

# 56:792:602 Design for Causal Analysis

Spring 2024

Thomas A. Dahan, PhD

Nursing and Science Building, Rm 425

[Tom.dahan@camden.rutgers.edu](mailto:Tom.dahan@camden.rutgers.edu)

**Office Hours: Tuesdays 10am – 2pm, schedule here:** <https://go.rutgers.edu/tomisavailable>

## Course Description

The cornerstone of empirical research is causal inference. To draw causal inference from data, we must design research questions and apply research methods appropriate to interpreting results as a cause-effect relationship. In this course, we will introduce the concept of causality and explore research designs that yield results with causal interpretations.

This course will explore concepts that require an understanding of statistical inference. However, the course will not require intensive mathematical computation, but will enable students to understand the logic and methods that yield causal interpretations from data.

## Learning Objectives

By the end of this course, students will be able to:

- Explain the concept of causality and differentiate causal research from research that does not yield causal interpretations.
- Understand the various threats to internal and external validity that limit research designs from yielding causal interpretations.
- Apply research designs and analytic methods to yield causal interpretations from empirical data.
- Develop a research proposal that yields results that can be plausibly interpreted with causal conclusions or implications for prevention science.

## Required Textbooks

Cunningham, Scott (2021). *Causal Inference: The Mixtape*. Yale University Press.

While I highly encourage all students to purchase this text (it costs roughly \$35), this book is also available online from the author at his website: <https://mixtape.scunning.com/>.

Murnane, Richard J. and Willet, John B. (2010). *Methods Matter: Improving Causal Inference in Educational and Social Science Research*. Oxford University Press.

Again, I highly recommend that students purchase this text (this text is more expensive, roughly \$65 for an online version and \$75 for a hard copy), students may access this text online through the Rutgers University library's ProQuest Ebook Central: <https://bit.ly/3S4iGhe>.

In addition to these two primary textbooks, there will be readings that apply the methods we will discuss during each week. Students are responsible for finding these articles on their own via the university library or a google scholar search.

## Course Format and Grading

Each session will consist of presentations made by the instructor regarding that week's topic, reviewing the logical and statistical underpinnings of the causal design method being explored that week. These presentations will be made accessible in our course website and summarize key concepts from the required texts.

The course assignments will primarily consist of article critiques in which teams of students will be assigned to review a published article. Each team will prepare a 10-minute presentation of the article followed by a 10-minute discussion of the article (I recommend that teams collaborate to develop these presentations and select which member will present the article and which will present the discussion). The presentation is designed to enable students to practice developing and delivering academic presentations like those delivered at professional conferences. The discussion presentation is designed to prepare students to critically analyze research findings to identify strengths and weaknesses related to the design, analysis, and conclusions/contributions of the work. Students will receive a grading rubric that outlines the expectations for successful presentations. Each student will complete 2 presentations, and teams will rotate throughout the semester to ensure that each student has an opportunity to collaborate with their peers. These presentations will constitute 40% of the grade. On weeks when students are not presenting, they are expected to complete a brief reflection on the assigned articles by the start of class and post to the discussions area of Canvas. Pose at least one question to either the paper's presenter or the discussant or the whole class for a more robust discussion. These reflections are worth 10% of the grade.

In addition, a final project will require students to identify a topic of interest and design a research study that applies one methodological technique that we discuss during the course. This project will be worth a total of 50% of your grade and will include a mid-term topic assignment, the final written proposal, and an oral presentation of the proposal design. This project will introduce students to the process of research proposal in preparation for their thesis/dissertation phase of the prevention science program.

## Course Requirements

1. 10 Weekly reflection discussion posts: 10%
2. Group Presentation 1: 20%
3. Research Project Topic Assignment: 20%
4. Group Presentation 2: 20%
5. Research Project Design Proposal: 20%
6. Oral presentation of Research Project Design Proposal: 10%

## Attendance Policy

Students are expected to attend all scheduled classes. Students are to notify the Professor via email prior to missing any class and reason for the absence. If class is missed, the student is responsible for missed content. Assigned readings are to be completed prior to the scheduled lecture. Professor reserves the right to add additional readings during the semester.

