

MULTIVARIATE ANALYSIS A and B (PhD 509A and PhD 509B)

Professor Hubert Gatignon

Overview

The two part course covers methodologies for analyzing primary or secondary data typically used in Management research and provides the opportunity to have hands-on experience with such methods. Two weeks (two sessions) are spent on each topic covered in the seminar. The first week is devoted to the theory where the methodologies are presented and discussed. Then, students analyze data using several statistical computer packages (SAS, LISREL, and other specialized packages) particularly suited for each analysis. Students present their analysis of the data during the second week covering the topic which is used to discuss their results and the issues they face during the assignment. Note that this class is not intended as your first statistical course. Instead, I will assume that you are familiar with basic statistical techniques so that we can focus on the multivariate nature of the methodologies.

TOPICS COVERED IN PhD 509A and PhD 509B

<p>Multivariate Analysis A (PhD 509A) – P4 (March-April 2009)</p> <ul style="list-style-type: none"> • Multivariate Analysis of Variance-MANOVA • Discriminant Analysis • Canonical Correlation • Cluster Analysis • Multidimensional Scaling 	<p>Multivariate Analysis B (PhD 509B) – P5 (May-June 2009)</p> <ul style="list-style-type: none"> • Measurement Theory-Reliability Alpha • Principle Component Analysis • Exploratory Factor Analysis • Confirmatory Factor Analysis • Second Order Factor Analysis • Multi-group Factor Analysis • Analysis of Covariance Structure • Multi-group Analysis of Covariance Structure
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OBJECTIVES

The main objectives of these courses are to:

- Develop the student's knowledge of the technical details of various techniques for analyzing data;
- Acquaint the student with new developments in the analysis of data at the individual or

aggregate level;

- Expose the students to "hand-on" use of various computer programs for carrying out statistical analyses of data.

PEDAGOGY

Each type of multivariate analysis will be treated during two class sessions corresponding to two weeks.

In the *first session* of a given topic, you will be assigned background reading material to cover the technical aspects of the methods. I will spend that first class "reviewing" and presenting the basics of the methodologies involved in that topic.

In addition to the background reading material, starting with the second topic (i.e., discriminant analysis for PhD 509A and confirmatory factor analysis for PhD 509B), each student should choose an application article according to their area of interest to see how the methodology has been used in a particular context. An individual summary of the application article selected by each student and to be distributed to the other students in the class will be due for the second session on the topic. The objective is not to summarize the whole article but to present to the other students the key points in the paper regarding the data analysis in order for everyone in the class to have a broad range of applications of the method. Ask questions regarding the understanding of the application article any time between the time the question arises and the second session when the summary is due (there will be limited time during the first session to answer such questions).

The basic articles and the selected application articles are available via links. You will then be responsible for accessing these articles (no preliminary bulk pack can be made since you will select application articles of your choice). Please e-mail my assistant, [Georgette Duprat](#), with the names of the articles you would like to select, so that she can confirm that no one else has already picked them.

At the end of the first session on a given topic, we will discuss general (although advanced) issues that need to be addressed in analyzing data so that you can apply these techniques with data that I will usually --although not always-- provide for the second session of each topic. I will give you a specific assignment for the second class.

In the *second session*, you will report on your assignment. The assignment for the second week corresponds to an application of the technique. The class will be divided in groups of two students each (you can choose your own partner) for the purpose of these analyses and reports. You will have approximately a week in between the "theoretical" class session and the second class meeting for the given topic to analyze data. The second class meeting will be a report to the class of your analysis and a discussion of the problems you have encountered and how you chose to solve them and why. The reports should be about 30-45 minutes per group (prepare power point presentations) and you are expected to turn in at the beginning of the class a five page typed report plus Tables of what you have done and why (do not include raw computer output but present results in a format similar to what would be expected in an academic journal article).

The rest of the time for the session will be used to discuss specific points in the applications articles of interest to the class.

In summary, for each topic, the classes will proceed as follows:

Session 1: summary of techniques and issues and description of data set(s) and computer procedures (by me).

Session 2: student presentations and discussion of analyses made; discussion of application articles.

COURSE ASSIGNMENTS

The assignments for each course (PhD 509 A and B) are divided into three parts:

1. summary of application articles (25% of the grade)
2. the seven reports discussed above (50% of the grade)
3. take home data analysis assignment (25% of the grade).

To be done prior to first day of class:

(i) review notions of matrix algebra. You might want to refer to Green, Paul E. (1978), *Mathematical Tools for Applied Multivariate Analysis*, New York, NY: Academic Press, [Chapters 2 to 4].

(ii) read assigned readings for first day of class. This includes
Basic technical readings
Required articles (those listed with an asterisk)

Please note the following link to a guide to SAS, the major statistical software we will be using. This is an introduction to the basics of SAS:

http://www.ats.ucla.edu/stat/sas/topics/data_management.htm