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Citizens' reactions to hot spots policing: impacts on perceptions of crime, disorder, safety and police

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Abstract
Objectives We explore whether the use of foot patrol, problem-oriented policing and offender-focused policing at violent crime hot spots negatively impacted the community's perceptions of crime and disorder, perceived safety, satisfaction with police and their perceptions of procedural justice.
Methods We report on a repeated cross-sectional survey that was mailed before and after the deployment of concentrated police interventions in 60 small areas of Philadelphia, PA, as part of the Philadelphia Policing Tactics Experiment. Eighty-one violent crime hot spots were randomly allocated to one of three treatments (20 each), or to a control assignment (21). Impacts on the community via seven scales were analyzed using OLS models with orthogonal contrast-coded treatment variables and demographic covariates.
Results The OLS models estimating changes in the community's opinions from pre- to post-intervention uncovered no statistically significant changes on any of the dependent variables relative to control locations, irrespective of the treatment type. Even though one experimental treatment condition (offender-focused) reported statistically significant violent crime reductions, the police activity that generated the crime reduction did not noticeably change community perceptions of crime and disorder, perceived safety, satisfaction with police or procedural justice.
Conclusions As implemented in Philadelphia, none of the policing tactics had measurable changes in resident perception within the communities that were targeted. The results do not support the suggestion that hot spots policing negatively impacts the community. At the same time, no positive benefits were generated.

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> "We believe that further research on community reactions to hot spots policing programs is still sorely needed… we need to know more about the effects of hot spots policing approaches on the communities that the police serve" (Braga et al. 2014: 659).

Introduction

In recent years, there have been at least two significant policy statements supporting hot spots policing. Mastrofski et al. (2010) argued that hot spots policing is sufficiently supported by scientific evidence to justify a major program of implementation and evaluation. They called on the National Institute of Justice to fund this program, which, they surmised, would "fundamentally restructure urban policing" (p. 251). Likewise, Durlauf and Nagin (2011) argued that crime, levels of incarceration and corrections costs could all be reduced if policy makers shifted resources away from corrections and imprisonment and into policing. The authors suggested that a move away from severity-based policies (for example, increased prison sentences or mandatory minimum sentences) to certainty-based policies (such as hot spots policing) was justified considering the growing body of evidence supporting the effectiveness of hot spots policing in reducing crime (Braga 2005, 2007; Braga et al. 2014), and the relatively weaker evidence-base suggesting that increasingly severe punishments produced meaningful crime reductions.

This solid evidential foundation for crime reduction notwithstanding, there remain a number of critiques of hot spots policing. These concerns include the possibility that hot spots policing might: (1) increase perceptions of crime and disorder; (2) decrease perceptions of safety; and (3) reduce perceptions of procedural justice and satisfaction with police (Kochel 2011; Rosenbaum 2006). In light of the recent attention given to hot spots policing and calls for increases in funding and implementation, these concerns are not trivial and deserve further consideration. The current article empirically assesses these possible "backfire effects" of hot spots policing (Weisburd et al. 2011: 297). We report on the results of a mail-based pre-/post-intervention community survey administered as part of the Philadelphia Policing Tactics Experiment (Groff et al. 2015). This experiment tested the crime reduction impact of three strategies across 81 violent crime hot spots in the city of Philadelphia: (1) foot patrol; (2) problem-oriented policing; and (3) offender-focused policing. Here, we report on the community survey component of this evaluation (and the reader is referred to the Groff et al. (2015) paper for further details of the experiment).

Support for hot spots policing

Since the 1990s, support for focusing police resources in small, high crime locations, or "hot spots," has been steadily increasing. Hot spots policing—the idea that police can

most efficiently reduce crime if efforts are concentrated at the highest crime locations—is rooted in Sherman et al.'s (1989) seminal finding that only 3 % of addresses in Minneapolis (MN) accounted for nearly 50 % of the calls for police service. Sherman and Weisburd (1995) later tested the crime reduction benefits of increasing patrols at these hot spots, and found that, relative to 55 control locations receiving standard police patrols, the increased police presence in the 55 hot spots produced 6–13 % reductions in calls for service. Their finding that police could be effective when their efforts were geographically focused provided an alternative interpretation to the findings of police ineffectiveness when deployed using a random vehicle patrol pattern across police beats (Kelling et al. 1974).

A recent randomized trial in Philadelphia demonstrated that foot patrol in small, high-violent-crime places could reduce crime. Ratcliffe et al. (2011) reported that 240 recent police academy graduates patrolling about 16 h per day for 5 days a week over the summer of 2009 were successful in reducing violence by 23 % across 60 targeted hot spots relative to 60 control areas. These findings were contrary to existing research which indicated that foot patrol had no measureable impact on crime (Kelling 1981; Pate 1986). Once again, the key seemed to be patrolling in small, high-crime-concentration locations.

Besides evaluations of more traditional tactics such as vehicle or foot patrol, more innovative strategies have been the subject of hot spots evaluations. For example, Braga and Bond (2008) found that problem-oriented policing which focused on physical and social disorder reduced crime by a statistically significant 19.8 % in treatment locations relative to controls. When the crime data were disaggregated, statistically significant reductions in robbery (by about 42 %), non-domestic assault (by 34 %) and burglary (by 36 %) were found. In addition to the reductions in crime, Braga and Bond (2008) noted that both social and physical disorder were significantly reduced. In sum, reviews of the literature and systematic reviews consistently find crime reduction benefits for several policing strategies when employed at hot spots of crime (Braga 2005, 2007; Braga et al. 2014).

Critiques of hot spots policing

Despite the growing evidence base, a number of criticisms have been raised. These concerns are diverse, but we limit our focus here on the claims that hot spots policing could induce "backfire effects" on the community (Weisburd et al. 2011: 297). We explore three potential ways in which critics claim hot spots policing could potentially backfire: (1) increasing perceptions of crime and disorder; (2) decreasing perceived levels of safety; and (3) reducing perceptions of procedural justice and satisfaction with police.

Perceptions of safety, crime and disorder

The claims that hot spots policing could decrease feelings of safety is rooted in the notion that sudden increases in police activity will communicate to residents that crime and/or disorder has increased in their neighborhood, and manifest as a more fearful public. Rosenbaum (2006) argues that simply being labeled a crime hot spot will cause

residents to perceive their neighborhood more negatively and adversely impact feelings of safety within these communities. This is potentially problematic because, as Weisburd et al. (2011) have suggested, feeling less safe might cause residents to withdraw, informal social control to decline and, ultimately, result in more crime (Wilson and Kelling 1982). That being said, empirical studies suggest crime hot spots tend to be chronic problems (Braga et al. 2011; Weisburd et al. 2004), and it is likely that residents of crime hot spots are already aware of the high levels of crime in their community prior to the police increasing resources in these areas or labeling a location a hot spot[1]. If this were the case, engaging in hot spots policing could have no significant impact on perceptions of crime and disorder or make the community more fearful.

