Impact of Changing the Definition of Rape

STA 199 Final Project

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The definition of rape used by Unified Crime Reporting was updated in 2013.

Definition *BEFORE* 2013

"The carnal knowledge of a female, forcibly and against her will."

- Unchanged since 1927
- Only includes forcible male penile penetration of a female vagina

Definition *AFTER* 2013

"The penetration, no matter how slight, of the vagina or anus with any body part or object, or oral penetration by a sex organ of another person, without the consent of the victim."

- Includes any gender of victim and perpetrator
- Recognizes that rape with an object can be as traumatic as penile/vaginal rape
- Includes instances in which the victim is unable to give consent because of temporary or permanent mental or physical incapacity

How did this change – broadening the definition – impact the cases of rapes?
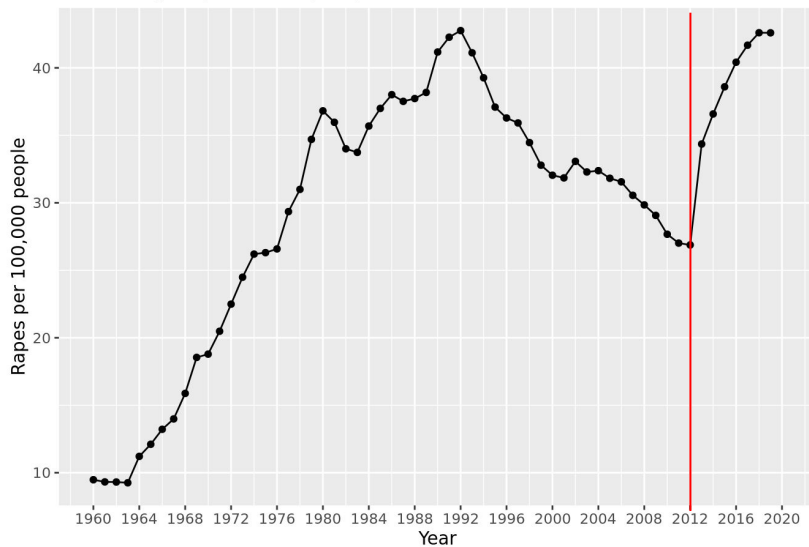
Crimes Dataset

- CORGIS Dataset Project

- United Crime Reporting (DOJ and FBI)

- 1960 - 2019

- Totals and Rates of various violent and non-violent crimes

- State-level data

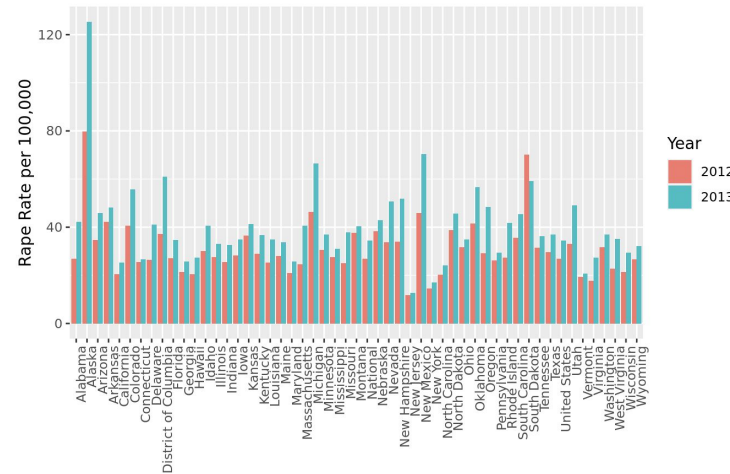- Rape total and rates vs violent crime totals and rates

Highlights from EDA

1. Dramatic National Increase in 2013

2. Increase in 49 of 50 states

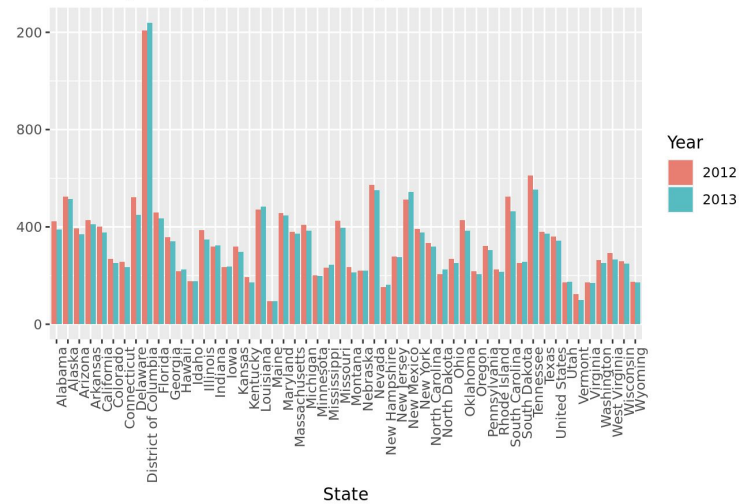3. Little to no increase in other violent crimes

Rate of Rape in 2012 vs 2013 Across Every US State

Nationally Reported Rapes per 100,000 (1960 - 2019)

Rate of Non-Rape Violent
Crimes per 100,000 Across every US State in 2012 and 2013

