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A Descriptive Analysis of Police Shootings in Houston

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Abstract
Understanding the nature of officer-involved shootings is of critical interest to policy makers, scholars, and the public. In the current article, we examined descriptive trends in officer-involved shootings in the Houston Police Department between the years 2005 and 2019. Overall, the incidence of such shootings declined over time. Officer-involved shootings reflected demographic changes in the underlying police department composition. Officer-suspect shooting dyads tended to reflect same-race characteristics, and most suspects were armed at the time of the shooting (though approximately 20% were not). Officers' race appeared to be a minor component of officer-involved shootings. Female officers were underrepresented in officer-involved shootings. We conclude that institutional factors related to officer training rather than officer race are more crucial to consider in regard to reducing police shootings.

Keywords Police shootings · Race · Gender

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Officer-involved shootings are a topic of widespread interest among policy makers, the public, and researchers. According to a Washington Post (2021) database, approximately 900–1,000 individuals are fatally shot by police in the United States each year. Most of these individuals are armed. The shooting of unarmed individuals of any race is far rarer, accounting for perhaps 5–7% of these figures. Researchers have investigated possible predictors of officer-involved shootings. Some studies explained the correlates involving the characteristics of police and citizens (Fryer 2019; Klinger et al. 2016; Nix et al. 2017; Ridgeway 2016). Researchers included various factors in these studies, such as the officer and citizen characteristics (e.g., race/ethnicity and age), situational factors (e.g., the citizen had a particular weapon), and other features (e.g., poverty level or crime rate). The current study is a descriptive study to examine how characteristics of officers involved in shooting incidents differ from the characteristics of the wider police force in which they are employed.

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A Brief Overview of Factors Related to Officer-Involved Shootings

Police Factors Some research has examined the characteristics of police officers involved in shooting incidents. Some scholars suggest that female officers may be quicker to resort to gun violence (Terrill et al. 2003). However, most studies suggest that female officers use less force overall and are less likely to use physical force in police-citizen encounters when compared to their male counterparts (McElvain and Kposowa 2008). At the same time, findings indicated that citizens used significantly more force against female officers relative to male officers in domestic calls (Rabe-Hemp and Schuck 2007). Further, there is literature supporting the notion that male officers are more likely to discharge their firearms than their female counterparts (Mcelvain and Kposowa 2008).

Most research suggests that female officers make fewer arrests (Sichel et al. 1978), have fewer citizen complaints (Finn and Stalans 1997), and are less frequently involved in excessive force claims (Spillar et al. 2000). More current research found that female officers receive fewer complaints and were less likely to use lethal force or shoot a suspect, even though they were involved in a similar number of violent confrontations as male officers (Sandifer 2006). When female officers have been interviewed regarding their performance

compared to their male counterparts, female respondents believed that they carried out policing tasks more effectively (Sandifer 2006). However, Smith (2003) found no significant difference in citizen satisfaction or crime rates between police departments with low or high female representation.

Given debates about race and officer-involved shootings, it is worth asking whether an officer's race plays a significant role in such events. Here, evidence is mixed. McElvain and Kposowa (2008) found that White officers were slightly more likely to be involved in shooting events, but the researchers observed no other racial differences. Geller and Scott (1992) concluded that Black officers were more likely to shoot, though this may have been a function of their patrolling more dangerous neighborhoods on average. Jennings et al. (2020) found that officer-involved shootings more often resulted in the death of the suspect when the officer was White but also when the suspect was White.

Suspect Factors Regarding issues related to civilians shot by police, considerable attention has focused, once again, on the sex and race of individuals involved in such shootings. Comparatively little, by contrast, has focused on class-related issues.

When considering injured or killed citizens in police encounters, considerable relevant literature has explained the difference in risk between women and men. For example, a woman's lifetime risk of being killed by police use of force has been found to be 20 times lower than that of a man's (Edwards et al. 2019). This connection between sex and the risk of police use of force could be because sex is one of the strongest, most consistently found predictors for general criminality (Denno 1994) and, presumably, a higher risk for police-related deaths among men.

Similar researchers who have focused on ethnicity in civilians have lent additional comments. Black males face the highest lifetime risk of being killed by an officer (120 per 100,000) among all racial groups (Edwards et al. 2019). For Latino males, the risk has been reported at 53 per 100,000, and for White males, the calculated risk of being killed by police is 39 per 100,000 (Edwards et al. 2019). Asian males have the lowest risk of being killed by an officer at 9 per 100,000 (Edwards et al. 2019). However, these patterns mirror racial differences regarding participation in violent crime (Beck 2021). Thus, it is difficult to disentangle disparities attributable to racism among police from disparities attributable to differential involvement in violent crime. Multivariate analyses of these factors have come to varying conclusions. For instance, Fryer (2019) found that suspect race was not a factor in fatal shootings, but there were small correlations for race with non-fatal police encounters. Cesario et al. (2019) concluded that race did not predict fatal police shootings with other factors controlled, and Worrall et al. (2018) concluded that Black suspects were less likely to be shot with other factors controlled. Hemenway et al. (2020) found that disparities differed by rural/urban context, and Scott et al. (2017) concluded that Black suspects were indeed shot more often, even with other factors controlled. As such, there is no consensus among scholars on this issue. Unfortunately, there are fewer clear examinations of class-related factors. For instance, racial disparities in committing violent crimes appear to be as correlated with community and class-related issues as they are with race (Smith et al. 2023).

