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Problem-Solving Tools Series
No. 10



Analyzing Crime Displacement and Diffusion

Rob T. Guerette

www.cops.usdoj.gov



Center for
Problem-Oriented Policing

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About the Problem-Solving Tools Series

Problem-Solving Tools is one of three in the series of *Problem-Oriented Guides for Police*. The other two are the *Problem-Specific Guides* and *Response Guides*.

Problem-Oriented Guides for Police summarize knowledge about how police can reduce the harm caused by specific crime and disorder problems by preventing problems and improving overall incident response. They are not guides to investigating offenses or handling specific incidents. Neither do they cover the technical details about how to implement specific responses. The guides are written for police—of whatever rank or assignment—who must address the specific problems the guides cover. The guides will be most useful to officers who are capable of the following:

- They understand basic problem-oriented policing principles and methods.
- They can look at problems in-depth.
- They are willing to consider new ways of doing police business.
- They understand the value and the limits of research knowledge.
- They are willing to work with other community agencies to find effective solutions to problems.

Publications in the *Problem-Solving Tools Series* summarize knowledge about information-gathering and analysis techniques that might assist police at any of the four main stages of a problem-oriented project: scanning, analysis, response, and assessment. Each guide offers the following:

- Describes the kind of information produced by each technique
- Discusses how the information could be useful in problem solving
- Gives examples of previous uses of the technique
- Provides practical guidance about adapting the technique to specific problems
- Provides templates of data-collection instruments, where appropriate



- Suggests how to analyze data gathered by using the technique
- Shows how to interpret the information correctly and present it effectively
- Warns about any ethical problems in using the technique
- Discusses the limitations of the technique when used by police in a problem-oriented project
- Provides reference sources for more detailed information about the technique
- Indicates when police should seek expert help in using the technique.

Extensive technical and scientific literature covers each technique addressed in the *Problem-Solving Tools Series*. The guides aim to provide only enough information about each technique to enable police and others to use it in the course of problem-solving. In most cases, the information gathered during a problem-solving project does not have to withstand rigorous scientific scrutiny. Where police need greater confidence in the data, they might need expert help in using the technique. Often, such help can be found in local university departments of sociology, psychology, and criminal justice.

The information needs for any single project can be quite diverse, and often it will be necessary to use a variety of data-collection techniques to meet those needs. Similarly, a variety of different analytic techniques may be needed to analyze the data. Police and crime analysts may be unfamiliar with some of the techniques, but the effort invested in learning to use them can make a difference in the success of a project.

The COPS Office defines community policing as “a philosophy that promotes organizational strategies that support the systematic use of partnerships and problem-solving techniques, to proactively address the immediate conditions that give rise to public safety issues such as crime, social disorder, and fear of crime.” These guides



emphasize *problem solving* and *police-community partnerships* in the context of addressing specific public safety problems. For the most part, the organizational strategies that can facilitate problem solving and police-community partnerships vary considerably and discussion of them is beyond the scope of these guides.

The guides in the *Problem-Solving Tools Series* have drawn on research findings and police practices in the United States, the United Kingdom, Canada, Australia, New Zealand, the Netherlands, and Scandinavia. Even though laws, customs, and police practices vary from country to country, it is apparent that the police everywhere experience common problems. In a world that is becoming increasingly interconnected, it is important that police are aware of research and successful practices beyond the borders of their own countries.

Each guide is informed by a thorough review of the research literature and reported police practice, and each guide is peer-reviewed anonymously by a line police officer, a police executive, and a researcher before publication. The review process is managed independently by the COPS Office, which solicits the reviews.

The COPS Office and the authors encourage you to provide feedback on this guide and to report on your own agency's experiences dealing with a similar problem. Your agency may have addressed a problem effectively using responses not considered in these guides and your experiences and knowledge could benefit others. This information will be used to update the guides. If you wish to provide feedback and share your experiences, e-mail the information to askCOPSRC@usdoj.gov.



For more information about problem-oriented policing, visit the Center for Problem-Oriented Policing online at www.popcenter.org. The web site offers free online access to the following:

- The *Problem-Solving Tools Series*
- The companion Response Guides and Problem-Specific Guides Series
- Special publications on crime analysis and on policing terrorism
- Instructional information about problem-oriented policing and related topics
- An interactive problem-oriented policing training exercise
- An interactive *Problem Analysis Module*
- Online access to important police research and practices
- Information about problem-oriented policing conferences and award programs.



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The project team that developed the guide series comprised Herman Goldstein (University of Wisconsin Law School), Ronald V. Clarke (Rutgers University), John E. Eck (University of Cincinnati), Michael S. Scott (University of Wisconsin Law School), Rana Sampson (Police Consultant), and Deborah Lamm Weisel (North Carolina State University.)

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Introduction

One of the most common criticisms of problem-oriented policing efforts[§] is that crime will simply relocate to other times and places since the “root causes” of crime were not addressed^{§§} or because offenders may remain on the streets after certain crime opportunities are reduced. This phenomenon—called crime displacement—has important implications for many problem-oriented policing projects. At the extreme, widespread displacement stands to undermine the effects of your project. More often, however, crime displacement is not total and is inconsequential if it does occur. Most claims of displacement are based on suppositions unsupported by empirical evidence.

The majority of problem-oriented policing projects fail to investigate displacement.^{§§§} Officers are generally pleased to achieve a crime reduction in the targeted area and may be less concerned if crime is displaced outside their jurisdiction. Yet assessing and understanding potential displacement effects can help ensure the effectiveness of your problem-oriented policing project because the presence of extensive displacement threatens to undo any successes. Determining the extent of displacement (or lack thereof) will also assist in defending your results to critics.

This guide serves as an introduction to crime displacement, describing the concept, the extent to which it occurs, and why it may or may not happen. It discusses the nature of displacement and its varieties, including where displaced crime is most likely to go and what it might look like. This guide then describes ways to manage displaced crime to ensure your project’s success. Finally, it describes methods for measuring and analyzing displacement that can be used to determine overall effectiveness of problem-oriented policing projects. The guide is intended to assist those engaged in problem-solving activities including line officers, crime analysts, police executives, and community development professionals.

[§]This is also a common criticism of most situational-focused prevention efforts.

^{§§}Here “root causes” refers to broader social forces such as economic disparity, blocked employment opportunities, improper socialization resulting in offending, etc.

^{§§§}At least those that are submitted each year for the Herman Goldstein Awards for Excellence in Problem-Oriented Policing.





Defining Displacement

Crime displacement is the relocation of crime from one place, time, target, offense, or tactic to another as a result of some crime prevention initiative. Spatial displacement is by far the most commonly recognized form,¹ though the other four are also frequently acknowledged by those studying crime prevention effects. Formally, the possible forms of displacement are:^{2,§}

- Temporal—offenders change the time at which they commit crime
- Spatial—offenders switch from targets in one location to targets in another location
- Target—offenders change from one type of target to another
- Tactical—offenders alter the methods used to carry out crime
- Offense—offenders switch from one form of crime to another.

Overall, displacement is viewed as a negative consequence of crime prevention efforts, but in some cases it can still provide some benefit. Current thinking on crime displacement suggests that beneficial or “benign” displacement can occur when the harm produced by the displaced crime or problem behavior is less than what existed before the intervention.³ Specifically, benign displacement can occur in a variety of ways and is when the displaced crime is:

- Less serious, such as the shift to petty thefts from robbery
- Less impactful on the community, which can occur three ways:
 1. The concentration of crime is redistributed across a larger pool of *victims* (i.e., relocating victimization from a small group of repeat victims).^{§§}
 2. The crime is transferred away from more *vulnerable groups* of the population, such as children and the elderly.
 3. The crime is relocated to *places* where the community impact is less harmful. For example, a street drug or prostitution market *relocates* from a residential area to a remote area, which would reduce fear of crime or residential and business decay, or the same volume of crime *disperses* to a larger area where the harm is less concentrated.

