CHRISTOPHER G. PRENER, PH.D.

READING LIST

SOC 5050: QUANTITATIVE ANALYSIS
FALL, 2016
SAINT LOUIS UNIVERSITY

Reading Notes

Reading Abbreviations

Abbreviation	Full Title
Acock	Acock, Alan. 2016. *A Gentle Introduction to Stata*. 5th edition. College Station, TX: Stata Press.
Freedman et al.	Freedman, David, Robert Pisani, and Roger Purves. 2007. *Statistics*. 4th edition. New York, NY: W.W. Norton and Company.
Long	Long, J. Scott. 2009. *The Workflow of Data Analysis Using Stata*. College Station, TX: Stata Press.
Mitchell	Mitchell, Michael N. 2012. *A Visual Guide to Stata Graphics*. 3rd edition. College Station, TX: Stata Press.
Wheelan	Wheelan, Charles. 2014. *Naked Statistics: Stripping the Dread from the Data*. New York, NY: W.W. Norton and Company.

Reading Locations

Abbreviation	Location
ER	Electronic Reserves
GH	GitHub
Link	Website URL
PL	Pius Library

Notes: Github readings will be available in the `Course-Readings` repository; you will need to be a member of the course organization to access them. The password for the Electric Reserves site will be emailed to students at the beginning of the semester.

Reading List

Week 1 - August 22nd

Course Introduction

Topics

- Syllabus Overview
- Inferential Statistics - What are quantitative data and what do they look like?
- Data Analysis - Intro to Course Tools: Stata, GitHub, and Atom
- Quantitative Research - What is a Workflow?

Readings

- Acock - Chapters 1 and 4 [GH]
- Freedman et al. - Chapters 1 and 2 [GH]
- Long - Chapters 1 and 8 [GH]
- Wheelan - Chapter 1 [GH]

Lab Activity

- Lab 1 - Introduction to Stata, GitHub, and Atom

Week 2 - August 29th

Describing Distributions

Topics

- Inferential Statistics - Mean, Median, Mode, Variance, & Standard Deviation
- Data Analysis - Describing Distributions
- Data Visualization - Histograms and Bar Charts
- Quantitative Research - Getting Organized

Readings

- Acock - Chapter 5
- Freedman et al. - Chapters 3 and 4
- Long - Chapter 2
- Wheelan - Chapters 2 and 3

Lab Activity

- Lab 2 - Descriptive Statistics and Graphs

Assignment Due

- Student Information Sheet and Syllabus Agreement

Week 3 - September 5th

***Tegrity Lecture:** Working with Data (Part 1)*

Topics

- Data Analysis - Initial Data Cleaning Tasks
- Quantitative Research - Structuring Do-Files

Readings

- Acock - Chapter 3 (skip Section 3.6)
- Long - Chapter 3

Lab Activity

- Lab 3 - Initial Data Cleaning Tasks

Assignment Due

- Problem Set 1 - Descriptive Statistics (Week 2)

Week 4 - September 12th

Probability and Bayes' Theorem

Topics

- Inferential Statistics - Probability and Bayes' Theorem

Readings

- Freedman et al. - Chapters 13 and 14
- Silver, Nate. "Less and Less Wrong." Pp. 232-261 in *The Signal and the Noise: Why So Many Predictions Fail but Some Don't*. New York, NY: Penguin Books. [ER]
- Wheelan - Chapters 5, 5.5, and 6

Lab Activity

- Lab 4 - Probability and Bayes' Theorem

Assignment Due

- Final Project - Memo
- Problem Set 2 - Initial Data Cleaning (Week 3)

Week 5 - September 19th

The Distribution of Random Variables

Topics

- Inferential Statistics - Bionomial, Negative Binomial, Poisson, and Gaussian Distributions; Testing for Normality
- Data Analysis - Calculated Probabilities for Random Variables; Normality Tests in Stata
- Data Visualization - Normality Plots

Readings

- Freedman et al. - Chapters 5 and 15

Lab Activity

- Lab 5 - Working with Random Variables

Assignment Due

- Problem Set 3 - Probability and Bayes' Theorem (Week 4)

Week 6 - September 26th

Foundations for Inference

Topics

- Inferential Statistics - Standard Error, Confidence Intervals, Hypothesis Testing, and the Central Limit Theorem

Readings

- Freedman et al. - Chapters 6, 16, 17, and 18
- Wheelan - Chapters 8 and 9

Lab Activity

- Lab 6 - Foundations for Inference

Assignment Due

- Problem Set 4 - Working with Random Variables (Week 5)

Week 7 - October 3rd

Difference of Means (Part 1)

Topics

- Inferential Statistics - One and Two Sample T-Tests
- Quantitative Research - Automating Your Work: Macros

Readings

- Freedman et al. - Chapter 26
- Long - Chapter 4, pp. 83-92

Lab Activity

- Lab 7 - T-Tests by Hand and Macros

Assignment Due

- Quiz 1 - Covers Weeks 1 to 6
- Problem Set 5 - Foundations for Inference (Week 6)

Week 8 - October 10th

Difference of Means (Part 2)

Topics

- Inferential Statistics - Non-parametric Tests: Wilcoxon Rank Sum Test
- Data Analysis - One and Two Sample T-Tests in Stata; Effect Sizes and Power Analyses for T-Tests
- Data Visualization - Graphing T-Test Results
- Quantitative Research - Automating Your Work: Loops

