

The Need for a General Causal Framework to Study Police Violence



4 June 2021

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Jonathan Mummolo **Princeton**

Policing data is generated
by a complex process

minority



force

minority

behavior

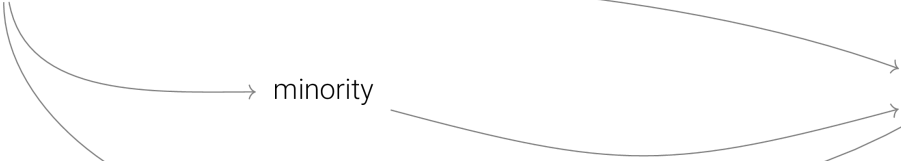
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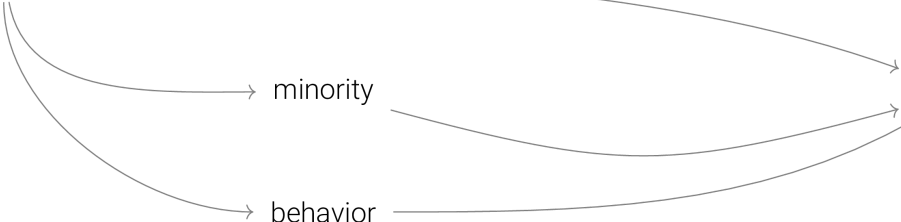
context



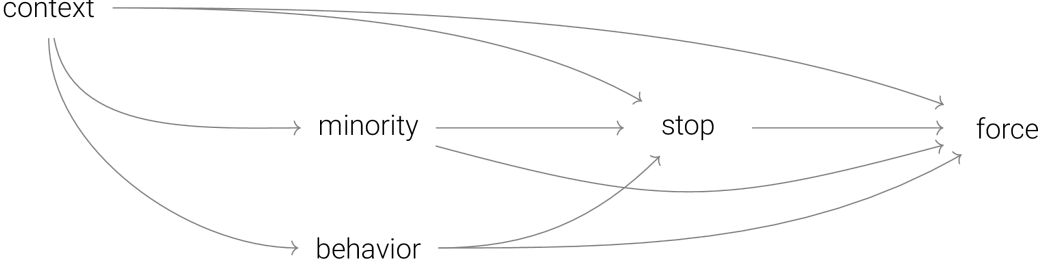
minority

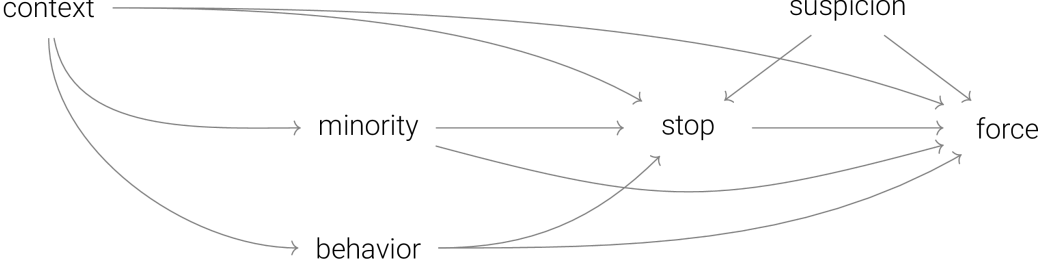


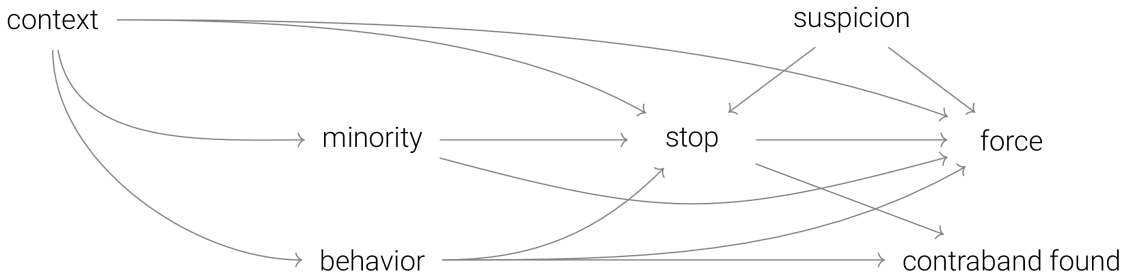
behavior



force







The state of research on discrimination in policing

State of the field

- Policing research faces severe data constraints
 - Generated by complex, partially observed process
 - The limited data that does exist is often closely guarded

[1] Bocar Ba, Dean Knox, Jonathan Mummolo, and Roman Rivera. 2021. "The Role of Officer Race and Gender in Police-Civilian Interactions in Chicago." *Science*.

