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# Public Perceptions of Crime Maps: Considering the Impact of Map Style on Perceptions of Safety

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# **Public Perceptions of Crime Maps:** Considering the Impact of Map Style on Perceptions of Safety

Kathryn Wuschke, Kris Henning, Greg Stewart and Kaitlyn Bonn  
Criminology and Criminal Justice, Portland State University

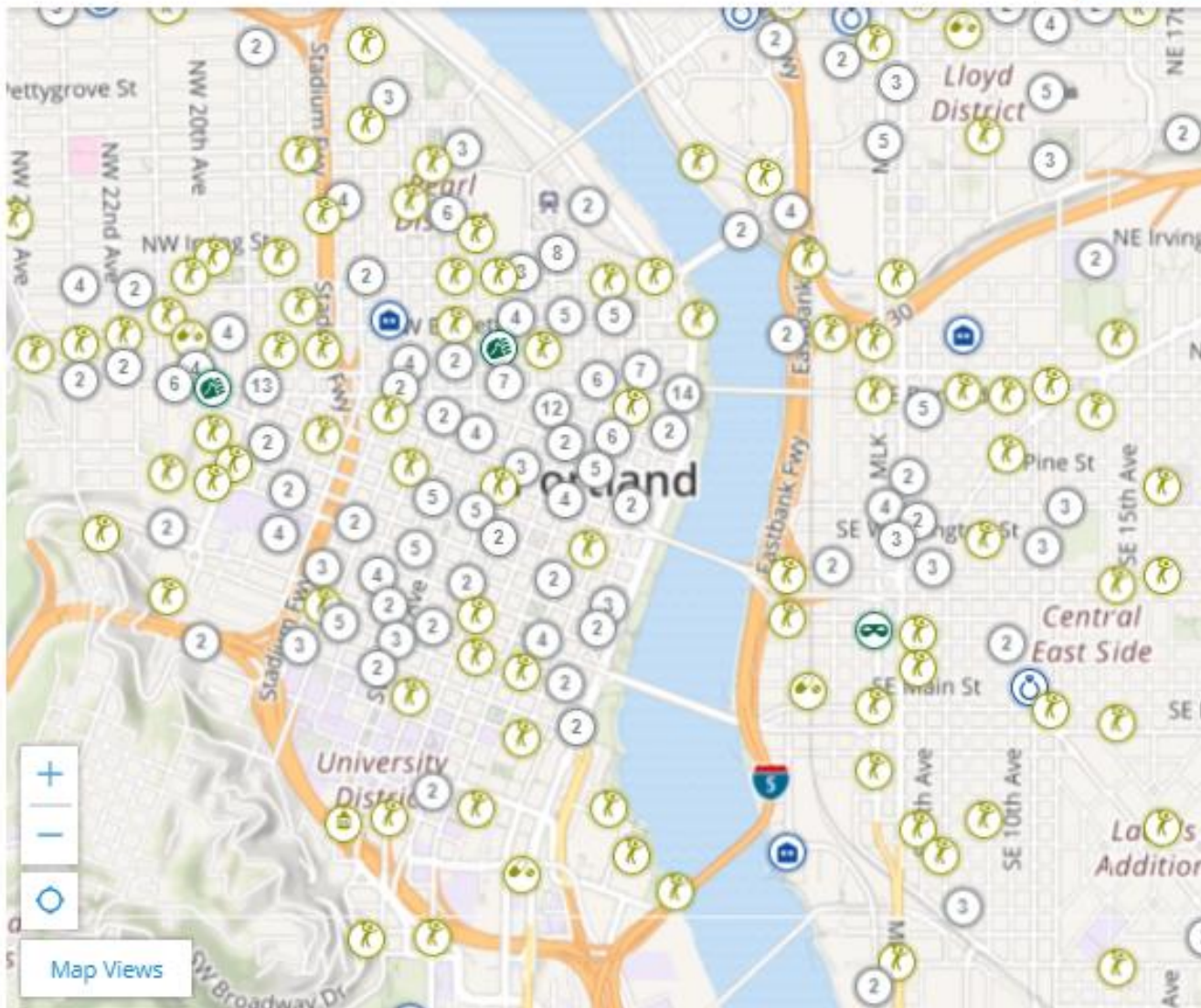




439 incidents

Oct 3, 2017 - Oct 9, 2017

Filter



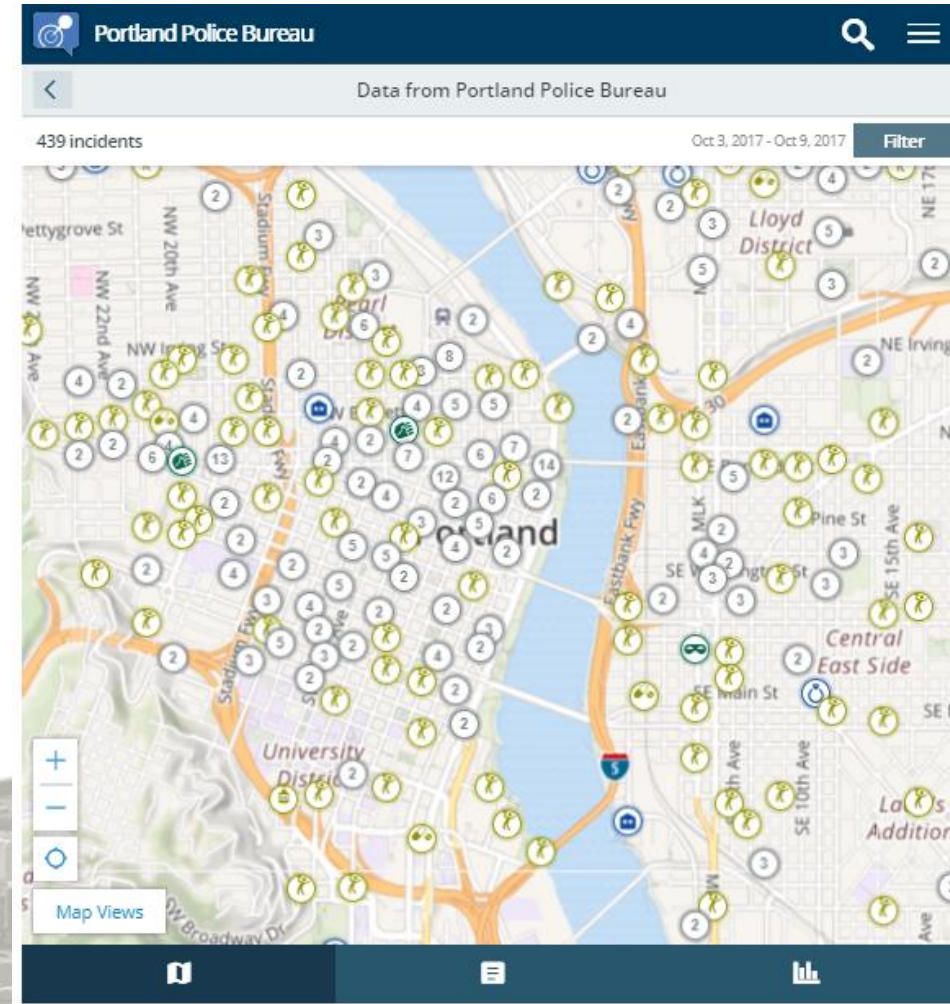
Map Views





# Considering Crime Maps

- This study questions how **people** may **interpret and understand** the types of crime maps that are frequently **publicly available**.





# Public Crime Maps: Accountability in Action?

- Maps commonly available via policing websites
  - Private competition increasing (Scassa, 2016)