[§]Also sometimes listed is offender displacement (when new offenders take the place of offenders who were arrested or have desisted from crime), but this is actually offender replacement. Displacement is a term reserved for changes offenders make so they can continue to offend when faced with reduced opportunities.

^{§§}For more on repeat victimization, see the Problem-Oriented Guides for Police Problem-Solving Tools Series No. 4 entitled, *Analyzing Repeat Victimization*.



- Lower in volume. For instance, the target area may experience a reduction of 100 crimes post response, but the displacement of the crime resulted in an increase of 50 crimes in the comparison area post response. Thus, a net reduction of 50 crimes was achieved.

At worst, displacement can lead to more harmful consequences. This occurs when there is a shift to more serious offenses or to similar offenses that have more serious consequences.⁴ Referred to as “malign” displacement, it involves any situation where the relocation of crime makes matters worse. This could be an increase in the volume of crime at the relocated area, a shift to more serious crime types, the concentration of crime to a smaller group of victims, the relocation of crime to places where it has greater impact on the community, or the relocation of crime to more vulnerable groups of the population.

Diffusion of Crime Control Benefits

The opposite of crime displacement is diffusion of crime control benefits. Crime diffusion entails the reduction of crime (or other improvements) in areas or ways that are related to the targeted crime prevention efforts, but not targeted by the response itself.⁵ Though less recognized than displacement, diffusion is recorded in many research evaluations of crime prevention responses.⁶ Diffusion effects are referred to in a variety of ways including the “bonus effect,” the “halo effect,” the “free-rider effect,” and the “multiplier effect.” In cases where any degree of diffusion is observed, the benefit of any response effects experienced in the targeted area are amplified as improvements were gained without expending resources in those areas.

As with displacement, diffusion of benefits can occur in many forms. Spatial and target diffusion occurs when areas or other crime targets near the intervention zone also experience a reduction in crime. Temporal diffusion occurs when other time periods experience a reduction in crime even though the intervention was not applied during those times. Crime type diffusion occurs when other crime types are prevented even though they were not targeted by the intervention (for instance, a project targeting commercial burglary may also achieve an added reduction in shoplifting).



The Evidence on Displacement

Universal assertions that displacement inevitably occurs in the aftermath of problem-led policing efforts are largely based on unfounded suppositions rather than empirical facts.⁷ Research has consistently found that crime displacement is the exception rather than the rule and that diffusion of benefits is just as likely and sometimes more likely to occur. In cases where some displacement occurs it tends to be less than the gains achieved by the response. Familiarizing yourself with this research allows you to justify your efforts to potential critics particularly during the early stages of your project before you've assessed displacement and diffusion effects of your own.

One of the most comprehensive reviews of the extent of displacement among evaluations of situational-focused crime prevention projects, conducted in 2008 by Guerette and Bowers, found that displacement and diffusion are equally likely to occur. Table 1 presents some of the results from this analysis (See Appendix A for more information). Displacement tends to be observed in 26 percent of the instances where it is examined, and diffusion is observed 27 percent of the time. This research also suggests that of the different types, temporal displacement is most common (occurring 36 percent of the time), followed by target (33 percent), offense (26 percent), spatial (23 percent), and tactical (22 percent). As for diffusion, spatial diffusion seems to be most common (occurring 37 percent of the time) followed by target (24 percent), offense and temporal (each at 16 percent), and tactical (12 percent).



§ Column percentages are reported (e.g., percent of the overall number of inspections (n = 572)).

§§ Row percents are reported (e.g., percent of those inspections of specific displacement/diffusion type).

§§§ Does not equal the number of studies in the review (i.e. 102) since several studies examined multiple forms and multiple inspections of displacement/diffusion.

§§§§ Specifically, of the 33 studies reviewed by Eck (1993), 91 percent found no or little displacement (e.g., displacement less than the response gain) and only three (9 percent) reported a substantial amount. Similarly, Hesseling (1994) found that 40 percent of the 55 studies reviewed reported no displacement at all, and, of these, six reported diffusion of benefits.

**Table 1:
The Extent of Displacement and Diffusion by Type⁸**

Study N = 102		Displacement	Diffusion of Benefit
Type	Examinations Frequency (%)[§]	Observed Frequency (%)^{§§}	Observed Frequency (%)
Spatial	272 (47%)	62 (23%)	100 (37%)
Offense	140 (24%)	36 (26%)	22(16%)
Target	80 (14%)	26 (33%)	19 (24%)
Tactical	49 (9%)	11 (22%)	6 (12%)
Temporal	31 (5%)	11 (36%)	5 (16%)
Total	572^{§§§}	146 (26%)	152 (27%)

Source: Guerette and Bowers (2009).

An analysis of a subsample of 13 studies, which allowed for the assessment of the prevention project's overall outcomes while accounting for spatial displacement and diffusion effects, found that when spatial displacement did occur, it tended to be less than the response effect, meaning that, on average, the responses were still beneficial.⁹ Previous reviews of crime prevention evaluations also found that the extent of displacement is usually limited.^{§§§§}

Research also shows that displacement is unlikely in the aftermath of broader community development programs¹⁰ and more focused policing initiatives that centered on hot spots.¹¹ An evaluation of the Weed and Seed program in Miami, Florida, found that spatial diffusion of benefits occurred more commonly than spatial displacement.¹² An evaluation of the New Deal for Communities (NDC) program in the United Kingdom discovered that, among 383 buffer zones, spatial diffusion of benefits was observed in 23



percent of zones, while spatial displacement was observed in only 2 percent. The remaining 75 percent showed no signs of displacement or diffusion. Also, across the buffer zones offense diffusion was more common than offense displacement (between 21 and 25 percent of the zones revealed offense diffusion compared to 0 to 5 percent for offense displacement).¹³

A systematic review of the effects of hot spots policing on crime found that of the five studies that examined displacement and diffusion effects none reported “substantial immediate spatial displacement of crime into areas surrounding the targeted locations” while four suggested possible diffusion effects.¹⁴ A randomized experiment testing for the presence of displacement in a problem-oriented policing project in Lowell, Massachusetts, found no significant displacement to the areas immediately surrounding the targeted places.¹⁵

It should be noted, however, that there may be times when displacement is simply undetectable. Offenders may move to other jurisdictions from which no data can be obtained, they may switch to offenses that are more difficult to detect (such as Internet fraud), or they may switch to offenses that have a very low reporting rate (such as shoplifting). Because of this, the research findings reported above may undercount the true extent of displacement effects. Nonetheless, the collective message of this research is that displacement is much less of a problem than originally and commonly believed.

