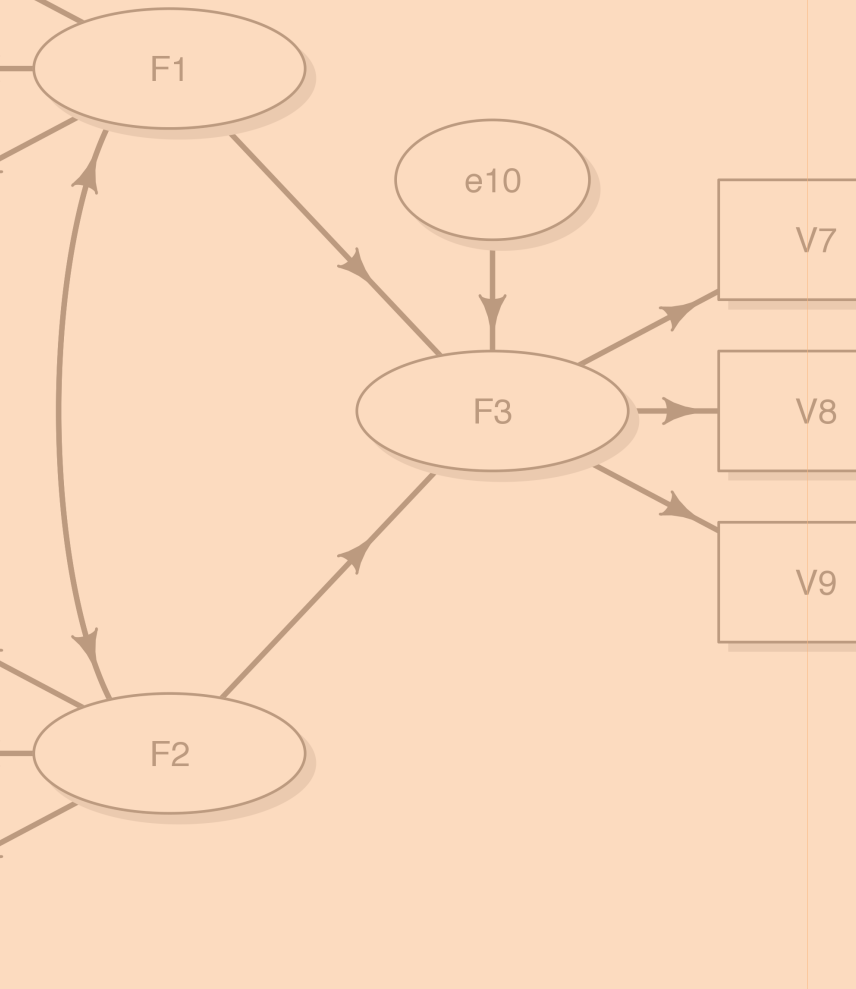## About the Instructors

Dr Ewa Sztendur is the Managing Director of ES-QUANT Statistical Consulting. Ewa is an experienced researcher and accredited statistician (AStat) with the Statistical Society of Australia. She has a PhD in statistics in the area of experimental design. Ewa has consulted and lectured in statistics at the University of Melbourne, Monash University and Victoria University in Australia. She has been involved in numerous research and evaluation projects in the field of education in the capacity of a statistical expert. Ewa has experience in working with large data sets, with particular expertise in the analysis of longitudinal data.

Dr Neil Diamond is the Research Director of ES-QUANT Statistical Consulting. Neil is an accredited statistician (AStat) with the Statistical Society of Australia. Previously, he was Associate Professor and Co-ordinator of Statistical Support at Victoria University and the Director of Statistical Consulting in the Department of Econometrics and Business Statistics at Monash University. He has worked as a statistician in both industry and academia. He has over 35 years experience as a consultant working in a diverse range of applications with particular emphasis on the design and analysis of observational studies, surveys, and experiments, quality improvement and time series modelling.

