Causal Inference

Cornell STSCI / INFO / ILRST 3900
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Fall 2023
causal3900.github.io

22 Aug 2023

Welcome to Causal Inference!

Ian Lundberg

Sam Wang

TA TBD

TA TBD

Why causal inference?

What motivated you to take this course?

Why causal inference?

Why are we teaching this course?

Why causal inference?

Why are we teaching this course?

Causal inference provides tools to

- Speak to policy interventions
- Understand the world

Observing

Observing

Image source: Wikimedia

Observing

Image source: Wikimedia

Observation:

People who eat a Mediterranean diet
have lower rates of cardiovascular disease

Observing

Image source: Wikimedia

Observation:

People who eat a Mediterranean diet
have lower rates of cardiovascular disease

What policies can we make from that evidence?

Intervening

Circulation
Volume 99, Issue 6, 16 February 1999; Pages 779-785
https://doi.org/10.1161/01.CIR.99.6.779

CLINICAL INVESTIGATION AND REPORTS

Mediterranean Diet, Traditional Risk Factors, and the Rate of Cardiovascular Complications After Myocardial Infarction

Final Report of the Lyon Diet Heart Study

Michel de Lorgeril, Patricia Salen, Jean-Louis Martin, Isabelle Monjaud, Jacques Delaye, and Nicole Mamelle

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Heart attack survivors randomized to

- advice to follow a Mediterranean diet (treatment)
- advice to follow a prudent diet (control)

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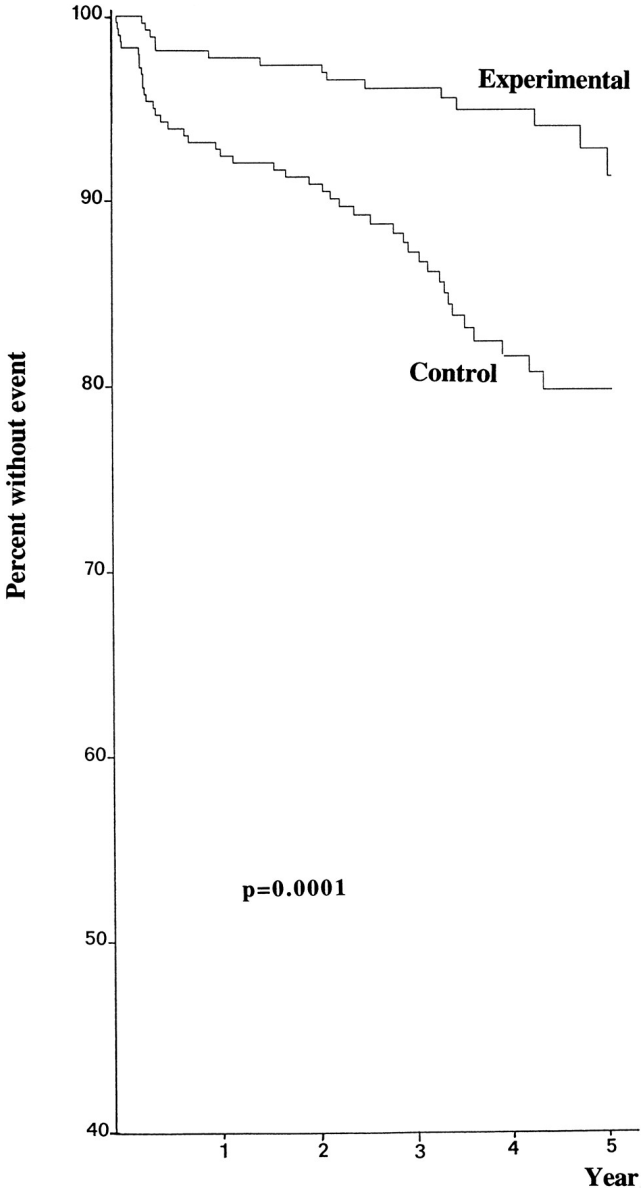
Heart attack survivors randomized to

- advice to follow a Mediterranean diet (treatment)
- advice to follow a prudent diet (control)

Outcome: Recurrent heart attack or death

Intervening



Course objectives

As a result of participating in this course, students will be able to

- define counterfactuals as the outcomes of hypothetical interventions
- identify counterfactuals by causal assumptions presented in graphs
- estimate counterfactual outcomes by pairing those assumptions with statistical evidence

COURSE LOGISTICS

Who should take this course?