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 - Tendency to focus on isolated aspects with available data
 - Multi-stage nature of policing is generally ignored

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 - Tendency to focus on isolated aspects with available data
 - Multi-stage nature of policing is generally ignored
- Fragmented data leads to fragmented literatures
 - Garbage-can regressions with datasets of convenience
 - Proliferation of incompatible analytic approaches
 - Unstated, often contradictory modeling assumptions
- Makes knowledge accumulation virtually impossible

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- Existing methods in context
 - Comparing counts of police actions
 - Benchmark tests (using side information)
 - Naïve regressions using police detainment records
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 - **And more:** veil of darkness, officer-race comparisons
- Understanding how these fit together is crucial
 - Shows why experts make different claims using same data
 - Reveals how to reconcile seemingly contradictory results

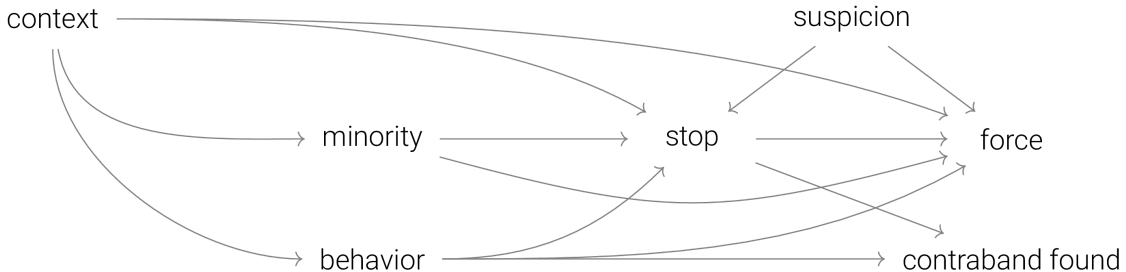
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- Understanding how these fit together is crucial
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- Analyzing police detainment records more rigorously
 - Pitfalls leading to severe underestimates of discrimination
 - Improved partial identification methods (bounds)

Statistical methods for measuring discrimination

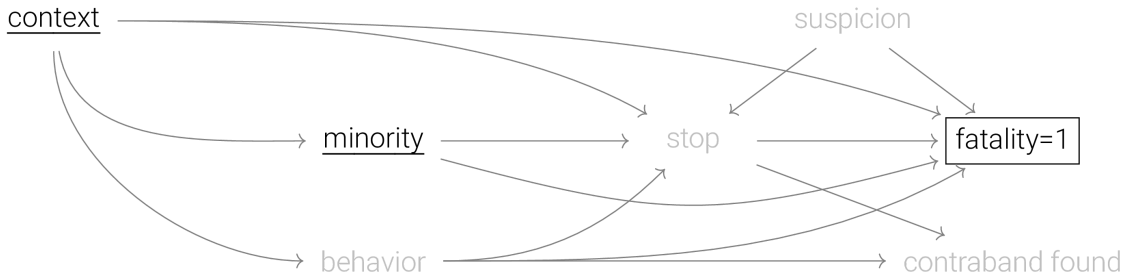
Johnson et al. ('19), *PNAS*

"We did not find evidence for anti-Black or anti-Hispanic disparity in police use of force... and, if anything, found anti-White disparities"



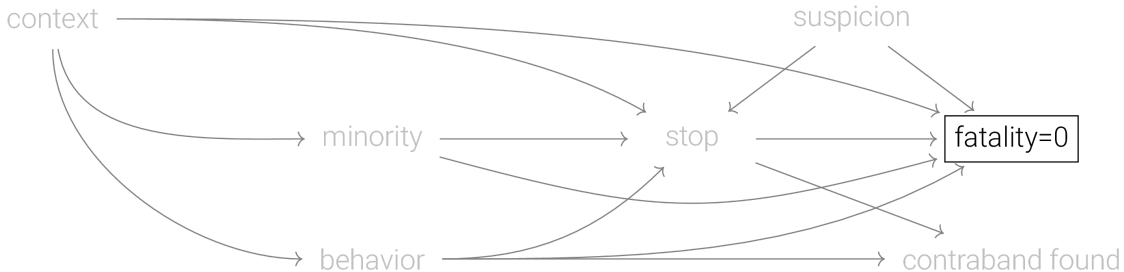
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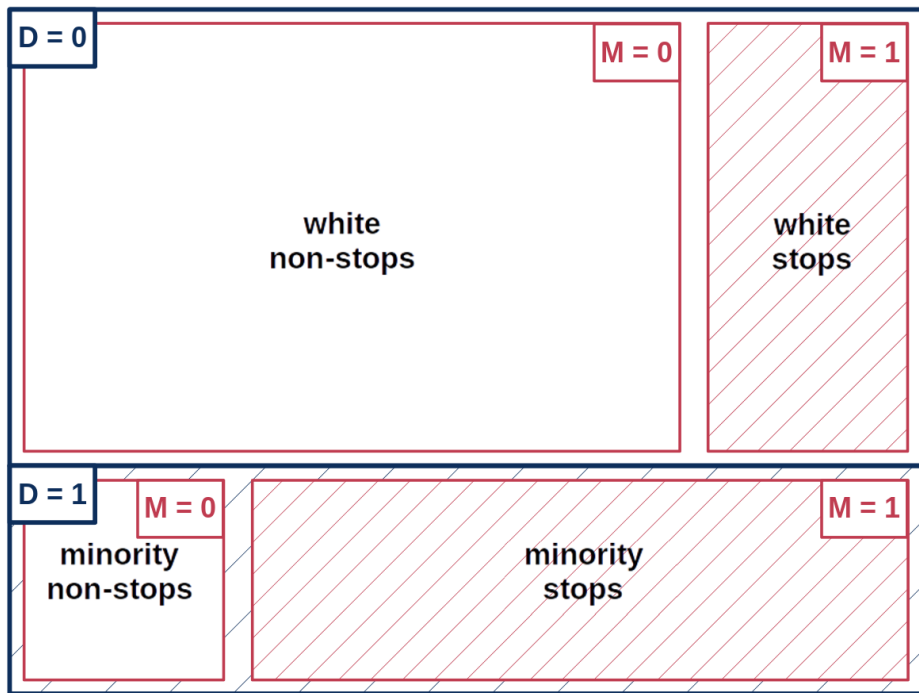


