

University of Manitoba
Department of Sociology and Criminology
Fall 2019 (3 credit hours)

SOC 7400 ADVANCED QUANTITATIVE RESEARCH METHODS

Instructor: Jason Edgerton
Office: 323 Isbister Building
Phone: 204-474-8192
Email: J.Edgerton@umanitoba.ca
Timeslot: Wednesday 11:30am-2:15pm Room: 202 Isbister
Office Hours: By appointment

Required Text:

Meyers, L.S., Gamst, G., & Guarino, A.J. (2017). *Applied Multivariate Research: Design and Interpretation* (3rd ed.). Thousand Oaks, CA: Sage.

Course Prerequisite:

All students must have completed an undergraduate course in research methods and statistics. This is the absolute minimum requirement. Students who only meet the basic requirement will probably not do well in this course. Preferably, students should have also completed (and received a good grade) SOC 4570 Quantitative Social Analysis or an equivalent senior undergraduate stats/methods course.

Course Objectives and Description:

This is an advanced quantitative course in research methods. Emphasis will be placed on the practical application of statistical techniques, and students will have ample opportunity to apply these methods to data. Students should be proficient with SPSS as this software will be used extensively in the course.

The objective of this course is to cover a range of multivariate topics and techniques using a conceptual, rather than mathematical, approach. Sociology students are not, nor are they likely to become statisticians. Accordingly, the focus in this course is on *applied* multivariate research methods, this means we will emphasize design and interpretation rather than mathematical computations and derivations.

It is expected that students will have a comprehensive understanding of univariate and bivariate research methods. In particular students should have a strong grasp of the following material: levels of measurement, descriptive statistics, inferential statistics, analysis of variance (ANOVA), bivariate categorical data, and bivariate correlation and regression.

In order to ensure that students possess adequate comprehension of these basic topics, it is probably a good idea for them to reacquaint themselves with their undergraduate methods/stats texts. For individuals who are still not confident with statistical reasoning, I suggest either of the following:

Field, A. (2017). *Discovering Statistics Using SPSS* (5th ed.). Thousand Oaks, CA: Sage.

Linneman, T. (2017). *Social Statistics: Managing Data, Conducting Analyses, Presenting Results*. London, UK: Routledge.

Given that this is an advanced course, our primary focus will be on multivariate statistical techniques. Some techniques (e.g. LGCA, LCA and LCGA) will be covered in an introductory manner with examples, others will also include an applied hands-on component (working with SPSS in the computer lab). Specific topics to be covered include:

- Checking Statistical Assumptions
- Dealing with Missing Data
- Interaction Terms (Moderation) in OLS regression
- Mediation Analysis in OLS regression
- Logistic Regression
- Multilevel Modelling
- Path Analysis
- Principal Components and Exploratory Factor Analysis
- Confirmatory Factor Analysis
- Structural Equation Modelling
- Latent Growth Curve Analysis (LGCA)
- Latent Class Analysis (LCA) and Latent Class Growth Analysis (LCGA)

Course Evaluation:	*Due Date	Weight
Data Processing Using SPSS Syntax	October 2	20%
Reviews of Quantitative Research Articles (x2)	November 6	20%
Research Project		
Presentations	November 20 & 27	10%
Final Paper	December 9	50%

*Students can expect to receive their marks for each assignment within 2 weeks of the due date.

NOTE: Students will require access to SPSS, either their own copy or from their department, in order to complete the syntax and research project assignments. Non-sociology students will not have access to the sociology department computer lab outside of class time.

Data Processing Using SPSS Syntax: Students will be given an SPSS data file (.sav) that they are to prepare for multivariate data analyses. Tasks will include labeling data, cleaning data, dealing with missing data, checking assumptions, creating variables, and saving specified variables. Additional information for this assignment will be given in class.

