

## THE CONDUCT OF INQUIRY

Methodology for Behavioral Science

BY ABRAHAM KAPLAN

# THE CONDUCT OF INQUIRY

Methodology for Behavioral Science

By ABRAHAM KAPLAN

University of Michigan

CHANDLER PUBLISHING COMPANY

124 Spear Street, San Francisco, California 94105

#### THE CONDUCT OF INQUIRY

Methodology for Behavioral Science

### Chandler Publications in ANTHROPOLOGY AND SOCIOLOGY

LEONARD BROOM, Editor

To

#### I. J. K.

My Women of Valor

#### PREFACE

In this book I have emphasized what unites the several behavioral sciences more than what distinguishes them from one another. The special problems of the various disciplines are dealt with only so far as may be helpful in clarifying the general method of inquiry.

With regard to the widely differing and often mutually hostile schools and approaches in behavioral science my position can be regarded, I suppose, as neutralist, and will therefore be condemned, no doubt, by both sides—not rigorous enough for one, and too demanding for the other. My aim has not been compromise, however, nor my ideal a golden mean. What seems to me important is yielding, not to demands externally imposed, but rather to those intrinsic to our own aspirations.

In methodology itself I have a corresponding range of sympathies—with logical construction and linguistic analysis, as well as with the more substantive concerns of the older methodologists, of whom I think more highly than is now fashionable. In particular, those who are acquainted with pragmatism will be aware of how much greater my indebtedness is to Peirce, James, and Dewey than is made explicit by citations. But I have sought the comfort of like-mindedness wherever I could find it, without regard to broader philosophical commitments. References are to whatever editions and printings among those at hand I judged to be most readily accessible to the reader.

The leisure to read and write—and what is more, the stimulus to think about both activities—was afforded me by the Center for Advanced Study in Behavioral Science at Palo Alto, and by the Center for Advanced

xvi Preface

Studies at Wesleyan University, in Middletown, Connecticut; to both I am deeply grateful. I want also to thank Alexander Sesonske and Clyde Coombs for reading portions of the manuscript.

ABRAHAM KAPLAN

Ann Arbor, Michigan 1963

#### **FOREWORD**

In this book for the first time a philosopher makes a systematic, rounded, and wide-ranging inquiry into behavioral science. In doing so he has been guided by the experience of sciences with longer histories, but he has been bound neither to their problems nor to their solutions. Instead, he has addressed himself to the methodology of behavioral science in the broad sense of both science and methodology. The tasks, achievements, limitations, and dilemmas of the newer disciplines are the focus of his attention. The work is not a formal exercise in the philosophy of science but rather a critical and constructive assessment of the developing standards and strategies of contemporary social inquiry. Professor Kaplan is familiar with the fields he discusses; he is not a visiting philosopher recounting a sightseeing trip.

Philosophers of science usually choose to write about the most fully developed sciences because the problems are clearer there. But the result is ordinarily of little benefit to the behavioral scientist. His most difficult task is the clarification of method where the precedents and analogies of physical science are inappropriate or obscure. What he needs most is a direct confrontation of methodological problems immediately relevant to his own discipline. He needs to read from the strengths of his own understanding, insights, expertness, and subject matter and not from the insecurity of a limited familiarity with a remote discipline. The Conduct of Inquiry goes a long way toward filling those needs because it is appropriate to the present state of the art and to the stages just ahead.

Professor Kaplan draws upon the whole scientific enterprise but always

xviii Introduction

with a purpose—to guide the behavioral scientist, to post warnings on pitfalls that may lie in his path, to remind him from time to time that he is not a nuclear physicist, to remind him that he is nevertheless a scientist in the somber and in the exciting significance of the term, and to place behavioral science in the context of an ongoing endeavor, particular as well as general.

This most useful philosopher is always lucid but he has not always made things easy. He is a hard taskmaster who holds high aspirations and high standards for behavioral science. He has no philosopher's stone that will turn empirical dross into theoretical gold or even empirical mud into theoretical pots. He does make it easier to distinguish the dross from the gold and the mud from the clay. It is clear that Professor Kaplan thinks behavioral science both feasible and worth the effort—worth his effort as a commentator and worth ours as practitioners.

The book, being an orientation in methodology for behavioral scientists, is indispensable for behavioral scientists and for aspiring ones irrespective of their orthodoxy or heterodoxy, but perhaps it will prove more palatable to the heterodox. It will be durable in its usefulness, and it will be useful to a wide range of readers many of whom will discover unsuspected strengths and weaknesses in their disciplines. The book proves by the fact of its existence that there is a community of scholarship between the humanities and behavioral science and that the validity of one does not depend upon alienation from the other.

There is a consistent emphasis on the common concerns of all the social sciences rather than on their parochial problems and their perhaps temporary points of isolation, an emphasis on major issues rather than side arguments, a concern with problems that are intrinsically important and recurrent rather than with transitory considerations or matters of technique. The author's intellectual tolerance does not extend to fads and fashions whose claims for attention rest on currency alone.

