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Reporting Gunshots: Prevalence, Correlates, and Obstacles to Calling the Police

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Abstract

Accurately documenting where and when firearms are discharged is a critical first step in gun violence prevention. Many cities rely on police calls for service as their primary source for this information. Recent studies find, however, that citizens underreport gunshots. This has led some communities to invest in gunshot detection technology (GDT) as an alternative data source. GDT remains an expensive and often controversial solution with limited evidence for long-term benefits. This underscores the need for additional research on third-party reporting of gunshots. The current study, conducted in Portland Oregon, surveyed 1,240 residents in 23 neighborhoods with above-average firearm discharges. Analyses confirm that gunshots are vastly underreported. Multivariate logistic regressions found that respondents with higher trust in the police and those worried about gun violence were more likely to call 911 when they heard gunfire. Obstacles to reporting include ambiguity regarding the nature of the sound, diffusion of responsibility, and the perceived hassle of dealing with the local emergency dispatch system. Implications for surveilling gun violence are discussed.

Keywords: crime reporting, police surveillance, law enforcement, gun violence, gunshot detection technology, trust and legitimacy

Reporting Gunshots: Prevalence, Correlates, and Obstacles to Calling the Police

Firearms account for a significant proportion of murders, suicides, fatal accidents, and injuries in the U.S. (Pew, 2022). Responding effectively to these incidents, whether using criminal justice or public health strategies, requires accurate and timely data on firearm discharges (Braga, 2022; Hipple, 2022). This includes surveillance systems for tracking fatal and nonfatal shootings as well as other incidents involving the use of a firearm (e.g., accidental discharge, celebratory gunfire). In many communities, the primary source of data for monitoring these events is police calls for service (CFS) generated by third-party reporters (i.e., people other than victims or offenders; Linning & Barnes 2022). Unfortunately, many citizens do not call the police when they hear gunfire (Carr & Doleac, 2016; Huebner et al., 2022; Renda & Zhang, 2019). Gunshot detection technology (GDT) has been proposed as a possible solution to this problem. GDT involves the use of acoustic devices installed in outdoor settings to detect gunshots, triangulate the location across multiple sensors, and rapidly transmit this information to emergency dispatchers (Mazerolle et al., 1998; Watkins, et al., 2002). While GDT provides an independent source of data on firearm discharges, the technology raises several concerns including false positive alerts, suppression of citizen reporting, privacy violations, and high recurring costs (Mares, 2022). In light of these concerns, it seems beneficial to further document the frequency of underreporting gunshots and to identify factors that contribute to this phenomenon. The current study uses a large community survey in Portland Oregon to address these goals.

Gunshot Detection Technology

Gunshots have identifiable acoustic signatures (e.g., muzzle blasts, supersonic shockwaves, and blast reflections) that allow GDT systems to distinguish shootings from most

other noises (Maher, 2007). Studies conducting test firings have found that GDT accurately detects outdoor gunshots and their location with only a marginal degree of error (i.e., Watkins et al, 2002). Increased detection of gunshots and improved accuracy in geolocating these events could benefit emergency responders, leading to faster response times, expedited medical treatment for victims, improved evidence collection, apprehension of suspects, and ultimately, reduced gun violence. Whether GDT achieves these outcomes remains subject to ongoing debate.

Regarding response times, most studies (Choi et al., 2014; Mares & Blackburn, 2012; Mazerolle, 1998; Piza et al, 2023b), but not all (Mares & Blackburn, 2021), find that officers arrive on the scene slightly faster when GDT initiates the alert as compared to a CFS from the public. Similarly, there is evidence that GDT can expedite the treatment of gunshot victims and their transport to medical centers (Beattie et al., 2020; Brooke et al., 2017; Goldenberg et al., 2019). It remains unclear, however, whether these time savings reflect an inherent benefit of GDT or whether jurisdictions investing in this technology make concurrent policy changes that elevate the priority assigned to these events. Reallocating GDT funds, roughly $70,000 to $85,000 per square mile per year (Mares, 2022), to support additional call takers and emergency responders might yield similar improvements in response times.

Moving to other potential benefits of GDT, two studies found that more shell casings were collected in areas using the devices (Lawrence et al., 2018; Piza et al, 2023c) and more guns were recovered in two studies (Connealy et al., 2024; Piza et al, 2023c). Evidence for positive “downstream” impacts remains limited. Choi and colleagues (2014) along with Piza and colleagues (2023c) found no impact of GDT on case outcomes. Doucette and colleagues (2021) found no effect on homicides or arrests. Mares and Blackburn (2012, 2021) found no change in

serious violent crime. Finally, Piza and colleagues (2023c) along with Connealy and colleagues (2024) found no impact on gun violence. In short, there is currently no evidence that GDT is associated with longer-term reductions in crime.

This technology may also be limited by high false positive or unfounded alerts (e.g., car backfires, fireworks; Mares, 2022). Assessing the ratio of false to true positive alerts generated by GDT is difficult because valid firearm discharges are often hard to corroborate due to the absence of a victim, witness, or ballistic evidence. Another challenge is that GDT cannot distinguish between violent criminal incidents, non-violent gun offenses (e.g., celebratory gunfire), and non-criminal incidents that might not require a police response (e.g., unintentional discharge). While these same criticisms apply to citizen reporting, GDT detects a large number of apparent gunshots that are unreported by members of the public (Carr & Doleac, 2016; Huebner et al., 2022; Renda & Zhang, 2019). This might increase the raw number of false positives and non-violent alerts an agency receives, negatively impacting officer workloads (Mazerolle et al., 1998; Mares & Blackburn, 2012; Piza et al., 2023a; Ratcliffe et al., 2018).

Two additional challenges associated with GDT are worth noting. First, GDT like other police surveillance practices, generates significant controversy in many communities due to privacy concerns and general distrust of the police (Henning, Carmony & Peterson, 2024). Agencies implementing GDT in the face of significant opposition may suffer a loss in perceived legitimacy, possibly impacting citizens' willingness to collaborate with the police in other crime control efforts (e.g., Sunshine & Tyler, 2003). Second, citizen reporting of gunshots might be suppressed because people believe it is no longer necessary to call 911 when the technology is used (Mares & Blackburn, 2012; Mares & Blackburn, 2021). This suppression may extend beyond GDT's immediate coverage area, usually just a small proportion of a city's landscape

because officials often withhold the location of the sensors (Lawrence et al., 2018). For some cities, this could mean an overall reduction in the proportion of gunshots identified following the implementation of GDT.

Underreporting Gunshots

One of the major selling points for GDT is that citizens grossly underreport gunshots. Ironically, the primary evidence for underreporting comes from studies comparing alerts generated by GDT sensors with citizen-initiated CFS (e.g., “shooting”, “shots”, “shots fired”). Carr and Doleac (2016) compared GDT and CFS data from Washington, DC. Using the former as their true accounting of gunfire, they reported that only 12.4% of incidents resulted in a concurrent 911 call. Irvin-Erickson and colleagues (2017) also studied DC’s data. For each alert generated by GDT, they coded whether a CFS was logged within 20 minutes. They found that GDT detected 52% more alleged shooting incidents. Renda and Zhang (2019) obtained four months of data for Louisville, KY. Only 11.7% of GDT events during the study period had a corresponding citizen CFS within one hour of sensor activation. Huebner, Lentz, and Schafer (2022) assessed disparities between GDT alerts and citizen-generated CFS in St. Louis, MO. Examining five years of data, the authors found that just 31.6% of GDT events were accompanied by a CFS within a 30-minute and 1,000-foot threshold. Piza and colleagues (2023b) conducted research in Kansas City, MO. They reported that fewer than one-half (42.3%) of GDT alerts generated a matching CFS from the community. Finally, a recent study by Cook and Soliman (2024) found that just one in five (20.8%) GDT alerts in Durham, NC were accompanied by a CFS.