On the other hand, if police address visible signs of crime and/or social and physical disorder to the extent that the community is cognizant of these reductions, the perceived level of crime and disorder could decline, residents may feel more safe, social control could increase and a decline in future crime trajectories might occur.

Perceptions of procedural justice and satisfaction with police services

Another critique of hot spots policing is that it will cause a decline in the satisfaction with police services and perceptions of procedural justice (Kochel 2011; Rosenbaum 2006). This is particularly relevant to interventions which include aggressive enforcement, especially in cases where levels of police activity are greatly increased. In such cases, citizens may feel harassed and may perceive that they, their families, or their friends have been unfairly targeted, especially if they feel they were treated poorly (Brunson and Miller 2006; Gau and Brunson 2010). This could be problematic because hot spot policing often takes place in neighborhoods where levels of satisfaction with police are already likely to be low (Sampson and Bartusch 1998). If perceptions of procedural justice and satisfaction with police services are weakened, the ability of hot spots policing to affect long-term crime reductions is questionable (Weisburd et al. 2011). Public support for police is strategically vital in order to effectively control crime (Sunshine and Tyler 2003; Tyler and Fagan 2003). In cities such as Philadelphia, which is infamous for a street code of 'no snitching,' that is, not cooperating with police investigations (see Anderson 2000), decreases in perceptions of procedural justice and the straining of the police–community relationship run the risk of increasing this already pervasive attitude. As a result, citizens could become less likely to cooperate with police.

On the other hand, when the police treat citizens in a procedurally just manner, citizens have more positive views of the police during a given encounter and of the police overall (Mazerolle et al. 2013). Procedurally just treatment also leads to higher levels of police legitimacy, satisfaction and cooperation. So it appears that how people are treated during encounters with police has more of an impact on their opinions of police than simply increasing the number of police or police activity in a hot spot (Sunshine and Tyler 2003). If the police treat residents in a just and respectful manner during hot spots patrols, increases in citizen satisfaction and perceptions of procedural justice may result.

[1] We note that labeling an area as "high crime" may have legal ramifications, but these considerations are beyond the intended scope of this article (Ferguson 2011).

The current state of knowledge

To date, two studies suggest a link between hot spots policing and the possibility of backfire. Only one policing strategy, broken windows/disorder-based policing, has been found to elicit any sort of backfire, though this may certainly reflect the dearth of research in this area. Hinkle and Weisburd (2008) found that residents living within blocks subjected to broken windows-style policing during the Jersey City Displacement study felt less safe than those living on blocks that were not (Weisburd et al. 2006). Their analysis suggested that even when controlling for residents' perceptions prior to the intervention, which included intensive prostitution and drug enforcement, residents in the targeted locations reported higher levels of fear than those living in neighborhoods not subjected to the intervention. Based on these findings, the authors advised that aggressive disorder-focused patrols may cause residents to feel less safe, and the study offers a degree of support to critics who fear that hot spots policing may produce some undesirable side effects.

Weisburd et al. (2011) is the only evaluation to date which has explicitly measured how hot spots policing affected a random sample of residents residing in targeted areas under an experimental design. In their work, street segments across three Californian cities were subjected to an additional 3 h per week dosage of social and physical disorder-based policing for about 8 months. Review of police logs indicated that over the study period, police addressed 2,025 social and 1,293 physical disorder problems. Street block residents were surveyed before and following the treatment period and asked questions relating to their fear of crime/perceived risk, perceptions of police legitimacy, collective efficacy and perceptions of crime and disorder.

Unlike the findings in Hinkle and Weisburd's (2008) work, residents living in the targeted area were no more fearful than those living in the control locations following the intervention. Furthermore, they did not report meaningful changes in perceptions of police legitimacy, collective efficacy or levels of crime or social disorder; however, residents in target locations reported significantly higher perceptions of physical disorder compared to those living in control areas. This finding is indicative of backfire as a result of broken windows policing. Increasing disorder-based policing in hot spots increased the perceived level of physical disorder, perhaps due to the intervention's explicit focus on disorder. Yet, it did not elicit meaningful changes in perceived levels of perceived safety, police legitimacy, collective efficacy, crime or social disorder, indicating that concerns over backfire may be overstated.

In contrast to these studies indicating backfire, several evaluations have found that residents welcome increased police activity. For example, Shaw (1995) measured changes in the perceptions of community members living within one target and one comparison beat (Sherman and Rogan 1995). The target beat saw a 65 % increase in gun seizures and a 49 % reduction in gun crime. In contrast, the comparison beat saw a slight decline in gun seizures and a slight increase in gun crimes during the study period. Contrary to the claims of critics, Shaw (1995) reported that residents in the targeted beat supported the increased police activity, and, as measured by pre-and post-intervention community surveys, perceived a better quality of life in the beat after the experiment.

Braga and Bond (2008, 2009) interviewed a select group of key community members following a problem-solving effort in Lowell (MA). Residents perceived a

decline in physical and social disorder due to the intervention, yet reported no statistically significant differences in fear of crime or perceptions of police. Generalizing results from these interviews, however, is difficult because interviewees were chosen because they were especially likely to have interacted with police. Nevertheless, no support for the fears of critics was found through their analysis. Finally, Wood et al. (2013) discovered that many residents living in hot spots targeted during the Philadelphia Foot Patrol Experiment (Ratcliffe et al. 2011) reported to field researchers that they were supportive of the increased police presence. This seemed especially true for older residents, who appreciated the foot patrol officers because they were reminiscent of how policing was carried out before vehicle patrols became the predominant means of policing. Again, generalizing from this finding is difficult due to the study's design, yet these findings suggest that backfire is not inevitable, especially with a tactic such as foot patrol.

In sum, the current evidence suggests that backfire as a result of hot spots policing is not a certain outcome. The potential for backfire may depend on the type of intervention employed, and currently only one policing strategy, broken windows policing, has been found to exhibit this characteristic. Although the Weisburd et al. (2011) study represents the strongest research design, the low base levels of recorded crime and the low dosage of policing applied (only three additional hours of patrol per week) make it difficult to assess whether these outcomes would transfer to an urbanized, higher crime area, or would be seen when a greater dosage of policing was applied (see also Hinkle et al. 2013). The current study builds on the work of Weisburd et al. (2011) by testing the impacts that three different policing strategies (foot patrol, problem-oriented policing and offender-focused policing), focused in urban, high crime areas have on residents' perceptions of crime, disorder, safety, procedural justice and their satisfaction with police services.

The current study

The current research was conducted as part of the Philadelphia Policing Tactics Experiment, an experiment designed to test the crime reduction benefits of three policing tactics at hot spots: (1) foot patrol; (2) offender-focused strategies; and (3) problem-oriented policing (Groff et al. 2015). The anticipated outcome of the experiment was violent crime reduction, defined here as homicide, robbery, aggravated assault, and misdemeanor assault. A pre-/post-intervention survey was imbedded into the design to explore the possible backfire effects of hot spots policing.