The course is designed for upper-division undergraduate students.

Prerequisites.
An introductory statistics course at the level of STSCI 2110, PAM 2100, PSYCH 2500, SOC 3010, ECON 3110, or similar courses.

Course materials

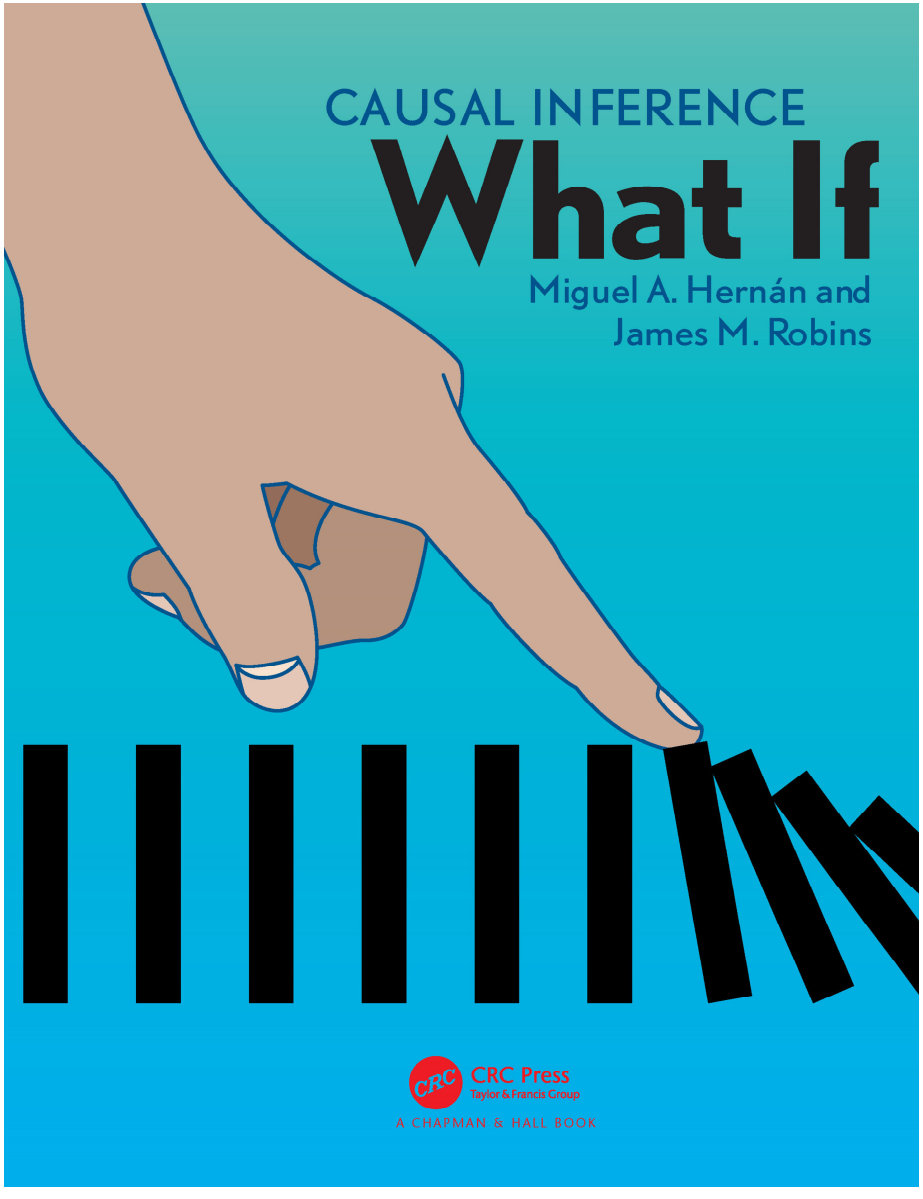
All materials will be posted here:

