Quantitative Analysis for Social Scientists: Introduction to Statistics and SPSS
Hilary 2016

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Summary of Course:
This course is designed for students who want to learn quantitative analysis techniques for use in criminological contexts. Students will learn both basic statistical concepts and how to use SPSS, a statistical package widely used in the social sciences. The course will be taught using a version of the Crime Survey for England and Wales (CSEW) dataset. By the end of the course, students will be able to understand and critically assess papers containing quantitative data, use appropriate statistical methods, and present their analyses effectively in their dissertations.

Course Objectives:
The course will enable students to:
- Understand and interpret quantitative criminological research.
- Conduct analysis of existing datasets using SPSS.
- Present findings in an appropriate manner.

Target Audience:
- Students who are new to statistics and statistical analysis.
- Students who are planning on doing secondary data analysis for their dissertations.
- Students who are considering applying for jobs where a basic knowledge of statistics and statistical computer packages is required.

Students:
- Compulsory for MSc (Research Methods) students
- Optional for MSc students

Duration and term:
- Duration: 8 classes over 8 weeks
- Term: Hilary Term.

Organization of each class (4 hours):
- 120 minutes of statistical concepts, delivered as a lecture in most cases.
- 120 minutes of working in SPSS. Students will complete set assignments in class. These will be structured around the type of analysis under consideration, not the use of the computer programme *per se*. The intention is not to ‘teach’ SPSS in a formal sense – rather, students will be introduced to the relevant aspects of the package as the course progresses, meaning that they will learn to use it in an organic fashion.
Note there will be a 10 minute break at the midpoint of each class – each 2 hour session will be treated as a discrete ‘unit’.

Assessment:
- The course will be examined by an assessed essay of 2,500 to 3,000 words (inclusive of footnotes, but excluding bibliography and appendices). This will involve producing analyses containing descriptive and inferential statistics.
- Students will also be asked to complete a short assignment each week, to be handed to the lecturer at an agreed later time. These will be marked on an informal pass/fail basis and returned to them the following week.

Pre-requisites:
- There are no formal pre-requisites for this course but it will assume that students are familiar with research design and methodology (i.e. students should have completed ‘Research Design and Data Collection’).
- No prior knowledge of statistics is required, and only extremely basic mathematic skills will be assumed (or required).

Reading
This course has one recommended course text:

Students may also find the following text book more ‘user-friendly’:

In addition, students may wish to consult the LSE Methodology Department’s excellent set of on-line tutorials, which cover much of the same material as the current course: http://www.lse.ac.uk/methodology/tutorials/SPSS/home.aspx

Additional references to relevant scholarly articles, books and other sources are provided below. Students will be encouraged to read these papers, although doing so will not be a formal course requirement. Note that these papers are not given as examples of best practice, merely of cases where specific techniques have been used.

Course Outline
As noted each class will be a mixture of lecture and practical session using SPSS. The lectures will cover both conceptual issues and practical examples: the emphasis will be on why and how to perform specific analyses. In the practical sessions students will work at their own pace through a class assignment. This will be provided in written form, along with instructions on how to conduct the necessary analyses.
WEEK 1

Unit 1: Introduction
Practical: Retrieving, entering and saving data; data management.

Unit 2: Descriptive statistics
Lecture: Univariate and bivariate statistics; distributions; presentation of data.
Practical: Descriptive statistics (frequencies, percentages, crosstabulations); charts and figures (histograms, bar charts, line charts, box-plots).

Readings:
- AF 1, 2.1 and 3.

WEEK 2

Unit 3: Introduction to statistical inference
Lecture: Samples and populations; sampling distributions and probability distributions; statistical inference.
Practical: Random sampling and calculations of sample means.

Unit 4: Introduction to statistical inference (continued)
Lecture: Hypothesis testing; t-tests.
Practical: Two-sample tests for group means; confidence intervals for point estimates

Readings:
- AF 2, 4, 6, 7.

WEEK 3

Unit 5: Associations between categorical variables: contingency tables
Lecture: Two-way contingency tables; Chi-square tests.
Practical: Generating and interpreting contingency tables; chi-square tests.

Unit 6: Associations between categorical variables: contingency tables continued
Lecture: Two- and three-way contingency tables; Chi-square tests; the concept of statistical control.
Practical: Generating and interpreting contingency tables; chi-square tests.
Readings:
- AF 8 and 10.

WEEK 4
Unit 7: Associations between continuous variables: correlation
Lecture: Scatterplots and the line of best fit; Pearson’s correlation coefficient
Practical: Generating scatterplots and interpreting correlation coefficients.

Unit 8: Associations between continuous variables: simple linear regression
Lecture: Simple linear regression.
Practical: Estimating and interpreting simple linear regression models.

Readings:
- AF 9.

WEEK 5
Unit 9: Scale Construction
Lecture: The concept of scales; validity and reliability; Cronbach’s alpha
Practical: Constructing and validating scales.

Unit 10: Multiple linear regression
Lecture: Revisiting the concept of statistical control. Estimating and interpreting multiple linear regression models
Practical: Estimating and interpreting multiple linear regression models.

Readings (for weeks 5 and 6):
- AF 11.
WEEK 6

Unit 11: Multiple linear regression (continued)
Lecture: Further interpretation of linear regression models; dummy variables.
Practical: Generating dummy variables; estimating and interpreting multiple linear regression models including dummy variables as predictors

Unit 12: Multiple linear regression (continued)
Lecture: Further interpretation of linear regression models; model diagnostics.
Practical: Estimating and interpreting multiple linear regression models.

WEEK 7

Unit 13: Binary logistic regression
Lecture: Regression models for binary response variables.
Practical: Estimating and interpreting binary logistic regression models.

Unit 14: Binary logistic regression (continued)
Lecture: Model selection
Practical: Estimating and interpreting binary logistic regression models.

Readings:
- AF 15.1.

WEEK 8

Revision session