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READING LIST

SOC 4930 & SOC 5050: QUANTITATIVE ANALYSIS - APPLIED INFERENTIAL STATISTICS

FALL, 2017
SAINT LOUIS UNIVERSITY

Reading Notes

Reading Abbreviations

Abbreviation	Full Title
Freedman et al.	David Freedman, Robert Pisani, and Roger Purves (2014). *Statistics*. New York, NY: WW Norton & Company.
Wheelan	Charles Wheelan (2013). *Naked statistics: stripping the dread from the data*. New York, NY: WW Norton & Company.
Wickham	Hadley Wickham and Garrett Grolemund (2016). *R for data science*. Sebastopol, CA: O'Reilly.

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 28th

Course Introduction

Topics

- Syllabus Overview
- Inferential Statistics - What are quantitative data and what do they look like?
- Data Analysis - The Data Analysis Toolkit
- Quantitative Research - What is a Workflow?

Readings

- Freedman et al. - Chapters 1 and 2 [ER]
- J Scott Long (2009). *The workflow of data analysis using Stata*. College Station, TX: Stata Press. Chapter 1 [ER]
- Wheelan - Chapter 1 [ER]
- Wickham:
  - *Print* - Preface

    OR
  - *Web* - Chapter 1 [Link]

Items Due Before Class

- Weekly Prep 1 - Getting Started (see User's Guide)

Items Due 5pm on Tuesday, September 5th

- Diagnostic Assessment [Link]
- Student Information Sheet [Link]
- Lab 1 - Introduction to the Data Analysis Toolkit

Week 2 - September 4th

Working with Data (Part 1)

Topics

- Data Analysis - Initial Data Wrangling Tasks
- Data Visualization - An Introduction to `ggplot2`
- Quantitative Research - Structuring Scripts and Notebooks

Readings

- Wickham:
  - *Print* - Chapters 1, 2, and 3
    OR
  - *Web* - Chapters 2 through 5 [Link]

Items Due By 5pm on Tuesday, September 5th

- *From Prior Week:* Diagnostic Assessment, Student Information Sheet, Lab 1
- Weekly Prep 2 - Getting Started with `ggplot2`

Online Lectures - Full Playlist

- Lecture 2a - Introducing `ggplot2` [Link]
- Lecture 2b - Customizing Plots [Link]
- Lecture 3a - Tidy Data [Link]
- Lecture 3b - Verbs for Cleaning Data [Link]
- Lecture 4 - Structuring Scripts and Notebooks [Link]

Items Due Before *Next* Class

- Lab 2 - Initial Data Cleaning
- Problem Set 1 - Initial Data Cleaning

Week 3 - September 11th

Describing Distributions

Topics

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

Readings

- Freedman et al. - Chapters 3 and 4
- Wheelan - Chapters 2 and 3
- Wickham:
  - *Print* - Chapters 4, 5, and 6
    OR
  - *Web* - Chapters 6, 7, and 8 [Link]

Items Due Before Class

- *From Prior Week:* Lab 2 and Problem Set 1
- Weekly Prep 3 - Interpreting Plots

Items Due Before *Next* Class

- Final Project - Memo
- Lab 3 - Exploring Data in R
- Problem Set 2 - Exploring Data in R

Week 4 - September 18th

Probability and Bayes' Theorem

Topics

- Inferential Statistics - Probability and Bayes' Theorem

Readings

- Freedman et al. - Chapters 13 and 14
- Nate Silver (2012). *The signal and the noise: why so many predictions fail–but some don't*. New York, NY: Penguin. Chapter 8 [ER]
- Wheelan - Chapters 5, 5.5, and 6

Items Due Before Class

- *From Prior Week:* Lab 3 and Problem Set 2
- Final Project - Memo
- Weekly Prep 4 - What Are the Chances?

