

Introduction to Quantitative Political Research

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University of North Texas
Department of Political Science

August 30th, 2022

- **Quantitative Social Science** is the use of quantitative data to study, analyze, or predict social and political phenomena

Introduction

PSCI 3300
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Why Take
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What
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do Today?

- **Quantitative Social Science** is the use of quantitative data to study, analyze, or predict social and political phenomena
- Outside of academic settings, this is more commonly known as *data science*

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 - The logic of quantitative social inquiry we will cover in this class is applied in academic social sciences, government, non-profits, and in the private sector

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- This course introduces students to the logic of causal inference and the tools social scientists use to study social, political, and economic phenomena

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- This course introduces students to the logic of causal inference and the tools social scientists use to study social, political, and economic phenomena
 - We will focus primarily on quantitative approaches to the study of politics with an emphasis on application, causal reasoning, and prediction

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- PSCI 3300 is a required course for political science majors so you'll have to take it at some point

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 - Contemporary political science is a primarily quantitative field, so understanding the tools of the trade will help you understand and critique the things you read in your other classes

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- I will not require you to laugh at my jokes

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- Math for the sake of math is an unfortunately common but largely unproductive way to teach quantitative social science

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- Though there is some basic statistics required, that means less of this

$$\text{Normal}(y|\mu, \sigma) = \frac{1}{\sqrt{2\pi} \sigma} \exp \left(-\frac{1}{2} \left(\frac{y - \mu}{\sigma} \right)^2 \right)$$

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- And more hands-on stuff like this

```
## Simulate 10,000 random draws from a standard normal dist  
std_norm <- rnorm(n = 10e3, mean = 0, sd = 1)
```

```
## Print a summary  
summary(std_norm)
```

Min.	1st Qu.	Median	Mean	3rd Qu.	Max.
-3.510897	-0.668450	0.000010	-0.001686	0.661517	3.705430

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 - Andrew Gelman, Jennifer Hill, and Aki Vehtari. *Regression and Other Stories*. Cambridge University Press, 2021. ISBN: 9781107676510
- All additional readings for the course and various instructional resources for applied statistics and programming in R are provided via the course's Canvas page

Technical Requirements

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- If you do not have access to a personal computer that meets the minimum requirements necessary to run R, you can access both R and RStudio from computers on the UNT campus

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- The computers in the political science lab in Wooten Hall 173 should have the most recent version of R, RStudio, and RTools

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- If you expect to have difficulty meeting the technical requirements for this course you need to let me know immediately

Getting Started with R

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What
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- Detailed instructions for installing R, RTools/Xcode, RStudio, and configuring Stan are provided on the course's Canvas page

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- We will also make use of the probabilistic programming language Stan via it's R interfaces **brms** and **rstanarm** during parts of this course

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- You should come to class having done the readings on the syllabus for that day so that we can discuss anything that isn't clear or appears confusing
- 10% of your grade in this course consists of participation. This means showing up to class, asking relevant questions, and completing occasional in-class activities

● Problem Sets

Assignment	Topic	Due Date
Problem Set 0	Getting Started with R and Markdown	September 4th, 2022
Problem Set 1	Data Wrangling and Visualization	September 25th, 2022
Problem Set 2	Probability and Descriptive Statistics	October 9th, 2022
Problem Set 3	Regression and Inferential Statistics	October 30th, 2022
Problem Set 4	Regression for Causal Inference	November 20th, 2022

● Problem Sets

- You will complete five problem sets which will account for 40% of your overall grade and ask you to apply the things we cover in class using real or simulated data

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● Problem Sets

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- Instructions for each problem set will be posted on the course's Canvas page approximately two weeks before its respective due date

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- **Final Project**

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- Develop a research question relevant to political science or public policy, identify the necessary source(s) of data, and undertake an analysis using R to answer the question

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- Broken down into a series of smaller assignments over the course of the semester

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- Broken down into a series of smaller assignments over the course of the semester
- Accounts for 50% of your overall grade; 70% from 8-12 page research paper and 30% from a final presentation

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- Follow the instructions on Canvas for installing R, RStudio, and Stan
- Start thinking about an empirical political research question