## Schedule

**Note: SC = Cunningham's Causal Inference Mixtape; MW = Murnane and Willet's Methods Matter**

Week 1 Introduction and review of probability and regression concepts (SC Chapter 1, 2; MW Chapter 3)

Week 2 Directed Acyclic Graphs and the Potential Outcomes Causal Model (SC Chapter 3, 4)

Article Discussion: Knox, D., Lowe, W., Mummolo, J. (2020). Administrative records mask racially biased policing. *American Political Science Review*, 114, (3), 619-637.

Week 3 Experimental Methods I: Randomization at the Individual level (MW Chapter 4, 5)

Article Discussion: Oreopoulos, P., Petronijevic, U. (2019). The remarkable unresponsiveness of college students to nudging and what we can learn from it. NBER Working Paper No. 26059.

Week 4 Matching (SC Chapter 5; MW Chapter 12)

Group presentation: Lippold, MA, Coffman, DL, Greenberg, MT (2014) Investigating the Potential Causal Relationship between Parental Knowledge and Youth Risky Behavior: A Propensity Score Analysis. *Prevention Science*, 15, 869-878.

Abaasa, A., Mayanja, Y., Asiki, G., Price, M. A., Fast, P. E., Ruzagira, E., Kaleebu, P., & Todd, J. (2021). Use of propensity score matching to create counterfactual group to assess potential HIV prevention interventions. *Scientific Reports*, 11(1), 7017.

Week 5 Regression Discontinuity (SC Chapter 6; MW Chapter 9)

Group presentation: Raifman, J, Larson, E, Barry, CL, Siegel, M, Ulrich, M, Knopov, A, Galea, S. (2020). State handgun purchase age minimums in the US and adolescent suicide rates: regression discontinuity and difference-in-difference analyses. *BMJ*, 370.

Group presentation: Holbein, JB, Ladd, HF. (2017). Accountability pressure: Regression discontinuity estimates of how No Child Left Behind influenced student behavior. *Economics of Education review*, 58, 55-67.

Week 6 Instrumental Variables (SC Chapter 7; MW Chapter 10)

Group presentation: Zeng, D., Thomsen, MR, Nayga, RM, Rouse, HL. (2019). Neighbourhood convenience stores and childhood weight outcomes: An instrumental variables approach. *Applied Economics*, 51(3), 288-302.

Group presentation: Lebenbaum, M, Laporte, A, de Oliveira, C. (2021). The effect of mental health on social capital: An instrumental variable analysis. *Social Science & Medicine*, 272.

Week 7 Experimental Methods II: Randomization at the Group Level (MW Chapter 7)

Article discussion: Peterson AV Jr, Kealey KA, Mann SL, Marek PM, Sarason IG. Hutchinson Smoking Prevention Project: long-term randomized trial in school-based tobacco use prevention--results on smoking. *J Natl Cancer Inst*. 92(24):1979-91.

In lieu of Group presentations, we will spend significant time this week introducing the final project and discussing students' potential topics in class. **Research Project Topic Assignment DUE.**

Week 8 Non-Compliance in Experimental Research (MW Chapter 11)

Group presentation: Jo, B, Ginexi, EM, Ialong, NS. (2010). Handling missing data in randomized experiments with non-compliance. *Prevention Science*, 11, 384-396.

Group presentation: Page, LC, Sacerdote, BI, Goldrick-Rab, S, Castleman, BL. (2022). Financial Aid Nudges: A National Experiment with Informational Nudges. *Educational Evaluation and Policy Analysis*.

#### Week 9 Panel Data (SC Chapter 8)

Group presentation: Kavisto, AJ, Kivisto, KL, Gurnell, E, Phalen, P, Ray, B. (2021). Adolescent suicide, household firearm ownership, and the effects of child access prevention laws. *Journal of the American Academy of Child & Adolescent Psychiatry*, 60(9), 1096-1104.

Group presentation: Milner, A, Krnjacki, L, Butterworth, P, LaMontagne, AD. (2016). The role of social support in protecting mental health when employed and unemployed: A longitudinal fixed-effects analysis using 12 annual waves of the HILDA cohort. *Social Science & Medicine*, 20-26.