While the consensus from this literature is that many, perhaps even the majority of gunshots in large cities go unreported by members of the public, there are several caveats to

consider. First, all of these studies assume that the GDT alerts were true positives as opposed to false alerts. When the data are restricted to founded gun crimes (e.g., shell casings collected, bullet holes observed, witness statements taken, victim found injured or dead) GDT's benefits over CFS appear to be more limited (Cook & Soliman, 2024; Mazeika 2022). Second, the benefit of GDT over CFS in detecting gunshots may be impacted by contextual factors. For example, GDT alerts are less likely to be accompanied by a CFS at nighttime, but in the daytime, the two measures are largely equivalent (Irvin-Erickson, et al., 2017; Renda & Zhang, 2019). There is similar evidence for geographic variability in the sensitivity of GDT over CFS. Citizen reporting appears to be particularly suppressed in areas with higher rates of violent crime (Huebner, Lentz, & Schafer, 2022), potentially the result of desensitization to gunshots with repeated exposure. Both Renda and Zhang (2019) and Huebner, Lentz, and Schafer (2022) report a higher ratio of GDT alerts relative to CFS in residential areas with a higher proportion of Blacks/African Americans. Third, the data are sparser when it comes to the reverse ratio – citizens reporting gunfire that is not detected by a GDT alert. Cook and Soliman (2024) report that 65.1% of their CFS involving "shots fired" did not generate a GDT response. Fourth, a certain proportion of gun violence happens indoors. Citizen reporting for these events might be more sensitive than GDT. Finally, as discussed earlier, the use of GDT may suppress citizen reporting. As such, it remains unclear whether the current studies demonstrate a clear benefit of GDT or simply highlight one of its unintended consequences.

In summary, while the existing research suggests a high degree of underreporting by citizens when it comes to firearm discharges, these studies rely on a singular methodology that comes with important caveats. An alternative approach to studying this topic, the one used in the current project, involves surveying people to assess whether they reported gunfire to the police.

This strategy allows us to assess whether person-level demographics (e.g., sex, age, race, ethnicity) and contextual factors (e.g., frequency of hearing gunfire, fear of crime, trust in the police) are associated with reporting gunshots. We base some of our hypotheses on the broader literature addressing crime reporting by victims and third parties.

Crime Reporting by Victims and Third Parties

In their review of crime reporting research Xie and Baumer (2019) propose that a victim's decision to contact the police results from the interaction of several factors including their demographics, attitudes toward the police, and the severity of the crime. For example, there is relatively consistent evidence that age is positively associated with reporting crimes to the police while being female is associated with higher reporting in many, but not all studies. The majority of studies find that race and ethnicity are either unrelated to crime reporting by victims or that Blacks report at higher levels than Whites (Zaykowski et al., 2019). A positive relationship is found between trust in the police and reporting crimes in hypothetical situations (Sunshine & Tyler, 2003) and when looking at national data (Xie, Solis, & Chauhan, 2023), but the impact on reporting in other studies has generated mixed results (Xie & Baumer, 2019; see also Linning & Barnes, 2022). The strongest and most consistently positive predictor of crime reporting by victims is the severity of the offense (Xie & Baumer, 2019). One interpretation of this finding is that victims make a rational choice, balancing the perceived benefits of reporting (e.g., protection from further offenses, insurance reimbursement, recovery of property) against the perceived costs of interacting with the police (e.g., time, hassle, embarrassment, intimidation). Third-party witnesses to a crime may engage in a similar calculus, however, the personal benefits derived from calling the police are less clear. Perhaps people are largely motivated by the desire to help others. Alternatively, some third-party reporting may result from the efforts to reduce one’s own

risk for victimization. Calling 911 to report gunshots might lead to the arrest of the perpetrator or increase police patrols in the area, actions that could increase perceived safety for the caller. With this in mind, we hypothesize that fear of gun violence and perceived safety will be associated with reporting gunshots heard in one's neighborhood.

Local Context and Research Questions

The current study was conducted in Portland Oregon, a large city in the Pacific Northwest. Portland's violent crime rate rose 52.5% from 2016 to 2022, compared to a 1.4% rise among large cities nationally. This increase came at a time when the Portland Police Bureau (PPB), an agency with one of the lowest officer staffing ratios in the country, lost more than 150 officers to retirement, transfers, and other departures associated with COVID-19 and civil unrest in 2020. The combination of rising violence, much of which involved the use of a firearm, and diminished police resources spurred considerable debate in 2023 regarding how the city should respond. Much of the discussion centered on whether the city would benefit from GDT. The Mayor's Office, seeking broader input on the topic, requested a community survey before making a final decision about investing in this technology.[1] We use the data from this survey to address seven research questions concerning citizen reporting of gunshots.

RQ 1 – How Often Do People Report Gunshots?
RQ 2 – What Reasons Do People Give for Not Reporting Gunshots?
RQ 3 – Are Women, Older People, and Minorities More Likely to Report Gunshots?
RQ 4 – Does Reporting Decline with Repeated Exposure to Gunfire?
RQ 5 – Is Reporting Positively Associated with Trust in the Police?
RQ 6 – Is Reporting Positively Associated with Safety Concerns?
RQ 7 – Would Use of GDT Suppress Citizen Reporting?

Methods

[1] Roughly one-half of residents surveyed were opposed to the city using GDT in their neighborhood (see Henning, Carmony, & Peterson, 2024). The mayor and police chief, based in part on these findings, opted to forgo a pilot test of this technology.

Sample

In 2021, the City of Portland had an estimated population of 652,503 residents living in 94 distinct neighborhoods. Rather than survey all of the neighborhoods, we restricted our initial focus to the locations where gun violence was more prevalent. We obtained four years of data (2019 to 2022) on verified firearm discharges from the PPB for this purpose. This data was used to identify 23 neighborhoods with above-average counts and rates for shooting incidents. City records were then used to identify the residential addresses in these 23 neighborhoods resulting in a sampling frame of 123,944 locations. Ten thousand addresses were randomly selected from the list, and the Mayor's Office mailed each address a letter to with an invitation to complete an online survey.[2] The letter, printed in English and Spanish, briefly explained that the city was working with university partners to collect community feedback on firearm-related issues.

People accessed the anonymous survey via a QR code or short URL provided in the invitation letter.[3] A total of 1,033 responses were submitted during the study period for a response rate of 10.3%. We removed 111 cases due to substantial missing data (11+ items) and seven cases where the respondent did not answer the central questions concerning the reporting of gunshots. Thus, our final *Random* sample consisted of 915 cases.

To provide local officials with as much feedback as possible, we collected data from a second sample. This *Open*, non-probability sample, was generated by having the Mayor's Office and City Council members distribute survey invitations via community list serves and social media. We received 844 responses on the secondary web survey. This was reduced to 325 final responses after removing 375 cases where the respondent did not live in one of the 23 target

[2] The study was reviewed by the Portland State University IRB and was classified as Exempt (HRPP # 238012-18). Informed consent was obtained at the start of the online survey.
[3] A paper copy of the survey instrument is available as a supplemental resource to this article.

neighborhoods, 139 cases with substantial missing data, and five cases where the respondent did not answer the questions about reporting gunshots. Lacking a known denominator, we could not calculate a response rate for the *Open* sample.

