Arnold Ventures BRIDGE Day:

Policing Technology

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Motivation

Technology in Police Departments:

- Substitutes $\rightarrow$ License plate readers, facial recognition
- Complements $\rightarrow$ predictive 'hotspot' policing
- Technology changes functionality

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Objective of this Presentation:

How can we rigorously evaluate these technologies to understand their effects on crime/policing?

- Overview of technologies: know/don't know/want to know/how to evaluate.

How can we find causal effects?

Thought Experiment:

- In a perfect world, how would we experimentally find whether X causes Y?

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Randomized Control Trials (RCT)

- The Gold Standard
- Pilot Programs
- Problem: Expensive, direct collaboration, bias of who selects in.
  - What happens at scale?

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Natural Experiments

- A great alternative; leverages randomness in the world
- Trade off: less expensive, more potential for confounders
- Departments may already be doing this!

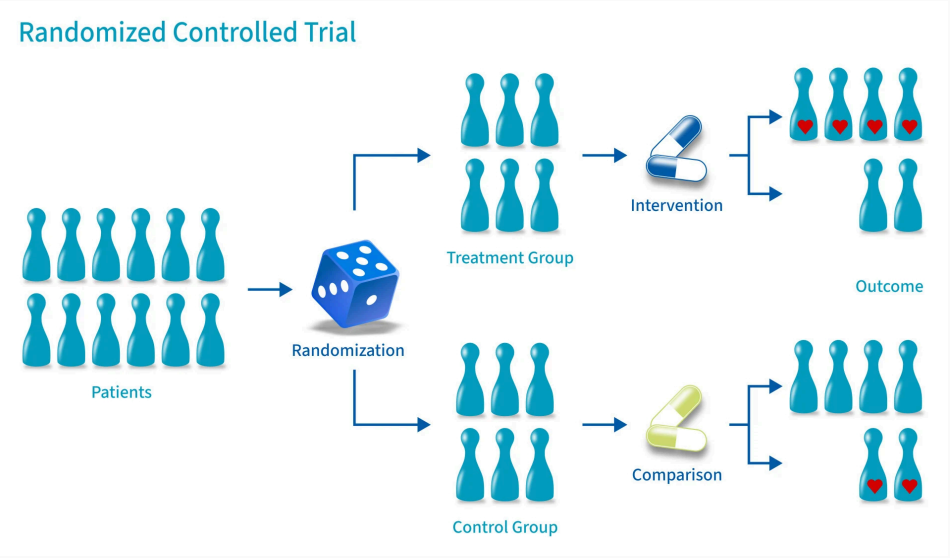
Examples of how to find causal effects

Randomized Control Trial | Regression Discontinuity | Difference-in-Differences

Construct a lab

- Randomly assign a population to a treated group and control group
- Randomness of treatment assignment allows for causal effects
  - Average out differences in treatment and control
- Example: pilot studies, randomly assign treatment to one group, and not another one

A perfect experiment:

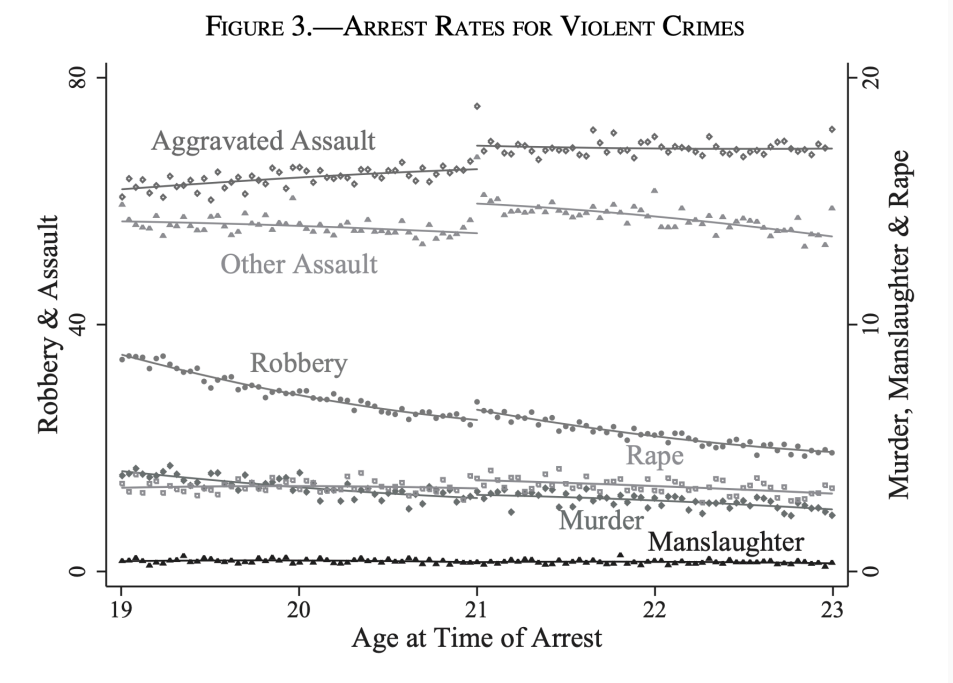


Examples of how to find causal effects

Randomized Control Trial | Regression Discontinuity | Difference-in-Differences

How do we get randomness necessary for causal effects?

