I. COURSE PURPOSE

The focus of this second course of the two semester course sequence is on the advanced multivariate statistics most commonly used in social work and in other social science research. The overall goal of this course is to expand students’ knowledge and skills in becoming both informed consumers and competent independent producers of research. In addition to learning more about specific multivariate statistical techniques, the students are expected to gain an increased appreciation of the importance of statistics in the context of research methodology, in the development of knowledge, and in the evaluation of programs and practice. Toward this aim, students will develop individual research proposals in which they will explicate not only their methodology but also their analysis plan to test their presented hypotheses while using one of the statistical techniques covered by this course. Finally, students are expected to identify both the strengths and limitations of statistics in the context of carrying out research.

II. EDUCATIONAL OBJECTIVES

Upon completion of these courses the students should be able to independently and competently:

1. Formulate multivariate research questions and testable hypotheses;
2. Identify the statistical analysis appropriate to test various hypotheses;
3. Provide appropriate justification for using selected statistical approach;
4. Interpret the results of statistical analysis with the latest APA format;
5. Understand statistical analysis presented in social science literature;
6. Carry out selected statistical tests using SPSS.
III. COURSE REQUIREMENTS FOR SSS 948

A. Texts and Readings

Required for SSS 948


Access to SPSS Software for SSS 947 and SSS 948

SPSS Graduate Pack for SPSS – software should be of version 18 or above: it is very helpful when a student has their own laptop loaded with own SPSS grad-pack software.

Access Blackboard at CUA for Data Files used SSS 948: Download or access SPSS data files in a link under “Course Document” – folder called DATA that accompany the Abu-Bader text (also available from Lyceum website).

Additional Recommended Readings


Field, A. (2009). Discovering Statistics Using SPSS. SAGE. (Suitable for SSS 947 and SSS 948)


Reading for Fun

B. Course Assignments

SSS 948  
1. Test 1 (20%) (Due: 2-27-13)  
2. Test 2 (20%) (Due: 4-17-13)  
3. Test 3 (15%) (Due: 5-8-13)  
4. Research Proposal – Part #1 (15%) (Due 4-3-13)  
5. Research proposal – Part # 1 and Part # 2 (20%) (Due 5-1-13)  
6. Homework Completion and Class participation (10%)

C. Grading Policy

Full credit will NOT be given for assignments which are submitted late. In addition, NO credit will be given for assignments which are submitted after they have been reviewed in class.

D. Course and Instructor Evaluation

NCSSS requires electronic evaluation of this course and the instructor. At the end of the semester, the evaluation form may be accessed at http://evaluations.cua.edu/evaluations using your CUA username and password. Additional informal written or verbal feedback to the instructor during the semester is encouraged and welcomed, and attempts will be made to respond to requests.

E. Class Expectations

1. Scholastic Expectations
   Please refer to the NCSSS Announcements or appropriate Program Handbook for Academic Requirements, including scholastic and behavioral requirements. All written work should reflect the original thinking of the student-author, cite references where material is quoted or adapted from existing sources, adhere to APA format, and be carefully proofread by the student before submission to the instructor for grading.

2. Academic Honesty
   Joining the community of scholars at CUA entails accepting the standards, living by those standards, and upholding them. Please refer to University Policy and appropriate Program Handbooks.

3. Accommodations
   Students with physical, learning, psychological, or other disabilities wishing to request accommodations must identify with the Disability Support Services (DDS) at CUA and submit documentation of a disability to the course instructor: PRYZ 207, Phone: 202-
If you have documented such a disability to DSS that requires accommodations or an academic adjustment, please arrange a meeting with the instructor as soon as possible to discuss these accommodations.

4. **Attendance/Participation**

   Please note that this class commences at 3:35pm and ends at 6:30pm. Students are expected to attend all class sessions and to arrive to class on time. Students are expected to conduct themselves in a professional manner. Use of any electronic devices during class must be approved by the instructor and is expected not to be disruptive to participants. All phone-listening devices are to be muted during class sessions. If a student expects to be absent for a particular session, the student is expected to notify the instructor in advance and in writing, or, in the case of illness, as soon as possible. Students are responsible for obtaining any materials they missed due to absence from the CUA Blackboard. Unexcused or multiple absences will result in a reduction of the final grade. Students are also expected to read all designated assignments for each class session and to actively participate in class discussion and exercises.