Officer-Suspect Interactions

In the United States, close to 70% of American officers are White. Current research on police use of force conflicts on whether racial bias influences an officer's decision to use lethal force (Menifield et al. 2019). Increasing officer diversity does not necessarily result in a reduction in deadly shootings (Menifield et al. 2019) nor in regard to non-lethal force (Jetelina et al. 2017). There is a tension in the research regarding the level to which departmental race influences police-involved shootings. There needs to be more research drawn from diverse police forces to more clearly understand this dynamic (Menifield et al. 2019).

Officers of different races or ethnicities perform policing tasks similarly (Smith 2003). Smith (2003) did not find that an officer's race influenced their behavior or decision-making when interacting with citizens. The level of violent crime and resistance behavior from citizens increased the likelihood of being fatally shot by an officer. Klinger et al. (2016) mentioned that high levels of firearm violence were directly related to police-involved shootings. Smith (2003) discussed the violence hypothesis on police killings, stating that lethal force is a direct response to the level of violence in the community. Thus, police may kill more citizens in locations where police are the targets of violence (Smith 2003). Despite these studies, Menifield et al. (2019) found no evidence that the level of violent crime in a neighborhood influenced minority killings, which contradicts Klinger et al. (2016) findings. Additional research is needed here to determine outcomes comparing the race of civilians and police officers in shooting or violent events.

The Current Study

Given prior research on the demographic makeup of officers and suspects involved in police shootings, we wished to examine these issues in a large urban police force. In particular, we sought to examine how officer and suspect race and sex correlated with officer-involved shootings. By

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examining these descriptive elements for the period of 2005 to 2019, we were able to examine these changes during a time of increased diversification for the Houston Police Department (HPD).

Methods

Data for this study were obtained from the HPD and reflect shootings that occurred within their jurisdictional limits. Officer-involved shootings (OIS) were independently investigated by multiple divisions and agencies (e.g., Homicide, Internal Affairs, District Attorney, Medical Examiner) and are available at http://www.houstontx.gov/police/ois/. To protect the anonymity of citizens and officers, limited data are publicly reported but include officer and citizen age, race, sex, and injuries, as well as officer duty status and call type. Additional citizen-level data include juvenile status and whether citizens employed physical force, a firearm, etc. While the OIS dataset includes only officers and citizens *involved* in shootings, the level of involvement is not indicated. Hence, when there was more than one officer at an incident, it is not always clear which or how many officers discharged their weapons. Likewise, when there was more than one citizen reported at a shooting incident, the levels of involvement of each citizen were not indicated. Due to this limitation in the data structure, two separate analyses were carried out: one involving all officers and all citizens reported in OIS and a separate analysis involving only OIS with police-citizen dyads (i.e., one officer and one citizen at the scene). Demographic data on the HPD were abstracted from annual reports (HPD 2019) or were solicited directly through the Office of Planning and Data Governance. All data preparation and analyses were carried out using R statistical software.

Results

With respect to demographics, reports from the HPD indicate that in 2005 (the first year of our analytic dataset on OIS), approximately 13% of the 5,070 sworn officers were classified as female, 57% as White, 20% as Hispanic, 20% as Black, and 3% as Asian/Other. A marked shift in demographics was observed by 2019 (the last full year of our analytic dataset), where approximately 17% of the 5,270 sworn officers were classified as female (4% increase), 42% were classified as White (15% decrease), 30% as Hispanic (10% increase), 21% as Black (1% increase), and 7% as Asian/Other (4% increase).

With respect to police shootings, 705 entries were reported in the OIS registry from January 1, 2005, to May 16, 2020, and of these, 341 were dyads. The average number of entries per year was 50 (SD = 12) from 2005–2009 and 50 (SD = 9) from 2010–2014, but there was a marked decline from 2015–2019 to 36 (SD = 7). An even larger decline in entries was observed in terms of the mean number of dyads from 2005–2009 (M = 27, SD = 6) and 2010–2014 (M = 25, SD = 2) to 2015–2019 (M = 15, SD = 6).

We present a demographic and situational profile of OIS entries in Table 1. The average age of officers was 37.1 (SD = 8.6), and the average age of citizens was 30.6 (SD = 10.9). When comparing to demographics of the larger HPD, the proportion of Black officers observed in OIS entries was slightly lower than HPD-wide estimates (18% vs. 21% HPD-2019 and 20% HPD-2005), but Hispanic officers were somewhat over-represented (32% vs. 30% HPD-2019 and 20% HPD-2005). However, White officers (46%) were over-represented in OIS when compared to 2019 (42% HPD-wide) but under-represented when compared to 2005 (57% HPD-wide). Conversely, officers classified as Asian/Other (4%) were under-represented in OIS when compared to 2019 (7% HPD-wide) but over-represented when compared to 2005 (3% HPD-wide). We observed a similar pattern when examining officer-citizen dyads.

