

Boundary Adherence during Place-based Policing Evaluations: A Research Note

Journal of Research in Crime and

Delinquency

2014, Vol. 51(3) 377-393

© The Author(s) 2014

Reprints and permission:

sagepub.com/journalsPermissions.nav

DOI: 10.1177/0022427814523789

jrcd.sagepub.com



Evan T. Sorg¹, Jennifer D. Wood¹,
Elizabeth R. Groff¹, and Jerry H. Ratcliffe¹

Abstract

Objectives: This note explores complications with standard methods to evaluate place-based policing interventions. It identifies and explains issues of boundary misspecification during evaluation as a result of boundary adjustment by police during an intervention. *Method:* Using geographic data gathered during post-experiment focus groups with officers involved in the Philadelphia Foot Patrol Experiment, we highlight the practice of boundary adjustment on the part of officers and we explain why such adjustments occurred. *Results:* Officers involved in the focus groups who identified the active boundaries of their hot spot assignments ($n = 124$) all reported policing outside of their delineated beats. On average, their active beats were 0.13 square miles larger than the originally delineated treatment beats. Some active beats overlapped catchment and control locations. *Conclusion:* Boundary misspecification could cause researchers to (1) incorrectly label a

¹Department of Criminal Justice, Center for Security and Crime Science, Temple University, Philadelphia, PA, USA

Corresponding Author:

Evan T. Sorg, Department of Criminal Justice, Temple University, 5th Floor Gladfelter Hall, Room 515, Philadelphia, PA 19122, USA.

Email: evan.sorg@temple.edu

direct benefit of receiving treatment as a diffusion of crime control benefits; (2) underestimate immediate spatial crime displacement; and (3) underestimate treatment effects. Future place-based experiments should take into account the various pressures on officers to adjust the boundaries of their assignments by incorporating measures that track boundary adherence over time (and reporting them) in order to optimize assessments of net effects, diffusion and displacement.

Keywords

hot spots policing, crime displacement, diffusion of crime control benefits, experiments, evaluation

Introduction

Over the past 20 years, policing has progressively become geographically focused (Braga, Hureau, and Papachristos 2011). Allocating resources at discrete locations with an above average concentration of crime—at hot spots—has been shown to be an effective method for reducing crime and disorder (Braga 2005, 2007; Braga, Papachristos, and Hureau 2012). Further, focusing on specific geographic areas does not seem to inevitably lead to spatial crime displacement (Braga et al. 2012; Guerette and Bowers 2009; Ratcliffe and Makkai 2004; Weisburd et al. 2006). In contrast, many studies report a diffusion of crime control benefits, or a crime reduction that spreads beyond areas targeted by police (Ratcliffe and Makkai 2004; Weisburd et al. 2006).

Despite the promise of hot spots patrols, researchers have highlighted the need to take greater care in measuring the effects of hot spots interventions. Although not commonly raised in the research literature, this research note takes up Rosenbaum's (2006:252-53) point that "some studies suggest there is evidence of a diffusion of crime control benefits to nearby areas, but some of these effects may reflect a misspecification of the target area boundaries." Rosenbaum suggests that in the past, researchers may have incorrectly specified the spatial boundaries of locations that police have targeted during place-based interventions. In other words, locations outside of delineated target areas may have received a dosage of policing intended to be reserved only for treatment locations, including locations used to estimate spatial crime displacement and the diffusion of crime control benefits. As a result, Rosenbaum argues that the diffusion of crime control benefits that many studies document may in fact represent a direct benefit of receiving a dosage of treatment.

The importance of monitoring “implementation fidelity” during hot spots policing experiments (and other place-based interventions) is well known (Weisburd 2005:235), and previous researchers have specifically designed studies to avoid contamination of control areas by, for example, ensuring sufficient distance exists between treatment and control hot spots, or monitoring differences in dosage levels between treatment and control beats (i.e., Sherman and Weisburd 1995). Some previous research has discussed the importance of officer boundary compliance for the measurement of crime displacement (Weisburd et al. 2006); however, the dosage of policing occurring in locations used to estimate displacement/diffusion has not, to our knowledge, previously been reported. How boundary compliance is monitored, and the extent to which boundary adherence is contested by officers facing a range of occupational pressures is seldom given serious discussion in the evaluation literature. This is a concern because the real-time adjustment of boundaries may not only negatively affect the accuracy with which spatial displacement/diffusion are estimated as suggested by Rosenbaum (2006) but also the accuracy with which net program benefits effects are estimated.

