FULL TEXT ARTICLE

The Relationship Between Structural Racism and Black-White Disparities in Fatal Police Shootings at the State Level

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Abstract

Objective

The objective of this study was to discern the relationship between state-level structural racism and Black-White disparities in police shootings of victims not known to be armed.

Methods

Using a Poisson regression, we evaluated the effect of structural racism on differences between states in Black-White disparities in fatal police shootings involving victims not known to be armed during the period from January 1, 2013 through June 30, 2017. We created a state racism index, which was comprised of five dimensions: (1) residential segregation; and gaps in (2) incarceration rates; (3) educational attainment; (4) economic indicators; and (5) employment status.

Results

After controlling for numerous state-level factors and for the underlying rate of fatal shootings of black victims in each state, the state racism index was a significant predictor of the Black-White disparity in police shooting rates of victims not known to be armed (incidence rate ratio: 1.24; 95% confidence interval, 1.02-1.50). For every 10-point increase in the state racism index, the Black-White disparity ratio of police shooting rates of people not known to be armed increased by 24%.

Conclusion

These findings suggest that structural racism is an important predictor of the Black-White disparity in rates of police shootings of unarmed victims across states.

Introduction

Of all firearm homicides in the world, 82% occur in the United States. [1] Of these firearm homicides, 59% of the victims are Black, even though Black people comprise just 14% of the population. [2] Nationally, Black people are eight times more likely to be killed by a firearm than White people. [2] This Black-White disparity in firearm homicide in the U.S. has been widely recognized, [3] and has recently gained public attention in the context of fatal police shootings. [4] [5] [6] Although the striking disparity in firearm death between Blacks and Whites has been documented for decades [7] [8] [9] [10] [11] [12] [13] [14] [15] [16] [17] [18] [19] [20] [21] [22] and a similarly striking racial disparity in the shooting by police of unarmed people has been reported, [6] the underlying cause of these disparities is still unknown.

There are two competing theories in the social science field regarding the use of lethal force by police: the threat hypothesis and the community violence hypothesis. The threat hypothesis, derived from the conflict theory of law, suggests that racial disparities in police shootings can be explained by racism and its influences on the interaction between law enforcement officials and black suspects. [23] [24] [25] In contrast, the community violence hypothesis maintains that disparities in the occurrence of lethal force by police is a direct response to the higher number of interactions that law enforcement officials have with black individuals due to higher rates of violent crime in the black community. [23] [24]

In the public health literature, there has been little empirical research to understand why Black people are so much more likely to be killed by police. In particular, there is a lack of research into the potential role of structural racism as a fundamental contributor to the disproportionate rates of black victimization by lethal police force. A search of Pub Med for articles with the keywords "racism" and "firearm" yielded only seven articles, just one of which examines racism as a potential explanation for firearm violence. [26] To the best of our knowledge, only one article in the public health literature has explored the relationship between racism and the Black-White disparity in fatal police shootings. [6] Ross reported a positive relationship between a measure of county-level racism and county-specific disparities in police shooting deaths between Blacks and Whites; however, these results were not statistically significant. [6] Ross noted: "The analyses presented here are only a very rough first pass through the data" [6, p. 16]; this study used a crude measure of racism: the number of Google searches for a derogatory racial term.

Despite the large gap in the public health literature with regards to the underlying causes of racial disparities in fatal police shootings, there are accessible and validated measures of structural racism in the public health and social science literature. Notably, nearly all of these measures assess racial structural discrimination at the neighborhood level. [27] [28] [29] [30] [31] [32] [33] [34] [35] However, extending the scope of previous research beyond the neighborhood level to the state level is crucial, because numerous policies that have been used to discriminate against Black people—such as mandatory minimum sentences for non-violent drug offenses [36] —have been instituted at the state level. Moreover, due to the relatively small number of fatal police shootings, rates at the local level may be unstable; therefore, studying this phenomenon at the state level is advantageous. As Lukachko et al. argued in a 2014 paper, "Focusing on variation in structural racism at the state level is one potentially profitable approach to examining structural discrimination given that states vary substantially in their past and present policies, laws, and institutional practices that systematically disadvantage Blacks, thereby creating unique cultures of racism [27, p. 44]. This perception of unique cultures of structural racism at the state level was recently demonstrated by a travel advisory issued by the NAACP for African-Americans for the state of Missouri. [37]