When and Where Displacement May Occur

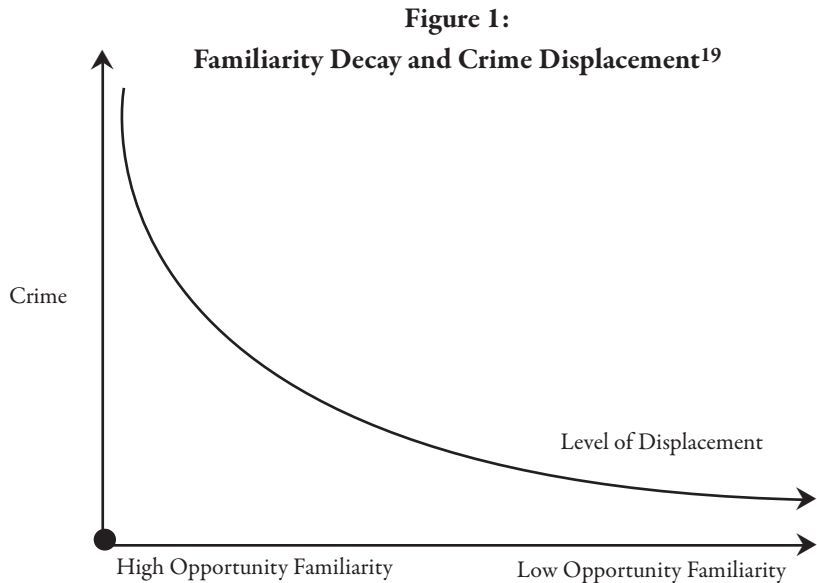
Whether displacement occurs is largely determined by three factors: *offender motivation*, *offender familiarity*, and *crime opportunity*. Offender motivation determines which offenders and types of crimes are likely to be displaced. Offenders driven by drug addiction are more likely to displace their crime behavior to crime types and targets that facilitate their addiction¹⁶ just as career criminals are more likely than marginal (opportunistic) offenders to continue to engage in crime after a response because their motivation is



§Similar meaning that the new offenses will involve targets and crimes that provide 'similar' rewards for the offender.

greater. Likewise, instrumental offenders (i.e., those motivated by monetary gain) are more likely to seek out other crime targets and types that provide similar monetary gain.¹⁷ Differently, motivations of expressive offenders (those motivated by emotion) tend to be contextually dependant. Expressive offenders are also less likely to displace their behavior once their situation is altered or otherwise remedied. Motivation is, however, influenced by offenders' familiarity with other locations and tactics and the prevalence of crime opportunities in their knowledge area.

Offenders are more likely to relocate their behavior to crime targets, places, times, and tactics with which they are most familiar.¹⁸ This means if displacement occurs it is most likely to be close to the original crime location and involve similar targets[§] and tactics. Termed "familiarity decay," for spatial displacement this means the probability of displacement is greatest close to the original crime location and decreases as the distance from the response area increases (see Figure 1). Offenders are less likely to offend in unfamiliar locations because it poses greater risk and greater effort to familiarize themselves with new locations. Distance from the original crime location increases the probability of unfamiliarity among offenders.





Displacement to the area immediately surrounding a response area is particularly likely if the crime area targeted by the intervention is a crime attractor,[§] a place to which offenders travel to commit crime because they present known crime opportunities (e.g., shopping malls, entertainment districts, or drug and prostitution areas). This provides minimal effort for offenders while also allowing them to operate within their zone of familiarity. Familiarity with locations also provides lower risks for offenders because they can more readily identify entry and exit points that will allow them to approach and leave crime scenes more quickly. Offenders' spatial familiarity is primarily determined by the known places and the surrounding vicinity that they frequent as part of their normal living routines. These areas of familiarity include the:

- Place(s) they currently or previously worked, if employed
- Areas near their current or previous residence
- Areas near where they participate in activities and/or shop
- Areas near the residence of significant others, such as friends or family members
- Routes they travel going to and from each of these places.

For target and tactical displacement, familiarity means offenders are more likely to select similar targets and use tactics similar to those they have used in former crimes. The more dissimilar other targets and tactics needed to commit other crimes; the lower the probability offenders will engage in them, at least in the near term. Most offenders acquire skill sets from peer groups or other delinquent associations as well as through their direct and indirect experiences of committing crime.²⁰ In the absence of other available crime targets (or at least those that the offender(s) is aware of) that provide for the use of existing skill sets, displacement is much less likely. Highly motivated offenders may expend the effort to acquire new skill sets, but the more common opportunistic offender is less likely to do so.

[§]For more on crime attractors, see steps 17 and 28 of Clarke and Eck's (2005), *Crime Analysis for Problem Solvers in 60 Small Steps*.



§Instrumental motivations may be violent, but the purpose of the violence is to secure monetary gain. Examples of this would include violence used during robbery, or by drug dealers to collect payments or to deter other drug dealers from operating in their turf zones.

Table 2: Predictors and Factors of Displacement

Predictors	Factors	How it relates to displacement
Offender Motivation	<p>Addiction</p> <p>High Motivation (career offenders)</p> <p>Low Motivation (opportunistic offenders)</p> <p>Instrumental (motivated by money)[§]</p> <p>Expressive (usually violent or destructive)</p>	<p>Likely to displace to other crimes that facilitate addiction.</p> <p>More likely to displace than desist from crime. More likely to expend the effort to find new crime opportunities and/or learn new skills.</p> <p>More likely to desist from crime than displace. Less likely to expend the effort to find new crime opportunities and/or learn new skills.</p> <p>More likely to seek out other crime targets and types that provide similar monetary gain.</p> <p>Usually highly contextual. Less likely to displace once situation is altered or remedied.</p>
Offender Familiarity of other targets/locations/skill sets	<p>High/many</p> <p>Low/few</p>	<p>More likely to displace crime behavior.</p> <p>Less likely to displace or will take longer to do so.</p>
Crime Opportunity	<p>Nearby</p> <p>Distant</p>	<p>More likely to displace crime behavior.</p> <p>Less likely to displace or will take longer to do so.</p>



The presence of crime opportunities also determines when and where displacement occurs. For many of the reasons already discussed, displacement is more likely where there are other suitable crime targets. This is contingent upon the offenders' motivation and familiarity with the crime targets and tactics needed to carry out the crime. Responses that occur adjacent to areas that have unprotected crime targets are more likely to experience some level of displacement compared to those that do not. Being aware of other crime opportunities near your response area allows you to anticipate the possibility of crime movement.

Why Displacement May Not Occur

Some criminality theories suggest that displacement inevitably occurs because crime behavior is the product of societal forces outside the individual, which instill criminal predispositions, or drives, within offenders. Because of the assumed need for offenders to “purge” their criminal tendencies or sustain certain income levels from criminal enterprises, this view contends that blocking crime opportunities through situational alterations inevitably compels offenders to seek out other crime opportunities (e.g., displacement occurs). Yet, this displacement assumption fails to recognize the important role that opportunity and temptation play in crime.

Offenders displace their criminal behavior only when the risks and effort of committing new crimes are worth the reward.²¹ Because different crimes present different costs, efforts, and rewards, there are many instances when displacing crime behavior is not worthwhile for the offender. In other words, opportunities to commit crime are not evenly distributed across time and place. Another aspect to consider is that when crime opportunities are closed down, committing other crimes is not the only way offenders can meet their needs. Blocking crime opportunities can make satisfying individual needs through legitimate activities more appealing.



Consider the following examples. It is unlikely a casual shoplifter would travel to a distant supermarket when newly introduced security makes it impossible for him to steal the odd item at his local market. It is also unlikely that commuters would seek another, less convenient route to work if it became impossible for them to exceed the speed limit on their current route. It is also implausible that travelers who casually take hotel items would expend the effort to seek out hotels that did not secure their alarm clocks, wall pictures, or closet hangers. Finally, when a store well known for selling alcohol to underage drinkers is shut down or otherwise brought into compliance, it is doubtful underage drinkers will simply go down the road to the next vendor because most vendors do not distribute to minors and the youth may not know which other ones do.