#### Week 10 Difference in Differences (SC Chapter-Sections 9.1-9.5; MW Chapter 8)

Group presentation: McNeely, CA, Lee, WF, Rosenbaum, JE, Alemu, B, Renner, LM. (2019). Long-term effects of truancy diversion on school attendance: A quasi-experimental study with linked administrative data. *Prevention Science*, 20, 996-1008.

Group presentation: Doyle, O, Hegarty, M, Owens, C. (2018). Population-based system of parenting support to reduce the prevalence of child social, emotional, and behavioural problems: Difference-in-Differences study. *Prevention Science*, 19, 772-781.

#### Week 11 Difference in Differences Continued (SC Chapter-Section 9.6)

In lieu of Group presentations, we will spend significant time this week learning about current topics in Diff-in-Diff, with particular emphasis on so-called staggered implementation designs.

#### Week 12 Synthetic Control (SC Chapter 10)

Article Discussion: Gius, M. (2020) Examining the impact of child access prevention laws on youth firearm suicides using the synthetic control method. *International Review of Law and Economics*, 63.

Article Discussion: Cunningham, S & Shah, M. (2018) Decriminalizing Indoor Prostitution: Implications for Sexual Violence and Public Health, *The Review of Economic Studies*, Volume 85, Issue 3, 1683–1715.

#### Week 13 No In-Class Meeting: schedule a consultation for your proposal presentations:

<https://go.rutgers.edu/tomisavailable>

#### Week 14 Proposals

#### Finals – Research

# STUDENT RESOURCES

A more comprehensive list of student resources is located here:

<https://studentaffairs.camden.rutgers.edu/student-resource-list>

all [embedded links](#) are listed at the end of this document.

## **Academic Integrity and Student Code of Conduct**

Rutgers University–Camden seeks a community that is free from violence, threats, and intimidation; is respectful of the rights, opportunities, and welfare of students, faculty, staff, and guests of the University; and does not threaten the physical or mental health or safety of members of the University community, including in classroom space, and a community in which students respect academic integrity and the integrity of your own and others' work.

As a student at the University, you are expected to adhere to the [Student Code of Conduct](#) and [Academic Integrity Policy](#). Academic Integrity is critical to the success of our students and the community and is everyone's responsibility to take their education seriously and follow the requirements to insure that you are doing your own work and following the guidelines of the course and professor and program.

Please Note: The conduct code specifically addresses disruptive classroom conduct, which means "engaging in behavior that substantially or repeatedly interrupts either the instructor's ability to teach or student learning. *The classroom extends to any setting where a student is engaged in work toward academic credit or satisfaction of program-based requirements or related activities.*" Please be aware of in-classroom and out-of-classroom expectations by making yourself familiar with and by following the Student Code of Conduct.

**Of note, any student who is aware of any academic misconduct has a moral and ethical responsibility to report it to the course faculty.**

## **Academic Integrity Policy:**

Rutgers University takes academic dishonesty very seriously. By enrolling in this course, you assume responsibility for familiarizing yourself with the Academic Integrity Policy and the possible penalties (including suspension and expulsion) for violating the policy. As per the policy, all suspected violations will be reported to the Office of Community Standards.

Academic dishonesty includes (but is not limited to):

- cheating
- plagiarism
- aiding others in committing a violation or allowing others to use your work

- failure to cite sources correctly
- fabrication
- using another person’s ideas or words without attribution
- re-using a previous assignment
- unauthorized collaboration
- sabotaging another student’s work

If in doubt, please consult the instructor. Please review the Academic Integrity Policy at <https://deanofstudents.camden.rutgers.edu/sites/deanofstudents/files/Academic%20Integrity%20Policy.pdf>.

### **Center for Learning and Student Success**

The Center for Learning and Student Success (CLASS) provides academic support and enrichment services for students, at no additional cost, including one-on-one tutoring, small-group tutoring and workshops, online tutoring, writing assistance, student success coaching, learning assessment, and metacognition training. Through collaboration with academic departments and faculty, CLASS facilitates programs and provides academic resources to students. Our Learning Specialists provide learning-specific resources and support to students on academic or continued probation. CLASS is in Armitage Hall, second floor, suite 231. To learn more or to schedule an appointment, visit the [CLASS website](#), [email us](#) or call us at [\(856\) 225-6442](tel:8562256442).

