

## Quick Reference Document

<b>Section in R online manual:</b>	<b>Corresponds to section/page in SPSS book:</b>	<b>Contains:</b>
Introduction	Introduction, p. 1-4	Notes about the R online version
List of R packages used	None	List of R packages
<b>Chapter 1: Getting started with R</b>		
1.1 Downloading & Opening	1.1 Getting Started with SPSS, p. 7-8	Quote, name of version, info on where to download R & R Commander and how to customize
1.2 Working with data	1.1.2-1.1.5 Data in SPSS	Entering your own data, importing files, viewing data, saving data (including graphics), closing programs
1.3 Application activity: Practice entering data	1.1.3 Application activity for getting started with SPSS	Three questions
1.4 Intro to R workspace	None	Listing objects in R, looking at variables, attaching and detaching datasets
1.5 Missing data	Section 3.6 Dealing with departures from expectations	How R notates missing data, how to do pairwise and listwise deletion, imputing data
1.6 Application activity: Saving data	1.1.6 Application activity for importing and saving files	Three questions
1.7 Getting help	None	Troubleshooting list (questions to ask first), commands that call help
1.8 R as a calculator	None	Using R to add, subtract, multiply and divide numbers, square root too
1.9 Application Activity: Using R as a calculator	None	Eight questions
1.10 Objects	None	Creating vectors of data (objects) in R
1.11 Application Activity: Creating objects	None	3 questions
1.12 Types of data in R	None	Looks at differences in data frames, vectors, matrices, arrays and factors in R
1.13 Application Activity: Types of data	None	4 questions
1.14 Functions in R	None	Goes over simple functions such as sum and mean
1.15 ApplicationActivity: Functions	None	4 questions
1.16 Manipulating variables (Advanced Topic)	1.2, p 18-27	Combining variables, creating categorical groups, deleting parts of a dataset, changing data format for various statistical tests
1.17 Application Activity: Manipulating variables	1.2.3, 1.2.5, 1.2.8	A series of activities for each of the 4 areas listed in manipulating variables

1.18 Random number generation	1.3, p. 29-30	Shows how to generate random numbers in R
<b><i>There is no Chapter 2</i></b>		
<b>Chapter 3: Describing data</b>		
3.1 Obtaining numerical summaries	3.2.1, p. 70-73	Calculate mean, standard deviation and quartiles, skewness and kurtosis
3.2 Application activity: Numerical summaries	3.2.2, p. 73-74	2 questions
3.3 Generating histograms, stem and leaf plots, and Q-Q plots	3.4.5, pp. 82-86	Histograms, stem and leaf plots, and Q-Q plots
3.4 Application activity: Exploring assumptions	3.4.6, p. 86	3 questions for normality, 3 for homogeneity of variance
3.5 Imputing missing data	3.6.1, p. 89-91	Imputing missing data
3.6 Transformations	3.6.3, p. 92-94	How to use R commander for transformation equations
3.7 Application activity: Transformations	3.6.4, p. 94	1 question
<b><i>There is no Chapter 4 or 5</i></b>		
<b>Chapter 6: Correlation</b>		
6.1 Creating scatterplots	6.2, p. 150-156, 6.2.4, p. 158-159	Creating scatterplots with Loess lines and regression lines, splitting data by groups in scatterplots
6.1 Application Activity: Creating scatterplots	6.2.3, p. 156-158	5 questions
6.2 Calculating coefficients	6.4.1, p. 163-164	Calculate Pearson's r, Spearman's rho or Kendall's tau, robust correlation
6.3 Application activity: Calculating coefficients	6.4.2, p. 165	4 questions for Pearson's, 3 for robust correlation
6.4 Partial correlation	6.5.2, p. 167-168	Calculating partial correlation
6.5 Point-Biserial and Interrater Reliability	6.5.4, p. 168-169 & 6.5.5, p. 170-174	Calculating the point-biserial correlation coefficient and interrater reliability
<b>Chapter 7: Multiple Regression</b>		
7.1 Graphs for understanding complex relationships	none, but right after 7.2, p. 181-3	Coplots, 3-D graphs, and tree models explained
7.2 Application activity: Graphs for complex relationships	None	5 questions
7.3 Doing the same type of regression as SPSS	7.4.1, p. 187-189	How to create a regression equation that evaluates how much each factor in the equation contributes to explaining the dependent variable, looks at sequential and standard regression, how to report results
7.4 Application activity: Multiple regression	7.4.5, p. 199-200	3 questions
7.5 Finding the best fit	7.5, pp. 200-204	Using R instead of SPSS one can work on finding the best fit for the regression