- Leverage an arbitrary cutoff
  - Intuition: compare individuals slightly above and slightly below the cutoff
- Example: Passing minimum legal drinking age results in more arrests
- Requires many observations



Examples of how to find causal effects

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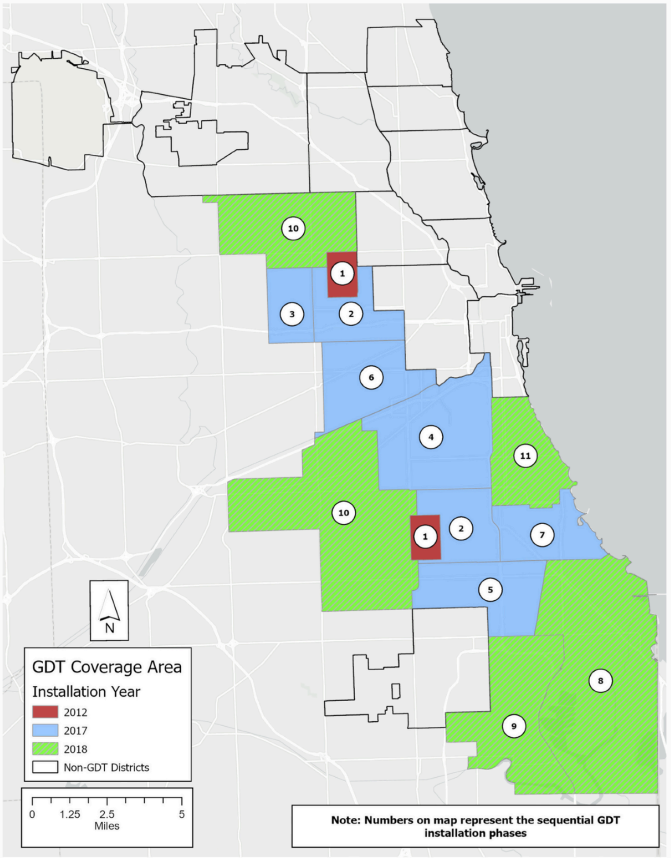
How do we get randomness necessary for causal effects?

- Timing of when assignment of treatment occurs
- Intuition: Compare the trends of treated places to untreated places
- Example: Adoption of gunshot detectors at different points
- Can be hard to isolate if many changes



Getting causal effects in crime setting

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- Changes in reporting
- Example: Streetlights and 911 calls

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Challenge 3: Data

- Freedom of Information Acts (FOIA)
  - Downfall: Costly, slow, inefficient
- Collaborations are easier!

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Challenge 4: Finding collaborators

- Collaborators are great but how to find them?
  - Cold calling does not work

Automation of Reporting

Motivation: Reduce reliance on civilians and police staffing

Automation of Reporting

How have we studied it?

- Traffic Cameras
  - Reduced red-light running (Wong 2014)
  - Trade-off: increased rear-ending (Wong 2014, Gallager and Fisher, 2020)
- Automated Gunshot Technology
  - 12% of gunfire goes reported (Carr and Doleac, 2018)
  - Measure of police mistrust (Ang et. al, 2021)

What can we still learn?

- Facial recognition
  - Increase deterrence?
  - Requires knowledge; cilivian pushback

Predictive Policing

Motivation: Prevention and Deterrence of Crime

Patrol Software and Risk Scores

Have we studied it?

- Assisting patrols (Hunchlab/PredPol/KeyStats):
  - Increases in clearance rates (Mastrobuoni, 2020)
  - Decreases serious violent/property crimes (Jabri, 2023)
  - Evidence of some officers not taking suggestions (Kapustin et al. 2022)
- Algorithmic risk scores/prediction of victims:
  - Good candidates for regression discontinuity!
  - Effective in finding at-risk victims and can prevent victimization (Heller et al., 2024)
  - Could bake-in bias (Angwin et al., 2016; Lum and Isaac, 2016; Richardson et al., 2019; Mehrabi et al., 2021, Jabri, 2023)

