

# Contents

Preface	page ix
Acknowledgments	xi
Contributors	xii
An Introduction to the Scientific Study of Thinking	1
<b>Part I. Problem Solving</b>	
Introduction	13
1 <i>A. S. Luchins and E. H. Luchins</i> Wertheimer's seminars revisited: diagnostic testing for understanding of structure	28
2 <i>I. M. L. Hunter</i> Mental calculation	35
Two additional comments	43
3 <i>A. Newell</i> On the analysis of human problem solving protocols	46
4 <i>T. Winograd</i> Formalisms for knowledge	62
<b>Part II. Deduction</b>	
Introduction	75
5 <i>J. Huttenlocher</i> Constructing spatial images: a strategy in reasoning	89
6 <i>H. H. Clark</i> Linguistic processes in deductive reasoning	98
7 <i>P. C. Wason</i> Self-contradictions	114
8 <i>P. N. Johnson-Laird</i> Reasoning with quantifiers	129

9	<i>P. N. Johnson-Laird and P. C. Wason</i>	A theoretical analysis of insight into a reasoning task	143
		Postscript	151
10	<i>J. Piaget</i>	Intellectual evolution from adolescence to adulthood	158

### Part III. Conceptual Thinking

		Introduction	169
11	<i>R. R. Sokal</i>	Classification: purposes, principles, progress, prospects	185
12	<i>P. H. Winston</i>	Learning to identify toy block structures	199
13	<i>E. Rosch</i>	Classification of real-world objects: origins and representations in cognition	212
14	<i>K. Nelson</i>	Some evidence for the cognitive primacy of categorization and its functional basis	223
15	<i>M. Bowerman</i>	The acquisition of word meaning: an investigation of some current conflicts	239

### Part IV. Hypotheses

		Introduction	257
16	<i>K. R. Popper</i>	On hypotheses	264
17	<i>T. S. Kuhn</i>	A function for thought experiments	274
18	<i>A. Karmiloff-Smith and B. Inhelder</i>	'If you want to get ahead, get a theory'	293
19	<i>P. C. Wason</i>	'On the failure to eliminate hypotheses. . .' – a second look	307
20	<i>C. R. Mynatt, M. E. Doherty, and R. D. Tweney</i>	Confirmation bias in a simulated research environment: an experimental study of scientific inference	315
21	<i>A. Tversky and D. Kahneman</i>	Judgment under uncertainty: heuristics and biases	326

### Part V. Inference and Comprehension

		Introduction	341
22	<i>M. Minsky</i>	Frame-system theory	355

23	<i>J. D. Bransford and N. S. McCarrell</i>	A sketch of a cognitive approach to comprehension: some thoughts about understanding what it means to comprehend	377
24	<i>G. A. Miller</i>	Practical and lexical knowledge	400
25	<i>H. H. Clark</i>	Bridging	411
26	<i>R. C. Schank and R. P. Abelson</i>	Scripts, plans, and knowledge	421

## **Part VI. Language, Culture, and Thinking**

		Introduction	435
27	<i>R. A. Shweder</i>	Likeness and likelihood in everyday thought: magical thinking and everyday judgments about personality	446
28	<i>M. Cole</i>	An ethnographic psychology of cognition	468
29	<i>S. Scribner</i>	Modes of thinking and ways of speaking: culture and logic reconsidered	483
30	<i>E. Rosch</i>	Linguistic relativity	501

## **Part VII. Imagery and Internal Representation**

		Introduction	523
31	<i>R. N. Shepard and J. Metzler</i>	Mental rotation of three-dimensional objects	532
32	<i>K. G. Oatley</i>	Inference, navigation, and cognitive maps	537
33	<i>M. Eisenstadt and Y. Kareev</i>	Perception in game playing: internal representation and scanning of board positions	548
34	<i>H. J. Berliner</i>	Some necessary conditions for a master chess program	565
		Bibliography (and citation index)	583