Data Analysis II
(Syllabus Revised 1/15/2019)
Psy 612
CRN 26034
Winter 2019

1000-1120 Tuesday & Thursday
Straub 251

Instructor

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Teaching Assistants

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Laboratory

Friday 0900-1020 (CRN: 26035); 1030-1150 (CRN: 26036)

Course Information

This is the second course in a three-course graduate level data analysis sequence. This course is devoted to topics in multiple regression with special emphasis on complex analysis of variance and experimental design. We assume that all students have successfully completed Psy 611 (Data Analysis I) or equivalent. In general, the text chapters listed in the syllabus cover the material planned for class on the day that they are assigned. This material provides more depth and often alternate explanations of some of the issues.

Text

Judd, C., McClelland, G., & Ryan, C. (2017). Data Analysis: A Model Comparison Approach to Regression, ANOVA, and Beyond (3rd Ed.). Routledge: New York, NY.

Class notes available on Canvas

Other Useful Books

Data Analysis

Abelson, R. (1995). Statistics as Principled Argument. Lawrence Erlbuam: Hillsdale, N.J.

Analysis of Variance & Experimental Design

Hays, W. L. (1994). Statistics (5th ed). Harcourt Brace College Publishers: Fort Worth.

Keppel, G. & Wickens, T. (2004). Design and Analysis: A Researcher's Handbook, 4th Ed. Prentice Hall: Upper Saddle River, NJ.

Tamhane, A., & Dunlop, D. (2000). Statistics and Data Analysis. Prentice Hall: Upper Saddle River, NJ.

Winer, B. J. (1971). Statistical Principles in Experimental Design (2d ed). McGraw-Hill: New York.

Multiple Regression & Related Issues

Cohen, J. & Cohen, P., West, S., & Aiken, L. (2003). Applied Multiple Regression /Correlation Analysis for the Behavioral Sciences, 3rd Ed. Taylor & Francis, NY.

Pedhazur, E. J. (1997). Multiple Regression in Behavioral Research (3rd Ed.). Harcourt Brace: San Diego, CA.

Wonnacott, R. & Wonnacott, T. (1970). Econometrics. J. Wiley: New York.
Conducting Empirical Research

Recommended Software

The laboratory sessions will focus on helping you to learn how to conduct analyses using R. However, you may use any program.

R

- R: https://www.r-project.org/
- R Studio: https://www.rstudio.com/
- Jamovi: https://www.jamovi.org/

- Additional resources for helping you learn how to use these programs (often in text and video) are available from links on these sites.

SPSS

- SPSS Software: Follow the link at https://software.uoregon.edu/ and login to obtain the software.
- Documentation and IBM tutorials: https://www.ibm.com/support/knowledgecenter/en/SSLVMB_25.0.0/statistics_kc_ddita/spss/product_landing.html
- Additional help: https://stats.idre.ucla.edu/spss/modules/ often uses command language "syntax" rather than GUI (but you should be able to easily translate)

Examples of the same analysis using different programs

- https://stats.idre.ucla.edu/other/dae/

Class Requirements:

Complete take-home midterm examination (35% of grade), final examination (45% of grade), and weekly homework assignments (20%) of grade. Responses to all homework and examination problems should follow standard reporting formats; see the Report Guidelines handout for examples. Homework will be assigned on Thursdays and due the following Thursday (see dates below). Homework should be uploaded to Canvas by 1000 on the Thursday that it is due. Students are encouraged to study together and discuss homework assignments. However, you should be able to complete every step of every homework problem. The report that you submit should reflect your own work. You are expected to complete the examinations on your own without discussing them with people other than the instructor and TAs.

Problem sets and exams will be graded by the teaching assistants using explicit criteria provided by the instructor. The teaching assistants have taken graduate statistics previously and performed at a superior level. If anyone has concerns about their work being graded by a fellow graduate student, please see me and we can consider alternative arrangements.

Learning Objectives

Upon completing this course you should have a broad conceptual understanding of many of the statistical techniques based on the General Linear Model (GLM) and related techniques that are used in psychology and many other disciplines. You should be able to choose appropriate GLM statistical analysis techniques for specific research questions and datasets, complete basic data analyses, and summarize the results in APA-style reports. You should also be better able to understand and evaluate statistical information reported in primary research articles.