- Maps provided in the name of **accountability & transparency**

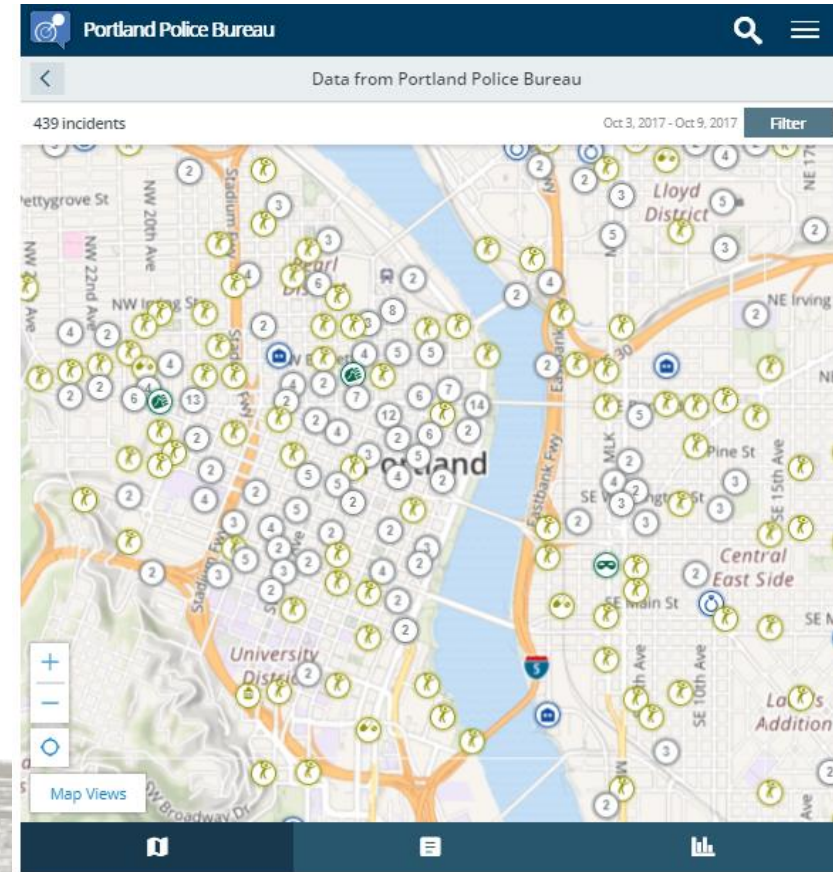


Image Source (2017):  
<https://www.portlandoregon.gov/police/>

FINAL REPORT OF

THE PRESIDENT'S TASK FORCE ON  
21ST CENTURY POLICING

MAY 2015



*“Law enforcement agencies should ... establish a culture of transparency and accountability to build public trust and legitimacy”*  
(USDOJ, 2015, p. 1)

Source: USDOJ, 2015

[https://cops.usdoj.gov/pdf/taskforce/taskforce\\_finalreport.pdf](https://cops.usdoj.gov/pdf/taskforce/taskforce_finalreport.pdf)



# Open Data...or is it?

- The Push for Open Data occurs at a time when the overall quantity of data is increasing (Scassa, 2016; Janssen, 2012; Police Foundation, 2015)
- Recent years have resulted in improvements to crime data collection, spatial accuracy, storage and dissemination
- As a result, a great increase in agency-affiliated crime maps have emerged (Paulsen and LeBeau, 2012).