As illustrated in Table 2, there were more than 3.5 times as many entries for Black citizens (n = 334, 55%) in OIS than for White citizens (n = 91, 15%) and nearly twice as many than for Hispanic citizens (n = 172, 28.1%). This pattern, however, was not consistent across officer race. Seventy-two percent of all entries regarding Black officers involved Black citizens, followed by 55% of entries with White officers and roughly 45% of entries with Hispanic and Asian-Other officers. With respect to Hispanic citizens, 40% of all entries regarding Hispanic officers involved Hispanic citizens, followed by 36% of entries with officers classified as Asian-Other, 23% of entries with White officers, and 17.3% of entries with Black officers. Officer-citizen dyads followed a very similar pattern.

While over half of all OIS entries (54%) and officer-citizen dyads (55%) involved Black civilians, these estimates were not stable over time (Table 3). The average percentage of entries involving Black citizens increased slightly over time, but the average percentage of police-citizen dyads involving Black citizens decreased substantially over time (2005–2009: M = 60%, SD = 10; 2010–2014: M = 59%, SD = 9; 2015–2019: M = 39%, SD = 10). Conversely, while approximately 28% of OIS entries involved Hispanic citizens, the average percentage of entries involving Hispanic citizens decreased slightly over time, but the average percentage of police-citizen dyads involving Hispanic citizens increased substantially over time (2005–2009: M = 23%, SD = 10; 2010–2014: M = 29%, SD = 6; 2015–2019: M = 46%, SD = 7). Overall and in dyads, the percentage of White citizens remained relatively stable (15% overall, 12% in dyads), while the percentage involving Asian/Other

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Table 1 Demographic and situational profile of police officers and citizens involved in police shootings (2005–2020)

	All entries in OIS		Dyadic entries in OIS	
	n = 705	(%)	*n* = 341	(%)
Officers				
Mean age [SD]	37.1	[8.6]	36.6	[8.5]
missing	8		1	
Sex				
Male	676	(96.8)	326	(95.6)
Female	22	(3.2)	15	(4.4)
missing	7			
Race				
White	321	(46.0)	157	(46.0)
Hispanic	224	(32.1)	97	(28.4)
Black	126	(18.1)	75	(22.0)
Asian/Other	27	(3.9)	12	(3.5)
missing	7			
Injuries				
None	657	(94.1)	320	(93.8)
Wounded	40	(5.7)	21	(6.2)
Killed	1	(0.1)	0	(0.0)
missing	7			
Duty status				
On duty	566	(81.1)	278	(81.5)
Off duty	132	(18.9)	63	(18.5)
missing	7			
Call type				
Emergency call	199	(42.6)	90	(37.0)
Warrant	141	(30.2)	74	(30.5)
Other	95	(20.3)	54	(22.2)
Traffic stop	32	(6.9)	25	(10.3)
missing	238		98	
Citizens				
Mean age [SD]	30.6	[10.9]	31.2	[10.7]
missing	138		53	
Sex				
Male	539	(93.4)	279	(94.9)
Female	32	(5.5)	9	(3.1)
Other	6	(1.0)	6	(2.0)
missing	128		47	
Race				
White	92	(14.9)	39	(12.0)
Hispanic	174	(28.2)	96	(29.6)
Black	336	(54.4)	179	(55.2)
Asian/Other	16	(2.6)	10	(3.1)
missing	87		17	
Injuries				
None	217	(33.4)	110	(33.1)
Wounded	245	(37.8)	131	(39.5)
Killed	184	(28.4)	89	(26.8)
Other	3	(0.5)	2	(0.1)
missing	56		9	
Juvenile				
No	442	(92.1)	210	(93.3)
Yes	38	(7.9)	15	(6.7)
missing	225		116	
Weapon				
Firearm	347	(52.9)	171	(50.9)
None	139	(21.2)	65	(19.3)
Other	91	(13.9)	55	(16.4)
Vehicle	63	(9.6)	31	(9.2)
Physical force	16	(2.4)	14	(4.2)
missing	49		5	

decreased slightly over time (from 5% in 2005–2009 to 2% in 2015–2019 overall, and from 7% in 2005–2009 to 2% in 2015–2019 in dyads).

As indicated in Table 4, there was substantial missingness on call type (476 out of 705 entries; 243 out of 341 dyadic entries). Among the available data from OIS, emergency calls were the most common (43%), followed by warrants (30%), "other" (20%), and traffic stops (7%), and this pattern was consistent by officer race and in dyads.

Our research found firearms were the most common weapon type for citizens in officer shooting incidents (53%), and this pattern persisted irrespective of officer race (Table 5). This concurs with other research that discusses the same issue. In fact, civilian possession of any weapon was the common characteristic of police shootings.

As illustrated in Table 6, the gross majority of officer-involved shootings (94%) resulted in no injury to the officers, and approximately 6% of entries resulted in officers being wounded. Only one entry was observed where an (Hispanic) officer was killed (0.1%). This pattern was relatively consistent by race and in dyads.

With respect to citizen injury, 28% of officer-involved shootings resulted in citizen death, 38% resulted in citizens being wounded, and 33% resulted with no reported harm to the citizen (Table 7). For Black officers overall and in dyads, the relative percentage of citizens killed was lower (18%) compared to White officers, and the percentage of citizens wounded (42%) and with no harm (39%) was higher.

