

Index

- ABA design 23
- alternative hypothesis 36, 75, 124
- arithmetic mean 42
- association, test of *see* chi-square test
- average 40

- bar charts (bar graphs) 32, 40–41
- baseline 22–3
- Bexhill Sixth Form College 10–11, 14
- bias 25
- bimodal distribution 43
- British Psychological Society 15

- carrying out experiment 134–6
- categorical variables 63
- causality 5–6
- ceiling effects 127
- central tendency measures 41–5
 - average 40
 - mean 41–2, 43–4
 - median 42–5
 - mode 43–5
- chi-square test 75, 89–111
 - 1 × N goodness of fit 108–11
 - 2 × 2 contingency table 89–92, 96–9
 - degrees of freedom 92–3, 100–101
 - goodness of fit test 106–7, 108–11
 - independence of observations 94
 - interpretation of results 94–5
 - one-tailed tests 93
 - small samples 93–4; in large tables 101, 106
 - tables larger than 2 × 2 100–106
 - values 166
- Citation Indices* 145
- confidentiality 138
- constant errors 25, 26–7
- continuous variables 63
- correlation 40, 54–5
 - negative 54–5
 - Pearson's r correlation
 - coefficients 146, 153–7
 - positive 54
 - significance of coefficients 162
 - Spearman's rho 57–61
- counterbalancing 20–21, 129

- degrees of freedom 49
 - chi-square test 92–3, 100–101
- dependent variables 4, 5, 12, 14, 124
 - more than one 133
- descriptive statistics 40–61
 - arithmetic mean 42
 - average 40

Index

- descriptive statistics – *contd*
 - correlation 40, 54–5
 - mean 41–2, 43–4
 - meaning 40–41
 - measures of central tendency *see*
 - central tendency measures
 - measures of dispersion *see*
 - dispersion measures
 - median 42–5
 - mode 43–5
 - most typical value 40
 - Pearson's r 146, 153–7
 - scattergrams 55–7
 - Spearman's ρ 57–61
 - standard scores 54
- design of experiments 9–24
 - ABA design 23
 - analysis and 124–33
 - baseline establishment 22–3
 - group designs 21–3
 - independent samples design
 - 17–18, 124
 - individual designs 21–3
 - matched pairs design 18–19, 124
 - more complex 129–31
 - more than one dependent variable 133
 - more than one independent variable 131–2
 - multiple-baseline designs 23
 - repeated measures design 19–20, 124
 - sensitivity 125–9
 - statement of problem 9–11
 - theory and 10
- deviation
 - mean 47–8
 - standard 49–53
- discrete variables 63
- dispersion measures
 - mean deviation 47–8
 - range 45
 - semi-interquartile range 46
 - standard deviation 49–53
 - variance 48–9
- empirical probability 29
- errors
 - constant 25, 26–7
 - random 25, 27
 - significance level 32–6
 - standard 68–70, 71
 - type 1 error 33, 34, 36, 73
 - type 2 error 33, 34
- experimental conditions 13
- experimenter effects 136
 - efficiency 14
- experiments
 - advantage of 5–6
 - carrying out 134–6
 - design *see* design of experiments
 - difficulties 6–7
 - enquiry driven 146
 - field 7
 - ideas for 144–6
 - laboratories 7
 - meaning 4–5
 - painful stimuli 6
 - replication 14
 - sensitivity *see* sensitivity of experiments
 - see also individual aspects e.g. samples*
- F -test (variance-ratio test) 84, 86–7, 146
 - underlying assumptions 84
- family trees 30–31, 37
- Fisher's exact test 94
- floor effects 127
- freedom, degrees of 49, 92–3, 100–101

- Gaussian distribution *see* normal distribution
- geometric mean 42
- goodness of fit test 106–7, 108–11
- group designs 21

- harmonic mean 42
- highly significant 35
- histograms 32, 40–41, 62
- hypotheses 36
 - alternative hypothesis 36, 75, 124
 - null hypothesis 36, 75, 124

- independent samples design 17–18, 124
- independent variables 4, 5, 11–12, 13–14, 124
 - more than one 131–2
- individual designs 21
- interaction 21
- interpretation of results 94–5

- laboratories 7
- lack of symmetry (skewness), 46, 47
- line graphs 40–41

- manipulation by selection 12
- Mann-Whitney tests 112–18
 - large sample case 118
 - small sample case 116–17
 - treatment of ties 116
 - values 167
 - Wilcoxon compared 122–3
- matched pairs design 18–19, 124
- mathematical probability 29
- mean 41–2, 43–4
 - arithmetic 42
 - geometric 42
 - harmonic 42
 - sampling distribution of 70–71
- mean deviation 47–8
- median 42–5
- mode 43–5
- most typical value 40
- multiple-baseline designs 23
- Multivariate procedures 133