We are aware of two previous efforts to develop measures of structural racism at the state level. [27] [38] Both of these approaches used the gap between White and Black populations in measures of structural advantage/disadvantage as an indicator of structural racism. Racial inequalities in these measures are a direct result of structural racism, which is "the systematic exclusion of non-White racial groups from resources and mobility in society as a means to secure or maintain power." [27, p. 44] Thus, greater racial gaps in these measures of structural advantage or disadvantage are likely to reflect higher levels of past and present structural racism. Lukachko et al. examined 11 measures of structural racism by comparing levels of factors among the Black and White population in a state across four domains: political participation (e.g., registered to vote), employment (e.g., labor force participation), educational attainment (college degree or higher), and judicial treatment (e.g., incarceration rate). [27] WalletHub developed a racial integration ranking for each state, on a scale of 0 –100, based on the sum of individual state scores measuring the Black-White gap in factors such as median household income, labor force participation, unemployment rate, home ownership rate, and educational attainment. [38]

In addition to racial gaps in structural advantage, racial residential segregation has been shown to be a strong measure of structural racism. [28] [29] [30] [31] [32] [33] [34] [35] [39] Jacoby et al. recently demonstrated that the degree of racial residential segregation of neighborhoods in Philadelphia in the 1940s is significantly predictive of current rates of firearm violence. [26] Massey et al. have argued that residential segregation is the hallmark of structural racism

and that segregation in turn promotes racial inequalities in structural advantage. [40] While racial segregation has typically been used to study the effects of racism at the neighborhood level, we consider racial segregation within a state as a measure of "policies, laws, and institutional practices that systematically disadvantage Blacks thereby creating unique cultures of racism."[27, p. 44].

In order to examine the potential influence of structural racism on racial disparities in police shootings, we combine these two previously validated indicators of structural racism – racial gaps in advantage/disadvantage and racial residential segregation – to create an overall state-level structural racism index.

While a number of articles in the criminology [7] [8] [9] [10] [11] [12] [13] [14] and social sciences [15] [16] [17] [18] [19] [20] [21] literature have explored the potential role of racial inequalities in explaining overall homicide rates among the Black population, we are aware of only one article that has analyzed the association between racial inequality and the rate of police shootings of Black victims. [23] However, this article used only one measure (the racial gap in mean family income) as an indicator of racial inequality.

In this paper, we adapt previously developed measures of structural racism at the state level to evaluate the relationship at the state level between structural racism and the Black-White disparity in fatal police shootings of victims not known to be armed. This study advances the existing public health literature by explicitly modeling the Black-White disparity in police shooting rates as the outcome variable and by relying upon concrete measures of structural racism developed in the social sciences literature, rather than a non-specific measure based on individual Google searches. We developed an index to measure structural racism at the state level that includes five dimensions: (1) residential segregation; and gaps in (2) incarceration rates; (3) educational attainment; (4) economic indicators; and (5) employment status. We took advantage of a new, comprehensive database of fatal police shootings that addresses the problem of significant undercounts in previously existing data sources [9] and is recognized as the most reliable and complete source of data. [6] [41] [42]

Materials and methods

Design overview

Using a cross-sectional design, we evaluated the effect of state-level, structural racism on differences between states in Black-White disparities in fatal police shootings involving victims not known to be armed during the period from January 1, 2013 through June 30, 2017. We obtained data on fatal police shootings from the Mapping Police Violence project. [43] Measures of structural racism at the state level were created using data from the U.S. Census, American Community Survey, and Bureau of Justice Statistics. Using a Poisson

regression, we evaluated the relationship between state-level racism and the Black-White disparity in police shootings of victims not known to be armed, while controlling for a wide range of state-level variables known to be associated with homicide rates.