### **Mid-Term Progress Reporting**

Each semester, typically from Week 6 through Week 8, faculty are offered the opportunity to provide students with feedback regarding their academic performance. Mid-Term Progress Reports are intended to encourage students to reflect on their academic performance and to take action, if necessary, to improve their academic outcomes. Students are notified immediately and provided information regarding available resources via email if they receive a progress report indicating concern. Students can access the details of their current and past progress reports by signing into [RaptorConnect](#). Mid-Term Progress Reporting encourages communication among faculty, students, advisors, and student success staff, which is critical to our academic mission.

### **Chosen Name (Preferred Name), pronunciation, and pronouns**

If you have a chosen name or preferred name or pronouns other than what is listed on the roster, let us know. If you would like to have your name changed officially on Rutgers University–Camden rosters, please follow our [Chosen Name Process](#).

In addition, within your Canvas course sites, the [Rutgers Shout-Out](#) tool allows you to type the phonetic spelling of your name and record the pronunciation of your name in a shared audio recording for your professor and fellow students.

### **Dean of Students Office—CARES Team**

College is a time when you may be testing your independence and/or striving to find yourself. It's not uncommon for these journeys to have rough points. The Dean of Students Office is here to assist you by strategically and effectively handling and referring student concerns/needs across all areas of the campus and University as needed. For some students, personal, emotional, psychological, academic, or other challenges may hinder their ability to succeed both in and outside of the classroom. The Dean of Students Office serves as your initial contact if you need assistance with these challenges. You can learn more about the free services by calling [\(856\) 225-6050](#), [emailing](#), or visiting the [Dean of Students website](#).

### **Office of Disability Services (ODS)—Students with Disabilities**

If you need academic support for your courses, accommodations can be provided once you share a Letter of Accommodation issued by the Office of Disability Services (ODS) that specifies your accommodations indicated. If you have already registered with ODS and have your Letter of Accommodation, please share this with your instructor early in the course. If you have not registered with ODS and you have or think you have a disability (learning, sensory, physical, chronic health, mental health or attentional), please visit the [ODS website](#), [email](#), or call [\(856\) 225-6954](#). Please Note: Accommodations will be provided only for students with a Letter of Accommodation from ODS. Accommodation Letters only provide information about the accommodation, not about the disability or diagnosis.

### **Help Desk (IT support and services)**

For technical assistance, visit Help Desk in the Rutgers Student Computer Lab on the first floor of Robeson Library, call [\(856\) 225-6274](#) or [email](#). Help Desk support is available during [lab hours](#). Visit the [IT FAQ page](#) for information and documentation.

### **Paul Robeson Library (reference desk, study space, computer lab, resources)**

We are here to help you succeed! Our dedicated library team will boost your library research skills via workshops and reference help. Our experts will help you find the latest resources to advance your research and strengthen your teaching. If we don't have what you are looking for, our team will get those items from partner libraries. Our vibrant exhibits and displays will tell you many new stories and our Rutgers–Camden faculty publications area will inspire you. Robeson Library is part of what makes Rutgers–Camden an exciting place to learn! More information is available on the [Robeson Library website](#).

### **Office of Military and Veteran Affairs—Veteran, Active Duty, and National Guard Member Services**

The Office of Military and Veterans Affairs and Rutgers University–Camden support our students who have served and their family members, including providing explanations of benefits, referrals to resources on and off campus, supporting students who are deployed for active duty, and answering questions. If you need assistance and are an active duty, National Guard, or veteran (or are a family member), we can assist. Find more information by calling 856-225-2791 or visiting the [Office of Military and Veteran Affairs website](#)

### **Title IX and the Violence Prevention & Victim Assistance Office**

Rutgers University–Camden strives to create a campus community free from discrimination and interpersonal violence and harm. If you have experienced sexual violence, domestic/dating violence, stalking or any form of sex or gender discrimination, help is available. The office for Violence Prevention and Victim Assistance provides support to students. For more information about VPVA or to schedule a time to speak with an advocate visit the [VPVA website](#). To report an incident or speak with the Title IX coordinator, please visit our [Title IX website](#). If you choose to disclose to me, thank you for trusting me. I am obligated to report any disclosures to our title IX coordinator to ensure you receive the appropriate support and university response.”

