NYC Subway & Crime Rate

Group **3**

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Research Problem
Solutions & Research Questions

◉ One Increases and Two Decreases

◉ The MTA has to add cameras to subway cars by 2025

◉ Our Process:

‣ Study the effectiveness of cameras installed on crime rate
‣ Post warning signs close to the cameras and study its effectiveness on crime rate

◉ Research questions:

‣ What is the effect on crime rate of installing cameras in subway cameras?
‣ What is the effect on crime rate of posting warning sings close to the cameras that have been installed?

"Man slashed on subway station in Queens"

"NYC subway attack: Gang of women in neon-green bodysuit attack and rob 2 women"

Experimental Method
& Operational Procedures

◉ Brief Schedule:

  ‣ *December 31, 2024: compile crime rates from 300 trips with subways cars without cameras.*

  ‣ *January 1, 2025 - December 31, 2025: With cameras installed and being operated by the MTA in all subway cars, research question 1 is studied using 300 trips.*

  ‣ *January 1, 2026: Warning signs are posted.*

  ‣ *February 1, 2026 - January 1, 2027: Research question 2 is studied.*

  ‣ *January 31, 2027: Research on question number two is finalized; experiment is concluded.*

◉ 300 samples will be collected per group, for a total of 900 samples. A sample is considered the entire trip for a train, from the starting station to the ending station.

  ‣ ***We will be using simple random sampling to randomly sample events.***

◉ The crime rates we use will be based off the daily NYPD crime reports based on the trips we selected as samples.

Analytical Plans
& Key Findings from the Simulation Studies

Group	Train_ID	Line	CrimeReported	Month	Date	Day
Treatment1	4434	1	0	2	25	Thu
Treatment1	7937	3	0	3	17	Mon
Treatment1	6702	R	1	5	16	Tue
Treatment1	18745	7	0	9	22	Thu
Treatment1	12884	W	2	2	24	Wed
Treatment1	105	N	0	8	15	Tue

Group - *Label of control, treatment 1and treatment 2*
Train ID - *Unique ID number for each train trip*
Line - *Subway line (weighted based on popularity)*
Crime Reported - *Crime reported on each trip*

Month - *Month of the train trip*
Date - *Date of the train trip*
Day - *Day of the train trip*

Simulation
Produced 1,000 Times

```
   Experiment      effect       upper_ci             p
1:          1  -0.2200000  -0.107169008  6.948678e-04
2:          2  -0.2866667  -0.180394924  5.282562e-06
3:          3  -0.3366667  -0.233141234  6.222375e-08
4:          4  -0.1166667  -0.007890104  3.887749e-02
5:          5  -0.2966667  -0.188766528  3.590181e-06
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```

Experiment - *Simulation count*

Effect - *Effect size of each simulation (t test estimate x - estimate y)*

Upper_ci - *95% Confidence Interval*

P - *P-value for each t test*

Research Question	Scenario	Mean Effect in Simulated Data	95% Confidence Interval of Mean Effect	Percentage of False Positives	Percentage of True Negatives	Percentage of False Negatives	Percentage of True Positives
Install of cameras	No Effect	-0.003	0.113	0.322	0.036	0.618	0.024
Install of cameras	Effect: -0.284 (45% of 0.63)	-0.257	-0.151	0	0.643	0.011	0.346
Install of warning signs	No Effect	-0.002	0.114	0.332	0.035	0.619	0.014
Install of warning signs	Effect: -0.284 (45% of 0.63)	-0.275	-0.170	0	0.646	0.008	0.346

Conclusion
Summarizing the Findings

◉ The relevance of our hypothesis is supported by the simulated experiment.

◉ This simulated experiment will serve as a base for the actual research.

◉ The most obvious finding from this study is that security cameras being installed alongside warning signs can be an effective strategy to reduce crime rates on the New York City Subway System.

Limitations
& Considerations

◉ Project does not consider how many cameras are needed and how many warning signs need to be posted to achieve the maximum crime rate reduction threshold.

◉ Other unpredicted factors may cause bias, such as: weather and season, crime-level on the streets above, etc.

◉ Other government policies may impact our experiment.

Recommendations
For Further Research

◉ Research has generated new questions in need of further investigation, such as the fact that long-term experiment research may be impacted by many other unpredictable factors and situations. Proper strategy to reduce experimental period would need further consideration as well.

◉ Further strategy to reduce bias.

◉ We recommend further research be undertaken in the following concept: stricter, further controlled entrances and exits to and from the subway stations.

Thank You

Any Questions?