Site identification

A multi-step process was used to identify the experimental sites. Violent crime data for 2009 were first extracted from the Philadelphia Police Department's (PPD) incident database; this database contains records of all crime occurring in the city and are automatically geocoded at a hit rate in excess of 98 %, well above acceptable levels for the purposes of mapping hot spots (Ratcliffe 2004). Two different techniques were used to identify the violent crime hot spots: a Local Indicator of Spatial Association (LISA), and a Hierarchical Nearest Neighbor Clustering routine

(HNN). The LISA analysis,[2] performed on a Thiessen polygon network drawn around every street intersection in the city, identified 818 street intersections that were adjacent to at least one other high crime corner, and the HNN analysis performed on violent crime events involving the use or threat of lethal force delineated 167 first order clusters.[3] A map depicting both types of hot spots was given to PPD leadership. Local and executive level commanders used their professional experience and operational knowledge to identify the 81 places (27 for each treatment type) on which to focus and which type of intervention should be applied. Of the 27 areas assigned to each treatment type, randomization was used to assign seven areas to a control category. This resulted in 20 foot patrol, 20 offender-focused, and 20 problem-solving areas, with a further 21 areas designated as controls (7 per treatment condition).

Treatments

To simulate how these treatments would be implemented under normal operations (i.e., without researcher involvement), district level commanders were given a degree of latitude in carrying out the interventions. The goal was to design the experiment to most accurately reflect the implementation of a hot spots policing intervention as it would be introduced in a large, urban police department.

Foot patrol

The only direction given to district level personnel from police headquarters was that the foot beats had to be staffed for at least 12 weeks, 5 days per week, and 8 h per day. The first foot beats were implemented on 15 June 2010 and the last foot beat terminated on 31 October 2010. Post-intervention interviews found that 19 out of the 20 foot beats were patrolled by pairs of officers, 11 out of 20 foot beat patrol officers were assigned by their supervisors because they were deemed to have the necessary skills, with the other 9 beats being staffed by officers who volunteered. Some officers reported changing the hours they worked the beats in response to their perception of changes in crime patterns. Others reported implementing problem-oriented responses such as clearing trash from alleyways or parks where guns were previously hidden, while some used more traditional responses such as making arrests and performing field stops. Overall, there appeared to be considerable variation in the activities of officers, based on the expectations of their supervisors, their personal views of how to best respond to the crime problem, the local context, and the perceived issues in their beats. For the foot patrol intervention, a review of daily activity logs, the incident database, and an interview with at least one officer from each site suggested that the foot patrol sites were receiving the prescribed dosage during the intervention.

[2] The LISA analysis was performed using local Moran's I test applied with a first order queen spatial weights matrix. To reflect the focus on violent crime, homicide and incidents involving the threat of deadly force were given a weight of 2 and (relatively) less serious crimes of unarmed robbery and misdemeanor assault were given a weight of 1.

[3] HNN analyses are useful in that they are not constrained by predetermined spatial units (here Thiessen polygons) but rather follow the shape of the data. First-order clusters include events that have nearest neighbor distances shorter than expected based on complete spatial randomness. The minimum number of events for each hot spot was set at 10.

Offender-focused policing

The offender-focused treatment followed the general tenets of intelligence-led policing (Ratcliffe 2008). District commanders and personnel were tasked with partnering with the PPD criminal intelligence unit to generate a list of active, repeat violent offenders who operated or lived within the delineated treatment beats. The officers who carried out this treatment were given autonomy in how they would focus attention on the nominated offenders. Activities included simply talking to these offenders, performing field interrogations and serving criminal warrants. The first offender-focused policing site began working on 20 June 2010 and all sites concluded on 27 February 2011. Self-report data indicated that the officers involved in the offender-focused intervention made frequent contact with prioritized offenders. This is unsurprising given that this type of intervention has a fair degree of support within the department and was a refined version of a tactic that was already employed at the district level.

Problem-oriented policing

Since problem-solving activities tend to be undertaken informally at the district level within the PPD, the structured and specific nature of problem solving undertaken during the experiment diverged from standard operating procedures at the district level. Officers were required to attend a 1-day training session on the tenets of problem solving, which introduced officers to the basics of problem-oriented policing (Goldstein 1990) and the SARA (Scanning, Analysis, Response and Assessment) process (Clarke and Eck 2003; Eck and Spelman 1987). It therefore took some time to organize, train and to begin implementing the problem-oriented treatments. The first problem-oriented policing sites went into effect on 24 September 2010 and the last sites to conclude did so on 30 December 2010. The activities that were undertaken varied widely, with some reflecting more traditional tactics such as increasing patrols and similar activities which could reasonably classified as "shallow" (Braga and Bond 2008). Others were more comprehensive in nature, such as building partnerships with local political officials and business owners in order to address social and physical disorder. For example, in one site, officers worked with owners of a problem motel to implement ID requirements, and, in another site, they met with bar owners to coordinate crime prevention work. Further tactics included installing solar powered garbage receptacles, arranging neighborhood clean-ups or posting 'no loitering' signs to deter offenders from loitering at crime prone locations.

For the problem-oriented policing sites, implementation fidelity was monitored via a review of action plans that were submitted and updated intermittently and which chronicled the activities undertaken in each site. Field visits and interviews with the program director for problem-oriented policing within the PPD were also undertaken to assess the interventions' progress. As is typical during problem-oriented policing deployments, some of the analyses that were conducted were rather shallow, and some sites switched to a focus on property crime as opposed to violent crime. Although this switch in focus suggests that the SARA process was being followed, the insignificant findings may reflect a failure of some of the sites to intervene in violent offenses. Just

over half of the sites involved in problem-oriented policing focused their problem-solving efforts on violent crime.

Results of treatments on crime measures

Of the three treatment types, offender-focused policing was the only tactic to produce statistically significant reductions. Relative to control locations, violent street felonies were reduced by 50 %, and all violent crime was reduced by 42 % relative to controls. Neither the foot patrol nor problem-oriented treatment produced statistically significant crime reductions during the intervention relative to controls. It should be noted that some differences in effectiveness may be reflected in the dosage or length of the interventions. The dosage of foot patrol in this study was much lower than that of the Philadelphia Foot Patrol Experiment (Ratcliffe et al. 2011). The problem-oriented policing sites only received a 3-month intervention. In addition, some problem-oriented policing sites shifted their focus from violent crime to property crime after the officers analyzed their respective crime problems. On the other hand, the offender-focused intervention lasted about 8 months, which may have allowed more time for the intervention to be introduced and take hold. We point readers to the experimental evaluation for further information on the design of the study and the results (Groff et al. 2015).