Put simply, very easy opportunities encourage crime and taking them out reduces the amount of crime committed. An offender's decision as to whether to displace his crime behavior in the aftermath of a response is shaped by the variety of circumstances found among other crime types, targets, times, tactics, and places.²² This means displacement often does not occur because:

- Offenders' knowledge is bounded in terms of knowing how to commit various types of crime (e.g., the tactics involved; skill sets).
- Offenders are less likely to commit crimes in unfamiliar locations or that involve unfamiliar tactics and targets.
- When blocked from their usual means of committing crime, even highly motivated offenders have to take time to scout out new territories and/or learn new ways to commit offenses. This means less crime, at least in the near term.
- Some offenders have a limited amount of time to commit crime.
- Illicit markets (such as street drug and prostitution) are often informally governed by competing offenders, which discourages displacement of outsiders into protected turf zones.



These crime features also explain why diffusion of benefits occurs. Two processes relate to diffusion: deterrence and discouragement.²³ As a prevention program in one area becomes known, offenders' uncertainty about the extent of the increased risk (deterrence) is coupled with the exaggerated perception that the rewards of particular crimes are no longer proportionate with the effort (discouragement). Thus, diffusion is likely to occur in places near response areas.

Displacement Often Does Not Occur and Diffusion is Likely

- In one of the earliest evaluations of problem-oriented policing in Newport News, Virginia, there were claims of displacement after the closure of a street corner marijuana market. Closer inspection revealed that displacement did not occur given that the other drug market where displacement was suspected sold heroin, not marijuana, none of the former marijuana dealers were observed at the heroin market, and the heroin market was a much smaller operation.²⁴
- The redesign of a trolley stop in San Diego, California, reduced robberies and assaults without displacing violent crime to other trolley stops.²³
- In the aftermath of an intensive police crackdown at street drug and prostitution markets in Jersey City, New Jersey, there was evidence of spatial diffusion of benefit effects across the two catchment areas studied, as well as reductions (i.e., diffusion) of general social disorder in those areas.²⁵
- Focused police patrols in Kansas City, Missouri, reduced firearms crime in a neighborhood without displacing these or other crimes to nearby areas.²³
- Following tightened security measures at ATMs in New York City and Los Angeles in the early 1990s, there were clear decreases in ATM-related crimes with no evidence of displacement to bank robberies or other forms of robbery.²⁶
- New identification procedures greatly reduced check fraud in Sweden, with no evidence of displacement to a range of other conceivable crimes.²³
- Following street closings and intensive policing at a street prostitution market in London, there was little evidence the prostitutes relocated to other areas. Researchers learned that many of the women were not committed to the trade and did it only because it was an easy way to make money. When the risks and effort of continuing prostitution were elevated due to the intervention, many of the women gave up the trade altogether.²³





What Displacement Means for Your POP Project

Crime displacement and diffusion of benefits have many implications for your problem-oriented policing project. Displacement may occur more readily when a response is too narrow in scope, is applied randomly without careful analysis of the problem, or is based on an inaccurate understanding of the problem. Yet, even in these cases, crime or nuisance behavior that is displaced may not be total, and the overall effect may be inconsequential relative to the gains achieved by the response. A well-researched problem-oriented policing project should identify the likelihood of displacement during the analysis phase and should account for it in the formulation of the response. You should determine whether displacement or diffusion of benefits occurs during the assessment phase. It is important to assess the extent to which displacement or diffusion happens because the successes your project achieves can either be undermined by displacement or amplified by diffusion.

When the benefits of your successful problem-oriented policing project are outweighed by the costs, harm, and/or volume of displaced crime, the prevention effort becomes ineffective.²⁷ For this reason, your assessment should measure the extent of crime displacement and compare it to the achieved gains. (How to do this is presented in a following section of this guide.) Being alert to the possibility of diffusion of benefits is also important when evaluating your project because determining your response's overall effectiveness is affected by an assessment of possible diffusion effects. Questions you need to answer are:

- What were the program's effects on the targeted behaviors in the response area?
- Was there any displacement? If so, what was the extent of the displacement? What was the extent of the harm produced by the displacement?
- Did the program have any positive effects in areas other than the response area (e.g., diffusion of benefits)? If so, to what extent?



Not assessing for diffusion could result in a conclusion of only marginal gains (when a response achieved only this much); whereas inspecting and observing the possibility of diffusion could lead to more favorable conclusions of effectiveness. The remainder of this guide presents things you should think about to manage displacement if it occurs, how to better understand your local displacement potential, and how to measure it so you can better assess your project's impact.



Managing Displacement

The best scenario at the conclusion of any problem-oriented policing project is the occurrence of diffusion of benefits rather than displacement, but clearly this is not always the case. Even if displacement occurs, your project can still benefit the community if the displacement is managed properly. To effectively manage displacement, you need to gain an in-depth understanding of your displacement potential and plan for the analysis of displacement and diffusion effects within your project.

Making Displacement Work for You

Knowing the different forms of displacement (such as benign and malign) allow you to orient your problem-solving efforts toward minimizing the impact of any displacement effects should they occur. This can mean taking steps to reduce the harm of displaced behavior, tailoring responses to protect vulnerable populations in the community, or shifting the impact of problem behavior where it has fewer consequences.

Reducing the Harm of Crime

One way to manage displacement is to reduce the harms attributable to displaced behavior relative to the harms experienced in the response area before the project's implementation. For instance, displacing a disorderly day labor site to an organized facility away from affected businesses and residential areas could alleviate the loitering, traffic congestion, and public disorder that previously existed.²⁸ Similarly, relocating a popular teenage cruising strip to a designated area can eliminate harms to businesses and neighborhoods such as traffic congestion, loud car stereos, public drunkenness, and assaults, which may contribute to heightened levels of community fear of crime.²⁹



Protecting Vulnerable Populations

Prevention efforts that are directed toward vulnerable populations such as the elderly, children, or immigrants can still be beneficial even if displacement occurs. These vulnerable populations are impacted by crime more than other community groups as they are less able to protect themselves from victimization and recuperate from or recover losses, and, because of this, generally have a higher fear of crime.³⁰ Conceivably, even a project that prevents victimization among these groups and results in total displacement (e.g., 100 percent relocation of crime or problem behavior) to non-vulnerable community members can still be beneficial. Of course, it is best to reduce the problem without any resultant displacement. Even so, the variability to which crime problems impact different members in the community may be worthwhile to consider.

Shifting the Impact of Crime

Another way the presence of displacement would fail to washout response effects is when victimization or the impact of crime and problem behavior is dispersed from concentrated places or people. Research shows that crime tends to disproportionately concentrate in time, place, and among victims.³¹ A response that targets community members who routinely experience a disproportionately high rate of victimization compared to others (e.g., repeat victims), or targets crime and problem behavior that is concentrated in a relatively small, specific place (e.g., hot spot, risky facilities) can continue to provide beneficial results even if displacement occurs. This is because the problem behavior will be less concentrated and as such, will result in less harm for the community. Again, any displacement is undesirable, but recognizing the benefit of crime dispersion could be useful.



Cautionary Note

For two reasons you should use caution when applying these ideas in practice. First, much of the knowledge regarding the nature of displacement is based on theoretical propositions that remain untested. Although they do stem from firm theoretical foundations regarding crime that have supportive research findings, there is little empirical evidence that displacement will behave the way the propositions specify (e.g., familiarity decay; movement to areas closest to former crime sites, etc.). Because of this they should be used as a guide to your approach to manage displacement not as hard and fast rules.[§] Second, orienting prevention efforts toward relocating the impact of crime or problem behavior may raise criticism from some community members and may pose some ethical dilemmas. Therefore, your primary goal should be to reduce crime and problem behavior outright without any displacement. Assessments of reduced harm should be used as a way to evaluate the impact of your efforts and to inform subsequent cycles of the problem-solving process.

