

Data Analytics with IBM SPSS

1. Statistics?

- a. The Research Process
- b. Initial Observation
- c. Generate Theory
- d. Generate Hypotheses
- e. Data collection to Test Theory
- f. What to measure
- g. How to Measure
- h. Analyze data
- i. Descriptive Statistics: Overview
- j. Central Tendency
- k. Measure of variation
- l. Coefficient of Variation
- m. Fitting Statistical Models
- n. Conclusion

2. Building statistical models

- a. Types of statistical models
- b. Populations and samples
- c. Simple statistical models
- d. The mean as a model
- e. The variance and standard deviation
- f. Central Limit Theorem
- g. The standard error
- h. Confidence Intervals
- i. Test statistics
- j. Non-significant results and Significant results:
- k. One- and two-tailed tests
- l. Type I and Type II errors
- m. Effect Sizes
- n. Statistical power

3. SPSS Environment

- a. Accessing SPSS
- b. To explore the key windows in SPSS

- c. Data editor
- d. The viewer
- e. The syntax editor
- f. How to create variables
- g. Enter Data and adjust the properties of your variables
- h. How to Load Files and Save
- i. Opening Excel Files
- j. Recoding Variables
- k. Deleting/Inserting a Case or a Column
- l. Selecting Cases
- m. Using SPSS Help

4. Exploring data with graphs

- a. The art of presenting data
- b. The SPSS Chart Builder
- c. Histograms: a good way to spot obvious problems
- d. Boxplots (box-whisker diagrams)
- e. Graphing means: bar charts and error bars
- f. Simple bar charts for independent means
- g. Clustered bar charts for independent means
- h. Simple bar charts for related means
- i. Clustered bar charts for related means
- j. Clustered bar charts for 'mixed' designs
- k. Line charts
- l. Graphing relationships: the scatterplot
- m. Simple scatterplot
- n. Grouped scatterplot
- o. Simple and grouped -D scatterplots
- p. Matrix scatterplot
- q. Simple dot plot or density plot
- r. Drop-line graph
- s. Editing graphs

5. Exploring Assumptions

- a. What are assumptions?
- b. Assumptions of parametric data
- c. The assumption of normality
- d. Quantifying normality with numbers
- e. Exploring groups of data
- f. Testing whether a distribution is normal
- g. Kolmogorov-Smirnov test on SPSS
- h. Testing for homogeneity of variance
- i. Correcting problems in the data

6. Correlation

- a. Looking at relationships
- b. Standardization and the correlation coefficient
- c. The significance of the correlation coefficient
- d. Confidence intervals for r
- e. Correlation in SPSS

- i. Bivariate correlation
- ii. Pearson's correlation coefficient
- iii. Spearman's correlation coefficient
- iv. Kendall's tau (non-parametric)
- v. Biserial and point-biserial correlations
- vi. Partial correlation
- vii. The theory behind part and partial correlation
- viii. Partial correlation using SPSS
- ix. Semi-partial (or part) correlations

- f. Comparing correlations
- g. Comparing independent rs
- h. dependent rs
- i. Calculating the effect size
- j. How to report correlation coefficients

7. Regression

- a. An introduction to regression
- b. Some important information about straight lines
- c. The method of least squares
- d. Assessing the goodness of fit: sums of squares, R and R²
- e. Doing simple regression on SPSS
- f. Multiple regression: the basics
- g. How to do multiple regression using SPSS
- h. Descriptive
- i. Checking assumptions

8. Logistic Regression

- a. Background to logistic regression
- b. What are the principles behind logistic regression?
- c. Assessing the model: the log-likelihood statistic
- d. Assessing the model: R and R²
- e. Methods of logistic regression
- f. Interpreting logistic regression
- g. How to report logistic regression
- h. Testing assumptions
- i. Predicting several categories: multinomial logistic regression
- j. Running multinomial logistic regression in SPSS

9. Comparing Two Means (t-test)

- a. Looking at differences
- b. The t-test
- c. Rationale for the t-test
- d. Reporting the dependent t-test
- e. Reporting the independent t-test
- f. Between groups or repeated measures?
- g. The t-test as a general linear model
- h. Comparing several means : ANOVA (GLM)
- i. The theory behind ANOVA
- j. Inflated error rates
- k. Interpreting f-test

- l. ANOVA as regression
- m. Assumptions of ANOVA
- n. Planned contrasts
- o. Post hoc procedure
- p. Running one-way ANOVA on SPSS