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Displacement of crime and diffusion of crime control benefits in large-scale geographic areas: a systematic review

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Abstract
Objectives To conduct a systematic review examining the extent to which there is crime displacement or a diffusion of crime control benefits in social control interventions implemented in medium sized or large geographic areas.
Methods A number of search strategies were used to identify and code eligible experimental or quasi-experimental studies that measured displacement in areas larger than crime hot spots. A total of 33 publications covering 43 quasi-experimental studies were identified as eligible. Nineteen of these publications covering 20 studies were included in a meta-analysis.
Results The narrative results overall suggest that displacement is not a common occurrence in interventions implemented at larger units of geography and a diffusion of crime control benefits is somewhat more likely to occur. The effect sizes from the meta-analyses suggest that, while the interventions, on average, were associated with a significant decline in crime, displacement was not likely to occur. The meta-analyses found no significant overall evidence of displacement or a diffusion of benefits.
Conclusions These findings are in line with previous reviews that have focused on displacement at smaller geographic units. When examining larger geographic scales

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and a broader array of interventions, spatial displacement is still a fairly unlikely occurrence.

Keywords Diffusion of benefits · Displacement · Large areas · Meta-analysis · Systematic review

Introduction

A series of reviews have found that spatial displacement is an uncommon outcome in place-based interventions (e.g., see Barr and Pease 1990; Bowers et al. 2011a; Guerette and Bowers 2009; Hesseling 1994; Johnson et al. 2012). When there is evidence of displacement, the amount of crime displaced tends to be far less than the amount of crime prevented by the initiative. Research also suggests that a "diffusion of crime control benefits" (Clarke and Weisburd 1994) to surrounding areas is a more common occurrence (Bowers et al. 2011a). Much of the primary research on displacement and most of these reviews have focused on interventions implemented at "micro-places" such as crime hot spots. Because formal social control interventions are often implemented at larger geographic units (e.g., police beats and districts, cities, jurisdictions), it is also important to examine displacement and diffusion of crime control benefit outcomes in broadly targeted place-based interventions. We conducted a systematic review in order to synthesize evidence on crime displacement and diffusion that results from formal social control interventions in larger areas.

Our main question is to what extent do formal social control interventions targeted at meso- or macro-places lead to spatial displacement of crime or diffusion of crime prevention benefits? Our results overall suggest that displacement of crime is not very common as a result of policing and other governmental interventions at a range of larger geographic scales. While there has only been limited research to date on interventions in very large macro-geographic areas, successful police interventions at meso-units larger than hot spots (e.g., neighborhoods or police beats) follow the pattern of studies at micro-geographic units. Crime displacement is not inevitable and it appears that a diffusion of crime prevention benefits is just as likely or a more likely outcome. We briefly review the existing literature on crime displacement before discussing our methodology for the review. We then turn to a more detailed description of our results before concluding with a discussion of the implications of our findings for future place-based crime control efforts and research on displacement and diffusion.

Background literature

Although there is growing evidence that formal social control, primarily in the form of police activity, can have an impact on crime at the specific areas where efforts are focused (Telep and Weisburd 2012; Weisburd and Eck 2004), such approaches risk shifting crime or disorder to other places where programs are not in place or to other times, targets, offenses, tactics, or offenders. This phenomenon is usually termed *displacement*, and it has been a major reason for traditional skepticism about the overall crime prevention benefits of place-based prevention efforts (see Reppetto 1976). The

majority of research has focused on spatial or place-based displacement. The idea of spatial displacement can be traced to early work by sociologists who noted the role of opportunities for crime at places, but at the same time assumed that the concentration of crime prevention efforts at places would simply shift crime events from place to place without any clear long-term crime prevention benefit. Crime opportunities provided by places were assumed to be so numerous as to make crime prevention strategies targeting specific places of little utility for theory or policy. In turn, criminologists traditionally assumed that situational factors played a relatively minor role in explaining crime as compared with the "driving force of criminal dispositions" (Clarke and Felson 1993: 4; Trasler 1993).

The assumption that displacement is an inevitable outcome of focused crime prevention efforts has been replaced by a new assumption that displacement is seldom total and often inconsequential (e.g., see Clarke 1992; Gabor 1990; Weisburd et al. 2006). Since 1990, there have been five main reviews of empirical studies that report on displacement: Barr and Pease (1990), Eck (1993), Hesseling (1994), Guerette and Bowers (2009) (updated in Johnson et al. 2012), and Bowers et al. (2011a). All five reviews arrive at the same basic conclusions: there is little evidence that crime prevention strategies lead to displacement, and if displacement does occur it is usually offset by the amount of crime prevented.

Clarke and Weisburd (1994), moreover, suggest that scholars need to be cognizant of the reverse of displacement. They point to evidence indicating that situational and place-oriented crime prevention strategies often lead to a diffusion of crime control benefits to areas or contexts that were not the primary focus of crime prevention initiatives. Such spatial diffusion of crime control benefits has now been noted in a number of studies (e.g., Braga et al. 1999; Weisburd and Green 1995; Weisburd et al. 2006). The Weisburd et al. (2006) study, in particular, was designed explicitly to examine displacement and diffusion effects, and a wealth of data was collected in the intervention target areas and surrounding catchment areas, approximately two blocks surrounding each target area.

Only two reviews have focused explicitly on displacement and diffusion effects. Guerette and Bowers (2009) reviewed situational crime prevention studies, finding some displacement in 26 % of the 574 observations from 102 studies they examined, and a diffusion of crime control benefits in 27 % of the examined studies. Focusing only on studies reporting on spatial displacement and diffusion, they found that 37 % of the observations showed evidence of spatial diffusion while only 23 % showed evidence of spatial displacement (see also Johnson et al. 2012). As situational crime prevention tends to focus on specific situations in specific places, this review concentrates observations on what might be termed "micro" areas of geography, usually a single facility or location, or sometimes a small cluster of buildings (for example, a housing project). Bowers et al. (2011a), in a Campbell Collaboration systematic review of crime displacement in police interventions, examined a number of studies focused on smaller geographic areas such as crime hot spots (e.g., Sherman et al. 1989; Sherman and Weisburd 1995).[1] They included 44 studies in a narrative review, 16 of which also

[1] Their specific definition of a place was "a specifically defined area that is smaller than a city or region," including census blocks, police areas, housing estates, districts, suburbs, block areas, series of roads, neighborhoods, or hot spots (Bowers et al. 2011a: 16).

contained sufficient quantitative data on treatment, control, and catchment areas to perform a meta-analysis. They also found little evidence of displacement of crime, reporting that on average police interventions at micro-places are associated with significant reductions in crime, and while changes in crime in catchment areas were non-significant, the trend favored diffusion of benefits rather than displacement. In their analysis of 36 studies that contained treatment and catchment area outcomes, they also found evidence in favor of diffusion of benefits over displacement, although the finding could not be statistically tested.

Like these two reviews, much of the primary research on displacement has focused primarily on local area ("micro-place") displacement. That is, many studies have been concerned with geographically focused police initiatives at crime hot spots of a single street block, or clusters of street blocks with high intensities of specific types of crime. Indeed, some of the strongest and most persuasive evidence against the assumption of immediate spatial displacement has come from recent studies of focused interventions at crime hot spots (see Braga et al. 2012). However, displacement may also occur across larger areas ("macro-places"), such as police beats, neighborhoods, cities, regions, states, and even nations. Displacement in these contexts involves the movement of crime across administrative, governmental, and/or social boundaries as a result of larger scale interventions of formal social control (such as policing strategies and changes in laws or policies) implemented by governmental or private agencies (McIver 1981).

Teichman (2005), for example, argues such large-scale displacement can occur as a result of efforts by jurisdictions to push criminal offenders to neighboring locations (see also Broude and Teichman 2009; Marceau 1997). By increasing sanctions or the probability of detection, for example, a jurisdiction could change a criminal's opportunity costs and, for certain financially motivated crimes, make it worth the offender's effort to displace to a neighboring jurisdiction with less severe sanctions. Teichman (2005) pointed to the Michigan Auto Theft Prevention Authority as an example, noting that increased enforcement efforts against auto theft and chop shops displaced auto thieves to neighboring and nearby states such as Wisconsin and Illinois.

Anecdotal evidence of large-area displacement can even be found at a global level. The United Nations World Drug Report (2007: 16), for instance, describes displacement on a larger scale in regards to international methamphetamine markets, noting that "[i]mproved controls in Canada and further tightening of controls in the USA have led to a decline in the number of clandestine laboratories operating within the USA and a shift of production across the border to Mexico. However, Mexico has now also improved its precursor control regime, prompting drug trafficking organizations to exploit other areas, such as Central America and possibly Africa." National drug control policy may thus have been responsible for pushing methamphetamine laboratories across international borders. These examples suggest that displacement in larger areas could be more likely for crimes in which there is a strong potential for financial gain. Interviews with drug smugglers, for example, suggest that potential massive payouts (even if the actual gain is far less) are one major motivator for offender involvement (Decker and Chapman 2008). Thus, this

activity may be more likely to be displaced in the face of enforcement activity because of a recognized potential for continued significant financial gains due to strong user demand for illegal drugs.[2]

The belief that displacement may be occurring at larger units of geography is not universal, however. In one of the first works to discuss spatial displacement, Reppetto (1976) argues that displacement in large-scale interventions might be even less common than more micro-scale displacement. He notes, "Probably the programs least subject to displacement would be those based on large areas rather than on individual targets, since securing only buses, stores, or particular streets while leaving nearby subways, homes, and other streets unprotected is likely to be unproductive" (Reppetto 1976: 176). It could be the case then that well-implemented and comprehensive larger-scale programs lead to less displacement because offenders would have to travel a great deal to find the same opportunities to offend.

Weisburd et al. (2012) have recently argued that the "tight coupling" of crime to place helps explain the stable concentration of crime in micro-units of geography. The stability of street-level factors explaining crime concentrations and the heterogeneity of surrounding streets helps explain why crime may not easily move around the corner. These ideas of tight coupling are especially relevant to micro-units of geography, but may also be applicable to more macro-units. If the police increase enforcement in one high crime neighborhood, it may not be easy for offenders to move their activity to surrounding neighborhoods if these places do not provide the same opportunities to offend. Additionally, as Weisburd et al. (2006) found, offenders are often reluctant to relocate criminal activity because of a lack of familiarity with surrounding areas or because of a recognized danger of infringing on the territory of other offenders or groups.

While less attention has been given to diffusion at larger units of geography, Weisburd and Telep (2012) review a number of arguments for why diffusion may occur, some of which are applicable at the neighborhood level. Clarke and Weisburd (1994), for example, argue that offenders may be unaware of the boundaries of interventions and thus may overestimate their risk of apprehension in surrounding areas and also avoid offending in these places. This remains possible in larger units of geography. Mears and Bhati (2006: 537) point to another potential mechanism and argue that "the influence of an initiative aimed at reducing community disadvantage may have positive ripple effects that extend to other communities in geographic and social space, especially insofar as social networks and ties are not constrained by neighborhood boundaries." Thus, a diffusion of crime control benefits could occur as residents in one neighborhood communicate with those in nearby areas about their positive experiences, potentially enhancing levels of social organization in both places. Others have focused on market-based explanations for a diffusion of benefits (see Taniguchi et al. 2009). Zielenbach and Voith (2010), for example, examine how the redevelopment of public housing projects affected

[2] These same levels of motivation likely do not exist for crimes with less potential rewards. As one anonymous reviewer noted, "it seems unlikely that a bag thief will travel 100 miles to commit a crime denied to them."

crime and property values in surrounding neighborhoods. They find evidence suggestive of a diffusion of crime control benefits and frame these findings in the context of overall economic spillover benefits resulting from improved housing markets surrounding the newly developed public housing sites.