The public perception survey

A 59-question survey was created to assess the impact of the intervention on the community across seven constructs: satisfaction with police, perceptions of violent crime, perceptions of property crime, perceptions of physical disorder, perceptions of social disorder, perceptions of safety, and perceptions of procedural justice. Questions were rated via Likert scales which either asked respondents about their level of agreement ('strongly disagree' to 'strongly agree'), their opinions about the extent of various problems in their neighborhoods ('big problem' to 'not at all a problem'), or their opinions of the police department's response to crime and disorder related problems ('very poor' to 'very good'). Demographic information was also collected. The mail-based survey followed a repeated cross-sectional design and was administered in two waves, one prior to implementing the experiment, and one upon conclusion of the interventions. Surveys were sent to the same set of addresses in both waves, but respondents were not necessarily the same for each wave.

Sampling

A list of all taxable properties in the city was provided by the Philadelphia Police Department. A geographic information system (GIS) was used to identify which properties fell within the 81 experimental areas (n=43,389). This subset of properties in hot spots became the sampling frame. Cluster-based random sampling was used

within each of the four experimental groups to draw the sample. We mailed surveys to 1,860 foot patrol area addresses, 1,830 problem-solving area address, 1,830 offender-focused area addresses, and 1,855 control area addresses during both a pre-intervention period and post-intervention period.[4]

For the pre-intervention mailing, 628 surveys in total were returned (157 problem solving, 152 offender focused, 160 foot patrol and 159 control location surveys). The post-intervention mailing produced a total of 647 surveys (162 problem solving, 160 offender focused, 148 foot patrol and 177 control location surveys). The response rate for both waves was about 9 %. From the onset of the experiment we recognized that drawing our sample from all known taxed properties in each area could be potentially problematic because of the high number of vacant properties noted during field observations completed at each site prior to implementing the treatments.[5] Since properties could be vacant and taxed, it is highly likely that our household population is much lower than we projected and was a contributing factor to the low response rate. Further, the locations were in high-crime, low-income areas, making them less likely to participate in surveys for a variety of reasons (Weiss and Bailar 2002).

Response rates to surveys have been on the decline for some time (Tourangeau 2004). Mail-based surveys began to fall out of favor after the 1980s, in part because they had become too expensive for routine use (Skogan 2014), and were largely replaced with random-digit dialing telephone surveys, which tended to elicit greater response rates (Messer and Dillman 2010). However, the lack of coverage with the advent of cell phones has made telephone surveys increasingly difficult. Although internet surveys have grown in popularity, several issues with drawing representative samples have been identified (Skogan 2014), and this is especially difficult when place is fundamental to sampling, as is the case in this study. So although other methods for conducting survey research may be able to elicit greater response rates, mail-based surveys have seen a renewed interest (ibid.). Despite their continued methodological issues, most notably the difficulty with achieving high response rates, a mail-based survey was employed here due to (1) the lack of appropriate funds to conduct door-to-door interviews, (2) the explicit focus on place which prevents the use of internet or telephone surveys, and (3) concerns over safety of the research staff given that the hot spots in this study are the most violent locations in the City of Philadelphia.

Non-response bias in survey research is widely problematic. In and of itself, however, non-response does not necessarily indicate that non-response bias exists (Rogelberg and Luong 1998), and survey methodologists find that higher response rates do not necessarily imply lower levels of non-response bias (Groves and Peytcheva 2008; Schouten et al. 2009). Furthermore, non-response rates themselves are

[4] These numbers are based on the total number of taxable properties within each cluster, a 95 % confidence level, and 5 % confidence interval to determine sample size for each cluster and an anticipated 20 % response rate for poor, urban neighborhoods.

[5] Field researchers visited each site and completed a structured observation form which measured a number of site characteristics such as the level of social and physical disorder, quality of housing and land use. As part of this form, field observers estimated on a 4-point scale the prevalence of vacant lots and buildings, where 1 was an indication of a very high amount of vacant land use, and 4 was an indication of very low numbers of vacant land. High was considered having over 50 % of the streets in the beat with at least one vacant lot or over 25 % of the streets having over half of their lots vacant. A beat was listed as medium when over 25 % of the streets had at least one vacant lot, and classified as low when an area had no vacant lots or only a few vacant lots interspersed in the area. The mean response across the areas was 2.47, an average between high and medium.

considered a poor predictor of non-response bias (Groves and Peytcheva 2008). It is therefore necessary to assess the extent of non-response bias in survey research regardless of response rate (Rogelberg and Luong 1998). The extent to which survey respondents were different from the general population was assessed via an archival approach (Rogelberg et al. 2003), where demographic information collected from the surveys was compared to the demographic information from the 2010 census.

Areal weighting techniques[6] (Downey 2006) were employed to aggregate census data to the treatment and control hot spots and estimate population characteristics of the experimental areas. The distributions of race, gender and educational attainment of the survey respondents were then compared to those living within the hot spots as reported in the 2010 census (see Table 1). Whites and individuals with higher levels of education were slightly more likely to respond relative to the entire population, a problem often encountered during survey research (Rogelberg and Luong 1998). Older females also tended to be slightly overrepresented relative to the entire population; however, since our survey was addressed to the head of the household this is to be expected as the target locations were high-crime, low-income urban neighborhoods where older females tend to be head of the home (Anderson 2000). These comparisons suggest that the sample of respondents is a close approximation to the actual population. Overall, no evidence of systematic non-response bias was found.

Outcomes

Additive scales were used to assess the impact of the three hot spots policing interventions on seven constructs.

The *perception of violent crime* scale included responses to six questions concerning how big of a problem respondents rated the crime mentioned in an individual item, ranging from 'not a problem' to 'big problem'. Higher scores represented *less* of a perceived problem given the survey formatting. The six questions asked respondents, in their neighborhood, how big of a problem was (1) "people being robbed, beaten up or mugged", (2) "people being killed", (3) "people being the victim of violent crime", (4) "people being victimized by gangs", (5) "people being threatened with guns", and (6) "people being threatened with knives or other weapons (not including guns)". This construct had a high degree of reliability for both waves of the survey (pre-intervention Cronbach's α=0.943; post-intervention Cronbach's α=0.950).

The *satisfaction with police services* scale consisted of five questions about the perceived quality of police services residents were receiving in their neighborhood. Respondents were given the choice of responding along a scale ranging from 'very poor' to 'very good', with higher scores being equivalent to a better rating of police. The five questions asked how good the police were doing at (1) "dealing with problems that really concern people of the neighborhood", (2) "keeping order on the streets and sidewalks", (3) "reducing violent crime", (4) "reducing non-violent crime", and (5) "preventing crime in the neighborhood". The pre- and post-intervention scales were

[6] This was done by determining the percentage of geographic area the experimental areas covered within each overlapping census tract, multiplying each census variable by the percentage of overlapping geographic area, and summing across census tracts variables for each experimental area.