Approximately 3% of entries (4% of dyads) involved female officers, which is substantially lower than that of the larger HPD over the same time period (~15%). As presented in Table 8, all entries with female officers involved male citizens, although that number was small (n = 18) relative to male officers (n = 516), and there was substantial

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Table 2 Number (%) of OIS entries (2005–2020) by officer and citizen race

Officer race	Citizen race									
	White	(row%)	Black	(row%)	Hisp.	(row%)	Other	(row%)	All citizens	(row%)
Officers and citizens race for all entries in OIS ($n=613$)										
White	52	(18.6)	154	(55.0)	65	(23.2)	9	(3.2)	280	(100.0)
[col%]	[57.1]		[46.1]		[37.8]		[56.2]		[45.7]	
Black	9	(8.2)	79	(71.8)	19	(17.3)	3	(2.7)	110	(100.0)
[col%]	[9.9]		[23.7]		[11.0]		[18.8]		[17.9]	
Hispanic	26	(12.9)	91	(45.3)	80	(39.8)	4	(2.0)	201	(100.0)
[col%]	[28.6]		[27.2]		[46.5]		[25.0]		[32.8]	
Asian-Other	4	(18.2)	10	(45.5)	8	(36.4)	0	(0.0)	22	(100.0)
[col%]	[4.4]		[3.0]		[4.7]		[0.0]		[3.6]	
All officers	91	(14.8)	334	(54.5)	172	(28.1)	16	(2.6)	613	(100.0)
[col%]	[100.0]		[100.0]		[100.0]		[100.0]		[100.0]	
Officers and citizen race for dyadic entries in OIS ($n=324$)										
White	22	(14.9)	82	(55.4)	38	(25.7)	6	(4.1)	148	(100.0)
[col%]	[56.4]		[45.8]		[39.6]		[60.0]		[45.7]	
Black	6	(8.3)	49	(68.1)	16	(22.2)	1	(1.4)	72	(100.0)
[col%]	[15.4]		[27.4]		[16.7]		[10.0]		[22.2]	
Hispanic	10	(10.8)	43	(46.2)	37	(39.8)	3	(3.2)	93	(100.0)
[col%]	[25.6]		[24.0]		[38.5]		[30.0]		[28.7]	
Asian-Other	1	(9.1)	5	(45.5)	5	(45.5)	0	(0.0)	11	(100.0)
[col%]	[2.6]		[2.8]		[5.2]		[0.0]		[3.4]	
All officers	39	(12.0)	179	(55.2)	96	(29.6)	10	(3.1)	324	(100.0)
[col%]	[100.0]		[100.0]		[100.0]		[100.0]		[100.0]	

missingness for citizen sex (~20%). While 8% of entries (7% of dyads) involved juveniles, there was little to no reliable difference in the relative percentages observed by officer gender (Table 9).

Discussion

In the current study, we sought to examine descriptive elements of officer-involved shootings occurring within the HPD. This allowed us to track not only officer characteristics but also officer-suspect dyads across a time of increased diversification for the department between 2005 and 2019. This allowed us to come to several specific conclusions.

First, our analysis supported that diversification of the HPD had indeed occurred between the years 2005 and 2019. Specifically, as the number of White officers declined, the number of Hispanic and Asian officers increased. Proportions of Black officers remained largely stable.

Second, the data indicated a marked decline in reported officer-involved shootings from 2005 to 2019, and this appears to be reflective of national trends (*Washington* Post 2021). The declining number of police shootings interestingly coincides with increased media interest and scrutiny (Ferguson 2023). However, some evidence suggests that news media attention to this issue has resulted in the general public vastly overestimating the proportion of officer-involved shootings, particularly those involving unarmed Black individuals (McCaffree and Saide 2021). Thus, it may be worth further investigating how the issue of officer-involved shootings is communicated to the general public and what impacts this may have on race relations (e.g., Ferguson 2023) and politics.

Regarding officer race and officer-citizen dyads, overall, Black officers were narrowly under-represented in officer-involved shootings, Hispanic officers were over-represented, and White officers' involvement in officer-involved shootings varied by year. Nevertheless, the majority of entries regarding Black officers involved Black citizens, and the majority of entries regarding Hispanic officers involved Hispanic citizens. This may reflect community policing practices of assigning officers to patrol neighborhoods in which they themselves live or share a race identity with community members.

Although Black citizens were generally overrepresented in officer-involved shootings, the proportion of Black citizens in officer-involved shootings declined over the time span considered, particularly the most recent five years.

