

PSY 5790: Univariate Statistics

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Class Hours: TR 09:30 a.m. - 10:45 a.m.

Class Room: 2603 Morrissey Hall

Required Texts (Open Source)

[1] D.M. Diez, C.D. Barr and M. Cetinkaya-Rundel. *OpenIntro Statistics*. Vol. 3. OpenIntro, Inc., 2015. <http://www.openintro.org/>.

[2] H. Wickham and G. Grolemund. *R for Data Science: Import, Tidy, Transform, Visualize, and Model Data*. O'Reilly Media, Inc., 2016. <https://r4ds.had.co.nz>.

Required Software (Open Source)

[1] R Core Team. *R: A Language and Environment for Statistical Computing*. R Foundation for Statistical Computing. Vienna, Austria, 2018. <http://www.R-project.org>.

[2] RStudio Team. *RStudio: Integrated Development Environment for R*. RStudio, Inc. Boston, MA, 2018. <http://www.rstudio.com/>.

Required Hardware

A personal laptop computer, running either OS X or Windows.

Dropbox

This course will use the file sharing software **Dropbox**. A free account can be set up by visiting www.dropbox.com. I also strongly suggest you download the desktop client for **Dropbox**, which will enable you to easily work with shared files from your personal computer.

Course Description

This course introduces students to the discipline of statistics as a science of understanding and analyzing data. Throughout the semester, students learn how to effectively make use of data in the face of uncertainty, including:

- How to collect and curate data
- How to analyze data
- How to use data to make inferences and conclusions about real world phenomena

Course Goals

This course has been structured around seven related goals:

- **Goal 1.** Recognize the importance of data collection, identify limitations in data collection methods and other sources of statistical bias, and determine their implications and how they affect the scope of inference.
- **Goal 2** Use statistical software to summarize data numerically and visually, and to perform data analysis.
- **Goal 3.** Have a conceptual understanding of the unified nature of statistical inference.
- **Goal 4.** Apply estimation and testing methods to analyze single variables or the relationship between two variables in order to understand natural phenomena and make data-based decisions.
- **Goal 5.** Model numerical response variables using a single explanatory variable or multiple explanatory variables in order to investigate relationships between variables.
- **Goal 6.** Interpret results correctly, effectively, and in context without relying on statistical jargon.
- **Goal 7.** Critique data-based claims and evaluate data-based decisions.

Course Policies

Grading Policy

- **25%** of your grade will be determined by a take-home midterm examination.
- **25%** of your grade will be determined by a take-home final examination.
- **25%** of your grade will be determined by your attendance and participation in class.
- **25%** of your grade will be determined by weekly learning checks

Examinations

There will be a take-home midterm and take-home final examination. Both exams will be assigned on the Tuesday of a given exam week, and are due by the end of class on the Thursday of an exam week. More details of both will be provided as we move forward.

Learning Checks

There will be weekly learning checks, which are assignments that you complete at home. Learning checks are designed to have you apply the material we have learned in class, and are due on the Tuesday following the presentation of a given topic (e.g., the “Week 3 Learning Check” is due on the Tuesday of “Week 4”).

We will spend approximately 20 minutes at the beginning of each Tuesday class session discussing the previous week’s learning check via “pair and share.” More specifically, you first will break into

groups of two, and discuss your answers to each question with a partner for approximately 10 minutes (i.e., “pair”). After this discussion, one pair will be selected at random to present their answers to a chosen learning check question to the class (i.e., “share”).

Learning checks will not be collected or formally graded, however, I will walk around and take note of whether or not you have attempted the assignment. It’s not important whether you get the “correct” answer for each learning check question, rather it is more important that you attempt each question, discuss any troubles you had arriving at an answer, and any differences between how each member of the pair attempted the analysis; this is meant to be a developmental, not an evaluative exercise. Full answers will be posted to self-check your work.

Final Grades

Letter	Percent
A	93-100%
A-	90-92.9%
B+	87-89.9%
B	83-86.9%
B-	80-82.9%
C+	77-79.9%
C	73-76.9%
C-	70-72.9%
D	60-69.9%
F	<60%

Attendance Policy

Although I do not formally take attendance, attendance and participation (i.e., being present and actively engaged in classroom discussions and activities) counts toward your final grade.

Syllabus Revisions

Other readings or activities may be assigned or substituted throughout the semester. Scheduling may be rearranged to accommodate guest lecturers or other events that may occur. Any changes made will be done as far in advance as possible to allow students the time necessary to prepare for class. The instructor reserves the right to make changes and/or additions to course policies as deemed appropriate.

University Policies

Title IX

Saint Louis University and its faculty are committed to supporting our students and seeking an environment that is free of bias, discrimination, and harassment. If you have encountered any form of sexual misconduct (e.g. sexual assault, sexual harassment, stalking, domestic or dating violence),

we encourage you to report this to the University. If you speak with a faculty member about an incident of misconduct, that faculty member must notify SLU's Title IX coordinator, Anna R. Kratky (DuBourg Hall, Room 36; akratky@slu.edu; 314-977-3886) and share the basic facts of your experience with her. The Title IX coordinator will then be available to assist you in understanding all of your options and in connecting you with all possible resources on and off campus.

If you wish to speak with a confidential source, you may contact the counselors at the University Counseling Center at 314-977-TALK. To view SLU's sexual misconduct policy and for resources, please visit the following web addresses: www.slu.edu/here4you and <https://www.slu.edu/general-counsel>.