Professor Kaplan departs from the stylistic presumptions that anything interesting must look as if it is being said for the first time, that anything important must be said sententiously, that anything difficult must be made to appear more difficult—and therefore more important—and that anything that bears upon error must begin with a destructive attack on someone—as if human fallibility needed to be proved all over

Introduction xix

again. In the pages that follow, the simple is said simply and the difficult is said clearly. A genuine erudition is opened to the student and the advanced scholar. The book fills a gap and does it with admirable clarity and often with engaging wit. It lacks pomposity, pedantry, and pretension, and it is bound to make an impact on the teaching of and, with luck, on research in the behavioral sciences.

LEONARD BROOM

Austin, Texas 1963

#### **CONTENTS**

Preface												$\mathbf{x}\mathbf{v}$
Foreword, I	Leonard	Broo	m		•	•	•		•	•	•	xvii
		I.	M	ETH	IODO	DLO	GY					
1. Logic-in	-Use and							•				3
Scientifi												3
	ny and l	•										6
2. Logic an	•	-										12
Justifica												12
Discove	ry .											13
3. The Tas	k of Me	thodolo	gy									18
Technic	=											19
Honorif	ics .											19
Epistem	ology	•										20
Method	s in Me	thodol	ogy									23
	yth of M											24
4. "Scienti	fic Metho	od" in	Beh	avior	al Sci	ence				•		27
Technic	ques .											28
Schools	-											29
Dilemn	ias .											30
The Go	enerality	of Sc	ienc	е.	•							30
	eciality o											32
-	•											

		II. CC	NCE	PTS				
5.	The Empirical Basis .				,			34
	Semantic and Epistemic	Empi	ricism	ι.				36
	Logical Positivism .	_						36
	Operationism							39
	Pragmatism							42
6.	Functions of Concepts .							46
	Terms							47
	Conceptions							48
	Classifications							50
	Concepts and Theories	•						52
7.	Theoretical Terms							54
	Reference to Direct Ob	servat	ions					54
	Reference to Indirect O	bserva	ations					55
	Reference to Observable	es .						55
	Reference to Theory .							56
	The Empirical-Theoreti	cal Co	ontinu	um				57
	The Functions of Term	<b>S</b> .						60
8.	Openness of Meaning .							62
	Systemic Openness .							63
	Vagueness		•					65
	Internal Vagueness .	*						67
	Dynamic Openness .							68
	Premature Closure .							70
9.	Specification of Meaning							71
	Definition							72
	Indication and Reductio						•	73
	Precision and Reliability	7.	,					76
	The Progress of Specific	cation						77
10.	Concepts in Behavioral Sc	ience						78
	The Locus Problem .			٠				78
	Collective Terms		٠					80
	Ideal Types	٠	•		•			82
		III.	LAV	vs				
11.	Functions of Laws .							84
	Identifications							25

<b>C</b> O1	NTENTS						1X
	Suppositions and Presupposition	s					86
	Resources						87
	Assumptions and Hypotheses						88
	Facts and Laws						89
<i>12</i> .	The Content of Laws						94
	Field, Range, Scope, and Conter	ıt					94
	Exceptions and Quasi Laws						96
	Trend, Tendency, and Approxim	nati	on				97
	Meaning						100
	Priority						103
13.	Types of Laws						104
	Form						105
	Content						109
	Use						113
14.	Laws in Behavioral Science .						115
	Desirability						115
	Possibility						116
	Free Will						12
	Determinism						12
	Methodological Determinism						124
	IV. EXPE	RI	MEI	VΤ			
15.	The Process of Observation .						120
	Intersubjectivity						123
	Error						129
	What is Observed						13
16.	Observation in Behavioral Science						13
	Interaction						13
	Levels of Interpretation .						139
	Introspection and Identification						14
17.	Functions of Experiment .						14
	What Experiments Can Do						14
	Kinds of Experiment						14
18.	The Structure of Experiment.						15.
	Generalization						15
	Yield						15
	Factors					_	158

x								Con	tents
	The Conceptual Frame .								159
19.	Experiment in Behavioral Science				•				161
	Manipulations								161
	Verbal Experiments								163
	Social Experiments								164
	Field and Laboratory								165
	Significance					•		•	169
	V. MEAS	URI	ЕМЕ.	NT					
20.	Functions of Measurement .								171
	Quantity and Quality								172
	What Measurement Permits								173
	The Use of Mathematical Tec	hniq							175
21.	The Structure of Measurement								177
	Mapping the Data								177
	Orders								178
	Additive Measurement .								184
	Standards								186
	Fundamental and Derived Me								187
22.	Scales								189
	Scales of Intensive Measureme	ent							191
	Scales of Extensive Measurem	ent							196
23.	. Validity								198
	Errors								199
	The "True" Measure and the	Sign	ifica	nt Fi	gure				202
24.	. Measurement in Behavioral Scie	_			_				206
	Quality and Quantity								206
	What is Not Measured .								208
	The Power of Measurement								209
	Incommensurables								210
	Judges								211
	The Quantitative Idiom						_		212
	The Dilemma				•	•		•	213
	VI. ST	TAT:	ISTIC	2S					
25	. Functions of Statistics								215
	Unities								216
<ul><li>20.</li><li>21.</li><li>22.</li><li>23.</li><li>24.</li></ul>	Uncertainties								217