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**SSS 948**

Multivariate statistics and Design II

**COURSE SCHEDULE**

SPRING 2013 - CUA Starts 1-14-12

<table>
<thead>
<tr>
<th>DATE</th>
<th>TOPICS</th>
</tr>
</thead>
<tbody>
<tr>
<td>Class 1</td>
<td>Review</td>
</tr>
<tr>
<td>1-16-13</td>
<td>• Bivariate tests</td>
</tr>
<tr>
<td></td>
<td>• Data cleaning, missing values, outlier cases, normality, and data transformation</td>
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<td></td>
<td>• Simple Linear Regression</td>
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</tbody>
</table>

**Readings**

Abu-Bader, 2010: Chapter 1: Review of Bivariate Statistical Tests
Chapter 2: Data Cleaning, Missing Values, Outlier Cases, Normality, and Data Transformation
Chapter 3: Simple Linear Regression

**Practice Homework: Abu-Bader (2010)**

(1) See pages 18-19 and complete Practical Exercise PART 1 only;
(2) See page 71 and complete 1-10;
(3) See page 95-96 and complete Practical Exercise items 1-8.
### Class 2
1-23-13

**Review Multiple Regression Analysis**
- Review homework from Class 1
- Work through Practical Exercise, pages 104-125
- Examining Interaction of 2 IVs in MRA

**Readings**
- Abu-Bader, 2010: Chapter 4: Multiple Regression Analysis
- Mertler and Vannatta (2010): Chapter 7: Multiple Regression

**Practice Homework: Abu-Bader**
Getting to know SPSS: See page 126: Complete Practical Exercise items 1, 2, 4, 5, 6, 7, 8 only.

### Class 3
1-30-13

**Path Analysis – extension of MRA**
- Introduction to concepts in causal modeling
- Path diagrams
- Path coefficients
- Causal paths, direct effects, indirect effects
- Endogenous and exogenous variables
- Starting SPSS – MRA to make sense of path analysis
- Work through Male Life Expectancy in Figure 8.3 (Mertler and Vannatta, page 199)

**Readings**
- Mertler and Vannatta (2010): Chapter 8; Pyrczak data set: `country-a.sav`


**Practice Homework:** See page 231 – path diagram, Exercise for Chapter 8.
1. Identify exogenous and endogenous variables in this path model;
2. Conduct regression analyses based on the proposed path model (shown in the path diagram);
3. Conduct regression analyses with missing paths;
4. Conduct final revised regression analyses.
5. Construct the final model with revised path coefficients;
6. Explain results in step-by-step manner along with SPSS results to support your interpretations.
<table>
<thead>
<tr>
<th>Class 4</th>
<th>Path Analysis – Continued</th>
</tr>
</thead>
<tbody>
<tr>
<td>2-6-13</td>
<td>Review homework</td>
</tr>
<tr>
<td></td>
<td>Address mediation and moderation</td>
</tr>
<tr>
<td></td>
<td>Rules for building causal mediational models</td>
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</tbody>
</table>

**Readings**
- Document: Mediation_SOBEL test calculations- on BB
- Mediation: Bigatti, Lydon, & Brothers (2008) – on BB
- Moderation: Rogers & Holmbeck, 1997 – on BB

<table>
<thead>
<tr>
<th>Class 5</th>
<th>Logistic Regression</th>
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</thead>
<tbody>
<tr>
<td>2-13-13</td>
<td>Review homework from previous class</td>
</tr>
<tr>
<td></td>
<td>Introduction to logistic regression analysis</td>
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<tr>
<td></td>
<td>Assumptions and selecting appropriate factors</td>
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<tr>
<td></td>
<td>Interpretation of results</td>
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<tr>
<td></td>
<td>Execution of logistic regression in SPSS</td>
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</tbody>
</table>

**Readings**
- Abu-Bader, 2010: Chapter 5
- Mertler and Vannatta: Chapter 11

**Practice Homework:**
- Abu-Bader, 2010: See page 155, Practice exercise: Use variables of age, gender, owning a home, emotional balance, physical health, and cognitive status to predict the odds of depression as indicated for items 1, 4, 5, 6, 7, and 8.