# The Call for Research

- As public crime maps increase in use and distribution, researchers are beginning to explore the impacts of access.
  - Groff et al. (2005) calls for more research on public perception of crime maps
  - Chainey and Thomson (2012) critique existing mapping practices, leading to inaccuracies and increasing the likelihood of misinterpretation





# Exploring Public Perceptions

- How is **public perception and interpretation** impacted by **map choice**?
  - Today's presentation focuses on a follow up to an earlier phase of this investigation by Bonn, Henning and Stewart
  - The preliminary study found that **dot maps** increased perceptions of fear when compared to **kernel density maps**
  - Our follow-up study builds upon these findings to explore **whether this pattern holds across crime types**
  - Further, we're extending this study beyond fear to consider **broader benefits** associated with these perceptions

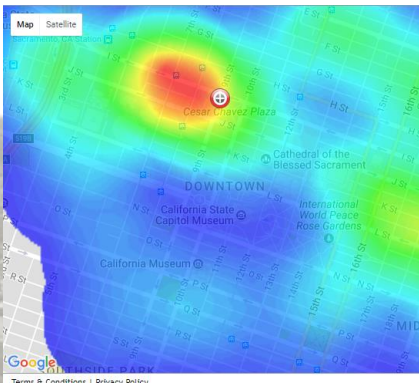
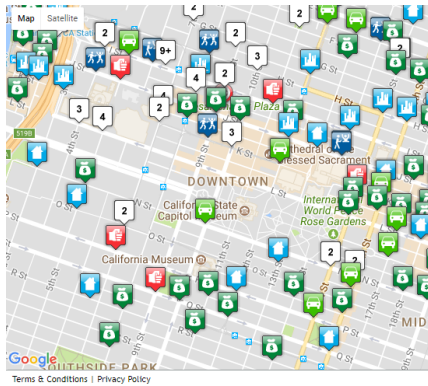


Image Source: <https://communitycrimemap.com/>



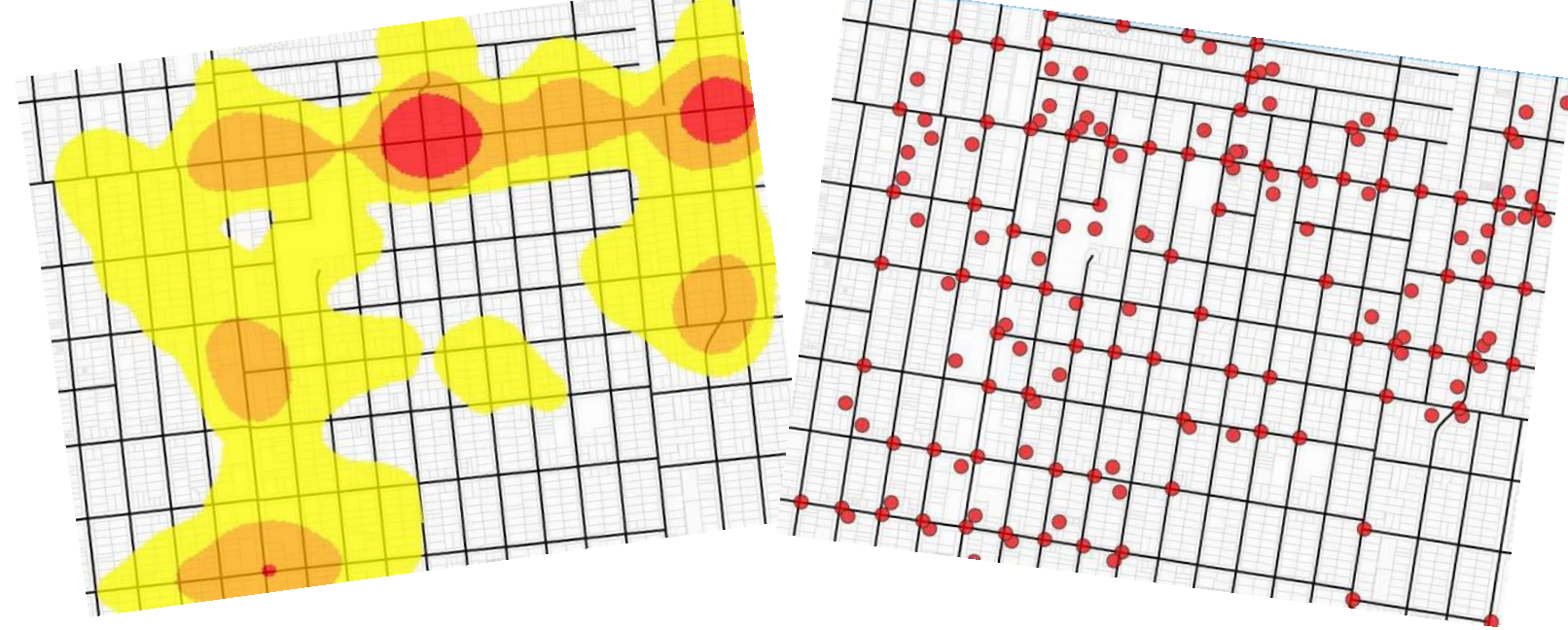
# Data and Methodology

- Starting Simply:
  - Initial stages have employed static maps for a fabricated neighborhood, using realistic spatial crime patterns
  - Two by Two factorial design:
    - 2 (Map Type: Dot vs Kernel Density) x
    - 2 (Crime Type: Violent vs Property)



