

Brooke Noel Moore
Richard Parker
California State University, Chico

with help in Chapter 12 from Nina Rosenstand and Anita Silvers









#### CRITICAL THINKING, 2024 RELEASE

Published by McGraw Hill LLC, 1325 Avenue of the Americas, New York, NY 10019. Copyright ©2024 by McGraw Hill LLC. All rights reserved. Printed in the United States of America. Previous editions ©2021, 2017, and 2015. No part of this publication may be reproduced or distributed in any form or by any means, or stored in a database or retrieval system, without the prior written consent of McGraw Hill LLC, including, but not limited to, in any network or other electronic storage or transmission, or broadcast for distance learning.

Some ancillaries, including electronic and print components, may not be available to customers outside the United States.

This book is printed on acid-free paper.

1 2 3 4 5 6 7 8 9 LWI 29 28 27 26 25 24

ISBN 978-1-266-55573-2(bound edition) MHID 1-266-55573-0 (bound edition) ISBN 978-1-266-90346-5 (loose leaf edition) MHID 1-266-90346-1 (loose leaf edition)

Associate Portfolio Manager: Elisa Odoardi Marketing Manager: Kim Schroeder-Freund

Lead/Senior Content Project Managers: Melissa M. Leick, Laura Payne

Manufacturing Project Manager: Nancy Flaggman Content Licensing Specialist: Gina Oberbroeckling Cover Image: Jacqui Langeland/McGraw Hill

Compositor: Straive

All credits appearing on page or at the end of the book are considered to be an extension of the copyright page.

#### **Library of Congress Cataloging-in-Publication Data**

Names: Moore, Brooke Noel, author. | Parker, Richard (Richard B.), author.

Title: Critical thinking / Brooke Noel Moore, Richard Parker, California State University, Chico; with help in Chapter 12 from Nina Rosenstand and Anita Silvers.

Description: 2024 release. | New York, NY: McGraw Hill LLC, 2024.

Identifiers: LCCN 2023045563 | ISBN 9781266555732 (bound edition; acid-free paper) | ISBN 1266555730 (bound edition; acid-free paper) | ISBN 9781266903465 (loose leaf edition; acid-free paper) | ISBN 1266903461 (loose leaf edition; acid-free paper)

Subjects: LCSH: Critical thinking.

Classification: LCC B105.T54 M66 2024 | DDC 160-dc23/eng/20231027

LC record available at https://lccn.loc.gov/2023045563

The Internet addresses listed in the text were accurate at the time of publication. The inclusion of a website does not indicate an endorsement by the authors or McGraw Hill LLC, and McGraw Hill LLC does not guarantee the accuracy of the information presented at these sites.

mheducation.com/highered





## **Brief Contents**

Chapter 1	Driving Blindfolded 1
Chapter 2	Reasoning and Arguments 32
Chapter 3	Vagueness, Generality, Ambiguity, and Definition 68
Chapter 4	Believability of Claims and Credibility of Sources 96
Chapter 5	Linguistic Persuasion Devices 125
Chapter 6	Bogus Logos Part I: Relevance Fallacies 161
Chapter 7	Bogus Logos Part II: Induction Fallacies 181
Chapter 8	Bogus Logos III: Formal Fallacies, Fallacies of Ambiguity, and Fallacies Involving Miscalculating Probabilities 204
Chapter 9	Deductive Arguments I 223
Chapter 10	Deductive Arguments II (Natural Deduction) 270
Chapter 11	Inductive Reasoning 324
Chanter 12	Moral Legal and Aesthetic Peasoning 377