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Table 3 Number (%) of OIS entries by citizen race from 2005–2020

	Citizen race for all entries in OIS ($n=618$)							
Year	White	(row %)	Black	(row %)	Hisp.	(row %)	Other	(row %)
2005	10	(20.4)	24	(49.0)	13	(26.5)	2	(4.1)
2006	7	(14.9)	24	(51.1)	10	(21.3)	6	(12.8)
2007	3	(8.3)	26	(72.2)	5	(13.9)	2	(5.6)
2008	6	(14.0)	17	(39.5)	20	(46.5)	0	(0.0)
2009	10	(21.7)	18	(39.1)	18	(39.1)	0	(0.0)
2010	2	(5.4)	18	(48.7)	15	(40.5)	2	(5.4)
2011	5	(17.2)	10	(34.5)	13	(44.8)	1	(3.5)
2012	3	(6.7)	29	(64.4)	13	(28.9)	0	(0.0)
2013	7	(11.7)	37	(61.7)	16	(26.7)	0	(0.0)
2014	10	(25.6)	24	(61.5)	5	(12.8)	0	(0.0)
2015	8	(18.6)	20	(46.5)	14	(32.6)	1	(2.3)
2016	5	(15.6)	21	(65.6)	6	(18.8)	0	(0.0)
2017	7	(23.3)	16	(53.3)	7	(23.3)	0	(0.0)
2018	2	(8.0)	15	(60.0)	7	(28.0)	1	(4.0)
2019	7	(18.4)	19	(50.0)	11	(29.0)	1	(2.6)
2020-May	0	(0.0)	18	(94.7)	1	(5.3)	0	(0.0)
Years	M	(SD)	M	(SD)	M	(SD)	M	(SD)
2005–2009	15.9%	(4.8)	50.2%	(12.0)	29.5%	(11.9)	4.5%	(4.7)
2010–2014	13.3%	(7.4)	54.2%	(11.3)	30.8%	(11.3)	1.8%	(2.3)
2015–2019	16.8%	(5.0)	55.1%	(6.9)	26.3%	(4.8)	1.8%	(1.6)
	Citizen race for dyadic entries in OIS ($n=324$)							
Year	White	(row %)	Black	(row %)	Hisp.	(row %)	Other	(row %)
2005	1	(3.9)	17	(65.4)	6	(23.1)	2	(7.7)
2006	4	(16.0)	14	(56.0)	3	(12.0)	4	(16.0)
2007	3	(13.6)	14	(63.6)	3	(13.6)	2	(9.1)
2008	0	(0.0)	15	(71.4)	6	(28.6)	0	(0.0)
2009	6	(18.2)	14	(42.4)	13	(39.4)	0	(0.0)
2010	0	(0.0)	15	(65.2)	8	(34.8)	0	(0.0)
2011	4	(19.1)	9	(42.9)	7	(33.3)	1	(4.8)
2012	1	(3.7)	19	(70.4)	7	(25.9)	0	(0.0)
2013	3	(12.0)	14	(56.0)	8	(32.0)	0	(0.0)
2014	5	(21.7)	14	(60.9)	4	(17.4)	0	(0.0)
2015	5	(23.8)	7	(33.3)	9	(42.9)	0	(0.0)
2016	5	(27.8)	7	(38.9)	6	(33.3)	0	(0.0)
2017	0	(0.0)	3	(50.0)	3	(50.0)	0	(0.0)
2018	2	(15.4)	3	(23.1)	7	(53.9)	1	(7.7)
2019	0	(0.0)	5	(50.0)	5	(50.0)	0	(0.0)
2020-May	0	(0.0)	9	(90.0)	1	(10.0)	0	(0.0)
Years	M	(SD)	M	(SD)	M	(SD)	M	(SD)
2005–2009	10.3%	(7.1)	59.8%	(10.0)	23.3%	(10.1)	6.6%	(6.0)
2010–2014	11.3%	(8.4)	59.1%	(9.4)	28.7%	(6.4)	1.0%	(1.9)
2015–2019	13.4%	(11.6)	39.1%	(10.3)	46.0%	(7.3)	1.5%	(3.1)

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Table 4 Number (%) of OIS entries by officer race and call type (2005–2020)

Officer race	traffic stop	(row%)	emergency	(row%)	warrant	(row%)	other	(row%)	all stops	(row%)
Call type for all entries in OIS ($n=467$)										
White	14	(6.3)	96	(43.4)	60	(27.1)	51	(23.1)	221	(100.0)
[col%]	[43.8]		[48.2]		[42.6]		[53.7]		[47.3]	
Black	8	(8.5)	41	(43.6)	32	(34.0)	13	(13.8)	94	(100.0)
[col%]	[25.0]		[20.6]		[22.7]		[13.7]		[20.1]	
Hispanic	10	(7.5)	51	(38.3)	44	(33.1)	28	(21.1)	133	(100.0)
[col%]	[31.2]		[25.6]		[31.2]		[29.5]		[28.5]	
Other	0	(0.0)	11	(57.9)	5	(26.3)	3	(15.8)	19	(100.0)
[col%]	[0.0]		[5.5]		[3.5]		[3.2]		[4.1]	
All officers	32	(6.9)	199	(42.6)	141	(30.2)	95	(20.3)	467	(100.0)
[col%]	[100.0]		[100.0]		[100.0]		[100.0]		[100.0]	
Call type for dyadic entries in OIS ($n=243$)										
White	10	(8.8)	40	(35.4)	34	(30.1)	29	(25.7)	113	(100.0)
[col%]	[40.0]		[44.4]		[45.9]		[53.7]		[46.5]	
Black	7	(11.3)	23	(37.1)	21	(33.9)	11	(17.7)	62	(100.0)
[col%]	[28.0]		[25.6]		[28.4]		[20.4]		[25.5]	
Hispanic	8	(13.6)	21	(35.6)	18	(30.5)	12	(20.3)	59	(100.0)
[col%]	[32.0]		[23.3]		[24.3]		[22.2]		[24.3]	
Other	0	(0.0)	6	(66.7)	1	(11.1)	2	(22.2)	9	(100.0)
[col%]	[0.0]		[6.7]		[1.4]		[3.7]		[3.7]	
All officers	25	(10.3)	90	(37.0)	74	(30.5)	54	(22.2)	243	(100.0)
[col%]	[100.0]		[100.0]		[100.0]		[100.0]		[100.0]	