Data sources and measures

Fatal police shooting rates

We used the Mapping Police Violence project database to identify the circumstances surrounding each reported fatal police shooting from the initiation of the database on January 1, 2013 through the mid-point of 2017 (June 30, 2017). [43] This is a comprehensive list of all fatal police shootings and combines data from the U.S. Police Shootings Database, FatalEncounters.org (http://FatalEncounters.org) , and KilledbyPolice.net (http://KilledbyPolice.net) , which are the three largest, most impartial and comprehensive crowd sourced databases. [43] The data include the date and location of each police shooting, the race/ethnicity of the victim, and whether the victim was armed at the time of the fatal encounter and the mechanism of death (e.g., firearm, vehicle, Taser [43]).

Previous research has shown that the two major national homicide reporting systems (Federal Bureau Of Investigation's Uniform Crime Reporting Program and National Vital Statistics System) both severely underestimate the number of police shooting fatalities. [44] [45] [46] [47] [48] [49] [50] The Centers for Disease Control and Prevention's National Violent Death Reporting System (NVDRS) captures a greater percentage of police shootings; however, not all states participate. Miller et al. documented that the Mapping Violence Project is superior to any of these other sources. [45] The Mapping Violence Project data is now considered the most comprehensive and reliable source of police fatality data and has been used in previous studies. [6] [41] [42]

We defined victims not known to be armed as those classified in the database as either "unarmed" or "unclear." Throughout the rest of this manuscript we will refer to these victims as unarmed victims. Victims classified as "armed," "allegedly armed," or "vehicle" were coded as being armed. We calculated state-specific rates of fatal police shootings among White and Black victims by dividing the total number of shootings during the entire period 2013-2017 by the total person-years of observation among each racial group during this period, and expressed these rates as police shootings per one million person-years. Person-years were calculated by adding the state populations for 2013-2016 and half of the population for 2017. The Black-White disparity in fatal police shootings among victims not known to be armed was defined as the ratio of the Black police-shooting rate to the White police-shooting rate. For one state (Rhode Island), there were no police shootings of white unarmed victims, so a ratio could not be calculated. This state was omitted from our analyses.

State racism index

We developed an index to measure structural racism at the state level for the years 2013-2015 that comprised five dimensions: (1) residential segregation; and gaps in (2) incarceration rates; (3) educational attainment; (4) economic indicators; and (5) employment status (Supplemental Table 1 (appsec1)). These dimensions and the specific measures within the dimensions were adapted from previous attempts to develop a state-level measure of structural racism. [27] [38] Our adaptation considered the conceptual validity of these measures as well as the availability of data at the state level.

Residential segregation: The residential segregation dimension consisted of two components: (a) the index of dissimilarity; and (b) the isolation index. The index of dissimilarity is a measure of the differential distribution of two racial groups; this is, represented as, the percentage of Blacks that would have to move to achieve an equal distribution of Whites and Black across all blocks within a state. [39] [51] [52] [53] The values are on a scale from 0 to 100, with 100 being the most spatially segregated by race. We calculated the dissimilarity index for each state for the Black vs. White population at the Census block level using data from the 2000 and 2010 Decennial Censuses and extrapolating to the years 2013-2015. The isolation index is a measure of the spatial isolation of one racial group from another; it represents the extent to which Black residents of a block are exposed only to one another. [39] [51] [52] [53] The values are also on a scale from 0 to 100, with 100 being the most spatially isolated for Blacks. We calculated the isolation index for each state for the Black vs. White population at the Census block level using data from the 2000 and 2010 Decennial Censuses and extrapolating to the years 2013--2015.

Incarceration rate gap: The incarceration rate gap was defined as the ratio of the incarceration rate among Blacks to the incarceration rate among Whites within a state.

Educational attainment gap: The educational attainment gap was defined as the ratio of the proportion of Blacks without a college degree to the proportion of Whites without a college degree.