Table 1 Comparison of survey respondents to actual populations by type of area

Variable	CO survey	CO census	FP survey	FP census	OF survey	OF census	PS survey	PS census
% Male	31.8	47.2	33.8	46.1	27.6	45.7	32.4	47.6
% Female	66.0	52.8	65.1	53.9	69.6	54.3	63.8	52.4
% White	38.5	29.1	23.9	19.9	14.6	16.7	32.8	29.3
% Black	33.5	50.4	56.3	65.6	66.5	68.3	47.3	56.6
% Hispanic	18.0	30.3	9.0	17.5	10.6	20.4	9.0	15.5
% High School Diploma	25.6	36.7	27.9	38.7	23.5	35.6	20.4	38.6
% Associate's Degree	34.3	20.9	34.5	21.8	34.0	22.3	40.2	20.5
%≥Bachelor's Degree	25.2	9.1	23.5	11.9	19.0	10.2	24.9	18.2
% 18–29 Years	12.4	16.7	11.4	18.4	11.7	16.7	10.4	19.2
% 30–49 Years	36.9	25.9	25.6	24.5	26.3	24.4	32.0	26.4
%≥50 Years	49.6	24.9	61.5	27.3	61.1	26.4	55.8	26.7

Percentages shown. Areal weighting techniques were used to estimate hot spot area populations using data from the 2010 census

CO control, *FP* foot patrol, *OF* offender focused and *PS* problem solving

both highly reliable (pre-intervention Cronbach's α=0.899; post-intervention Cronbach's α=0.897).

Residents' *perceptions of property crime* were gauged by the responses to three questions. Respondents were asked to rate how big of a problem in the neighborhood the following crimes were: (1) "people breaking into the homes of others", (2) "people breaking into or stealing cars", and (3) "the vandalism of homes, buildings or properties". Higher scores represented a lesser degree of concern over property crime given the survey formatting. With a pre- and post- intervention Cronbach's α of 0.821 and 0.815, respectively, the construct was sufficiently reliable.

The *perceptions of physical disorder* scale consisted of four questions which asked residents to gauge how big of a problem the following things were in their neighborhood: (1) "abandoned cars in the streets and alleys", (2) "abandoned houses or other empty buildings", (3) "trash junk and litter on the street or sidewalk", and (4) "people or landlords allowing their properties to become run down". Higher scores were equivalent to a lesser perceived level of physical disorder. This scale also demonstrated sufficient reliability, with a pre-intervention Cronbach's α of 0.682 and a post-intervention Cronbach's α of 0.701.

The *perceptions of social disorder* scale included six questions which asked residents to rate how big of a problem the following things were in their neighborhood: (1) "excessive noise", (2) "homeless people or vagrants", (3) "teens hanging out and causing disturbances", (4) "drug dealing on the street", (5) "drug dealing from houses or other buildings", and (6) "truancy". As with physical disorder, higher scores on the social disorder scale represented a lesser perceived level of social disorder. Both the pre- and post-intervention scales were deemed reliable (pre-intervention Cronbach's α=0.843; post-intervention Cronbach's α=0.852).

The *perception of safety scale* included residents' responses to their level of agreement with two questions: (1) "I feel safe walking in my neighborhood during

the daytime" and (2) "I feel safe walking in my neighborhood after dark". Respondents noted their level of agreement with the two statements, which ranged from 'strongly disagree' to 'strongly agree', with higher scores representing a higher degree of feeling safe. The scale was found to be sufficiently reliable (pre-intervention Cronbach's α= 0.708; post-intervention Cronbach's α=0.712).

Finally, the *perceptions of procedural justice* scale asked respondents to gauge their level of agreement, ranging from 'strongly disagree' to 'strongly agree', to five statements related to procedural justice: (1) "the police in this city are usually courteous", (2) "the police in this city are usually honest", (3) "the police in this city are usually fair", (4) "the police in this city use only the amount of force necessary to accomplish their tasks", and (5) "Philadelphia police treat all people equally according to the law." Higher scores reflected a greater perception of procedural justice. Both the pre- and post-intervention scales were highly reliable (pre-intervention Cronbach's α= 0.842; post-intervention Cronbach's α=0.834).

Analytic methods

Multiple imputation

In instances where respondents failed to answer survey questions that were included in the scales, data were imputed using multiple imputation methods with Stata's multiple imputation (MI) module. MI is carried out by generating a user-specified number of datasets with the missing values imputed. Data analysis is performed on each dataset and the results are pooled following Rubin's (1987) formula. This is considered superior to other methods of handling missing data, such as expectation maximization imputation, because standard error estimates are adjusted for the variability within and across imputed datasets, which ensures that significance tests are unbiased (Allison 2001).

We first computed the scale variables discussed above. When a respondent failed to answer a question included in a scale, that scale was specified as having a missing value. On average, respondents did not answer a question included in a scale 6 % of the time, and this ranged from 3.2 to 12.7 %. We then specified a sequential chained equation imputation model that included all of the scale variables as well as the demographic control variables and a dummy variable differentiating whether the survey stemmed from wave one or wave two. We imputed 20 datasets. Although three to five imputations are considered to be sufficient according to Rubin (1987), Stata's MI procedure is highly efficient, so we followed their recommendation of imputing 20 datasets (StataCorp 2011).

OLS regression models

Although we had the ability to differentiate between foot patrol, offender-focused, problem-oriented policing and control locations, we did not have the ability to differentiate between individual sites within the groups. Also recall that for the experimental design, randomization occurred in qualitative strata, such that 27 sites were slated to receive one of the three treatments, and control groups were randomly selected from

within those groups. For this analysis, all control locations were grouped into a pre-treatment control group and a post-treatment control group, given that we could not discern which controls were associated with which policing tactic. So although these data stem from an experimental evaluation, analysis of the survey data must be undertaken quasi-experimentally.

We fit seven ordinary least square (OLS) models where the seven scales were entered as dependent variables in their own model. We employed an orthogonal contrast coding scheme to estimate the effect of each treatment type on the outcome variables during the post-treatment period relative to the pooled control locations during the post-treatment period. Three variables (k–1 contrasts) were created which differentiate between (1) problem-oriented policing sites during the post-treatment period relative to control sites during the post-treatment period while ignoring foot patrol and offender-focused sites during both the pre- and post-treatment period and the problem-oriented policing and control sites during the pre-treatment period, (2) offender-focused policing sites relative to controls during the post-treatment period while ignoring foot patrol and problem-oriented policing sites during the pre- and post-intervention period and the offender-focused policing and control sites during the pre-intervention period, and (3) foot patrol sites relative to controls during the post-intervention period while ignoring problem-oriented policing sites and offender-focused sites both before and after the experiment and foot patrol and control sites before the experiment.

For example, for the problem-oriented policing effects variable, responses coming from problem-oriented policing sites after the experiment were coded as $+0.5$ while the foot patrol and offender focused site respondents were coded as 0 regardless of whether the survey stemmed from the pre- or post-intervention period. Responses coming from control sites before the experiment was underway were coded as 0, as were the problem-oriented policing responses from the pre-treatment survey. Responses coming from a control site during the post-treatment period, however, were coded -0.5. So here, we are contrasting the post-experiment problem-oriented policing responses with the post-experiment control responses only. The offender-focused and foot patrol contrast variables follow the same coding scheme, yet these specific tactics are contrasted with the wave two control locations. Specifying the variables in this way allows us to estimate the impact of each of the interventions relative to the control locations after the treatments were administered while controlling for pre-treatment responses.