# Collecting Perceptions

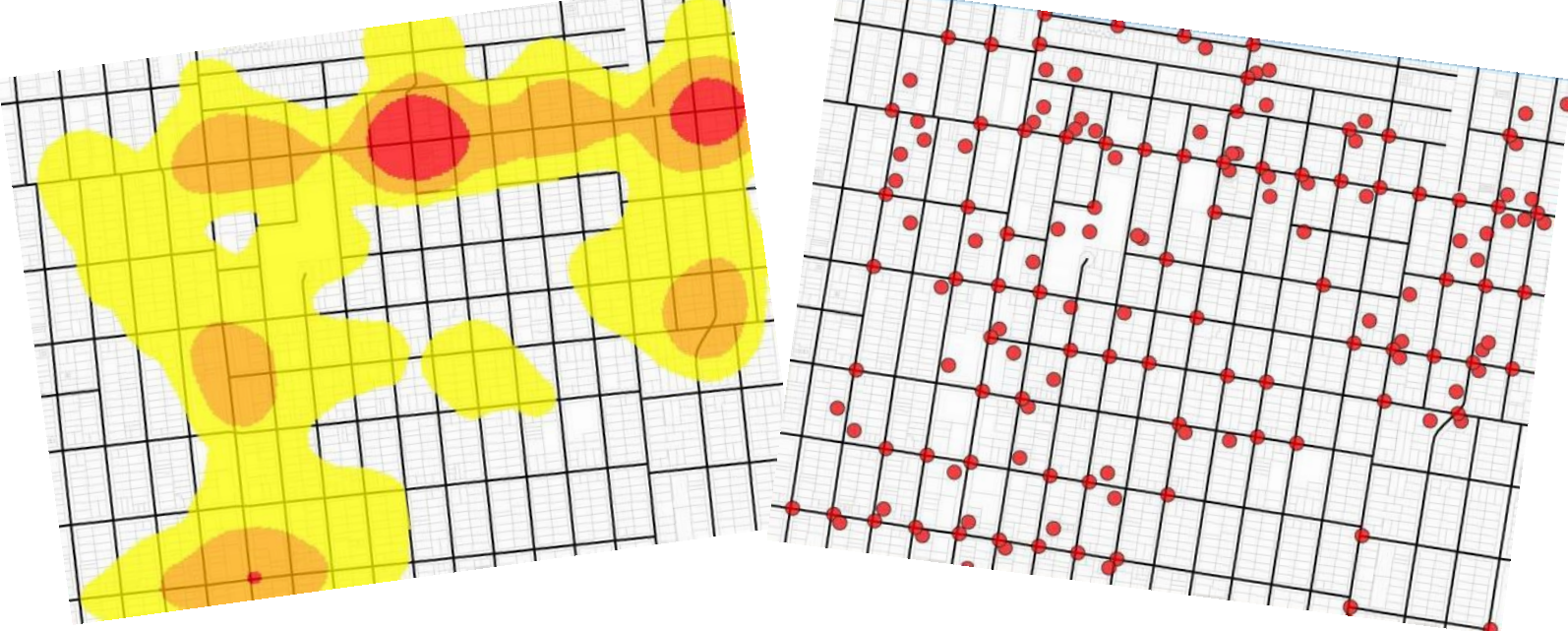
- We created a survey using Qualtrics
  - Survey displays a map, then ask participants to provide their understanding and impressions of the data as displayed.
  - Questions ask participant to answer questions based on if this hypothetical neighborhood is their own.
  - Questions Include:



**If you lived in this neighborhood how safe would you feel doing the following activities?**

Walking alone during the DAY

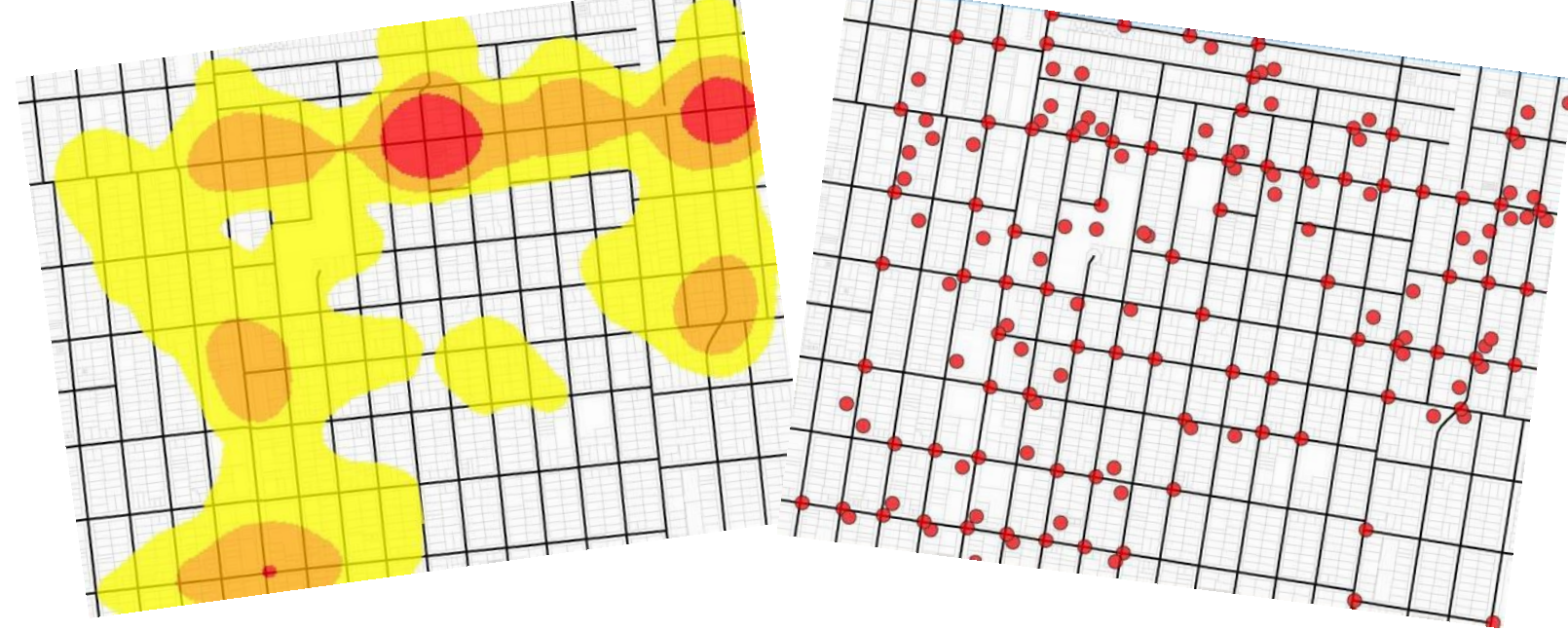
- Very Safe**
- Safe**
- Unsafe**
- Very Unsafe**