Economic Disparity Index: This dimension consisted of three components: (a) the Black-White gap in proportion of the population living under the poverty level; (b) the Black-White gap in median household income (White income divided by Black income); and (c) the Black-White gap in the proportion of the population that lives in rental housing as opposed to owning a home.

Employment Disparity Index: This dimension consisted of two components: (a) the Black-White gap in the proportion of people not participating in the labor force; and (b) the Black-White gap in the proportion of people who are unemployed.

Data sources: Sources of data for each indicator are shown in Supplemental Table 1 (appsec1) .

Creation of state racism index: Each individual indicator, other than the dissimilarity index and isolation index, consisted of each state's ratio of Black to White values. For each of these individual indicators, we converted these ratios into a scale from 0 to 100 using a rescaling formula that assigns the maximum ratio to a score of 100, the minimum ratio to a score of 0, and each intermediate ratio to a score between 0 and 100. To derive an overall racism index for each dimension, we averaged the scores for each component within that dimension. For example, to calculate a racism index for the economic dimension, we averaged the scores for the poverty gap, income gap, and rental housing gap. To obtain a single, overall state racism index, we averaged the scores for each of the five dimensions. In the analysis, we used a single value for each racism measure for each state by averaging across the years 2013-2015. The state racism indices are shown in Supplemental Table 2 (appsec1) .

Analysis

Outcome variable

The outcome variable was the Black-White disparity in fatal police shootings of unarmed victims, defined as the ratio of the Black fatal unarmed police shooting rate to the White fatal unarmed police shooting rate for the period 2013-2017 (January 1, 2013 through June 30, 2017).

Main predictor variables

The main predictor variables were the state racism indices, averaged across the years 2013-2015. We examined each dimension separately as well as the overall state racism index (Supplemental Table 2 (appsec1)).

Control variables

In analyzing the relationship between the state racism indices and Black-White disparities in fatal police shootings, we considered several state-level factors known to be associated with homicide rates. We controlled for total population size, population density, percent Black, percent Hispanic, Gini coefficient (a widely used measure of income inequality), median household income, the non-homicide violent crime rate, per capita law enforcement officers. We also controlled for household gun ownership (using a well-established proxy: the proportion of suicides committed using a firearm), proportion of population living in an urban area, poverty rate, unemployment rate, divorce rate, and incarceration rate.

It is possible that one could find an increased ratio of Black to White fatal police shootings simply because there are a greater number of police interactions with people who are Black. To account for this possibility, we controlled for the overall rate of fatal police shootings of Black people in each state. We also examined the relationship between structural racism and

the ratio of Black to White fatal police shootings of armed victims, since a finding that structural racism affects only the Black-White disparity in police shootings of unarmed victims would add validity to our conceptual hypothesis that structural racism affects the rate of shooting of unarmed Black victims.

Finally, we controlled for the black adult arrest rate, because the number of arrests of black individuals serves as a good proxy for the number of interactions between law enforcement and black suspects. These data were obtained from the FBI Uniform Crime Reports (ICPSR, University of Michigan). To obtain stable estimates, we computed the combined arrest rate over the three year period 2013-2015.

Statistical analysis

The outcome variable—the ratio of Black to White fatal police shooting rates of unarmed victims—was not normally distributed but was skewed and distributed in the pattern of a count variable. For this reason, we used a Poisson regression. We modeled the Black-White disparity ratio in each state as a function of the control variables and the state racism indices. The resulting regression coefficients are reported as incidence rate ratios (IRR) that represent the percentage change in the outcome variable associated with a one unit change in the predictor variable. To ease interpretation of these coefficients, we report the IRRs in terms of the percentage change in the disparity ratios associated with a 10-point increase in the state racism index of interest.

Results and discussion

Results

Nationally, during the period 2013-2015, Blacks were shot by police at a rate 3.1 times higher than Whites, and unarmed Blacks were shot at a rate 4.5 times higher (Table 1 (tbl1)). There was tremendous variability across the states in the ratio of Black to White police shooting rates. Among states with at least two Black police shootings, the ratio of unarmed or unclear Black to White police shooting rates ranged from a low of 0.7 in South Carolina to a high of 20.8 in Illinois. There was a positive correlation between the Black to White unarmed or unclear police shooting rate ratio and the state racism index (r = 0.29) (Figures 1 and 2 (fig1)).