Students with Disabilities

If you have a documented disability and may need accommodations, contact me ASAP. Students who are experiencing learning difficulties are encouraged to consult the Accessible Education Center (164 Oregon Hall; 541-346-1155; uoaec@uoregon.edu; web: http://aec.uoregon.edu/). Without documentation, accommodations are not guaranteed and are to be made at the discretion of the instructor.

Academic Dishonesty

The University Student Conduct Code defines academic misconduct. Students are prohibited from committing or attempting to commit any act that constitutes academic misconduct. All work submitted in this course must be your own. For the consequences of academic dishonesty, refer to the Schedule of Classes published quarterly. Violations will be taken seriously and are noted on student disciplinary records. If you are in doubt regarding any aspect of these issues as they pertain to this course, please consult with me before you complete any relevant requirements of the course. For more information regarding academic honesty and the student conduct code, see: http://dos.uoregon.edu/conduct .

Inclement Weather Policy

If Eugene School District 4J cancels (not delays) school, we will cancel class. Nothing we do in this class can't wait until it is safe to travel.

Tentative Syllabus+

Date	Topics, Text Readings, & Handouts*	Homework
1/8	**Introduction: GLM concepts** • Introduction.pdf • Linear Regression Handout.doc • Empirical Example of Linear Regression.doc • Calculus Derivation of Least Squares Parameters of a Line.doc	
1/10	**GLM with Matrices** • Introduction to Matrix Algebra.doc • Regression with Matrices in R.doc • Regression with Matrices in Excel.doc • Excel Matrix Example.xlsx	Hmk1 Out
1/15	**LS Multiple Regression: Basics (Review)** • JMR 6. Multiple Regression • Multiple Regression Handout.doc	
1/17	**Partitioning Variance** • Regression Diagnostics.doc • Regression Diagnostics.pdf • Multicollinearity.doc • Principal Components Analysis.doc	Hmk 1 Due Hmk2 Out
1/22	**Interactions: Mediation & Moderation** • JMR 7. Moderated and Nonlinear Regression Models • Interactions in Multiple Regression Models.doc • Mediation.doc	
1/24	**Non-linear Relations** • Trend.doc	Hwk 2 Due Hmk 3 Out
1/29	**Combinations of Categorical Predictors** • JMR 9. Factorial ANOVA • Regression with Categorical Predictors.doc • Factorial Analysis of Variance Analysis.doc • Multiple Comparisons.doc • Planned Comparisons.doc	
1/31	**Combinations of Continuous and Categorical Predictors** • JMR 10. ANCOVA • Interactions Between Categorical and Continuous Predictors.doc • Analysis of Change with ANCOVA.doc	Hwk 3 Due Hmk 4 Out

+ Expect changes! * JMR: Judd et al (2017) text; other entries are handouts

2/5	**Experimental Design** • Representations of Experimental Designs.doc • Quasi-F.doc	
2/7	**Random & Fixed Factors: Multiple Sources of Error**	Hwk 4 Due Midterm Exam Out
2/12	**Nested Designs** • Nested Designs.doc	
2/14	**Repeated Measures: Non-independent Error** • JMR 11. Repeated Measures • Repeated Measures.doc	Midterm Exam Due Hmk 5 Out
2/19	**Poor Man's MLM** • JMR 12. On the Road to MLM • Multi-level Analysis.doc • Poor Man's MLM.doc • Repeated Measures ANCOVA.doc • Multi-level Models.doc	
2/21		Hmk 5 Due Hmk 6 Out
2/26	**Omitted Variables** • Omitted Variables.doc • Omitted Variables.pdf	
2/28	**Heteroscedasticity** • JMR 13. Outliers and ill-mannered error • Heteroscedasticity.doc • Weighted Least Squares.doc	Hmk 6 Due Hmk 7 Out
3/5	**Missing Data** • Missing.doc • Types of Sums of Squares.doc	
3/7		Hwk 7 Due
3/12	**Non-Linear Regression** • JMR 14. Logistic Regression • Logistic Regression.doc	Final Exam Out
3/14	**Introduction to Bayesian Statistics** • Bayes Theorem.doc	
3/19	Final Due 8:00 AM	