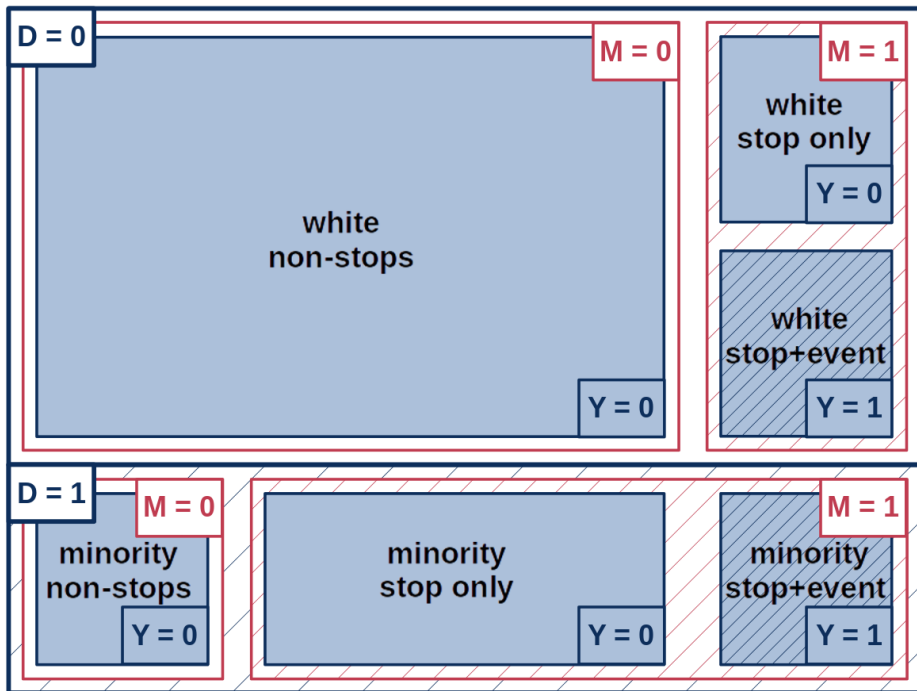
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white