Readings

- Acock - Chapter 7
- Long - Chapter 4, pp. 92-106

Lab Activity

- Lab 8 - T-Tests in Stata, Power Analyses, and Loops

Assignment Due

- Final Project - Literature Review, Hypotheses, and Data Analysis Plan

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Week 9 - October 18th

***Tegrity Lecture:** Working with Data (Part 2)*

Topics

- Quantitative Research - Exploring, Cleaning, and Documenting Datasets

Readings

- Long - Chapters 5 and 6
- Wheelan - Chapter 7

Lab Activity

- Lab 9 - Deep Cleaning Data

Assignment Due

- Problem Set 6 - T-Tests and Automation (Weeks 7 and 8)

Week 10 - October 24th

Correlations (Part 1)

Topics

- Statistics Applications - Public Polling
- Inferential Statistics - Pearson's *r*
- Data Visualization - Interpreting Scatterplots
- Quantitative Research - Digging in to the Final Project: Planning, Organizing, and Documenting

Readings

- Freedman et al. - Chapters 8 and 9; Chapters 19, 20, and 21
- Long - Chapter 7, pp. 287-298
- Wheelan - Chapters 4 and 10

Lab Activity

- Lab 10 - Pearson's *r* by Hand and Scatterplot Interpretations

Assignment Due

- Problem Set 7 - Deep Cleaning Data (Week 9)

Week 11 - October 31st

Correlations (Part 2)

Topics

- Inferential Statistics - Non-parametric Correlations: Spearman's *rho* and Kendall's *tau*
- Data Analysis - Pearson's *r* in Stata; Power Analyses for Correlations
- Data Visualization - Creating Scatterplots
- Quantitative Research - More Automation, Baseline Statistics, and Replication

Readings

- Acock - Chapter 8 (skip Section 8.5)
- Long - Chapter 7, pp. 298-303 and pp. 312-318

Lab Activity

- Lab 11 - Correlations in Stata, Power Analyses, and Scatterplots

Week 12 - November 7th

ANOVA

Topics

- Inferential Statistics - ANOVA Tests
- Data Analysis - ANOVA Tests in Stata
- Quantitative Research - Presenting Results: Creating Tables

Readings

- Acock - Chapter 9
- Long - Chapter 7, pp. 319-323

Lab Activity

- Quiz 2 - Weeks 7 to 11
- Lab 12 - ANOVA

Assignment Due

- Problem Set 8 - Correlation (Weeks 10 and 11)

Week 13 - November 14th

Bivariate Regression

Topics

- Inferential Statistics - Regression Theory and Bivarite Regression
- Data Analysis - Bivariate Regression in Stata
- Quantitative Research - Presenting Results: Graphs

Readings

- Acock - Chapter 8, pp. 207-212
- Freedman et al. - Chapters 10 and 11
- Long - Chapter 7, pp. 323-326
- Wheelan - Chapter 11

Lab Activity

- Lab 13 - Bivariate Regression

Assignment Due

- Problem Set 9 - ANOVA (Week 12)

Week 14 - November 21st

Multivariate Regression (Part 1)

Topics

- Inferential Statistics - Multivariate Regression Theory
- Data Analysis - Multivariate Regression in Stata
- Data Visualization - The `marginsplot` Command
- Quantitative Research - Creating Papers and Presentations

Readings

- Acock - Chapter 10, pp. 273-281
- Freedman et al. - Chapter 12
- Long - Chapter 7, pp. 326-328

Lab Activity

- Lab 14 - Multivariate Regression

Assignment Due

- Final Project - Draft of Paper and Slides

Week 15 - November 28th

Multivariate Regression (Part 2)

Topics

- Data Analysis - Multivariate Regression Assumptions and Model Fit
- Data Visualization - Plots for Model Fit
- Quantitative Research - A Project Checklist

Readings

- Acock - Chapter 10, pp. 281-296
- Long - Chapter 7, p. 328
- Wheelan - Chapter 12

Lab Activity

- Lab 15 - Multivariate Regression Diagnostics

Week 16 - December 5th

Analyzing Categorical Data

Topics

- Inferential Statistics - Chi-squared Test; Some Final Points on Statistical Analyses
- Data Analysis - Chi-squared Test in Stata; Power Analyses for Chi-squared Tests

Readings

- Acock - Chapter 6
- Freedman et al. - Chapters 28 and 29
- Kass et al. 2016. "Ten Simple Rules for Effective Statistical Practice." *PLoS Computational Biology* 12(6): e1004961. [ER]

Lab Activity

- Lab 16 - Analyzing Categorical Data

Assignments Due

- Quiz 3 - Weeks 12 to 15
- Problem Set 10 - Multivariate Regression

Week 17 - December 12th

Final Presentations

Topics

- Final Project Presentations - Analyses of the 2012 General Social Survey

Assignment Due

- Final Project - All requested data, code, and documentation
- Final Project - `.pdf` of Slides
- Final Project - `.pdf` and Printed Copy of Paper

Document Details

Document produced by Christopher Prener, Ph.D. for the Saint Louis University course SOC 5050 - QUANTITATIVE ANALYSIS: APPLIED INFERENTIAL STATISTICS. See the course wiki and the repository `README.md` file for additional details.