The study of large-area displacement is important because, despite the extent of research on micro-places, many police interventions take place at geographic units larger than hot spots. For example, the Evidence-Based Policing Matrix, a compilation of rigorous policing evaluation studies (Lum et al. 2011), suggests that police are frequently targeting crime and disorder at the neighborhood level. While 29 of the 124 studies included in the Matrix (23.4 %) focused on crime micro-places, 42 (33.9 %) used the neighborhood as the unit of analysis. Six studies used the jurisdiction as the unit of analysis. While the Matrix did not systematically assess displacement and diffusion effects in these studies, these results suggest the importance of understanding the relationship between formal social control interventions at larger geographic units and displacement/diffusion of crime.

Does displacement operate differently at these larger geographic levels? There are several reasons to question the applicability of the findings on displacement and diffusion of crime control benefits in micro-places to larger geographic units. First, the types of interventions used in larger areas are often different from those applied to smaller places. For example, changes in the law that could result in crime (or benefits) shifting across boundaries clearly apply to an entire jurisdiction, rather than a small group of street blocks. Further, any type of intervention applied over a larger area will necessarily differ from those applied to small areas in terms of intensity, focus, and dosage, which could affect displacement and diffusion outcomes. Second, displacement across administrative areas may differ from displacement across hot spots or other small areas that are not "officially" defined. For example, offenders may find it more difficult to move to a different area when the area is large (it may not be practical to move to a new city), but there could also be benefits in such moves, such as avoiding social control agents like the police by crossing administrative borders. A third and related point is that differences in enforcement are more clear-cut across administrative boundaries than small areas. Finally, socioeconomic composition and behavioral norms may vary more widely across large places than small ones, and could also be related to the mechanisms by which displacement and diffusion occur. The theory of crime displacement is still in an early stage of development and the reasons for these potential differences are not yet fully understood; however, investigating whether there is evidence for these differences could help to inform theoretical advances.

Thus, we felt it important to undertake a systematic assessment of what we know about displacement and diffusion of crime control benefits in broadly targeted place-based interventions. We wanted to more rigorously assess the claim, largely from anecdotal evidence, that large-scale displacement may be a greater problem than displacement resulting from micro-scale interventions. The objective of this review was to synthesize the extant empirical evidence (published and unpublished) on crime displacement and diffusion of crime prevention benefits across medium and large geographic units as a result of formal social control interventions.

Methods

Criteria for inclusion

To be included in the review studies had to meet five main criteria:

1. The main intervention must have been an instance of formal social control, such as a law enforcement strategy targeted at a particular beat or neighborhood; or a legal or policy change. The instance of formal social control must have been implemented with the explicit purpose of controlling or preventing crime or disorder.
2. The intervention must have been targeted at a "meso-" or "macro-" geographic area. We define meso- and macro-areas as larger geographic units at which crime prevention resources are organized and can be distributed. That is, these units have some form of administration or government with at least some control over how crime is addressed in that unit. These include police beats, police districts or precincts, cities, jurisdictions or counties, states, and countries. We included non-administrative units only when they are specifically defined in the intervention as representing "neighborhoods" or "communities." We recognize our examination of macro-level displacement at geographic areas overlaps somewhat with the Bowers et al. (2011a) review described above. Bowers and colleagues included some police interventions that focused on neighborhoods or police precincts within a city. Our review takes a more expansive view of the macro-level, so, while there is overlap that we discuss more below, we also collect studies using larger geographic units than Bowers et al. considered. Additionally, we do not limit our review to only police interventions, so we also take a more expansive view of what constitutes crime prevention efforts at geographic areas.
3. The intervention must have been assessed using at least one crime- or disorder-related outcome. This could include measures related to total crime or disorder or total amount of a particular crime or disorder type.
4. The study must have measured spatial displacement and/or diffusion effects. Displacement and diffusion effects need not be the sole focus of the evaluation, but they must be explicitly measured as part of the evaluation.
5. We included randomized experiments or quasi-experiments with a comparison group that did not receive the intervention or change in conditions, as well as quasi-experiments that adjusted for secular trends (e.g., citywide crime rates), in our main analysis.

We recognized that many studies of displacement and diffusion are likely to simply look at pre-post changes in the target and surrounding areas (i.e. not make use of a comparison group). We think these studies are highly vulnerable to historical validity biases. It is sometimes argued that a decrease in crime in the target area but an increase in the surrounding areas would provide a reasonable case for a displacement effect even without a comparison group or adjustment for secular trends. However, even here, the displacement effect could simply represent a secular trend, while the target area effect represented the success of the intervention in offsetting a general secular trend. Because of our concern with drawing conclusions from such studies, we made an initial decision to avoid including these studies in our main analysis.

Search strategy for identification of relevant studies

Several strategies were used to perform an exhaustive search for literature fitting the eligibility criteria. First, a keyword search was performed on an array of online abstract databases.[3] Second, we reviewed the bibliographies of past reviews of crime displacement (e.g. Barr and Pease 1990; Eck 1993; Hesseling 1994; Guerette 2009; Guerette and Bowers 2009; Bowers et al. 2011a). Third, we performed forward searches for works that have cited seminal displacement studies.[4] Fourth, we reviewed abstracts of leading journals in the field.[5] Fifth, we searched the publications of several research and professional agencies. Sixth, we emailed a preliminary list of eligible studies to leading scholars knowledgeable in the area of crime displacement and diffusion of crime control benefits in an effort to identify any additional relevant studies. Our initial searches were conducted in the spring and summer of 2011 with supplemental searches conducted in the fall of 2013.

Details of study coding categories

All eligible studies were coded on a variety of criteria. A full coding sheet is available in Weisburd et al. (2011). After coding basic reference information, we recorded information on the nature of the target and comparison sites, the unit of analysis for the intervention, the sample size for the intervention, and what exactly the intervention entailed. We also coded the strategy used for measuring displacement and diffusion and the nature of the catchment area(s). We described any implementation difficulties described by the authors and coded the methodology of the evaluation. We noted any statistical tests completed, and we coded any results from tests of statistical significance. For calculating effect sizes, we included pre and post counts or rates of crime in treatment, control, and catchment areas when these were available. Finally, we detailed the conclusions drawn by the authors about the main effects of the intervention (was crime reduced?) and whether there was evidence of displacement or diffusion.[6] If there was evidence of displacement or diffusion, we recorded any explanations provided by the authors.

Statistical procedures and conventions

When possible, meta-analytic procedures were used to combine data from studies. For eligible studies with enough data present, effect sizes were calculated using an approach first described by Farrington and colleagues (2007). Reviews of displacement offer a special challenge in meta-analysis because rather than a simple treatment–control comparison of outcomes, we are interested in whether the change in crime in the catchment areas (the places to which crime or crime control benefits might be

[3] See Telep et al. (2014) for a list of databases searched and keywords used.
[4] The seminal pieces used were: Clarke (1995), Clarke and Weisburd (1994), Cornish and Clarke (1987), McIver (1981), Reppetto (1976), and Teichman (2005).
[5] See Telep et al. (2014) for a list of these journals.
[6] While we coded any type of displacement noted by study authors, we focus here only on spatial displacement as this was the most common type of displacement examined and often the only type examined quantitatively.

displaced or diffused as a result of an intervention in another area) differs to a greater or lesser extent from the change in the control areas relative to the treatment areas. This challenge makes it difficult to use many of the standardized measures of effect sizes suggested in the meta-analytic literature (see Lipsey and Wilson 2001). An optimal comparison would be the simplest one that compares treatment catchment areas to control catchment areas. In this scenario, one would assess whether areas around treatment sites experience greater crime increases or decreases than those around control sites. Most of our eligible studies, however, have only catchment areas surrounding the treatment site(s). Thus, we focus on the overall difference between treatment and catchment areas to compare the change that has occurred in a catchment area relative to a treatment control area.

Following Bowers et al. (2011a, b), we use before and after data in treatment, comparison, and catchment areas to calculate a modified odds ratio, based on the method proposed by Farrington et al. (2007) in their meta-analysis on CCTV interventions. We use the following equations to calculate the effect size (ES) and standard error (SE) for the main results (was crime reduced in the intervention area compared to the comparison area?) and for the displacement and diffusion analysis (did crime change in the catchment area relative to the comparison area?)

$$ES = \frac{ad}{bc} \qquad SE = \sqrt{\frac{1}{a} + \frac{1}{b} + \frac{1}{c} + \frac{1}{d}}$$

Where a, b, c and d represent crime counts, average crime counts, or crime rates:

	Pre-intervention	Post-intervention
Intervention area OR Catchment area	a	b
Comparison area	c	d

For the main analysis, we use the effect size equation above, so that odds ratios greater than 1 are indicative of a crime decline in the intervention area relative to the comparison area. For the displacement and diffusion analyses, we compare the catchment area to the comparison area. Here, odds ratios greater than 1 indicate a greater crime decline in the catchment area compared to the control area and suggest a possible diffusion of crime control benefits. Odds ratios less than 1 indicate possible crime displacement. We use the term odds ratio to describe these results, while recognizing that this is not truly an odds ratio as commonly calculated for meta-analyses and so should be thought of as a modified odds ratio or, as Farrington et al. (2007) call it, a relative effect size. Following Bowers et al. (2011a), we note that that this measure is not without potential limitations, but it allows for comparisons across a number of our eligible studies and we felt it was the best way to create a meta-analytic summary of our main findings.

Bowers et al. (2011a) also discuss in some detail the potential issues with the calculation of the standard error for these effect sizes. As they note, the variance estimates may be too small, particularly because the assumption that these data are distributed Poisson may be less realistic with place-based interventions, as compared to interventions focused on individuals. Thus, we follow the Bowers et al. (2011a)

approach of multiplying the standard error by an inflation factor of 2 to increase the size of confidence intervals and make any estimations of statistical significance more conservative (see Farrington et al. 2007).

Mean effect sizes were computed across studies and weighted (using the inverse variance weighting procedure) to account for the greater precision of effect size estimates from larger samples. Random effects models were used for the meta-analysis, which account for the diversity of crime prevention interventions in large-scale geographic areas. While these effect size estimates do not rely on the exact same approach as calculating a "weighted displacement quotient" (WDQ; Bowers and Johnson 2003; Guerette and Bowers 2009),[7] they use a similar logic and so here we focus on effect size results rather than WDQs.

Finally, as we describe below, a number of our eligible publications included multiple non-independent studies or multiple outcome measures within an individual study. These multiple effect sizes from a single study or publication cannot all be used in a single meta-analysis without violating assumptions about statistical independence. To address this and following prior reviews (e.g., Bowers et al. 2011a, b; Weisburd et al. 2008), we use three different methods to report our displacement and diffusion results. We report the mean effect size for each eligible study, which combines data from all the coded outcomes for a particular study. We also report the "best case" and "worst case" scenarios, which include the one effect from each study that shows either the results most favorable towards a diffusion of benefits or the results least favorable towards a diffusion of benefits (this could be the same for a particular study with only one coded effect). Because we are less interested in the main analysis findings, we only report the mean effect size for whether crime declined in intervention areas relative to comparison areas.