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The mean percentage of dyads involving Black citizens decreased sharply (21%), and the mean percentage of dyads involving Hispanic citizens increased sharply (23%) in nearly equal magnitude. This contrasts the relatively stable mean percentage of shootings involving White citizens and the slightly decreasing mean percentage of shootings involving Asian citizens. Simultaneously, the percentage of Hispanic officers increased (10%), and the percentage of White officers decreased (15%), which may be a reflection of the HPD's changing focus with more attention surrounding shootings of Black citizens (which dropped from 60 to 40% in dyads). Further, the dynamic between civilians and officers may change when officers are alone as compared to in groups. We note the likelihood of police shootings when officers are the sole officer on the scene and add that there may be need for further investigation with regard to how this dynamic changes as the number of officers increases. As noted in other data (Smith et al. 2023), the overrepresentation of Black individuals in officer-involved shootings mirrors the overrepresentation of Black individuals in violent crime. However, the degree to which community and class-related stress account for observed racial differences in police shootings as well as violent crime perpetration remains a contentious but important debate, given the implications for current and future policy directives aimed at reducing racial disparities.

Our research found firearms were the weapon type that led to higher shooting incidents regardless of officer race. This concurs with other research that discusses the same issue. In fact, civilian possession of any weapon was the common characteristic of police shootings, in ours and most other research (Wheeler et al. 2017). For example, Paddock (2018) found that higher citizen fatalities due to police-related shooting incidents were because the citizen had a weapon. Similarly, Wheeler et al. (2017) found that 45% of civilians who were shot were armed with firearms, and 12% were shot while armed with knives. In our research, the most common weapon type in police-related shooting incidents was a firearm, followed by "other," a vehicle, and physical force, though it should be emphasized that no weapon was present in about 21% of cases. Similarly, Paddock (2018) found that of civilians shot by police, 61% had firearms present, 15% were unarmed, and 24% had other weapons present. This literature suggests that highly volatile police action is aligned with highly volatile citizen action, with firearms serving as the primary weapon.

As we are unable to determine the race of the police shooter(s) when there are multiple police officers present

Table 5 Number (%) of OIS entries by officer race and citizen weapon type (2005–2020)

Officer race	none	(row%)	physical force	(row%)	other	(row%)	vehicle	(row%)	firearm	(row%)	all weapons	(row%)
Citizen weapon type for all entries in OIS ($n=649$)												
White	55	(18.3)	5	(1.7)	36	(12.0)	24	(8.0)	180	(60.0)	300	(100.0)
[col%]	[40.4]		[31.2]		[39.6]		[38.7]		[52.3]		[46.2]	
Black	33	(28.4)	4	(3.4)	18	(15.5)	11	(9.5)	50	(43.1)	116	(100.0)
[col%]	[24.3]		[25.0]		[19.8]		[17.7]		[14.5]		[17.9]	
Hispanic	42	(20.1)	6	(2.9)	35	(16.7)	21	(10.0)	105	(50.2)	209	(100.0)
[col%]	[30.9]		[37.5]		[38.5]		[33.9]		[30.5]		[32.2]	
Other	6	(25.0)	1	(4.2)	2	(8.3)	6	(25.0)	9	(37.5)	24	(100.0)
[col%]	[4.4]		[6.2]		[2.2]		[9.7]		[2.6]		[3.7]	
All officers	136	(21.0)	16	(2.5)	91	(14.0)	62	(9.6)	344	(53.0)	649	(100.0)
[col%]	[100.0]		[100.0]		[100.0]		[100.0]		[100.0]		[100.0]	
Citizen weapon type for dyadic entries in OIS ($n=336$)												
White	24	(15.4)	5	(3.2)	25	(16.0)	13	(8.3)	89	(57.1)	156	(100.0)
[col%]	[36.9]		[35.7]		[45.5]		[41.9]		[52.0]		[46.4]	
Black	21	(29.2)	4	(5.6)	13	(18.1)	7	(9.7)	27	(37.5)	72	(100.0)
[col%]	[32.3]		[28.6]		[23.6]		[22.6]		[15.8]		[21.4]	
Hispanic	17	(17.7)	4	(4.2)	17	(17.7)	8	(8.3)	50	(52.1)	96	(100.0)
[col%]	[26.2]		[28.6]		[30.9]		[25.8]		[29.2]		[28.6]	
Other	3	(25.0)	1	(8.3)	0	(0.0)	3	(25.0)	5	(41.7)	12	(100.0)
[col%]	[4.6]		[7.1]		[0.0]		[9.7]		[2.9]		[3.6]	
All officers	65	(19.3)	14	(4.2)	55	(16.4)	31	(9.2)	171	(50.9)	336	(100.0)
[col%]	[100.0]		[100.0]		[100.0]		[100.0]		[100.0]		[100.0]	