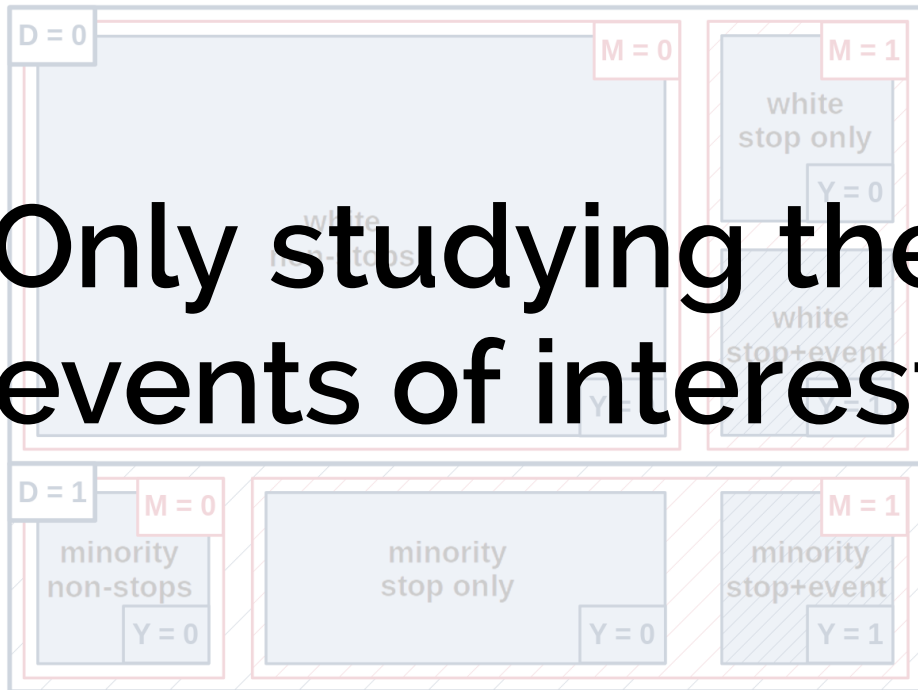
D = 1

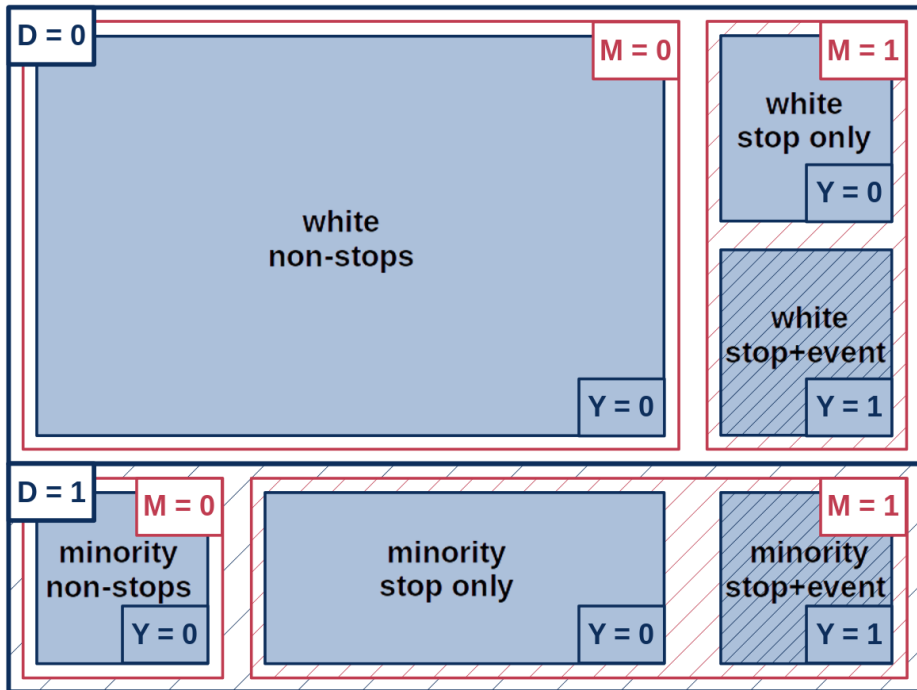
minority

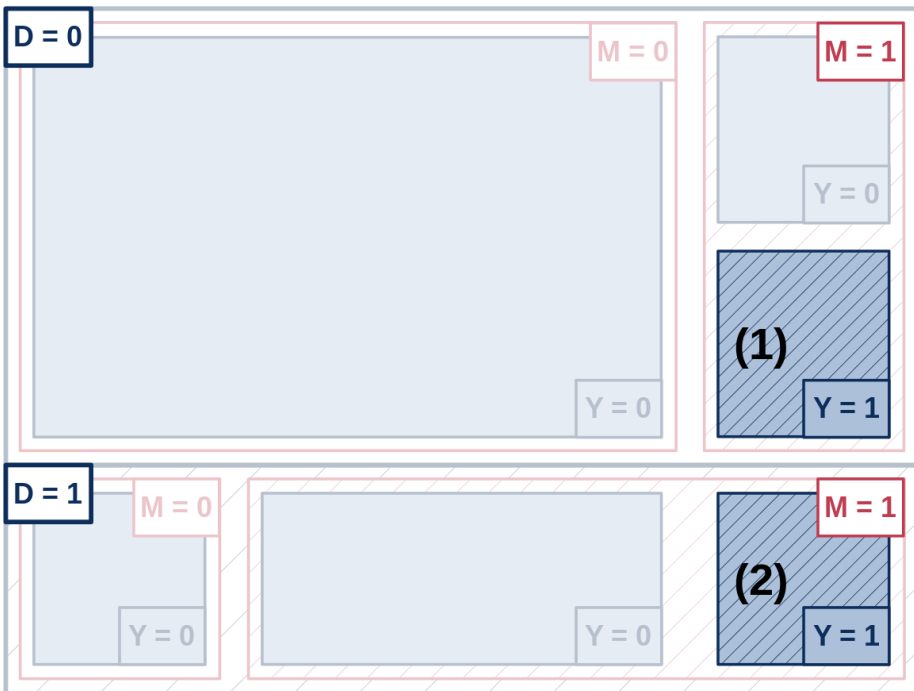


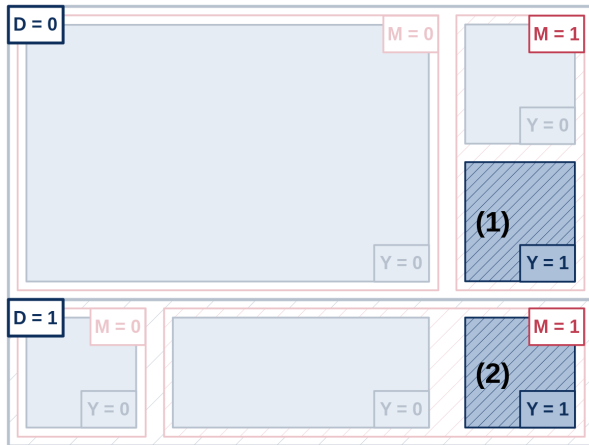


Only studying the events of interest

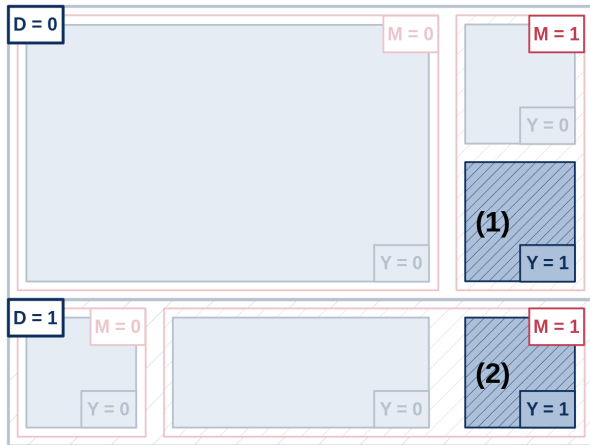








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 - If (1) larger, conclude **anti-white bias**
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- A simple logical fallacy that can be obscured by seemingly complex statistical modeling