What students say

- From a Professor: "Thank you for this: your explanations are always very clear and helpful."
- From a lecturer from the Arts Faculty: "We're enjoying the good news on X's thesis here, and I would like to thank you again for your contribution, one which really had a substantial effect on the final quality of X's work."
- From a postgraduate student: "Thanks again for this afternoon, it is great being able to work through the process with a wonderful stats coach."
- From a postgraduate student: "Thankyou immensely for your amazing support."

A Two Day Course in
Structural Equation Modelling
with Lavaan and R

ESQUANT
Statistical Consulting

26, 27 February 2014

Do Structural Equation Modelling with Free and Easy to Use Software

Structural Equation Modelling (SEM) is one of the most widely used techniques in the social sciences. With SEM you can evaluate your theories about causal relationships between measured and/or latent variables.

There are a wide variety of commercial software packages that allow you to perform SEM. Such packages as LISREL, AMOS, EQS, Mplus are excellent tools, but they are also costly.

There are a number of alternatives that are free and just as good. The Lavaan package based on the free and open source R environment for Statistical Computing and Graphics provides most of what the commercial packages offer and in some areas much more.

Aim of the Course

Our aim is to get you up and running with Lavaan and R. The course will be a mixture of practical examples and the relevant theory, and run in a small group setting.

What background do I need?

Not much. As long as you know what a correlation and linear regression are, and have some exposure to p-values, you can do SEM. There is no need to have any experience with R, but it is essential that you are willing to learn!

What's so great about R?

R is a free and open source environment for Statistical Computing and Graphics. It has many available statistical capabilities and the graphics are second to none. In addition, there are over 4000 contributed statistical packages which are both powerful and readily available. R has become the standard by which all other statistical packages are compared. It's up to date and with the free RStudio integrated development environment it is easy to use.

What's so great about Lavaan?

Lavaan is a package for Structural Equation Modelling. It is easy to use and has a simple model syntax allowing you to easily specify the model you want to fit to your data. The package provides many summaries of your model and provides convenient ways of improving your model. Lavaan handles multiple groups (e.g. Males and Females) and handles growth curve models, categorical variables and more.

Onyx

Onyx is a graphical interface for SEM. You can use Onyx to estimate the parameters in models but also Onyx provides import and export to a number of SEM packages including Lavaan. With Onyx, Lavaan syntax can be generated via an intuitive and easy to use GUI.

Course Outline

Day 1

Introduction to R Downloading and Installing R and RStudio. Reading in the data. Using R to summarise your data. How to generate graphs using R.

Introduction to SEM Revision of Correlation and Regression. Confirmatory Factor Analysis. Simple Structural Equation Models. Fit indices.

Using Lavaan Understanding the model syntax. Using Onyx to generate the syntax. Fitting the model using Lavaan. Interpreting the output. Extracting information from the fitted model.

Day 2

More on SEM Multiple Groups Analysis and Growth Models.

Some advanced features of Lavaan Modification Indices. Using categorical variables. Some more advanced syntax.

Reporting SEM Graphics packages to prepare SEM diagrams.

Venue

The course will be held at 5 Everage St, Moonee Ponds, a two minute walk to the Moonee Ponds Railway Station. If you come by car there is convenient all day car-parking available for $6 per day adjacent to the venue.

What to bring

A laptop with wireless connectivity. Our staff will assist in loading R and the other packages used in the course.

Fees

The cost is $595 for postgraduate students and $895 for others. Early bird rates, before 24 January 2014, are $495 and $795, respectively. All costs include GST. Included in the cost are also a full set of notes and morning and afternoon teas (lunches are not provided).

How to Register?

A registration form is available on the website `www.esquant.com.au`. Places will be reserved on a first-come-first-served basis.

Cancellation of Place

Places are limited. If you register, but later find you cannot come due to circumstances, you will get a full refund before the early bird registration time. Between the early bird registration time and one week before the course, there will be a $200 charge. No refund will be given after 18 February 2014.