Review of a Quantitative Research Article: Students are to find two quantitative research articles, each employing a different statistical method (e.g. logistic regression and EFA). They are to provide a summary of the purpose, methods, findings and conclusions of the article and a critique of the methods and analytical procedures—strengths, weaknesses and limitations, what steps and or information is lacking (e.g. measures, underlying statistical assumptions, dealing with missing data, software used, etc.), are the research questions and data analytical methods aligned and do the results justify the conclusions, how does it stack up against “best practices” (*desiderata*). Neither review paper should exceed 5 double-spaced pages. *Selected research articles must be vetted by the course instructor prior to writing of review papers.*

Research Project: Students will be required to design and develop a research project using secondary data (or original data). Students are responsible to select a data set to analyze. The research project will involve generating testable research hypotheses that can be empirically evaluated. Students must select at least one multivariate statistic discussed in class. Students must also create at least one composite index for their final

research paper, and some evidence must be given for its shared variance. More details will be provided in class.

Late Assignments and Papers:

Late papers and assignments will be penalized 10% per day (including weekends and holidays) unless permission is granted *prior* to the due date. Note that such permission is only granted for exceptional circumstances. Papers or assignments more than five days late will not be accepted.

Unclaimed Term Work Disposal:

Any term work that has not been claimed by students will be held for four (4) months from the end of the final examination period for the term in which the work was assigned. At the conclusion of this time, all unclaimed term work will become property of the Faculty of Arts and be destroyed according to FIPPA guidelines and using confidential measures for disposal.

Grade Distribution:

A+	=	90% and over	4.5
A	=	80% to 89%	4.0
B+	=	75% to 79%	3.5
B	=	70% to 74%	3.0
C+	=	66% to 69%	2.5
C	=	60% to 65%	2.0
D	=	50% to 59%	1.0
F	=	Under 50%	0.0

Students should be aware that the above grade categories are only guidelines. Different cut-off percentages may be used depending on the final grade distribution.

Sequence of Topics:

- 1) Review of Statistics
 - useful terms and definitions
 - review of univariate and bivariate statistics
- 2) OLS Regression (main effects)
- 3) Meeting Assumptions: Screening Data Prior to Analyses
- 4) Introduction to SPSS Syntax
- 5) Presentation of Selected Multivariate Techniques (listed previously)
- 6) Individual Presentations of Final Research Paper

Student Conduct and Academic Regulation of the University:

Voluntary Withdrawal:

The final date for voluntary withdrawal from this course is November 18, 2019.

Academic Dishonesty:

University policy on academic integrity will be enforced. A full description of academic integrity matters, including plagiarism and cheating, can be found in Section 8 of the General Academic Regulations and Requirements of the University of Manitoba.

Accommodations:

Special Needs: Special needs services are provided through Disability Services (474-6213). Students with special needs (who require aids, other supports, or require extra time to write a test) should introduce themselves to the instructor at the beginning of the term in order to arrange suitable testing times.

Holy Days: The university recognizes the right of all students to observe recognized holidays of their faith, which fall within the academic year. With instructor discretion, necessary arrangements can be made to ensure studies are not jeopardized. The instructor should be notified of a student's intended absence in advance. At least three weeks notice of absence should normally be given where special arrangements are sought.

Additional Readings:

The following is a selection of supplementary references that students may find useful to help increase their understanding of the topics, during the course and in future.

Agresti, A. (2007). *An Introduction to Categorical Data Analysis* (2nd Ed.). New York: Wiley.

Bryk, A.S., and Raudenbush. (2002). *Hierarchical Linear Models* (2nd Ed.). Thousand Oaks: Sage.

Byrne, B. M. (2010). *Structural Equation Modeling With AMOS: Basic Concepts, Applications, and Programming* (2nd Ed.). New York: Routledge.

Cohen, J., Cohen, P., West, S.G., & Aiken, L.S. (2003). *Applied Multiple Regression/Correlation Analysis for the Behavioural Sciences*, (3rd Ed.). Mahwah, NJ: LEA.

Duncan, T.E., Duncan, S.C., & Strycker, L.A. (2006). *An Introduction to Latent Variable Growth Curve Modeling: Concepts, Issues, and Applications* (2nd ed.). Mahwah, NJ: LEA.

Enders, C.K. (2010). *Applied Missing Data Analysis*. New York: Guilford Press.

Gelfand, L.A., Mensinger, J.L., & Tenhave, T. (2009). Mediation analysis: A retrospective snapshot of practice and more recent directions. *Journal of General Psychology*, 136(2), 153–176.