[§] It should also be noted that social science is based in probabilities rather than absolutes. This means that theoretical propositions should be interpreted as proposing that it is more probable than not that a certain event will occur given various circumstances. For example, in the case of theoretical propositions regarding displacement, the theories hold that if displacement occurs, it will most likely occur in areas familiar to the offender, which will tend to be close to the original offending site. The failure of this to occur in any single instance does not negate the theory.





Understanding Your Local Displacement Potential

There are several things you should consider during the formulation of your POP project as it relates to displacement and diffusion. This guide contains only a general description of displacement and diffusion. Because displacement and diffusion take various forms as they relate to different problems and locations, you need to combine the basic concepts of displacement and diffusion with a more specific understanding of the problem your project will address. A thorough analysis of your local problem will help you more accurately predict the likelihood of displacement or diffusion and accommodate it in your response strategy. Use the problem analysis triangle[§] to help you understand your displacement potential.

[§] For a discussion of the problem-analysis triangle, see step 8 of Clarke and Eck's (2005) *Crime Analysis for Problem Solvers in 60 Small Steps*. www.popcenter.org/learning/60steps

Analyzing Offenders

To assess the possibility of displacement and diffusion effects, it is important to understand the characteristics of the offenders your response will involve. Generally, you need to know how offenders benefit from the problem behavior and whether they are opportunistic or driven by stronger motivations. You also need to identify any individuals or organizations that could control offenders' actions (e.g., handlers). Knowing about handlers helps you better assess the likelihood that offenders will displace their problem behavior to other times and places in addition to helping you identify potential responses to the problem. In regards to offenders, some of the questions you need to ask and answer include:

- How are they rewarded for engaging in the problem behavior at that time and place?
- How dependent are they on the problem behavior?
- Does it provide economic sustenance for them or others in the community?
- Do they have the resources to travel to new locations?
- Are they familiar with other places to engage in similar behaviors?



- Do they have the skills or resources to engage in other problem or crime behaviors that provide similar benefits?
- Do they have the ability to acquire new skill sets and are they likely to do so?
- Do they have other legitimate opportunities to achieve the rewards provided by the problem or crime behavior?

Analyzing the Location

To better anticipate and determine displacement and diffusion effects, you also need to consider the location of the problem your project will target. Using the principles of when and where displacement is likely to occur discussed in the previous section, you need to analyze areas near your response zone. In doing so, seek answers to the following questions:

- Are there crime targets in areas nearby that provide similar benefits for offenders?
- If so, are they adequately protected or are they vulnerable to crime?
- How far is the potential new crime location from the response area?
- How easy or difficult is it for offenders to travel to the new location? For instance, are there natural or manmade barriers such as ponds, rivers, lakes, interstates, or roadblocks that would impede travel to those locations or are they easily accessible through open and direct routes of travel? Are other sources of public transport available, such as buses and trains, to the potential new location?
- Is the new location controlled by other offenders such as drug dealers, gangs, pimps, or organized crime members?
- If your project response is implemented only during specific time periods, how likely is it that the crimes will take place during other unprotected times? For example, do those other time periods provide similar opportunities for crimes to occur such as the convergence of victims and offenders without sufficient guardianship?



Analyzing Victims

Understanding the victims can help prepare you for the possibility of displacement and determine the impact of your project in the assessment phase. You need to know who the victims are, why they are victims, and the harms they incur. With regard to victims, seek answers to the following questions:

- Who is being victimized?
- What factors facilitate their victimization?
- Are any of the victims repeatedly victimized more than others?[§]
- Are they also offenders?
- Are they a vulnerable population such as children or the elderly?
- What are the nature and extent of the damage they experience?
- Do they live or work in the problem area, or do they come from other places to that location?
- If so, what brings them to that location during the times of victimization?

[§]To learn more about determining the extent of repeat victimization, see the Problem-Oriented Guides for Police Problem-Solving Tools Series No. 4 entitled, *Analyzing Repeat Victimization*.

Collecting Information

To answer the above questions, you need to gather information from a variety of sources. It is better to collect information from multiple sources because it increases the accuracy and breadth of your understanding. In some instances displacement or diffusion may fall outside your jurisdiction. In these cases it may be useful to collaborate with other departments (such as acquiring data from them) to fully gauge displacement or diffusion effects. Following are some information sources that could be useful in understanding your displacement potential:

- Citizen surveys
- Informal discussions with community members
- Organizational or departmental intelligence
- Calls for service records
- Criminal histories
- Regular observations



- Interviews with line officers and investigators
- Interviews with other government agents such as probation and parole officers, fire rescue personnel, and school personnel
- Interviews with religious leaders, business merchants, and community organizations.

Putting it Together

Once you develop an in-depth understanding of your displacement potential, you can better predict the likelihood of it occurring, the types that might occur, and where it is likely to go. This understanding allows you to accommodate the possibility of displacement in forming your response and makes it easier for you to evaluate the influence of displacement and diffusion effects during the assessment of your project.

Planning Your Analysis

To carry out your analysis you need to identify the area or boundaries within which your response is targeted (i.e., response area), an area to examine for the presence of displacement or diffusion (i.e., diffusion/displacement area), and a third untouched area to compare (i.e., control area) any changes observed in both the response area and the displacement/diffusion area. Focus your analysis on the various forms of displacement and allow enough time from the point at which the response was implemented for it to appear. Displacement may not occur immediately following the implementation of the response but may gradually emerge as time passes.

In conducting your analysis you need to identify the volume, severity, and harm of any displacement effects and measure these relative to the gains achieved by your response. If your project does not result in any reductions in the targeted area, there is no need to analyze for displacement or diffusion effects. Your analysis can help refine subsequent cycles of the scanning, analysis, response, and assessment (SARA) process or facilitate a second problem-solving project. The steps involved in the analyses should include:



1. **The volume of displacement.** First, look at the amount of crime or problem behavior that moved. To do this you need to obtain a baseline measure of the behavior in the displacement/diffusion area before implementing your response. An increase in what you are measuring suggests that displacement has occurred. A decrease suggests that diffusion has occurred. What you measure should be tailored to the specific nature of the problem your project will address. The measure may be a specific crime type, but it can also include levels of calls for service, fear of crime, social and physical disorder, or nuisance behaviors such as loitering, traffic conditions, and vagrants, among others. You should also look to see whether any changes in the displacement/diffusion area are the result of something other than your response such as the removal or introduction of some separate security measure.
2. **The severity of displacement.** If you determine some level of displacement occurred, see whether the severity of the displaced behavior is greater than or less than that which was prevented in the response area. For instance, if there was a reduction in burglaries in the target area but the displacement area experienced an increase in armed robberies, the severity of the displaced crime has increased. If, however, the reduction of burglaries in the target area is associated with an increase in petty larceny in the displacement area, the severity of the displaced crime has decreased. This means the project still achieved a beneficial result despite an increase in the volume of petty larceny. This is an example of benign displacement.
3. **The level of harm incurred by displacement.** Third, determine the amount of harm experienced in the displacement/diffusion area as a result of the displaced behavior. This could be done in a variety of ways depending on the specific nature of your project. It might involve assessing the financial losses suffered, whether the displaced behavior has shifted to or away from a vulnerable population, or whether the displaced behavior has been disbursed to a wider pool of victims or has been concentrated on fewer victims.