## Contents

Changes to the 2024 RELEASE XVI Acknowledgments XVII About the Authors XX Chapter 1 Driving Blindfolded 1 Reasoning, Arguments, and Issues 3 Issues 4 Fact and Opinion 5 Factual vs. Non-factual Questions and Issues 6 Reasoning is used to establish both factual and non-factual statements/claims 7 Are moral/ethical issues non-factual? 7 Critical Thinking Roadblocks 8 Cognitive bias 8 Counteracting cognitive bias 12 Truth and Knowledge 13 What Critical Thinking Can and Can't Do 14 A Word About the Exercises 14 Recap 14 Additional Exercises 16 Answers, Suggestions, and Tips for Triangle Exercises 29 Chapter 2 Reasoning and Arguments 32 Two Kinds of Successful Reasoning 32 Deductive reasoning 33 Inductive reasoning 34 Two Kinds of Deductive Reasoning 36 Four Kinds of Inductive Reasoning 37 Telling Whether Reasoning is Deductive or Inductive 39 Things That Aren't Arguments in the First Place 40 Reports 41 If/then statements 42 "A because B" statements 42 Selfies and Other Pictures 43 Counterarguments and Balance-of-consideration Reasoning 44 Ethos, Pathos, and Logos 45 Techniques for Understanding Arguments 46 Diagramming an Argument's Structure 46

Distinguishing Arguments from Window Dressing 48

Recap 49 Additional Exercises 50 Answers, Suggestions, and Tips for Triangle Exercises 63 Chapter 3 Vagueness, Generality, Ambiguity, and Definition 68 Vagueness, Generality, and Ambiguity 69 Vagueness 69 Generality 70 Ambiguity 71 Defining Terms 75 Definition Purposes 75 Definition Forms 76 Evaluating Definitions 77 Evaluating Argumentative Essays 78 Recap 80 Additional Exercises 81 Answers, Suggestions, and Tips for Triangle Exercises 93 Chapter 4 Believability of Claims and Credibility of Sources 96 When Does a Claim's Content Present Believability Problems? 97 When Does a Claim's Source Present Credibility Problems? 99 Reasons for Questioning a Source's Credibility 100 Expertise 102 When Experts Disagree or Turn Out to Have Been Mistaken 103 Expertise Isn't Interdisciplinary 104 Unreliable Indicators of Credibility 104 The News 106 Mainstream News Media 106 Videos 109 Social Media 109 Wikipedia 111 Talk Radio 111 Blogs 111 Advertising 112 Three Kinds of Ads 113 Recap 115 Additional Exercises 115 Answers, Suggestions, and Tips for Triangle Exercises 123 Chapter 5 Linguistic Persuasion Devices 125 Logical Force Versus Rhetorical Force 126 Euphemisms, Dyphemisms, and Sweeteners 126 Downplayers 128

Ridicule (Sarcasm; Derision) 128

Stereotyping Language 129

Innuendo 130

Loaded Questions, Loaded Definitions, Loaded Explanations, and Loaded Analogies 131

Hyperbole and Repetition 133

Weaselers and Proof Surrogates 134

Non-verbal Visual Persuasion 135

Propaganda and Demagoguery 136

Recap 139

Additional Exercises 140

Answers, Suggestions, and Tips for Triangle Exercises 158

#### Chapter 6 Bogus Logos Part I: Relevance Fallacies 161

Argumentum Ad Hominem 162

Poisoning the Well 164

Guilt by Association 164

Genetic Fallacy 165

Straw Man 165

False Dilemma (Ignoring Other Alternatives) 166

Perfectionist Fallacy 167

The Line-Drawing Fallacy 167

Misplacing the Burden of Proof 168

Begging the Question (Using a Conclusion as Evidence of Its Own Truth) 169

Appeals to Emotion 170

Argument from Outrage 170

Scare Tactics 171

Appeal to Pity 172

Other Appeals to Emotion 172

Two Wrongs Make a Right, Wishful Thinking, and Denial 173

Irrelevant Conclusion 174

Recap 174

Additional Exercises 175

Answers, Suggestions, and Tips for Triangle Exercises 179

#### Chapter 7 Bogus Logos Part II: Induction Fallacies 181

Hasty Generalizing (Generalizing From Too Few Cases) 182

Hasty Generalizing Used as Disproof 182

Skewed Generalizing (Generalizing From Atypical Cases) 184

Accident 185

Weak Analogy 186

Mistaken Appeal to Authority 187

Mistaken Appeal to Popularity 188

Appeal to Tradition/Appeal to Common Practice 188



Bandwagon Fallacy 190

Fallacies Related to Cause and Effect 191

Post Hoc, Ergo Propter Hoc 191

Cum Hoc, Ergo Propter Hoc 192

Confusing Correlation with Causation 193

Overlooking the Possibility of Chance Variation and Overlooking the Possibility of Regression to the Mean 194

