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 multivariate quantitative 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 for quantitative multivariate hypothesis testing, and in the evaluation of programs and practice. In this context, students are expected to identify both the strengths and limitations of statistics in carrying out quantitative multivariate research. Toward this aim, students’ progress is gauged through assigned homework practice, and demonstrated through three graded tests that include actual data analysis and problem solving using SPSS software for multivariate data analysis.

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 a multivariate hypothesis;
3. Provide appropriate justification for using selected statistical tests;
4. Document steps in hypothesis testing using selected statistical procedures;
5. Present the results of statistical analysis with the latest APA style used for summarizing the written discussion and table results;
6. Draw appropriate conclusions about statistical analysis presented in social science literature;
7. Carry out appropriately selected statistical tests using SPSS software approach.

III. COURSE REQUIREMENTS FOR SSS 948

A. Texts and Readings

Required for SSS 948


Privitera, G.J. (2012). Statistics for the Behavioral Sciences. SAGE. [Carry over from SSS 947; however, other statistics book with some discussion on regression and two-way ANOVA will do as well]

Access to SPSS Software for SSS 948

Please notice that the class for SSS 948 takes place in a CUA computer-desktop based classroom with SPSS loaded on the computer.

However, most students find it helpful to have access to their own SPSS (Graduate Pack for SPSS – software should be of version 18 or above) in order to complete homework exercises, and complete the three take-home tests. Having a laptop in the classroom is not necessary for this course as typically there is not enough time to address any connectivity issues that may arise. You are welcome to have a laptop; however, you are responsible for addressing the connection to CUA wireless and any other issues that may arise.

Datasets: 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


B. **Course Assignments**

SSS 948

1. Test 1 (30%)
2. Test 2 (30%)
3. Test 3 (30%)
4. 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](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: 202-319-5211, [http://disabilityservices.cua.edu/](http://disabilityservices.cua.edu/). 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**

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 or distracting 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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**CLASS SCHEULE**

**SSS 948**

Multivariate statistics and Design II

**SPRING 2016**

<table>
<thead>
<tr>
<th>DATE</th>
<th>TOPICS</th>
</tr>
</thead>
<tbody>
<tr>
<td>Class 1</td>
<td>Review Basic Multivariate Assumptions and Data Preparation</td>
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</tbody>
</table>
| 1-13-16 | • Crash Review: Bivariate tests and MRA  
           • Main focus on: Data cleaning, missing values, outlier cases, normality, and data transformation |

**Readings**

Abu-Bader (2010): Chapter 1: Review of bivariate statistical tests; Chapter 2: Data cleaning, missing values, outlier cases, normality, data transformation; Chapter 3: Simple linear regression.

Field (2013): Chapter 5: The beast of bias.

**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.

Updated: 1.08.2016 Farber
<table>
<thead>
<tr>
<th>Class 2</th>
<th>Review MRA and Move onto Path Analysis: mediation concepts</th>
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</thead>
<tbody>
<tr>
<td>1-20-16</td>
<td>• Review homework from Class 1</td>
</tr>
<tr>
<td></td>
<td>• Work through MRA Practical Exercise, pages 104-125</td>
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<td>• Examining Interaction of 2 IVs in MRA</td>
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</tbody>
</table>

**Readings**

Abu-Bader (2010): Chapter 4: Multiple Regression Analysis
Field (2013): Chapter 8 Regression and Chapter 10: Section 10.5.1: Dummy coding on pages 419-426
Mertler & Vannatta (2005): Chapter 8 on BB

**Practice Homework: Abu-Bader**

Practical Exercises: page 126: Complete items 1, 2, 4, 5, 6, 7, 8 only.

<table>
<thead>
<tr>
<th>Class 3</th>
<th>Path Analysis – extension of MRA</th>
</tr>
</thead>
<tbody>
<tr>
<td>1-27-16</td>
<td>• Concept of “mediation”</td>
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<td>• Concepts in causal modeling</td>
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<td>• Path diagrams and path coefficients</td>
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<td>• Causal paths, direct effects, indirect effects</td>
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<td></td>
<td>• Partial and complete mediation</td>
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<td></td>
<td>• Using SPSS &amp; MRA to make sense of path analysis</td>
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<td></td>
<td>• Work through Male Life Expectancy in Figure 8.3 (Mertler and Vannatta, page 199)</td>
</tr>
</tbody>
</table>

**Readings**

On Blackboard: Mertler and Vannatta (2010): Chapter 8;
Pyrczak data set: country-a.sav (for Male life expectancy),


**Practice Homework:** To be assigned

<table>
<thead>
<tr>
<th>Class 4</th>
<th>Path Analysis - Continued</th>
</tr>
</thead>
<tbody>
<tr>
<td>2-3-16</td>
<td>• Review path analysis homework</td>
</tr>
<tr>
<td></td>
<td>• Address moderation example</td>
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<td></td>
<td>• Rules for building causal mediational models</td>
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<td></td>
<td>• More Practice</td>
</tr>
</tbody>
</table>

**Practice Homework:** To be assigned

Updated: 1.08.2016 Farber
Class 5  Logistic Regression  
2-10-16  
- Review homework from previous class  
- Introduction to logistic regression analysis  
- Assumptions and selecting appropriate factors  
- Interpretation of results  
- Execution of logistic regression in SPSS

Readings  
Abu-Bader (2010): Chapter 5  
Field (2013): Logistic regression, Chapter 19

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.

