

# **A Handbook of Statistical Analyses**

**Using**

**R**

**SECOND  
EDITION**

**Brian S. Everitt and Torsten Hothorn**



**CRC Press**  
Taylor & Francis Group

A CHAPMAN & HALL BOOK

---

# Contents

---

<b>1</b>	<b>An Introduction to R</b>	<b>1</b>
1.1	What Is R?	1
1.2	Installing R	2
1.3	Help and Documentation	4
1.4	Data Objects in R	5
1.5	Data Import and Export	9
1.6	Basic Data Manipulation	11
1.7	Simple Summary Statistics	14
1.8	Organising an Analysis	18
1.9	Summary	20
<b>2</b>	<b>Simple Inference</b>	<b>21</b>
2.1	Introduction	21
2.2	Statistical Tests	25
2.3	Analysis Using R	29
2.4	Summary	39
<b>3</b>	<b>Conditional Inference</b>	<b>41</b>
3.1	Introduction	41
3.2	Conditional Test Procedures	44
3.3	Analysis Using R	46
3.4	Summary	53
<b>4</b>	<b>Analysis of Variance</b>	<b>55</b>
4.1	Introduction	55
4.2	Analysis of Variance	58
4.3	Analysis Using R	59
4.4	Summary	71
<b>5</b>	<b>Multiple Linear Regression</b>	<b>73</b>
5.1	Introduction	73
5.2	Multiple Linear Regression	74
5.3	Analysis Using R	76
5.4	Summary	86

<b>6</b>	<b>Logistic Regression and Generalised Linear Models</b>	<b>89</b>
6.1	Introduction	89
6.2	Logistic Regression and Generalised Linear Models	92
6.3	Analysis Using R	94
6.4	Summary	106
<b>7</b>	<b>Density Estimation</b>	<b>109</b>
7.1	Introduction	109
7.2	Density Estimation	111
7.3	Analysis Using R	117
7.4	Summary	125
<b>8</b>	<b>Recursive Partitioning</b>	<b>131</b>
8.1	Introduction	131
8.2	Recursive Partitioning	131
8.3	Analysis Using R	133
8.4	Summary	141
<b>9</b>	<b>Survival Analysis</b>	<b>143</b>
9.1	Introduction	143
9.2	Survival Analysis	144
9.3	Analysis Using R	150
9.4	Summary	157
<b>10</b>	<b>Analysing Longitudinal Data I</b>	<b>159</b>
10.1	Introduction	159
10.2	Analysing Longitudinal Data	162
10.3	Linear Mixed Effects Models	163
10.4	Analysis Using R	165
10.5	Prediction of Random Effects	168
10.6	The Problem of Dropouts	169
10.7	Summary	172
<b>11</b>	<b>Analysing Longitudinal Data II</b>	<b>175</b>
11.1	Introduction	175
11.2	Generalised Estimating Equations	177
11.3	Analysis Using R	179
11.4	Summary	194
<b>12</b>	<b>Meta-Analysis</b>	<b>197</b>
12.1	Introduction	197
12.2	Systematic Reviews and Meta-Analysis	199
12.3	Statistics of Meta-Analysis	201
12.4	Analysis Using R	202
12.5	Meta-Regression	203

12.6 Publication Bias	207
12.7 Summary	211
<b>13 Principal Component Analysis</b>	<b>215</b>
13.1 Introduction	215
13.2 Principal Component Analysis	215
13.3 Analysis Using R	218
13.4 Summary	223
<b>14 Multidimensional Scaling</b>	<b>227</b>
14.1 Introduction	227
14.2 Multidimensional Scaling	227
14.3 Analysis Using R	233
14.4 Summary	239
<b>15 Cluster Analysis</b>	<b>243</b>
15.1 Introduction	243
15.2 Cluster Analysis	245
15.3 Analysis Using R	248
15.4 Summary	253
<b>Bibliography</b>	<b>259</b>