Johnson et al. ('19), *PNAS*

- Data environment:
 - **Observed:** $\Pr(\text{minority} \mid \text{Fatality}=1)$
 - **Unobserved:** $\Pr(\text{minority})$, $\Pr(\text{fatality})$
- Classic case of selection on dependent variable

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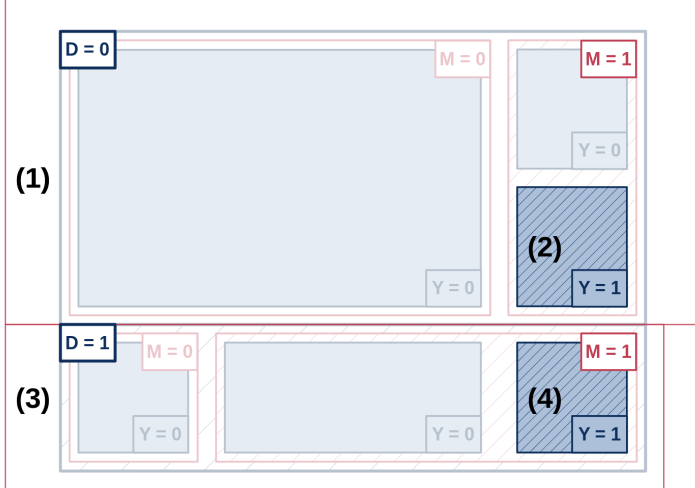
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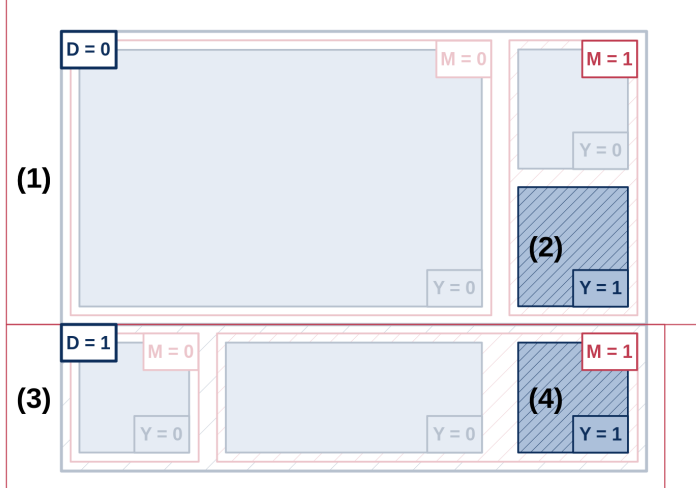
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- Ultimately retracted after one year of harm