Analyses comparing the demographic characteristics of the two samples found that they were largely similar in sex, race, and ethnicity (see Table 1). The *Random* sample had a higher proportion of people aged 55 or older while the *Open* sample was larger in the 35 to 54 age group [χ^2 (2, N = 1,215) = 26.63, $p < .001$]. Rather than conduct separate analyses for each sample, we opted to combine the two groups and enter sample type (i.e., *Open* vs. *Random*) as a control variable in the multivariate analyses.[4]

The *Combined* sample (N = 1,240; see Table 1) was evenly distributed across sexes, with 52.5% female and 47.5% male. City-wide estimates from the U.S. Census (2020) were similar at 50.2% female and 49.8% male. Younger people, aged 18 to 34, accounted for 20.1% of those surveyed, followed by 54.1% aged 35 to 54, and 25.8% aged 55 or older. This compares to 32.0%, 38.1%, and 29.9% respectively using the city's Census data. The racial distribution included 81.5% who identified as White-alone (72.1% Census) and 18.5% who identified as a Minority (27.9% Census). The latter consisted of 1.0% American Indian or Alaskan Native-alone (1.0% in the Census), 2.8% Asian-alone (8.4%), 3.1% Black/African American-alone (5.9%), 0.2% Native Hawaiian or Pacific Islander-alone (0.6%), and 11.5% reported they were multi-racial or some other race (9.2%). Hispanics/Latinos comprised 8.0% of the sample compared to the Census estimate of 10.3%.

Measures

[4] Separate analyses (available upon request) were conducted for each sample and the results were largely the same.

Reporting Gunshots. Several questions were used to assess the respondents' recent history of or willingness to report gunshots. We started by asking, "How many times over the past 12 months have you heard gunfire in your neighborhood? [count multiple shots within an hour as a single incident]." The response options were (0) *Never*, (1) *Once*, (2), *2 to 5 times*, and (3) *6 or more times*[5]. Anyone answering one or more times was then asked, (1) *Yes* or (0) *No*, "Did you call 911 to report the most recent gunshot you heard?" Respondents who had not heard gunfire in the past 12 months were asked, "If you heard a gunshot in your neighborhood would you call 911 to report it?" The response options included (0) *No – Definitely Not*, (1) *No – Probably not*, (2), *Yes - Probably*, and (3) *Yes – Definitely*. These responses were dichotomized into *Yes* and *No* for the current analysis.

Reasons for Not Reporting. Respondents who said they did not report the most recent gunshot were asked to answer the following open-ended question: "People may have different reasons for NOT reporting gunshots. What was your main reason for not reporting this incident?" The text responses tended to be short, averaging 128.8 characters (SD = 127.1). An iterative qualitative approach was used to analyze these data. This included an initial review of 200 randomly selected cases to identify the most common reasons cited. The inter-rater reliability of the resulting coding system was then assessed using a second random sample of 200 cases. Three themes with Kappa coefficients under .60 were revised to clarify the coding manual. All of the text submissions (n = 875) were then recoded using the final codebook. Most submissions (74.4%) contained just a single theme.

Trust in the Police. Three items assessed peoples' trust in the local police: "The Portland Police can be trusted to make decisions that are right for my community", "The Portland

[5] We combined "6 to 10 times" and "11 or more times" from the original survey.

Police are trustworthy", and "I have confidence in the Portland Police." A 5-point Likert scale was used to answer these questions, ranging from (0) *Strongly disagree* to (4) *Strongly agree*. The mean scores for these items were 1.52 (SD = 1.34), 1.63 (SD = 1.36), and 1.51 (SD = 1.34) respectively. A combined measure with high internal consistency (Cronbach's $\alpha = .97$) was created by averaging the three items, producing a mean score of 1.56 (SD = 1.34). The resulting scale deviated significantly from a normal distribution due to roughly one-third of the respondents answering all three questions with *Strongly disagree*. We addressed this by recoding the mean score into a categorical variable: (0) *Very low trust* [M = 0; 29.6% of the sample], (1) *Low to moderate trust* [M > 0 and < 3; 47.5%], and (2) *High trust* [M ≥ 3; 22.9%].

Worry About Gun Violence. We used two items to assess concerns about personal involvement in gun violence: "How often do you worry about being the victim of gun violence in your neighborhood?" and "How often do you worry about someone you know being the victim of gun violence in your neighborhood?" These items were answered using a 5-point frequency scale: (0) *Never,* (1) *Rarely,* (2) *Sometimes*, (3) *Often*, (4) *Very often*. Mean scores for the individual items were 1.44 (SD = 1.02) and 1.63 (SD = 1.11) respectively. A combined scale was created by averaging these two questions ($\alpha = .89$; M = 1.53, SD = 1.01).

Safety Concerns. A general assessment of the respondents' perceived safety was obtained via two questions: "How safe would you feel walking alone in your neighborhood: during the daytime?" and "How safe would you feel walking alone in your neighborhood: at night?" A 5-point Likert response scale was used ranging from (0) *Very safe* to (4) *Very unsafe*. Mean scores for the individual items were .98 (SD = 1.03) and 1.95 (SD = 1.24) respectively, yielding a combined scale with acceptable internal consistency ($\alpha = .80$; M = 1.47, SD = 1.04).

Reporting and GDT. We used the following question to assess whether citizen reporting would be impacted by the use of GDT: "What impact, if any, would GDT have on reporting gunshots you heard in your neighborhood?" Participants were given the following options for responding: (0) *I would be less likely to call 911 if GDT was used in my area*, (1) *GDT would have no impact on whether I call 911*, and (2) *I would be more likely to call 911 if GDT was used in my area.*

Results

RQ 1 – How Often Do People Report Gunshots?

The majority of respondents (85.2%) heard at least one gunshot in their neighborhood over the past 12 months. This includes 13.5% who heard gunfire just one time, 35.2% who heard it two to five times, and 36.5% six or more times. Among those hearing a gunshot, just 11.5% said they called 911 to report the most recent incident. People who had not heard a gunshot, 14.8% of the sample, were asked whether they would call the police *if* they heard gunfire in their neighborhood. Slightly less than one-half (45.1%) of this group answered in the affirmative.

RQ 2 – What Reasons Do People Give for Not Reporting Gunshots?

People who heard gunfire in their neighborhood but did not report the most recent incident were asked to explain their decision. The most common justification, cited by 43.8% of the respondents, was that they were uncertain about the nature of the incident. This included uncertainty about whether it was an actual gunshot versus some other sound (e.g., fireworks, car backfiring), the direction or the distance involved, or whether the incident was criminal in nature. In some cases, people questioned the utility of reporting potentially inaccurate information to the police. The following quotes are illustrative of this theme.

- "It's very difficult to tell whether a sound is a gunshot or just something that sounds similar."
- "It was somewhat far away and I was uncertain about if it was a gunshot."

- “I live near high-density housing so I don’t know where it is coming from as we have echoes in the area.”
- “I wouldn't have felt like I had enough concrete information to offer - it was a sound in the distance.”
- “I did not know exactly where the shots came from so, I could not give accurate directions.”
- “I don't know why someone was shooting. For all I know, it was legitimate self-defense.”