This research note uses geographic data collected from 124 officers involved in the Philadelphia Foot Patrol Experiment during post-experiment focus groups (Ratcliffe et al. 2011) to directly examine the issue of boundary adherence. These geographic data represent the spatial boundaries that officers reported actually policing during the experiment, which we term their “active beats,” and not just the boundaries that they were assigned to patrol. We supplement these geographic data with qualitative data collected during post-experiment focus groups. While the geographic data captures the extent of boundary adherence, the qualitative data illuminate officers’ rationalizations for contesting the boundaries they played no role in establishing. We close by discussing the implications of boundary adjustment, including the need to acknowledge officers’ realities and pressures over the lifecycle of an experiment, and the need to track this phenomenon accordingly.

Evaluating Place-based Policing Programs

Within hot spots experiments, police interventions have been likened to medical “treatments” (Thacher 2001), and as such police are understood in terms of “treatment providers” (Wood, Sorg et al. 2013). In the hot spots policing literature, a variety of treatments have been evaluated, including increased patrols (Sherman and Weisburd 1995), intermittent short-term

patrols (Telep, Mitchell, and Weisburd 2012), crackdowns (Sherman et al. 1995), and targeted enforcement (Sherman and Rogan 1995). Common among these treatments is the fact that all involve an increased police presence. The theoretical logic underpinning these treatments is that police being physically present at a hot spot will deter offenders from committing crime (Sherman 1990). In this research note, we are referring to treatment as the physical presence of police at a particular location.

Main Effects

In place-based policing research, the geographic boundaries of locations designated to receive a treatment and those that will act as controls are generally drawn prior to initiating an intervention (see Braga et al. 2011 for an exception). In experimental research, assignment to a condition of treatment or control is achieved through some form of randomization. Quasi-experimental evaluations attempt to identify locations similar to those that will be targeted to act as controls (Sherman and Rogan 1995), such as using propensity score matching methods to identify comparable sites (Braga et al. 2011). After an intervention is introduced, evaluators use a variety of statistical techniques to estimate any program benefits in the targeted locations relative to these controls. More specifically, crime or call for service counts are drawn from these geographic locations in order to test whether there are any meaningful differences between treated and untreated locations during or following the treatment period. To make accurate statistical inferences, crime measures must be drawn from control locations that did not receive the treatment.¹

Displacement and Diffusion of Benefits

In addition to estimating treatment effects, place-based policing interventions frequently estimate the possibility of spatial crime displacement and any ancillary diffusion of crime control benefits to areas outside of those targeted. The need to test for the possibility of spatial displacement stems from the oft-raised criticism that taking a geographic focus will inevitably lead to crime displacing elsewhere (Reppetto 1976). In fact, Braga et al.'s (2012) most recent meta-analysis found a statistically significant effect size favoring a diffusion of crime control benefits over spatial displacement. At least in academic circles, a diffusion of benefits is thought of as a more likely outcome than spatial displacement. Given the possibility of these

divergent outcomes, displacement/diffusion analysis is an important component of place-based policing evaluations.

In order to test whether either of these phenomena materialize as a result of a place-based intervention, “catchment locations” (Weisburd and Green 1995:354) are typically drawn immediately surrounding targeted locations. For both theoretical and practical reasons (see Bowers and Johnson 2003), these catchment locations typically extend about two blocks past the intervention location. Investigators then draw crime or call for service counts from these geographic locations and estimate, relative either to control locations (Ratcliffe et al. 2011) or to similar catchment locations drawn around control locations (Braga et al. 1999), whether there were any significant changes in crime incidents or 911 calls from before, to during or after an intervention. For the analysis of displacement/diffusion, boundary noncompliance could be problematic.

Just as dosages of policing applied in control locations may cause an evaluator to incorrectly label a police intervention ineffective or underestimate its effect size, policing that occurs in areas surrounding target locations intended to be used to estimate displacement/diffusion could cause the evaluator to (1) incorrectly label a direct benefit of receiving a dosage of treatment as a diffusion of crime control benefits; (2) underestimate the extent of spatial crime displacement due to the possibility of offense reduction as a result of receiving a dosage of treatment; and (3) fail to detect significant crime displacement altogether when this may have occurred had the unintended dosage of treatment been absent. Although some have made efforts to monitor and ensure differences in the dosage of policing in treatment areas relative to controls, it is not common practice to consider or report whether and to what extent the treatment spilled into catchment locations. Given that catchment locations are often contiguous to target area boundaries, the need to monitor possible boundary adjustment is especially pertinent.