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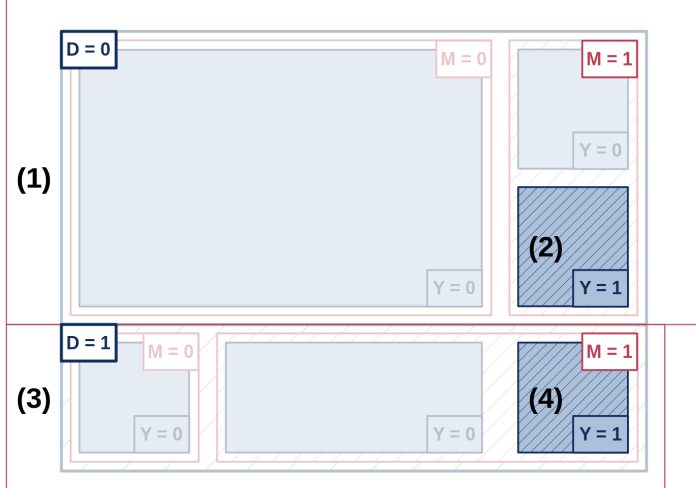
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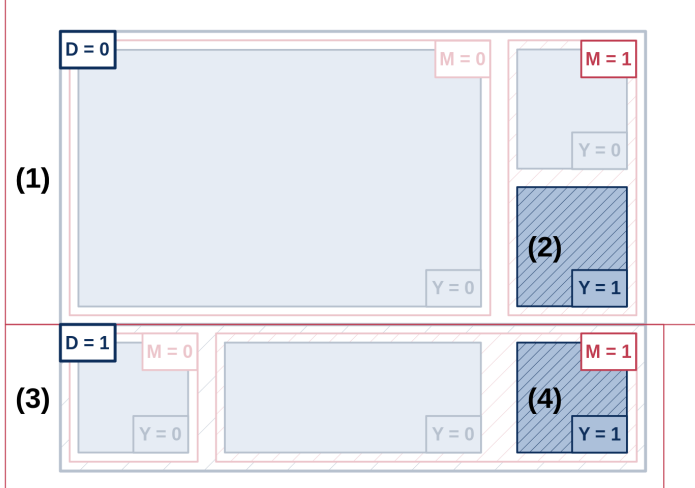
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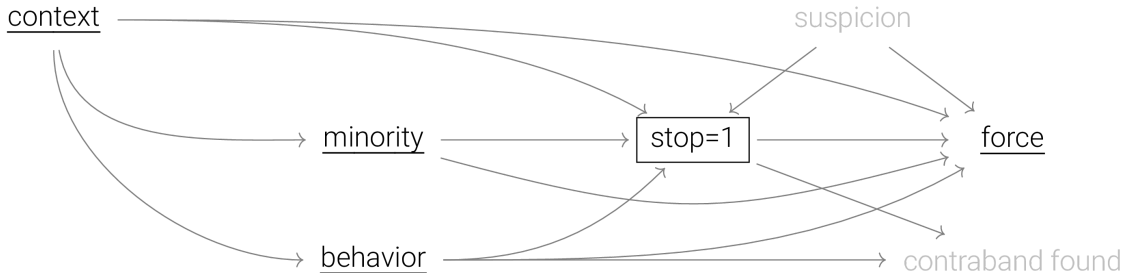
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 - **Issues w/ population:** police deployment, driving rates
 - **Issues w/ historical arrests:** prior discrimination in arrests

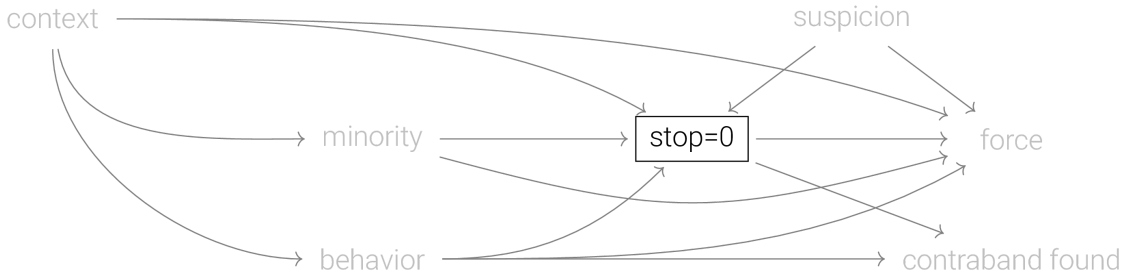
Fryer ('19), *JPE*

"... compelling case that there is no discrimination in officer-involved shootings" and reports surprisingly little discrimination in nonlethal force