Class 6  Logistic Regression continued  
2-17-16  
- Review homework from previous class  
- Continue practice of logistic regression  
- Continue interpretation of results

Readings  
Abu-Bader (2010): Chapter 5  
Field (2013): Logistic regression, Chapter 19

Class 7  TEST 1  TAKE HOME – Test Opens on BB on 2/18 and is Due 2/24/16, by the end of the day – Upload onto BB

Note:  
Spring Break 2/29/16 to 3/04/16

Class 8  Review of Analysis of Variance (ANOVA)  
3-09-16  
- Review assumptions and conditions for conducting One-Way ANOVA  
- Post hoc multiple comparison tests  
- Reporting results  
- Engage in a class-practice exercise

Readings  
Abu-Bader (2006): Review Chapter 9: Group Comparisons: K Group Means –One-
Way Analysis of Variance
Field (2013): Chapter 11 Comparing several means: ANOVA (GLM1)
Privitera (2012): Chapter 12: ANOVA One Way Between Subjects Design

**Practice Homework: To be Assigned**

<table>
<thead>
<tr>
<th>Class 9</th>
<th>Analysis of Variance: Two Way</th>
</tr>
</thead>
<tbody>
<tr>
<td>3-16-16</td>
<td></td>
</tr>
<tr>
<td></td>
<td>- Underlying assumptions for conducting Two-Way ANOVA</td>
</tr>
<tr>
<td></td>
<td>- Post hoc tests</td>
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<td></td>
<td>- Using SPSS to execute Two-Way or Factorial Analysis of Variance</td>
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<tr>
<td></td>
<td>- Interpreting and reporting results</td>
</tr>
</tbody>
</table>

**Readings**
Abu-Bader (2010): Chapter 6 Two-Way Analysis of Variance
Field (2013): Chapter 13 Factorial ANOVA (GLM 3)
Privitera (2012): Chapter 14 – Two Way Between Subjects factorial Design

**Practice Homework: To be Assigned**

<table>
<thead>
<tr>
<th>Class 10</th>
<th>Two-Way Analysis of Covariance</th>
</tr>
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<tbody>
<tr>
<td>3-23-16</td>
<td></td>
</tr>
<tr>
<td></td>
<td>- Purpose of two-way ANCOVA</td>
</tr>
<tr>
<td></td>
<td>- Assumptions underlying ANCOVA</td>
</tr>
<tr>
<td></td>
<td>- Post hoc tests</td>
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<tr>
<td></td>
<td>- Using SPSS to compute statistics</td>
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<tr>
<td></td>
<td>- Interpretation and reporting of results</td>
</tr>
</tbody>
</table>

**Readings**
Abu-Bader (2010): Chapter 7 Two-Way Analysis of Co-Variance
Field (2013): Chapter 12 Analysis of covariance (GLM2)

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

<table>
<thead>
<tr>
<th>Class 11</th>
<th>Repeated Measured Analysis of Variance (RANOVA)</th>
</tr>
</thead>
<tbody>
<tr>
<td>3-30-16</td>
<td></td>
</tr>
<tr>
<td></td>
<td>- Review Two-Way ANCOVA homework</td>
</tr>
<tr>
<td></td>
<td>- Purpose of RANOVA</td>
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<tr>
<td></td>
<td>- Differences between within-subjects RANOVA and mixed between-within-subjects RANOVA</td>
</tr>
<tr>
<td></td>
<td>- Sources of variation in repeated measures</td>
</tr>
<tr>
<td></td>
<td>- Advantages of repeated measures</td>
</tr>
<tr>
<td></td>
<td>- Assumptions underlying repeated measures</td>
</tr>
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<td></td>
<td>- Post hoc tests</td>
</tr>
</tbody>
</table>

Updated: 1.08.2016 Farber
• Executing SPSS analysis
• Interpretation of results

Readings
Abu-Bader (2010): Chapter 8 Repeated Measured Analysis of Variance
Field (2013): Chapter 14 Repeated measures designs (GLM4)

Practical exercise (Skip item 4).

Class 12  Repeated Measured Analysis of Variance: Continued
4-06-16  • Continue SPSS for executing RANOVA

Readings
Abu-Bader (2010): Chapter 8 Repeated Measured Analysis of Variance
Field (2013): Chapter 14 Repeated measures designs (GLM4)

Practical exercise (Skip item 3).

Class 13  TEST 2 Take-Home opens on 4-07-16 and is Due on 4-13-16 by upload to BB.
4-13-16

Class 14  Factor Analysis
4-20-16  • Purpose of Factor Analysis
• Exploratory Factor Analysis, and developing scales
• Factor loadings, communalities, and extraction methods
• Assumptions and limitations
• Interpretation of results (Eigenvalues, variance, scree plot, and residuals)
• Executing SPSS analysis

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

Practice Homework: To be assigned.

Class 15  Factor Analysis Continued (LAST CLASS)
4-27-16  • Continue SPSS for executing Factor Analysis
• Developing and Validating Rapid Assessment Instruments Reliability

Updated: 1.08.2016 Farber
• Using SPSS for conducting reliability analysis

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


TEST 3  TAKE HOME – Opens 4-28-16 and is DUE 5-04-16 by Upload to BB

THANK YOU.

Congratulations – You have completed and survived SSS 948!

Have a Great Summer!