If you lived in this neighborhood for the next 12 months, how likely is it that you or a family member would experience the following crimes? (0 = very unlikely, 5 = very likely)

	VERY UNLIKELY					VERY LIKELY						
	0	1	2	3	4	5	0	1	2	3	4	5
Sexual Assault	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
Larceny	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
Burglary	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
Motor Vehicle Theft	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
Assault	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
Robbery	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>





**Based on the data shown in the map, how would you rate the police department's efforts to address crime in this neighborhood?**

- They are doing a VERY GOOD job (A)
- They are doing a GOOD job (B)
- They are doing an OK job (C)
- They are doing a POOR job (D)
- They are doing a VERY POOR job (F)



# Representing the Public

- Sample of Public Perceptions acquired by creating a survey and requesting respondents using Amazon's Mechanical Turk (MTurk)
  - MTurk is a crowd-sourcing platform that is increasingly being used in academic studies
  - Resulting samples are found to be consistent with traditional methods of acquiring research participants (Henderson and Levett, 2016; Chandler and Shapiro, 2016).



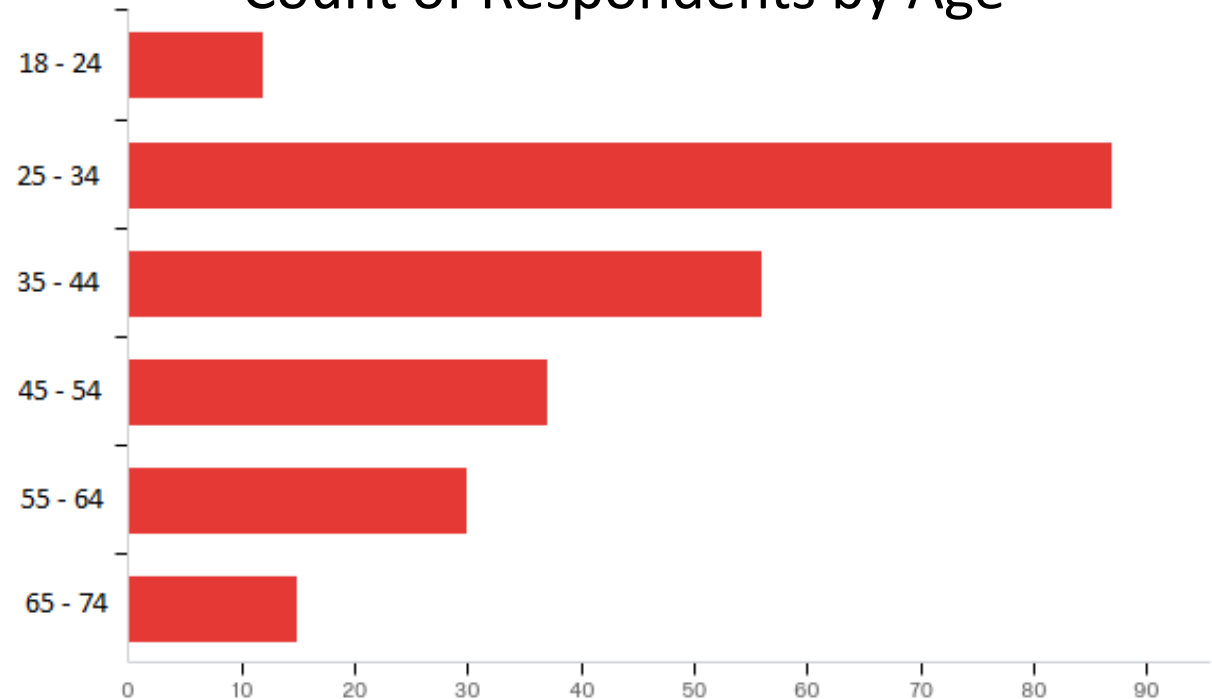


# Mechanical Turk Sample

We received 230 respondents to our survey.