Results

Identification of eligible studies

Our multi-faceted search strategy identified a large number of potential studies. We began with 51,649 hits from our searches of databases and research agencies. We more closely examined 507 publications from these databases and from our contacts with experts in the field. From these, we found a final sample of 43 eligible studies from 33 publications that met all of our eligibility criteria. Four of our publications included multiple studies. These were coded as separate studies because they represented separate interventions. The Cahill et al. (2008) report included three independent interventions in three cities while Wilson and Chermak (2011) describe two independent interventions in the same city. Caeti (1999) and Cummings (2006) report on multiple studies, but they are not statistically independent because of overlap in control

[7] The WDQ is given by $(D_a/C_a - D_b/C_b)/(R_a/C_a - R_b/C_b)$, where R_a is the crime count in the treatment area post-intervention, R_b is the crime count in the treatment area pre-intervention, C_a is the post-intervention crime count in the comparison area, C_b is the pre-intervention crime count in the comparison area, D_a is the post-intervention crime count in the catchment area, and D_b is the pre-intervention crime count in the catchment area (Bowers et al. 2011a).

and/or catchment areas. An additional 37 pre-post studies examined meso- or macro-displacement but did not have a comparison group.[8]

We summarize characteristics of our eligible studies in Table 1. Our studies are fairly evenly split between pieces published in books and journals and those in government reports or dissertations. In terms of methodological rigor, we find exclusively quasi-experimental studies with a comparison group in our pool of eligible studies. This raises some concerns we revisit later about our overall findings. While we have chosen the most rigorous quasi-experimental studies available, these studies still may suffer from some threats to internal validity that would be less of a concern in a randomized experiment. This also suggests the difficulty of implementing randomized experiments in larger geographic units. As the unit size increases, it becomes more difficult to identify a sufficient number of units to make randomization feasible. Many of our studies used a single treatment and comparison site and so randomization was rarely a reasonable option.

Our eligible studies cover a broad array of policing and non-policing strategies.[9] The most commonly used strategy was a police crackdown or an increase in police patrols. Community policing and problem solving approaches were also fairly common. A handful of strategies used pulling levers or focused deterrence approaches to deal with gang or drug market violence. Some studies were less focused on police intervention and used situational crime prevention strategies (e.g., increased street lighting) or a private security intervention (e.g., Business Improvement Districts) to address crime problems. There was also variation in the geographic unit used in these studies. While we had initially hoped to find a large number of studies examining displacement in macro-units like jurisdictions, counties, states, or even countries, the vast majority of studies focus on more meso-units like neighborhoods or police beats. In these studies, we have some overlap with the Bowers et al. (2011a) review, which also examined policing interventions at these mid-sized units. Thirteen of our 33 publications (representing 20 total studies) also appear in the Bowers et al. review. The additional 20 publications (representing 23 total studies) that we identified in our review suggest the usefulness of our review in identifying studies published since the Bowers et al. (2011a) review, and studies that were either implemented in large geographic areas or that did not directly involve a police intervention. These two types of studies were not included by Bowers et al. (2011a).

In Table 2, we present more detailed information on our eligible publications and studies. For each study, we provide information on the location of the intervention; what the intervention entailed; what constituted the treatment, comparison, and catchment areas; what outcomes were measured; and what the main results suggested about the effectiveness of the intervention. We report on results for the studies that found evidence of displacement or diffusion in Table 4. We also note when particular publications represent more than one study. The full citations for eligible studies are available as a separate section of the references.

[8] As noted earlier, we did not include these pre-post studies in our main analysis. To avoid distracting from our main findings, we do not discuss these studies here, but briefly describe these studies in our Campbell Collaboration final report for this review (Telep et al. 2014).

[9] A single study could fall into more than one category in the types of interventions listed in Table 1.

Table 1 Characteristics of eligible studies (n=43)

Characteristic	Category	n
Publication type	Journal article	19
	Government/technical report	14
	Dissertation or thesis	8
	Book chapter	2
Design	Quasi-experiment	43
	Randomized experiment	0
Country	United States	27
	United Kingdom	11
	Australia	3
	Other	2
Intervention	Crackdown/intensive or directed patrol	19
	POP/community policing	13
	Pulling levers/gang injunction	7
	Situational crime prevention	7
	Private security intervention	4
Geographic unit of analysis	Neighborhood/part of neighborhood	21
	Police beat/part of beat	15
	Police district/precinct	3
	Jurisdiction	2
	State	1
	Country	1

Narrative review of results

We coded 98 different outcome measures from our sample of 43 studies. We had a total of 127 coded effects for displacement when we include studies that had data on multiple catchment areas for a particular intervention area. We present a summary of the narrative results from these outcomes in Table 3. As argued by Bowers et al. (2011a) and others (e.g., Petticrew and Roberts 2006), we must be cautious in using a vote counting method to arrive at conclusions. As we describe below, however, we faced a number of difficulties in calculating effect sizes suitable for a meta-analysis for many of our studies, so we felt this overall review was useful to examine outcomes in our full database of eligible studies.

When examining the main effects of the intervention, we find that crime was reduced in about 46 % of our coded outcomes with no impact on crime or backfire effects in about 41 % of these outcomes. Our main interest was the extent to which displacement or a diffusion of crime control benefits occurred in these studies. In Table 3, we see that displacement was an overall fairly rare occurrence in our eligible studies. In 11.9 % of our coded displacement/diffusion effects, there was some evidence of spatial displacement of crime. Thus, there was no evidence that crime moved to geographic units nearby in the vast majority of our coded effects. When we examine

Table 2 Description of eligible studies

Study	Location	Intervention	Treatment	Comparison	Catchment(s)	Outcome(s)	Main Results
Allat (1984)	Northumbria, UK	Installation of deadlocks or chains on ground floor homes	Scotswood, west end of Newcastle (792 households)	Springwell, Wrekenton area of Gateshead (758 households)	Small area of private housing to the west of target, and council estate to north of target	Burglary	Prevented a burglary increase (steady rates in target area, increases in control area)
Bennett (1988)	London, UK	Neighborhood watch program	Area in Wimbledon (711 households)	Randomly selected area matched to target (495 households)	Area adjacent to target site (540 households)	Household offenses, personal offenses	No impact on either outcome
Bowers et al. (2003)	Liverpool, UK	Target hardening, property marking, alley-gating, intensive offender supervision	Community with 3,317 households	Matched community with 2,658 households	5 concentric rings around the target area (400 m in width each)	Burglary	No overall decline, but in areas where program most focused, did see some benefits
Bowers et al. (2004)	Liverpool, UK	Alley-gating (installing lockable gates in alleyways)	106 blocks of adjacent housing	Police department area excluding the target area	Seven 200 m buffer zones around target area	Burglary	Burglary declined
Brown (1995)	Newcastle upon Tyne, UK	16 camera CCTV system	4 beats of Newcastle Central Area	Byker (one of Newcastle Central's neighboring divisions)	7 other beats of Newcastle Central area which surround the CCTV system	Burglary, criminal damage, theft of cars, theft from cars, theft other, juvenile disorder	Decline in burglary and criminal damage; unclear impact on other outcomes
Caeti (1999)	Houston, TX, USA (7 non-independent studies)	Zero tolerance (3 beats); high visibility patrol (3 beats); POP (1 beat)	Seven police beats	Seven matched, non-contiguous police beats	All contiguous police beats (n=27)	Part I crimes	Mixed results with some beats showing declines but not others
Cahill et al. (2008)	Los Angeles, CA, USA	Multi-faceted gang program focused on prevention and suppression	Two square miles of Boyle Heights	Combination of 7 police reporting districts to northwest of target site with similar crime/demographics	4 police reporting districts to the north and 2 to the west	Calls: shots fired, vandalism; Incidents: serious violence, gang-related, gang-related serious violence	Shots fired calls and gang-related incidents declined; no impact on other outcomes
Cahill et al. (2008)	Richmond, VA, USA	Multi-faceted gang program focused on prevention and suppression	6.9 square miles in the southern part of the city	Area to the north of the target area similar in demographics and crime	Area surrounding the target area on all sides but the south	Incidents: vandalism, drug-related, serious violence	No impact on any of the outcomes

Table 2 (continued)

Study	Location	Intervention	Treatment	Comparison	Catchment(s)	Outcome(s)	Main Results
Cahill et al. (2008)	Milwaukee, WI, USA	Multi-faceted gang program focused on prevention and suppression	All or parts of the Midtown, Metcalfe Park, and Amani neighborhoods	Geographically close area similar in demographics and crime	Area surrounding target area extending out by 3 blocks on all sides	Drug-related incidents, serious violence incidents	No impact on drug-related incidents; serious violent incidents increased
Cook and MacDonald (2011)	Los Angeles, CA, USA	Business improvement districts (BIDs)	All police reporting districts with a BID (n=179)	Police reporting districts without a BID and not adjacent to BID (n=650)	All police reporting districts adjacent to a district with a BID (n=243)	Incidents: total index crime, robbery, assault, burglary, auto theft	Significant impact on all offenses except auto theft
Corsaro et al. (2010)	Nashville, TN, USA	Drug market intervention pulling levers approach	McFerrin Park neighborhood	Rest of Davidson County (no neighborhood similar enough)	Adjoining contiguous area to McFerrin Park neighborhood	Drug equipment, narcotics violations, calls for service	All outcomes showed significant declines
Corsaro et al. (2012)	High Point, NC, USA	Pulling levers drug market intervention	122 Census blocks that comprise 4 target neighborhoods	96 Census blocks matched to be as similar as possible to target sites	59 Census blocks immediately contiguous to targeted areas	Violent crime (homicide, rape, assaults, robberies)	Violent crime declined
Costanza et al. (2010)	New Britain, CT, USA	Weed and Seed program to address drug and gun crime and blight	Broad St. neighborhood (about 337.4 square acres)	Rest of New Britain not in the treatment or catchment area	All Census block collection units within 337.5 square acres of the target area	Arrests per Census block unit, arrests per 1,000 calls for assistance	Unclear impact, some evidence program worked
Cummings (2006)	Bentley, Australia; Morley Australia (2 studies)	Multi-agency deterrence intervention to address property crime	1. Suburb of Bentley 2. Suburb of Morley	Metropolitan Perth (not including target and catchment sites)	1. 7 suburbs around Bentley 2. 5 suburbs around Morley	Residential burglaries	Burglary declined in both interventions
Draca et al. (2010)	London, UK	Increase in police presence following a terrorist attack	5 boroughs (Westminster, Camden, Kensington and Chelsea, Tower Hamlets, Islington)	19 boroughs in Outer London	8 boroughs in Inner London	Susceptible crimes rate (theft and handling, violence and sex offenses, robbery)	Susceptible crime rate declined
Farrell and Thorne (2005)	Afghanistan	Taliban government's enforcement of a ban on opium growing	95 % of Afghanistan under Taliban rule	Myanmar	5 % of Afghanistan in the northeast not under Taliban control	Opium poppy cultivation	Massive drop in opium poppy cultivation
Farrell et al. (1998)	Yorkshire, UK	Targeting known prolific burglars and	Boggart Hill police beat	17 non-treated beats in the Killingbeck Division	Three beats surrounding Boggart Hill	Burglaries, thefts of motor vehicles, damage to	Burglary, theft of motor vehicles, damage

