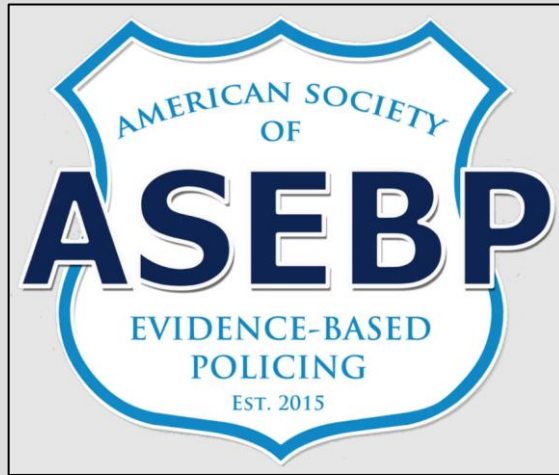
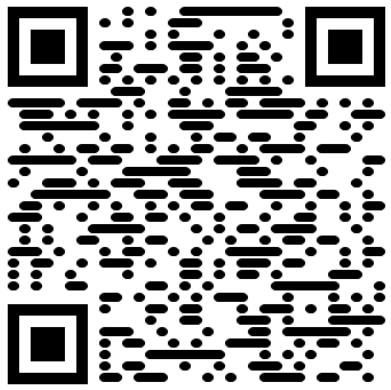


How long to conduct your experiment?

05-26



Andrew Wheeler, PhD
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My Background

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PhD Criminal Justice

- Statistical Analysis
- Operations Research
- Predictive Modelling
- Policy Analysis

Examples of Prior Work

- Predictive accuracy of violent offender forecasts ([Wheeler et al., 2019](#))
- Cost of crime hotspots ([Wheeler & Reuter, 2021](#))
- Racial bias in officer involved shootings ([Wheeler et al., 2017](#))

Large Language Models for Mortals
A Practical Guide for Analysts with Python
Andrew P. Wheeler



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What is the point?

Want to see if some intervention is working

- Does targeted patrol at X housing unit reduce crime?
- Did our policy change reduce officer use of force?

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Basic Assumptions

- You want a counterfactual estimate (does not need to be randomized)
- These estimators are for counting things
- E.g. counts of crime
- E.g. rates of events (clearances, use of force, etc)

Our *treatment effect* can be expressed as some equation:

$$\mathbb{E}[y] = \beta_0 + \beta_1 \cdot \text{treated}$$

- β_1 is the treatment effect
- Example: 10 crimes in control, 5 crimes in treated
- $\mathbb{E}[\text{crime}] = 10 + (-5) \cdot \text{treated}$
- Treatment effect is -5 crimes

Our effect has a standard error

$$\mathbb{E}[\text{crime}] = 10 + (-5) \cdot \text{treated}$$

- Assuming Poisson, standard error is 4
- 95% Confidence interval for the treatment effect is -13 to +3 crimes