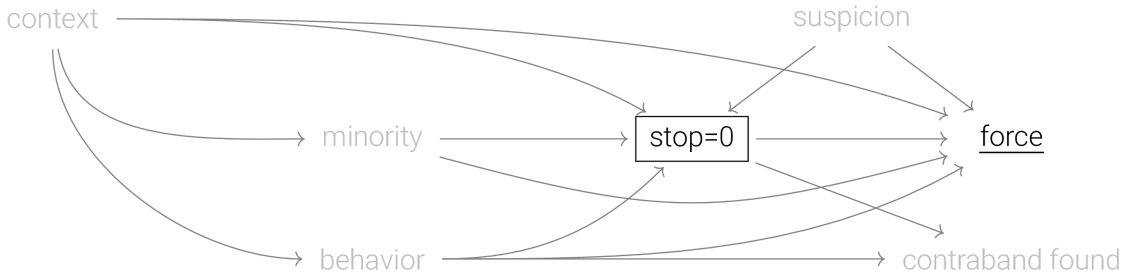
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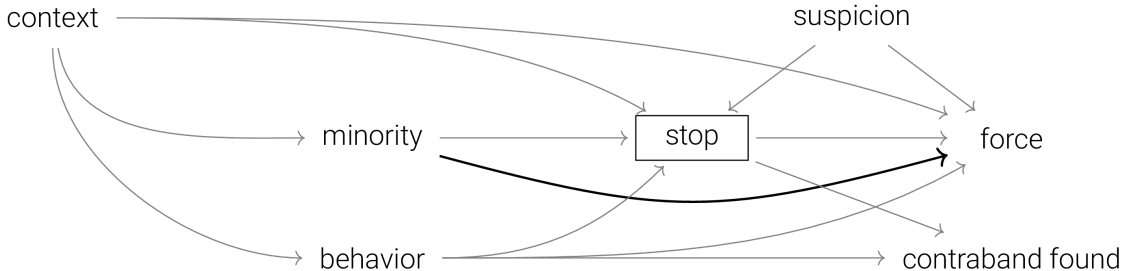
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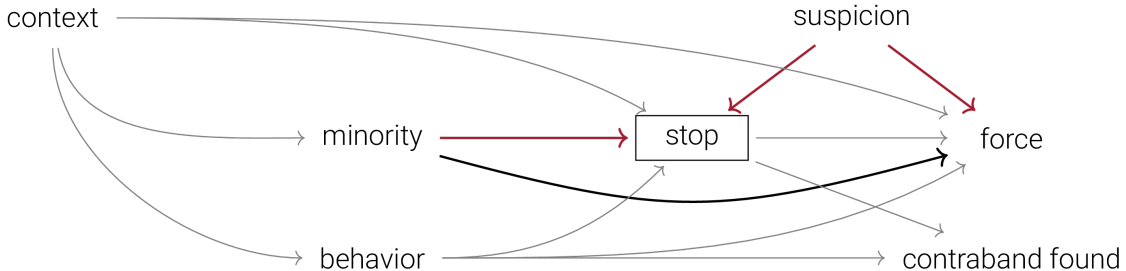
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Conditioning on detention records
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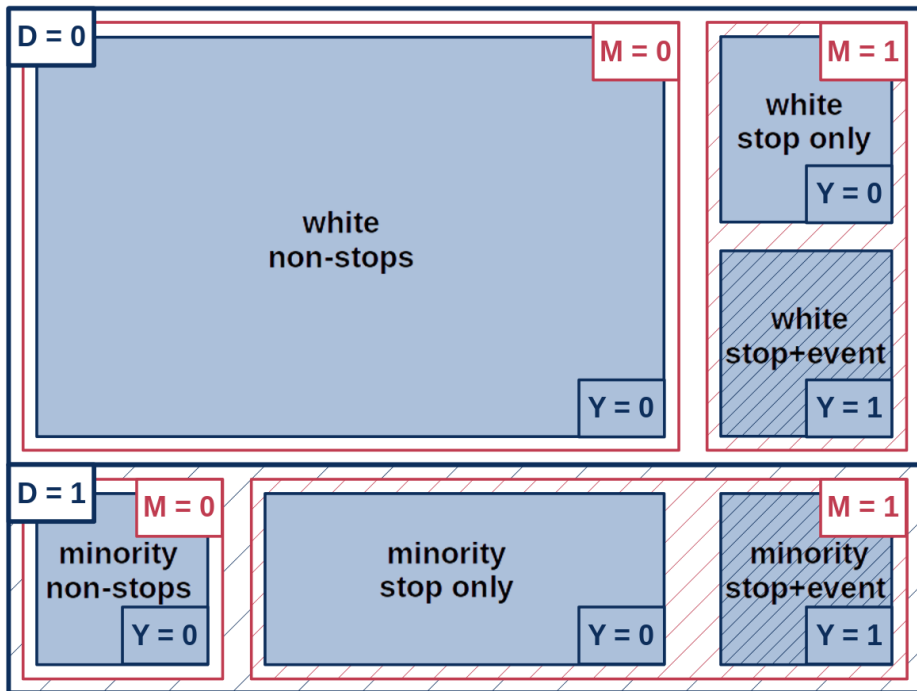
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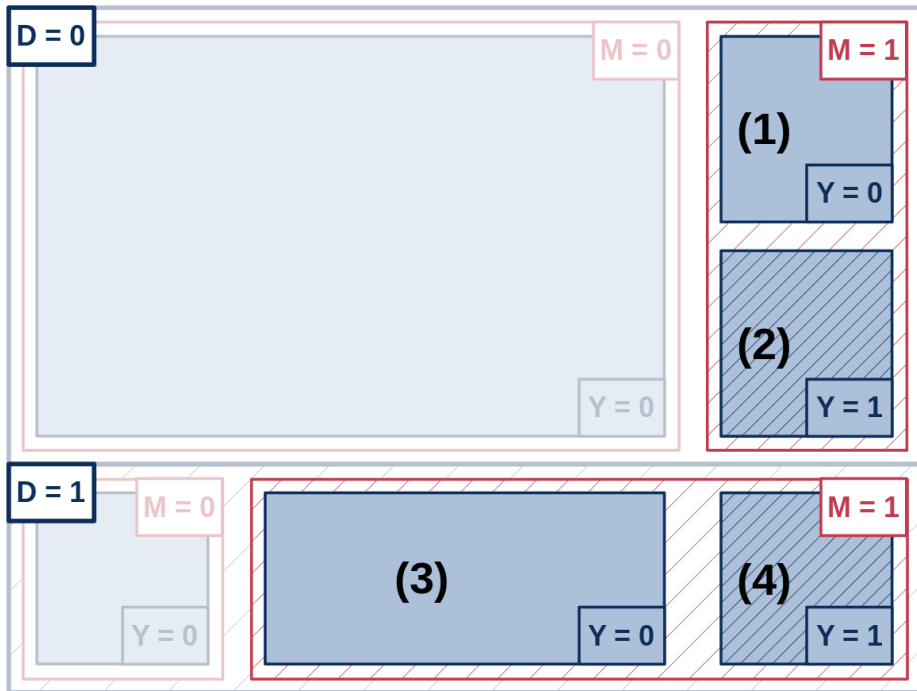
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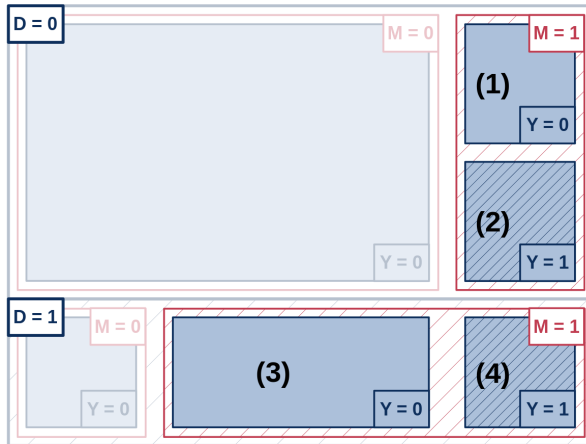