Assessing Displacement

Determining displacement and diffusion should be central to understanding the impact of your POP project because the presence of extensive or malign displacement can overshadow any gains your response achieved. At the same time any level of diffusion stands to amplify response effects. In short, this means any determination of response effectiveness must directly measure the extent to which displacement and/or diffusion occurs. This has implications for how you design your assessment.

Designing your assessment to determine the presence of displacement or diffusion effects requires you to apply what you learned in the analysis of your project's displacement potential, particularly involving the types of displacement that might occur. For many projects spatial and temporal displacement will be most relevant; for others target, tactical, or crime type displacement may be more likely. A project could result in more than one type of displacement or diffusion. If you think this could be the case in your project, you need to assess the different types of displacement and diffusion that might reasonably occur.

Assessing most forms of displacement and diffusion requires the use of at least three different components:[§]

1. **Response area**—to determine any change in the crime or problem behavior as a result of the response. Many times this is a specific geographical area, but it can also be a system (such as transport systems), a group of facilities (such as convenience stores, banks, or retail businesses), or a specific time period (such as Friday or Saturday evenings).
2. **Displacement/diffusion area**—to determine whether the response resulted in the relocation (displacement) or reduction (diffusion) of crime or problem behavior elsewhere. Again, this may be a specific geographical area surrounding your response area (perhaps to another police jurisdiction), but it could also be another system (such as the relocation of problem behavior from a subway system to a bus system), a group of facilities (such as other convenience stores or retail businesses) or other targets, tactics, or time periods.

[§]For a thorough primer on assessment design, see Problem-Solving Tools Guide No. 1, *Assessing Responses to Problems: An Introductory Guide for Police Problem-Solvers*, by John Eck. popcenter.org/tools/assessing_responses; also see steps 46 to 53 of Clarke and Eck's (2005) *Crime Analysis for Problem Solvers in 60 Small Steps*. www.popcenter.org/learning/60steps



3. **Control area**—to determine whether areas that did not receive the response changed in ways similar to or different from those observed in the response area. The type of control area should be the same as or as similar as possible to that used for the response area. The control should also have not received the response, and there should be no possibility that it would have been influenced (or contaminated) by the response or by some other intervention. For instance, if the response area is a specific geographical location (such as a hot spot), the control area should be a similarly sized geographical area with similar traits. If the response is a sample of targets, the control should be some other similar group of targets not subjected to the response (secured convenience stores [response] versus unsecured convenience stores [control]). The key is that they are similar and unrelated in the sense that they are free from influencing one another.

You should consider three criteria when selecting suitable displacement/diffusion areas (see Table 3). The first criterion is that there is a logically specifiable reason to expect displacement or diffusion to that place, target, tactic, time, or crime type. For spatial displacement and diffusion this usually requires the area to be near the response area for many of the theoretical reasons discussed previously in this guide (e.g., awareness space and familiarity decay). There may, however, be times when it is logical for displacement to occur some distance away from the response area, and this should also be examined. Examples of this would be the relocation of problem behavior in a park to another park several blocks away or a street prostitution market that may shift to an existing prostitution market in another part of town. In such instances you need to assess the presence of displacement and diffusion in each location (e.g., the zone around the response area and the distant location).

For the other forms of displacement, the logical relationship between the former and the alternatives should guide you. For instance, in a project that gated alley ways to prevent residential burglaries accomplished through rear entry, did offenders change tactics and enter the residences from the front (e.g., tactical



displacement)? Did offenders shift to burglarizing businesses rather than homes (e.g., target displacement)? Or was there an increase in nearby robberies (e.g., crime type displacement)?

The second criterion to consider in selecting the displacement/diffusion catchment area is size.³² The catchment area should not be too large relative to your response area as it could lead to the false conclusion that displacement did not occur. In other words, if the displacement/diffusion area is too large, the relocation of crime (displacement) might actually have occurred but the amount relative to the volume of crime in the (too large) catchment area may not be discernible. In this instance you would have concluded there was no displacement when in fact there was. The displacement/diffusion area should also not be too small so as to ensure that any relocation of crime is detectable. In practice it may be difficult to determine what exactly constitutes an appropriate-sized catchment area, and there is no right or wrong answer. You need to explore this with your crime analyst to see what works best. It may be useful to use multiple catchment areas, perhaps of different sizes such as one smaller and one larger.

Table 3: Criteria for Selecting Displacement/Diffusion Areas

Criterion	Purpose	Rationale
Logical Interrelatedness and/ or Proximity	To ensure the observation is valid.	Selecting an area where displacement or diffusion would not logically occur may result in false conclusions that it did not occur when in fact it did.
Proportionate in Size	To increase the accuracy of your measures.	An area too small or too large could conceal the presence of displacement or diffusion if it occurs.
Contamination Free (Exclusivity)	To help ensure the observation is an effect of the response.	A contaminated area may lead to false determinations of displacement or diffusion when in fact it was the result of something else, such as another intervention.



The third criterion is that the displacement/diffusion area is free from any possible contamination, which could occur when catchment areas overlap with each other, with control areas, or with response areas other than the one you are assessing.³³ If there is a possibility that changes in the displacement/diffusion area are the result of factors other than the response you are assessing, it will be difficult for you to claim the change was displacement or diffusion as it could be caused by something else. This means you need to ensure the displacement area does not overlap with other areas of activity. Beyond ensuring the areas do not overlap, in practice (e.g., applied settings) it is nearly impossible to control all outside influences. At the least, you should strive to identify what those possible influences are and understand how they might influence your measures of displacement and diffusion.



Figure 2:
Illustration of Response, Displacement/Diffusion Area, and Control Area
Used to Determine Spatial Displacement and Diffusion Effects

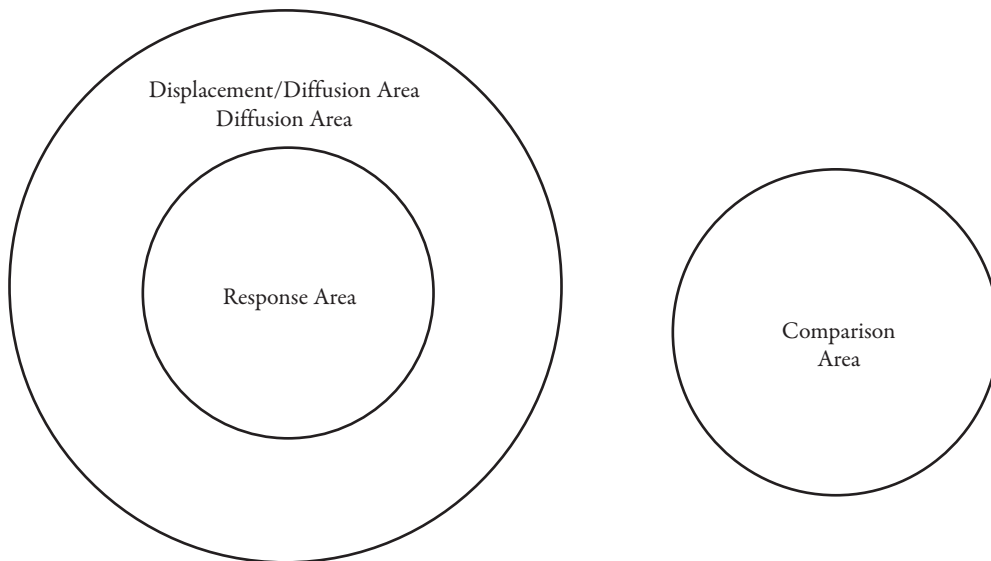


Figure 2 provides a schematic of an assessment designed to examine spatial displacement and diffusion. Here all three criteria are met. First, the displacement/diffusion area is logically related (in this case of spatial displacement, adjacent to) to the response area. Second, it is also proportional to the size of the response area. Third, it is free from any overlap with the response area or the comparison area, which could contaminate the measurements.