Refutation by Anecdote, Causal Variety 195

Slippery Slope 195

Untestable Statement 196

Recap 197

Additional Exercises 197

Answers, Suggestions, and Tips for Triangle Exercises 203

## Chapter 8 Bogus Logos III: Formal Fallacies, Fallacies of Ambiguity, and Fallacies InvolvingMiscalculating Probabilities 204

Fallacies Involving Defective Logical Form 204

Affirming the Consequent 205

Form of Affirming the Consequent 205

Denying the Antecedent 206

Form of Denying the Antecedent 206

Undistributed Middle 206

Two versions of Undistributed Middle 206

Illicit Conversion 208

Three Forms of Illicit Conversion (Letters stand for terms) 208

Confusing Contraries and Contradictories 208

Form of Confusing Contradictories and Contraries 209

Fallacies of Ambiguity 209

Equivocation 210

Amphiboly 211

Composition 212

Division 212

Miscalculating Probabilities 213

Incorrectly Combining the Probability of Independent Events 214

Gambler's Fallacy 214

Base Rate Fallacy 215

Recap 216

Additional Exercises 217

Answers, Suggestions, and Tips for Triangle Exercises 222

#### Chapter 9 Deductive Arguments I 223

Categorical Logic 223

Categorical Claims 225

Venn Diagrams 226



```
Translation Into Standard Form 227
   Translating Claims in Which the Word "Only" or the Phrase "The Only" Occurs 228
   Translating Claims About Times and Places 229
   Translating Claims About Specific Individuals 230
   Translating Claims that Use Mass Nouns 231
The Square of Opposition 233
   Existential Assumption and the Square of Opposition 233
   Inferences Across the Square 234
Three Categorical Relations 235
   Conversion 235
   Obversion 235
   Contraposition 236
Categorical Syllogisms 243
   The Venn Diagram Method of Testing for Validity 245
   Existential Assumption in Categorical Syllogisms 248
   Categorical Syllogisms with Unstated Premises 249
   Real-Life Syllogisms 250
   The Rules Method of Testing for Validity 253
Recap 255
Additional Exercises 255
Answers, Suggestions, and Tips for Triangle Exercises 264
Chapter 10 Deductive Arguments II (Natural Deduction) 270
   Truth-Functional (Sentential) Logic 270
Truth Tables and Logical Symbols 271
   Claim Variables 271
   Truth Tables 271
Symbolizing Compound Claims 277
   "If" and "Only If" 277
   Necessary and Sufficient Conditions 278
   "Unless" 279
   "Either . . . Or" 280
Truth-functional Argument Patterns (Brief Version) 282
   Three Common Valid Argument Patterns 282
   Modus Ponens 282.
   Modus Tollens 283
   Chain Argument 284
   Three Mistakes: Invalid Argument Forms 285
Truth-Functional Arguments (Full Version) 288
   The Truth-Table Method 288
   The Short Truth-Table Method 290
A System of Natural Deduction 295
```

Group I Rules: Elementary Valid Argument Patterns 296

Group II Rules: Truth-Functional Equivalences 301

Conditional Proof 309

Recap 312

Additional Exercises 312

Answers, Suggestions, and Tips for Triangle Exercises 318

#### Chapter 11 Inductive Reasoning 324

Inductive Analogical Arguments 325

Evaluating Inductive Analogical Arguments 326

Criterion for Evaluating the Strength of an Inductive Analogical Argument 326

Attacking the Analogy 326

Three Inductive Analogical Arguments Analyzed 327

Other Uses of Analogy 328

Generalizing From Nonrandom Samples 332

Evaluating Generalizations from Nonrandom Samples 333

Criterion for Evaluating the Strength of a Generalization from a Nonrandom Sample 334