Exploring Boundary Adherence

In order to investigate this topic, we draw from data collected during post-experiment focus groups with a subset of the police officers involved in the Philadelphia Foot Patrol Experiment (Ratcliffe et al. 2011).² This 2009 randomized field experiment tested the crime reduction benefits of having 240 police officers patrol, on foot, in 60 of Philadelphia’s most violent crime hot spots relative to 60 control beats. Results indicated that violent crime was 23 percent lower in treatment locations during the experimental period relative to control locations, notwithstanding a slight amount of crime

displacement at the streets nearby. As part of the evaluation, field researchers performed walk-alongs with the officers involved in the experiment (Wood, Sorg et al. 2013). As Ratcliffe et al. (2011:807) noted, these observations revealed that some of the officers would leave their beats and patrol at nearby areas of interest from time to time. The field observation study further noted that officers felt constrained by boundaries that they themselves did not help to define. The need to remain in set areas, especially when they perceived that criminals were adapting their spatial offending behaviors over time, was seen as limiting and essentially counterintuitive (Wood, Sorg et al. 2013). This issue of spatial boundary adherence was therefore explored further in the post-experiment focus groups, with an emphasis on how they viewed the boundaries of their beats and whether they transgressed them (and why).

Post-experiment Focus Groups

The issue of boundary adherence was explored in two ways during the focus groups. First, officers were given a map of their respective beats and asked to delineate the approximate boundaries of their active beats, or the locations that they actually patrolled, not just the boundaries that they were told to patrol. The hard copy maps were digitized for analysis using a geographic information system. These data are used to explore the extent to which officers patrolled outside of their beats and within catchment and control locations. We also present issues raised by officers during the focus groups which related to boundary adherence and the rationales for leaving their beats, despite being instructed not to. The first focus group was held on February 9, 2010, and the final focus group was held on May 12, 2010. Each focus group was allotted two hours, although sometimes the lengths differed due to variability in attendance or arrival times. In total, 20 focus groups were conducted. Although all but one of the foot beats were represented in the mapping exercises ($n = 59$), scheduling conflicts impeded interviewing all of the officers involved in the experiment, and in a very small number of cases due to logistical issues, officers filled out maps, but did not participate in the focus groups. In total, 124 (51.6 percent) officers drew maps of their active beat areas.³

Mapping Exercise Results

Of the subset of officers involved in the experiment, all reported patrolling at locations outside of the experimental foot beats that they were initially

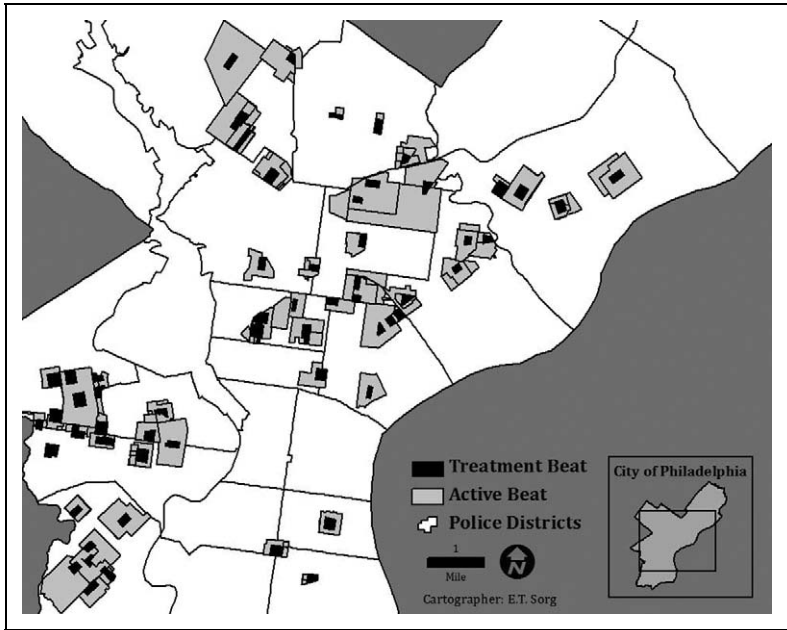


Figure 1. Treatment versus active foot beat boundaries.

Note: Treatment beats are the beats that officers involved in the focus groups were assigned to patrol ($n = 59$). Active beats are the beats officers drew during the focus groups representing where they actually patrolled ($n = 128$). Some active beats overlap each other.

assigned to patrol. The average foot beat as delineated at the onset of the experiment was .03 square miles (standard deviation [SD] = .01), contained approximately 21 street segments ($SD = 8.50$) and included 1.3 miles of streets ($SD = .40$). In contrast, the officers' active beats averaged .16 square mile ($SD = .17$), 119 street segments ($SD = 87.18$), and 7 miles of streets ($SD = 5.44$). When the officer's active beats are mapped alongside their assigned treatment beats as shown in Figure 1, it is clear that some active beats extended well past the originally delineated beat geographies.