		model instead of letting the statistical software determine the model. Notes on how to report a regression with best fit.
7.6 Further steps in finding the best fit	None	This section deals with overparameterization (what to do when you have too many variables to test the entire regression model all at once) and how to test other types of model such as those with polynomials (such as $x^2$ )
7.7 Examining regression assumptions	7.4.3, pp. 195-197	Shows how to examine assumptions of normal distribution of errors and heteroscedasticity (constancy of variance) of whatever model you choose to fit
7.8 Application activity: Finding the best fit	None	3 questions
7.9 Robust regression	None	Covers several robust methods of calculating best fit regression equations and also graphics that show how robust methods differ from traditional parametric ones
7.10 Application activity: Robust regression	None	4 questions
<b>Chapter 8: Chi-square</b>		
8.1 Summarizing and visualizing data	8.2-8.3, pp. 216-226	How to examine goodness-of-fit data using tables or group-independence data using crosstabs; barplots in R; association plots, mosaic plots and doubledecker plots.
8.2 Application activity: Summarizing and visualizing data	8.2.3, p. 219-220; 8.3.4, p. 223	12 questions covering crosstabs, barplots, association plots, mosaic plots and doubledecker plots
8.3 One-way goodness of fit test	8.5.1, pp. 228-230	Calculate whether distributions of data fit a specified distribution
8.4 Two-way group independence test	8.5.2, pp. 230-233	Calculate whether categorical data from two groups are independent
8.5 Application activity: Chi-square tests	8.5.3, pp. 234	5 questions, covers both types of tests
<b>Chapter 9: T-tests</b>		
9.1 Creating boxplots	9.2.2-9.2.3, pp. 246-249	Shows how to create boxplots for three different situations: 1) one independent variable separated by groups 2) a series of independent variables 3) a series of dependent variables split

		into groups
9.2 Application activity: Creating boxplots	9.2.4, p. 250	4 questions
9.3 The independent samples t-test	9.4.1, pp. 255-258	Test whether two groups performed differently on an interval-level test
9.4 A robust independent samples t-test	None	Test whether two groups performed differently on an interval-level test using modern robust methods; how to report results of robust t-test
9.5 Application activity: Independent samples t-tests	9.4.3, p. 259	5 questions
9.6 The paired samples t-test	9.5.1, pp. 260-262	Test whether two sets of scores from the same people show differences on an interval-level test
9.7 A robust paired-samples t-test	None	Test whether two sets of scores from the same people show differences on an interval-level test using modern robust methods
9.8 Application activity: Paired-samples t-tests		5 questions
9.9 The one-sample t-test	9.7.2, pp. 265-266	Test whether one set of scores is different from some externally determined mean score
9.10 A robust one-sample t-test	None	Test whether one set of scores is different from some externally determined mean score using modern robust methods
9.11 Application activity: One-sample t-tests	9.7.3, pp. 266-267	3 questions
<b>Chapter 10: One way ANOVA</b>		
10.1 Visual summary with boxplots overlaid with dotcharts	10.2.1, pp. 271-272; None	How to call for group summaries in R; how to create boxplots with overlaid dotcharts
10.2 Application activity: Boxplots overlaid with dotcharts	None	3 questions
10.3 One-way ANOVA test	10.5, pp. 275-285	Test whether scores from 3 or more groups are different on an interval level test; also includes information about post-hocs or doing planned comparisons instead of post-hocs
10.4 A robust one-way ANOVA test	None	Test whether scores from 3 or more groups are different on an interval level test using modern robust methods
10.5 Application activity: One-way ANOVAs	10.5.5, pp. 286-287	5 questions
<b>Chapter 11: Factorial ANOVA</b>		
11.1 Visual summary with means	11.2-11.2.2, pp. 296-299	How to do a numerical summary of