Attacking the Generalization 334

Three Generalizations from Nonrandom Samples Analyzed 334

Generalizing From Random Samples 335

Two Conclusions Regarding Generalizing from Random Samples 337

Instantiating (De-generalizing) 338

Form of Instantiating 338

Causal Statements and Their Support 345

Reasons for Hypothesizing Cause and Effect 345

Testing a Causal Hypothesis 347

Randomized Controlled Experiments (RCEs) 348

Observational Studies 350

Calculating Statistical Probabilities 351

Joint Occurrence of Independent Events 352

Alternative Occurrences 352

Expectation Value 353

Calculating Conditional Probabilities 354

Recap 356

Additional Exercises 357

Answers, Suggestions, and Tips for Triangle Exercises 371

#### Chapter 12 Moral, Legal, and Aesthetic Reasoning 377

Moral Value Judgments 378

Two Moral Reasoning Principles 379

The consistency moral reasoning principle 379

The burden-of-proof moral reasoning principle 379

General Moral Statements 380

The Foundations of Moral Reasoning 380



Outcome Morality (Consequentialism) 380

Rule Morality 381

Virtue Morality 382

Moral Relativism 383

Moral Subjectivism (Existentialism) 384

Religious Absolutism 384

Moral Deliberation 385

Legal Reasoning 392

Four Justifications for Legal Proscriptions 393

Aesthetic Reasoning 395

Eight Aesthetic Principles 395

Using Aesthetic Principles to Judge Aesthetic Value 397

Evaluating Aesthetic Criticism: Relevance and Truth 398

Recap 398

Additional Exercises 399

Answers, Suggestions, and Tips for Triangle Exercises 403

Appendix: Selected Exercises from Previous Editions 406

Glossary 428

Index 440





### A complete course platform

Connect enables you to build deeper connections with your students through cohesive digital content and tools, creating engaging learning experiences. We are committed to providing you with the right resources and tools to support all your students along their personal learning journeys.

65% Less Time Grading



Laptop: Getty Images; Woman/dog: George Doyle/Getty Images

## **Every learner is unique**

In Connect, instructors can assign an adaptive reading experience with SmartBook® 2.0. Rooted in advanced learning science principles, SmartBook® 2.0 delivers each student a personalized experience, focusing students on their learning gaps, ensuring that the time they spend studying is time well spent. **mheducation.com/highered/connect/smartbook** 

### Study anytime, anywhere

Encourage your students to download the free ReadAnywhere® app so they can access their online eBook, SmartBook® 2.0, or Adaptive Learning Assignments when it's convenient, even when they're offline. And since the app automatically syncs with their Connect account, all of their work is available every time they open it. Find out more at **mheducation.com/readanywhere** 

"I really liked this app—it made it easy to study when you don't have your textbook in front of you."

Jordan Cunningham, a student at Eastern Washington University

### Effective tools for efficient studying

Connect is designed to help students be more productive with simple, flexible, intuitive tools that maximize study time and meet students' individual learning needs. Get learning that works for everyone with Connect.



#### **Education for all**

McGraw Hill works directly with Accessibility Services departments and faculty to meet the learning needs of all students. Please contact your Accessibility Services Office, and ask them to email accessibility@mheducation.com, or visit mheducation.com/about/accessibility for more information.

## Affordable solutions, added value

Make technology work for you with LMS integration for single sign-on access, mobile access to the digital textbook, and reports to quickly show you how each of your students is doing. And with our Inclusive Access program, you can provide all these tools at the lowest available market price to your students. Ask your McGraw Hill representative for more information.

# Solutions for your challenges

A product isn't a solution. Real solutions are affordable, reliable, and come with training and ongoing support when you need it and how you want it. Visit **supportateverystep.com** for videos and resources both you and your students can use throughout the term.



### **Updated and relevant content**

Our new Evergreen delivery model provides the most current and relevant content for your course, hassle-free. Content, tools, and technology updates are delivered directly to your existing McGraw Hill Connect® course. Engage students and freshen up assignments with up-to-date coverage of select topics and assessments, all without having to switch editions or build a new course.

## **CHANGES TO THE 2024 RELEASE**

After years of studying the problem, we've concluded that one reason students don't do reading assignments is that reading assignments contain words.

So, in this release, we try a new approach: fewer words. Fewer words, fewer sentences, fewer semicolons. We've revised the book to make it more readable, navigable, and reviewable, especially for online readers. Key-point summaries and numerous location indicators are embedded frequently throughout this edition of the text to facilitate efficient reading and review. Concepts, principles, and evaluation criteria are easily spotted and are clearly illustrated by short examples.