Table 2 (continued)

Study	Location	Intervention	Treatment	Comparison	Catchment(s)	Outcome(s)	Main Results
		outreach and target hardening work to prevent burglary				motor vehicles, street robberies	to motor vehicles all showed declines; no impact on robbery
Gonzalez-Navarro (2010)	Mexico	Installation of Lojack in certain new Ford models in certain states	4 states with Lojack (Jalisco, Estado de Mexico, Distrito Federal, Morelos)	Distant states from those with Lojack	Two rings of states surrounding target sites	Car theft insurance reports of models that were Lojack eligible	Car theft reports declined
Goulka et al. (2009)	Santa Ana, CA, USA	Civil gang injunction	One square mile injunction area (6 Census block groups)	6 Census block groups matched on demographics	Block groups within ½ mile of target site	Calls: total, violent crime, property crime, public order, weapons/major violent crime	Decrease in property crime calls; no impact on other outcomes
Grogger (2002)	Los Angeles, CA, USA	Civil gang injunction	Police reporting districts where 14 injunctions used	Reporting districts with similar crime levels to target site	Reporting districts adjoining target areas	Combined murder, rape, robbery, and aggravated assault	Violent crime declined in injunction area
Machin and Marie (2005)	England and Wales	Extra funds for staffing and technology	Area covered by 10 police forces receiving extra funds	32 police forces not receiving extra funds	All areas that are adjacent to a treatment area force	Robbery rate	Robberies declined
McGarrell et al. (2001)	Indianapolis, IN, USA	Directed patrol to reduce firearms violence	Two north district beats	Two similar east district beats	Five police beats surrounding the two target beats	Sum of homicides, gun assaults, armed robberies	Crime declined (in 1 target area with a catchment area)
Novak et al. (1999)	Unnamed Midwestern U.S. city	Crackdown on disorder crimes	10 by 12 block area in a beat	Non-contiguous similar area north of the target area	Three to four streets surrounding target and comparison area	Robbery, aggravated burglary	No impact on either outcome
Painter and Farrington (1999)	Stoke-on-Trent, UK	Increase in street lighting	Council estate with 365 properties	Primarily council owned property to north and south of target area	Adjacent areas to the east (council-owned property) and west (private property) of the target area	Victimization: burglary, outside theft/vandalism, vehicle crime, property crime, personal crime, all crime	No impact on burglary, declines in victimization prevalence for all other categories
Press (1971)	New York, NY, USA	Increase of 100 patrol officers	20th precinct	Varies by crime type, other precincts		Total felonies, total misdemeanors	

Table 2 (continued)

Study	Location	Intervention	Treatment	Comparison	Catchment(s)	Outcome(s)	Main Results
					18th and 24th precincts, Central Park (adjacent to 20th)		Declines in both outcomes, bigger impact on felonies
Roman et al. (2005)	Miami, FL, USA	Crackdown on gang members involved in federal law violations as part of Weed and Seed	Liberty City neighborhood (about half of 25 by 25 block area used for Weed and Seed)	Beats contiguous to the buffer zone beats	Larger Liberty City/Model City area contiguous with Weed and Seed boundaries	Violent crime, drug crime	No impact on violent crime; drug crime increased, but may just reflect more enforcement
Salisbury (2008)	Lancashire, UK	Increased enforcement, situational crime prevention, social prevention strategies	Farrington Park neighborhood (210 homes)	Estate in Preston known as "The Trees"	Neighborhood adjacent to the target area	Total crime incidents, total calls for service	Significant declines in incidents and calls for service
Segrave and Collins (2005)	Narrabundah, Australia	Two officer community policing team	Lower Narrabundah neighborhood	Suburb of Ainslie (similar to treatment site)	Three neighborhoods (Red Hill, Griffith and Kingston)	Violent crime, property crime, disorder	No significant impact on any outcome
Sherman and Rogan (1995)	Kansas City, MO, USA	Directed patrol to reduce gun violence	Police beat (8 by 10 block area)	Police beat with similar crime	Seven beats surrounding treatment beat	Gun crimes	Gun crime reduced
Smith (2001)	Richmond, VA, USA	Crackdown on drug dealing	50 square block area in Highland Park neighborhood	Police beat similar in demographics/ crime to target	Rest of Highland Park neighborhood	Total Part I offenses	Major drop in offenses
Sturgeon-Adams et al. (2005)	Hartlepool, UK	Multiple strategies including alley-gating, target hardening, and property marking	Hartlepool town centre area (3,500 homes)	Area north of the town centre with similar demographics	600 f. buffer around the target site	Burglary	Burglary declined
Swanson (2010)	Las Vegas, NV, USA	Former gang members express outrage in responding to violent events, use mentors for outreach	2 police beats in Webster area	2 police beats in Nora area	6 police beats surrounding target site	Violent crime calls for service	Violent crime calls declined
Tita et al. (2003)							

Table 2 (continued)

Study	Location	Intervention	Treatment	Comparison	Catchment(s)	Outcome(s)	Main Results
	Los Angeles, CA, USA	Pulling levers approach to deal with gangs	5 reporting districts in Hollenback neighborhood	6 matched Census block groups in Hollenback	11 Census block groups surrounding target site	Violent crime, gang crime, gun crime	Decline in violent crime, no impact on gang crime, unclear impact on gun crime
Wilson and Chermak (2011)	Pittsburgh, PA (2 studies), USA	One Vision One Life-using streetworkers to interrupt potential violence	1. Hill District (6 neighborhoods) 2. Southside (8 neighborhoods)	1, 2. Propensity scores used to create matched neighborhoods	1. 6 neighborhoods surrounding Hill District 2. 6 neighborhoods surrounding Southside	Homicide, aggravated assault, gun assault	Both target sizes: no impact on homicide, increases in gun and aggravated assaults
Worrall and Gaines (2006)	San Bernardino, CA, USA	Police-probation partnership to increase supervision of juvenile probationers	San Bernardino, CA	Fontana, CA	3 cities adjacent to San Bernardino (Colton, Highland, Rialto) that are analyzed together as single catchment	Juvenile arrest rates: robbery, assault, burglary, theft, motor vehicle theft, assault/battery, petty theft, marijuana, disturbing the peace, vandalism, curfew	Decline in burglary and assault arrests; unclear impact on theft arrests; no impact on other outcomes

Table 3 Summary of findings of eligible studies

Outcome	Category	*n*
Main effects	Crime was reduced	45
	No impact on crime	34
	Backfire effect	6
	Unclear effect	13
Displacement	Yes	15
	No	107
	Cannot tell	4
Diffusion of benefits	Yes	28
	No	78
	Cannot tell	10
	Not tested	10

the findings for diffusion of crime control benefits, we again see that the most common outcome (61.9 %) was no diffusion of benefits observed. A diffusion of crime control benefits, however, was more commonly observed than displacement with 22.2 % of coded effects suggesting some evidence that crime was reduced in surrounding areas following an intervention. Overall then, displacement was not a common occurrence in these meso- and macro-scale interventions, and a diffusion of crime control benefits occurred almost twice as often as spatial displacement.

We wanted to look more closely at the 9 publications and 10 studies that find some evidence of crime displacement and the 16 publications reporting a diffusion of crime control benefits. In Table 4, we present the offense type and any potential reasons the authors provided as to why displacement or diffusion may have occurred. Overall, there are generally only limited explanations for why crime may have been displaced. Studies tend to either not provide an explanation or note that larger trends in the comparison area may have contributed to what at first appears to be displacement. For studies finding diffusion, there is again often no explanation provided for the findings. For studies that do provide an explanation, the most common one is that offenders committing crime in the target area may also have been operating in the catchment areas, so if they were deterred or incapacitated by the intervention, then crime declines in the intervention area may have also spread to surrounding areas. We elaborate on these findings in our discussion section below.

Meta-analysis of results

While our narrative review of our eligible studies is telling regarding the extent to which displacement and a diffusion of benefits occur in interventions in large-scale geographic areas, we also were interested in a more quantitative summary of our results. Meta-analysis is a useful tool to combine effect sizes from multiple studies to provide an overall statistical portrait of the effectiveness of a particular intervention or treatment or, in our case, the extent to which displacement or a diffusion of crime control benefits is likely in larger scale interventions. Like Bowers et al. (2011a), we

Table 4 Studies with displacement and/or diffusion of benefits

Study	Effects	Outcome(s)	Explanation, if provided
Displacement			
Allat (1984)	2	Burglary in both catchments (private and public housing areas)	Some of the increase may reflect increasing burglary trends; estimate that 9 % of increase in private estate and 21 % of increase in public estate were result of displacement
Bowers et al. (2003)	1	Burglary in some buffer zones (some displacement in buffer zones fairly close to the target site based on WDQs)	These results are in line with the travel to crime literature (offenders more likely to target sites near the intervention area but not immediately adjacent to it)
Cahill et al. (2008)	1	Drug incidents in Milwaukee	Crime was increasing in comparison area and displacement area relative to treatment area, so hard to say if this was displacement or intervention just helped ensure that crime increases in the target area were less than they would have been in the absence of treatment
Cummings (2006)	1	Burglary in Morley	Only noted that amount of displacement was small
Farrell and Thorne (2005)	1	Opium cultivation	Some farmers may have moved to non-Taliban areas to continue growing, but displacement was less than the massive reduction in opium production
Gonzalez-Navarro (2010)	2	Auto theft reports	Auto theft rings are mobile and include highly motivated offenders, particularly in Mexico
Press (1971)	3	Total felonies in Central Park; total misdemeanors in Central Park and in 18th precinct	Manpower decreased 11 % in Central Park during this time, so this may reflect manpower declines rather than displacement
Wilson and Chermak (2011)	3	Gun assault in Hill District, gun assault and aggravated assault in Southside	Crime was increasing in the comparison area and the catchment areas so hard to say definitively that displacement occurred
Worrall and Gaines (2006)	1	Burglary	One of the catchment cities (Highland) showed a decline in burglaries (suggesting potential diffusion), so there is concern that the WDQ is not adequately measuring displacement/diffusion in these macro-units

Table 4 (continued)