plots		data with more than one independent variables; how to create means plots
11.2 Putting data in correct format for factorial ANOVA	11.4.1, pp. 302-304	How to change data from wide form to long form
11.3 Factorial ANOVA test		Test whether independent variables interact and differ depending on level; shows steps on finding a fully specified model and a minimally adequate model; includes examples of reports
11.4 Performing comparisons in a factorial ANOVA	11.4.4, pp. 313-319	Doing post-hocs after a factorial ANOVA; includes example of report on data
11.5 Application activity: Factorial ANOVA	11.4.5, p. 320	4 questions
11.6 Robust ANOVA	None	Test whether independent variables interact for two-way and three-way ANOVAs using modern robust methods
<b>Chapter 12: Repeated Measures ANOVA</b>		
12.1 Visualizing data	12.2.1, pp. 331-335	Creating interaction plots with more than one response variable and creating parallel coordinate plots
12.2 Application activity: Interaction plots and parallel coordinate plots	12.2.2, p. 335	4 questions
12.3 Putting data in correct format for RM ANOVA	12.4.1, p. 340-341	Moving from the 'wide' form of data to the 'long' form
12.4 Performing an RM ANOVA the fixed effects way	12.4.2-12.4.2, pp. 341-354	Test whether variables factors which tested the same persons more than once interact and differ depending on level; assumes that all variables are fixed, meaning that we cannot generalize beyond the parameters or levels that make up the variable; the model fitting is done by using a least-squares analysis
12.5 Performing an RM ANOVA the mixed-effects way	None	How to analyze mixed-effect models by looking at model fit (AIC), estimating the size of the variance of random effects, and testing for interaction and statistical significance in fixed variables; uses a fitting process for models called restricted maximum likelihood (REML), which is much smarter than least-squares; split-plot designs; how to understand mixed-effect model output; searching for the minimally adequate

		model; testing model assumptions
12.6 Application activity: Mixed-effect models	None	3 questions
<b>Chapter 13: ANCOVA</b>		
13.1 One-way ANCOVA with one covariate	13.3.1, pp. 365-366, 13.4, pp. 367-370	Checking assumptions for data, testing whether there is a difference between groups while factoring out one continuous independent variable (the covariate); R code for visual plots
13.2 Two-way ANCOVA with two covariates	None	Checking assumptions for data, testing whether there is an interaction between independent variables while factoring out two continuous independent variables (the covariates)
13.3 Robust ANCOVA	None	Eliminates parametric assumption that regression lines of all groups are parallel, uses a Loess smoother, trims and bootstraps the data, then chooses 5 points along the smoother lines to compare for differences; can only compare two groups at a time
13.4 Application activity: ANCOVA	13.4.2, p. 370	2 questions
<b>Appendices</b>		
Appendix A: Doing things in R	None	A collection of ways to do things in R gathered into one place. Some are found in various places in the text while others are not, but they are collected here. Examples are 'finding out names of a dataset', 'changing data from one type to another' and 'Order data in a dataframe'. Ideas for troubleshooting are also included.
Appendix B: Calculating the FDR	None	Calculate p-value cut-offs for adjusting for multiple tests (the FDR algorithm is much more powerful than conventional tests like Tukey's HSD or Scheffe)
Appendix C: Using Wilcox's R library	None	How to get commands for robust tests using the Wilcox WRS library into R
Bibliography		