	NTENTS								X
	Quality of Knowledge.								219
26.	Probability and Induction								221
	Calculus of Probability								221
	Theories of Probability					•			225
	Inductive Inference .					٠.			232
27.	Statistical Description .								234
	Central Tendency .					. •			23
	Dispersion								238
28.	Statistical Hypotheses .								239
	Sampling Plans								239
	Hypotheses				•				244
	Tests and Errors								240
	Correlation								249
29.	Statistics in Behavioral Scien	ce							250
	Utilities								250
	Criteria								25
	Values								254
	Objections								25
30.	The Structure of Models							•	25
	Cognitive Style								
	Models and Theories .			•	•				259
	Models and Theories.	•				•			
	Analogy and Metaphor					•	•	•	 26
						•			 26: 26:
31.	Analogy and Metaphor				•	•		•	 26: 26: 26:
31.	Analogy and Metaphor Kinds of Models Functions of Models . Data Organization .								 26: 26: 26: 26:
31.	Analogy and Metaphor Kinds of Models				•	•		•	 26: 26: 26: 26: 26:
31.	Analogy and Metaphor Kinds of Models Functions of Models . Data Organization .				•				 26: 26: 26: 26: 26: 26: 26:
	Analogy and Metaphor Kinds of Models .  Functions of Models .  Data Organization .  Cognitive Styles .		•		•				 26: 26: 26: 26: 26: 26: 26: 27:
	Analogy and Metaphor Kinds of Models .  Functions of Models .  Data Organization .  Cognitive Styles .  Kinds of Models .		•		•				 26: 26: 26: 26: 26: 26: 27: 27:
	Analogy and Metaphor Kinds of Models .  Functions of Models .  Data Organization .  Cognitive Styles .  Kinds of Models .  Shortcomings of Models .				•				 26: 26: 26: 26: 26: 26: 27: 27: 27:
	Analogy and Metaphor Kinds of Models .  Functions of Models .  Data Organization .  Cognitive Styles .  Kinds of Models .  Shortcomings of Models .  Overemphasis on Symbols								 26: 26: 26: 26: 26: 27: 27: 27: 27:
	Analogy and Metaphor Kinds of Models . Functions of Models . Data Organization . Cognitive Styles . Kinds of Models . Shortcomings of Models . Overemphasis on Symbols Overemphasis on Form	· · · · · · ·							26: 26: 26: 26: 26: 27: 27: 27: 27: 28:
	Analogy and Metaphor Kinds of Models .  Functions of Models .  Data Organization .  Cognitive Styles .  Kinds of Models .  Shortcomings of Models .  Overemphasis on Symbols  Overemphasis on Form  Oversimplification .  Overemphasis on Rigor  Map Reading .								26: 26: 26: 26: 26: 27: 27: 27: 27: 28: 28:
32.	Analogy and Metaphor Kinds of Models .  Functions of Models .  Data Organization .  Cognitive Styles .  Kinds of Models .  Shortcomings of Models .  Overemphasis on Symbols Overemphasis on Form Oversimplification .  Overemphasis on Rigor Map Reading .  Pictorial Realism .								263 266 268 268 268 273 273 275 278 280 283 284
32.	Analogy and Metaphor Kinds of Models . Functions of Models . Data Organization . Cognitive Styles . Kinds of Models . Shortcomings of Models . Overemphasis on Symbols Overemphasis on Form Oversimplification . Overemphasis on Rigor								259 263 266 268 268 268 273 275 277 278 280 283 284 285 288

xii									(	Cont	ents
	Empiricism .										290
	Kinds of Models .										291
		VIII.	TH	EOR	IES						
<i>34</i> .	Theories and Laws										294
	Theory, Practice, Fac										295
	Types of Theories										298
35.	Functions of Theories										302
	Theories in Process										302
	Realism and Instrumen	ntalis	m								306
36.	Validation of Theories										311
	Norms of Corresponde	ence									312
	Norms of Coherence										314
	Pragmatic Norms.										319
<i>3</i> 7.	Pragmatic Norms. Theories in Behavioral	Scienc	e								322
	Biases										322
	Biases Interaction of Factors										325
				4NA							227
38.				r. 1							327
	Description, Interpret			_				•			327
	Pattern and Deduction							•			332
	Objectivity .							•			335
	The Cognitive Map							•			336
39.	The Deductive Model							•	•	•	336
	Deduction and Pattern						•	•	•	•	336
	Generality and Specia				•		•	•		•	338
	Law and Theory.						•	•	•	•	341
	Deducibility							•	•	٠	343
	Confirmation .				•	•	•	•	٠	•	345
40	. Explanation and Predic	tion			•	•	•	•	٠	٠	346
	Explanation without ]	Predic	ction	•	•	•	•	•	•	•	346
	Explanation without I Prediction without Ex Differences between	xplan	ation	•				•	٠	•	349
	Differences between	Expla	inatio	n and	i Pre	dict	ion	•	•	•	
41	. Functions of Explanati	on		•	•	•	•	•		•	
	Openness in Explanat	tions		•	•	•		•	•	•	351