Study	Effects	Outcome(s)	Explanation, if provided
Diffusion of benefits			
Bowers et al. (2003)	1	Burglary in some buffer zones (some diffusion in immediate vicinity to target site based on WDQ)	Offenders may not have been aware of the exact boundaries of the intervention. Situational crime prevention could potentially be enhanced by making it appear an intervention is more expansive than it really is
Bowers et al. (2004)	1	Burglary	Offenders might not be aware of the boundary of the scheme or think that initiative is more wide-ranging
Brown (1995)	2	Burglary, criminal damage	Property crime seems easier to control with cameras and extensive camera coverage in the town center may help reduce crime in surrounding areas
Cahill et al. (2008)	1	Serious violent incidents in Milwaukee	Difficult to assess as crime increased in target area but decreased significantly in catchment area
Corsaro et al. (2010)	2	Narcotics violations and drug equipment incidents	Some of the targeted offenders may have been offending in adjoining area as well
Cummings (2006)	1	Burglary in Bentley	None provided
Farrell et al. (1998)	3	Burglary, theft of motor vehicles, damage to motor vehicles	Prolific, non-specialist criminals may have been operating in close by areas, so their arrest may have led to diffusion
Goulka et al. (2009)	1	Weapons/major violent crime calls for service	Gang members may not have been aware of the injunction area boundaries
Roman et al. (2005)	1	Violent crime	Could be individuals arrested in the intervention area lived in the buffer area so were responsible for violent crime there as well
Salisbury (2008)	2	Total incidents, total calls for service	None provided
Sherman and Rogan (1995)	1	Gun crime diffusion in 2 of 7 adjoining beats relying on longer post-intervention period	Some evidence of a non-significant overall gun crime increase in the surrounding beats (evidence of displacement), so authors focus

Table 4 (continued)

Study	Effects	Outcome(s)	Explanation, if provided
			more on noting this does not suggest overall displacement rather than explaining potential diffusion
Smith (2001)	1	Part I offenses in one catchment area (Zone 92)	None provided
Sturgeon-Adams et al. (2005)	1	Burglary	None provided
Swanson (2010)	1	Violent crime calls for service	None provided
Tita et al. (2003)	3	Violent crime, gun crime, gang crime	Locally focused policing can lead to spillovers
Worrall and Gaines (2006)	6	Assault, motor vehicle theft, assault/battery, marijuana, disturbing the peace, vandalism	None provided

found that a number of our eligible studies presented insufficient data to calculate an effect size that could be used to make comparisons across studies. In particular, studies often present limited data about outcomes in comparison or catchment area, which makes it difficult to compute exact effects. In their systematic review, Bowers et al. (2011a) were able to conduct a meta-analysis using 16 of their 44 eligible studies. Eight of our eligible publications overlap with these 16 (Allat 1984; Cummings 2006; Farrell et al. 1998; Grogger 2002; McGarrell et al. 2001; Press 1971; Segrave and Collins 2005; Sherman and Rogan 1995) and so, for these studies, we were guided by the findings of Bowers et al. (2011a) in developing effect size estimates. Five of our eligible studies were included by Bowers et al. (2011a) and excluded from their meta-analysis (Caeti 1999; Novak et al. 1999; Roman et al. 2005; Smith 2001; Tita et al. 2003), and we agree with their assessment that these studies cannot be included in a meta-analysis. That left us with 20 additional publications to examine for potential inclusion in a meta-analysis.

We computed effects for 12 of these 20 publications (Bennett 1988; Brown 1995; Corsaro et al. 2010; Costanza et al. 2010; Draca et al. 2010; Farrell and Thorne 2005; Gonzalez-Navarro 2010[10]; Painter and Farrington 1999; Salisbury 2008; Sturgeon-Adams et al. 2005; Swanson 2010; Worrall and Gaines 2006) and so we calculated odds ratios from 20 publications covering 21 non-independent studies[11] and representing 65 coded effects for displacement and diffusion. In our final meta-analyses below, we excluded Farrell and Thorne's (2005) study because of its dissimilarity from our other eligible studies[12] for a total of 19 eligible publications covering 20 studies.

In our meta-analysis figures below, we include an odds ratio for each study, as well as the standard error, *z* value, and *p* value. We note the outcome included for each study or whether outcomes were combined in the case of our mean effect meta-analyses. In Figs. 3 and 4 (below) the comparison column represents the particular catchment area or comparison area used for the effect for each study (if applicable). We also include a forest plot that shows the lower and upper bound for each odds ratio. The last line of each meta-analysis represents the mean effect size. As noted above, we used random effects models to account for the heterogeneity across our eligible studies. It is also important to note that in order to maximize the number of studies in our meta-analysis, we included studies that reported both pre-post crime counts and crime rates (typically per 1,000 population). The use of crime rates versus counts does not affect our odds ratio estimates, but our standard error estimates become quite large when dealing with rates, particularly rates less than 1. As a result, the confidence intervals for some of our effects are massive. Thus, while we do not want to ignore the variation across studies, we focus more below on the mean effects for each meta-analysis rather than the findings from individual studies.

In Fig. 1, we present the mean effect sizes for the main effects of whether the intervention was associated with a crime decline in the target area relative to the

[10] We also make use of data from Gonzalez-Navarro (2013) in our effect size calculations.

[11] Cummings (2006) reports on two separate interventions in Australia but uses the same comparison group for both studies.

[12] We felt the outcome measure in this study (opium cultivation) was too dissimilar from the other studies to be included. The main effect size was also massive (an odds ratio of greater than 85), which skewed our results.

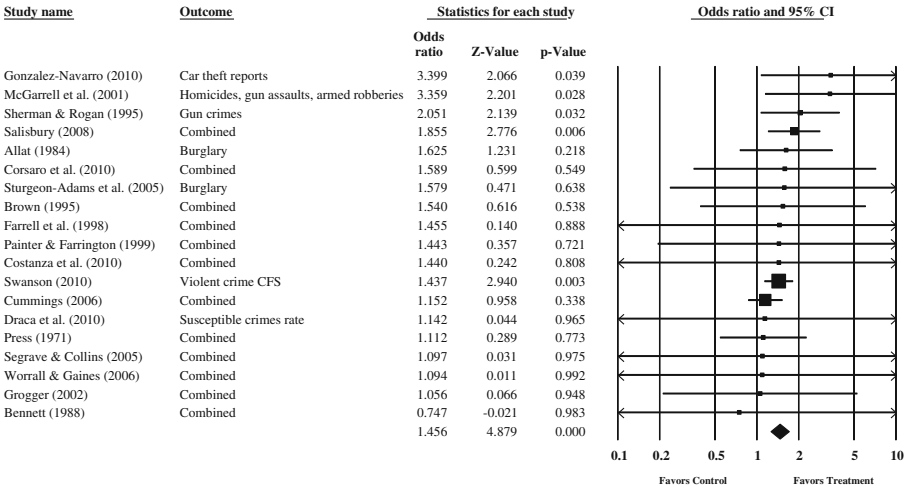

Fig. 1 Main analysis crime reduction effects

comparison area. For studies with multiple outcomes, we calculate a mean outcome by combining all coded outcomes into a single effect and then use these mean effects for the meta-analysis. The mean odds ratio of 1.456 [confidence interval (CI): 1.252–1.693] suggests that among our sample of 20 studies, there is an overall average effect suggesting a significant crime decline in the intervention areas relative to the comparison areas. This suggests that, on average, the studies we included in the meta-analysis were likely to be successful in addressing crime problems in medium and large geographic units. While there is some debate over whether it is worthwhile to look for displacement in studies that do not report a significant crime reduction benefit (see Bowers and Johnson 2003; Weisburd and Telep 2012), it is certainly the case that displacement has been most frequently considered as a negative side effect of interventions that at first appear to have a positive impact on crime.[13] Our results here suggest that a number of the studies in our meta-analysis did have a significant impact on reducing crime, which suggests that considering whether crime was simply pushed to other geographic units is especially relevant.

Our main question of interest was to what extent the studies we included in the meta-analysis found evidence of crime displacement or a diffusion of crime control benefits. We examined displacement and diffusion outcomes in three ways. In Fig. 2, we present the mean effects for displacement and diffusion. Like the results in Fig. 1, we combined effects for studies with multiple outcome measures into a single average effect size. Across the 20 studies, the mean random effect was 1.069 (CI: 0.950–1.204). Effect sizes of greater than one suggest some evidence of a diffusion of crime control benefits, but because the overall mean effect has a p value of 0.268, we find no statistically

[13] While it is certainly the case that spatial displacement is most relevant to consider when intervention are associated with reduction in crime, we think it is possible that interventions could fail to have the desired impacts in a target site, but still have negative consequences (i.e. displacement) for surrounding areas. For our purposes this issue is not as relevant because just one of our studies (Bennett 1988) has an odds ratio of less than 1.000 in Fig. 1, suggesting that most of our studies had some impact on crime (although only five of these effect sizes are statistically significant).

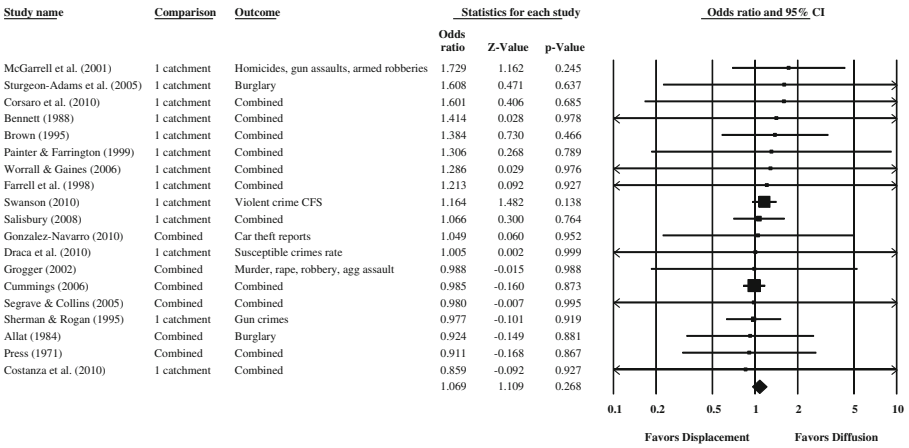

Fig. 2 Displacement and diffusion mean effects

significant evidence of a diffusion of crime control benefits. Still, the results in Fig. 2 also suggest no evidence that these studies, on average, are associated with crime displacement. Interestingly, the study with the largest mean effect size (McGarrell et al. 2001) is not included in Table 4, because the study authors concluded there was little evidence of displacement or diffusion. Our odds ratio suggests a diffusion of benefits (although the effect is not statistically significant) because crime increased so dramatically in the comparison beats in this study, suggesting a beneficial change in the catchment area relative to the comparison site.

