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Class location and time: Center for Law and Justice 573, Thursdays 6:00pm – 8:40pm

Office hours: Thursdays 4:00pm-5:00pm or by appointment

Office: Center for Law and Justice, Room 542

SCJ 523: Data Analysis & Management, Fall 2023

Course Description

This course is an introduction to methods for analyzing quantitative criminal justice data. Emphasis is placed on understanding data in relation to key methodological concepts, including units of analysis, variables, measurement, and associations. It teaches strategies for presenting data patterns graphically, describing distributions and relationships through summary statistics, and drawing conclusions about sampled populations using inferential statistical methods, including statistical models. In doing so, it will teach methods for assessing univariate, bivariate, and multivariate patterns and relationships.

Course Learning Objectives

1. Define the main characteristics of research designs.
2. Distinguish the levels of measurements and types of variables.
3. Choose, apply, and correctly interpret summary measures.
4. Visualize distributions of continuous and categorical variables.
5. Calculate and interpret measures of association.
6. Explain the principles of statistical inference.
7. Test hypotheses using bivariate analytic techniques.
8. Conduct basic statistical analyses by hand and using computer software.

Requirements and Grading

20% of total grade – In-class participation

Our class sessions will involve your active participation in discussions and activities. I use your participation to assess your mastery of the course material and shape the class discussions. If you are not comfortable speaking extemporaneously, don't worry, I will give you plenty of chances to write your responses before sharing them. While we will review some of the assigned material, the class sessions will largely extend the concepts from the readings, so make sure you have completed them thoroughly, including annotating them and rereading sections you don't understand. Come to each class with the reading's main idea and one question you have for the reading. It is a good idea to write down the idea and question ahead of time as I will often start discussions by asking people to recite theirs. The question could be something you didn't understand, something you want to discuss further, or a critique you have.

20% – Exercises

Five times this semester, you will have a short homework assignment to complete like making a graph, finding a dataset, or merging two datasets. Brenden will elaborate on them at least one week before they are due.

60% – Take-home analyses

Four times during the semester, you'll complete a take-home analysis incorporating the ideas you've learned. Each analysis will cover the material since the previous analysis, but some ideas build on one another. You'll have six days to complete each analysis. You will not be able to collaborate with other students on the analyses nor receive outside help. You are welcome to use any available non-human resources like your notes, the readings, and the internet.

Letter grades are the unrounded percentages and follow the typical A for 93% or above, A- for 90% to 92.9%, B+ for 87% to 89.9%, etc., with the minus and plus cut-offs at the 3s and 7s.

Required texts

- Urdan, Timothy. 2022. *Statistics in Plain English*. Taylor & Francis. 5th Edition.
 - PDF posted to Canvas.
 - If you prefer a hard copy, be sure to buy the 5th edition, not a previous edition.
- Best, Joel. 2013. *Stat Spotting: A Field Guide to Identifying Dubious Data*.
 - PDF posted to Canvas.
 - If you prefer a hard copy, be sure to buy the “updated and expanded” 2013 edition with the orange cover.
- All other materials will be posted to Canvas.

Late Work

If you submit work late, the late assignment's grade will be reduced by one letter grade (10%) for every 24 hours it is late. Presentations cannot be made up. Technical difficulties are not an excuse for missing deadlines, so allow extra time before the deadline in case you need switch computers or contact [IT Support](#). If there is an emergency life situation, email me 24 hours in advance of the assignment due date.

Technology

Please bring a tablet or laptop to class each day, as some in-class activities will involve accessing Stata and other software on the [virtual computer lab](#). If bringing a device is not possible for any reason (its too expensive, it's broken, you're sharing it with friends/family, etc.), just let me know and we will work something out.

Your Rutgers email account is the official form of communication for this class and you should check it regularly. You are responsible for all information about the class sent to that email address. Please use only your Rutgers email because the University spam filter sometimes eats emails from non-Rutgers email addresses. If you email me and do not get a response within 48

hours, please email me again to remind me. I respond to Canvas messages much slower than email.

Plagiarism

Plagiarism of any kind will result in you failing the course. For more information, review the university's academic integrity policy [here](#). I will be using plagiarism detection software to assess your take-home assignments. You may consult large-language models like Chat GPT or Google Bard for reference, but you may not include any of their outputs in your work. In class, we'll discuss the best ways to use these tools.

Attendance

As with any seminar, your attendance and participation will be vital to your getting the most out of the class. Every student can miss one class without penalty, no excuse needed. If you are going to miss more than one, please email me. Unexcused absences will result in a lower participation grade. Whether the absence is excused or not, make sure to coordinate with a fellow student to learn what you missed.