Graham, J.W. (2009). Missing data analysis: making it work in the real world. *Annual Review of Psychology*, 60, 549-576.

Hox, J. (2010). *Multilevel Analysis: Techniques and Applications* (2nd Ed.). New York: Routledge.

- Jaccard, J. (2001). *Interaction Effects in Logistic Regression*. Sage Series: Quantitative Applications in the Social Sciences. Thousand Oaks: Sage.
- Jaccard, J., & Turrisi, R. (2003). *Interaction Effects in Multiple Regression* (2nd Ed.). Sage Series: Quantitative Applications in the Social Sciences. Thousand Oaks: Sage.
- Keith, T.Z. (2005). *Multiple Regression and Beyond*. Boston: Allyn & Bacon.
- Kline, R.B. (2011). *Principles and Practice of Structural Equation Modeling* (3rd Ed.). New York: Guilford Press.
- Knoke, D., & G. W. Bohrnstedt, and A.P. Mee. (2002). *Statistics for Social Data Analysis* (4th Ed.). Itasca, IL: F. E. Peacock Publishers, Inc.
- Lawal, B. (2003). *Categorical Analysis with SAS and SPSS Applications*. Mahwah, NJ: LEA.
- Loehlin, J.C. (2004). *Latent Variable Models: An Introduction to Factor, Path, and Structural Equation Analysis* (4th Ed.). Mahwah, NJ: LEA.
- Luke, D.A. (2004). *Multilevel Modeling*. Sage Series: Quantitative Applications in the Social Sciences. Thousand Oaks: Sage.
- McDonald, R.P. (1996). Path analysis with composite variables. *Multivariate Behavioral Research*, 31(2), 239-270.
- MacKinnon, D.P. (2008). *Introduction to Statistical Mediation Analysis*. New York: LEA.
- Menard, S. (2002). *Longitudinal Research* (2nd Ed.). Sage Series: Quantitative Applications in the Social Sciences. Thousand Oaks, CA: Sage.
- Menard, S. (Ed.). (2008). *Handbook of Longitudinal Research: Design, Measurement, and Analysis*. New York: academic Press.
- Menard, S. (2010). *Logistic Regression: From Introductory to Advanced Concepts and Applications*. Thousand Oaks, CA: Sage.
- Miles, J., & Shevlin, M. (2001). *Applying Regression and Correlation: A Guide for Students and Researchers*. London: Sage.
- Morgan, S.E., Reichert, T., & Harrison, T.R. (2002). *From Numbers to Words: Reporting Statistical Results for the Social Sciences*. Boston: Allyn and Bacon.
- Pett, M.A., Lackey, N.R., & Sullivan, J.J. (2003). *Making Sense of Factor Analysis*. Thousand Oaks, CA: Sage.
- Preacher et al. (2008). *Latent Growth Curve Modeling*. Sage Series: Quantitative Applications in the Social Sciences. Thousand Oaks, CA: Sage.
- Rucker, D. D., Preacher, K. J., Tormala, Z. L., & Petty, R. E. (2011). Mediation analysis in social psychology: Current practices and new recommendations. *Social and Personality Psychology Compass*, 5/6, 359–371.
- Schlomer, G. L., Bauman, S., & Card, N. A. (2010). Best practices for missing data management in counseling psychology. *Journal of Counseling Psychology*, 57, 1-10.
- Schumacker, R.E., & Lomax, R.G. (2010). *A Beginner's Guide to Structural Equation Modeling* (3rd Ed.). New York: LEA.
- Singer, J.D., & Willet, J.B. (2003). *Applied Longitudinal Data Analysis*. New York. Oxford University Press.

Snijders, T.A.B., & Bosker, R.J. (2012). *Multilevel Analysis: An Introduction to Basic and Advanced Multilevel Modeling*. Thousand Oaks, CA: Sage.

Spicer, J. (2005). *Making Sense of Multivariate Data Analysis*, Thousand Oaks: Sage.

Thompson, B. (2004). *Exploratory and Confirmatory Factor Analysis: Understanding Concepts and Applications*. Washington, DC: APA.