Please Note: All Rutgers employees (other than those designated as confidential resources such as advocates, counselors, clergy, and healthcare providers as listed in Appendix A to Policy 60.1.33) are required to report information about such discrimination and harassment to the University. This means that if you tell me or any faculty member about a situation of sexual harassment or sexual violence, or other related misconduct, we must share that information with the University’s Title IX Coordinator.

### **Wellness Center—Health and Wellbeing Resources**

Health and well-being impact learning and academic success. Throughout your time in college, you may experience a range of concerns that can create barriers to your academic success. These might include illnesses, strained relationships, anxiety, high levels of stress, alcohol or drug problems, feeling down, or loss of motivation. The Wellness Center Medical and Counseling staff can help with these or other issues you may experience. You can learn about the free, confidential medical and mental health services available on campus by calling [\(856\) 225-6005](#), visiting the [Wellness Center website](#), or visiting the Wellness Center on the 2nd Floor of the Campus Center.

### **Writing and Design Lab—Writing Support and Services**

If you need assistance with writing, audio recordings, web creation, or other technology used in class for creating content, the Writing and Design Lab can help. We offer personal tutoring, workshops, and online assistance. You can learn more by [emailing us rutgers.wdl@rutgers.edu](mailto:rutgers.wdl@rutgers.edu) or visiting the [WDL website](#). From the website, you can schedule an appointment.



## Wellbeing—National and State Resources in Alphabetical Order

- Crisis Text Line: text HOME to 741741
- Crisis Text Line for Students of Color: text STEVE to 741741
- National Domestic Violence Helpline: [\(800\) 799-7233](tel:8007997233) or text LOVEIS to 22522
- National Substance Abuse helpline, SAMHSA's National Helpline, [\(800\) 662-HELP](tel:8006624357) (4357)
- National Suicide Prevention Lifeline: [\(800\) 273-8255](tel:8002738255)
- [NJ HOPE line](http://njhope.org) website
- The Sexual Assault helpline at [\(800\) 656-HOPE](tel:8006564673) (4673)
- Trevor Lifeline (LGBTQ+): [\(866\) 488-7386](tel:8664887386)

## Links to student resources, alphabetically

- Academic Integrity Policy: <https://deanofstudents.camden.rutgers.edu/academic-integrity>
- Chosen Name Process: <https://belonging.camden.rutgers.edu/chosen-name-process>
- CLASS web: <https://learn.camden.rutgers.edu>
- CLASS email: [learningcenter@camden.rutgers.edu](mailto:learningcenter@camden.rutgers.edu)
- Dean of Students email: [deanofstudents@camden.rutgers.edu](mailto:deanofstudents@camden.rutgers.edu)
- Dean of Students website: <http://deanofstudents.camden.rutgers.edu/>
- IT Help Desk computer lab: <https://it.camden.rutgers.edu/facilities/lab/>
- IT Help Desk email: [help@camden.rutgers.edu](mailto:help@camden.rutgers.edu)
- IT Frequently-Asked Questions (FAQ): <https://it.camden.rutgers.edu/help/faqs/>
- Military and Veteran Affairs: <http://veterans.camden.rutgers.edu/>
- ODS website: <https://success.camden.rutgers.edu/disability-services>
- ODS email: [disability-services@camden.rutgers.edu](mailto:disability-services@camden.rutgers.edu)
- RaptorConnect: <https://raptorconnect.camden.rutgers.edu>
- Robeson Library: <https://www.libraries.rutgers.edu/camden>
- Shout-Out: <https://online.camden.rutgers.edu/shout-out-share-the-pronunciation-of-your-name/>
- Student Affairs Reporting form: <https://deanofstudents.camden.rutgers.edu/reporting>
- Student Code of Conduct: <https://deanofstudents.camden.rutgers.edu/student-conduct>
- Title IX Coordinator: <https://respect.camden.rutgers.edu/>
- Violence Prevention and Victim Assistance: <https://vpva.camden.rutgers.edu/>
- Wellness Center: <https://wellnesscenter.camden.rutgers.edu/>
- Writing and Design Lab email: [rutgers.wdl@rutgers.edu](mailto:rutgers.wdl@rutgers.edu)
- Writing and Design Lab website: <https://wdl.camden.rutgers.edu/about-2/>

\*\*\*\*\*