Contents

1

Preface ix

1 Thinking Critically about Psychology

	Why Do We Need to Think Critically about Psychology? 2
	The Development of Scientific Thinking in Psychology:
	A Brief History 6
	Wundt and Introspectionist Experiments 6
	Logical Positivism 10
	Operationism 12
	Hull versus Tolman: A Case History in Psychological
	Research 12
	The Context of Discovery versus the Context of
	Justification 16
	More Recent Developments 17
	A Summary and Some Implications 20
	Names and Concepts to Understand and Remember 20
	Additional Reading 21
	v
2	The Psychology of Scientific Thinking 23
	Is Scientific Thinking Different? 24
	Confirmation Bias 24
	Simplicity 28
	Consistency 29
	The Psycho-Logic of Disconfirmation 31
	Concept Formation in Science 35
	Ethical Principles of Research 39
	Animal Rights? 44
	Names and Concepts to Understand and Remember 46
	Additional Reading 47

3	Designing Experiments 49 Mill's Methods 50 The Method of Agreement 50 The Method of Difference 52 The Method of Residues 53 The Method of Concomitant Variation 54 Galton and the Concept of Correlation 55 Regression toward the Mean 55 The Law of Large Numbers 57 The "Law of Small Numbers" 59 The Normal Distribution 60 Doing Experiments 63
	Fisher's Approach to Designing Experiments The Null Hypothesis 65 Blocks and Plots 67 Correlational Designs 75 Names and Concepts to Understand and Remember 77 Additional Reading 78
4	Control and Power 79 The Problem of Control 80 Clever Hans 80 Rosenthal and Experimenter Bias 81 Orne and Demand Characteristics 82 A Well-Controlled Experiment 83 The Solomon Four-Group Design 86 External versus Internal Validity 89 Quasi-Experimental Designs 89 A Quasi-Experimental Example 90 Logical Spaces and the Partial Nature of Experiments 92 Piaget and the Development of a "Logical Space" 92 Power 94 Names and Concepts to Understand and Remember 99 Additional Reading 100
5	Sources of Data 101 On Being "Objective" 102 Do Chemists Make Better Scientists? 102 Does Experience Always Make You an Expert Observer? 104 Theory-Driven Observations 106 Scales of Measurement 107

	Nominal Scales 108 Ordinal Scales 109 Interval Scales 109 Ratio Scales 110 Standard Research Materials 110 Linguistic Norms 110 Word-Frequency Norms 111 Experimentally Derived Linguistic Norms 111 Alternative Methods of Gathering Data and Their Limitations Archival Research: A Case Study 112 Names and Concepts to Understand and Remember 115 Additional Reading 116	112
6	The Context of Discovery 118 The Context of Discovery 118 Two Case Histories 118 Intuition 119 Wallas and Stages of the Creative Process 120 Skinner's Approach to Creativity in Research 122 Sagacity 123 The Role of "Tools" 124 Algorithms 127 Just Do It! 128	
	Names and Concepts to Understand and Remember 129 Additional Reading 130	
7	Experiments to Think About 131	
	Finding the Form of a Law Inductively 133 Can We Measure the Time Taken by Mental Processes? How Many Life Events Can We Remember? 139 Weber's Law and Psychophysics 142 Deciding between Rival Hypotheses 142	134
	Does Familiarity Breed Liking or Contempt? 143	
	Null Results: Failing to Find a Difference Can Make a Difference Can Learning Take Place in One Trial? 148 What Does the SAT Measure? 151 Using Models 152	147
	Can Computers Simulate Human Behavior? 153 Turing's "Imitation Game" 153 PARRY 154 Thinking Aloud 156 Can We Learn to Love Catastrophes? 158	

A Catastrophe Machine 159
An Application of Catastrophe Theory 161
The Demonstration of Underlying Unity within Apparent
Variety 163
Can Newton's Laws Be Generalized to Psychology? 163
The Concept of a Threshold 165
Blind Variation and Selective Retention 168
Exploiting an Accident 170
Are There Some Things That I Never Forget? 171
Exploring the Characteristics of Naturally Occurring Processes 173
The Process of Peer Review 173
Are Reviewers Biased? 174
Is There a Home-Field <i>Dis-</i> advantage? 177
Finding the Explanation of a Known Effect 179
How Many Animals Did Moses Take on the Ark? 179
Why Do Babies Smile? 182
Attempting to Demonstrate the Existence of a Psychological
Entity 184
Does the Unconscious Exist? 184
Analyzing a Phenomenon 187
The Perception of Color 187
Using the Right Experimental Technique 190
Is There a Difference between Seeing and Saying? 190
Finding the Right Test or Apparatus 193
What Happens When "Red" Is Blue? 193
Why Are We So Well Organized? 196
Names and Concepts to Understand and Remember 200

References 203

Index 219