In Fig. 3, we examine the "best case" scenario for displacement and diffusion effects. Following Bowers et al. (2011a, b), for each study, we used the effect size that showed the greatest diffusion of benefits (or the least evidence of displacement). For studies with only a single outcome, this effect will be the same as that reported in Fig. 2 (and in Fig. 4 below). The overall random effect across studies is 1.111 (CI: 0.988–1.248). Thus, the best case scenario for diffusion of benefits is not substantially different from the odds ratio of 1.069 we found for the mean effect. The *p* value of .079 indicates a marginally

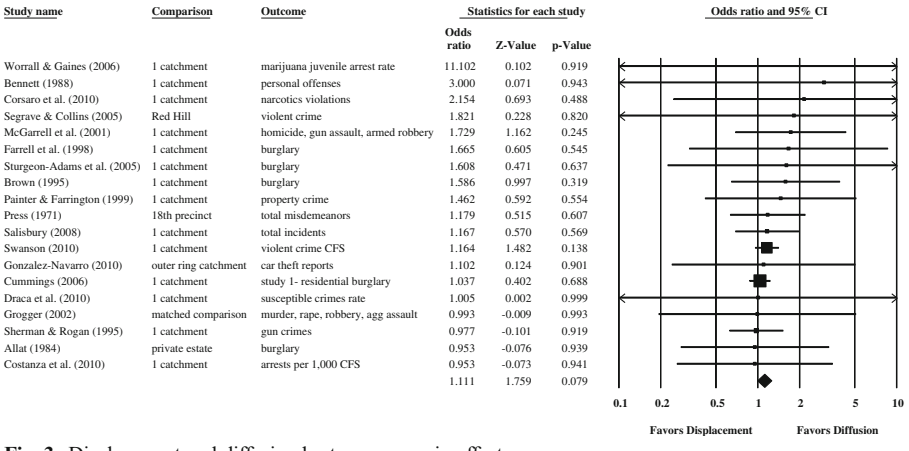

Fig. 3 Displacement and diffusion best case scenario effects

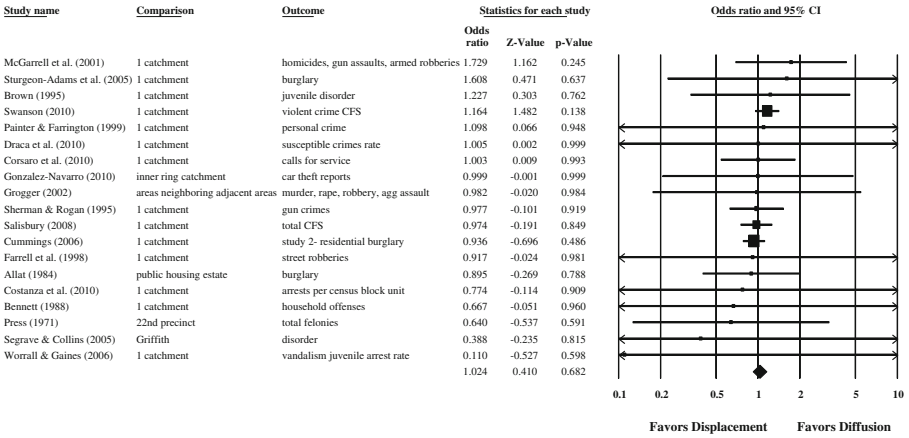

Fig. 4 Displacement and diffusion worst case scenario effects

significant overall effect that is suggestive of a diffusion of benefits. We should be cautious, however, in focusing too much on statistical significance since, as we discussed earlier, there are potential issues in our standard error calculations.

Finally in Fig. 4, we present the "worst case" scenario results. For each study, we used the effect that showed the least evidence of a diffusion of crime control benefits or the most evidence of crime displacement. The overall random effect is 1.024 (CI: 0.915–1.145). Again, this effect is not dramatically different from the mean or best case scenario effects in Figs. 2 and 3. All three displacement and diffusion effects are greater than 1, indicating some overall evidence of a diffusion of crime control benefits, although none of the three are substantially greater than 1 and none of the three are statistically significant at the $p<.05$ level. Still, the results reinforce our narrative findings that displacement is not a likely occurrence in social control interventions in medium and large-scale geographic areas. Our mean effect sizes also follow our finding from the narrative results that the most common outcome in catchment areas may be no significant change in crime following an intervention.

Additional analyses

We had initially hoped to use several moderator variables to assess whether our overall meta-analysis results varied based on factors related to interventions or evaluation methods. Because all our eligible studies used quasi-experimental approaches, methodological rigor is not a useful moderator. All but two of the studies included in the meta-analysis (Gonzalez-Navarro 2010; Worrall and Gaines 2006) focused on meso-units of analysis (e.g., neighborhoods, police beats), so we were limited in our ability to assess how the size of the geographic unit affects our findings. We did compare displacement outcomes based on three categories of intervention unit of analysis. The two studies noted above were considered large, studies that reported on interventions taking place in a group of neighborhoods or police beats were considered medium-large ($n=7$), and interventions taking place in a single neighborhood or beat were considered medium ($n=11$). The differences across unit of analysis size were not substantial.

Because of the large confidence interval for the Worrall and Gaines (2006) study, the confidence interval for mean effect of the two large unit studies is also quite large (mean effect: 1.051; CI: 0.224–4.936). The medium-large unit (mean effect: 1.068; CI: 0.936-1.220) and medium unit studies (mean effect: 1.074; CI: 0.819–1.407) had slightly larger effect sizes and much smaller confidence intervals, although none of the effects reached statistical significance. From these findings, there do not appear to be major differences in the extent to which displacement or diffusion occurs based on the size of the intervention area.

In terms of crime outcomes, we ideally would have examined whether displacement outcomes were affected by the type of crime on which the intervention focused. The majority of studies in our meta-analysis, however, included measures of both property and violent crime (or often of all crime), which makes it difficult to assess the likelihood of displacement based on crime type. We did divide our studies based on whether the intervention was primarily police-based or non-police-based. While some interventions were clearly police-based (e.g., increasing police manpower in Press 1971) and others were not (e.g., increasing street-lighting in Painter and Farrington 1999), there was some degree of subjectivity in determining which multi-agency partnership projects were police-based. We chose to categorize interventions in which the police played a primary role in delivering the treatment or intervention as police-based and all others as non-police-based leaving us with 11 police-based and eight non-police-based publications in our meta-analysis. When we examine the mean effects for displacement and diffusion across these different groups, we do not see substantial differences in the odds ratios. The mean effect for police-based studies was 1.011 (CI: 0.868–1.177) and the average effect for non-police-based studies was 1.165 (0.965–1.307). While the point estimate for non-police-based studies was slightly larger, neither effect was statistically significant, suggesting that there were few overall differences in the extent to which displacement or diffusion occurred based on how involved the police were in the intervention.

Publication bias is a concern in any systematic review or meta-analysis because published studies tend to be more likely to show some sort of significant finding. This may be less of a concern for our review as many of our studies did not focus primarily on displacement or diffusion effects. Additionally, 7 of the 19 publications included in the meta-analysis were not published in scholarly journals or books. Still, to assess whether publication bias could be affecting our meta-analytic results, we used the Duval and Tweedie (2000) trim and fill approach to assess whether there could be missing studies leading to an asymmetrical funnel plot of our results. For our mean displacement and diffusion effects (see Fig. 2), the trim and fill method suggested four studies were missing, but the adjusted mean effect size of 1.058 (CI: 0.941–1.189) did not differ substantially from the original effect. The trim and fill approach suggested six studies were missing in our best case scenario meta-analysis (see Fig. 3). The adjusted mean odds ratio estimate of 1.098 (CI: 0.978–1.232) again did not differ greatly from the non-adjusted effect. Finally, for our worst case scenario meta-analysis (see Fig. 4), the method suggested there were no missing studies, and so the mean effect did not change. Our results overall suggest that publication bias was not driving the findings from our meta-analyses.

Discussion

Our narrative results and meta-analyses both overall suggest that displacement is not very common in interventions implemented in meso- and macro-level units of geography. While we do not find evidence of a statistically significant diffusion of crime control benefits in our meta-analyses, our effect sizes and narrative results suggest that diffusion is just as likely as or somewhat more likely to occur than spatial displacement. Below, we examine some potential reasons for our findings regarding displacement and diffusion before turning to limitations with the review and our set of eligible studies.

Our findings on displacement are largely in line with those from previous reviews, which suggest that displacement is fairly uncommon. Displacement is not an inevitable outcome of interventions focused on medium- and large-sized geographic units. We were not, however, able to assess large-scale displacement to the extent we had hoped because of a lack of eligible rigorous studies. This makes it difficult to assess the validity of some of the anecdotal evidence described above. Our one study of international drug policy focused on the unique case of the Taliban regime in Afghanistan and their ban on opium cultivation (Farrell and Thorne 2005). The results here suggested there may have been some displacement to non-Taliban-controlled areas, but this was far less than the decline in cultivation resulting from the regime's strict policies. This, however, is certainly not the most common form of international drug control policy and so our results tell us little about how national-level drug control efforts may have displaced drug activity.

In terms of Teichman's (2005) arguments about auto theft rings, we do find one study where the author's conclusions are supportive of his arguments. Gonzalez-Navarro (2010) finds that after Lojack was installed in certain car models in particular states in Mexico, there may have been displacement to non-Lojack Mexican states. He argues this may reflect highly motivated auto thieves who were willing to travel longer distances to continue to offend. Whether more highly organized criminal organizations involved in auto theft or other crimes are more likely to displace across jurisdictional boundaries as a result of changes in social control measures should be further examined in future research. While these groups do not represent the "average" criminal, there could be certain instances where criminal organizations are motivated enough and have the resources to relocate activity, which could make macro-level displacement more common, although we cannot reach any strong conclusions about that with our limited sample of macro-level studies.

The explanations for displacement we provided in Table 4 were typically fairly limited and suggested that general crime increases in surrounding areas may in some instances have made displacement appear to be a greater problem than it actually was. This is in line with prior reviews, which suggest that substantial displacement in place-based interventions is uncommon. Indeed, even the displacement noted by Gonzalez-Navarro (2010) was not reflected in our meta-analyses. While he suggests potential spillover of auto thefts into non-Lojack states, the rate of auto theft increased at an almost identical rate in the catchment and control states, which is reflected as little evidence of displacement in our odds ratio calculation. Still, the possibility raised by Teichman (2005) and others that crimes committed by organized groups (or at least semi-organized groups) with a strong financial incentive may be more likely to be displaced in large-scale geographic areas is worthy of further attention in future

research. Overall, though, the lack of displacement in most studies could very well reflect the reasons provided in the micro-displacement literature. The same opportunities to offend may not exist nearby beats or neighborhoods, and as intervention areas increase in size, traveling to areas outside the intervention side becomes more burdensome for offenders. Following the findings of Weisburd et al. (2006), offenders may be unfamiliar with or uncomfortable in these areas surrounding larger target sites.

In Table 4, we also presented potential reasons given by authors for why a diffusion of crime control benefits may have occurred. One common explanation is that offenders may not be aware of the boundaries of social control interventions and so may also avoid offending in nearby places. Additionally, some offenders may be arrested during interventions and, if these offenders were also committing crimes in catchment areas, then incapacitation may be explaining diffusion. It is difficult to make any strong conclusions about what could be contributing to diffusion in some studies. As Clarke and Weisburd (1994) and Weisburd and Telep (2012) argue, there are a host of different individual offender-level and community-based factors that could trigger a diffusion of crime control benefits. Incapacitation is one possible explanation, particularly in interventions focused largely on arresting and monitoring high rate offenders, but it does not explain diffusion in non-police interventions. As we noted earlier, these studies showed slightly greater evidence of a diffusion of benefits compared to policing interventions. Our eligible studies did not consider some of the market-based and community-based explanations discussed by Weisburd and Telep (2012) and reviewed above, but we recognize designing evaluations to assess these mechanisms is challenging.

While we focused primarily on the mean random effects for each meta-analysis in our presentation of the results, our findings suggest that there is heterogeneity in the effects observed in individual studies. While none of the effects in Figs. 2, 3, and 4 are statistically significant (in part because of our inflation of the standard errors), there is variation across studies. While all of our mean odds ratios were greater than 1, in all three figures, and in Fig. 4 in particular, a number of individual study effects were less than 1, indicating the potential for some displacement. As we have already noted we do not have enough studies focusing on specific types of interventions to be able to parse out the nature of moderating effects. But our results raise the question of whether there are specific types of interventions that are likely to lead to displacement impacts, and others that lead to diffusion. In other words, while we draw a general conclusion here which we think is warranted by the data, we think caution is appropriate. Our review shows little evidence of displacement. However, we think studies in the future should try to identify when such displacement is more likely to occur. In contrast, we find more evidence of diffusion of crime control benefits. But again, if we want to harness such diffusion, we need to increase our knowledge base of the relationship between a diffusion of crime control benefits and intervention type or problem type.