If you are an instructor, you will want to know that definitions of several fundamental concepts have been simplified, refined, and made more intuitive. These include the definitions of deduction and induction, factual and nonfactual statements, causal hypothesis, and instantiation.

Material on testing causal statements now treats the null hypothesis.

Evaluation criteria for inductive reasoning have been simplified, reduced in number, and made more intuitive.

Generalizing from nonrandom samples is treated as a form of analogical argument. This reduces the evaluation criteria for both types of argument to what is essentially a single, simplified criterion.

The chapter on truth-functional logic emphasizes that it is a system of natural deduction. The material presumes no background in formal logic, and proceeds at small, easy-to-follow steps.



■ Moore lectures to a packed classroom.

Likewise, the complexities of basic statistical inference are made understandable to readers who have no background in statistics

In the chapter on credibility, we consider when a claim's content presents believability problems, and when a source presents credibility problems. Then we examine various sources of information with respect to their credibility and authority.

As always, we distinguish logic from persuasion, logical force from rhetorical impact.

New to this edition is the Base Rate Fallacy. You will find new boxes on interesting topics such as the "Platinum Rule" and Critical Race Theory. We have broadened the discussion of untestable explanations to untestable statements used for any purpose.

The section of the last chapter which formerly discussed fundamental moral perspectives has been revised. It now covers the foundations of moral reasoning: "outcome morality," "rule morality," "virtue morality," "moral relativism," "moral subjectivism," and "religious absolutism."

Finally, we want to remind readers that an appendix to the book still contains over 200 additional critical thinking exercise items from previous editions.

Recently, we were startled to hear David Muir, anchor of ABC World News Tonight, explain to "younger members" of his audience what answering machines and landlines were. We hope first- and second-year college students who are unfamiliar with antiquities like these will still find this book culturally relevant and user friendly.

## Acknowledgments

You may find mistakes in this book. Who made them? Moore blames Parker; Parker blames Moore. Neither blame the people we are about to list, who have helped us enormously in our effort to improve. In a previous edition, we tried to blame everything on Terry McGraw, but someone said we couldn't do that.

For thanks, we begin with our caring brand manager Elisa Oboardi and our astute and amazing production manager, Katherine Habr. Katherine, who works with us on other projects, is efficient and wise. We are indebted to her for her patience and knowledge. She is a fantastic asset. Thanks, Katherine. We also want to thank our entire McGraw Hill Education team, including Melissa M. Leick, Laura Payne, Gina Oberbroeckling, and Kim Schroeder-Freund, and Kala Ramachandran.

The guidance of our reviewers over the editions has been indispensable to us. These reviewers include