Table 1

States ranked by racism index measure and corresponding police shooting rates, 2013–2017.

State	State racism index	Black shootings rate (per 1,000,000 person-years)	White shootings rate (per 1,000,000 person-years)	Black to White rate ratio	Black unarmed [a] (tbl1fna) shooting rate (per 1,000,000 person-years)	White unarmed [a] (tbl1fna) shootings rate (per 1,000,000 person-years)	Black to White unarmed [a] (tbl1fna) shootings rate ratio
Wisconsin	74.9	10.60	1.82	5.81	2.23	0.14	15.91
Minnesota	70.0	6.34	1.54	4.12	1.27	0.25	5.11
New Jersey	68.5	5.06	0.83	6.09	1.47	0.22	6.72
Illinois	67.8	7.50	0.91	8.20	1.15	0.06	20.82
Connecticut	63.9	1.03	0.99	1.04	0	0.27	0
New York	60.3	2.55	0.64	4.01	0.68	0.10	6.88
Pennsylvania	59.1	5.04	1.03	4.92	0.43	0.18	2.42
Iowa	59.1	5.54	1.55	3.57	0	0.33	0
California	56.8	9.99	3.30	3.03	3.05	0.59	5.21
Michigan	55.6	3.98	1.06	3.76	0.46	0.12	3.90
Colorado	55.5	9.28	3.00	3.09	0.84	0.29	2.86
Massachusetts	54.6	4.86	0.75	6.47	0.37	0.13	2.82
Nebraska	53.4	11.08	2.77	4.00	2.22	0.29	7.60
Rhode Island	52.0	5.01	0.28	17.76	2.51	0	[b] (tbl1fnb)
Kansas	51.2	6.83	3.17	2.16	0	0.69	0
Ohio	50.4	5.67	1.64	3.45	1.45	0.33	4.36
Maine	50.1	10.22	3.72	2.74	10.22	0.18	57.63
Maryland	49.7	6.11	1.62	3.77	1.20	0.63	1.89
Virginia	49.2	4.08	1.13	3.61	1.18	0.08	14.14
Louisiana	48.0	7.11	2.48	2.87	1.16	0.72	1.61
South Carolina	46.7	4.22	3.11	1.36	0.32	0.50	0.66

State	State racism index	Black shootings rate (per 1,000,000 person-years)	White shootings rate (per 1,000,000 person-years)	Black to White rate ratio	Black unarmed [a] (tbl1fna) shooting rate (per 1,000,000 person-years)	White unarmed [a] (tbl1fna) shootings rate (per 1,000,000 person-years)	Black to White unarmed [a] (tbl1fna) shootings rate ratio
Indiana	46.4	9.07	1.71	5.30	2.02	0.25	8.04
Utah	45.1	9.62	3.36	2.86	4.81	0.84	5.73
Missouri	44.6	13.51	2.59	5.22	2.70	0.32	8.50
Texas	43.9	5.87	3.12	1.88	1.40	0.43	3.27
North Carolina	43.3	4.82	1.96	2.45	1.08	0.28	3.92
South Dakota	43.3	0	1.87	0	0	0.31	0
Mississippi	42.3	3.73	2.98	1.25	1.18	0.52	2.27
North Dakota	41.9	0	1.03	0	0	0.34	0
Vermont	41.6	0	1.13	0	0	0	1.00
Arkansas	41.3	6.10	3.34	1.83	0.94	0.40	2.32
Alabama	41.2	5.60	3.24	1.73	1.02	0.83	1.23
Alaska	40.8	20.14	3.79	5.31	0	0.47	0
Georgia	40.3	2.44	2.33	1.05	0.81	0.28	2.90
Florida	39.7	7.01	2.86	2.45	2.12	0.37	5.67
Oklahoma	39.2	20.52	5.76	3.56	2.74	0.83	3.28
Washington	38.6	10.04	3.01	3.33	2.01	0.31	6.57
Delaware	38.5	6.17	2.22	2.78	1.03	0.74	1.39
Tennessee	38.0	4.27	3.15	1.35	0.97	0.58	1.66
Oregon	36.5	11.47	3.70	3.10	2.29	0.64	3.59
West Virginia	36.2	15.54	4.41	3.52	0	0.52	0
Idaho	36.1	0	2.90	0	0	0.16	0

