

# Journal of Undergraduate Research



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# Calling The Cops: How Race/Ethnicity and Gender Contribute to the Perception of the Police at the University of Rochester

Syed Arsalan Ghani '21, *Statistics*

Advised by Nicholas Zaino, *Department of Mathematics*

## Abstract

Nationally, people of color report lower levels of trust in the law enforcement compared to their White counterparts. This paper examines this sentiment at the University of Rochester in New York, in relation to the campus police called Public Safety. A survey regarding race/ethnicity, gender, and number of emergency calls to Public Safety was administered to 391 undergraduates. Trust in Public Safety was operationalized by the amount of calls made to them by students, wherein more calls suggest higher amounts of trust. A two-way ANOVA, logistic regression, and Poisson-Hurdle regression all showed only gender to be a significant predictor of calling Public Safety, with males calling more often than females. Neither race/ethnicity nor the interaction of race/ethnicity and gender were significant predictors. Implications of these results will be discussed.

## Background

The prevalent social climate in the United States of America is one where law enforcement is feared by people of color (POC). This is mostly because POC are disproportionately targeted and profiled by law enforcement agents. In 2017, police killed 1,147 people with Black people being 25% of those killed despite making up 13% of the population. The same study found that Black people were three times more likely to be killed by the police than White people even though 30% of those Black people were unarmed compared to 21% of the White people. It is also pertinent to mention that 13 out of the 100 largest U.S. city police departments kill Black men at higher rates than the United States' average murder rate. The Black Youth Project found that less than half of Black youth (44.2%) trust the police compared to young people from other racial and ethnic groups.

Research also suggests that the gender of an individual affects one's experience when interacting with the police. Due to the gendered policies of many U.S. police departments (such as the policy that only male policemen can search males and vice versa) and the male-dominated police force, there exists a dynamic of procedural injustice that is based upon the gender of an individual. This results in men and women having vastly different interactions with the police. Moreover, it is very important to consider the intersection of one's identities because those identities introduce a new dimension into one's experience with the police. Novich, Kringen, and Hunt (2018) found that the police unfairly enforced the law on disadvantaged male suspects when compared to female sus-

pects. Such research is crucial to ensuring that all people feel safe and equal when interacting with the police and to guaranteeing harmony.

The goal of this study is to see whether or not race/ethnicity, gender, and the interaction of the two (such as Black females or White males) will have different expectations of interactions with a campus police force (Public Safety) at the University of Rochester. This was quantified by administering the student body a survey which asked the number of times they had called Public Safety in emergencies during the last academic year. An emergency was described as "*a medical or non-medical emergency that requires immediate Public Safety's attention*" to control for the plethora of other reasons Public Safety is called for such as lost belongings, lock-outs, and "safe" rides. Higher amounts of calls indicate higher levels of trust and vice versa. The rationale is that if a student trusts Public Safety then they would not hesitate to call them, while students with lower levels of trust would generally try other approaches in tackling the emergency. Thus, this study has two guiding hypotheses:

1. POC will be less likely to call Public Safety due to high levels of distrust and disproportionate targeting nationally.
2. Male POC will call Public Safety the least due to the disproportionate targeting towards them evidenced at a national level.

## Methods

The data was collected through convenience sampling and the participants were given a short survey which asked for their demographic data (i.e., age, gender, race/ethnicity, and class year). Lastly, the survey asked for the number of times they have called Public Safety in the past academic year for an emergency. Responses were collected from 391 participants, representing 10% of the total undergraduate population of the college. These 391 participants represented the four major races/ethnicities in the school: Asian (including the Indian subcontinent), Black or African-American, Latinx, and White/Caucasian. Since very few non-binary people took part in the study, the data was categorised as males and non-males (including females and non-binary students). Three inferential statistical tests were run to test the reliability and the validity of the data:

**1. Two-way ANOVA** was chosen to test the differences in mean between the groups of races and genders. Interaction between gender and race/ethnicity was also tested. ANOVA was chosen because it is a versatile test and is robust when

the sample size is big enough. The data was not normal in this dataset (there were many zeros signifying no calls to Public Safety), but, since the sample size was 391 participants, we were able to assume that ANOVA conditions would hold.

**2. Binary Logistic Regression** was chosen since the data could easily be converted into binary by designating no calls to Public Safety as “0” and one or more call(s) as “1.” This allowed for the calculations of the odds of calling Public Safety based on one’s race/ethnicity and gender.

