
CONTENTS

Preface	xiii
1 Descriptive Methods	1
1.1 Distribution Tables: Discrete Data	4
1.2 A Quick Look at Distribution: Stem and Leaf	12
1.3 Frequency Distributions: Histograms	18
Cumulative Distributions	23
1.4 Measures of Location	29
1.5 Measures of Variability	34
1.6 Box Plots (Optional)	46
1.7 Handling Grouped Data (Optional)	50
2 Introduction to Probability and Counting	55
2.1 Interpreting Probabilities	56
2.2 Tree Diagrams and Elementary Genetics	60
2.3 Permutations and Combinations	67
2.4 Multiplication Principle	69
2.5 Permutations of Indistinguishable Objects	75
3 Probability and Problem Solving	82
3.1 Venn Diagrams and the Axioms of Probability	82
3.2 General Addition Rule	88
3.3 Conditional Probability	92
3.4 Diagnostic Tests and Relative Risk	96
3.5 Independence	105
3.6 The Multiplication Rule	111
3.7 Bayes' Theorem	114
4 Discrete Random Variables	121
4.1 Discrete and Continuous Variables	122
4.2 Discrete Density Functions and Expectation	123

4.3	Cumulative Distribution Function	132
4.4	Binomial Distribution	134
4.5	Poisson Distribution	143
5	Continuous Random Variables	148
5.1	Continuous Density Functions and Expectation	148
5.2	Cumulative Distribution Function	155
5.3	Normal Distribution	159
6	Inferences on the Mean	172
6.1	Random Sampling and Randomization	172
6.2	Point Estimation of the Mean	182
6.3	Rules for Expectation and Variance (Optional)	186
6.4	Introduction to Interval Estimation	188
6.5	Confidence Interval on the Population Mean and the <i>T</i> Distribution	192
6.6	Introduction to Hypothesis Testing	199
6.7	Testing Hypotheses on the Population Mean	201
6.8	Sample Size: Confidence Intervals and Power	211
7	Chi-Squared Distribution and Inferences on the Variance	218
7.1	Chi-Squared Distribution and Interval Estimation of the Population Variance	218
7.2	Testing Hypotheses on the Population Variance	224
8	Inferences on Proportions	228
8.1	Point Estimation	228
8.2	Interval Estimation of <i>p</i>	234
8.3	Sample Size for Estimating <i>p</i>	237
8.4	Hypothesis Testing on <i>p</i>	240
8.5	Comparing Two Proportions: Estimation	244
8.6	Comparing Two Proportions: Hypothesis Testing	249
9	Comparing Two Means	255
9.1	Point Estimation: Independent Samples	255
9.2	Comparing Variances	258
9.3	Inferences on $\mu_1 - \mu_2$: Pooled <i>T</i>	265
9.4	Inferences on $\mu_1 - \mu_2$: Unequal Variances	273
9.5	Inferences on $\mu_1 - \mu_2$: Paired <i>T</i>	280
10	<i>k</i>-Sample Procedures: Introduction to Design	286
10.1	One-Way Classification, Completely Random Design with Fixed Effects	286
10.2	Paired and Multiple Comparisons	300
10.3	Random Effects	312
10.4	Randomized Complete Blocks	315
10.5	Factorial Experiments	330

11	Regression and Correlation	346
11.1	Introduction to Simple Linear Regression	346
11.2	Method of Least Squares	354
11.3	Introduction to Correlation	363
11.4	Evaluating the Strength of the Linear Relationship	373
11.5	Confidence Interval Estimation	381
11.6	Multiple Regression	387
12	Categorical Data	391
12.1	2×2 Contingency Tables	391
12.2	$r \times c$ Contingency Tables	405
13	Some Additional Procedures and Distribution-Free Alternatives	413
13.1	Testing for Normality: The Lilliefors Test	414
13.2	Tests of Location: One Sample	420
13.3	Tests of Location: Paired Data	427
13.4	Tests of Location: Unmatched Data	433
13.5	Kruskal-Wallis k -Sample Test for Location: Unmatched Data	437
13.6	Friedman k -Sample Test for Location: Matched Data	441
13.7	Correlation	446
13.8	Bartlett's Test for Equality of Variances	450
13.9	Normal Approximations	453
13.10	A Small Sample Test on Proportions	457
	Appendixes	461
A	Summation Notation	461
B	Statistical Tables	464
	I. Cumulative Binomial Distribution	464
	II. Poisson Distribution Function	469
	III. Cumulative Distribution: Standard Normal	470
	IV. Random Digits	472
	V. Mean Diameter at Breast Height for a Stand of Loblolly Pines	473
	VI. Cumulative T Distribution	478
	VII. Sample Size for Testing the Mean	479
	VIII. Cumulative Chi-Squared Distribution	481
	IX. Cumulative F Distribution	482
	X. Duncan's Tables	486
	XI. Wilcoxon Signed-Rank Test	487
	XII. Wilcoxon Rank-Sum Test	488
	References	490
	Answers	491
	Index	523