In addition to examining the relative differences, we explored the extent to which the officers' active beats overlapped control locations. We found that officers drew active beat boundaries that to some extent overlapped 18 of the locations operationalized as control beats (30 percent). As depicted in Figure 2, the extent to which the controls were patrolled varied somewhat: 8 of the control foot beats (13 percent) were completely encompassed within

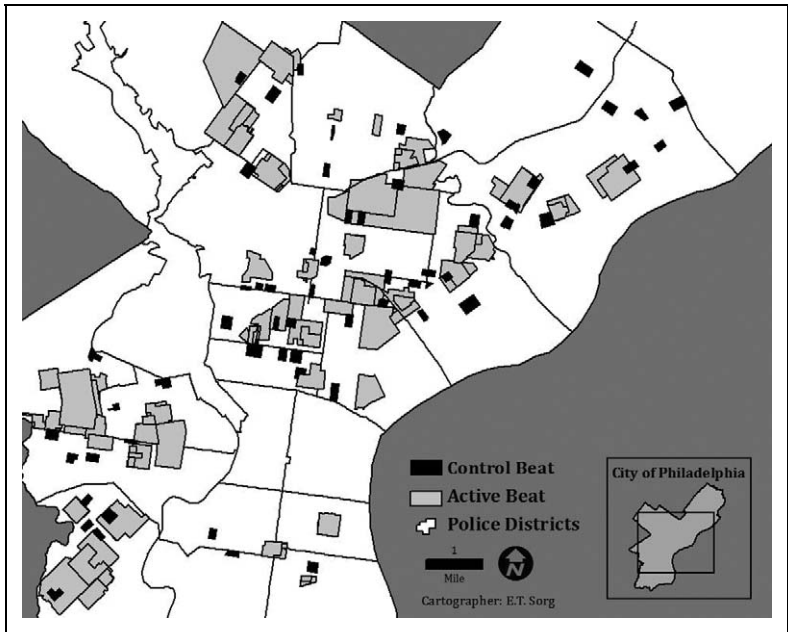


Figure 2. Control versus active foot beat boundaries.

the officer's active beats, whereas 10 were only partially patrolled (17 percent). In total, the control areas consisted of 1.8 square miles worth of land. The officer's active beats overlapped 0.35 square miles (21 percent) of the geographic locations operationalized as controls.

When the catchment locations are mapped in relation to the active beats, a great deal of overlap is evident (Figure 3). Of the 55 catchment locations,⁴ 12 were completely encompassed by the officer's active beats. All of the catchment locations received at least some dosage of patrol as measured by the officer's active beats.⁵ The geographic extent of all catchment locations was 4.3 square miles. The officers' active beats overlapped 3.3 square miles (77 percent) of the geographic locations that were operationalized as catchment locations. All results from the mapping exercise appear in Table 1.

In summary, our mapping exercise revealed that all of the officers reported policing outside of their beats and that a number of control locations and all of the catchment locations received at least some dosage of police foot patrols that were intended to be reserved only for target

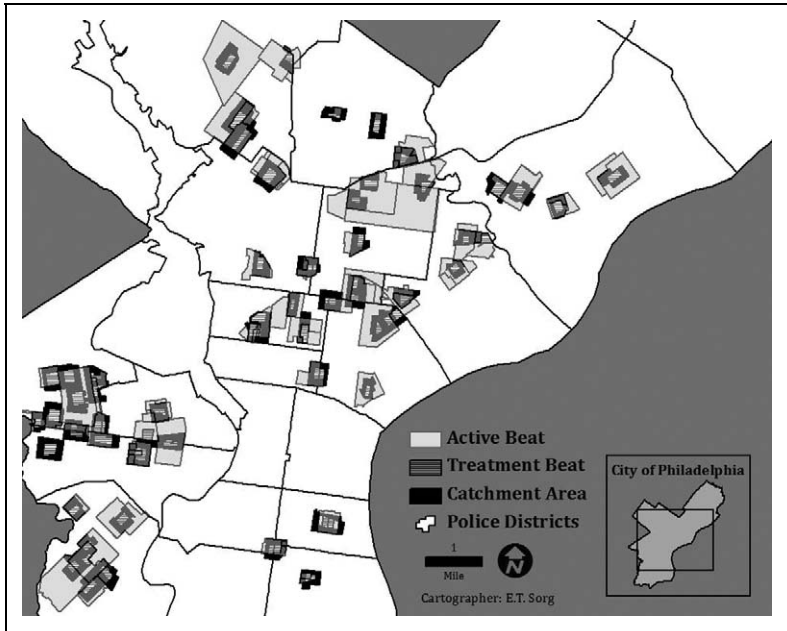


Figure 3. Active and treatment beats versus catchment areas.

locations. This occurred even after being instructed to patrol within the boundaries of their beats at the onset of the experiment. One shortcoming of these data is that we do not have estimates of how long or how frequently officers patrolled outside of their beats, just that they spent some time at these locations. When this question was raised during walk-alongs with the officers, they reported spending most of their time within their beats, yet leaving every once in a while for a variety of reasons. Thus, the active beats represent the maximum geographic extent they ever patrolled. We discuss these reasons subsequently.

