

Preface	ix
PART I FOUNDATIONS	1
1. Sources of Error	3
Prescription	4
Fundamental Concepts	4
Ad Hoc, Post Hoc Hypotheses	7
2. Hypotheses: The Why of Your Research	11
Prescription	11
What Is a Hypothesis?	11
Null Hypothesis	14
Neyman-Pearson Theory	15
Deduction and Induction	19
Losses	20
Decisions	21
To Learn More	23
3. Collecting Data	25
Preparation	25
Measuring Devices	26
Determining Sample Size	28
Fundamental Assumptions	32
Experimental Design	33
Four Guidelines	34
To Learn More	37

PAl	RT II HYPOTHESIS TESTING AND ESTIMATION	39
4.	Estimation	41
	Prevention	41
	Desirable and Not-So-Desirable Estimators	41
	Interval Estimates	45
	Improved Results	49
	Summary	50
	To Learn More	50
5.	Testing Hypotheses: Choosing a Test Statistic	51
	Comparing Means of Two Populations	53
	Comparing Variances	60
	Comparing the Means of K Samples	62
	Higher-Order Experimental Designs	65
	Contingency Tables	70
	Inferior Tests	71
	Multiple Tests	72
	Before You Draw Conclusions	72
	Summary	74
	To Learn More	74
	Strengths and Limitations of Some Miscellaneous Statistical	
Pro	cedures	77
	Bootstrap	78
	Bayesian Methodology	79
	Meta-Analysis	87
Permutation Tests To Learn More		89
	To Learn More	90
7.	Reporting Your Results	91
	Fundamentals	91
	Tables	94
	Standard Error	95
	p Values	100
	Confidence Intervals	101
	Recognizing and Reporting Biases	102
	Reporting Power	104
Drawing Conclusions Summary To Learn More	-	104
	·	105
	To Learn More	105
8.	Graphics	107
	The Soccer Data	107
	Five Rules for Avoiding Bad Graphics	108

One Rule for Correct Usage of Three-Dimensional Graphics	115
One Rule for the Misunderstood Pie Chart	117
Three Rules for Effective Display of Subgroup Information	118
Two Rules for Text Elements in Graphics	121
Multidimensional Displays	123
Choosing Effective Display Elements	123
Choosing Graphical Displays	124
Summary	124
To Learn More	125
PART III BUILDING A MODEL	127
9. Univariate Regression	129
Model Selection	129
Estimating Coefficients	137
Further Considerations	138
Summary	142
To Learn More	143
10. Multivariable Regression	145
Generalized Linear Models	146
Reporting Your Results	149
A Conjecture	152
Building a Successful Model	152
To Learn More	153
11. Validation	155
Methods of Validation	156
Measures of Predictive Success	159
Long-Term Stability	161
To Learn More	162
Appendix A	163
Appendix B	173
Glossary, Grouped by Related but Distinct Terms	187
Bibliography	191
Author Index	211
Subject Index	217