Although our contrast variables were coded $+0.5$, -0.5 and 0 at the onset of the analysis, our data are unbalanced. That is, we have different numbers of respondents for each of the sites at each of the waves. In order to create contrasts that are orthogonal, the contrast coded treatment effect variables were mean centered within their group during the post-treatment period. This was achieved by subtracting the group's grand mean from the respective contrast value. This resulted in the recoding from $+0.5$, -0.5 and 0 into 0.522, 0 and -0.478 for the problem-oriented policing sites, 0.545, 0 and -0.475 for the foot patrol sites and 0.525, 0 and -0.475 for the offender-focused sites.

We also entered neighborhood level covariates for race of the respondent (1 = non-Hispanic black, 0 = other), age (1 = over 30, 0 = under 30), sex (1 = female, 0 = male), educational attainment (1 = greater than high school diploma, 0 = high school diploma

or less) and whether a respondent had been the victim of a violent crime within the year before the survey was filled out (1 = yes, 0 = not).

Results

Results are reported in Tables 2, 3, 4, 5, 6, 7 and 8, yet we note upfront that none of the experimental treatments produced statistically significant differences on any of the outcomes relative to the control locations during the post-treatment period. Backfire does not seem to have occurred as a result of any of the interventions. The interventions also did not improve hot spot community members' perceptions of the outcomes either.

Satisfaction with police

None of the three contrast-coded treatment variables reached conventional levels of statistical significance, suggesting that after the intervention, no differences in reported levels of satisfaction arose for respondents in any of the treatment type locations relative to the control group (Table 2). In other words, we see no evidence of backfire in terms of respondents levels of satisfaction with police as a result of the three interventions. Four covariates exhibit statistically significant differences in the outcome. Females, African-Americans and those who were the victim of violent crime in the previous year all had lower reported levels of satisfaction with police. Respondents who were over 30 had higher levels of satisfaction with police than those who were under 30.

Perceptions of violent crime

None of the three treatment variables reached conventional levels of statistical significance, suggesting that, after the intervention, no differences in the perceived level of

Table 2 OLS regression results for satisfaction with police

	b	SE	*t*	95 % Confidence Interval
Constant	13.974	0.479	29.17**	13.034, 14.915
Problem-oriented	−.029	0.617	−0.05	−1.239, 1.181
Offender-focused	−0.201	0.613	−0.33	−1.404, 1.002
Foot patrol	−0.019	0.618	−0.03	−1.231, 1.193
Female	−0.613	0.288	−2.13*	−1.178, −0.049
Black	−0.583	0.280	−2.08*	−1.133, −0.033
Over 30 years	1.987	0.430	4.62**	1.143, 2.831
More than high school diploma	−0.373	0.270	−1.38	−0.902, 0.157
Victim of violent crime	−1.66	0.282	−5.87**	−2.210, −1.102

Problem-oriented, offender-focused and foot patrol represent contrast between these treatments and controls during the post-treatment period; pooled estimates of 20 imputed datasets; higher scores on the outcome represent greater satisfaction with police

**$p<.001$, *$p<.05$

Table 3 OLS regression results for perceptions of violent crime

	b	SE	*t*	95 % Confidence Interval
Constant	15.559	0.856	18.17**	13.8791, 17.238
Problem-oriented	1.045	1.071	0.98	−0.057, 3.147
Offender-focused	0.151	1.084	0.14	−1.975, 2.277
Foot patrol	−1.950	1.090	−1.79	−4.089, 0.190
Female	−0.535	0.513	−1.04	−1.541, 0.471
Black	−.0367	0.499	−0.74	−1.348, 0.613
Over 30 years	3.124	0.767	4.07**	1.618, 4.629
More than high school diploma	1.051	0.484	2.17*	0.100, 2.002
Victim of violent crime	−2.741	0.505	−5.43**	−3.732, −1.751

Problem-oriented, offender-focused and foot patrol represent contrast between these treatments and controls during the post-treatment period; pooled estimates of 20 imputed datasets; higher scores on the outcome represent perceiving violent crime as *less* of a problem

**$p<.001$, *$p<.05$

violent crime arose for respondents in any of the treatment locations relative to the control group (Table 3). In other words, we see no evidence of backfire in terms of respondents reporting higher levels of perceived violent crime. At the same time, we see no improvements, which is interesting given that the offender-focused treatment reduced violent street felonies by 50 %. We reflect on this finding in the discussion section. Three covariates exhibit statistically significant differences. Keep in mind that higher scores on the scale represent perceiving violent crime as *less* of a problem. Older respondents and those that had more than a high school diploma reported perceiving less violent crime overall, while those who were the victim of violent crime in the past reported perceiving higher levels of violent crime.

Table 4 OLS regression results for perceptions of property crime

	b	SE	*t*	95 % Confidence Interval
Constant	7.914	0.390	20.31**	7.150, 8.678
Problem-oriented	−0.062	0.484	−0.13	−1.012, 0.888
Offender-focused	0.114	0.486	0.23	−0.840, 1.067
Foot patrol	−0.278	0.493	−0.56	−1.245, 0.690
Female	−0.013	0.236	−0.06	−0.477, 0.450
Black	0.770	0.229	3.37*	0.321, 1.219
Over 30 years	0.857	0.348	2.46*	0.174, 1.540
More than high school diploma	0.211	0.219	−0.96	−0.220, 0.641
Victim of violent crime	−1.023	0.231	−4.43**	−1.476, −0.570

Problem-oriented, offender-focused and foot patrol represent contrast between these treatments and controls during the post-treatment period; pooled estimates of 20 imputed datasets; higher scores on the outcome represent perceiving property crime as *less* of a problem

**$p<.001$, *$p<.05$

Table 5 OLS regression results for perceptions of physical disorder

	b	SE	*t*	95 % Confidence Interval
Constant	10.655	0.469	22.70**	9.734, 11.576
Problem-oriented	−0.215	0.582	−0.37	−1.357, 0.927
Offender-focused	−0.945	0.592	−1.59	−2.107, 0.218
Foot patrol	0.813	0.605	1.34	−0.373, 1.999
Female	−0.560	0.275	−2.04*	−1.099, −0.021
Black	−0.442	0.276	−1.60	−0.985, 0.099
Over 30 years	1.496	0.419	3.57**	0.673, 2.319
More than high school diploma	0.263	0.265	1.00	−0.256, 0.784
Victim of violent crime	−0.850	0.280	−3.04*	−1.399, −0.301

Problem-oriented, offender-focused and foot patrol represent contrast between these treatments and controls during the post-treatment period; pooled estimates of 20 imputed datasets; higher scores on the outcome represent perceiving physical disorder as *less* of a problem

**$p<.001$, *$p<.05$

Perceptions of property crime

None of the three treatment variables reached conventional levels of statistical significance, suggesting that after the intervention, no differences in the perceived level of property crime arose for respondents in any of the treatment locations relative to the control group (Table 4). We again see no evidence of backfire in terms of respondents reporting higher levels of perceived property crime. Three covariates exhibit statistically significant differences. Given the coding of the survey, higher scores on the scale represent perceiving property crime as *less* of a problem. Older respondents and African-American respondents perceived lower levels of property crime overall, whereas those that had been the victim of violent crime in the year had higher levels of perceived property crime.

