

MSCA 673 – WINTER 2010
Statistical Tools for Segmentation and Positioning in Marketing
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Note: This is a tentative course outline. A more detailed version will be available on First Class at the beginning of the semester..

Objectives: Segmentation and positioning are two of the most critical strategic choices in marketing. This course focuses on some statistical models that are used often by researchers in segmentation and positioning. Collectively, these tools aim to (1) understand the nature of consumer perceptions, preferences and choices and (2) examine if they are homogeneous across groups of buyers. The models to be covered include factor analysis, deterministic and probabilistic multidimensional scaling, correspondence analysis, internal and external analysis of preferences, conjoint analysis, choice models and various types of cluster analysis. In addition to providing an understanding of the statistical foundations of these popular models in marketing research, the course will expose the students to "hands-on" data analysis through assignments that require the use of statistical software SAS.

Evaluation: The students will be evaluated based on their performance in the following components of the course.

Data Analysis, Interpretation and Reporting (2 assignments): 65 %
Final Exam (In-Class): 35 %

We will discuss the format and the content of the final examination in class.

The first data analysis assignment partially deals with using SAS and conducting matrix algebra using IML (Interactive Matrix Language), a dynamic interactive environment within SAS that enables one to carry out computations involving matrix algebra. The two assignments will require the students to apply the models that we will review in the course. For each assignment the students will write a report to presents their findings after analyzing some simulated and real data sets. The students are encouraged to emulate the presentation styles that they have observed in the articles that they reviewed in other seminars in the program and build skills in scientific reporting of empirical research. The data sets for the assignments will be provided by the professor. Please review and follow the style requirements at the Journal of Marketing Research for your reports two through four.

If you have a data set that could be analyzed using any one of the statistical models that will be covered in this course, and if you would like to substitute such an analysis for one of the assignments in this course, contact me as soon as possible.

Books and Computer Manuals: The following books and computer manuals will be referenced at different points during the course of the semester. Please note the capital letter(s) in parentheses preceding each book title. These abbreviations are used in the course schedule that appears on the following pages to refer to the corresponding books.

(LCG) Lattin James, J. Douglas Carroll, and Paul E Green (2003), *Analyzing Multivariate Data*, Pacific Grove, California: Brooks/Cole (THIS IS THE **REQUIRED** TEXT BOOK FOR THE COURSE.)

(MRA) *Getting Started with the Market Research Application* (1997), SAS Institute Inc., Cary, NC. (This SAS publication is **required** for the course.)

The following are only suggested as supplementary material for those who would like to do further reading regarding the statistical models that we will recover.

(CGH) Carroll, J. Douglas, Paul E. Green and Anil Chaturvedi (1997), *Mathematical Tools for Applied Multivariate Analysis*, Revised Edition, San Diego, Academic Press. This is a **highly recommended** book for those who would like to learn about matrix algebra and multivariate calculus to be able study multivariate statistics seriously. The coverage is rather rigorous at certain points, but it is not impossible to follow for those who have some solid background in algebra. I will be referring to certain sections of this book as we progress in our course.

(M) Naresh K. Malhotra (1996), *Marketing Research: An Applied Orientation*, 2nd. Ed. New Jersey, Prentice-Hall. This marketing research textbook presents many of the statistical models that we will cover at an introductory level. Therefore, it would be an excellent source for those who would like to have an initial exposure to the tools to be covered before beginning to read the textbook for the course.

(DG) William R. Dillon and Matthew Goldstein (1984), *Multivariate Analysis: Methods and Applications*, New York: Wiley. I highly recommend this excellent book (despite its “age”) for those who would like to learn about the statistical models to be discussed in the course slightly more rigorously than our coverage.

(GW) Paul E. Green and Yoram Wind (1973), *Multiattribute Decisions in Marketing: A Measurement Approach*, Hinsdale, Illinois: The Dryden Press. This is one of the seminal books that introduced perceptual mapping and preference analysis to the marketing literature. It is full of data and presents various ways of analyzing the same data set to gain an insight into consumer perceptions and preferences.

(JW) Richard A. Johnson and Dean W. Wichern (1988), *Applied Multivariate Statistical Analysis*, Englewood Cliffs, New Jersey: Prentice Hall. This text is a rather advanced treatment of many statistical models that are used in marketing research (and statistics in general). Matrix algebra and multivariate calculus are used to derive many formulae that appear in our text. I believe that this textbook should be present in the personal library of anyone for whom data analysis is a key component of his/her profession.

(UH) Glen L. Urban and John R. Hauser (1993), *Design and Marketing of New Products*, 2nd ed., Englewood Cliffs, New Jersey: Prentice Hall. This book presents an excellent review of the tools that we will cover within the new product development context. The discussion is very intuitive and application oriented. It also shows how the related statistical models can be used to identify “market gaps” and opportunities for new product development.

Please see the next page for the course schedule.

TENTATIVE COURSE SCHEDULE

Note: Our textbook by Carroll, J. Douglas, Paul E. Green and Anil Chaturvedi (1997) is abbreviated as (LCG) below.