Disability Services

Students with a documented disability who wish to request academic accommodations must contact Disability Services to discuss accommodation requests and eligibility requirements. Once successfully registered, the student also must notify the course instructor that they wish to access accommodations in the course.

Please contact Disability Services, located within the Student Success Center, at Disability_services@slu.edu or 314.977.3484 to schedule an appointment. Confidentiality will be observed in all inquiries. Once approved, information about the student's eligibility for academic accommodations will be shared with course instructors via email from Disability Services and viewed within Banner via the instructor's course roster.

Note: Students who do not have a documented disability but who think they may have one are encouraged to contact Disability Services.

Academic Integrity

Academic integrity is honest, truthful and responsible conduct in all academic endeavors. The mission of Saint Louis University is "the pursuit of truth for the greater glory of God and for the service of humanity." Accordingly, all acts of falsehood demean and compromise the corporate endeavors of teaching, research, health care, and community service via which SLU embodies its mission. The University strives to prepare students for lives of personal and professional integrity, and therefore regards all breaches of academic integrity as matters of serious concern.

The governing University-level Academic Integrity Policy was adopted in Spring 2015, and can be accessed at: https://www.slu.edu/provost/policies/academic-and-course/policy_academic-integrity_6-26-2015.pdf.

Additionally, each SLU College, School, and Center has adopted its own academic integrity policies, available on their respective websites. All SLU students are expected to know and abide by these policies, which detail definitions of violations, processes for reporting violations, sanctions, and appeals. Please direct questions about any facet of academic integrity to your faculty, the chair of the department of your academic program, or the Dean/Director of the College, School or Center in which your program is housed.

Student Success Center

In recognition that people learn in a variety of ways and that learning is influenced by multiple factors (e.g., prior experience, study skills, learning disability), resources to support student success are available on campus. The Student Success Center assists students with academic-related services and is located in the Busch Student Center (Suite, 331). Students can visit <https://www.slu.edu/life-at-slu/student-success-center/> to learn more about tutoring services, university writing services, disability services, and academic coaching.

University Writing Services

Students are encouraged to take advantage of University Writing Services in the Student Success Center; getting feedback benefits writers at all skill levels. Trained writing consultants can help with writing projects, multimedia projects, and oral presentations. University Writing Services offers one-on-one consultations that address everything from brainstorming and developing ideas to crafting strong sentences and documenting sources. For more information, visit <https://www.slu.edu/life-at-slu/student-success-center/> or call the Student Success Center at 314-977-3484.

Basic Needs Security

Students in personal or academic distress and/or who may be specifically experiencing challenges such as securing food or difficulty navigating campus resources, and who believe this may affect their performance in the course, are encouraged to contact the Dean of Students Office (deanofstudents@slu.edu or 314-977-9378) for support. Furthermore, please notify the instructor if you are comfortable in doing so, as this will enable them to assist you with finding the resources you may need.

Class Schedule

Note: Class schedule for planning purposes only; subject to change.

Week 01, 08/26 - 08/30: Welcome: Course Introduction

- Download & Install R & RStudio
- Diez, Barr, & Cetinkaya-Rundel (2015): Chapter 1

Week 02, 09/02 - 09/06: RMarkdown & RStudio

- **No class Thursday, NAS Meeting**
- Wickham & Grolemund (2016): Chapter 4
- Wickham & Grolemund (2016): Chapter 27

Week 03, 09/09 - 09/13: Data Visualization

- Wickham & Grolemund (2016): Chapter 2
- Week #3 Learning Check

Week 04, 09/16 - 09/20: Tidy Data

- Wickham & Grolemund (2016): Chapter 12
- Week #4 Learning Check

Week 05, 09/23 - 09/27: Data Wrangling

- Wickham & Grolemund (2016): Chapter 5
- Week #5 Learning Check

Week 06, 09/30 - 10/04: Regression: Part I

- **No class Thursday, NAS Meeting**
- Diez, Barr, & Cetinkaya-Rundel (2015): Chapter 7
- Week #6 Learning Check

Week 07, 10/07 - 10/11: Regression: Part II

- Diez, Barr, & Cetinkaya-Rundel (2015): Chapter 8
- Week #7 Learning Check

Week 08, 10/14 - 10/18: Midterm Examination Week

Week 09, 10/21 - 10/25: Fall Break

Week 10, 10/28 - 11/01: Basics of Inference: Sampling

- Diez, Barr, & Cetinkaya-Rundel (2015): Chapter 2
- Week #10 Learning Check

Week 11, 11/04 - 11/08: No class, Aging and Work Meeting 2019

Week 12, 11/11 - 11/15: Basics of Inference: Confidence Intervals

- Diez, Barr, & Cetinkaya-Rundel (2015): Chapter 3
- Diez, Barr, & Cetinkaya-Rundel (2015): Chapter 4
- Week #12 Learning Check

Week 13, 11/18 - 11/22: Basics of Inference: Hypothesis Testing

- Diez, Barr, & Cetinkaya-Rundel (2015): Chapter 3
- Diez, Barr, & Cetinkaya-Rundel (2015): Chapter 4
- Week #13 Learning Check

Week 14, 11/25 - 11/29: Inferences from Numerical & Categorical Data

- No class Thursday, Thanksgiving break
- Diez, Barr, & Cetinkaya-Rundel (2015): Chapter 5 & 6
- Week #14 Learning Check

Week 15, 12/02 - 12/06: Final Examination Week