Table 6 OLS regression result for perceptions of social disorder

	b	SE	*t*	95 % Confidence Interval
Constant	15.908	0.697	22.80**	14.540, 17.276
Problem-oriented	0.041	0.876	0.05	−1.677, 1.759
Offender-focused	−0.370	0.884	−0.42	−2.105, 1.366
Foot patrol	−0.731	0.899	−0.81	−2.497, 1.035
Female	−0.272	0.410	−0.66	−1.076, 0.533
Black	−0.477	0.404	−1.18	−1.270, 0.316
Over 30 years	1.739	0.621	2.80*	0.520, 2.957
More than high school diploma	0.373	0.398	0.94	−0.408, 1.155
Victim of violent crime	−1.406	0.419	−3.36**	−2.229, −0.584

Problem-oriented, offender-focused and foot patrol represent contrast between these treatments and controls during the post-treatment period; pooled estimates of 20 imputed datasets; higher scores on the outcome represent perceiving social disorder as *less* of a problem

**$p<.001$, *$p<.05$

Table 7 OLS regression results for perceptions of safety

	b	SE	*t*	95 % Confidence Interval
Constant	5.642	0.232	24.27**	5.186, 6.098
Problem-oriented	−0.153	0.285	−0.54	−0.712, 0.406
Offender-focused	0.049	0.286	0.17	−0.512, 0.612
Foot patrol	−0.062	0.290	−0.21	−0.630, 0.507
Female	−0.492	0.134	−3.68**	−0.754, −0.229
Black	0.014	0.131	0.11	−0.244, 0.272
Over 30 years	0.179	0.206	0.87	−0.224, 0.583
More than high school diploma	0.393	0.127	3.11*	0.145, 0.642
Victim of violent crime	−0.548	0.134	−4.08**	−0.811, −0.284

Problem-oriented, offender-focused and foot patrol represent contrast between these treatments and controls during the post-treatment period; pooled estimates of 20 imputed datasets; higher scores on the outcome represent having higher levels of perceived safety

**p<.001, *p<.05

Perceptions of physical disorder

None of the three treatment variables reached conventional levels of statistical significance, suggesting that after the intervention, no differences in the perceived level of physical disorder arose for respondents in any of the treatment locations relative to the control group (Table 5). We again see no evidence of backfire in terms of respondents reporting higher levels of perceived physical disorder. Three covariates exhibit statistically significant differences. Here again, higher scores on the scale represent perceiving physical disorder as *less* of a problem. Respondents over the age of 30 had lower levels of perceived physical disorder in their neighborhoods, whereas females and those

Table 8 OLS regression models for perceptions of procedural justice

	b	SE	*t*	95 % Confidence Interval
Constant	14.497	0.458	31.64**	13.598, 15.396
Problem-oriented	0.536	0.576	0.93	−0.594, 1.665
Offender-focused	−0.660	0.571	−1.16	−1.780, 0.460
Foot patrol	0.335	0.581	0.58	−0.806, 1.476
Female	−0.849	0.269	−3.16*	−1.376, −0.321
Black	−2.444	0.265	−9.22**	−2.965, −1.924
Over 30 years	2.540	0.405	6.28**	1.747, 3.334
More than high school diploma	−0.222	0.261	−0.85	−.0734, 0.290
Victim of violent crime	−1.177	0.269	−4.37**	−1.705, −0.648

Problem-oriented, offender-focused and foot patrol represent contrast between these treatments and controls during the post-treatment period; pooled estimates of 20 imputed datasets; higher scores on the outcome represent having higher levels of perceived procedural justice

**p<.001, *p<.05

who were the victims of violent crime perceived physical disorder to be more of a problem in their neighborhood.

Perceptions of social disorder

As reported in Table 6, none of the respondents residing in the treated locations had scale values that differed from controls at conventional levels of statistical significance. Yet again, backfire does not seem to have occurred as a result of any of the interventions in terms of residents' perceptions of social disorder. Here again, higher scores on the social disorder scale represent perceiving social disorder to be less of a problem. Respondents who were over 30 perceived social disorder to be less of a problem overall, whereas those who were the victim of a violent crime in the year prior to filling out the survey perceived social disorder to be more of a problem.

Perceptions of safety

Table 7 shows that after the intervention, none of the areas that were targeted with the interventions had statistically significant differences in responses on the perceived safety scale relative to the control respondents. The hot spots interventions appear not to have left residents feeling more unsafe. Although this is good news in that hot spots policing did not result in backfire, even the offender-focused policing intervention (which reduced violent felonies by nearly 50 %) did not give cause for residents to feel measurably safer. Three covariates reached statistical significance. The coefficients can be interpreted as higher values representing higher perceived levels of safety. Females and those who were the victim of violent crime in the year prior felt less safe than males and those who were not the victims of violent crimes, whereas people with more than a high school diploma reported feeling safer.

Perceptions of procedural justice

Table 8 contains results for the OLS model estimating perceptions of procedural justice. As shown, none of the interventions had an impact on how respondents rated the police on the procedural justice scale. On the one hand this is good news, as reductions in violent crime and violent street felonies were achieved in the offender-focused policing sites with no significant difference in perceptions of the police behaving any less procedurally just—a concern raised with respect to hot spots policing. At the same time, no improvements were achieved as a result of the interventions. Four covariates reached levels of statistical significance. Overall, females, African-Americans and those who were the victims of violent crime in the previous year perceived the police as less procedurally just. Respondents over the age of 30 viewed the police as more procedurally just.

Discussion

As the use of hot spots policing by practitioners has increased it has been accompanied by concerns about potential 'backfire effects' from concentrated dosages of police activity. These include the potential to increase perceptions of crime and disorder,

decrease citizens' perceived safety (Farrall and Gadd 2004), and decrease perceptions of procedural justice and general satisfaction with police services. In relation to a randomized control experiment testing three different policing tactics at hot spots, our survey found no support for these 'backfire' hypotheses. It appears that residents living within the violent crime hot spots targeted during the experiment were on average either unaware of or unaffected by the increased police activities being carried out in their neighborhoods, at least as gauged by the items on our survey.