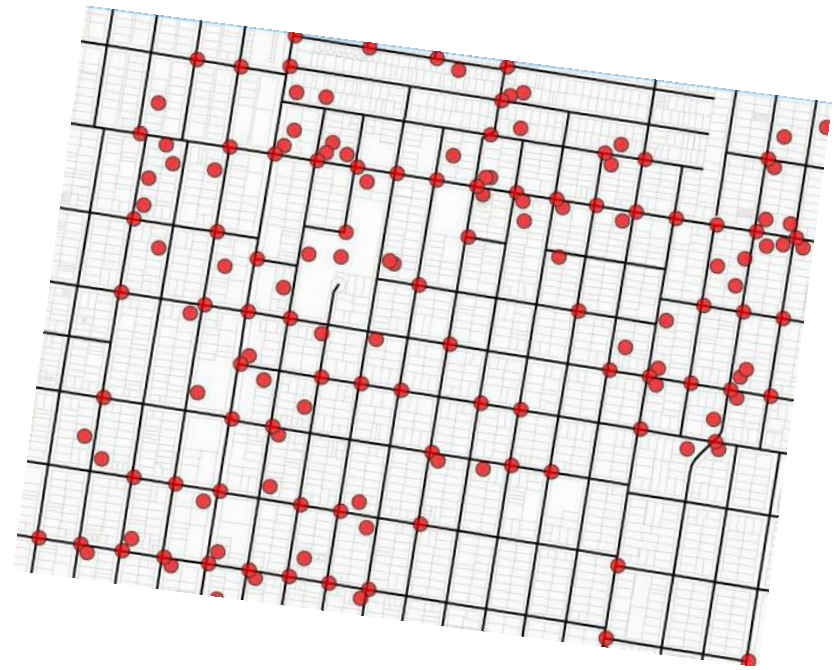
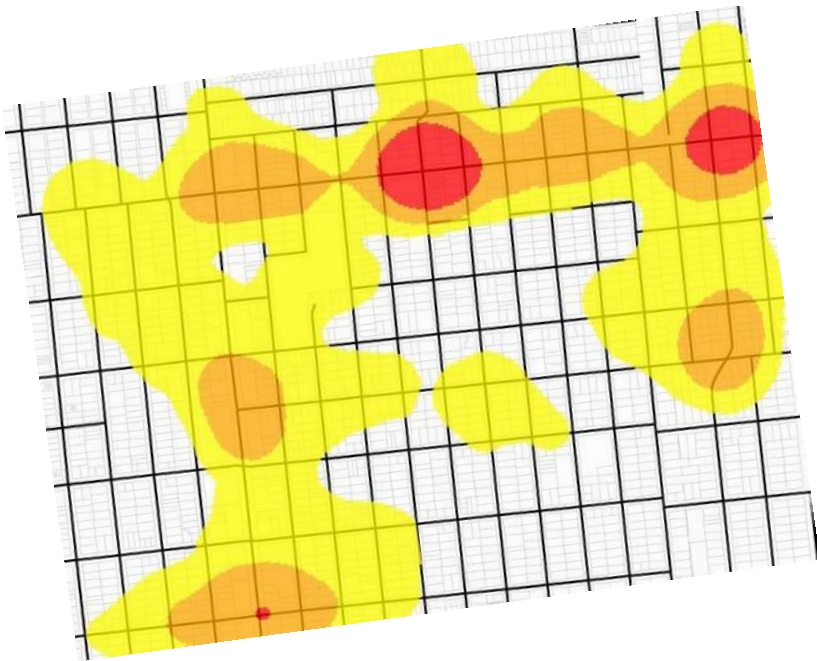
- 54% Male
- 37% aged 25-34

