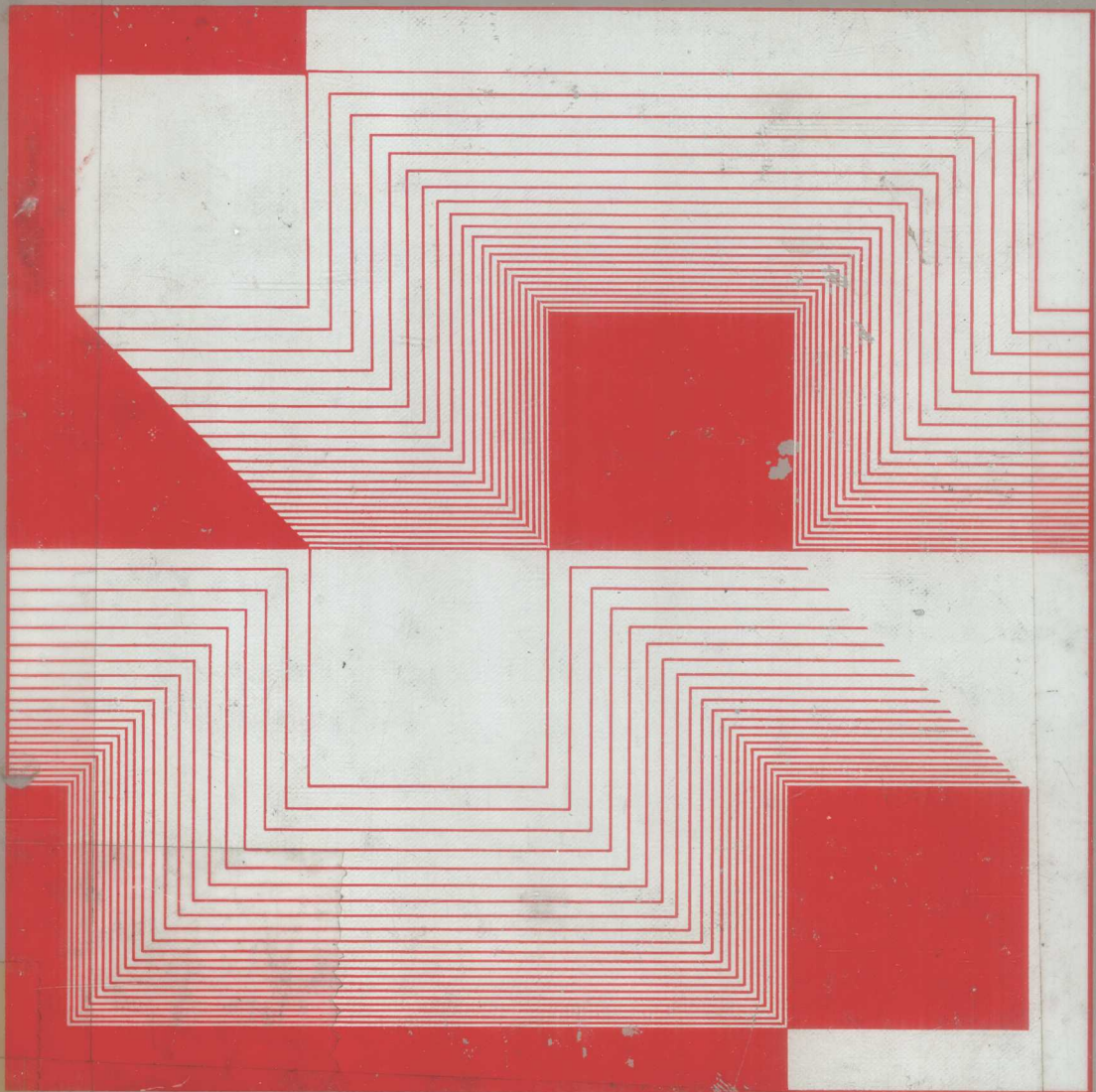


Creative and Critical Thinking

Second Edition

Moore/McCann/McCann



Creative and Critical Thinking

Second Edition

W. Edgar Moore
Emeritus
University of Florida

Hugh McCann
Texas A & M University

Janet McCann
Texas A & M University

Houghton Mifflin Company
Boston

Dallas Geneva, Illinois
Lawrenceville, New Jersey Palo Alto

Acknowledgment is made to Houghton Mifflin Company for permission to reprint material from *The Riverside Shakespeare*: William Shakespeare's *Julius Caesar*, *The First Part of Henry the Fourth*, and *Hamlet*. Copyright © 1974 by Houghton Mifflin Company. Used with permission.