Table 6 Number (%) of OIS entries by officer race and officer injury (2005–2020)

Officer race	none	(row%)	wounded	(row%)	killed	(row%)	combined	(row%)
Officer injury for all entries in OIS ($n=698$)								
White	303	(94.4)	18	(5.6)	0	(0.0)	321	(100.0)
[col%]	[46.1]		[45.0]		[0.0]		[46.0]	
Black	121	(96.0)	5	(4.0)	0	(0.0)	126	(100.0)
[col%]	[18.4]		[12.5]		[0.0]		[18.1]	
Hispanic	209	(93.3)	14	(6.2)	1	(0.4)	224	(100.0)
[col%]	[31.8]		[35.0]		[100.0]		[32.1]	
Other	24	(88.9)	3	(11.1)	0	(0.0)	27	(100.0)
[col%]	[3.7]		[7.5]		[0.0]		[3.9]	
All officers	657	(94.1)	40	(5.7)	1	(0.1)	698	(100.0)
[col%]	[100.0]		[100.0]		[100.0]		[100.0]	
Officer injury for dyadic entries in OIS ($n=341$)								
White	147	(93.6)	10	(6.4)	0	(0.0)	157	(100.0)
[col%]	[45.9]		[47.6]				[46.0]	
Black	70	(93.3)	5	(6.7)	0	(0.0)	75	(100.0)
[col%]	[21.9]		[23.8]				[22.0]	
Hispanic	92	(94.8)	5	(5.2)	0	(0.0)	97	(100.0)
[col%]	[28.7]		[23.8]				[28.4]	
Other	11	(91.7)	1	(8.3)	0	(0.0)	12	(100.0)
[col%]	[3.4]		[4.8]				[3.5]	
All officers	320	(93.8)	21	(6.2)	0	(0.0)	341	(100.0)
[col%]	[100.0]		[100.0]				[100.0]	

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Table 7 Number (%) of OIS entries by officer race and citizen injury (2005–2020)

Officer race	none	(row%)	wounded	(row%)	killed	(row%)	other	(row%)	combined	(row%)
Citizen injury for all entries in OIS ($n=639$)										
White	89	(29.8)	110	(36.8)	99	(33.1)	1	(0.3)	298	(100.0)
[col%]	[42.0]		[45.1]		[54.1]		[33.3]		[46.6]	
Black	45	(39.5)	48	(42.1)	21	(18.4)	0	(0.0)	114	(100.0)
[col%]	[21.2]		[19.7]		[11.5]		[0.0]		[17.8]	
Hispanic	67	(32.7)	78	(38.0)	58	(28.3)	2	(1.0)	203	(100.0)
[col%]	[31.6]		[32.0]		[31.7]		[66.7]		[31.7]	
Other	11	(45.8)	8	(33.3)	5	(20.8)	0	(0.0)	24	(100.0)
[col%]	[5.2]		[3.3]		[2.7]		[0.0]		[3.7]	
All officers	212	(33.2)	244	(38.2)	183	(28.6)	3	(0.5)	639	(100.0)
[col%]	[100.0]		[100.0]		[100.0]		[100.0]		[100.0]	
Citizen injury for dyadic entries in OIS ($n=330$)										
White	49	(31.6)	58	(37.4)	47	(30.3)	1	(0.6)	154	(100.0)
[col%]	[44.5]		[44.3]		[52.8]		[50.0]		[46.6]	
Black	27	(38.0)	30	(42.3)	14	(19.7)	0	(0.0)	71	(100.0)
[col%]	[24.5]		[22.9]		[15.7]		[0.0]		[21.5]	
Hispanic	31	(33.0)	38	(40.4)	24	(25.5)	1	(1.1)	93	(100.0)
[col%]	[28.2]		[29.0]		[27.0]		[50.0]		[28.1]	
Other	3	(25.0)	5	(41.7)	4	(33.3)	0	(0.0)	12	(100.0)
[col%]	[2.7]		[3.8]		[4.5]		[0.0]		[3.5]	
All officers	110	(33.3)	131	(39.7)	89	(27.0)	2	(0.6)	330	(100.0)
[col%]	[100.0]		[100.0]		[100.0]		[100.0]		[100.0]	

at each incident, we duplicated our analysis with officer-citizen dyads to be confident the characteristics of the officer were the characteristics of the shooter. This is a common methodological tact taken in similar research (Donner and Popovich 2019). The figures drawn from this subset were very similar to those drawn from the larger sample.

With respect to officer fatalities, we only observed one entry where an officer was killed. It is important to note that this is not reflective of harm to officers overall, as many more officers who died in the line of duty without discharging their service weapon were not reflected in this database (HPD 2021). By contrast, officer-involved shootings resulted in the death of 28% of suspects and injury of 38% of suspects.