Week Number	Topic	Assignment
Week 1:	<p>Introduction and Overview</p> <p>Review of matrix algebra,</p> <p>Review of data types: Nominal, ordinal, interval and ratio scales</p> <p>Proximity data, dominance data, profile data, conjoint data</p>	<p>Kuhfeld, Warren F. (1992), "Marketing Research: Uncovering Competitive Advantages," SAS Institute. (This article provides an overview of what we will do in this course. It also touches on the SAS software that we will use.)</p> <p>A review of Some Mathematical and Statistical Tools, Class notes prepared by K. Buyukkurt</p> <p>(LCG) Chapters 1 and 2</p> <p>The following article is suggested only if you would like to pursue further reading in this area. I will briefly summarize this article to define various types of data: Shepard, Roger N. (1972), "A Taxonomy of Some Principal Types of Data and of Multidimensional Methods for Their Analysis," in Shepard, Roger N., A, Kimball Romney, and Sara Beth Nerlove (eds.), <i>Multidimensional Scaling: Theory and Applications in the Behavioral Sciences, Volume I: Theory</i>, New York: Seminar Press, p. 23-47.</p>
<p>January 9, 2010</p> <p>10:00 am – 12:15 pm.</p> <p>Location to be announced.</p>	<p>Review of matrix algebra continued</p> <p>SAS tutorial: I would like to hold two optional SAS tutorials sometime during the weekends to introduce SAS and IML (Interactive Matrix Language).</p>	<p>(LCG) Chapters 1 and 2</p>
Week 2:	Principal Components Analysis	(LCG) Chapter 4
Week 3:	Exploratory Factor Analysis	<p>(LCG) Chapter 5</p> <p>Steps in Factor Analysis, Class Notes (Prepared by Dr. K. Buyukkurt)</p>

Week Number	Topic	Assignment
Week 4:	Exploratory Factor Analysis Continued	Factor Rotation, Handout (prepared by Dr. K. Buyukkurt) Fabrigar, Leandre R. , Robert C. MacCallum, Duane T. Wegener, and Erin J. Strahan (1999), "Evaluating the Use of Exploratory Factor Analysis in Psychological Research," <i>Psychological Methods</i> , vol. 4, No. 3, p. 272-299.
Week 5	Conjoint Analysis	(M) Conjoint Analysis, p. 709-726. Green, Paul E. and Yoram Wind (1975), "New Ways to Measure Consumers' Judgments," <i>Harvard Business Review</i> (July-August), p. 107-117. (MRA) Conjoint Analysis, p. 8-18. Kuhfeld, Warren F. (2000) "Conjoint Analysis Examples," SAS Institute, Inc.
Week 6	Conjoint Analysis Continued	
Week 7	Choice Models	Reading Material from text and SAS SUGI papers are to be assigned.
Week 8	Choice Models Continued	Reading Material from text and SAS SUGI papers are to be assigned
Week 9:	Measures of proximity	SAS DISTANCE macro (See SAS online help). Everitt, Brian S., Sabine Landau, and Morven Leese (2001), <i>Cluster Analysis</i> , 4 th. Ed. New York, N. Y. Oxford University Press, pages 35-54. (LCG), Chapter 8 (Only pages 273-278. The rest of the chapter will be covered later). (JW) Chapter 12: Clustering, Distance Methods, and Ordination.
Week 10:	Cluster Analysis	(LCG) Chapter 8
Week 11:	Cluster Analysis Continued	(LCG) Chapter 8 Milligan, Glenn w. and Martha C. Cooper (1987), "Methodology Review: Clustering Methods," <i>Applied Psychological Measurement</i> , vol. 11, No.4, p. 329-354. Yeung, Ka Yee, and Walter L. Ruzzo, "Adjusted Rand Index". (This PDF file will be available on the web site for our course.)

Week 12:	Multidimensional Scaling (MDS) Multidimensional Preference Analysis (MDPREF)	(LCG) Chapter 7 (GW) MDPREF, p. 326-328. (GW) PREFMAP, p. 329-334. (MRA) Multidimensional Preference Analysis, p. 46-50.
Week 13:	Correspondence Analysis	Churchill, Gilbert A. Jr. (1992), <i>Basic Marketing Research</i> , (2 nd ed.), Prentice Hall: New Jersey, p. 732-735. (Contingency tables and the chi-test test of independence.) Hair, Joseph F., Rolph E. Anderson, Ronald L. Tatham, and William L. Black (1998), <i>Multivariate Data Analysis</i> , 5 th. Ed, Prentice Hall: New Jersey, p. 548-555, Prentice (MRA) Correspondence Analysis, p. 19-30. “Simple Correspondence Analysis of Cars and Their Owners”, SAS Online Documentation, The CORRESP Procedure, Example 24.1 Hoffman, Donna L., and George R. Franke (1986), “Correspondence Analysis: Graphical Representation of Categorical Data in Marketing Research,” <i>Journal of Marketing Research</i> , Vol. 23 (August), p. 213-227.
	FINAL EXAM (IN CLASS)	DATE TO BE DETERMINED.