SUBJUNCTIVE REASONING

PHILOSOPHICAL STUDIES SERIES
IN PHILOSOPHY

Editors:

WILFRID SELLARS, *University of Pittsburgh*

KEITH LEHRER, *University of Arizona*

Board of Consulting Editors:

JONATHAN BENNETT, *University of British Columbia*

ALAN GIBBARD, *University of Pittsburgh*

ROBERT STALNAKER, *Cornell University*

ROBERT G. TURNBULL, *Ohio State University*

VOLUME 8

JOHN L. POLLOCK

University of Rochester

SUBJUNCTIVE REASONING

D. REIDEL PUBLISHING COMPANY

DORDRECHT-HOLLAND/BOSTON-U.S.A.

Library of Congress Cataloging in Publication Data

Pollock, John L

Subjunctive reasoning.

(Philosophical studies series in philosophy ; v. 8)

Bibliography: p.

Includes index.

1. Conditionals (Logic) 2. Reasoning. 3. Counter-factuals (Logic) 4. Probabilities. I. Title.

BC199.C56P64 160 76-19095

ISBN-13: 978-94-010-1502-8 e-ISBN-13: 978-94-010-1500-4

DOI:10.1007978-94-010-1500-4

Published by D. Reidel Publishing Company,
P.O. Box 17, Dordrecht, Holland

Sold and distributed in the U.S.A., Canada, and Mexico
by D. Reidel Publishing Company, Inc.
Lincoln Building, 160 Old Derby Street, Hingham,
Mass. 02043, U.S.A.

All Rights Reserved

Copyright © 1976 by D. Reidel Publishing Company, Dordrecht, Holland

Softcover reprint of the hardcover 1st Edition 1976

No part of the material protected by this copyright notice may be reproduced or
utilized in any form or by any means, electronic or mechanical,
including photocopying, recording or by any informational storage and
retrieval system, without written permission from the copyright owner

*TO CAROL
who puts up
with me*

TABLE OF CONTENTS

PREFACE	XI
I. INTRODUCTION	1
1. Subjunctive Reasoning	1
2. The Linguistic Approach	4
3. The 'Possible Worlds' Approach	13
4. Conclusions	23
Notes	24
II. FOUR KINDS OF CONDITIONALS	25
1. Introduction	25
2. The Four Kinds	25
3. 'Even if' Subjunctives	29
4. 'Might Be' Conditionals	31
5. Necessitation Conditionals	33
6. Simple Subjunctives	38
7. The Axiomatization of Simple Subjunctives	42
8. Conclusions	44
Notes	44
III. SUBJUNCTIVE GENERALIZATIONS	46
1. Introduction	46
2. Rudiments of an Analysis	48
3. Strong Generalizations	54
4. Weak Generalizations	62
5. Conclusions	68
Notes	68
IV. THE BASIC ANALYSIS OF SUBJUNCTIVE CONDITIONALS	70
1. Introduction	70
2. The Analysis of M	70
3. Simple Propositions	91

4. Counter-Legal Conditionals	93
5. Subject Preference	97
Notes	103
V. QUANTIFICATION, MODALITIES, AND CONDITIONALS	104
1. Referential Opacity	104
2. Transworld Identity	108
3. Kripke's Observation	111
4. Quantified Modal Logic	116
5. Conditionals	124
Notes	124
VI. THE FULL THEORY	125
1. Syntax	125
2. Semantics	128
3. Infinitary Operators	135
4. The Introduction of Sets	138
5. Some Consequences of the Analysis	140
Note	144
VII. CAUSES	145
1. Introduction	145
2. The Ontology of Causes	145
3. Some Causal Relations	157
4. Causal Sufficiency	160
4.1. Nomic Subsumption	160
4.2. Contingently Sufficient Conditions	162
4.3. Causal Sufficiency and Subjunctive Conditionals	164
5. Remarks on the Analysis	180
6. The Logic of Causes	182
Notes	187
VIII. PROBABILITIES	188
1. Introduction	188
2. Indefinite Probabilities	189
2.1. Relative Frequencies	189
2.2. Subjunctive Indefinite Probabilities	192

TABLE OF CONTENTS

IX

2.3. Strong Indefinite Probabilities	195
2.4. Weak Indefinite Probability Statements	204
3. The Redefinition of M	208
3.1. Strong and Weak Definite Probability	209
3.2. Probabilistic Laws	212
3.3. The Analysis of M	215
4. Simple Subjunctive Probability	219
4.1. The Variety of Probabilities	220
4.2. Simple Subjunctive Probability	221
4.3. A Probability Algebra	227
4.4. Simple Subjunctive Probability and Simple Sub- junctive Conditionals	231
4.5. Simple Indefinite Probabilities	233
Notes	235
IX. DISPOSITIONS	237
1. Introduction	237
2. Absolute Dispositions	239
3. Probabilistic Dispositions	248
Notes	251
BIBLIOGRAPHY	252
INDEX	254

PREFACE

I am indebted to many people for the help they gave me in the writing of this book. I owe a large debt to David Lewis and Robert Stalnaker, on both general and specific grounds. As becomes apparent from reading the notes, the book would not have been possible without their pioneering work on subjunctive conditionals. In addition, both were kind enough to provide specific comments on earlier versions of different parts of the book, and Stalnaker read and commented on the entire manuscript. Closer to home, I am indebted to my colleagues Rolf Eberle and Henry Kyburg, Jr., my erstwhile colleague Keith Lehrer, and numerous graduate students for their helpful comments on various parts of the manuscript. Some of the material contained herein appeared first in the form of journal articles, and I wish to thank the journals in question for allowing the material to be reprinted here. Chapter One contains material taken from 'The "Possible Worlds" Analysis of Counter-factuals', published in *Phil. Studies* **29** (1976), 469 (Reidel); Chapter Two contains material much revised from 'Four Kinds of Conditionals', *Am. Phil. Quarterly* **12** (1975), and Chapter Three contains much revised material from 'Subjunctive Generalizations', *Synthese* **28** (1974), 199 (Reidel).