Copyright © 1985 by Houghton Mifflin Company. All Rights Reserved. No part of this work may be reproduced or transmitted in any form or by any means, electronic or mechanical, including photocopying and recording, or by any information storage or retrieval system, except as may be expressly permitted by the 1976 Copyright Act or in writing by the Publisher. Requests for permission should be addressed to Permissions, Houghton Mifflin Company, One Beacon Street, Boston, MA 02108.

Printed in the U.S.A.
Library of Congress Catalog Number: 84-81047
ISBN: 0-395-35780-2

BCDEFGHIJ-H-898765

Preface

Purpose

Creative and Critical Thinking is a text on the development of thinking skills. It is designed for courses whose primary goal is to teach students how to solve problems using practical reasoning. Although the text's coverage is rooted in applied logic, it covers those subjective factors that influence decision-making. We believe that a course devoted to the development of effective thinking is as necessary as a basic course in English or mathematics. While students can and do improve their thinking through the study of such subjects as English, mathematics, physical science, and social science, they also need to study the techniques of effective thinking directly. Many studies in psychology reveal that the study of those techniques—the development of metacognitive skills—improves thinking and learning abilities. Sound thinking is too complex a process to be adequately treated as an adjunct to a course devoted primarily to other matter and is too important to be relegated to spare moments.

Audience

The text was written for students at the undergraduate level and should serve for students in any curriculum. No previous training in logic is presupposed, and many of the examples were designed for students who are in the early stages of their college curriculum.

Previous Editions

This text has a long history. The first version, *Applied Logic*, by Winston W. Little, W. Harold Wilson, and W. Edgar Moore, was published in 1955. Their purpose was to present a text that would enable students to develop their intellectual skills for practical use in problem-solving. For this purpose the content of the traditional logic text was changed, more categories of informal logic were added, and the traditional treatment of deduction was simplified and streamlined to make it more applicable to everyday problems. The standard principles of induction and probability were presented with an emphasis on applications. From the behavioral sciences were taken materials that would provide insight into the operation of such factors as emotion and cultural influence and their impact on sound thinking.

In 1967, the book was revised by W. Edgar Moore. Its scope was altered to focus on decision-making, the most practical application of effective thinking techniques. The material on subjective factors was enlarged and updated, and chapters were added to show how techniques in effective thinking could be used to help create a consistent system of values to live by. Material was included on the theory of creativity, and this information too was put in practical form. Reflecting this last addition, the title of the text was changed to *Creative and Critical Thinking*.

The Present Edition

In this revision, we have kept in mind the book's original goal: to teach students the specific skills necessary for selecting and using information to solve problems and make decisions. Thus we have tried to retain the book's practical approach and its involvement in student concerns while at the same time thoroughly updating both theory and example. The changes we have made include the following:

Chapter 2 (a new chapter) now introduces the fundamental logical concepts employed in the text;

Two new chapters apply the skills developed throughout the text to the writing of argumentative essays;

The text is now organized into six parts, which may be used as units in the course;

The chapters on informal fallacies, which were previously distributed throughout the text, now form a complete unit;

The Exercises which appear at the end of each chapter have been revised and updated, and, in many cases, additional problems are provided.

Like the previous revision of the text, this one has drawn heavily on the experiences and suggestions of instructors and students who have used earlier editions. With the exception of some historical material and a few incidents that are public knowledge, the subject matter of illustra-

tions and exercises is completely fictitious.

Acknowledgments

We are grateful above all to W. Edgar Moore, both for providing an excellent foundation and for trusting us to build upon it. The manuscript was reviewed by:

Harold Alderman, California State University at Sonoma, CA

John M. Barbee, National College of Education, Evanston, IL

John A. Barker, Southern Illinois University at Edwardsville, IL

Linda A. Bell, Georgia State University, Atlanta, GA

Dion K. Brown, Polk Community College, Winter Haven, FL

Their suggestions did much to shape and improve the book. We also benefitted greatly from numerous discussions with our colleagues at Texas A & M University. Special thanks are due to Mary Johnson and Melissa Meyer for their patient and unflagging dedication in preparing the manuscript. Finally, we must thank our children, Stephanie, Hugh, Paul, and Peter, for their understanding and tolerance in enduring the hardship of having both parents at work on a book.