State	State racism index	Black shootings rate (per 1,000,000 person-years)	White shootings rate (per 1,000,000 person-years)	Black to White rate ratio	Black unarmed [a] (tbl1fna) shooting rate (per 1,000,000 person-years)	White unarmed [a] (tbl1fna) shootings rate (per 1,000,000 person-years)	Black to White unarmed [a] (tbl1fna) shootings rate ratio
New Mexico	36.0	11.44	7.39	1.55	0	1.37	0
Wyoming	35.6	0	4.04	0	0	0.45	0
Arizona	34.8	10.78	5.15	2.09	3.80	0.81	4.70
Nevada	34.7	8.60	6.43	1.34	3.91	0.60	6.54
New Hampshire	34.4	19.96	1.82	10.94	0	0.36	0
Kentucky	34.1	6.45	3.16	2.04	0.59	0.35	1.67
Hawaii	28.5	5.53	1.27	4.36	0	0	1.00
Montana	25.9	0	4.44	0	0	1.08	0
United States	--	**8.66**	**2.77**	**3.13**	**1.95**	**0.43**	**4.53**

a Unarmed police shootings were defined as those in which the victim is not known to be armed.

b There were no unarmed White shootings so ratio unable to be calculated.

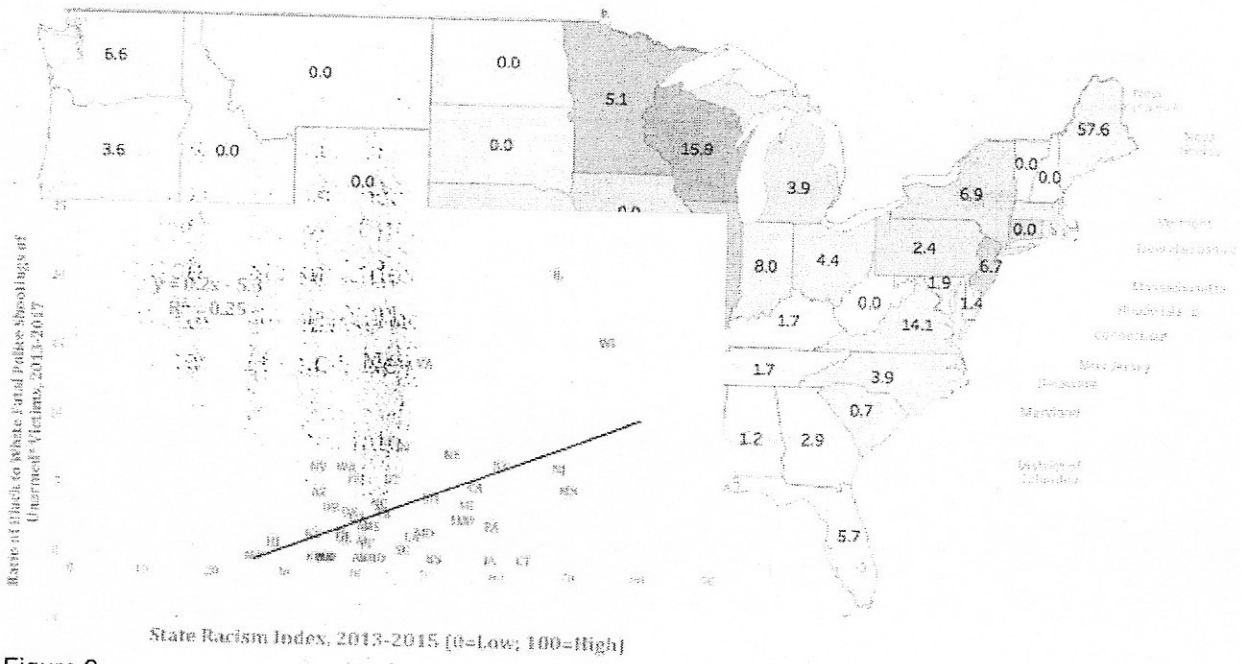

Figure 2

Ratio of Black to White rates of police shootings of victims not known to be armed, 2013-2017 (color gradient shows state racism index, 2013-2015).