Although this could be interpreted as good news, the failure of any of the tactics (even the one which significantly reduced violent crime) to improve residents' perceptions of the police and crime and disorder is disappointing. Although the offender-focused treatment reduced violent crime by 42 % and violent felonies by 50 % relative to the seven offender-focused control areas, public perception of crime may only be loosely coupled to the actual crime rate, and other factors may more directly impact perceptions of risk. In fact, it is possible that public perception of the police may not be directly tied to the crime rate or police effectiveness in combatting violence at all. Respondents were not more likely to perceive the Philadelphia police as more procedurally just, report being more satisfied with their services, or report feeling safer, despite significant reductions in violent crime.

It could be that the highly targeted and focused nature of the offender-focused tactic meant that the general public was not aware that the police were working with increased vigor and reducing violence in their neighborhoods. The PPD officers involved in the experiment partnered with the criminal intelligence division to identify and target prolific offenders who were active in the treatment sites. Although officers served warrants and stopped to question alleged offenders, their activities generally did not consist of high visibility activities such as increased uniform patrols or enforcement. So for the offender-focused treatment, it is possible that the community was simply not cognizant of the activities undertaken by the PPD.

This could potentially be problematic for the ability of police to address levels of satisfaction with police directly through operational tactics. The police rely on the public in a variety of ways, from reporting crime to providing information during the investigation of crime. In Philadelphia, and especially in poor, crime-ridden sections of the city, citizens are dissuaded from cooperating with the police for various reasons. A culture of no snitching is pervasive, and fear of retaliation, the act of harm inflicted on another person in return for being wronged oneself (Jacobs 2000), is believed to be prevalent in the poorer areas of the city, where the combination of drugs, lack of mobility and violent neighborhood gangs makes retaliation difficult to escape. Across Philadelphia, about half the people who are shot are done so within two blocks of their home address (Ratcliffe and Rengert 2008).

The city does not have a reputation for a strong and effective criminal justice system, and jail space is at a premium. It may be that offender-focused arrests can inhibit criminal activity in the short-term, yet the constraints of the criminal justice system mean that offenders are back on the streets quickly enough that the community does not perceive any benefit (notwithstanding the empirical crime reduction evidence). Improving police legitimacy through offender targeting may require an equivalent focus on prosecutions and custodial sentences, so that the community not only sees their worst offenders removed from the streets, but also removed from the community for an extended period.

We might expect the different tactics that the PPD employed to affect the community in different ways. In particular, we find it curious that the foot patrol did not positively influence the residents in areas targeted, regardless of the non-significant findings related to crime. Foot patrol has a history of being considered a "proactive, non-threatening, community-oriented approach to local policing" (Wakefield 2007 : 343), and previous evaluations have demonstrated that foot patrol was successful in improving citizens' opinions of police and reducing fear of crime even though crime itself was not reduced (Cordner 1986). Qualitative field researchers working during the Philadelphia Foot Patrol Experiment (Ratcliffe et al. 2011; Wood et al. 2013) reported, at least anecdotally, a positive business and residents' community reaction to increased foot patrols. Why did we not see positive changes in residents' perceptions in the foot patrol locations? One possible explanation is the extent to which foot patrols have been used in Philadelphia since the foot patrol experiment. In discussing this topic with district commanders, many reported continuing to utilize foot patrols as part of an overall crime reduction strategy since 2009. As many of the sites during the current experiment were near locations targeted during the Philadelphia Foot Patrol Experiment, foot patrol could have lost its novelty: perhaps the public were simply more accustomed to having officers patrol on foot. It is also possible that the reduction in dosage, or some impact of the shift from using trained rookies during the 2009 experiment to using older officers during this experiment, were sufficient to negate any improvements in community perception.

It is a little less surprising that problem-oriented policing tactics did not change community members' views. Since the problem solving techniques followed the tenets of problem-oriented policing as outlined by Goldstein (1979, 1990), the tactics generally did not involve much engagement from the wider community, but rather focused on a few particularly active and/or problem-specific community members. The PPD analyzed the problems occurring in their respective beats and developed responses based on these analyses, and contact was directed to specific community leaders who work with the police frequently, or to particular members of the community related to the problem being addressed. Although in some cases more traditional tactics were employed, such as increased patrols or stop-and-frisks, it is likely that the community-wide dosage was not sufficient to cause any measurable changes in the survey responses.

Limitations

First, our study is not a panel design. Although we sent surveys to the same addresses during each wave, confidentiality concerns limited our ability to track surveys at the individual level. In other words, different members of the same household could have completed the survey at each wave, or different households responded from wave 1 to wave 2. In addition, again due to human subjects' protections, the surveys were also not tracked at the area level. Therefore, our results represent changes, or lack thereof, across pre/post samples across a large geography (20 areas per treatment type/21 areas for controls). In the future, the use of telephone based surveys and the ability to more easily conceal respondents' identity (see Weisburd et al. 2011) could be used in order to draw conclusions about changes within individuals or hot spots. Data collected at the hot spot level could be used to test how differences in dosage or successful treatment impact residents' perceptions and opinions.

The low response rate of our survey is a limitation. We went to great lengths to explore and mitigate the issue of non-response bias, but even so, we cannot rule out the possibility that some factor we did not measure did introduce bias into our sample. In addition, although we found no negative impacts on the community, the failure to find positive impacts in neighborhoods where the foot patrols were conducted contradicts previous literature (Cordner 1986). It is possible that the adoption of foot patrols by the PPD as a general crime fighting strategy masked the potential to pick up positive changes since the community may be used to foot patrolling. Future work should of course attempt to replicate these analyses not only for foot patrol, but for all of the tested tactics in different cities.

Conclusion

In light of recent calls by criminological scholars to shift resources from imprisonment to policing, and for increased funding, implementation and evaluation of hot spots policing, understanding any possible backfire effects is especially relevant to policy makers and practitioners. Our study found no evidence for any perceived backfire effects. Results indicate that the changes in the responses of citizens to questions gauging their perceived safety, perceptions of procedural justice and satisfaction with police and perceptions of crime and disorder were marginal and not statistically significant. This suggests that a variety of police tactics do not necessarily automatically impact the community negatively, and provides some quantitative support for the anecdotal impressions from the foot patrol research of the Philadelphia Foot Patrol Experiment that certain types of proactive policing are not necessarily perceived as harmful.

A deeper reading of the survey does however raise some challenges for police leadership. The battle in a democracy is not just to reduce crime, but also to retain and enhance the perception of police legitimacy. Even when police were able to reduce violent crime by over 40 % and violent felonies by 50 %, there were no noticeable bumps in positive perceptions of police, procedural justice, safety or crime and disorder prevalence in the immediate aftermath of that success. The good work conducted in Philadelphia was not necessarily perceived that way at a measurable level by the residents, and here lies the challenge for police leadership. Good policing, as defined by the police through crime fighting, may not easily translate to good policing as defined by the community. There are various avenues for further research in this area before the coupling of hot spots policing, crime reduction, and perceptions of the police and the neighborhood are fully understood.

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