causal3900.github.io

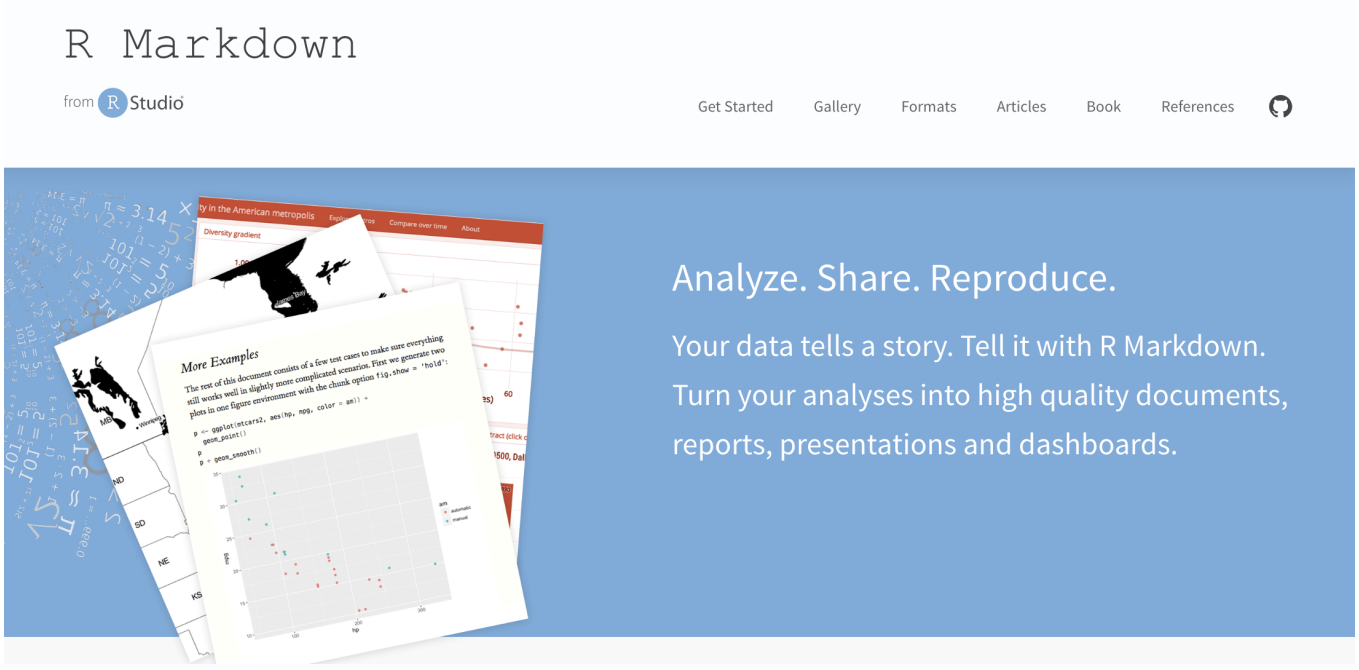
Course support

- Post questions on Ed Discussion
- Office hours—listed at who we are page

Course readings



Typesetting



As soon as possible, you should

- Install R (statistical software)
- Install RStudio (user interface)
- Bookmark the RMarkdown cheat sheet (documentation)

Note: 20% penalty for reported results that are not reproducible

Method of assessing student achievement

Problem sets	70%
Peer grading	10%
Final project presentation (10 minutes)	5%
Final project write-up (1000 words)	15%

Problem sets

- conceptual questions
- coding questions

Final project

Details TBD

Academic integrity

Each student in this course is expected to abide by the Cornell University Code of Academic Integrity. Any work submitted by a student in this course for academic credit must be the student's own work.

Collaboration

- encouraged to work together
- consulting help is great
- should never involve one student having possession of a copy of all or part of work done by someone else, in the form of an email, an email attachment file, or a hard copy

Late work

- 5 flex days to be used on problem sets with no questions
- Each day beyond your 5 deducts 10% of the assignment's total points
  - max score after 1 days late is 90%
  - max score after 2 days late is 80%
- Exceptions to this policy in exceptional circumstances; come talk to us.
- Minimum grade value of 50%

Attendance

Public health matters—stay home if sick! Let us know.

Otherwise, we hope to see you in class and discussion.

Students with disabilities

You belong in this course. We are happy to work with you on appropriate accomodations—see the syllabus for details about working with Student Disability Services.

Mental health and wellbeing

Your health and wellbeing are important to us!

See syllabus for links to mental health resources. We hope our course helps you thrive a Cornell, and your thriving at Cornell is far more important than anything in this course.

We look forward to exploring causal inference together!