Why Patrol Outside of Assigned Beats?

Officers reported leaving their assigned beats for a variety of reasons. Some officers reported becoming bored over time, and noted that they occasionally left their beats simply to break up the monotony of eight hours of patrolling relatively restricted locations. Other officers explained that they left their beats in response to perceived spatial displacement. If they were

Table 1. Size Differences between Actual and Active Foot Beats.

	Square Miles	<i>n</i> of Street Segments	Miles of Streets	Controls Overlapped (% of Area Patrolled) ^b	Catchments Overlapped (% of Area Patrolled) ^b
Actual beats	.03	21	1.3	—	—
Active beats	.16	119	7	18(21)	54(77) ^c
Active versus actual ^a	+.13	+98	+5.7	—	—

Note: ^aActive versus actual = difference in size of active beat relative to treatment beat. Control *n* = 60; Catchment *n* = 54.

^b% of Area Patrolled = percentage of land designated as control or catchment locations that officer's active beats overlapped (square miles).

^cOne catchment location was excluded because no officers from the beat participated in a focus group.

aware of a problem that had moved from their beat to a nearby location, they would leave their beats to address the situation. Likewise, some officers believed that the perceived offenders in their beats became cognizant of the boundaries they were patrolling, so they left their beats to enhance the element of surprise. It didn't take long (1–3 weeks), officers suggested, for criminals such as drug dealers to learn not only their boundaries, but their patrol schedules as well (when they started and ended their shift). It was suggested by some officers that criminals engaged in illicit activities during hours that foot beats weren't operational (between 2:00 a.m. and 10:00 a.m.). In short, many were of the view that they simply “delayed” crime or moved it.

Since criminals were seen as highly adaptive, the police also felt they needed to have the capacity to adapt as well. More fundamentally though, given their rookie status, line officers necessarily did not participate in delineating boundaries at the outset of the experiment, nor did they provide input into whether, or how they should be adjusted over time. However, as the officers gained local knowledge, a larger disconnect developed between officer local knowledge and the “formal” or “bureaucratic” knowledge involved in the design and evaluation of the experiment. Officers learned about the problem areas, which could potentially guide ongoing patrol decisions to maximize their effectiveness. Their knowledge of such trouble spots was granular and accumulated over time. However, the experimental design did not provide officers the scope to adjust their beat areas, as this knowledge deepened. Building on suggestions by Thacher (2001), we have argued elsewhere (Wood, Sorg et al. 2013) that

including line officers at the onset of experiments through scenario-based exercises might help researchers anticipate boundary adherence concerns and work to address them prospectively. In sum, experimental protocols may impede estimating the benefits of hot spots policing programs as they would be carried out in the real world, and thus should be supplemented with other types of rigorous designs.

Discussion

Recent work by Telep et al. (2012) found that intermittent 15-minute patrols at hot spots significantly reduced crime in areas targeted relative to controls. Their work suggests that even relatively low dosages of focused police patrol presence can influence crime. Therefore, it appears that even minor instances of boundary adjustment can bias the accuracy with which treatment effects and, perhaps more so, the estimation of displacement/diffusion. Although we cannot comment on the extent to which violations of boundary adherence occurred in other place-based studies, our analysis suggests that there may be some merit to Rosenbaum's (2006) concern that some diffusion effects that have been reported may be the result of boundary misspecification. Although a diffusion of benefits has been documented more often than spatial displacement during place-based policing evaluations,⁶ the validity of these findings are difficult to assess, as previous studies generally do not report levels of boundary adherence or whether boundary adjustment occurred.

Implications for the Philadelphia Foot Patrol Experiment

The Philadelphia Foot Patrol Experiment found evidence of displacement to adjacent locations, despite the fact that officers patrolled at these locations to some extent. It may be that the dosage applied in catchment locations was not great enough to influence the extent of offending at adjacent locations. It may also be that this patrolling led to an underestimation of the extent of spatial displacement. These conclusions are clearly speculative, as we have no way of knowing the impact that these violations had. Nevertheless, it is clear that police patrol within the catchment locations during the experiment is problematic and may have impacted the accuracy with which displacement was measured, despite the fact that most officers reported spending the vast majority of their time within the beats they were assigned. At the same time, the fact that officers also patrolled within control

locations to varying degrees raises the possibility that the net treatment effect could have been underestimated. Again, we can only speculate.