The second most common reason for not reporting (29.6%) was the belief that calling 911 was unlikely to yield a timely or beneficial response from the police. This includes the perception that reporting would be a hassle, that it would require waiting on hold for a dispatcher, and/or that officers might not be dispatched to investigate the incident.

- “I am skeptical that police will do anything useful if I call, especially since they are so slow to respond.”
- “By the time police arrive everyone involved is always gone unless someone got shot.”
- “There’s no point in calling 911 the police won’t do anything.”
- “911 hold times are problematic and response times from PPB are worse.”
- “The Portland Police Bureau has zero presence here & when called never responds.”
- “When there was a shooting directly in front of my home, 911 took over 30 minutes to answer the phone and it was another 90 min before emergency services arrived. So why would I call 911 to report something at an unknown location?”

A third justification for not reporting (13.0%) concerns the perceived risk of harm. Some people worry that calling the police and bringing officers into their neighborhood will negatively impact their community as a whole or certain subgroups (e.g., racial/ethnic minorities, houseless, mentally ill). Racial profiling, over-policing, and use of force incidents were often mentioned in these responses.

- “I don't want police showing up in my neighborhood looking for a shooter who has likely already fled. They are much more likely to find an unhoused person, a mentally ill person, or a person of color, and stereotype them and then criminalize them than they are to find the shooter.”
- “Our police are quick to find the black guy at fault. Calling them endangers anyone in the area where they respond.”
- “If they do show up, they are more likely to escalate violence than prevent it.”
- “I don’t want to bring more guns into the neighborhood.”
- “I was more concerned that calling would bring harm on my neighbors rather than help.”
- “I am afraid that the police will target the wrong person and harass citizens.”

Roughly one in ten people (9.3%) did not report because they assumed that someone else would call 911 and/or that others would have more accurate information regarding the incident. Diffusion of responsibility is reflected in the quotes below.

- "Assuming someone closer to the incident would."
- "I assume someone else will."
- "Someone with more worry and time on their hands in the neighborhood will likely call."
- "I know there is always someone more eager to report things and I don't want to clog up 911."
- "Assume that a lot of other people have called."
- "I know my neighbors are really good about calling in to report if they hear gunshots."

Other reasons for not calling 911 include:

- Desensitization/apathy (5.7%) - "Gunshots are a regular occurrence in my neighborhood", "I feel like it happens so frequently that you just get used to hearing the sounds", "I don't give a shit, let the tweekers kill each other"
- It was already reported (5.5%) - "We heard sirens", "I checked Nextdoor.com and it was already reported by a neighbor", "We knew are neighbor was calling 911"
- Generic distrust of the police (2.9%) - "No trust in Portland Police", "I don't trust the PPB", "ACAB"
- Distrust of other governmental officials (1.1%) - "Why bother? Even if the shooter is arrested, they will likely be released and never face trial", "The lack of prosecution in this county would render the effort fruitless"

RQ 3 – Are Women, Older People, and Minorities More Likely to Report Gunshots?

Bivariate associations between the available demographic variables (e.g., sex, age, race, and ethnicity) and gunshot reporting are presented in Table 2. Starting with actual reporting, neither sex, age, nor ethnicity was associated with calling the police to report the most recently heard gunshot. Race was marginally associated with reporting [$\chi^2(1, N = 1{,}023) = 3.04$, $p = .08$], but the direction was the opposite of our hypothesis. Racial minorities as a group were more likely to call 911 than Whites (15.1% vs. 10.7% respectively). This pattern was consistent for all three racial groups with at least 25 respondents including Asian-alone (24.1%), Black/African-American-alone (14.7%), and Multi-racial/Other (13.0%). Age was the only factor associated

with calling the police in the hypothetical reporting situation [$\chi^2(2, N = 179) = 21.57, p < .001$]. People aged 55 or older were nearly three times more likely to say they would call 911 if they heard a gunshot as compared to people aged 18 to 34 (70.0% vs. 25.0%).

Two multivariate logistic regressions were conducted to assess the relationship between demographic factors and reporting while holding constant all of the other predictor variables under consideration. One analysis examined reporting the most recently heard gunshot and the other sought to predict reporting in the hypothetical scenario. Sample type (*Open* vs. *Random*) was entered as a control variable. As shown in Table 3, sex, age, race, and ethnicity were not predictive ($p < .05$) of reporting gunshots in either the real or hypothetical scenario when controlling for other variables in the models.

RQ 4 – Does Reporting Decline with Repeated Exposure to Gunfire?

The next analysis tested whether repeated exposure to gunfire in one's neighborhood might lead to a decreased likelihood of reporting (i.e., desensitization). As shown in Table 2, our bivariate findings suggest the opposite: people were more likely to call 911 for the most recent firearm discharge when they heard six or more incidents of gunfire in the past 12 months [$\chi^2(2, N = 1{,}056) = 7.54, p = .008$]. The significant association between exposure and reporting was not sustained in the multivariate model (see Table 3), suggesting that the initial bivariate relationship might be attributable to other factors. In particular, there was a strong correlation between the number of times gunshots were heard in one's neighborhood and the frequency of worrying about gun violence ($r = .47, p < .001$).

RQ 5 – Is Reporting Positively Associated with Trust in the Police?

Consistent with our hypothesis, people who had greater confidence and trust in the police were more likely to have called 911 to report the most recent gunshot heard in their

neighborhood [$\chi^2(2, N = 1{,}055) = 30.67$, $p < .001$; see Table 2]. Trust was similarly associated with the likelihood of reporting gunfire in the hypothetical scenario [$\chi^2(2, N = 184) = 47.35$, $p < .001$]. As shown in Table 3, trust was a significant predictor in both multivariate regression models. For example, high trust in the police, compared to very low trust, increased the odds of actual reporting by a factor of 6.07 (95% CI = 2.72 to 13.54) and hypothetical reporting by a factor of 12.11 (3.36 to 43.71).

RQ 6 – Is Reporting Positively Associated with Safety Concerns?

As expected, people who worried more frequently about gun violence in their neighborhood were more likely to report the most recent gunfire they heard [$F(1, 1{,}054) = 26.44$, $p < .001$] or a hypothetical firearm discharge [$F(1, 182) = 11.57$, $p < .001$; see Table 2]. Likewise, people who felt less safe walking alone in their neighborhood were more likely to report the most recent incident heard [$F(1, 1{,}052) = 21.63$, $p < .001$] or the hypothetical situation [$F(1, 182) = 5.14$, $p = .025$]. In the multivariate models only the former variable, frequency of worrying about gun violence, was independently associated with hypothetical reporting ($p < .05$). Worry was marginally associated with actual reporting ($p = .064$).

RQ 7 – Would Use of GDT Suppress Citizen Reporting?

Our final analysis assessed what impact GDT might have on citizen reporting. Three-quarters of the respondents (76.3%) said that the use of GDT in their neighborhood would have no impact on whether they called 911 to report a gunshot. The remaining participants said that they would be *less* likely to call 911 (20.1%) or *more* likely (3.7%).