Hypothesis Testing

Our null hypothesis:

$$\mu_{2013} = \mu_{2012}$$

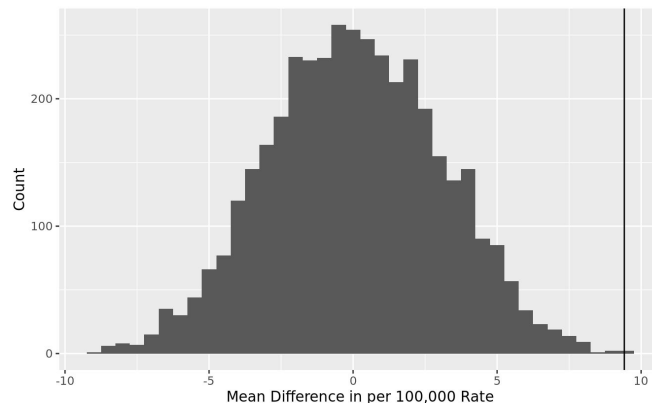**Mean rate of rape per 100,000 people across all 50 states**

Our alternative hypothesis:

$$\mu_{2013} > \mu_{2012}$$

P-Value: 0.0005

$$\overline{x}_{2013} - \overline{x}_{2012} = 9.415$$

Null Distribution of Mean Difference in 2012 and 2013
State-Level Rate Rapes (2013 - 2012)
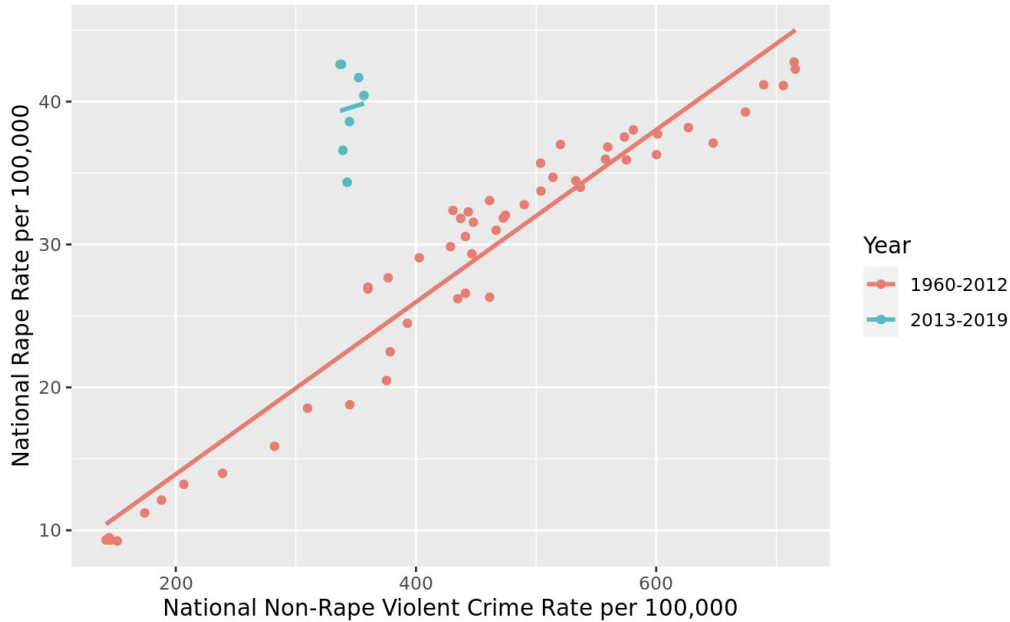Black Line Indicates Point Estimate of 9.415

A p-value of 0.0005 means we can reject H_0 in favor of H_a at a 99.95% confidence level.

From 2012 to 2013, an additional 9-10 rapes per 100,000 people were defined per state.

Linear Models

Interactive Linear Regression Between 1960-2019 National
Rape Rates and Corresponding Non-Rape Violent Crime Rates
Model Varies between Pre and Post 2013 Years

Pre-2013:

R^2 = 0.9372598

Coefficient: 0.0602*year

2013 and Onwards:

R^2 = 0.628789

Coefficient: 0.0263*year

1960-2012 and 2013-2019
(interactive):

R^2 = 0.9351682

Conclusions

From the modeling and statistical testing we conducted, we observe a marked and statistically significant difference between the instances of rape before and after the UCR broadened its definition.

- Non-Violent Crime Rate did not experience same change, relationship with rapes became weaker and changed
- We now have strong evidence to believe that before 2012, many instances of rape went overlooked due to misclassification
- Definitions matter and are often outdated

Future Work:
How has the updated definition of rape changed cases prosecuted? If we can statistically prove that many instances of rape previously overlooked are being appropriately classified, can we identify a statistically significant amount of unjust court cases? We can also look at other definition changes in history for other crimes.

References

1. *An Updated Definition of Rape* (2012). The United States Department of Justice Archives. Retrieved October 30, 2023, from https://www.justice.gov/archives/opa/blog/updated-definition-rape
2. Bierie, D.M. & Davis-Siegel, J.C. (2014). Measurement Matters. *Sexual Abuse*, *27*(5), 443-459. https://doi.org/10.1177/1079063214521470