conclusion	356
References	358

PART VI DECISION THEORY: AREAS OF FUTURE IMPACT

Chapter 16

Education and Decision Theory: A Personal View	363
---	------------

Jack Dowie

Restructuring the Institution	366
Rethinking the Curriculum	367
Reexamining Assessment	369
Aggregating Components	369
Marking Components	371
Scoring Multiple-Choice Items	372
Conclusion	376
References	377

Chapter 17

Choice Decision and the Anticipation of Events	379
---	------------

Lawrence C. Currie

Introduction: Choosing an Approach	379
A Brief Description of Personal Construct Theory	382
The Fundamental Postulate and Corollaries	382
The Nature of Constructs	384
Dimensions of Transition	384
Construing Danger	385

The Perception of Danger	385
Dimensions of Transition and Corollaries Relevant to the Perception of Danger	386
Games and Imperfect Rationality	390
A Primitive Game	390
PCT Interpretation of the Game	392
PCT Applied to War Games and Driving Games	395
A Suitable Theory for Describing and Explaining Decision-Making Processes	400
References	402
Index	405