Discussion

A major argument in favor of GDT is that shootings in metropolitan areas are vastly underreported by residents (Carr & Doleac, 2016; Huebner et al., 2022; Irvin-Erickson et al.,

2017; Rhenda & Zang, 2019). One limitation of these studies is that citizen reporting may be suppressed when people know or believe their residence is covered by GDT (Mares & Blackburn, 2021; Piza et al., 2023c). This highlights the need for alternative methodologies for researching gunshot reporting, something that the current study addressed using a large community survey. The current research also explored the reasons people gave for not calling the police when they heard a gunshot in their neighborhood. A better understanding of this decision-making process could help cities develop alternative strategies for documenting gunfire, which in turn could benefit efforts to reduce gun violence.

Reporting Prevalence

In the current study, nearly nine out of ten people heard at least one gunshot in their neighborhood over the past 12 months. Our sampling procedure, which targeted residents in neighborhoods with above-average rates for validated shootings, helps to explain this high level of exposure to gunfire. As for reporting these incidents to the police, we found that the vast majority of respondents (88.5%) did not call 911 to document the most recent gunshot they heard. Among the minority of respondents who denied hearing recent gunfire, more than one-half said they would not call the police if they did hear a gunshot in their neighborhood. These findings, using an alternative methodology and conducted in a city that was not currently using GDT, further substantiate underreporting as a significant problem when it comes to the accuracy of data generated from police CFS.

A major impediment to citizens reporting gunshots in the current study was ambiguity. Our qualitative data revealed that roughly one-half of the respondents who heard a gunshot and did not call the police attributed their decision to uncertainty about the nature of the sound, the direction it came from, and/or whether it involved criminal activity. In this context, people may

default to letting others report the incident, believing they will have better information to share with emergency dispatchers. Ambiguity plays a similar role in the so-called bystander effect, where the odds of intervening to help a person are decreased if other witnesses are unresponsive (Fischer et al., 2011). Presumably, inaction by others increases uncertainty about the nature of the conflict and whether aid is needed. Galvin and Safer-Lichtenstein (2018) report a similar finding for third-party reporting of violent crimes. People in their study were more likely to call the police when a criminal incident involved heightened violence (e.g., use of a weapon, injury to the victim). The authors attribute this to witnesses being less certain about the nature of a conflict when it involves less serious acts of aggression.

The calculus for reporting gunshots may also be impacted by the perceived costs associated with contacting the police. In the current sample, nearly one-third of the people who decided against reporting the most recent gunshot attributed their decision to the perceived hassle and ineffectiveness of the city's emergency dispatch system. This cynicism was often based on the respondent's prior experiences communicating with the police. Unfortunately, these opinions are consistent with local dispatch data. The waiting period for dispatching an officer for a "shots fired" call increased from 1.9 minutes in 2019 to 14.8 minutes in 2023. This has resulted in part from an increased call load (+174.0% for "shots fired") and decreased availability of officers in the study location.

Our qualitative analysis identified two other factors that meaningfully contributed to the underreporting of gunshots in this community. First, roughly one in ten respondents who heard a gunshot and did not report it believed that police intervention might do more harm than good. Of particular concern was the potential impact of additional policing on people of color, those who were houseless, and people suffering from mental illness. Similar concerns have been discussed

in other academic studies (e.g., Chu, Pezzella, & Evans, 2023). Second, one in ten non-reporters believed that other people would call 911. This illustrates the concept of *diffusion of responsibility* (Latane´ & Darley, 1970; Latane´ & Nida, 1981), wherein the likelihood that an individual intervenes in a crisis decreases with the number of other people present. In the case of gunshots, the count of people hearing the sound could easily number in the hundreds depending on population density, weapon caliber, the number of shots fired, and other factors impacting the ballistic soundwave. Complicating this is the reality that many people calling 911 at the same time to report the same gunshot might overwhelm the dispatch system, a concern voiced by some of the survey respondents.

Correlates of Gunshot Reporting

A second goal of the current study was to identify individual-level correlates of reporting a gunshot, either a real incident or a hypothetical scenario if the respondent did not hear any firearm discharges over the past year. Starting with demographic factors and looking at just the multivariate findings, no differences were seen as a function of the respondents' sex, age, race, or ethnicity. This stands in contrast to many studies in the broader crime reporting literature where older, female, and Black victims are more likely to contact the police (e.g., Hart & Rennison, 2003; Langton, et al., 2012; Skogan, 1984; Watkins, 2005; Xie & Baumer, 2019). These are not universal findings, however, (e.g., Rengifo et al., 2019; see also Linning & Barnes, 2022) suggesting that the relationship between personal characteristics and a willingness to contact the police may interact with a host of other factors. This includes the possibility of varied findings based on research design and measurement. The current study, for example, found that reporting in a hypothetical scenario (45.1%) was much higher than when people heard what they believed was a real gunshot (11.5%).

Worry about firearm victimization and more general perceptions of neighborhood safety were the next correlates examined in association with calling 911 to report gunshots. We hypothesized that people would be more likely to call the police if they felt unsafe in their neighborhood or worried frequently about gun violence. The findings of our multivariate analysis supported the latter hypothesis but not the former. We attribute this to the direct association between our measure of worry and the specific threat addressed in this research: gun violence. Respondents were asked how often they worry about being the victim of gun violence or people they know being victimized, whereas our measure of perceived safety was non-specific regarding the threat involved (e.g., "How safe would you feel walking alone in your neighborhood?"). Outside of fear of reprisal, which is believed to suppress crime reporting (Hart & Rennison, 2003; Langton et al., 2012; Skogan, 1984; Zaykowski et al., 2019), there has been surprisingly little research assessing the effect of perceived safety on third-party crime reporting. One exception to this is Linning and Barnes' (2022) finding that third parties were more likely to report a crime to the police if they had been previously victimized. The underlying mechanism accounting for this association might be trauma, which is often associated with increased anxiety, worry, and intrusive thoughts regarding victimization (McCann et al., 1988).

Another factor we examined was the frequency of exposure to gunfire. We hypothesized that people who were repeatedly exposed to firearm discharges in their neighborhood would become desensitized and not contact the police. Contrary to our hypothesis, our multivariate analysis found no difference between those who heard gunfire six or more times during the preceding 12 months and those who were exposed to a single discharge. If anything, the evidence from the bivariate analysis suggests the association between exposure frequency and reporting is reversed - that people are more likely to report gunshots when they are repeatedly

exposed to these events. Future studies should explore the possibility that exposure frequency positively impacts reporting by increasing fear of victimization.

Finally, we hypothesized that people would be more likely to report gunshots if they had higher trust in the police. This hypothesis is consistent with a large body of scholarship showing that people are more willing to cooperate in crime control, including crime reporting, when the police are perceived as legitimate and trustworthy (Sunshine & Tyler, 2003). As predicted, people in our sample who had higher trust in the local police were significantly more likely to report a real or hypothetical gunshot than people with very low trust. The influence of distrust, along with the perceived inefficiency and ineffectiveness of the local police in responding to CFS were also evident in the qualitative data generated from the survey. Nevertheless, our findings conflict with a recent study that found no association between confidence in the police and third-party crime reporting (Linning & Barnes; 2022). One explanation is that measurement differences account for these contradictory outcomes. As noted by Xie and Baumer (2019), public attitudes toward police are multidimensional and the operationalizations used in a given study are likely to impact the findings. Another possibility is that the different communities involved in these studies complicate direct comparisons. Confidence in the police was quite high in Linning and Barnes' (2022) study and it was very low in our Portland sample. Distrust in this context may overwhelm other considerations that would normally impact reporting.