Moving Forward with Place-based Evaluations

Weisburd (2005:236) suggests that evaluations involving organizations with a ranking structure or hierarchical control are easier to implement, as it allows the experimental design to be imposed upon line officers who are most often tasked with implementing policing treatments. At the same time, however, the local knowledge that officers develop about their areas over time may lead to a growing concern about the “artificiality” of experimental boundaries. To the extent possible, given the modest funding for the foot patrol experiment, experimental protocols were monitored via four field observations at each of the 60 targeted hot spots. Nevertheless, and even after being told to patrol only within their designated beats, rigid compliance to the experimental boundaries was not achieved. It appears that coercion via a ranking structure may not always be sufficient to ensure implementation fidelity and may depend on the organization under study. This also speaks to the extensive latitude given to patrolling police officers, even when new to the job. Given these findings, we suggest ways in which boundary adherence might be anticipated, monitored, quantified, and addressed in future research.

The Telep et al. (2012) study mentioned previously used automatic vehicle locator (AVL) information to ensure that the dosage of time officers were spending at hot spots was in line with what was prescribed (12- to 16-minute stops). Although not all departments employ AVL, this technology could be useful for monitoring patrol time in catchment and control locations and discerning whether this dosage approached what was applied in target areas. In studies where a “security-guard style presence” (Sherman and Weisburd 1995:634) is the treatment, researchers could discern the extent to which officers strayed from targeted areas by monitoring the geographic extent that officers patrol. Future evaluations with organizations that utilize AVL or similar technology have the opportunity to not only ensure dosage compliance as was the case in the Telep et al. (2012) study, but also the degree to which a treatment dosage was applied in catchment and control locations.

Although randomized experiments are considered the gold standard in evaluation research, Eck (2003:101) has suggested that it may be necessary for crime scientists to “go off the gold standard” in certain instances, such as for problem-oriented policing evaluations. Certain quasi-experimental, *ex post facto* designs might offer a practical and methodologically rigorous

alternative to experimental evaluations of the effects of place-based policing programs when strict compliance to experimental protocols is questionable. This has the added benefit of estimating the impact of policing strategies, as they would be carried out in the real world and not under experimental constraints imposed by researchers. Braga et al.'s (2011) ex post facto evaluation of a problem-oriented policing program in Boston (MA) is a promising framework (but see Shadish 2013). Using propensity score matching methods to identify equivalent street segments and street corners, the authors present a robust quasi-experimental framework for evaluating place-based policing programs. One advantage of an ex post facto evaluation is that all locations that received a dosage of policing are known prior to analysis and therefore target, control and catchment locations can be specified with greater precision.

In short, future work must monitor and document the extent to which boundaries are contested, both at the outset of experiments and especially over time, so that the validity of an identified diffusion of crime control benefits can be gauged. More fundamentally, efforts should be made to ensure line officer buy-in to randomized controlled experiments during the design and implementation phases (Wood, Sorg et al. 2013). This could be achieved by seeing them, as one officer put it, as "equal partner[s]" in innovation. During the course of interventions, opportunities could be created for listening to officers and integrating (or even interrogating) their local knowledge with the data acquired through crime and spatial analyses. If officers are treated as experimentalists in their own right, there may be a greater potential to ensure implementation fidelity generally and boundary adherence specifically.⁷ Discussing the importance of boundary compliance and the evidence regarding the benefits of patrolling in relatively small locations at the onset may also help ensure boundary adherence. In a related vein, revealing control locations to officers, which is often avoided due to the possibility of contamination, could be one method of ensuring that police do not apply dosages of treatment to locations used for comparisons.⁸

Limitations

Several limitations of our analysis deserve discussion. First, the Philadelphia Foot Patrol Experiment was unique in many ways when compared to previous hot spot studies. All of the officers that acted as treatment providers were rookies. Young and inexperienced officers may be especially proactive in performing stops, making arrests, and seeking out criminal and disorderly behaviors. It may be that this

increased the extent to which they contested the boundaries to which they were assigned. In addition, the hot spots in the experiment were larger than previous hot spot studies, and the officers patrolled the locations for their entire eight-hour shift. Having more area to patrol may have lessened the extent to which officers strayed from their beats. At the same time, patrolling the same location for many hours may have increased the extent of boundary adjustment. Finally, the experiment was carried out with very limited funding relative to previous hot spots policing experiments. Because of this, systematic observations were limited to four site visits per hot spot. Well-funded evaluations may have been better able to monitor as well as better understand issues of boundary compliance than the experiment involved here. Finally, although unlikely to affect the overall findings, it may be that officer recall regarding the size of their beats was diminished due to the time that lapsed between the experiment and the focus groups.

