

Contents

Preface to Second Edition	xi
1 The Scope of Statistics	1
1.1 General	1
1.2 Diagrams	5
1.3 Tabulation and data processing	8
1.4 Summarizing numerical data	15
1.5 Means and other measures of location	26
1.6 Measures of variation	32
2 Probability	42
2.1 The meaning of probability	42
2.2 Probability calculations	45
2.3 Probability distributions	49
2.4 Expectation	53
2.5 The binomial distribution	56
2.6 The Poisson distribution	60
2.7 The normal (or Gaussian) distribution	67
2.8 Bayes' theorem	73
2.9 Subjective probability	76
3 Sampling	78
3.1 Population and sample	78
3.2 The sampling error of a mean	80
3.3 The sampling error of a proportion	84
3.4 The sampling error of a variance	85
3.5 The sampling error of a difference	88
3.6 Some other variance formulae	90
4 Statistical Inference	93
4.1 General	93
4.2 Significance tests on a sample mean	94
4.3 Interval estimation of a mean	100
4.4 Comparison of two means	104
4.5 Inferences from variances	112
4.6 Comparison of two variances	112
4.7 Inferences from proportions	115
4.8 Comparison of two proportions	120
4.9 2×2 tables and χ^2 tests	125
4.10 Inferences from counts	132
4.11 Comparison of two counts	134
4.12 Likelihood and Bayesian methods	137

5	Regression and Correlation	141
5.1	Association	141
5.2	Linear regression	143
5.3	Correlation	150
5.4	Sampling errors in regression and correlation	152
6	The Planning of Statistical Investigations	160
6.1	General	160
6.2	The planning of surveys: estimation of population parameters	161
6.3	Surveys to investigate associations	168
6.4	The design of experiments	172
6.5	Clinical trials	175
6.6	The size of a statistical investigation	179
7	Comparison of Several Groups.....	186
7.1	One-way analysis of variance	186
7.2	The method of weighting	194
7.3	Components of variance	196
7.4	Multiple comparisons	200
7.5	Comparison of several proportions: the $2 \times k$ contingency table	205
7.6	General contingency tables	208
7.7	Comparison of several variances	209
7.8	Comparison of several counts: the Poisson heterogeneity test	211
8	Further Analysis of Variance	214
8.1	Two-way analysis of variance: randomized blocks	214
8.2	The simple crossover design	222
8.3	Factorial designs	227
8.4	Latin squares	239
8.5	Other incomplete designs	245
8.6	Split-unit designs	251
8.7	Nonorthogonal two-way tables: some simple cases	257
9	Further Analysis of Straight-Line Data	264
9.1	Analysis of variance applied to regression	264
9.2	Errors in both variables	270
9.3	Straight lines through the origin	272
9.4	Regression in groups	273
9.5	The analysis of covariance	282

10	Multiple Measurements	296
10.1	Multiple regression	296
10.2	Multiple regression in groups	312
10.3	Polynomial and other curvilinear regressions	318
10.4	Multiple regression in the analysis of nonorthogonal data	324
10.5	Multivariate methods	326
10.6	Time series	347
10.7	Repeated measurements and growth curves	353
11	Data Editing	358
11.1	Preliminary remarks	358
11.2	Transformations in general	358
11.3	Logarithmic and power transformations	360
11.4	Transformations for proportions	364
11.5	Normal plots	368
11.6	Outlying observations	368
12	Further Analysis of Qualitative Data	371
12.1	Introduction	371
12.2	Components of χ^2	371
12.3	Combination of 2×2 tables	380
12.4	Combination of $r \times c$ tables	385
12.5	Generalized linear models	386
12.6	Standardization	399
12.7	Goodness of fit of frequency distributions	405
13	Distribution-Free Methods	408
13.1	Introduction	408
13.2	One-sample tests for location	409
13.3	Two-sample tests for location	411
13.4	Rank correlation	417
13.5	Estimation and general comments	419
14	Survival Analysis	421
14.1	Introduction	421
14.2	Life tables	422
14.3	Follow-up studies	424
14.4	Sampling errors in the life table	427
14.5	The product-limit estimate of survival	428
14.6	The logrank test	429
14.7	Parametric models	433
14.8	Regression and proportional-hazards models	435
14.9	The subject-years method	438

15	Sequential Methods	440
15.1	General	440
15.2	Sequential tests for binary data	442
15.3	Normal approximations	449
15.4	Group sequential plans	451
15.5	Concluding remarks	454
16	Statistical Methods in Epidemiology	455
16.1	Introduction	455
16.2	Relative risk	456
16.3	Attributable risk	469
16.4	Diagnostic tests and screening procedures	472
16.5	Disease clustering	478
17	Biological Assay	484
17.1	Introduction	484
17.2	Parallel-line assays	486
17.3	Slope-ratio assays	492
17.4	Quantal-response assays	495
18	Statistical Computation	499
	Appendix Tables	506
	References	527
	Author Index	539
	Subject Index	543