Course Schedule

Date	Required Readings	Assignments Due
Week 1 Introduction 9/7		Complete the course survey by the end of class
Week 2 Data Analysis Basics 9/14	<ul style="list-style-type: none"> ● Urdan, Ch. 1 (pp. 1-14). Principles, populations, variables, and distributions ● Trochim, "Units of Analysis" <ul style="list-style-type: none"> ○ https://conjointly.com/kb/unit-of-analysis/ ● Best, <i>Stat-Spotting</i>, Part 1 (pp. 3-13) 	Exercise: Movie data due by 9/13 at 11:59pm
Week 3 Distributions and Measures of Central Tendency 9/21	<ul style="list-style-type: none"> ● Math Is Fun, "Frequency distributions" <ul style="list-style-type: none"> ○ https://www.mathsisfun.com/data/frequency-distribution.html ● Histograms: https://onlinestatbook.com/2/graphing_distributions/histograms.html ● Rumsey, "Skew in frequency distributions" <ul style="list-style-type: none"> ○ https://www.dummies.com/education/math/statistics/how-to-identify-skew-and-symmetry-in-a-statistical-histogram/ ● Urdan, Ch. 2 (pp. 15-22). Measures of Central Tendency ● Best, <i>Stat-Spotting</i>, Part 2 C & D (pp. 17-40) 	No assignment due
Week 4 Variability 9/28	<ul style="list-style-type: none"> ● Urdan, Ch. 3 (pp. 23-34). Variability ● Lane, "Measures of variability" <ul style="list-style-type: none"> ○ https://onlinestatbook.com/2/summarizing_distributions/variability.html ● Best, <i>Stat-Spotting</i>, Part 2, E & F (pp. 41-63) 	Exercise: Graph of one variable over time due by 4pm on 9/28 and presented in class. Analysis #1 Assigned

Week 5 Normal distributions 10/5	<ul style="list-style-type: none"> • Urdan, Ch. 4 (pp. 35-43). Normal distributions. 	Analysis #1 Due 11:59pm on 10/4
Week 6 Standard Errors and Sampling Distributions 10/12	<ul style="list-style-type: none"> • Standard Errors (Urdan, ch. 6, pp. 59-74) • Frost, "Sample Statistics Are Always Wrong" <ul style="list-style-type: none"> ◦ https://statisticsbyjim.com/basics/sample-statistics-wrong/ • Sampling distribution of the mean (<i>OSB Sampling Distributions</i>, E, pages 307-310) • Best, <i>Stat-Spotting</i>, Part 2 G & H (pp. 64-99) 	No assignment due
Week 7 Confidence Intervals 10/19	<ul style="list-style-type: none"> • Urdan, Ch. 7 (pp. 75-96). Statistical Significance, Effect Size, and Confidence Intervals. • Minitab, "What are Degrees of Freedom in Statistics?" <ul style="list-style-type: none"> ◦ https://blog.minitab.com/en/statistics-and-quality-data-analysis/what-are-degrees-of-freedom-in-statistics • Best, <i>Stat-Spotting</i>, Part 2 I (pp. 100 – 115) • McLeod, "Confidence Intervals Explained" <ul style="list-style-type: none"> ◦ https://www.simplypsychology.org/confidence-interval.html 	Exercise: Dataset merge assignment due by 4pm on 10/19. Analysis #2 Assigned
Week 8 Hypothesis testing 10/26	<ul style="list-style-type: none"> • Lane, <i>Logic of Hypothesis Testing</i> Parts A, B, and E-I. <ul style="list-style-type: none"> ◦ https://onlinestatbook.com/2/logic_of_hypothesis_testing/logic_hypothesis.html • UCLA, "Choosing the Correct Statistical Test." (Skim for the basics, do not worry if some parts are unfamiliar) <ul style="list-style-type: none"> ◦ https://stats.oarc.ucla.edu/other/mult-pkg/whatstat/ 	Analysis #2 Due 11:59pm on 10/25
Week 9 <i>t</i> Tests comparing two means 11/2	<ul style="list-style-type: none"> • Urdan, Ch. 8 (pp. 97-116). <i>t</i> Tests. 	Exercise: Present a dataset. Due to Canvas by 4pm on 11/2 and presented in class.
Week 10 No class 11/9	No class this week. Brenden away.	No assignment due
Week 11 Comparing Three or More Means 11/16	<ul style="list-style-type: none"> • Urdan, Ch. 9 (pp. 119-136) Analysis of Variance • https://www.analyticsvidhya.com/blog/2018/01/anova-analysis-of-variance/ 	Exercise: Original graph or map due by 4pm on 11/16 and presented in class.
Week 12 11/22 Chi Square Tests CLASS MEETS ON TUESDAY	<ul style="list-style-type: none"> • Urdan, part of Ch. 14 (pp. 222-230) • https://www.mathsisfun.com/data/chi-square-test.html • Lane, <i>Testing Goodness of Fit</i>: https://onlinestatbook.com/2/chi_square/one-way.html 	Analysis #3 Assigned