Closing Comments

This research note was intended to illustrate the importance of understanding and measuring boundary adherence so that future research more explicitly considers this threat to a study's internal validity. The majority of previous place-based evaluations exploring the effects of displacement/diffusion do not report the extent to which officer's patrol in areas used to estimate displacement/diffusion. Given that these locations typically adjoin target areas, the possibility that these locations will receive dosages of treatment intended to be reserved only for target locations seems high. We conclude that there may be merit to Rosenbaum's (2006) concern that some diffusion of benefits reported may reflect a misspecification of target area boundaries. We suggest that future research be designed to anticipate, monitor, quantify, and report boundary adjustment, based on the reality that such contestation may be unavoidable in real-world experiments.

Declaration of Conflicting Interests

The author(s) declared no potential conflicts of interest with respect to the research, authorship, and/or publication of this article.

Funding

The author(s) disclosed receipt of the following financial support for the research, authorship, and/or publication of this article: Aspects of the Philadelphia Foot Patrol Experiment were funded through the Robert Wood Johnson Foundation's national

program for Public Health Law Research and the Temple University College of Liberal Arts Research Award (CLARA) Program.

Notes

1. For example, during the Philadelphia Foot Patrol Experiment, we would expect control locations to not receive foot patrols, though normal patrol operations would continue in the control locations. In studies of increased patrols, we would be referring to the increased patrol dosage being applied in targeted areas and that control areas receive only conventional dosages of patrols.
2. See Ratcliffe et al. (2011) for more information about the experimental design and analysis.
3. We note that a separate article by Wood, Taylor, et al. (2013) report that 129 officers participated. This article is limited to 124 maps that could be analyzed for our purposes here.
4. Because some of the foot beats were in close proximity to each other, 10 of the foot beats shared a catchment location with another beat.
5. All but one of the foot beats had at least one officer attend the focus groups, and therefore this one beat did not have any active beat overlap and is excluded from the analysis.
6. See Gurette and Bowers' (2009) evaluation of situational crime prevention strategies which estimate displacement/diffusion.
7. We should note that we are not advocating changes be made to treatment areas be made during a randomized trial but rather that the information is collected and used to interpret the results of an intervention and to design subsequent tests.
8. We would like to thank one of the anonymous reviewers for making this interesting suggestion.

References

- Bowers, K. J. and S. D. Johnson. 2003. "Measuring the Geographical Displacement and Diffusion of Benefit Effects of Crime Prevention Activity." *Journal of Quantitative Criminology* 19:275-301.
- Braga, A. A. 2005. "Hot Spots Policing and Crime Prevention: A Systematic Review of Randomized Controlled Trials." *Journal of Experimental Criminology* 1:317-42.
- Braga, A. A. 2007. "The Effects of Hot Spots Policing on Crime." *Campbell Systematic Reviews* 1:1-36.
- Braga, A. A., D. M. Hureau, and A. V. Papachristos. 2011. "An Ex Post Facto Evaluation Framework for Place-based Police Interventions." *Evaluation Review* 35:592-626.

