

**Department of Psychology,
Durham University
Applied Statistics Main Assignment 2019-2020
Answer all questions**

Question 1 (30 marks)

A number of women aged between 16-49 years were asked about their method of birth control. Ages were classified into eight age groups and method of contraception was recorded in 11 categories. The data is given in the file '**Birth Control.sav**'.

Undertake the appropriate correspondence analysis and determine the patterns which may be present in the relationship between the Age and Birth Control Method variables.

Report all your conclusions and the statistics on which they are based. You should provide a clear and logical report and conclude with a final section drawing your findings together with an interpretation of the data.

Question 2 (30 marks)

An experimenter investigated how the strength of a person's handshake influences their perception of the trustworthiness of a person. To this end, the experimenter recruited 10 'raters'. Each rater shook hands with 200 individuals. After each handshake each rater assigned a 'trustworthiness rating' to the person they had shaken hands with. The strength of the handshake was measured with a force transducer and recorded for each handshake. The experimenter then averaged ratings and strength measures across all 10 raters for each person, whose hand was shaken, resulting in 200 average trustworthiness ratings and 200 strength measures.

The data are contained in the data file '**handshake.sav**' and consist of the following 3 variables:

ID	Participant number (1-200)
Strength	Force measurement (higher value = more strength)
Trust	Trustworthiness rating (higher value = more trust)

Use non-linear regression to analyse if there is any relationship between the strength of a person's handshake [Strength] and the trustworthiness raters perceive [Trust]. When analysing the data, consider linear, quadratic and cubic models.

You should provide a clear and logical report to justify your findings. Include any diagrams and statistics that you think are relevant. (At a minimum, refer to the predictive regression equations, the significance of the coefficients, and the R

squared values to justify your view). You should conclude with a final section drawing your findings together with an interpretation of the data.

Question 3 (30 marks)

A group of researchers wanted to test the hypothesis that girls are better at reading than boys up to the age of 14 years. To investigate this, the researchers measured children's ability to comprehend written text by asking them to read a set of six short texts. After each text the children were given a set of comprehension questions. The dependent variable was the number of questions they answered correctly. The children were split into groups by gender and age. The researcher also recorded the time that each child spent reading each day.

The data are shown in the file '**SchoolReading.xls**'.

Enter the data into SPSS and carry out appropriate analyses to investigate the effects of the experimental variables. Also consider if the time that each child spends reading each day should be statistically controlled for in the context of your analysis. Report all your conclusions and the statistics on which they are based. Based on your findings, is there any support for the researchers' hypothesis?

Question 4 (10 marks – 5 per question)

1. Define the "Power of a statistical test". Name at least three ways to change the power of a statistical test.
2. A researcher wants to test the effectiveness of a (supposedly) performance enhancing drug. To this effect she measures accuracy of participants' responses in conditions where participants received either the drug, or a placebo. She used logistic regression to analyse the data. The dependent variable was accuracy, i.e. the proportion of correct answers in each condition. She found that the Odds Ratio for taking the drug was 2.49 ($p < .001$).

What does this mean?