Hugh McCann

Janet McCann

Creative and Critical Thinking

Contents

Preface / xv

Part One

Decision Making and Problem Solving

Chapter 1

Decision Making / 3

Creative and Critical Thinking / 5

Phases of Decision Making / 6

The Personal Point of View / 10

Objectivity / 13

Improving Thinking / 15

Exercise 1 / 17

Chapter 2

Propositions and Arguments / 19

Propositions / 19

Arguments / 20

Premises and Conclusions / 21

Induction and Deduction / 25

Validity / 26

Arguments and Decision Making / 29

Exercise 2 / 31

Chapter 3

The Hypothetical Syllogism / 35

The Hypothetical Proposition / 36

Structure of the Hypothetical Syllogism / 36

Affirming the Antecedent / 37

Denying the Antecedent / 38

Affirming the Consequent / 38

Denying the Consequent / 39

Uncertain Relationship Between Premises / 39

Non Sequitur / 40

Hypothetical Syllogisms in Extended Reasoning / 41

Interpreting Hypothetical Propositions / 42

Logical Shorthand / 44

Exercise 3A / 45

Exercise 3B / 49

Exercise 3C / 51

Chapter 4

Forming Hypotheses / 53

The Problem of Induction / 54

The Nature of Hypotheses / 55

Guidelines for Forming Hypotheses / 57

Adding and Testing Consequents / 57

Priorities in Testing Hypotheses / 60

Repeating the Cycle / 61

Exercise 4 / 63

Chapter 5

Testing Hypotheses / 67

Rival Hypotheses / 67

Reliability and Probability / 68

Converging Propositions / 70

Diverging Propositions / 71

Criteria / 72

Evaluation and Decision / 76

Exercise 5 / 77

Chapter 6

Evaluating Evidence / 81

Physical Conditions / 84

Sensory Acuity / 84

Technical Knowledge / 84

Degree of Objectivity / 85

Effects of Memory / 85

Corroboration / 87

Degree of Precision Required / 87

Evidence from Authorities / 88

Exercise 6 / 91

Part Two

Probability and Induction

Chapter 7

Calculating Probabilities / 97

Theoretical Probability / 98

The Master Formula / 99

Single Events / 99

Conjunctions of Independent Events / 99

Conjunctions Involving Dependent Events / 101

Alternative Possibilities / 103

Applications / 105

The Gambler's Fallacy / 106
Empirical Probability / 107
Intuitive Estimates of Probability / 109
Degrees of Reliability / 110
Exercise 7 / 113

Chapter 8

Generalization / 115

The Function of Generalization / 116
Hasty Generalization / 116
Defining the Problem / 117
Selecting the Sample / 117
Forming General Conclusions / 120
Testing General Conclusions / 121
Evaluation and Decision / 123
Exercise 8 / 125

Chapter 9

Statistical Concepts / 127

Selecting the Sample / 128
Frequency Tables / 128
Frequency Polygons and Curves / 129
Averages / 130
Percentile Ranks / 132
Measures of Dispersion / 133
Exercise 9 / 137

Chapter 10

Reasoning From Statistics / 139

The Normal Probability Curve / 139
Inferences from Normal Distributions / 140
Inferences from Irregular Distributions / 142
Interpreting Averages / 144
Hazards in Interpreting Statistics / 145
Misuse of Statistics / 147
Exercise 10 / 149

Chapter 11

Forming Causal Principles / 151

Finding Common Factors / 153
Types of Causal Relationships / 155
Guidelines for Forming Causal Principles / 156
Refining Causal Principles / 157
Preliminary Testing / 158
Controls / 159

Statistical Procedures / 160
Exercise 11 / 165

Chapter 12

Testing Causal Principles / 167

Repeating the Cycle / 167
The Fallacy of Questionable Cause / 169
Sources of Doubt / 170
Types of Evidence / 171
Criteria / 176
Exercise 12 / 181

Chapter 13

Evaluation and Decision / 183

Deductive Decisions / 184
Inductive Decisions / 184
Proposals for Action / 185
Predicting Consequences / 185
Evaluating Consequences / 186
Revising Proposals for Action / 187
Acting on Unreliable Conclusions / 188
Exercise 13 / 193

Part Three

Meaning and Deduction

Chapter 14

Classification and Definition / 197

Utilitarian Systems of Classification / 199
Explanatory Systems of Classification / 200
Meaning / 202
Definition / 204
Genus and Difference / 205
Evaluation and Decision / 208
Exercise 14 / 211

Chapter 15

Categorical Propositions / 213

Relationships Between Classes / 214
A-Form Propositions / 214
E-Form Propositions / 216
I-Form Propositions / 217

O-Form Propositions / 218
Exercise 15 / 221

Chapter 16

Immediate Inference / 223

Conversion / 223
Obversion / 225
The Square of Opposition / 227
The Importance of Immediate Inference / 230
Exercise 16 / 233

Chapter 17

Categorical Syllogisms / 237

Structure / 237
The Four-Terms Fallacy / 238
The Fallacy of Faulty Exclusion / 240
The Fallacy of Undistributed Middle / 240
The Fallacy of Illicit Distribution / 242
Constellations of Terms / 243
Exercise 17 / 245