Week 13 Correlations 11/30	<ul style="list-style-type: none"> ● Urdan, Ch. 12 (pp. 171-190). Correlations. ● https://www.scribbr.com/statistics/pearson-correlation-coefficient/ 	Analysis #3 Due at 11:59pm on 11/29
Week 14 Regression 12/7	<ul style="list-style-type: none"> ● Urdan, Ch. 13 (pp. 191-214). Regressions. ● UCLA, <i>Regression with Stata</i>, "Simple and Linear Regression." (Skim section 1.2, skip section 1.7) <ul style="list-style-type: none"> ○ https://stats.oarc.ucla.edu/stata/webbooks/reg/chapter1/regressionwith-statachapter-1-simple-and-multiple-regression/ ● Optional: UCLA, Stata Annotated Output <ul style="list-style-type: none"> ○ https://stats.oarc.ucla.edu/stata/output/regression-analysis/ 	Analysis #4 Assigned
Finals Week 12/15-12/22	No class. Finals week.	Analysis #4 Due at 5pm on Tuesday 12/20

Accommodation and Support Statement

Rutgers University-Newark (RU-N) is committed to the creation of an inclusive and safe learning environment for all students and the University as a whole. RU-N has identified the following resources to further its mission of access and support:

For Individuals Experiencing Disability: The Office of Disability Services (ODS) works with students with medical, physical, and/or mental conditions who encounter disabling barriers to determine reasonable and appropriate accommodations for access. Students who have completed the process with ODS and have approved accommodations are provided a Letter of Accommodation (LOA) specific to each course. To initiate accommodations for their course students must both provide the LOA and have a conversation with the course instructor about the accommodations. This should occur as early in the semester as possible. More information can be found at the [RU-N ODS website \(ods.newark.rutgers.edu\)](https://ods.newark.rutgers.edu). Contact ODS at (973) 353-5375 or via email at ods@newark.rutgers.edu.

For Individuals who are Pregnant: The Office of Title IX and ADA Compliance is available to assist with any concerns or potential accommodations related to pregnancy. Students may contact the Office of Title IX and ADA Compliance at (973) 353-5063 or via email at TitleIX@newark.rutgers.edu.

For Short-term Absence Verification: The Office of the Dean of Students can help with absences related to religious observance, emergency or unavoidable conflict (illness, personal or family emergency, etc.). Students should refer to [University Policy 10.2.7](#) for information about expectations and responsibilities. The Office of the Dean of Students can be contacted by calling (973) 353-5063 or emailing deanofstudents@newark.rutgers.edu.

For Individuals with temporary conditions/injuries: The Office of the Dean of Students can assist students who are experiencing a temporary condition or injury (broken or sprained limbs, concussions, recovery from surgery, etc.). Students experiencing a temporary condition or injury should submit a request using the following link: <https://temporaryconditions.rutgers.edu>.

For Gender or Sex-Based Discrimination or Harassment: The Office of Title IX and ADA Compliance can assist students who are experiencing any form of gender or sex-based discrimination or harassment, including sexual assault, sexual harassment, relationship violence, or stalking. Students can report an incident to the Office of Title IX and ADA Compliance by calling (973) 353-1906 or emailing TitleIX@newark.rutgers.edu. Incidents may also be reported by using the following link: tinyurl.com/RUNReportingForm. For more information, students should refer to the University's Title IX Policy and Grievance Procedures located at <https://uec.rutgers.edu/wp-content/uploads/60-1-33-current-1.pdf>

For support related to Interpersonal Violence: The Office for Violence Prevention and Victim Assistance (VPVA) can provide any student with confidential support. VPVA is a confidential resource and does **not** have a reporting obligation to Title IX. Students can contact the office by calling (973) 353-1918 or emailing run.vpva@rutgers.edu. VPVA also maintains a confidential text-based helpline available to students; students can text (973) 339-0734 for support. Students do not need to be a victim/survivor of violence to receive assistance; any student can receive services, information, and support.

For Crisis and Concerns: The Campus Awareness Response and Education (CARE) Team works with students in crisis to develop a plan of support plan and address personal situations that might impact their academic performance. Connect with the CARE Team by using the following link: tinyurl.com/RUNCARE or emailing careteam@rutgers.edu.

For Psychological Support (Stress, Mood, Family Issues, Substance Use concerns and other personal challenges): The Rutgers University-Newark Counseling Center provides individual therapy and support groups for students dealing with psychological issues. To schedule an appointment, email counseling@newark.rutgers.edu or call (973) 353-5805.

Additional support is available to any RU-N student through Uwill services:

- ✓ Umatch: Teletherapy with flexible scheduling, starting with a free account.
- ✓ Uhelp: Crisis support at 833-646-1526 (available 24/7/365).
- ✓ Urise: Wellness-based video collection with a free account.

Access Uwill@RUN at <https://my.rutgers.edu> using your netid. Services are confidential and free.

For emergencies, call 911 or Rutgers University Police Department at (973) 353-5111.