Overall, though, both our narrative review and meta-analyses suggest the most likely outcome in these larger-scale interventions may be neither displacement nor a diffusion of benefits. It could be that crime levels in neighboring areas are often not significantly affected by the social control activities in a particular intervention area. It could also be the case that we cannot measure displacement and diffusion activity precisely enough, particularly in larger-scale interventions, to identify smaller effects that may exist (see more below). For example, it is possible that an intervention could both displace some

crime to places nearby, while also diffusing some of the crime control benefits to these places. In that case, this mix of diffusion and displacement would likely show up as no effect in an assessment. Despite these measurement difficulties, we cannot ignore the most important positive findings from our review. Our results overall suggest that the crime control benefits from social control interventions in these larger geographic units will not simply be negated by spatial displacement.

Limitations

We recognize our review is not without some limitations. First, the thrust of much recent criminological research on geographic areas has been the importance of focusing in on small units of geography (e.g., see the edited volume by Weisburd et al. 2009). This research tends to show great heterogeneity of crime and other social factors when examining smaller places within macro-level units such as neighborhoods (see Weisburd et al. 2012). This suggests potential issues with the focus of our review. First, increasing the size of intervention units can make it more difficult to detect displacement and diffusion effects. That is, it may be easier to assess whether crime moves around the corner than to determine whether it moves across city borders, in part because of the greater heterogeneity of macro-places. This is one possible explanation for why so few studies examine displacement at very large units of geography.

Additionally, in examining larger units, the extent of displacement may vary across the unit. For example, in Teichman's (2005) example of the Michigan Auto Theft Prevention Authority reviewed above, he points to declines in Michigan's auto theft rate at the same time Wisconsin and then Illinois experienced car theft increases. It seems likely though that any displacement of auto thefts from Wisconsin to Illinois, for example, was concentrated near population centers and the border of these two states. Thus, the movement of organized theft rings from Milwaukee to Chicago seems much more plausible than Green Bay to Carbondale. Thus, using macro-units to assess displacement may mask heterogeneity in the extent to which displacement occurred within these larger units.

A second related problem is that larger-scale interventions are more likely to be heterogeneous in their actual implementation. As the unit size increases, the likelihood of uniform application of any social control treatment across the entire unit decreases. Specifically, interventions at micro-places will likely receive more consistent attention and application of resources. At larger levels of geography, crime may be displaced to smaller areas that are within the treatment area but received inconsistent implementation of the treatment. This is a challenge that our eligible studies could not fully address, but one we must be aware of in making assessments about displacement in non-micro-contexts.

Third, as noted above, our goal was to measure displacement in large-scale geographic areas, but our eligible studies largely consist of more medium-sized or meso-level interventions. And even with these studies, we find a lack of highly rigorous evaluations. None of our eligible studies is a randomized trial, which raises concerns about the internal validity of our overall findings. One issue in studies using both medium and large units of analysis is finding sufficient units to make randomization feasible. Certainly, it is easier to randomize at the street or address level within a jurisdiction than it is to obtain the cooperation of a sufficient number of jurisdictions to randomize at the jurisdiction level. Similarly, some of the more meso-level studies we

included had some difficulty in defining a comparison group for the treatment area. In some situations, the treatment area was chosen because it was the highest crime beat or neighborhood by far in a city and so no other beat or neighborhood could be used as a matched comparison group. These issues again raise some concerns about the internal validity of our studies and reinforce the point that it may be easier to rigorously assess displacement and diffusion outcomes in more micro-scale interventions.

Fourth, we focus here only on spatial displacement, while recognizing that displacement can take other forms (i.e. crime may shift not only to other places, but also to other times, targets, offenses, tactics, or offenders; see Johnson et al. 2012; Reppetto 1976). We focused on spatial displacement largely because it has been the most frequently examined in prior studies (e.g., Guerette and Bowers 2009) and has been most commonly referred to by critics of place-based interventions. This is not to suggest, however, that other forms of displacement and diffusion are not possible in macro-level interventions. Indeed, as noted earlier, larger geographic areas makes it more possible for displacement of all forms to occur within target areas, which makes it more challenging to disentangle treatment and displacement effects.

Finally, similar to prior systematic reviews, we faced issues with descriptive validity (see Gill 2011) in potentially eligible studies. Many studies simply do not report enough information on the main effects and, in particular, on displacement and diffusion outcomes to meet our inclusion criteria. As we described in "Methods", we recognize the limitations of using the modified odds ratio for calculating effect sizes, but this approach allowed us to maximize the number of eligible studies we could include in our meta-analyses. Our other eligible studies do not report displacement outcomes in ways that could easily be converted into standardized effect sizes. A number of the studies we reviewed and excluded appeared to fit our inclusion criteria at first glance. But, upon further review, many of these medium- or large-scale interventions with a comparison group and catchment area did not provide sufficient data (or at times any data) on displacement outcomes. Authors simply noting that "no displacement was observed" was not enough to make a study eligible and certainly did not provide enough information for a meta-analysis.

Conclusions

The results of our systematic review of displacement and diffusion of benefits resulting from social control interventions in medium- and large-sized geographic units are generally in line with those from prior reviews of the displacement literature. While these reviews have generally focused on smaller geographic units, they found, as we do, that spatial displacement is not an inevitable outcome of place-based interventions. Both our narrative results and meta-analysis suggest that the most likely outcome from meso- and macro-level studies is neither displacement nor a diffusion of benefits, although there is some suggestive evidence that diffusion may be somewhat more likely than displacement. These results suggest that police and other social control interventions do not just push crime to other beats, neighborhoods, districts, or even cities. It is good news indeed that the studies in our meta-analysis are overall associated with a reduction in crime without evidence of overall spatial displacement of crime.

Our limitations suggest important areas for future research. We need more rigorous studies examining displacement in medium and large geographic units. We must be somewhat cautious in our conclusions here because we are relying entirely on quasi-experimental evidence. We also need more studies of large-scale social interventions. While the police and other agencies are often working at large scales, there is little rigorous research of these treatments. We recognize that rigorous research becomes increasingly difficult as the geographic unit increases in size, but our review suggests such research is possible and it is important for better assessing displacement at more macro-levels. Theoretical advances in understanding displacement and diffusion at these larger units are also important for future research. While many of the explanations provided by authors mirror those given for more micro-level displacement, more careful attention to the processes driving displacement or diffusion in larger geographic units would be useful for expanding our understanding of why displacement is uncommon in these interventions and why a diffusion of benefits may be just as likely (or even more likely) to occur.

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References

Barr, R., & Pease, K. (1990). Crime placement, displacement, and deflection. In M. Tonry & N. Morris (Eds.), *Crime and justice: A review of research* (Vol. 12, pp. 277–318). Chicago: University of Chicago Press.

Bowers, K. S., & Johnson, S. D. (2003). Measuring the geographical displacement and diffusion of benefit effects of crime prevention activity. *Journal of Quantitative Criminology, 19*, 275–301.

Bowers, K., Johnson, S., Guerette, R. T., Summers, L., & Poynton, S. (2011a). Spatial displacement and diffusion of benefits among geographically focused policing interventions. *Campbell Systematic Reviews, 7*(3).

Bowers, K., Johnson, S., Guerette, R. T., Summers, L., & Poynton, S. (2011b). Spatial displacement and diffusion of benefits among geographically focused policing interventions: a meta analytical review. *Journal of Experimental Criminology, 7*, 347–374.

Braga, A. A., Weisburd, D. L., Waring, E. J., Mazerolle, L. G., Spelman, W., & Gajewski, F. (1999). Problem-oriented policing in violent crime places: a randomized controlled experiment. *Criminology, 37*, 541–580.

Braga, A. A., Papachristos, A. V., & Hureau, D. M. (2012). Hot spots policing effects on crime. *Campbell Systematic Reviews, 8*(8).

Broude, T., & Teichman, D. (2009). Outsourcing and insourcing crime: the political economy of globalized criminal activity. *Vanderbilt Law Review, 62*, 796–848.

Clarke, R. V. (1992). *Situational crime prevention: Successful case studies*. Albany: Harrow and Heston.

Clarke, R. V. (1995). Situational crime prevention. In M. Tonry & D. Farrington (Eds.), *Building a safer society: Strategic approaches to crime prevention. crime and justice: A review of research, vol. 19* (pp. 91–150). Chicago: University of Chicago Press.

Clarke, R. V., & Felson, M. (1993). Introduction: Criminology, routine activity, and rational choice. In R. V. Clarke & M. Felson (Eds.), *Routine activity and rational choice. advances in criminological theory, vol. 5* (pp. 1–14). New Brunswick: Transaction.

Clarke, R. V., & Weisburd, D. (1994). Diffusion of crime control benefits: Observations on the reverse of displacement. In R. V. Clarke (Ed.), *Crime prevention studies* (Vol. 2, pp. 165–184). Monsey: Criminal Justice Press.

