Lab 5: Mediation, Moderation, ANOVA

A. Mediation

The extent to which people enjoy reading books [enjoy] is likely to be a predictor of number of books they buy [buy] which in turn is likely to be a predictor of the number of books they read [read]. But, people can also borrow books from friends or libraries (Miles & Shevlin, 2011, 188-191).

The data set **Books.xlsx** contains the three variables enjoy, buy and read. Investigate the mediating effect that the variable buy has in the relationship between enjoy and read by completing the following steps (in each case write out the regression equation):

(i) Regress read (Y) against enjoy (X)
(ii) Regress buy (M) against enjoy (X)
(iii) Regress read (Y) against enjoy (X) and buy (M)

What conclusions can you draw from these models?

B. Moderation

The data **Jigsaw.xlsx** are taken from a fictitious psychological experiment of 22 subjects who consumed varying quantities of alcohol. The time they then took to complete a simple jigsaw puzzle was recorded. The data set contains the variables Time, Alcohol and Gender (1 = Male, 0 = Female).

(i) Run a regression model for Time using the independent variables Gender and Alcohol. Which variables are significant in the model? Write out the regression equation and interpret the results
(ii) Create an interaction variable using the product of gender by alcohol and include this new variable in the model. Is this interaction term significant? Write out the regression equations for each gender separately and comment on the results.

C. Two-way ANOVA:

An experiment was set up to compare the effectiveness of two different types of filters at reducing the engine noise from differently sized cars. The data set **NoiseFilter.xlsx** contains the following variables

Variable Name	Description
Noise	Noise level reading (decibels)
Carsize	Vehicle size (1 = small, 2 = medium, 3 = large)
Filter	Filter type (1 = standard filter, 2 = Octel filter)

Fit an appropriate two-way ANOVA model to the data using the variable Noise as the dependent variable of interest. What variables are significant in the model? State test statistics and p-values for the significant variables. Does the model satisfy all the assumptions of two-way ANOVA? Justify your answer. Using the estimated marginal means or otherwise explain the effects of the filter type on noise levels.