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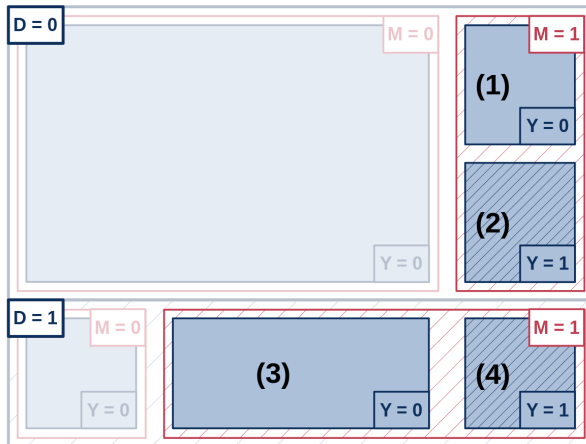








- **Naïve regressions:** How often is force seen in stops?
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- **Naïve regressions:** How often is force seen in stops?
 - If **(1) / (1 + 2)** larger, conclude **anti-white bias**
 - If **(4) / (3 + 4)** larger, conclude **anti-minority bias**
- Can lead to dramatic underestimates of bias in force
 - Study of NYPD, 2003-2013 (laying hands on civilians)
 - **Naïve:** 74k instances of discriminatory force vs. Black/Hisp.
 - **Bias-correction:** at least 307k instances (lower bound)

Fryer ('19), *JPE*

- Data environment:
 - **Observed:** $\Pr(\text{minority, force} \mid \text{Stop}=1)$, $\Pr(\text{force} \mid \text{Stop}=0)$
 - **Unobserved:** $\Pr(\text{stop})$, $\Pr(\text{minority, force} \mid \text{Stop}=0)$
- Classic case of post-treatment selection
 - Minorities stopped for jaywalking, white civs. only for robbery

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- Bounds say this design is fairly uninformative
 - Yet Fryer ('19) reports point estimates
 - **Hidden asm.:** $E[\text{Stop}(\text{minority}=1) - \text{Stop}(\text{minority}=0)] = 0$

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Reveal hidden assumptions

- Impossible point estimates are often reported; causal framework helps reveal hidden assumptions
- Fryer ('19).
 - **Problem:** post-treatment conditioning (PTC)
 - **Hidden asm.:** no discrimination in stops
- Gaebler, Cai, Basse, Shroff, Goel & Hill ('20).
 - **Problem:** PTC + treatment confounding
 - **Hidden asm.:** post-treatment bias = -omitted variable bias
- Johnson, Tress, Burkel, Taylor & Cesario ('19).
 - **Problem:** selection on dependent variable
 - **Hidden asm.:** $\Pr(\text{minority}) = \Pr(\text{white}) = \frac{1}{2}$
- Shoddy work on high-stakes policy has consequences

References

- Bocar Ba, Dean Knox, Jonathan Mummolo, and Roman Rivera. 2021. "The Role of Officer Race and Gender in Police-Civilian Interactions in Chicago." *Science*.
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- Dean Knox and Jonathan Mummolo. 2020. "Making inferences about racial disparities in police violence." *Proceedings of the National Academy of Sciences*.
- Dean Knox and Jonathan Mummolo. 2020. "Toward a General Causal Framework for the Study of Racial Bias in Policing." *Journal of Political Institutions and Political Economy*.
- Dean Knox, Will Lowe, and Jonathan Mummolo. "Can Racial Bias in Policing Be Credibly Estimated Using Data Contaminated by Post-Treatment Selection?" Preprint.

Research on Policing Reform & Accountability

policingresearch.org

Rigorous evidence on police-civilian interactions
and the efficacy of policing reforms

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