Keith Abney, California Polytechnic State University, San Luis Obispo

James Anderson, San Diego State University

Benjamin Arah, Bowie State University

Joseph Aranyosi, University of Phoenix

Sheldon Bachus

Patricia Baldwin, Pitt Community College

Rick Beno, Wilmington University

Monique Bindra

Tim Black, California State University, Northridge

Charles Blatz, University of Toledo

Christian Blum, Bryant & Stratton, Buffalo

K. D. Borcoman, Coastline College/CSUDH

Keith Brown, California State University, East Bay

Rosalie Brown

Lee Carter, Glendale Community College

Jennifer Caseldine-Bracht, Indiana University-Purdue University, Fort Wayne

Lynne Chandler-Garcia, Pikes Peak Community College

David Connelly, Cayuga Community College

Anne D'Arcy, California State University, Chico

Michelle Darnelle, Fayetteville State University

Ray Darr, Southern Illinois University, Edwardsville

William J. Devlin, Bridgewater State University

Paul Dickey, Metropolitan Community College

Sandra Dwyer, Georgia State University

Jeffrey Easlick, Saginaw Valley State University

Aaron Edlin, University of California, Berkeley

Dorothy Edlin

Noel Edlin

Ellery Eells, University of Wisconsin-Madison

Ben Eggleston, University of Kansas

Geoffrey B. Frasz, Community College of Southern Nevada

Josh Fulcher

Angela Gearhart, University of Chile, Santiago

Rory Goggins

Geoffrey Gorham, University of Wisconsin-Eau Claire

Joseph Graves, North Carolina A&T University

Dabney Gray, Stillman College

Richard A. S. Hall, Fayetteville State University

Patricia Hammer, Delta College

Anthony Hanson, De Anza College

Rebecca Hendricks

Judith M. Hill, Saginaw Valley State University

Steven Hoeltzel, James Madison University

Steven R. Huizenga, Central Ohio Technical College

J. F. Humphrey, North Carolina A&T University

Amro Jayousi

Gary John, Richland College

Sunghyun Jung

Allyn Kahn, Champlain College

David Kelsey, Coastline Community College

Daniel Kenzie, North Dakota State University

David Keyt, University of Washington

Paulina Kohan

William Krieger, California State University-Pomona

Michael LaBossiere, Florida A&M University

Sunita Lanka, Hartnell College

Bill Lawson

Marisha Lecea, Western Michigan University

Marion Ledwig, University of Nevada-Las Vegas

Vern Lee, University of Phoenix

Terrance MacMullon, Eastern Washington University

Andrew Magrath, Kent State University

Alistair Moles, Sierra College

Ralph J. Moore, Jr.

Jeffry Norby, Northcentral Technical College

Eric Parkinson, Syracuse University

Steven Patterson, Marygrove College

Carmel Phelan, College of Southern Nevada

Jamie L. Phillips, Clarion University

Domenick Pinto, Sacred Heart University

Ayaz Pirani, Hartnell College

Ed Pluth, California State University, Chico

Scott Rappold, Our Lady of Holy Cross College

N. Mark Rauls, College of Southern Nevada

Victor Reppert, Glendale Community College

Matthew E. Roberts, Patrick Henry College

Greg Sadler, Fayetteville State University

Matt Schulte, Montgomery College

Richard Scott, Glendale Community College

Laurel Severino, Santa Fe Community College

Mehul Shah, Bergen Community College

Robert Shanab, University of Nevada at Las Vegas

Steven Silveria

Robert Skipper, St. Mary's University

Aeon J. Skoble, Bridgewater State University

Taggart Smith, Purdue University-Calumet

Richard Sneed, University of Central Oklahoma

Alan Soble, Drexel University

Chris Soutter

James Stump, Bethel College

Lou Suarez

Susan Vineberg, Wayne State University

Michael Ventimiglia, Sacred Heart University

Jerry Voltura, Lone Star College

Helmut Wautischer, Sonoma State University

Dennis Weiss, York College of Pennsylvania

Linda L. Williams, Kent State University

Amy Goodman Wilson, Webster University

Christine Wolf

Wayne Yuen, Ohlone College; and

Marie G. Zaccaria, Georgia Perimeter College

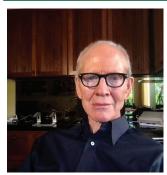
Over the years, our Chico State colleague Anne Morrissey has given us more usable material than anybody else. She's also given us more unusable material, but never mind. We've also had fine suggestions and examples from Curtis Peldo of Chico State and Butte College; Dan Barnett, also of Butte College, has helped in many ways over the years.

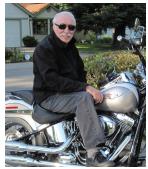
We thank colleagues at Chico State, who are ever ready with a suggestion, idea, or constructive criticism; in particular, Marcel Daguerre, Randy Larsen, Becky White, Wai-hung Wong, Zanja Yudell, and Greg Tropea, whose death in 2010 left us saddened beyond words. We are also grateful to Bangs Tapscott, Linda Kaye Bomstad, Ann Bykerk-Kauffman, Sue Patterson, and Jeffrey Ridenour for contributions both archival and recent. David Connelly, from Cayuga Community College, helped us rethink the objective/subjective distinction; we appreciate that.

Michael Parker, Headmaster of Newington College in Sydney, Australia, contributed nice material on Chat GPT. Mr. Parker is starting a critical thinking and ethics center at Newington College, and we wish him well.

Last, and especially, we give thanks to two people who put up with us with patience, encouragement, and grace, Leah Blum and Marianne Moore.

## About the Authors





Brooke Moore Richard Parker

Brooke Moore and Richard Parker are emeriti faculty in philosophy at the California State University, Chico. After all this time working together they are still on speaking terms.

To: Sherry and Bill; and Sydney, Darby, Peyton Elizabeth,

Alexander and Levi and Griffin

From Richard From Brooke