<table>
<thead>
<tr>
<th>Class 6</th>
<th>Logistic Regression continued</th>
</tr>
</thead>
<tbody>
<tr>
<td>2-20-13</td>
<td>Review homework from previous class</td>
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<tr>
<td></td>
<td>Continue practice of logistic regression using Mertler &amp; Vannatta, Example 1 and 2</td>
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<td></td>
<td>Continue interpretation of results</td>
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</tbody>
</table>

**TEST 1**
- TAKE HOME – Due 2/27/13 – Upload onto BB

**Note:**
- CUA – Spring Break 3/4 – 3/8
### Class 7

**Review of Analysis of Variance (ANOVA)**
- Review assumptions and conditions for conducting One-Way ANOVA
- Post hoc multiple comparison tests
- Reporting results
- Engage in a class-practice exercise

**Readings**
- Privitera (2012): Chapter 12: ANOVA One Way Between Subjects Design
- Mertler and Vannatta (2010): Chapter 4 Factorial Analysis of Variance – pages 67-70

**Practice Homework:**
Mertler and Vannatta (2010): See page 91: use `profile-a.sav` data set, and test the research questions (a) whether ‘hours worked’ [sprhs1] significantly differed by ‘level of happiness’ [happy], and (b) Whether ‘hours worked’ significantly differed by level of ‘income’ [rincome91]. In executing these analyses: 1. State null and alternate hypotheses, 2. Set the criteria for rejecting the null hypothesis, 3. Identify the level of measurement for each variable, 4. Explain whether the data meet assumptions for conducting One-Way ANOVA, 5. Execute ANOVA, 6. Execute Post Hoc Multiple Comparisons, 7. Generate Mean Plot and Descriptive Statistics for each question being examined, and write up the results along with presenting relevant tables to support your interpretation of results.

### Class 8

**Analysis of Variance: Two Way**
- Underlying assumptions for conducting Two-Way ANOVA
- Post hoc tests
- Using SPSS to execute Two-Way or Factorial Analysis of Variance
- Interpreting and reporting results

**Readings**
- Abu-Bader (2010): Chapter 6 Two-Way Analysis of Variance
- Privitera (2012): Chapter 14 – Two Way Between Subjects factorial Design
- Mertler and Vannatta (2010): Chapter 4 Factorial Analysis of Variance – 70-90

**Practice Homework:** Mertler and Vannatta (2010): See page 91: use `profile-a.sav` data set, and complete questions 1 and 2 on this page.

### Class 9

**Two-Way Analysis of Covariance**
- Purpose of two-way ANCOVA
- Assumptions underlying ANCOVA
- Post hoc tests
- Using SPSS to compute statistics

Updated: 12.1.12 Farber
• Interpretation and reporting of results

Readings
Abu-Bader (2010): Chapter 7 Two-Way Analysis of Co-Variance
Mertler and Vannatta (2010): Chapter 5 Analysis of Covariance

Practice Homework: Abu-Bader (2010), See page 210 – Complete practical exercise items 1, 2, 3, 5, 6, 7.

Class 10  Repeated Measured Analysis of Variance (RANOVA)
4-3-13  
• Review Two-Way ANCOVA homework
• Purpose of RANOVA
• Differences between within-subjects RANOVA and mixed between-within-subjects RANOVA
• Sources of variation in repeated measures
• Advantages of repeated measures
• Assumptions underlying repeated measures
• Post hoc tests
• Executing SPSS analysis
• Interpretation of results

Readings
Abu-Bader (2010): Chapter 8 Repeated Measured Analysis of Variance


DUE ** Research Proposal Paper – Part # 1

Class 11  Repeated Measured Analysis of Variance Continued
4-10-13  
• Continue SPSS for executing RANOVA

Readings
Abu-Bader (2010): Chapter 8 Repeated Measured Analysis of Variance


TEST 2  Due April 17th upload onto BB

Class 12  Factor Analysis
4-24-13  
• Purpose of Factor Analysis
• Exploratory Factor Analysis, and developing scales
• Factor loadings, communalities, and extraction methods

Updated: 12.1.12 Farber
• Assumptions and limitations
• Interpretation of results (Eigenvalues, variance, scree plot, and residuals)
• Executing SPSS analysis

Readings
Mertler and Vannatta (2010): Chapter 9 Factor Analysis


Class 13  Factor Analysis Continued  (LAST CLASS)
Reliability Assessment in Instruments
5-1-13  • Continue SPSS for executing Factor Analysis
• Developing and Validating Rapid Assessment Instruments Reliability
• Using SPSS for conducting reliability analysis

Readings
Mertler and Vannatta (2010): Chapter 9 Factor Analysis


DUE**  Research Proposal Paper – Parts # 1 and # 2 (complete paper)

TEST 3  DUE May 8th Upload to BB

Congratulations and Thank You: You have survived SSS 947 and 948!

Have a Great Summer!