Limitations

Several limitations of the current study are worth noting. First, the generalizability of our findings to other municipalities remains in question. Portland's political and criminological context, the procedures used in selecting the target neighborhoods, administration of the survey before GDT was implemented, and media coverage during public deliberations about this

technology may have impacted how people responded to our questions. Second, the response rate for the *Random* sample was less than ideal (10%). Unfortunately, we are not alone in this regard. Survey response rates have been declining for decades (Couper, 2017; Daikeler et al., 2020; Stedman et al. 2019) and it is not unusual to see rates for similar topics fall below 30% (e.g., Crow et al., 2017; Lawrence et al., 2023; Merola & Lum, 2014; Nader et al., 2023). Third, our decision to combine the *Open* and *Random* samples might have introduced additional bias. Portland has a well-documented history of conflict between activist groups and the local police. Recruiting survey participants via the City Council, the approach for the *Open* sample, may have led to the overrepresentation of those opposing GDT and other policing initiatives (see Henning, Carmony, & Peterson, 2024). As we noted earlier, however, the pattern of findings was consistent across samples and we controlled for the sample type in the multivariate analysis. Fourth, relative to the city's Census data, our sample underrepresented people of color and younger residents. The underrepresentation of racial and ethnic minorities in survey research is again not unique to our study - a similar pattern is reported in several of the published works addressing related public safety topics (e.g., Heen, Lieberman and Miethe, 2018; Kopp and Gardiner, 2021; Nelson et al., 2019; Sakiyama et al. 2017). The fact that demographics were largely unrelated to reporting gunshots in the present study hopefully mitigates the impact of this issue.

Finally, we acknowledge the possibility that people's explanations for not reporting the most recent gunshot might have been impacted by socially desirable responding, demand characteristics, or post-hoc interpreting on the part of the respondents. Similarly, we note the apparent contradiction between people answering "yes" to hearing a gunshot in the past 12 months and then saying they did not report the incident because they were uncertain about the

nature of the sound. Some of these respondents might have been initially uncertain about the sound, hence no call to the police, but later they learned that it was a real gunshot via a news report, social media, or other indicators (e.g., sirens, the arrival of officers). In these cases, answering "yes" to hearing a gunshot was valid. All of this speaks to the importance of additional research on this topic and alternative strategies for documenting the decision-making process when it comes to reporting firearm discharges (or not).

Conclusion

The effectiveness of our criminal justice system is heavily dependent on knowing when and where crimes happen, data that is largely generated by victims and third-party reporters who contact their local law enforcement agency (Galvin & Safer-Lichtenstein, 2018; Xie & Baumer, 2019). Unfortunately, not everyone is willing to call the police when they learn that a crime has or may have occurred. This can lead to tragic consequences when the incident involves firearm-related violence. Even slight delays in reporting gunshots are critical. A shooting victim's risk for mortality rises substantially with every minute that emergency responders are delayed (Hatten & Wolff, 2020; Poulson et al., 2023). Within this context, GDT could provide important advantages to law enforcement agencies. Studies, including the current research, find that the majority of firearm discharges in large cities go unreported by members of the public. GDT is capable of detecting many of these undocumented incidents and facilitating the arrival of emergency responders.

GDT may have unintended consequences, however, that should be considered before cities invest in this expensive technology. One concern, substantiated in the current study, is that the use of GDT will further suppress citizen reporting. Residents, including those in areas not covered by the system, might assume that calling the police when they hear a gunshot is no

longer necessary (Piza et al., 2023c; Mares & Blackburn, 2021). Another concern is that using surveillance technologies like GDT will impact residents' trust in their local law enforcement (Henning, Carmony & Peterson, 2024). This could lead to further reductions in citizen reporting, as suggested by the negative association between trust and reporting in the present research. The high volume of alerts generated by GDT presents a third challenge. Studies have shown that the vast majority of these incidents do not involve a violent crime or injury (Mares & Blackburn, 2012, 2021; Ratcliffe, et. al., 2018), potentially overwhelming emergency responders with false alerts. By contrast, citizen-reported gunshots are more likely to involve a valid criminal offense, perhaps because people access multiple sources of information as opposed to relying solely on the sound of the initial gunshot (Mares & Blackburn, 2012).

It seems prudent, therefore, for cities to consider alternative strategies for increasing citizen reporting of firearm discharges. One of the strongest factors associated with non-reporting in the current study was distrust of the local police. Improving police-community relations in neighborhoods marked by high gun violence could lead to more accurate data on gunshots. The qualitative data collected in the current study also highlighted the role of uncertainty and diffusion of responsibility as obstacles to reporting. This might be addressed via public education, something akin to the U.S. Department of Homeland Security's popular "See Something – Say Something" campaign (Galvin & Safer-Lichtenstein, 2018; Haner et al., 2022). Finally, people in our study were often discouraged from calling 911 due to perceived hassles in communicating with dispatchers and the belief that officers would not be dispatched or dispatched in time to make a difference. Providing citizens with a user-friendly mechanism for reporting gunshots and ensuring there is sufficient staffing to respond to these reports might be a better option or first step for some communities.

References

Beattie, G., Cohan, C., Brooke, M., Kaplanes, S., & Victorino, G. P. (2020). Automatic acoustic gunshot sensor technology's impact on trauma care. *The American Journal of Emergency Medicine*, *38*(7), 1340–1345. https://doi.org/10.1016/j.ajem.2019.10.042

Braga, A. A. (2022). Gun violence is a public health crisis that needs more applied criminologists. *Criminology & Public Policy*, *21*(4), 811–837.

Brooke, M. A., Kaplanes, S., & Victorino, G. P. (2017). Automatic acoustic gunshot sensor technology's impact on trauma care. *Journal of the American College of Surgeons, 225*(4), S50–S51.

Carr, J., & Doleac, J. L. (2016). The geography, incidence, and underreporting of gun violence: New evidence using ShotSpotter data. (April 26, 2016). SSRN. https://dx.doi.org/10.2139/ssrn.2770506

Choi, K.-S., Librett, M., & Collins, T. J. (2014). An empirical evaluation: Gunshot detection system and its effectiveness on police practices. *Police Practice and Research*, *15*(1), 48–61.

Chu, S. P., Pezzella, F. S., & Evans, J. D. (2023). Surveillance load: A burden of search borne by Black and Brown bodies. *Critical Criminology*, *31*, 451-466.

Connealy, N. T., Piza, E. L., Arietti, R. A., Mohler, G. O., & Carter, J. G. (2024). Staggered deployment of gunshot detection technology in Chicago, IL: A matched quasi-experiment of gun violence outcomes. *Journal of Experimental Criminology*. https://doi.org/10.1007/s11292-024-09617-w

Cook, P., & Soliman, A. (2024). *Evaluation of Durham's ShotSpotter installation: Results of a 12-month pilot project*. Wilson Center for Science and Justice at Duke Law.

Couper, M. P. (2017). New developments in survey data collection. *Annual Review of Sociology 43*(1), 121–145.

Crow, M. S., Snyder, J. A., Crichlow, V. J., & Smykla, J. O. (2017). Community perceptions of police body-worn cameras: The impact of views on fairness, fear, performance, and privacy. *Criminal Justice and Behavior*, *44*(4), 589–610.

Daikeler, J., Bošnjak, M., & Manfreda, K. (2020). Web versus other survey modes: An updated and extended meta-analysis comparing response rates. *Journal of Survey Statistics and Methodology, 8*(3): 513–539.

