PSY 775/875
Multivariate Statistics
Spring Semester, 2011

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Class Times and Locations:

Thursday 8:30-11:30 in Life Sciences 244

Required Books/Materials:

PSY 775/875: Multivariate Statistics Reader (**readings can be downloaded from course Blackboard site**)

Recommended Book:

Byrne, B.M. (2006). *Structural Equation Modeling with EQS: Basic Concepts, Applications, and Programming*. 2nd Edition. Mahwah, NJ: Erlbaum.

Tabachnik, B. G., & Fidell, L. S. (2007). *Using Multivariate Statistics*, 5th Edition. Boston, MA: Pearson; Allyn & Bacon Publishers.

Software: We will be using SPSS for Windows (just about any version) for the more traditional multivariate statistical procedures that you will be conducting for this class. However, you will also be using EQS and HLM for the more sophisticated statistical modeling procedures that you will learn during the latter part of the semester.

Course Overview and Objectives:

This course is a **practical** approach to using and interpreting multivariate statistics. First let me tell you what practical does <u>not</u> mean. Practical does not mean that you will be learning how to pre- and multiply matrices of various forms to generate eigenvalues. Practical <u>does</u> <u>mean</u> that you will learn how and when to apply specific multivariate statistical procedures given the variables and type of data that you have. Practical also means that you will conceptually learn and understand what each of the multivariate procedures is actually doing. And finally, practical means that you learn and understand how statistical software is used to conduct these procedures and interpret the output that is generated by these programs. There will be a strong emphasis on "hands-on" data analysis and interpretation.

We will cover a range of multivariate topics that you have not already covered in previous courses. These topics will include canonical correlation, discriminant function analysis, principal components analysis, exploratory factor analysis, confirmatory factor analysis, structural equation modeling, hierarchical linear modeling, and latent class analysis. Our class meetings that address these topics will be a combination of lecture, demonstration, and discussion of questions/problems encountered during the various assignments. **ALL COURSE MATERIALS (LECTURES, LABS, AND COURSE ASSIGNMENTS) ARE LOCATED ON BLACKBOARD UNDER PSY 775 or PSY 875 Spring 2010 (http://blackboard.sdsu.edu).**

Grading Method:

(1) 2 exams worth 73% of your course grade (each worth 36.5%)
(2) 9 computer activities worth 27% of your course grade (each worth 3%)

Grading Scales: Exams will be graded using a percentage system. I do not grade on a curve. Letter grades will be given in accordance with a traditional grading scale: 90-100 (**A**), 80-89.99 (**B**), etc. Plus (e.g. B+), solid (e.g., B), and minus (e.g., B-) grades are assigned based on whether your grade falls in the upper third (e.g., 86.67-89.99), middle third (e.g., 83.34-86.66), or bottom third (e.g., 80.00. 83.33) of a particular grade range (e.g., 80.00-89.99).

Exams: You are assigned a percentage score that ranges from 0-100% for each exam: big surprise! The exams will all be in-class and are pretty straightforward. Each exam will consist of 3 essay questions. These 3 questions will come from a list of approximately 15 questions that are in documents posted on the Course Blackboard website. The goal of these exam questions is to determine if you conceptually understand the target statistical procedures.

Computer Activities: You will be completing 9 computer tasks over the course of the semester. For these tasks you will be required to conduct statistical analyses on the computer that parallels the statistical procedures that we are discussing in lecture. You will also be required to interpret the analysis and write a mock <u>Results</u> section that is similar to that which appears in each chapter of your textbook or that I present to you in class. I will walk through an interpretation of each analysis together before you are turned loose on your own. I will email each of you an SPSS data file that will serve as the target data set for each target analysis. You will turn in the Results section one week after the assignment was received. You are encouraged to work together making decisions, computing results and output related to all computer activities. However, there is to be NO COLLABORATION on the WRITING portions of the activities. Obviously the write-ups will be very similar but just do me the favor of doing your own writing.

Tentative Schedule of Events, Topics, and Reading Assignments

<u>Date</u>	<u>Topic</u>	<u>Reading Assignment</u>
1/20	Course and People Introduction	
	Introduction to Multivariate Statistics	Reading 1
1/27	Canonical Correlation (and SPSS)	Reading 2
	MANOVA	Reading 3
2/3	MANOVA (SPSS)	
	Discriminant Function Analysis (and SPSS)	Reading 4
2/10	Principal Components and Factor Analysis	Reading 5
2/17	Principal Components and Factor Analysis (SPSS)	
	Path Analysis	Readings 6, 7
2/24	EXAM 1	
3/3	**NO CLASS!!!!!!!!!!!!!!!!!!!!!!!!**	
3/10	Path Analysis and EQS	
	Structural Equation Modeling (SEM) Overview	Readings 8-11
3/17	Confirmatory Factor Analysis (CFA) and SEM	Readings 8-11
	CFA and SEM in EQS	
3/24	Multisample CFA and SEM	Reading 12
	Multisample CFA and SEM (EQS)	
3/31	**SPRING BREAK!!!!!!!!!!!!!!!!!**	
4/7	Latent Growth Curve Modeling (LGCM)	Readings 13, 14
	LGCM in EQS	
4/14	Hierarchical Linear Modeling (HLM)	Readings 15, 16
	HLM lecture part 2 and HLM Software	
4/21	Latent Class and Profile Analysis	Reading 17, 18
	Latent Class and Profile Analysis in MPlus	
4/28	Longitudinal Data Analysis	No readings
5/5	EXAM 2	