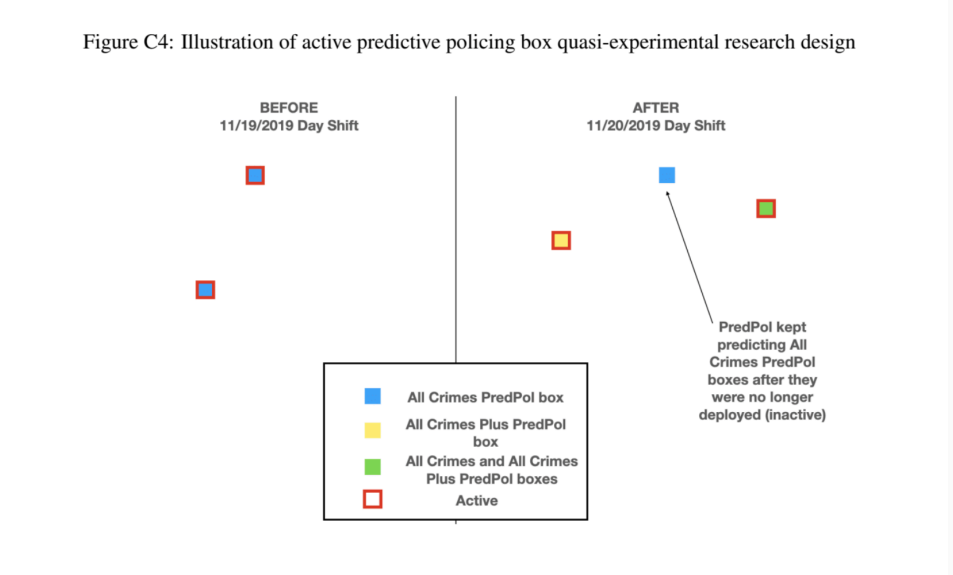
What can we still learn?

- Do criminals get smarter? Spillovers, criminals acting more randomly?
- How can we motivate officers to take the suggestions?

Case Study: Jabri 2023

The natural experiment:

- PredPol technology: unexpected change in how the 'hotspot' boxes are created
- Comparison: can old predictive boxes (control), and new predictive boxes (treatment)



Results:

- Decreases serious violent and property crimes
- Exacerbates racial disparities in arrests in traffic incidents and serious violent crime

Police Oversight:

Motivation: Increase policing accountability to change behavior

Body-Worn Cameras

How have we studied it?

- RCTs: Mixed evidence on use-of-force; Null (Yokum et. al, 2019) Significant reductions (Braga et. al, 2018)
- Difference-in-Differences
  - Lower complaints (Ferrazares, 2024), police-involved homicides (Kim, 2024)

What could be done?

- Videos = untapped data source; source of measurement, senitment, citizen relations
- Truleo (new!): Uses AI to automate transcripts/sentiment of officer
  - Upcoming studies (Adams et al., 2024)

GPS Trackers

Have we studied it?

- Difficult to get high-frequency data
- Descriptive work: Smartphone data (Chen et al., 2023)
  - Officers patrol in high Black density more, controlling for crime/density/demand

What we still learn?

- Can these be used to increase oversight?
  - CCTV cameras shown to stop officers from shirking in India (Conover et al., 2023)
- Can these be used to improve data quality?
  - Example: improve 911 response time reporting

Police Response:

Motivation: Reactive policing

Automated Gunshot Technology

How have we studied it?

- Difference-in-Differences
- No clear evidence of reductions in crime (Manes, 2021; Ferguson and Witzburg, 2021; Connealy et al., 2024, Topper and Ferrazares, 2024)
- Evidence of better locational accuracy (Piza et al., 2023), faster gun-related dispatch (Choi et al., 2014)
- High trade-off in resource-constrained environment (Topper and Ferrazares, 2024)

What can we still learn?

- Does this help gunshot victims? (Upcoming work)
  - Do benefits outweigh costs?
- Can we leverage this data for other purposes?
  - Ex: Better method of understanding crime (Carr and Doleac, 2018)

Information Technology:

Motivation: More information can increases likelihood of criminal being caught

Ring Doorbells

Have we studied it?

- Only study: attempts to create a Ring map in LA (Calacci et al., 2022)
  - Descriptively does not find much evidence of crime reduction

What can we still learn?

- Need collaborators and data!
- Could utilize timing of Ring rollouts for a natural experiment
  - Discontinuity in city boundaries on legality?
- Deterrence effects? Increase in clearance rates?

Main takeaways

Policing technology can be effective

- We can study it causally by using:
  - Randomized Control Trials
  - Natural Experiments

How should we implement?

- Thoughtful evaluation considering costs/benefits first
  - ShotSpotter creating a costly trade-off
  - Traffic cameras change composition, but not total accidents
  - PredPol decreasing crime, but increasing racial discrimination

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- Bypass the FOIA process
- Negotiate contracts with firms to allow open data

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Challenge 4: Finding collaborators

- If you build it, they will come
- Post information; point-of-contact
- Young scholars will (likely) do it for free

Thank you