**3. Poisson Hurdle Regression** was chosen because the data had many zeros which made the data non-normal. This model is for count data and helps handle excess zeros and over-dispersion. When performing Poisson regression, it is assumed that our count data follows a Poisson distribution with a mean conditional on the predictors.

The data was analyzed with the statistical program Minitab. The chosen significance level was  $\alpha=0.05$ .

## Results

Of the 391 participants, 77.4% never called Public Safety in the academic year, while 22.6% called at least once. With regard to gender, 41.2% of the participants identified as males, 56.9% as females, and 1.9% as non-binary. When asked for racial and ethnic backgrounds, 54% of the participants identified as White, 10.7% as Black, 24.5% as Asian (including the Indian subcontinent), 9.1% as Latinx, and 1.7% as other. This gender and racial breakdown closely mirrors the college’s overall population.

### Two-way ANOVA

This analysis showed that gender was very significant in predicting the calls made to Public Safety ( $p=0.005$ ). This suggests that there is a difference in the means of calls made to Public Safety between males and non-males in this sample. Moreover, race/ethnicity also approached significance ( $p=0.082$ ). However, the interaction between race and gender remained non-significant. A closer look into the ANOVA results shows a very clear pattern that is consistent with our hypotheses. Specifically, for race/ethnicity, the number of calls made by White/Caucasian individuals was significant and implied that the means of Whites/Caucasians were different from the rest ( $p=0.026$ ). The Means Table from Minitab showed that the mean for Whites/Caucasians was much higher than the rest while the mean for all the non-male participants was lower than for males.

### Binary Logistic Regression

The binary logistic regression analysis also showed results consistent with the ANOVA. The results suggest that gender has a statistically significant association with the number of calls to Public Safety ( $p=0.007$ ). The odds ratio for the significant term was also calculated to be 4.3. This implies that males are 4.3 times more likely to call Public Safety than non-

males. No other predictor variables (such as race/ethnicity) were significant.

### Poisson Hurdle Regression

As mentioned above, there was a huge number of zeros in the dataset, indicating individuals made no calls to Public Safety as apparent from Figure 1.

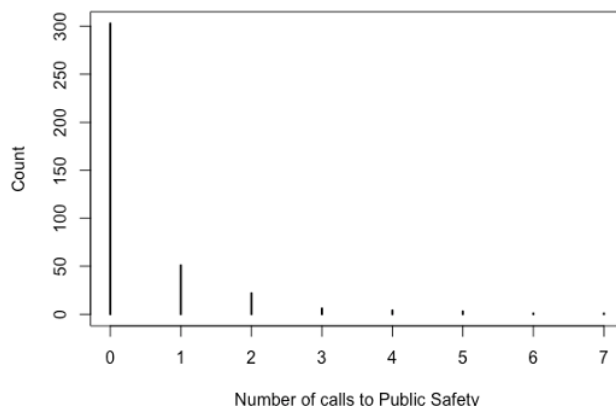


Fig 1. The over-dispersion and skewness of data

### Illustration of Skewness

After correcting for the over-inflation of the excess zeros (266 expected while 303 observed), the Poisson Hurdle regression showed that gender had a significant effect on Public Safety calls ( $p=0.00562$ ). No other factors were significant, including race. This implies that our previous models, which were poor fits, could not correct the over-inflation of the zeros in the data. Figure 2 shows the counts after correcting for over-inflation of the zeros.

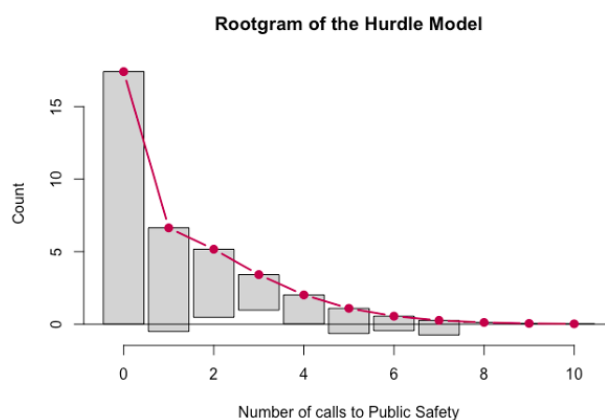


Fig 2. The hurdle model after correcting for the over-inflation of number of zeros in the data.