- negative correlation 54–5
- negative skew 46, 47
- non-parametric tests
 - Mann-Whitney 112–18
 - power efficiency 113, 114
 - Wilcoxon tests 112–13, 118–23
- normal distribution 50, 62–71, 74
 - area under curve 163
 - asymptotical curve 65
 - curve 63
 - importance 64
 - randomization 67
 - samples and populations 67–77
 - shape of curve 65–6
 - standard deviation and 65–6
 - standard normal distribution 66–7
- null hypothesis 36, 75, 124

- one-tailed tests 75–6, 93
- operational definitions 13–14
- operationalized variables 124
- order effect 20

- painful stimuli *see* stimuli
- parametric tests 112
 - see also* *F*-test: *t*-test
- participants 15
 - care and treatment 137–8
 - confidentiality 138
 - consent 137
 - counterbalancing 20–21

Index

- participants – *contd*
 - debriefing 137–8
 - deception 137
 - independent samples design 18
 - matched pairs design 19
 - repeated measures design 19–20
 - screening from experimenter 134–5
 - withdrawal from experiment 138
 - see also* populations
- Pearson's r 146, 153–7
 - values 162
- pilot trials 135–6
- populations 15–17
 - increase in size 126–7
 - normal distribution 67–77
 - see also* participants
- positive correlation 54
- positive skew 46, 47
- probability 28–32
 - empirical 29
 - family trees 30–31, 37
 - mathematical 29
 - subjective 28
- qualitative variables 12–13
- quantitative variables 12–13
- random errors 25, 27
- random number tables 158–60
 - use 149–52
- randomization 21, 67, 129
- range 45
 - semi-interquartile 46
- repeated measures design 19–20, 124
 - order effect 20
- replication 14
- robustness 37
 - F -test 84
 - t -test 75
- samples 15–17
 - comparison of two 68
 - counterbalancing 20–21, 129
 - increase in size 126–7
 - independent samples design 17–18, 124
 - matched pairs design 18–19, 124
 - normal distribution 67–77
 - random 16
 - randomization 21
 - repeated measures design 19–20, 124
 - see also* participants
- sampling distribution of means 70–71
- scattergrams (scatterplot) 55–7
- scores
 - standard 54, 66
 - z -scores 54, 66
- selection, manipulation by 12
- semi-interquartile range 46
- sensitivity of experiments
 - choice of design 128–9
 - floor and ceiling effects 127
 - increasing reliability of measure 127–8
 - reduction in noise level 125–6
 - sample size increase 126–7
- sign test 37, 38–9, 73
 - table 161
- significance 34, 36–7
 - t -test 77
- significance level 32–6
- skewness 46, 47
 - negative skew 46, 47
 - positive skew 46, 47
- Spearman's ρ xiii, 57–61, 146, 153
 - values 162
- spread *see* dispersion measures

- standard deviation 49–53
 - normal distribution and 65–6
 - standard error 68–70, 81
- standard error 23, 68–70, 81
- standard normal distribution 66–7
- standard scores 54, 66
- statistical inference 25–39
 - errors 25–7
 - hypotheses 36
 - probability 28–32
 - sign test 37, 38–9
 - significance level 32–6
- statistical significance 32–7, 77
- statistics, descriptive *see* descriptive statistics
- stimuli, painful 6
- subjective probability 28
- subjects *see* participants
- t*-distribution 72–3
 - values 164–5
- t*-test 71–5, 113, 132, 146
 - computation of *t* 74
 - correlated samples 82–3
 - independent samples 78–81
 - one- and two-tailed tests 75–7
 - statistical significance 77
 - underlying assumptions 74–5
- test of association *see* chi-square test
- treatment conditions 13
- 2 × 2 contingency table 89–92, 96–9
- two-tailed test 76–7
- variability *see* dispersion measures
- variables
 - categorical 63
 - continuous 63
 - dependent 4, 5, 12, 14, 124, 133
 - discrete 63
 - independent 4, 5, 11–12, 13–14, 124, 131–2
 - manipulation by selection 12
 - operationalized 124
 - painful stimuli 6
 - qualitative 12–13
 - quantitative 12–13
- variance 48–9
 - homogeneity assumption 74
- variance analysis 132
- variance-ratio test (*F*-test) 84, 86–7, 146
- Wilcoxon tests 112–13, 118–23
 - large sample case 122
 - Mann-Whitney compared 122–3
 - small sample case 120–21
 - values 168
- writing up 138–43
 - apparatus 140
 - design 140
 - discussion 141–2
 - introduction 139
 - materials 140
 - method 139
 - participants 140
 - procedure 140–41
 - references 142–3
 - results 141
 - title 139
- Yate's correction 93, 100, 101, 107
- z-scores 54, 66