Figure 3:
Illustration of Response, Two Displacement/Diffusion Areas, and Control Area
Used to Determine Spatial Displacement and Diffusion Effects in a Field Setting

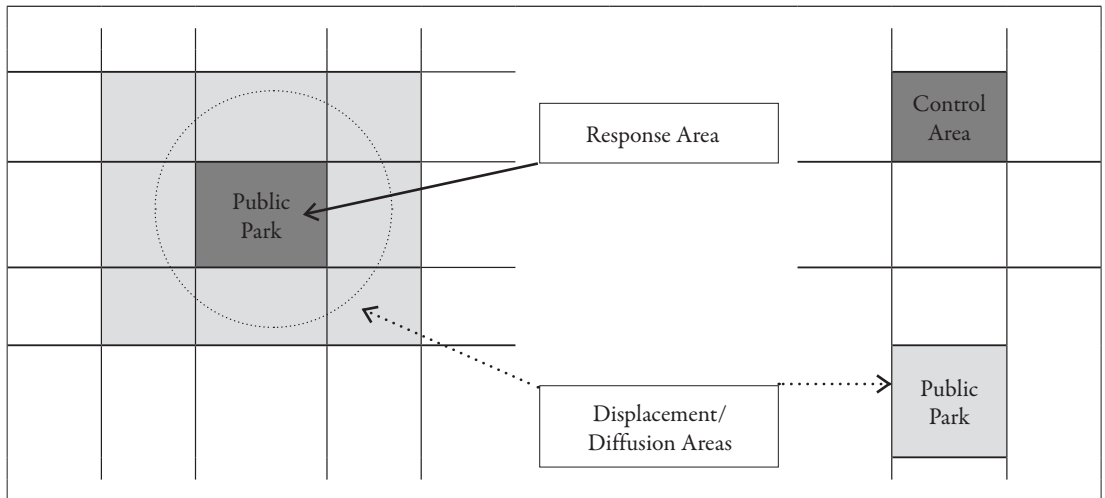


Figure 3 shows how this might look in a field setting with more than one displacement/ diffusion area. In this diagram the displacement/diffusion areas are both blocks surrounding the response area located at a public park (e.g., hot spot) and a somewhat distant public park. Again each criterion is satisfied: a) they are logically interrelated and/or proximate to one another, b) they are proportionate in size, and c) they are free from contamination (exclusivity).



Measuring Displacement

To determine the presence of displacement and diffusion effects, take measurements both before and after the implementation of the response in each area you identified in your assessment design (e.g., the response area, one or more displacement/diffusion areas, and the control area). Doing this allows you to find any change in the problem behavior after the implementation of the response relative to before it was in place, and to identify any displacement or diffusion effects. You can use a variety of measures as long as they are relevant to the focus of the responses. It is better to use several measures to assess improvements made by your project because it more fully represents the multiple dimensions your project stands to impact. Some types of measures you can use are:

- Crime counts or crime rates (i.e., number of crimes per 100,000 population)
- Levels of disorder (such as graffiti, loitering, or vandalism)
- Citizen fears, attitudes, or perceptions
- Observations or arrest reports of specific offenders (to determine whether offenders in one area are observed or arrested in the displacement/diffusion areas)
- Motor vehicle accidents
- Levels of incurred harm
- Crime severity
- Financial costs, among others.

At a minimum you need one before and one after measurement, but you may want to take several after measurements to gauge the impact of your project over time. As a rule, the longer the time period after the response the better, but most existing evaluation periods of crime prevention efforts tend to be less than two years after the response is applied.³⁴



For many projects it is sufficient to simply compare before and after changes in your response area to those in your displacement/diffusion area. An increase in the measured level of crime or problem behavior in your displacement/diffusion area suggests that displacement occurred. If the increase is less than the reduction achieved in your response area, the project still achieved some success. If, however, the increase in the displacement/diffusion area is greater than the reduction in the response area, the project was unsuccessful because the displacement erased all of the response affects. A decrease in the level of crime or problem behavior in the displacement/diffusion area suggests that diffusion occurred and the benefits of the project achieved in the response area were augmented.

Table 4: Comparing Displacement and Diffusion Effects to Response Effects				
	Before	After	Difference	Estimated Cumulative Net Effect
Response area	200	100	-100	
Displacement/Diffusion Area 1	100	150	+50	-50
Displacement/Diffusion Area 2	75	50	-25	-75

The hypothetical data presented in Table 4 provides an illustration. Let's say the implementation of a problem-led response results in a 100-crime reduction in the targeted area. One displacement/diffusion area experiences a 50-crime increase (indicating displacement) while a second displacement/diffusion area experiences a 25-crime reduction (indicating diffusion). The 100-crime reduction achieved in the response area is cut in half to a net reduction of 50 crimes due to displacement in the first comparison area. Even though displacement occurred here, it was not enough to wash out the response effects. The 25-crime diffusion effect in the second comparison area adds to the net effect of the project resulting in an overall net reduction of 75 crimes.



For some projects, such as those that are large in scale or where there is much at stake, a more in-depth and precise determination of displacement and diffusion effects may be needed. When this is the case you may need to enlist the services of someone within your agency, such as a crime analyst, who has sufficient statistical and evaluation skills or an expert at your local university. Because evaluation of displacement and diffusion effects is unique to the crime sciences, general experts on evaluation methods may find the information presented in this guide useful. To assist you, your crime analyst, and/or your enlisted expert, a series of formulas are provided in Appendix B, which allow for precise empirical determinations of displacement and diffusion relative to any response effects. Appendix C provides the purpose, rationale, and interpretation of these formulas, and Appendix D gives an example of the use of these formulas from an actual project that was a finalist for the annual Herman Goldstein awards.





Conclusion

This guide introduced the idea of crime displacement and its opposite, diffusion of benefits, and explored their implications for problem-oriented policing projects. Although it is possible that some displacement will occur in the aftermath of the implementation of problem-led responses, it is equally likely that diffusion of benefits will occur. Approaching your project with an understanding of displacement and diffusion effects will allow you to more carefully assess the impact of your problem-solving efforts, and the measurement techniques presented in this guide will allow you to compare any displacement and diffusion effects in relation to the gains achieved by your response.

The numbers from your measurements can be used as an indicator of displacement and diffusion effects, but overall determinations of whether your project was worthwhile when displacement is present are up to you. This is because of the inherent difficulty of comprehensively gauging all of the potential costs and consequences of a project on the community. There may be instances where the level of displacement is less than the reductions achieved by the response but the costs (both financial and intangible) involved in accomplishing those reductions along with the observed displacement levels make the project unsuccessful. It should also be recognized that even when all of the principles discussed here are used, the information regarding displacement and diffusion that is produced should be taken as a general understanding rather than an absolute assessment of displacement and diffusion effects. This is also because of the complexity of fully gauging all possible movements of crime and problem behavior.

Incorporating the concepts of displacement and diffusion into your approach to problem-oriented policing prepares you for it, should it occur. It also allows you to respond to those who may criticize your efforts with claims of the inevitability of displacement. In some cases, such as for small scale problem-solving efforts, it may be sufficient to assess displacement and diffusion effects at face value without a more intricate determination provided by the approach



described in this guide. However, for large scale problem-solving projects where much is at stake, the analytical approach and measurements presented here are instrumental in ascertaining the role of displacement and diffusion in your project. In either case, attention to displacement and diffusion should be central to your problem-solving activities.



