Data Analysis Bootcamp Using Open-Access Program R (Essential Level)

Course Content:

Levels	Sessions	Modules
Essentials	**Session 1**	**1. The R environment** 1.1 Why R, and R Paradigm 1.2 References, Tutorials and links 1.3 R Overview 1.4 R Interface, RStudio, R Script 1.5 Commands, objects and functions 1.6 Points to note 1.7 R Working directory and Workspace 1.8 Help 1.9 R-chitecture and R Packages 2.0 Data types
	Session 2	**2. Getting data into and out of R** 2.1 Creating variables and data frames 2.2 Calculating new variables from existing ones 2.3 Working with dates 2.4 Missing values 2.5 Entering data, creation of variables and coding variables using R Commander 2.6 Using other software to enter and edit data 2.7 Importing data 2.8 Exporting data 2.9 Viewing and Examining data
	Session 3	**3. Data Management in R** 3.1 Sorting Data 3.2 Merging Data 3.3 Aggregating Data 3.4 Reshaping Data 3.5 Subsetting Data 3.6 Data Type Conversion
	Session 4	**4. Plotting in R** 4.1 Creating a Graph 4.2 Histograms and Density Plots 4.3 Dot Plots 4.4 Bar Plots 4.5 Line Charts 4.6 Pie Charts 4.7 Boxplots

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		4.8 Scatterplots 4.9 Advanced Graphics: graphical parameters, axes and text, combining plots
	Session 5	**Part 1** **3 Exploring assumptions** 3.1. What will this chapter tell me? 3.2. What are assumptions? 3.3. Assumptions of parametric data 3.4. Packages used in this chapter 3.5. The assumption of normality 3.5.1. Oh no, it's that pesky frequency distribution again: checking normality visually 3.5.2. Quantifying normality with numbers 3.5.3. Exploring groups of data 3.6. Testing whether a distribution is normal 3.6.1. Doing the Shapiro–Wilk test in R 3.6.2. Reporting the Shapiro–Wilk test 3.7. Testing for homogeneity of variance 3.7.1. Levene's test 3.7.2. Reporting Levene's test 3.7.3. Hartley's *F*max: the variance ratio **Part 2** 3.8. Correcting problems in the data 3.8.1. Dealing with outliers 3.8.2. Dealing with non-normality and unequal variances 3.8.3. Transforming the data using R 3.8.4. When it all goes horribly wrong
	Session 6	**Part 1** **4 Correlation** 4.1. What will this session tell me? 4.2. Looking at relationships 4.3. How do we measure relationships? 4.3.1. Standardization and the correlation coefficient 4.3.3. The significance of the correlation coefficient 4.3.4. Confidence intervals for *r* 4.3.5. A word of warning about interpretation: causality 4.4. Data entry for correlation analysis 4.5. Bivariate correlation

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		4.5.1. Packages for correlation analysis in R 4.5.2. General procedure for correlations using R 4.5.3. Pearson's correlation coefficient 4.5.4. Spearman's correlation coefficient 4.5.5. Kendall's tau (non-parametric) 4.5.6. Bootstrapping correlations 4.5.7. Biserial and point-biserial correlations **Part 2** 4.6. Partial correlation 4.6.1. The theory behind part and partial correlation 4.6.2. Partial correlation using R 4.6.3 Semi-partial (or part) correlations 4.7. Comparing correlations 4.7.1. Comparing independent *r*s 4.7.2. Comparing dependent *r*s 4.8. Calculating the effect size 4.9. How to report correlation coefficients Interesting real research