

# Officer Features and Shooting Risk

Greg Ridgeway

Department of Criminology

Department of Statistics

G. Ridgeway (2020). "The Role of Individual Officer Characteristics in Police Shootings," *ANNALS of the American Academy of Political and Social Science* 687(1):58-66



## Confounding Chronically Hindered Connecting Officer Features and Risk

“the overrepresentation of minority officers among police shooters [is] closely associated with racially varying pattern of assignment...”


Fyfe (1981)

The age/shooting risk relationship is “an artifact of age-related variations in assignment and in exposure to potential shooting situations”

Fyfe (1988)

# Link Shooting, Environment, Officers

- Probability of shooting,  $R$ , for an officer with features  $\mathbf{x}$  in an environment with features  $\mathbf{z}$

$$\log \frac{P(R = 1 | \mathbf{x}, \mathbf{z})}{1 - P(R = 1 | \mathbf{x}, \mathbf{z})} = h(\mathbf{z}) + \beta' \mathbf{x}$$


- The likelihood for  $h(\mathbf{z})$  and  $\beta$  factors into two parts

$$L_i(h, \beta) = P(R_1, \dots, R_n | R_1 + \dots + R_n, \mathbf{x}_1, \dots, \mathbf{x}_n, \beta) \times P(R_1 + \dots + R_n | \mathbf{x}_1, \dots, \mathbf{x}_n, \mathbf{z}, h, \beta)$$

The only moments in time and the only places in space with information on  $\beta$  through the conditional likelihood are multi-officer shooting incidents in which some officers did not shoot







Officer characteristic	Odds ratio	95% CI
<b>Rank (reference: officer)</b>		
Detective	1.30	(0.34, 5.03)
Sergeant	*0.29	(0.10, 0.80)
Lieutenant or above	*0.04	(0.01, 0.30)
Years at NYPD	0.98	(0.90, 1.07)
Age when recruited	*0.90	(0.81, 0.99)
<b>Race (reference: white)</b>		
Black	*2.96	(1.17, 7.46)
Other	1.09	(0.45, 2.65)
<b>Average annual</b>		
CPI points > 3.1	*3.09	(1.11, 8.56)
Misdemeanor arrests > 10.0	*0.26	(0.09, 0.74)

## NYPD

- All officer-involved shootings adjudicated in 2004, 2005, and 2006
- 106 incidents
- 150 shooting officers
- 141 non-shooting officers

Officer characteristic	Odds ratio	95% CI
<b>Rank (reference: officer)</b>		
Detective	1.30	(0.34, 5.03)
Sergeant	*0.29	(0.10, 0.80)
Lieutenant or above	*0.04	(0.01, 0.30)
Years at NYPD	0.98	(0.90, 1.07)
Age when recruited	*0.90	(0.81, 0.99)
<b>Race (reference: white)</b>		
Black	*2.96	(1.17, 7.46)
Other	1.09	(0.45, 2.65)
Male	2.19	(0.50, 9.63)
<b>Education (reference: HS)</b>		
High school+some college	1.30	(0.54, 3.16)
College	1.98	(0.61, 6.40)
College+some graduate	2.06	(0.08, 56.18)
<b>Average annual</b>		
CPI points > 3.1	*3.09	(1.11, 8.56)
Misdemeanor arrests > 10.0	*0.26	(0.09, 0.74)

## NYPD

- All officer-involved shootings adjudicated in 2004, 2005, and 2006
- 106 incidents
- 150 shooting officers
- 141 non-shooting officers



Officer characteristic	Odds ratio	95% CI
Rank (reference: officer)		
Detective	1.30	(0.34, 5.03)
Sergeant	*0.29	(0.10, 0.80)
Lieutenant or above	*0.04	(0.01, 0.30)
Years at NYPD	0.98	(0.90, 1.07)
Age when recruited	*0.90	(0.81, 0.99)
Race (reference: white)		
Black	*2.96	(1.17, 7.46)
Other	1.09	(0.45, 2.65)
Male	2.19	(0.50, 9.63)
Education (reference: HS)		
High school+some college	1.30	(0.54, 3.16)
College	1.98	(0.61, 6.40)
College+some graduate	2.06	(0.08, 56.18)
Average annual		
CPI points > 3.1	*3.09	(1.11, 8.56)
Misdemeanor arrests > 10.0	*0.26	(0.09, 0.74)
Evaluation score < 3.5	0.60	(0.25, 1.46)
Range score < 86	1.71	(0.70, 4.19)
Complaints > 0.6	1.99	(0.71, 5.57)
Medal count/year > 3.8	2.12	(0.62, 7.20)
Gun arrests > 2.4	0.83	(0.25, 2.79)
Felony arrests > 9.3	1.38	(0.44, 4.38)
Days of leave		
Not line of duty injury > 8.4	1.11	(0.49, 2.52)
Line of duty injury > 5.6	1.13	(0.45, 2.86)

## NYPD

- All officer-involved shootings adjudicated in 2004, 2005, and 2006
- 106 incidents
- 150 shooting officers
- 141 non-shooting officers

## Major City Chiefs

- 56 agencies
- 317 multi-officer shootings
- 849 officers
- 5,026 rounds
- Latest is in the *Journal of Quantitative Criminology*

# Officer Features and Shooting Risk

Greg Ridgeway

Department of Criminology

Department of Statistics

G. Ridgeway (2020). "The Role of Individual Officer Characteristics in Police Shootings," *ANNALS of the American Academy of Political and Social Science* 687(1):58-66