

CONTENTS

About the Authors

Preface

Preliminaries: Introduction to Statistical Investigations	P-1
Section P.1: Introduction to the Six-Step Method	P-1
Section P.2: Exploring Data	P-7
Section P.3: Exploring Random Processes	P-12

UNIT 1: FOUR PILLARS OF INFERENCE: STRENGTH, SIZE, BREADTH, AND CAUSE

Chapter 1: Significance: How Strong is the Evidence?	1
Section 1.1: Introduction to Chance Models	1
Section 1.2: Measuring the Strength of Evidence	24
Section 1.3: Alternative Measure of Strength of Evidence	45
Section 1.4: What Impacts Strength of Evidence?	57
Section 1.5: Inference on a Single Proportion: Theory-Based Approach	71
Chapter 2: Generalization: How Broadly Do the Results Apply?	149
Section 2.1: Sampling from a Finite Population	150
Section 2.2: Inference for a Single Quantitative Variable	183
Section 2.3: Errors and Significance	218
Chapter 3: Estimation: How Large is the Effect?	273

Section 3.1: Statistical Inference – Confidence Intervals	274
Section 3.2: 2SD and Theory-Based Confidence Intervals for a Single Proportion	288
Section 3.3: 2SD and Theory-Based Confidence Intervals for a Single Mean	302
Section 3.4: Factors that Affect the Width of a Confidence Interval	312
Section 3.5: Cautions When Conducting Inference	326
Chapter 4: Causation: Can We Say What Caused the Effect?	400
Section 4.1: Association and Confounding	401
Section 4.2: Observational Studies versus Experiments	409
UNIT 2: COMPARING TWO GROUPS	
Chapter 5: Comparing Two Proportions	455
Section 5.1: Comparing Two Groups: Categorical Response	456
Section 5.2: Comparing Two Proportions: Simulation-Based Approach	465
Section 5.3: Comparing Two Proportions: Theory-Based Approach	496
Chapter 6: Comparing Two Means	581
Section 6.1: Comparing Two Groups: Quantitative Response	581
Section 6.2: Comparing Two Means: Simulation-Based Approach	597
Section 6.3: Comparing Two Means: Theory-Based Approach	622
Chapter 7: Paired Data: One Quantitative Variable	700

Section 7.1: Paired Designs	701
Section 7.2: Simulation-Based Approach for Analyzing Paired Data	712
Section 7.3: Theory-Based Approach to Analyzing Data from Paired Samples	730
UNIT 3: ANALYZING MORE GENERAL SITUATIONS	
Chapter 8: Comparing More Than Two Proportions	790
Section 8.1: Simulation-Based Approach to Compare Multiple Proportions	791
Section 8.2: Theory-Based Approach to Compare Multiple Proportions	812
Chapter 9: Comparing More Than Two Means	889
Section 9.1: Simulation-Based Approach for Comparing More Than Two Groups with a Quantitative Response	889
Section 9.2: Theory-Based Approach to Comparing More Than Two Groups with a Quantitative Response	906
Chapter 10: Two Quantitative Variables	981
Section 10.1: Summarizing the Relationship between Two Quantitative Variables Using the Correlation Coefficient	982
Section 10.2: Inference for Correlation Coefficient: A Simulation-Based Approach	993
Section 10.3: Least Squares Regression	1007
Section 10.4: Inference for Regression Slope: Simulation-Based Approach	1021
Section 10.5: Inference for the Regression Slope: Theory-based Approach	1030
APPENDIX: Calculation Details	1110

APPENDIX: Stratified and cluster samples	1140
ANSWERS: Answered to starred homework problems	1147
INDEX	1270