- Braga, A. A., A. V. Papachristos, and D. M. Hureau. 2012. "The Effects of Hot Spots Policing on Crime: An Updated Systematic Review and Meta-analysis." *Campbell Systematic Reviews* 1-31.
- Braga, A. A., D. L. Weisburd, E. J. Waring, L. Green Mazerolle, W. Spelman, and F. Gajewski. 1999. "Problem-oriented Policing in Violent Crime Places: A Randomized Controlled Experiment." *Criminology* 37:541-80.
- Eck, J. E. 2003. "Police Problems: The Complexity of Problem Theory, Research and Evaluation." *Crime Prevention Studies* 15:79-114.
- Guerette, R. T. and K. J. Bowers. 2009. "Assessing the Extent of Crime Displacement and Diffusion of Benefits: A Review of Situational Crime Prevention Evaluations." *Criminology* 47:1331-68.
- Ratcliffe, J. H. and T. Makkai. 2004. *Diffusion of Benefits: Evaluating a Policing Operation*. Canberra, Australia: Australian Institute of Criminology.
- Ratcliffe, J. H., T. Taniguchi, E. R. Groff, and J. D. Wood. 2011. "The Philadelphia Foot Patrol Experiment: A Randomized Controlled Trial of Police Patrol Effectiveness in Violent Crime Hotspots." *Criminology* 49:795-831.
- Repetto, T. A. 1976. "Crime Prevention and the Displacement Phenomenon." *Crime and Delinquency* 22:166-77.
- Rosenbaum, D. P. 2006. "The Limits of Hot Spots Policing." Pp. 245-63 in *Police Innovation: Contrasting Perspectives*, edited by David Weisburd and Anthony A. Braga. New York: Cambridge University Press.
- Shadish, W. R. 2013. "Propensity Score Analysis: Promise, Reality and Irrational Exuberance." *Journal of Experimental Criminology* 9:129-44. doi:10.1007/s11292-012-9166-8.
- Sherman, Lawrence W. 1990. "Police Crackdowns: Initial and Residual Deterrence." *Crime and Justice* 12:1-48.
- Sherman, L. W. and D. P. Rogan. 1995. "Effects of Gun Seizures on Gun Violence: "Hot Spots" Patrol in Kansas City." *Justice Quarterly* 12:673-93.
- Sherman, L. W., D. P. Rogan, T. Edwards, R. Whipple, D. Shreve, D. Witcher, W. Trimble, R. Velke, M. Blumberg, A. Beatty, and C. A. Bridgeforth. 1995. "Deterrent Effects of Police Raids on Crack Houses: A Randomized Controlled Experiment." *Justice Quarterly* 12:755-81.
- Sherman, L. W. and D. Weisburd. 1995. "General Deterrent Effects of Police Patrol in Crime "Hot Spots": A Randomized, Controlled Trial." *Justice Quarterly* 12: 625-48.
- Telep, C. W., R. J. Mitchell, and D. Weisburd. 2012. "How Much Time Should the Police Spend at Crime Hot Spots? Answers from a Police Agency Directed Randomized Field Trial in Sacramento, California." *Justice Quarterly* 31:165-93.
- Thacher, D. 2001. "Policing is not a Treatment: Alternatives to the Medical Model of Police Research." *Journal of Research in Crime and Delinquency* 38:387-415.

- Weisburd, D. 2005. "Hot Spots Policing Experiments and Criminal Justice Research: Lessons from the Field." *The Annals of the American Academy of Political and Social Science* 599:220-45.
- Weisburd, D. and L. Green. 1995. "Measuring Immediate Spatial Displacement: Methodological Issues and Problems." *Crime and Place* 4:349-61.
- Weisburd, D., L. A. Wyckoff, J. Ready, J. E. Eck, J. C. Hinkle, and F. Gajewski. 2006. "Does Crime Just Move around the Corner? A Controlled Study of Spatial Displacement and Diffusion of Crime Control Benefits." *Criminology* 44:549-91.
- Wood, J., E. T. Sorg, E. R. Groff, J. H. Ratcliffe, and C. J. Taylor. 2013. "Cops as Treatment Providers: Realities and Ironies of Police Work in a Foot Patrol Experiment." *Policing in Society*. 1-18. doi:10.1080/10439463.2013.784292.
- Wood, J., C. Taylor, E. Groff, and J. Ratcliffe. 2013. "Aligning Policing and Public Health Promotion: Insights from the World of Foot Patrol." *Police Practice and Research: An International Journal*. 1-13. doi:10.1080/15614263.2013.846982.

Author Biographies

Evan T. Sorg is a doctoral student in the Department of Criminal Justice, Temple University, Philadelphia, PA; a research associate at Temple University's Center for Security and Crime Science; and a former New York City police officer. He received his BA (2009) and MA (2011) in criminal justice from Temple University. He has published research involving policing, program evaluation, and environmental criminology in journals such as *Criminology*, *Journal of Criminal Justice*, and *Policing and Society*.

Jennifer D. Wood (PhD in criminology, 2000, University of Toronto) is an associate professor in the criminal justice department at Temple University. Her research interests include policing and security, regulation, public health law, and qualitative research. She is the coauthor, with Clifford Shearing of *Imagining Security* (2007, Willan), and the coeditor, with Benoît Dupont of *Democracy, Society and the Governance of Security* (2006, Cambridge).

Elizabeth R. Groff (PhD in geography, 2006, University of Maryland) is an associate professor in the criminal justice department at Temple University. Her research focuses on place-based criminology and policing which she investigates using geographic information systems, randomized controlled experiments, and agent-based simulation models.

Jerry H. Ratcliffe is a professor in the Department of Criminal Justice at Temple University. His work has examined the intersection of information/intelligence systems and police decision making, spatial analysis, intelligence-led policing, and crime reduction. He is a former police officer currently working on research projects with the Philadelphia Police Department and the Criminal Investigative Division of the FBI.