Cornish, D. B., & Clarke, R. V. (1987). Understanding crime displacement: an application of rational choice theory. *Criminology, 25*, 933–948.
Decker, S. H., & Chapman, M. H. (2008). *Drug smugglers on drug smuggling: Lessons from the inside*. Philadelphia: Temple University Press.
Duval, S., & Tweedie, R. (2000). Trim and fill: a simple funnel-plot-based method of testing and adjusting for publication bias in meta-analysis. *Biometrics, 56*, 455–463.
Eck, J. E. (1993). The threat of crime displacement. *Criminal Justice Abstracts, 25*, 527–546.
Farrington, D., Gill, M., Waples, S., & Argomaniz, J. (2007). The effects of closed-circuit television on crime: meta-analysis of an English national quasi-experimental multi-site evaluation. *Journal of Experimental Criminology, 3*, 21–38.
Gabor, T. (1990). Crime displacement and situational prevention: toward the development of some principles. *Canadian Journal of Criminology, 32*, 41–74.
Gill, C. E. (2011). Missing links: how descriptive validity impacts the policy relevance of randomized controlled trials in criminology. *Journal of Experimental Criminology, 7*, 201–224.
Guerette, R. T. (2009). The pull, push, and expansion of situational crime prevention evaluation: An appraisal of thirty-seven years of research. In J. Knutsson & N. Tilley (Eds.), *Evaluating crime reduction initiatives. crime prevention studies, vol. 24* (pp. 29–58). Monsey: Criminal Justice Press.
Guerette, R. T., & Bowers, K. J. (2009). Assessing the extent of crime displacement and diffusion of benefits: a review of situational crime prevention evaluations. *Criminology, 47*, 1331–1368.
Hesseling, R. B. P. (1994). Displacement: a review of the empirical literature. In R. V. Clarke (Ed.), *Crime prevention studies* (Vol. 3, pp. 197–230). Monsey: Criminal Justice Press.
Johnson, S. D., Guerette, R. T., & Bowers, K. J. (2012). Crime displacement and diffusion of benefits. In B. C. Welsh & D. P. Farrington (Eds.), *The Oxford handbook of crime prevention* (pp. 337–353). New York: Oxford University Press.
Lipsey, M. W., & Wilson, D. B. (2001). *Practical meta-analysis*. Thousand Oaks: Sage.
Lum, C., Koper, C., & Telep, C. W. (2011). The evidence-based policing matrix. *Journal of Experimental Criminology, 7*, 3–26.
Marceau, N. (1997). Competition in crime deterrence. *Canadian Journal of Economics, 30*, 844–854.
McIver, J. P. (1981). Criminal mobility: A review of empirical studies. In S. Hakim & G. Rengert (Eds.), *Crime spillover* (pp. 20–47). Thousand Oaks: Sage.
Mears, D. P., & Bhati, A. S. (2006). No community is an island: the effects of resource deprivation on urban violence in spatially and socially proximate communities. *Criminology, 44*, 509–548.
Petticrew, M., & Roberts, H. (2006). *Systematic reviews in the social sciences: A practical guide*. Malden: Blackwell.
Reppetto, T. (1976). Crime prevention and the displacement phenomenon. *Crime & Delinquency, 22*, 166–177.
Sherman, L. W., & Weisburd, D. (1995). General deterrent effects of police patrol in crime "hot spots": a randomized, controlled trial. *Justice Quarterly, 12*, 625–648.
Sherman, L. W., Gartin, P. R., & Buerger, M. E. (1989). Hot spots of predatory crime: routine activities and the criminology of place. *Criminology, 27*, 27–55.
Taniguchi, T. A., Rengert, G. F., & McCord, E. S. (2009). Where size matters: agglomeration economies of illegal drug markets in Philadelphia. *Justice Quarterly, 26*, 670–694.
Teichman, D. (2005). The market for criminal justice: federalism, crime control, and jurisdictional competition. *Michigan Law Review, 103*, 1831–1876.
Telep, C. W., & Weisburd, D. (2012). What is known about the effectiveness of police practices in reducing crime and disorder? *Police Quarterly, 15*, 331–357.
Telep, C. W., Weisburd, D. Gill, C. E., Teichman, D., & Vitter, Z. (2014). Displacement of crime and diffusion of crime control benefits in large-scale geographic areas. *Campbell Systematic Reviews* (in press)
Trasler, G. (1993). Conscience, opportunity, rational choice, and crime. In R. V. Clarke & M. Felson (Eds.), *Routine activity and rational choice. Advances in criminological theory, vol. 5* (pp. 305–322). New Brunswick: Transaction.
United Nations Office on Drugs and Crime. (2007). *2007 World drug report*. New York: United Nations.
Weisburd, D., & Eck, J. E. (2004). What can the police due to reduce crime, disorder and fear? *Annals of the American Academy of Social and Political Sciences, 593*, 42–65.
Weisburd, D., & Green, L. (1995). Policing drug hot spots: the Jersey City drug market analysis experiment. *Justice Quarterly, 12*, 711–736.
Weisburd, D., & Telep, C. W. (2012). Spatial displacement and diffusion of crime control benefits revisited: New evidence on why crime doesn't just move around the corner. In N. Tilley & G. Farrell (Eds.), *The reasoning criminologist: Essays in honour of Ronald V. Clarke* (pp. 142–159). New York: Routledge.

Weisburd, D., Wyckoff, L. A., Ready, J., Eck, J. E., Hinkle, J. C., & Gajewski, F. (2006). Does crime just move around the corner? A controlled study of spatial displacement and diffusion of crime control benefits. *Criminology, 44*, 549–592.

Weisburd, D., Telep, C. W., Hinkle, J. C., & Eck, J. E. (2008). Effects of problem-oriented policing on crime and disorder. *Campbell Systematic Reviews, 4*(14).

Weisburd, D., Bernasco, W., & Bruinsma, G. J. N. (Eds.). (2009). *Putting crime in its place: Units of analysis in geographic criminology*. New York: Springer.

Weisburd, D., Telep, C. W., Teichman, D., Gill, C. E., & Vitter, Z. (2011). Protocol for a systematic review: displacement of crime and diffusion of crime control benefits in large-scale geographic areas. *Campbell Systematic Reviews*.

Weisburd, D., Groff, E. R., & Yang, S.-M. (2012). *The criminology of place: Street segments and our understanding of the crime problem*. New York: Oxford University Press.

Zielenbach, S., & Voith, R. (2010). HOPE VI and neighborhood economic development: the importance of local market dynamics. *Cityscape: A Journal of Policy Development and Research, 12*, 99–132.

References of eligible studies

Allat, P. (1984). Residential security: containment and displacement of burglary. *Howard Journal, 23*, 100–116.

Bennett, T. (1988). An assessment of the design, implementation and effectiveness of neighbourhood watch in London. *Howard Journal of Criminal Justice, 244*, 241–255.

Bowers, K., Johnson, S., & Hirschfield, A. (2003). *Pushing back the boundaries: New techniques for assessing the impact of burglary schemes. Home Office Online Report (vol. 23)*. London: Home Office.

Bowers, K. J., Johnson, S. D., & Hirschfield, A. F. G. (2004). Closing off opportunity for crime: an evaluation of alley-gating. *European Journal on Criminal Policy and Research, 10*, 285–308.

Brown, B. (1995). *CCTV in town centres: Three case studies. Crime detection and prevention series paper 68*. London: Home Office.

Caeti, T. J. (1999). *Houston's targeted beat program: A quasi-experimental test of police patrol strategies. Ph.D. dissertation*. Huntsville: Sam Houston State University.

Cahill, M., Coggeshall, M., Hayeslip, D., Wolff, A., Lagerson, E., Scott, M., Davies, E., Roland, K., & Decker, S. (2008). *Community collaboratives addressing youth gangs: Interim findings from the gang reduction program*. Washington, DC: Urban Institute.

Cook, P. J., & MacDonald, J. (2011). Public safety through private action: an economic assessment of BIDs. *The Economic Journal, 121*, 445–462.

Corsaro, N., Brunson, R. K., & McGarrell, E. F. (2010). Evaluating a policing strategy intended to disrupt an illicit street-level drug market. *Evaluation Review, 34*, 513–548.

Corsaro, N., Hunt, E. D., Hipple, N. K., & McGarrell, E. F. (2012). The impact of drug market pulling levers policing on neighborhood violence. An evaluation of the High Point Drug Market Intervention. *Criminology and Public Policy, 11*, 167–199.

Costanza, S. E., Helms, R., Ratansi, S., Kilburn, J. C., & Harmon, J. E. (2010). Boom to bust or bust to boom? Following the effects of Weed and Seed Zoning in New Britain, Connecticut, from 1995 to 2000. *Police Quarterly, 13*, 49–72.

Cummings, R. (2006). 'What if': the counterfactual in program evaluation. *Evaluation Journal of Australasia, 6*, 6–15.

Draca, M., Machin, S., & Witt, R. (2010). Crime displacement and police interventions: Evidence from London's "Operation Theseus.". In R. Di Tella, S. Edwards, & E. Schargrodsky (Eds.), *The economics of crime: Lessons for and from Latin America* (pp. 359–374). Chicago: University of Chicago Press.

Farrell, G., & Thorne, J. (2005). Where have all the flowers gone?: evaluation of the Taliban crackdown against opium poppy cultivation in Afghanistan. *International Journal of Drug Policy, 16*, 81–91.

Farrell, G., Chenery, S., & Pease, K. (1998). *Consolidating police crackdowns: Findings from an anti-burglary project. Police Research Paper 113*. London: Home Office.

Gonzalez-Navarro, M. (2010). *Deterrence and geographical externalities in auto theft*. Berkeley: University of California-Berkeley Department of Economics.

Gonzalez-Navarro, M. (2013). Deterrence and geographical externalities in auto theft. *American Economic Journal: Applied Economics, 5*, 92–110.

Goulka, J., Heaton, P., Tita, G., Matthies, C., Whitby, A., & Cooper, A. (2009). *FY2006 Anti-gang initiative grants in the Central District of California: Report to the U.S. Attorney*. Santa Monica: RAND Corporation.

Grogger, J. (2002). The effects of civil gang injunctions on reported violent crime: evidence from Los Angeles County. *Journal of Law and Economics, 45*, 69–90.

Machin, S., & Marie, O. (2005). *Crime and police resources: The street crime initiative. centre for economic performance discussion paper (Vol. 680)*. London: London School of Economics and Political Science.

McGarrell, E. F., Chermak, S., Weiss, A., & Wilson, J. (2001). Reducing firearms violence through directed police patrol. *Criminology & Public Policy, 1*, 119–148.

Novak, K. J., Hartmann, J. L., Holsinger, A. M., & Turner, M. G. (1999). The effects of aggressive policing of disorder on serious crime. *Policing: An International Journal of Police Strategies & Management, 22*, 171–190.

Painter, K., & Farrington, D. P. (1999). Street lighting and crime: Diffusion of benefits in the Stoke-on-Trent Project. In K. Painter & N. Tilley (Eds.), *Surveillance of public space: CCTV, street lighting and crime prevention. Crime prevention studies, vol. 10* (pp. 77–122). Monsey: Criminal Justice Press.

Press, S. J. (1971). *Some effects of an increase in police manpower in the 20th precinct of New York City*. New York: Rand Institute.

Roman, C. G., Cahill, M., Coggeshall, M., Lagerson, E., & Courtney, S. (2005). *The Weed and Seed Initiative and crime displacement in South Florida: An examination of spatial displacement associated with crime control initiatives and the redevelopment of public housing*. Washington, DC: Urban Institute, Justice Policy Center.

Salisbury, G. (2008). *'MOPPIN' up Dodge. Herman Goldstein Award Submission*. Lancashire: Lancashire Constabulary.

Segrave, M., & Collins, L. (2005). *Evaluation of a suburban crime prevention team. Technical and Background Paper Series, No. 14*. Canberra: Australian Institute of Criminology.

Sherman, L. W., & Rogan, D. P. (1995). Effects of gun seizures on gun violence: "hot spots" patrol in Kansas City. *Justice Quarterly, 12*, 673–693.

Smith, M. R. (2001). Police-led crackdowns and cleanups: an evaluation of a crime control initiative in Richmond, Virginia. *Crime & Delinquency, 47*, 60–83.

Sturgeon-Adams, L., Adamson, S., & Davidson, N. (2005). *Hartlepool: A case study in burglary reduction*. Hull: University of Hull, Centre for Criminology and Criminal Justice.

Swanson, D. D. (2010). *Displacement or diffusion: A secondary analysis of the Las Vegas safe village initiative. master's thesis*. Las Vegas: University of Nevada Las Vegas.

Tita, G., Riley, K. J., Ridgeway, G., Grammich, C., Abrahamse, A. F., & Greenwood, P. W. (2003). *Reducing gun violence: Results from an intervention in East Los Angeles*. Santa Monica: RAND Corporation.

Wilson, J. M., & Chermak, S. (2011). Community-driven violence reduction programs: examining Pittsburgh's one vision one life. *Criminology and Public Policy, 10*, 991–1027.

Worrall, J. L., & Gaines, L. K. (2006). The effect of police-probation partnerships on juvenile arrests. *Journal of Criminal Justice, 34*, 579–589.

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