## Conclusion & Discussion

This study aimed to analyze discrepancies that may exist in seeking Public Safety’s help as a function of race/ethnicity, gender, and the interaction of the two at the University of Rochester. The results suggest that a racial/ethnic bias towards calling Public Safety does not exist on the campus,

effectively refuting both hypotheses. However, there is a gender bias, wherein males are 4.3 times more likely to call Public Safety for help compared to non-male students, regardless of race/ethnicity. Lastly, there was no evidence of significant interaction between gender and race/ethnicity.

A major reason that this data could have deviated from previous research is that students may have a very different outlook on the role of Public Safety on campus, compared to police in the city. This could be due to the fact that Public Safety officers are currently unarmed, thus reducing the student body's fear. They are also seen around the school often, which in a way normalises their presence. This could lead to students seeing them as trustworthy and helpful, and not as a threat. Moreover, previous research on police brutality has been done in areas with relatively little economic growth and low education rates, which increases the chances of the police getting away with misdemeanors. However, this is not necessarily the case in a large upstate New York college, where students are well aware of their rights and Public Safety is kept in strict check by the college.

However, it was surprising to see a gender deviation in the sentiments towards Public Safety, which could potentially be explained by the disproportionately low number of female officers on-campus. Positive, same-gender role models are excellent in fostering a sense of trust towards an organisation, and Public Safety fails to possess them. This is in line with previous research which shows that males and females

have a very different experience with law enforcement, mostly because of the bureaucratic problems that exist in police stations. Non-male students may not expect cis-male Public Safety officers to understand some of their problems; thus they may opt to consult other resources, such as *RE-STORE Rape Crisis*, significantly reducing calls made to Public Safety.

There are several limitations in the study. The dataset, though representative, captured only approximately 10% of the college's population. A bigger and randomly-sampled dataset would be excellent in elucidating this phenomenon. Since participants were self-reporting, they could also have been exaggerating the amount of times they called Public Safety to appear more responsible. Another problem in this dataset was the over-inflation of zeros, making it non-normal, thus requiring several tests to check and balance the robustness of two-way ANOVA. A future direction could be to develop a novel method to test such data. Lastly, for a future study, participants could be asked for the specific reason they called Public Safety; responses could then be coded to provide a greater depth in the data.

These are incredibly optimistic results and show a general trend of trust towards law enforcement on racial and ethnic lines. Although the police force has a long way to go to cultivate trust among American minorities (non-males and non-Whites), this study suggests that it is possible on smaller scales, which can eventually build up.

## Footnotes

1. Sinyangwe, Samuel. "Mapping Police Violence." Mapping Police Violence. Accessed April 15, 2019. <https://mappingpoliceviolence.org/>.
2. Ibid
3. Rogowski, Jon C, and Cathy J Cohen. "The Policing of Black Communities and Young People of Color." *The Policing of Black Communities and Young People of Color*. Black Youth Project, n.d. from [http://blackyouthproject.com/wp-content/uploads/2014/08/ferguson\\_policing.pdf](http://blackyouthproject.com/wp-content/uploads/2014/08/ferguson_policing.pdf)
4. Tyler, Tom R. *Why People Obey the Law*. Princeton: Princeton University Press, 2006.
5. Reaves, Brian A. "Local Police Departments, 2013: Personnel, Policies, and Practices," 2015.
6. Durán, Robert J. "Legitimated Oppression." *Journal of Contemporary Ethnography* 38, no. 2 (2008): 143–68. <https://doi.org/10.1177/0891241607313057>.
7. Novich, Madeleine, Anne Li Kringen, and Geoffrey Hunt. "'They Can't Search Her': How Gender Imbalances in the Police Force Contribute to Perceptions of Procedural Unfairness." *Feminist Criminology* 13, no. 3 (2018): 260–86. <https://doi.org/10.1177/1557085117753669>.
8. Kleiber, Christian, and Achim Zeileis. "Visualizing Count Data Regressions Using Rootograms." *The American Statistician* 70, no. 3 (February 2016): 296–303. <https://doi.org/10.1080/00031305.2016.1173590>.
9. "2019-20 FACT SHEET." *2019-20 FACT SHEET*. University of Rochester, 2019.
10. Bryant, Alison L., and Marc A. Zimmerman. "Role Models and Psychosocial Outcomes Among African American Adolescents." *Journal of Adolescent Research* 18, no. 1 (2003): 36–67. <https://doi.org/10.1177/0743558402238276>