Count of Respondents by Age



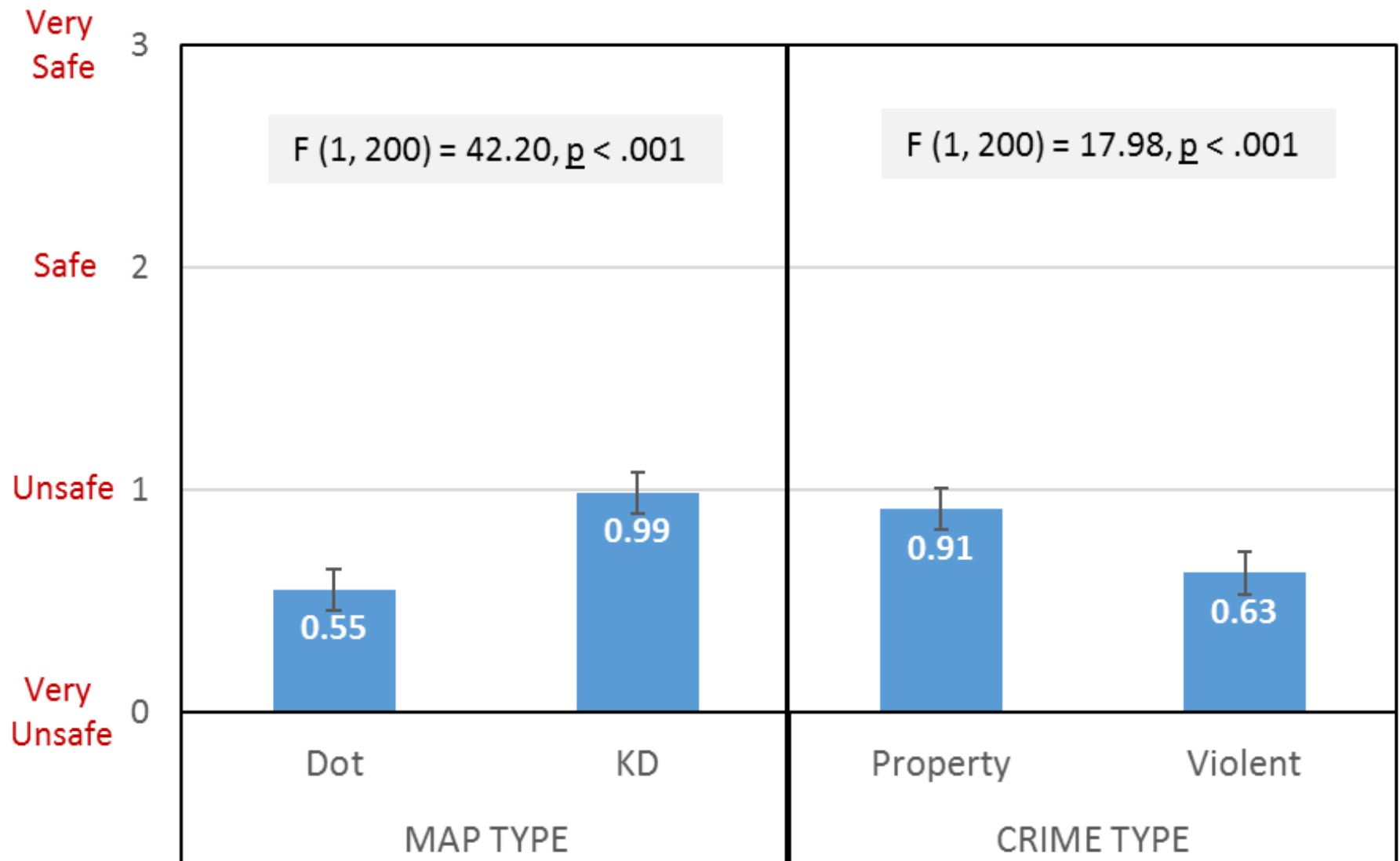


# Results: Map Types Matter



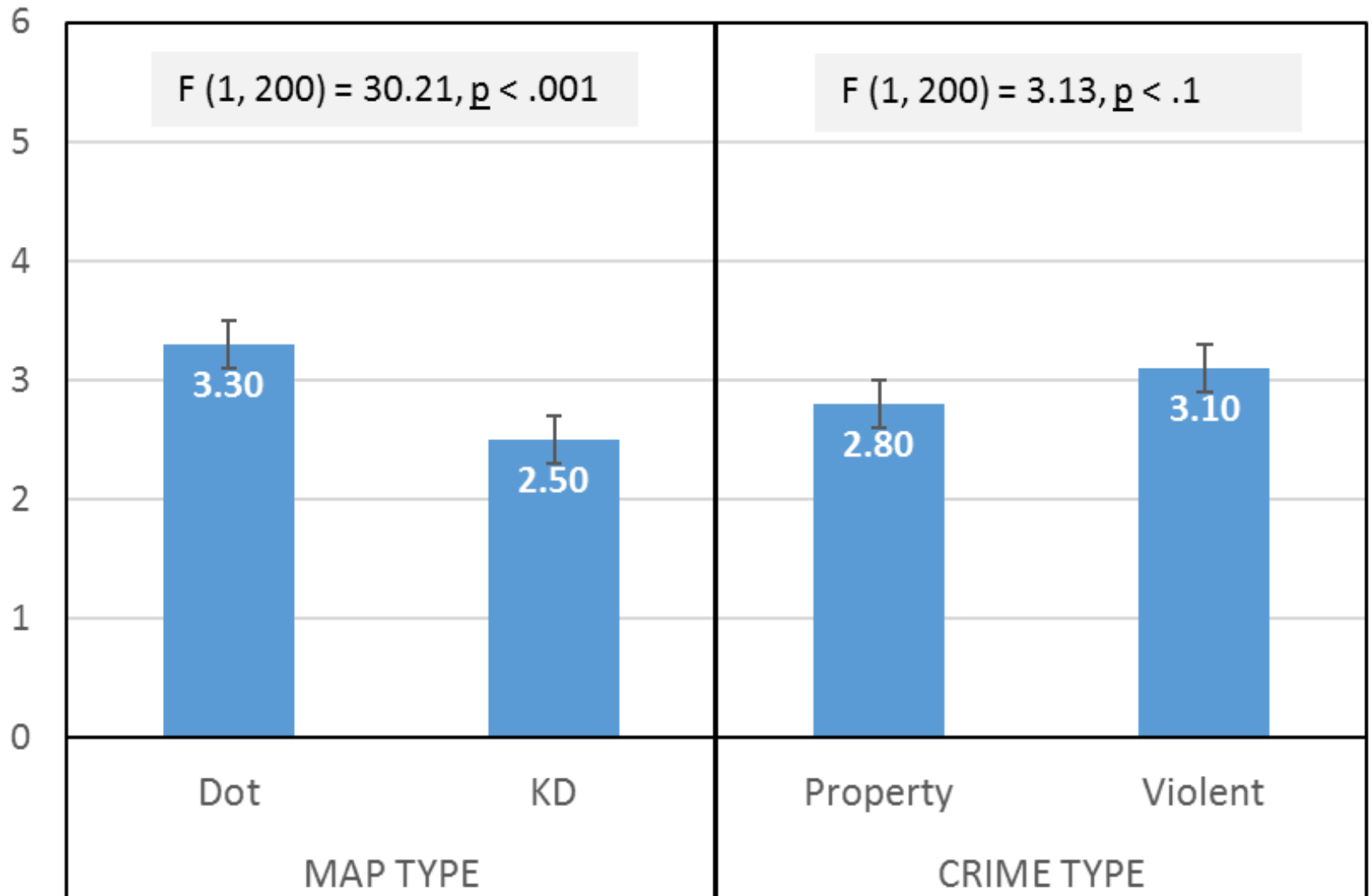
- Dot maps are found to be associated with **lower levels of perceived safety**, regardless of type of crime