Our findings indicated that female officers were underrepresented among officer-involved shootings. This finding is in line with previous data from other studies. As the current study is descriptive, we cannot determine the cause of this gender discrepancy. It may be that female officers are

Table 8 Number (%) of OIS entries by officer and citizen sex (2005–2020)

Officer sex	male	(row%)	female	(row%)	others	(row%)	all citizens	(row%)
Citizen sex for all entries in OIS (n = 572)								
male	516	(93.1)	32	(5.8)	6	(1.1)	554	(100.0)
[col%]	[96.6]		[100.0]		[100.0]		[96.9]	
female	18	(100.0)	0	(0.0)	0	(0.0)	18	(100.0)
[col%]	[3.4]		[0.0]		[0.0]		[3.1]	
all officers	534	(93.4)	32	(5.6)	6	(1.0)	572	(100.0)
[col%]	[100.0]		[100.0]		[100.0]		[100.0]	
Citizen sex for dyadic entries in OIS ($n=294$)								
male	267	(94.7)	9	(3.2)	6	(2.1)	282	(100.0)
[col%]	[95.7]		[100.0]		[100.0]		[95.9]	
female	12	(100.0)	0	(0.0)	0	(0.0)	12	(100.0)
[col%]	[4.3]		[0.0]		[0.0]		[4.1]	
all officers	279	(94.9)	9	(3.1)	6	(2.0)	294	(100.0)
[col%]	[100.0]		[100.0]		[100.0]		[100.0]	

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Table 9 Number (%) of OIS entries by officer sex and citizen age classification injury (2005–2020)

Officer sex	adult	(row%)	juvenile	(row%)	all citizens	(row%)
Citizen age classification for all entries in OIS ($n=480$)						
male	430	(92.1)	37	(7.9)	467	(100.0)
[col%]	[97.3]		[97.4]		[97.3]	
female	12	(92.3)	1	(7.7)	13	(100.0)
[col%]	[2.7]		[2.6]		[2.7]	
all officers	442	(92.1)	38	(7.9)	480	(100.0)
[col%]	[100.0]		[100.0]		[100.0]	
Citizen age classification for dyadic entries in OIS ($n=225$)						
male	203	(93.5)	14	(6.5)	217	(100.0)
[col%]	[96.7]		[93.3]		[96.4]	
female	7	(87.5)	1	(12.5)	8	(100.0)
[col%]	[3.3]		[6.7]		[3.6]	
all officers	210	(93.3)	15	(6.7)	225	(100.0)
[col%]	[100.0]		[100.0]		[100.0]	

more often assigned to different duties than male officers (Brown et al. 1993). It may also be the case that sex-based differences in aggression (Archer and Côté 2005) may make female officers less inclined to escalate crisis-based situations than male officers.

Limitations

Due to the structure of the available data, it was not possible to identify the level of involvement of each citizen and each officer when multiple people were present at officer-involved shooting incidents. Moreover, in the larger unrestricted dataset, certain characteristics of each officer and citizen were over-represented by definition. To accommodate multiple officers and multiple citizens at individual officer-involved shooting incidents, characteristics of citizens were duplicated when there was more than one officer involved and the characteristics of officers were duplicated when there was more than one citizen involved. Therefore, strong caution is warranted when interpreting findings from the larger unrestricted dataset. However, the smaller dataset restricted to officer-citizen dyads did not suffer from this limitation, and many effects were similar between the unrestricted and restricted datasets.

Conclusions

Demographic changes in officer-involved shootings reflect demographic changes in the HPD over time. Reported incidents of officer-involved shootings declined over time. Black suspects were shot more often than other racial groups. However, other data indicate overrepresentation of Black individuals in violent crime perpetration (Beck 2021). We recommend that future research should cautiously examine how these data points interact with each other, both avoiding ideological assumptions, but also working toward positive and constructive solutions for reducing both of these numbers. Racial differences between officers involved in shootings appeared fairly small, and officer-suspect dyads often reflected similar races/ethnicities.

Increasing diversity based on race and gender in police forces is a worthwhile goal in and of itself and efforts to encourage diverse pools of potential officers to apply should continue. However, diversifying police forces in and of themselves do not appear to be likely to reduce police shootings, including those of unarmed suspects. Changes to officer training and police strategies to focus on community engagement and protection rather than "warrior training" type programs that emphasize the use of force and ever-present danger may be more effective avenues to consider. However, all policy changes must also be realistic about the challenges police face in the United States given the ubiquity of firearms and high crime in low-SES communities of all ethnicities.

The issue of officer-involved shootings appears to be a complex and nuanced one, and caution is advised when making causal claims about the nature of such incidents. Future research should examine how violent crime perpetration and officer excessive force data interact with and influence each other and what policies may be most effective both in reducing violent crime and the excessive use of police force, as well as a closer examination of whether issues related to class-based discrimination and police training as opposed to racial prejudice may be a more productive avenue for consideration.

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Data Availability Data for this study are publicly available data which can be found at: http://www.houstontx.gov/police/ois/.

Declarations

Ethics Approval/Informed Consent This article does not contain any studies with human participants performed by any of the authors.

Conflicts of Interest All authors declare they have no conflicts of interest.

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