Doucette, M. L., Green, C., Necci Dineen, J., Shapiro, D., & Raissian, K. M. (2021). Impact of ShotSpotter technology on firearm homicides and arrests among large metropolitan counties: A longitudinal analysis, 1999–2016. *Journal of Urban Health*, *98*(5), 609–621.

Fischer, P., Krueger, J. I., Greitemeyer, T., Vogrincic, C., Kastenmüller, A., Frey, D., Heene, M., Wicher, M., & Kainbacher, M. (2011). The bystander-effect: A meta-analytic review on bystander intervention in dangerous and non-dangerous emergencies. *Psychological Bulletin*, *137*(4), 517–537.

Galvin, M. A., & Safer-Lichtenstein, A. (2018). Same question, different answers: Theorizing victim and third party decisions to report crime to the police. *Justice Quarterly*, *35*(6), 1073–1104.

Goldenberg, A., Rattigan, D., Dalton, M., Gaughan, J. P., Thomson, J. S., Remick, K., Butts, C., & Hazelton, J. P. (2019). Use of ShotSpotter detection technology decreases prehospital time for patients sustaining gunshot wounds. *Journal of Trauma and Acute Care Surgery, 87*(6), 1253–1259.

Haner, M., Sloan, M. M., Pickett, J. T., & Cullen, F. T. (2022). When do Americans "see something, say something"? Experimental evidence on the willingness to report terrorist activity. *Justice Quarterly*, *39*(5), 1079–1103.

Hart, T. C., & Rennison, C. M. (2003). *Reporting crime to the police, 1992-2000*. US Department of Justice, Office of Justice Programs.

Hatten, D. N., & Wolff, K. T. (2020). Rushing gunshot victims to trauma care: The influence of first responders and the challenge of the geography. *Homicide Studies*, *24*(4), 377–397.

Heen, M. SJ., Lieberman, J. D., & Miethe, T. D. (2018). The thin blue line meets the big blue sky: Perceptions of police legitimacy and public attitudes towards aerial drones. *Criminal Justice Studies*, *31*(1), 18–37.

Henning, K., Carmony, J., & Peterson, C. (2024). Public support for gunshot detection technology. *Security Journal*, https://doi.org/10.1057/s41284-024-00434-4

Hipple, N. K. (2022). Towards a national definition and database for nonfatal shooting incidents. *Journal of Urban Health*, *99*(3), 361–372.

Huebner, B. M., Lentz, T. S., & Schafer, J. A. (2022). Heard shots–call the police? An examination of citizen responses to gunfire. *Justice Quarterly, 39*(4), 673-696.

Irvin-Erickson, Y., La Vigne, N., Levine, N., Tiry, E., & Bieler, S. (2017). What does gunshot detection technology tell us about gun violence? *Applied Geography*, *86*, 262–273.

Kopp, P. M., & Gardiner, C. L. (2021). Public support for body-worn cameras: The need for inclusion of more comprehensive measures of public concerns. *Criminal Justice Studies, 34*(3), 289–305.

Langton, L., Berzofsky, M., Krebs, C., & Smiley-McDonald, H. (2012). *Victimizations Not Reported to the Police, 2006-2010*. U.S. Department of Justice, Office of Justice Programs.

Latane´, B., & Darley, J. M. (1970). *The unresponsive bystander: Why doesn't he help?* New York: Appleton-Century-Croft.

Latane´, B., & Nida, S. (1981). Ten years of research on group size and helping. *Psychological Bulletin*, *89*(2), 308 –324.

Lawrence, D. S., La Vigne, N. G., Goff, M., & Thompson, P. S. (2018). Lessons Learned Implementing Gunshot Detection Technology: Results of a Process Evaluation in Three Major Cities. *Justice Evaluation Journal*, *1*(2), 109–129.

Lawrence, T., Mcfield, A., & Freeman, K. (2023). Understanding the role of race and procedural justice on the support for police body-worn cameras and reporting crime. *Criminal Justice Review, 48*(1), 48–68.

Linning, S. J., & Barnes, J. C. (2022). Third-party crime reporting: Examining the effects of perceived social cohesion and confidence in police effectiveness. *Journal of Crime and Justice*, *45*(1), 39–54.

Maher, R. C. (2007, April). Acoustical characterization of gunshots. In *2007 IEEE Workshop on Signal Processing Applications for Public Security and Forensics* (pp. 1-5). IEEE.

Mares, D. (2022). *Gunshot detection: Reducing gunfire through acoustic technology*. Problem-Oriented Guides for Police.

Mares, D., & Blackburn, E. (2012). Evaluating the effectiveness of an acoustic gunshot location system in St. Louis, MO. *Policing*, *6*(1), 26–42.

Mares, D., & Blackburn, E. (2021). Acoustic gunshot detection systems: A quasi-experimental evaluation in St. Louis, MO. *Journal of Experimental Criminology*, *17*(2), 193–215.

Mazeika, D. (2022). The effect of unreported gun-related violent crime on crime hot spots. *Security Journal*, *36*(1), 101–117.

Mazerolle, L. G., Watkins, C., Rogan, D., & Frank, J. (1998). using gunshot detection systems in police departments: The impact on police response times and officer workloads. *Police Quarterly*, *1*(2), 21–49.

McCann, I. L., Sakheim, D. K., & Abrahamson, D. J. (1988). Trauma and victimization: A model of psychological adaptation. *The Counseling Psychologist*, *16*(4), 531–594.

Merola, L. M., & Lum, C. (2014). Predicting public support for the use of license plate recognition technology by police. *Police Practice and Research*, *15*(5), 373–388.

Nader, E., Wasileski, G., & Poteyeva, M. (2023). Community perceptions, concerns for privacy, and support for law enforcement use of aerial surveillance in Baltimore. *Crime & Delinquency*, 00111287231189720. https://doi.org/10.1177/00111287231189720

Nelson, J., Grubesic, T., Wallace, D., & Chamberlain, A. (2019). The view from above: A survey of the public's perception of unmanned aerial vehicles and privacy. *Journal of Urban Technology, 26*(1), 83–105.

Pew Research Center. (2022). *What the data says about gun deaths in the U.S.* Retrieved April 1, 2024, from https://www.pewresearch.org/short-reads/2023/04/26/what-the-data-says-about-gun-deaths-in-the-u-s/

Piza, E. L., Arietti, R. A., Carter, J. G., & Mohler, G. O. (2023a). The effect of gunshot detection technology on evidence collection and case clearance in Kansas City, Missouri. *Journal of Experimental Criminology*. https://doi.org/10.1007/s11292-023-09594-6

Piza, E. L., Hatten, D. N., Carter, J. G., Baughman, J. H., & Mohler, G. O. (2023b). Gunshot detection technology time savings and spatial precision: An exploratory analysis in Kansas City. Policing: A Journal of Policy and Practice 17, paac097. https://doi.org/10.1093/police/paac097

Piza, E. L., Hatten, D. N., Mohler, G. O., Carter, J. G., & Cho, J. (2023c). Gunshot detection technology effect on gun violence in Kansas City, Missouri: A microsynthetic control evaluation. *Criminology & Public Policy*, 1745-9133.12648. https://doi.org/10.1111/1745-9133.12648

Poulson, M., Jay, J., Kenzik, K., Torres, C., Sanchez, S. E., Saillant, N., Holena, D., Galea, S., & Scantling, D. (2023). Death by the minute: Inequities in trauma care for victims of firearm violence. *Journal of Trauma and Acute Care Surgery*, 10–1097.