# Perceived Safety in Neighborhood



# Perceived Likelihood of Victimization

Very Likely 6



Very Unlikely 0

# Perceived Trust in Neighbors

Strongly Agree

3

$F(1, 200) = 18.17, p < .001$

$F(1, 200) = 4.87, p < .05$

Agree

2

Disagree

1

Strongly Disagree

0

Dot

KD

Property

Violent

MAP TYPE

CRIME TYPE

1.18

1.50

1.42

1.25

# Perceived Likelihood to take Precautions

Very Likely

6

5

4

3

2

1

0

Very  
Unlikely

$F(1, 200) = 18.44, p < .001$

$F(1, 200) = 7.28, p < .05$

4.25

3.85

3.93

4.18

Dot

KD

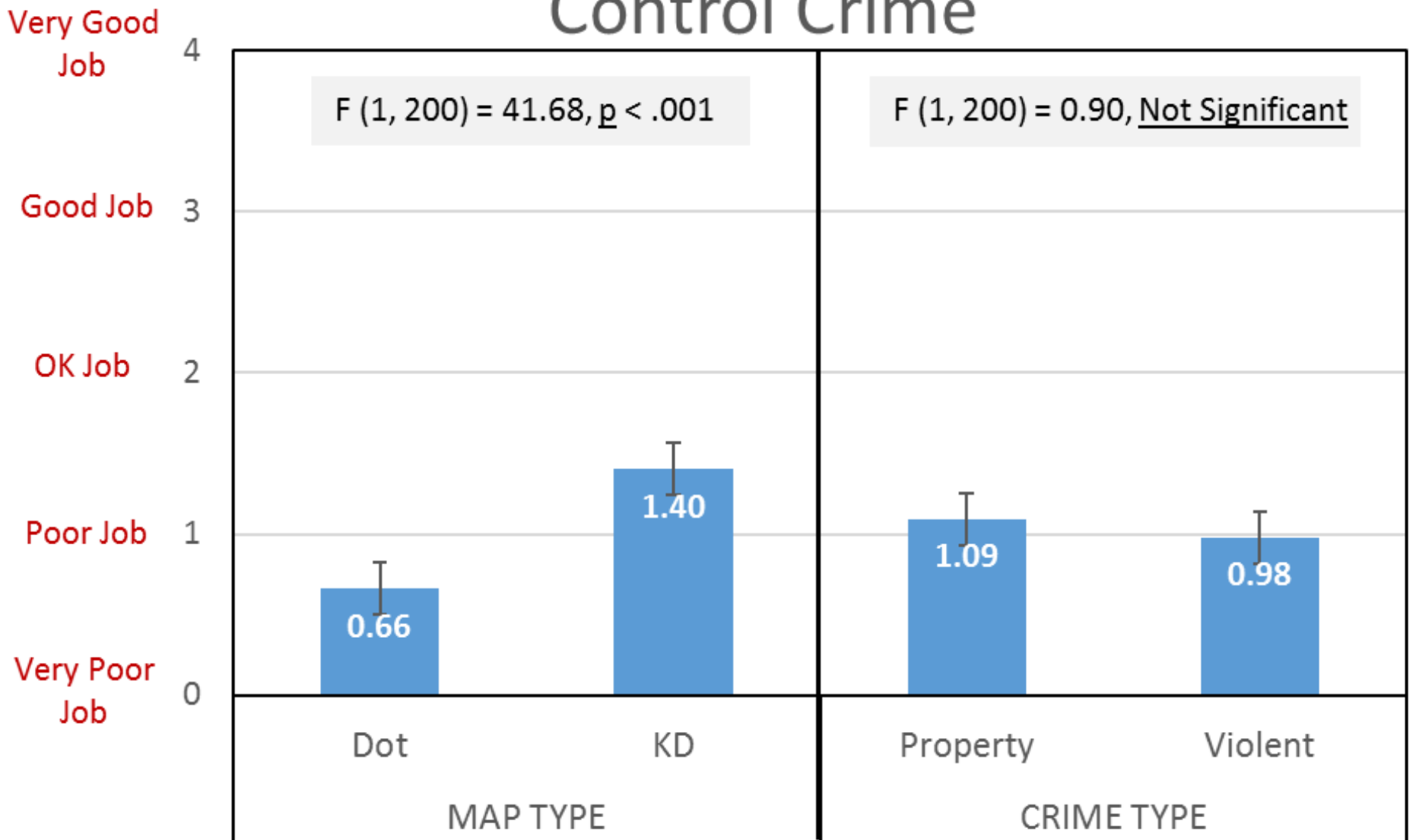
Property

Violent

MAP TYPE

CRIME TYPE

# Perceptions of Police Efforts to Control Crime





# All Results Lead to Questions

- What is the impact of adjusting the Kernel Density bandwidth/Cell Size?
  - While frequently used within crime mapping, Kernel Density receives criticism regarding the highly variable output resulting from changes to inputs (Hart and Zandbergen, 2014; Chainey et al., 2002).
  - Future phases can explore results using alternative bandwidth and cell size inputs, guided by in-field practitioners.





# All Results Lead to Questions

- What is the impact of the color choices?
  - Our dot density map displayed crime events in red.
  - Did this color choice impact the resulting perceptions?



# Moving Forward

- As we push for transparency and access, there is a continued need to understand the resulting impacts
  - **Consider your goals, Consider your audience**
  - If the goals of public display of maps are to increase public trust in police agencies, dot maps may not be an effective tool.
  - If the goals are to provide the public with access to data to encourage informed decision-making, **we must better understand the accuracy of the perception**



# I Welcome your Feedback!

- Thank you to my collaborators, Kris Henning, Greg Stewart and Kaitlyn Bonn!
- This research has been supported by a Faculty Enhancement Grant.

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