Items Due Before *Next* Class

- Lab 4 - Probability and Bayes' Theorem
- Problem Set 3 - Probability and Bayes' Theorem

Week 5 - September 25th

The Distribution of Random Variables

Topics

- Inferential Statistics - Bionomial, 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

Items Due Before Class

- *From Prior Week:* Lab 4 and Problem Set 3
- Weekly Prep 5 - The Normal Approximation

Items Due Before *Next* Class

- Lab 5 - Working with Random Variables
- Problem Set 4 - Working with Random Variables

Week 6 - October 2nd

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, 18, and Chapter 26 (*part* - pp. 475-488)
- Wheelan - Chapters 8 and 9

Items Due Before Class

- *From Prior Week:* Lab 5 and Problem Set 4
- Weekly Prep 6 - The Law of Averages

Items Due Before *Next* Class

- Lab 6 - Foundations for Inference
- Problem Set 5 - Foundations for Inference

Week 7 - October 9th

Difference of Means (Part 1)

Topics

- Inferential Statistics - One and Two Sample T-Tests
- Quantitative Research - More Data Wrangling: Tibbles and Tidy Data; Publishing and Presenting Quantitative Research

Readings

- Freedman et al. - Chapter 26 (*part* - pp. 488-500)
- Wickham - Chapters 7 and 9

Items Due Before Class

- *From Prior Week:* Lab 6 and Problem Set 5
- Weekly Prep 7 - The Law of Averages

Items Due Before *Next* Class

- Final Project - Annotated Bibliography (*SOC 5050 only*)
- Lab 7 - T-Tests by Hand and Data Wrangling

Week 8 - October 16th

Difference of Means (Part 2)

Topics

- Data Analysis - One and Two Sample T-Tests in R; Effect Sizes and Power Analyses for T-Tests
- Data Visualization - Plotting T-Test Results
- Quantitative Research - Getting Started with LaTeX

Readings

- Stefan Kottwitz (2011). *LaTeX beginner's guide*. Packt Publishing Ltd. Chapters 1 and 2 [PL]

Items Due Before Class

- *From Prior Week:* Lab 7
- Final Project - Annotated Bibliography (*SOC 5050 only*)
- Weekly Prep 8 - LaTeX Basics

Items Due By 5pm on Wednesday, October 20th

- Lab 8 - T-Tests in R, Power Analyses, and Descriptive Statistics Tables in LaTeX
- Problem Set 6 - Difference of Means

Week 9 - October 23rd

Working with Data (Part 2)

Topics

- Quantitative Research - Deep Cleaning Data (Tibbles, Factors) and Streamlining Your Work (Pipes and Functions); Writing Papers in LaTeX

Readings

- Wickham:
  - *Print* - Chapters 7, 9, 12, 15, and 16
    OR
  - *Web* - Chapters 10, 12, 15, 18, and 19 [Link]

Items Due By 5pm on Wednesday, October 20th

- *From Prior Week:* Lab 8 and Problem Set 6
- Weekly Prep 9 - A Simple Function

Online Lectures - Full Playlist

- Lecture 11 - Tidy Data and Tibbles [Link]
- Lecture 12 - Working with Factors [Link]
- Lecture 13a - Streamlining Your Work: Pipes [Link]
- Lecture 13b - Streamlining Your Work: Functions [Link]
- Lecture 14 - Writing Papers in LaTeX

Items Due Before *Next* Class

- Lab 9 - Streamlined Data Cleaning
- Problem Set 7 - Streamlined Data Cleaning

Week 10 - October 30th

Correlations (Part 1)

Topics

- Statistics Applications - Public Polling
- Inferential Statistics - Pearson's *r*
- Data Visualization - Interpreting Scatterplots
- Quantitative Research - LaTeX Handouts

Readings

- Freedman et al. - Chapters 8 and 9; Chapters 19, 20, and 21
- Wheelan - Chapters 4 and 10

Items Due Before Class

- *From Prior Week:* Lab 9 and Problem Set 7
- Weekly Prep 10 - Interpreting Scatterplots

Items Due Before *Next* Class

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

Week 11 - November 6th

Correlations (Part 2)

Topics

- Data Analysis - Pearson's *r* in R; Power Analyses for Correlations
- Data Visualization - Creating Scatterplots
- Quantitative Research - LaTeX Equations