Ratcliffe, J. H., Lattanzio, M., Kikuchi, G., & Thomas, K. (2018). A partially randomized field experiment on the effect of an acoustic gunshot detection system on police incident reports. *Journal of Experimental Criminology*, *15*(1), 67–76.

Renda, W., & Zhang, C. H. (2019). Comparative analysis of firearm discharge recorded by gunshot detection technology and calls for service in Louisville, Kentucky. *ISPRS International Journal of Geo-Information, 8*(6), 275. https://doi.org/10.3390/ijgi8060275

Rengifo, A. F., Slocum, L. A., & Chillar, V. (2019). From impressions to intentions: Direct and indirect effects of police contact on willingness to report crimes to law enforcement. *Journal of Research in Crime and Delinquency*, *56*(3), 412–450.

Sakiyama, M., Miethe, T. D., Lieberman, J. D., Heen, M. S. J., & Tuttle, O. (2017). Big hover or big brother? Public attitudes about drone usage in domestic policing activities. *Security Journal*, *30*(4), 1027–1044.

Skogan, W. G. (1984). Reporting crimes to the police: The status of world research. *Journal of Research in Crime and Delinquency*, *21*(2), 113–137.

Stedman, R., Connelly, N., Heberlein, T., Decker, D. & Allred, S. (2019). The end of the (research) world as we know it? Understanding and coping with declining response rates to mail surveys." *Society & Natural Resources*, *32*(10), 1139–1154.

Sunshine, J., & Tyler, T. R. (2003). The role of procedural justice and legitimacy in shaping public support for policing. *Law & Society Review*, *37*(3), 513–548.

Watkins, A. M. (2005). Examining the disparity between juvenile and adult victims in notifying the police: a study of mediating variables. *Journal of Research in Crime and Delinquency*, *42*(3), 333–353.

Watkins, C., Green Mazerolle, L., Rogan, D., & Frank, J. (2002). Technological approaches to controlling random gunfire: Results of a gunshot detection system field test. *Policing: An International Journal of Police Strategies & Management*, *25*(2), 345–370.

Xie, M., & Baumer, E. P. (2019). Crime Victims' Decisions to Call the Police: Past Research and New Directions. *Annual Review of Criminology*, *2*(1), 217–240.

Xie, M., Ortiz Solis, V., & Chauhan, P. (2023). Declining trends in crime reporting and victims' trust of police in the United States and major metropolitan areas in the 21st century. *Journal of Contemporary Criminal Justice*. https://doi.org/10.1177/10439862231190212

Zaykowski, H., Allain, E. C., & Campagna, L. M. (2019). Examining the paradox of crime reporting: Are disadvantaged victims more likely to report to the police? *Law & Society Review*, *53*(4), 1305–1340.

Table 1. Demographic Characteristics of the Samples.

		Sample		
	Combined % or M(SD)	*Open* (N = 325)[a] % or M(SD)	*Random* (N = 915)[a] % or M(SD)	F or χ^2
Sex				1.43
Female	52.5%	55.4%	51.5%	
Male	47.5%	44.6%	48.5%	
Age				26.63***
18 to 34	20.1%	21.1%	19.7%	
35 to 54	54.1%	63.7%	50.7%	
55 or older	25.8%	15.1%	29.6%	
Race				.15
White-alone	81.5%	80.8%	81.8%	
Minority	18.5%	19.2%	18.2%	
Ethnicity				.23
Non-Hispanic	92.0%	92.7%	91.8%	
Hispanic/Latino	8.0%	7.3%	8.2%	

[a] Sample size varies slightly by comparison due to missing values.
*$p < .05$, **$p < .01$, ***$p < .001$.

Table 2. Predictors of Actual and Hypothetical Gunshot Reporting.

	Reported Most Recent Gunshot[a]			Would Report Gunshot if Heard[b]		
	No	**Yes**		**No**	**Yes**	
Variables	%/M(SD)	%/M(SD)	F or χ^2	%/M(SD)	%/M(SD)	F or χ^2
Sex			0.01			1.45
Female	88.3%	11.7%		59.0%	41.0%	
Male	88.4%	11.6%		50.0%	50.0%	
Age			0.99			21.57***
18 to 34	90.4%	9.6%		75.0%	25.0%	
35 to 54	88.2%	11.8%		54.8%	45.2%	
55 or older	87.5%	12.5%		30.0%	70.0%	
Race			3.04			0.47
White-alone	89.3%	10.7%		53.2%	46.8%	
Minority	84.9%	15.1%		60.9%	39.1%	
Ethnicity			0.63			0.23
Non-Hispanic	88.1%	11.9%		53.8%	46.2%	
Hispanic/Latino	90.9%	9.1%		62.5%	37.5%	
Gunshots Heard Past Year			7.54*			
Once	92.8%	7.2%				
2 to 5 times	89.9%	10.1%				
6 or more times	85.7%	14.3%				
Trust in the Police			30.67***			47.35***
Very low	96.7%	3.3%		86.8%	13.2%	
Low to moderate	86.8%	13.2%		41.8%	58.2%	
High	82.2%	17.8%		24.3%	75.7%	
Worry About Gun Violence	1.61 (0.96)	2.10 (1.06)	26.44***	0.58 (0.69)	.98 (0.89)	11.57***
Safety Concerns	1.49 (1.02)	1.95 (1.05)	21.63***	0.89 (1.03)	1.21 (0.84)	5.14*

[a] Limited to respondents who heard at least one gunshot in their neighborhood (max n = 1,056).
[b] Limited to respondents who did not hear a gunshot in their neighborhood (max n = 184).
*$p < .05$, **$p < .01$, ***$p < .001$.

Table 3. Multivariate Logistic Regression Predicting Actual and Hypothetical Gunshot Reporting.

	Reported Most Recent Gunshot[a]			Would Report Gunshot if Heard[b]		
Variables (reference)	*B*	SE	Odds	*B*	SE	Odds
Random Sample (Open)	-0.47*	0.23	0.62	1.19*	0.53	3.29
Male (Female)	0.00	0.21	1.00	0.59	0.38	1.81
Age (55+)						
18 to 34	0.06	0.35	1.06	-0.91	0.56	0.40
35 to 54	0.24	0.24	1.28	-0.21	0.46	0.81
Minority (White-alone)	0.40	0.25	1.50	-0.44	0.61	0.64
Hispanic (Non-Hispanic)	-0.75	0.44	0.47	0.96	0.98	2.62
Gunshots Heard (Once)						
2 to 5 times	0.22	0.37	1.24			
6 or more times	0.35	0.37	1.41			
Trust in Police (Very low)						
Low to moderate	1.47***	0.38	4.34	1.84***	0.51	6.27
High	1.80***	0.41	6.07	2.49***	0.65	12.11
Worry About Gun Violence	0.24+	0.13	1.27	0.57*	0.27	1.77
Safety Concerns	0.16	0.12	1.17	-0.10	0.22	.91
Intercept	-3.52	0.67	0.03	-3.20	1.17	0.04
Model Summary						
χ^2		63.54***			65.97***	
Nagelkerke R^2		.12			.42	

[a] Limited to respondents who heard at least one gunshot in their neighborhood (n = 1,002).
[b] Limited to respondents who did not hear a gunshot in their neighborhood (n = 173).
*$p < .05$, **$p < .01$, ***$p < .001$; +$p = .064$.