The overall state racism index varied from a low of 25.9 in Montana to a high of 74.9 in Wisconsin (Table 1 (tbl1)). The five states with the highest racism indices were Wisconsin (74.9), Minnesota (70.0), New Jersey (68.5), Illinois (67.8), and Connecticut (63.9).

After controlling for the state-level factors, the overall rate of police shootings of Black victims and the adult Black arrest rate, the state racism index was a significant predictor of the Black-White disparity in unarmed police shootings (IRR = 1.24; 95% CI, 1.02-1.50), indicating that for every 10-point increase in the overall state racism index, the Black-White disparity ratio of unarmed police shooting rates increased by 24% (Table 2 (tbl2)). Three of the five racism dimensions were significant positive predictors of the Black-White unarmed or unclear police shooting rate disparity: segregation index (IRR = 1.67), economic disparity index (IRR = 1.40), and employment disparity index (IRR = 1.33). Notably, both the overall rate of police shootings of Black victims the adult Black arrest rate were positively and significantly associated with the Black-White disparity in unarmed police shootings (data not shown). For every increase in the overall rate of black police shootings of one per million people, the ratio of Black-White unarmed police shootings increased by 12.5%. For every increase in the overall rate of adult Black arrests of one per 10,000 people, the ratio of Black-White unarmed police shootings increased by 10.4%.

Table 2

Incidence rate ratios and 95% confidence intervals: ratio of Black to White unarmed [a] (tbl2fna) police shooting rates, 2013-2017 as a function of state racism measures, 2013-2015 [b] (tbl2fnb) .

State racism measure	Incidence rate ratio [c] (tbl2fnc)	95% confidence interval
Overall state racism index	**1.24***	**1.02-1.50**
Segregation index	1.67*	1.24-2.24
Economic disparity index	1.40*	1.19-1.65
Employment disparity index	1.33*	1.08-1.62
Incarceration gap	1.01	0.92-1.12
Educational attainment gap	1.01	0.86-1.19

*$p < 0.05$.

a Unarmed police shootings were defined as those in which the victim is not known to be armed.

b In these models, the dependent variable is the state-specific ratio of Black to White unarmed police shooting rates during the period 2013-2017 and the main predictor variable is a state racism measure averaged over the period 2013-2015. All models control for the following state-level factors, measured in 2013: total population, population density, percent Black, percent Hispanic, Gini coefficient, median household income, non-homicide violent crime rate, per capita law enforcement officers, household gun ownership, proportion of population living in an urban area, poverty rate, unemployment rate, divorce rate, and incarceration rate. The models also control for the overall rate of fatal police shootings of people who are Black and for the black adult arrest rate.

c The incidence rate ratio is expressed as the percentage change in the disparity ratio of Black to White unarmed police shooting rate associated with a 10-point increase in the state racism measure.

We repeated the regressions with the Black to White ratio of fatal police shootings of armed victims as the outcome variable. None of the racism measures, including the overall racism index and each of the dimensions, were significantly related to the disparity in fatal police shootings of armed victims (data not shown).

Discussion

To the best of our knowledge, this is the first paper to create a comprehensive index that measures state-level structural racism and examines the relationship between structural racism and Black-White disparities in fatal police shootings. We found that states with a higher racism index had significantly higher Black-White disparities in rates of police shootings of unarmed victims.

