
Contents

<i>Preface</i>	<i>xi</i>
<i>Acknowledgments</i>	<i>xvii</i>
<i>Credits</i>	<i>xix</i>
CHAPTER 1 Two Case Studies in Creativity	1
Beliefs about Creativity	4
Two Case Studies in Creativity	6
Creativity in Science: Discovery of the Double Helix	6
Conclusions: Watson and Crick's Discovery of the Double Helix	31
Artistic Creativity: Development of Picasso's <i>Guernica</i>	34
Structure in Creative Thinking: Conclusions from the Case Studies	51
Revisiting the Question of Artistic Creativity versus Scientific Discovery	54
Beyond Case Studies: Outline of the Book	57
CHAPTER 2 The Study of Creativity	59
Outline of the Chapter	59
Creative Product, Creative Process, and Creative Person: Questions of Definition	60
Method versus Theory in the Study of Creativity	72
Methods of Studying Creativity	73
An Introduction to Theories of Creativity	90

CONTENTS

CHAPTER 3 The Cognitive Perspective on Creativity, Part I: Ordinary Thinking, Creative Thinking, and Problem Solving	104
Outline of the Chapter	105
Basic Cognitive Components of Ordinary Thinking	106
General Characteristics of Ordinary Thinking	108
Creative Thinking and Ordinary Thinking: Conclusions	118
The Cognitive Analysis of Problem Solving	119
An Example of Problem Solving	121
Solving a Problem: Questions of Definition	123
A Brief History of the Cognitive Perspective on Problem Solving	128
Problem Solving: Processes of Understanding and Search	135
Strategies for Searching Problem Spaces	141
Weak Heuristic Methods of Problem Solving and Creative Thinking: Conclusions	152
CHAPTER 4 The Cognitive Perspective on Creativity, Part II: Knowledge and Expertise in Problem Solving	153
Outline of the Chapter	154
Use of Knowledge in Problem Solving: Studies of Analogical Transfer	155
Strong Methods in Problem Solving: Studies of Expertise	168
Outline of a Cognitive-Analytic Model of Problem Solving: Strong and Weak Methods in Problem Solving	178
The Cognitive Perspective on Problem Solving and Creativity: Conclusions and Implications	180
The Creative Cognition Approach: A Bottom-Up Analysis of Creative Thinking	183
Skepticism about Expertise and Creativity	189
Practice or Talent?	191
Expertise and Achievement: Reproductive or Productive?	198
Expertise, Knowledge, and Experience versus Creativity: The Tension View	203
The Cognitive Perspective on Problem Solving and Creativity: Conclusions	207
CHAPTER 5 Case Studies of Creativity: Ordinary Thinking in the Arts, Science, and Invention	209
Outline of the Chapter	210
Basic Components of Ordinary Thinking	210
The 10-Year Rule in Creative Development	212
Case Studies of Creativity in the Visual Arts	223

Contents

Case Studies of Creativity in Science	237
Scientific Creativity: Scientific Discovery as Problem Solving	254
The Wright Brothers' Invention of the Airplane	255
Thomas Edison as a Creative Thinker: Themes and Variations Based on Analogy	261
James Watt's Invention of the Steam Engine	275
Eli Whitney's Cotton Gin	278
Ordinary Thinking in Invention: Summary	280
Case Studies of Creativity: Conclusions	280
CHAPTER 6 The Question of Insight in Problem Solving	282
Outline of the Chapter	286
The Gestalt Analysis of Insight: Problem Solving and Perception	286
Evidence to Support the Gestalt View	291
The Neo-Gestalt View: Heuristic-Based Restructuring in Response to Impasse	302
Challenges to the Gestalt View	308
An Elaboration of the Cognitive-Analytic Model to Deal with Restructuring and Insight	325
A Critical Reexamination of Evidence in Support of the Gestalt View	330
Insight in Problem Solving: Conclusions and Implications	339
CHAPTER 7 Out of One's Mind, Part I: Muses, Primary Process, and Madness	341
Outline of the Chapter	342
Messengers of the Gods	342
Primary Process and Creativity	343
Genius and Madness: Bipolarity and Creativity	356
Mood Disorders and Creativity: The Question of Causality	363
The Role of Affect in Creativity	368
Genius and Madness: Schizophrenia and Creativity	371
Social Factors and Genius and Madness	375
A Reconsideration of Some Basic Data	382
Genius and Madness: Conclusions	384
CHAPTER 8 Out of One's Mind, Part II: Unconscious Processing, Incubation, and Illumination	386
Outline of the Chapter	386
Unconscious Associations and Unconscious Processing	387
Poincaré's Theory of Unconscious Creative Processes	389

CONTENTS

Wallas's Stages of the Creative Process	397
Hadamard's Studies of Unconscious Thinking in Incubation	398
Koestler's Bisociation Theory	399
Campbell's Evolutionary Theory of Creativity: Blind Variation and Selective Retention	400
Simonton's Chance Configuration Theory	402
Csikszentmihalyi's Theory of the Unconscious in Creative Thinking	407
Unconscious Thinking in Creativity: Conclusions	413
Laboratory Investigations of Incubation and Illumination	414
Evidence for Incubation and Illumination: A Critique	428
Illumination without Unconscious Processing?	433
Incubation, Illumination, and the Unconscious: Conclusions	445
CHAPTER 9 The Psychometric Perspective, Part I: Measuring the Capacity to Think Creatively	447
Outline of the Chapter	448
Guilford and the Modern Psychometric Perspective on Creativity	448
Methods of Measuring Creativity	451
Cognitive Components of the Creative Process: Testing for Creative-Thinking Ability	461
Testing the Tests: The Reliability and Validity of Tests of Creative-Thinking Capacity	470
The Generality versus Domain Specificity of Creative-Thinking Skills	483
Testing Creativity: Conclusions	487
CHAPTER 10 The Psychometric Perspective, Part II: The Search for the Creative Personality	488
Creative versus Comparison or Control Groups	489
Questions about Method in Studies of the Creative Personality	492
A Model of the Role of Creative Personality in Creative Achievement in Science	496
Is It Futile to Search for <i>The</i> Creative Personality in the Arts and the Sciences?	504
Creativity and the Need to Be Original: A Reexamination of Divergent Thinking and Creativity	506
Personality, Cognition, and Creativity Reconsidered: The Question of Openness to Experience and Creativity	508
Divergent Thinking and the Creative Personality: Conclusions	515

Contents

CHAPTER 11	Confluence Models of Creativity	517
	Outline of the Chapter	517
	The Social Psychology of Creativity:	
	Amabile's Componential Model	518
	Economic Theory of Creativity: Buy Low, Sell High	534
	The Darwinian Theory of Creativity	552
	Confluence Models of Creativity: Summary	570
CHAPTER 12	Understanding Creativity: Where Are We?	
	Where Are We Going?	572
	Outline of the Chapter	572
	Ordinary versus Extraordinary Processes in Creativity	573
	Ordinary Thinking in Creativity	575
	Extraordinary Processes in Creativity?	586
	On Using Case Studies to Study Creativity	592
	Is It Possible to Test the Hypothesis That "Ordinary Thinking" Is the Basis for Creativity?	594
	On Creative Ideas and Creative People	596
	<i>References</i>	600
	<i>Index</i>	613