Readings

- Stefan Kottwitz (2011). *LaTeX beginner's guide*. Packt Publishing Ltd. Chapter 8, pp. 189-196 [PL]

Items Due Before Class

- *From Prior Week:* Lab 10
- Weekly Prep 11 - Creating Scatterplots

Items Due Before *Next* Class

- Final Project - Draft Handout and Draft Slides (*all students*); Draft Paper (*SOC 5050 only*)
- Lab 11 - Pearson's *r* in R and Creating Scatterplots

Items Due Before Class on November 20th (Week 13)

- Problem Set 8 - Correlations

Week 12 - November 13th

Bivariate Regression

Topics

- Inferential Statistics - Regression Theory and Bivarite Regression
- Data Analysis - Bivariate Regression in R
- Quantitative Research - Regression Equations in LaTeX

Readings

- Freedman et al. - Chapters 10 and 11
- Wheelan - Chapter 11

Items Due Before Class

- *From Prior Week:* Lab 11
- Final Project - Draft Handout and Draft Slides (*all students*); Draft Paper (*SOC 5050 only*)
- Weekly Prep 12 - The Regression Line

Items Due Before *Next* Class

- Lab 13 - Bivariate Regression

Week 13 - November 20th

Multivariate Regression (Part 1)

Topics

- Inferential Statistics - Multivariate Regression Theory
- Data Analysis - Multivariate Regression in R
- Quantitative Research - Citing Sources in LaTeX

Readings

- Freedman et al. - Chapter 12
- Stefan Kottwitz (2011). *LaTeX beginner's guide*. Packt Publishing Ltd. Chapter 7, pp. 177-185 [PL]

Items Due Before Class

- *From November 6th:* Problem Set 8
- *From Prior Week:* Lab 12
- Weekly Prep 13 - A Simple Bibliography in LaTeX

Items Due Before *Next* Class

- Lab 14 - Multivariate Regression
- Problem Set 9 - Multivariate Regression

Week 14 - November 27st

Multivariate Regression (Part 2)

Topics

- Data Analysis - Multivariate Regression Assumptions and Model Fit
- Data Visualization - Plots for Model Fit
- Quantitative Research - Presenting Results: Regression Tables in LaTeX

Readings

- Wheelan - Chapter 12

Items Due Before Class

- *From Prior Week:* Lab 13 and Problem Set 9
- Weekly Prep 14 - Regression Tables in LaTeX

Items Due Before *Next* Class

- Lab 14 - Multivariate Regression Diagnostics
- Problem Set 10 - Multivariate Regression Diagnostics

Week 15 - December 4th

ANOVA

Topics

- Inferential Statistics - ANOVA Tests
- Data Analysis - ANOVA Tests in `R`
- Quantitative Research - Presenting Results: More with `ggplot2` and Inserting Images in LaTeX

Readings

- Wickham:
  - *Print* - Chapter 22
    OR
  - *Web* - Chapter 28 [Link]

Items Due Before Class

- *From Prior Week:* Lab 14 and Problem Set 10
- Weekly Prep 15 - More with `ggplot2`

Items Due Before *Next* Class

- Lab 15 - ANOVA

Week 16 - December 11th

Analyzing Categorical Data

Topics

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

Readings

- 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]

Items Due Before Class

- *From Prior Week:* Lab 15
- Weekly Prep 16 - The Structure of the Chi-squared Test

Items Due By 4pm on Tuesday, December 18th

- Lab 16 - Analyzing Categorical Data

Week 17 - December 18th

Final Presentations

Topics

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

Items Due by 4pm on Tuesday, December 18th

- *From Prior Week:* Lab 16
- Final Project - All requested data, code, and documentation (*all students*)
- Final Project - `.pdf` of Slides and Handout (*all students*)
- Final Project - `.pdf` and Printed Copy of Paper (*SOC 5050 only*)

Final Presentations will be given in MOR 2720 during our designated finals period - 4pm to 5:50pm on December 18th