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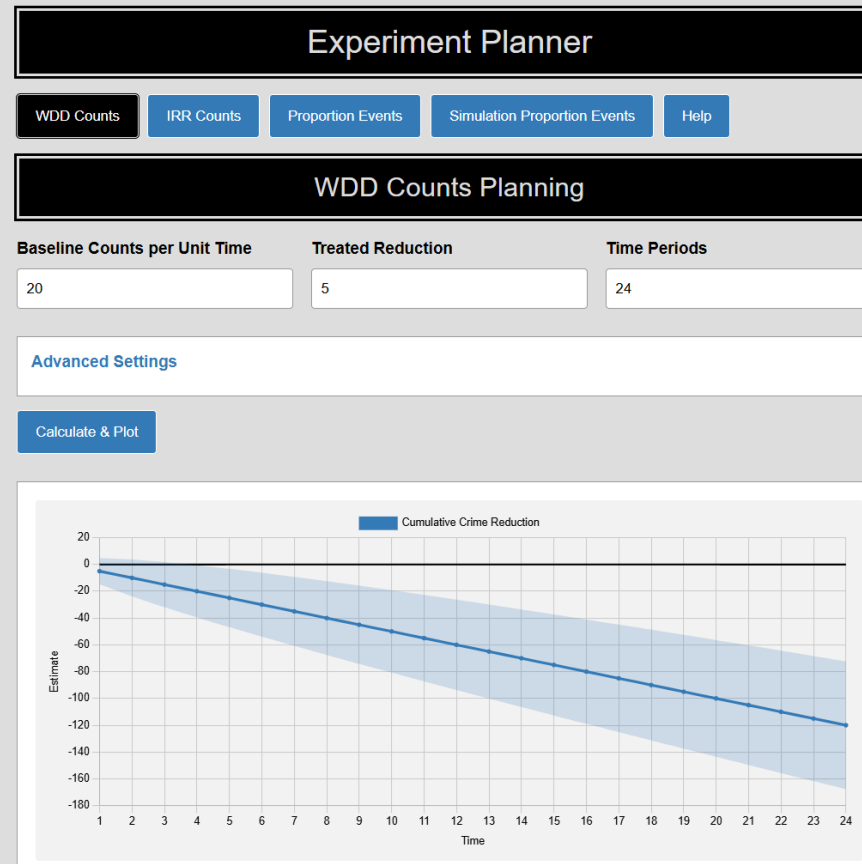
- Assuming Poisson, standard error is 4
- 95% Confidence interval for the treatment effect is -13 to +3 crimes

$$\mathbb{E}[\text{crime}] = 100 + (-50) \cdot \text{treated}$$

- Standard error for this equation is 12
- 95% Confidence interval for the treatment effect is -74 to -26 crimes

How long to plan your experiment?

- Need to know baseline number of events in treated/control
- Need to estimate *realistically* how much your intervention will work
- [Demo of planning app](#)



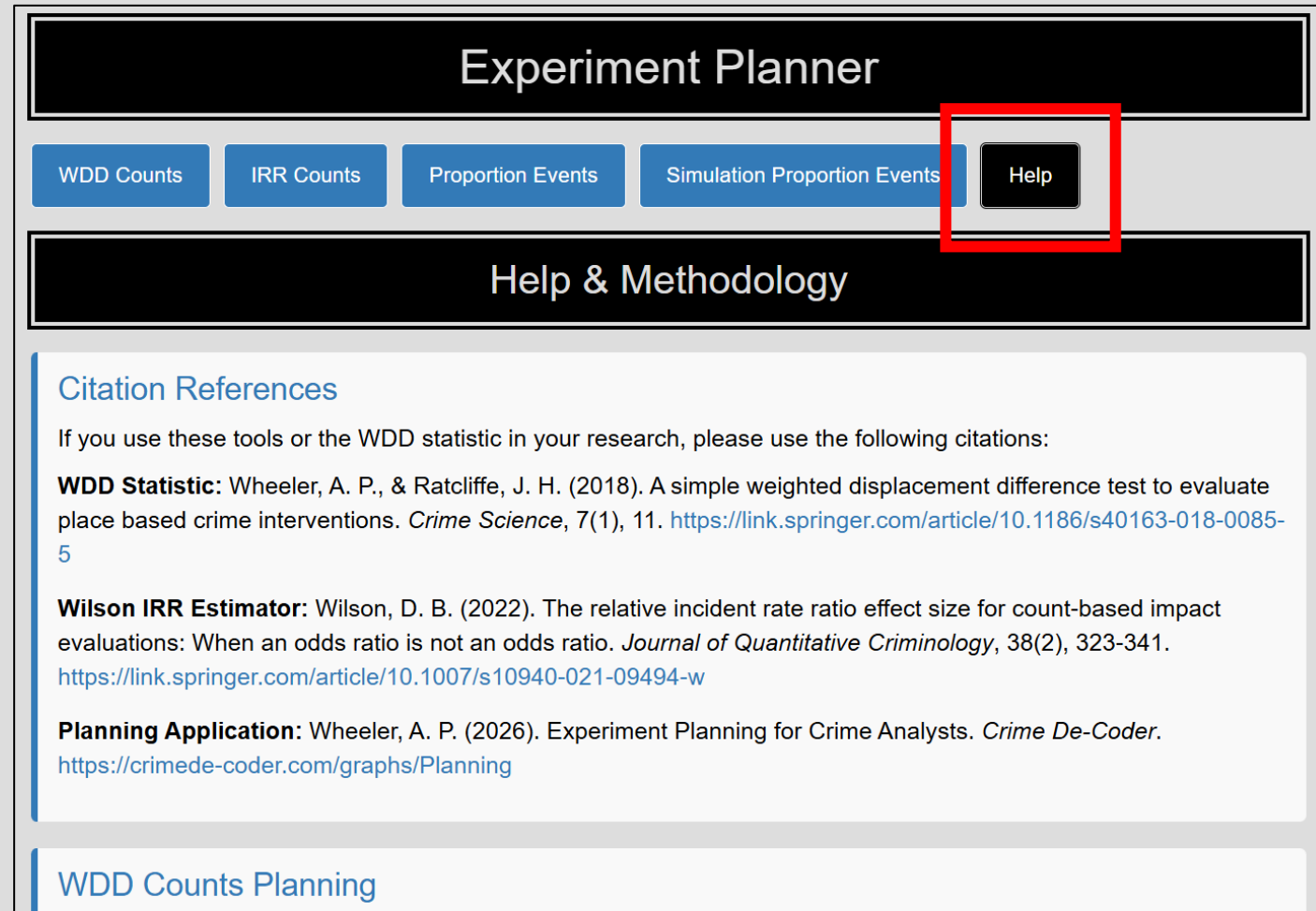
Having pre-treated data *can* make the estimator smaller