Although several articles in the public health literature have theorized that there exists a relationship between structural racism and racial disparities in gun violence, [5] [6] [24] [33] few articles have empirically examined this relationship. Previously, Jacoby et al., found that a history of structural racism at the neighborhood level was related to current rates of fi6rearm violence in those neighborhoods in one city. [24] Ross et al. did not find a significant effect of county level racism on the ratio of Black-White unarmed police shootings [6] however the racism measure used was crude. Finally, Jacobs and O'Brien used one measure of racial inequality (mean family income) and found that it significantly predicted higher rates of police killings of Blacks. [23] Here, we show that on a national level, using a robust set of measures of racial inequality, the Black-White disparity between states in the rate of fatal police shootings of unarmed victims are explained by the state's levels of structural racism.

Among the state racism measure, racial residential segregation was the most robust indicator associated with state-level racial disparities in police shootings of unarmed victims. Many previous studies have shown that racial residential segregation is associated with a series of adverse health outcomes. [39] [41] [42] [43] [44] [51] [52] [53] Racial residential segregation is the primary basis for a range of social, economic, employment, educational, criminal justice and political inequalities between Blacks and Whites. [34] [35] Therefore, racial residential segregation may be the most fundamental indicator of longstanding structural racism, which could explain our finding that this measure was single best predictor of the racial disparity in fatal police shootings of unarmed victims.

We are aware of only two previous attempts to relate racial residential segregation with state level racial disparities in homicide victimization. Both of these studies found racial segregation to be significantly associated with Black-White disparities in overall homicide rates. [7] [15] Our research adds to the literature by empirically demonstrating an association between racial residential segregation and racial disparities in one specific form of firearm violence: fatal police shootings of unarmed victims.

Our findings provide evidence that both the threat hypothesis and the community violence hypothesis are contributing to the explanation of the striking racial disparity in police shootings of unarmed suspects. The community violence hypothesis is supported by our finding that higher rates of arrest of Black adults were significantly predictive of greater racial disparities in the fatal shooting of unarmed suspects. However, the observed

association is not solely explained by higher levels of police interactions with the Black population; even when controlling for both the overall rate of Black police shootings and Black arrest rates, structural racism was still a significant positive predictor of police shootings of unarmed Black suspects.

There is experimental evidence from computer simulation studies to support the hypothesis that implicit racial biases influence police officers' decisions whether to shoot unarmed suspects. [54] [55] [56] There is also evidence from investigations of actual police incidents that police are more likely to use lethal force with black suspects than white suspects. [24] [57] [58] Our findings suggest that the degree of racial bias among police officers in a state may be related to underlying levels of structural racism in that state.

In our analysis, the observed association between structural racism and racial disparities in fatal police shootings was specific to the ratio of shootings of unarmed victims and did not hold for shootings of armed victims. There is evidence that when confronting an armed suspect, police officers make a decision on whether to shoot much more quickly than when confronting an unarmed suspect. [54] Thus, there may be less time for inherent racial biases to affect these decisions. In addition, when a suspect is armed, the weapon may be the predominant perceived threat; with an unarmed suspect, this threat is no longer present allowing less objective influences such as racial bias to enter the picture.

A major strength of this paper is that the factors we used to measure structural racism cannot themselves be plausibly linked to an increase rate of police shootings of people who are Black. For example, differences in levels of unemployment in it of themselves would not explain a greater likelihood of a person who is Black being shot by the police. Our hypothesis is that gaps in employment, education, and incarceration and racial residential segregation are markers for a history of structural violence that in turn may be associated with differences in the way police interact with Black versus White suspects.

Limitations

This paper is subject to several important limitations. First, police shooting rates for small states are unstable due to the small number of cases. Furthermore, our analysis was limited to years starting in 2013 because the police-shooting database was initiated in that year. To derive relatively stable estimates, we combined police shooting data from 2013 to 2017 resulting in a cross-sectional study design. Therefore, it is not possible to draw causal inferences from this analysis. Second, this paper only examines racial disparities between Blacks and Whites, regardless of ethnicity. We did not investigate disparities among the Hispanic population or other racial/ethnic groups. Third, we focused on state-level differences in firearm violence-associated racial disparities and did not examine city-level or

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