Chapter 18

Categorical Syllogisms in Ordinary Discourse / 247

Interpreting Categorical Propositions / 248
Finding the Parts of Syllogisms / 252
Putting Arguments into Logical Form / 253
Missing Propositions / 256
Exercise 18A / 259
Exercise 18B / 261
Exercise 18C / 263

Chapter 19

Alternative and Disjunctive Syllogisms / 267

Structure of the Alternative Syllogism / 267
Affirming an Alternative / 268
Denying an Alternative / 269
Structure of the Disjunctive Syllogism / 269
Affirming a Disjunct / 270
Denying a Disjunct / 270
Combined Alternative and Disjunctive Syllogisms / 270
Uncertain Relationship Between Premises / 271
Exercise 19 / 273

Chapter 20

Complex Syllogistic Forms / 275

Dilemmas / 275

Chain Arguments / 277

Syllogisms Within Syllogisms / 279

Deductive-Inductive Arguments / 280

Exercise 20A / 283

Exercise 20B / 285

Part Four

Ineffective Thinking

Chapter 21

Faulty Assumptions / 291

Straw Man / 292

Argument from Ignorance / 293

Hypothesis Contrary to Fact / 295

Irrelevant Conclusion / 296

False Analogy / 297

Composition / 299

Division / 300

Circular Argument / 301

Accident and Cliché Thinking / 301

Inconsistency / 303

Exercise 21 / 307

Chapter 22

Neglected Aspect / 311

Oversimplification / 312

The Black-or-White Fallacy / 314

The Argument of the Beard / 314

Misuse of the Mean / 316

Half-truths / 317

Decision by Indecision / 318

Exercise 22 / 321

Chapter 23

Pitfalls in Language / 323

The Problem of Communication / 323

Lifting Out of Context / 324

Equivocation / 326

Amphiboly / 326

Misuse of Evaluative Words / 327

Obfuscation / 329

Hairsplitting / 330

Complex Question / 331
Exercise 23 / 333

Chapter 24

Irrelevant Appeals / 335

Appeal to Pity / 336
Personal Attack / 336
Poisoning the Well / 337
Appeal to Force / 338
Misuse of Authority / 339
Bandwagon Argument / 340
Meaning from Association / 341
Diversion / 343
Exercise 24 / 345

Part Five

The Human Element

Chapter 25

Creative Thinking / 349

The Creative Breakthrough / 350
Preparation / 353
Incubation / 353
Persistence / 355
Mechanical Methods / 357
Analogies / 358
Adversity / 359
Practice / 360
Exercise 25 / 363

Chapter 26

Need-Directed Thinking / 365

Needs and Thinking / 366
Physiological Needs / 367
Needs of the Self-Concept / 368
Intellectual Needs / 375
Balanced Satisfaction of Needs / 378
Exercise 26 / 381

Chapter 27

The Personal Point of View / 383

The Organization of Experience / 383
Value Systems / 385

The Importance of Culture / 389
The Individual Character of Thinking / 392
Exercise 27 / 395

Chapter 28

How We May Distort the Evidence / 397

Self-Defense / 398
Mechanisms of Self-Defense / 399
Sophistical Defense / 399
Avoidance / 400
Distraction Devices / 401
Rationalizing / 401
Repression / 402
Projection / 404
Evaluating Defense Mechanisms / 404
Exercise 28 / 407

Chapter 29

Dealing with Emotions / 411

Emotions and Physiology / 412
Emotions and Thinking / 413
Anxiety / 414
Feelings of Insecurity and Inferiority / 415
Guilt / 418
Depression / 419
Coping with Stress / 420
Expert Help / 423
Exercise 29A / 425
Exercise 29B / 429

Chapter 30

Psychological Blinders / 431

Mindsets / 431
Thought Habits / 433
Attitudes / 433
Stereotypes / 435
Displacement / 436
Identification / 437
Failure to Listen / 437
Exercise 30 / 439

Chapter 31

Understanding and Refining Values / 441

Values and Decision Making / 442
Discovering Value Premises / 444

Criteria / 447
Classifying Values / 450
Modifying Value Systems / 452
Value Conflicts / 452
Exercise 31A / 457
Exercise 31B / 459
Exercise 31C / 463

Part Six

The Argumentative Essay

Chapter 32

The Planning Stage / 467

Choosing a Topic / 468
Gathering Information / 471
Forming a Thesis / 474
Testing Your Thesis / 475
Evaluating and Deciding / 476
Exercise 32 / 479

Chapter 33

The Writing Stage / 481

Determining Your Purpose / 481
Analyzing Your Audience / 483
Choosing Your Tone / 485
Putting It All Together / 486
The Introduction / 486
The Exposition / 488
The Body / 489
The Conclusion / 491
Exercise 33 / 493

Index / 495

Part One

Decision Making and Problem Solving