- Changes estimator to Difference in Difference (for WDD and IRR estimator)

With rates, smaller rates need to monitor for a much longer period of time

Other Resources

- Help page lists plenty of references
- Bottom of each application generates R code
- YouTube video tutorials
 - [WDD](#)
 - [IRR](#)
 - [Proportion](#)
- Just send me an email!
andrew.wheeler@crimedecoder.com



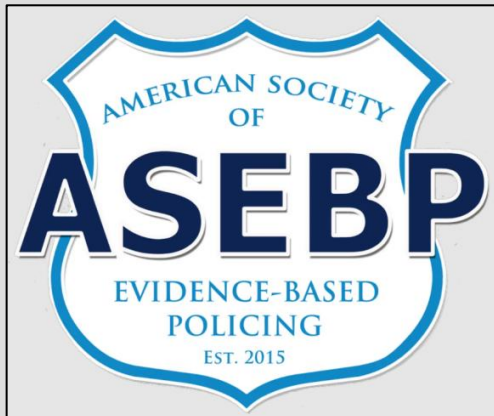
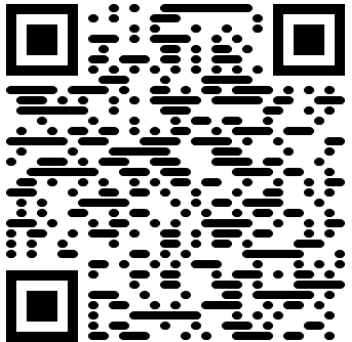
The screenshot shows the 'Experiment Planner' interface. At the top, there is a navigation bar with the title 'Experiment Planner'. Below this, there are five buttons: 'WDD Counts', 'IRR Counts', 'Proportion Events', 'Simulation Proportion Events', and 'Help'. The 'Help' button is highlighted with a red rectangular box. Below the navigation bar, there is a section titled 'Help & Methodology'. This section contains a sub-section for 'Citation References' which lists three references with their respective URLs. The first reference is for the 'WDD Statistic' by Wheeler and Ratcliffe (2018). The second is for the 'Wilson IRR Estimator' by Wilson (2022). The third is for the 'Planning Application' by Wheeler (2026). Below the citation references, there is a section for 'WDD Counts Planning'.

How long to conduct your experiment?

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