Appendix A: About the Data Presented in Table 1

The numbers reported in Table 1 are from an analysis conducted by Guerette and Bowers (2009) of more than 200 evaluations of situational crime prevention measures. Each evaluation is accessible from the Center for Problem-Oriented Policing web site www.popcenter.org/library/scp. Of the more than 200 evaluations, 102 provided some inspection of displacement or diffusion effects, and, within these, there were 574 different inspections. Each of these were reviewed and recorded by two independent reviewers whether or not there was evidence “consistent with” the possibility of displacement or diffusion effects. The numbers presented should be used as a general guide as to the probability of the various forms of displacement and diffusion occurring and should not be considered as absolute. This is because many studies lacked sufficient research designs to make confident determinations and a few did not provide data to evidence their reporting of the presence of displacement or diffusion. Additionally, most did not allow for the comparison of displacement and diffusion effects relative to the gains achieved by the intervention.

Those studies included in the evaluation met the following conditions:

1. It was written in English.
2. It was published as a journal article, government report, organizational report, or book (including book chapters).
3. It reported an evaluation of a crime prevention effort that was predominantly or exclusively a situational intervention. In some cases the crime prevention effort also included dispositional interventions (i.e., directed to modifying criminal motivation) but the situational intervention(s) was predominant. The situational techniques employed in the intervention were classifiable under Cornish and Clarke's (2003) listing of 25 situational crime prevention techniques.



4. Studies that involved targeted police tactics were not included (even though they could have been classified as "strengthening formal surveillance"). Studies that used predominantly situational measures but which also involved some targeted police efforts were included.
5. The evaluation used some quantitative measure of crime.
6. The article reported original research findings. Systematic reviews or other meta-analyses of prevention projects themselves were not included.
7. In cases where the same project was reported in two different publications (e.g., in a government report and in a journal article), only the manuscript with the most detailed information was included.



Appendix B: Formulas for the WDQ and TNE to Measure Displacement and Diffusion

An innovative team of crime scientists in the United Kingdom has developed a series of formulas to precisely measure displacement and diffusion effects in relation to response effects.³⁵ These consist of the gross effect (GE), net effect (NE), weighted displacement quotient (WDQ), and the total net effect (TNE).[§] Each of these is determined as presented in the following four steps:

The gross effect (GE) and the net effect (NE) are defined as

$$GE = R_b - R_a \quad (1)$$

where R_a is the crime count in the response area post intervention, and R_b is the crime count in the response area before the intervention.

$$NE = (R_b/C_b) - (R_a/C_a) \quad (2)$$

where C_a is the crime count in the comparison area post intervention, C_b is the crime count in the comparison area before the intervention.

The weighted distribution quotient, or WDQ, used to determine displacement or diffusion effects and is designated as

$$WDQ = \frac{D_a/C_a - D_b/C_b}{R_a/C_a - R_b/C_b} \quad (3)$$

where D_a is the crime count in the buffer area post intervention, D_b is the crime rate in the buffer area before the intervention.

The WDQ can also be broken down into separate measures of response success and displacement/diffusion, such as:

Success Measure (WDQ denominator) = $R_a/C_a - R_b/C_b$

Buffer Displacement Measure (WDQ numerator) = $D_a/C_a - D_b/C_b$

Additionally, the overall impact of the project can be determined using the TNE or “total net effects” model, which is defined by the relationship

$$TNE = [R_b(C_a/C_b) - R_a] + [D_b(C_a/C_b) - D_a] \quad (4)$$

[§]If the time period following the response is long enough it may be possible to use a statistical procedure called ARIMA to assess displacement and diffusion effects. To use this procedure you need to contact an expert in evaluation or statistics such as a crime analyst from your agency or one from your local university for assistance.



These computations can be used for measuring any form of displacement as long as the three criteria for the selection of the areas are followed (e.g., logical interrelatedness/ proximity, proportionality, and contamination free). If you use multiple measures to assess your project, you need to use these four formulas for each of the types of measures that you collect or create a single composite measure from all or some of the measures taken. If before and after measures are taken at repeated intervals over time, the average of the before and after data periods can be computed and used in the equations. You can also use rates of crime for the computation of the net effect (NE) and weighted displacement quotient (WDQ), but not for the gross effect (GE) and total net effect (TNE) as these require the use of raw counts of crime or problem behavior. They require counts because they provide measures of the number of crimes or problem behaviors prevented, and, therefore, the resulting number can be interpreted as such (i.e., a TNE = 50 would mean that overall the project resulted in the prevention of 50 crimes).



Appendix C: Use and Interpretation of Coefficients to Measure Displacement and Diffusion

Coefficient	Use	Interpretation
Gross Effect (GE)	Determines increase or decrease in response area.	Positive number > 0) indicates decrease in crime; Negative number < 0) indicates increase in crime. Zero = 0) means there was no change.
Net Effect (NE)	Determines increase or decrease in response area in relation to changes in control area.	Positive number > 0) indicates decrease in crime; Negative number < 0) indicates increase in crime. Zero = 0) means there was no change.
Weighted Displacement Quotient (WDQ)	Determines the extent of displacement or diffusion in buffer areas in relation to changes in response and control area.	Positive number > 0) indicates there was a diffusion effect and any response effects were amplified; If number is greater than positive one $> + 1.00$) then the diffusion effect was greater than the response effect. Negative number < 0) indicates there was displacement. A negative number between zero and negative one $< 0 > -1.00$) means the displacement was not greater than the response effects and the intervention still achieved some benefit. A negative number beyond negative one < -1.00) means the response effect was eclipsed or erased by displacement. Zero = 0) means there was no effect.
Success Measure	Determines the degree to which the decrease in the action area outweighs that in the control area (i.e., the degree to which the response was successful).	Negative number < 0) indicates successful responses where the decrease in the action area outweighed that in the control area. Positive number > 0) indicates responses where the response was not effective.
Buffer Displacement Measure	Determines whether the interventions show possible evidence of displacement or diffusion.	Positive number > 0) indicates a possible displacement effect. Negative number < 0) indicates a possible diffusion of benefit.
Total Net Effect (TNE)	Determines the overall effect of the response in relation to changes in the control area while adjusting for displacement and/or diffusion effects.	Positive number > 0) indicates response was effective overall; Negative number < 0) indicates it was not. Zero = 0) means there was no change. The greater the number, either positive or negative, the more or less effective the response, respectively.





Appendix D: Illustration of the Use of the GE, NE, WDQ, and TNE in Lancashire, England

2008 Goldstein Award Finalist

“MOPPIN up Dodge”

submitted by the Lancashire Constabulary, UK

Synopsis: A neighborhood made up largely of rental units ranks within the top 10 percent of deprived communities in England and suffers from disorderly youth, drug use, high fear of crime levels, and little community involvement. A multi-pronged analysis led to a wide array of responses, which included enforcement, situational and social crime prevention guided by crime science research.

Specific tactics included standard law/ housing enforcement; innovative crime and disorder legislation; a media campaign; diversion tactics, youth outreach and a buddy system; reparation, restorative justice and ABCs; target hardening (improve lighting/fencing); modification of public places to discourage disorderly behavior; and early youth interventions. The project submission presented the actual data which was used in the following calculations:

$$GE = 207 - 110 = 97$$

The positive number indicates there was a decrease in crime in the target area.

$$NE = (207/308) - (110/318) = .326$$

Again, the positive number indicates there was a decrease in crime in the target area that was greater than or different from changes in the control area.

$$WDQ = \frac{(157/318) - (178/308)}{(110/318) - (207/308)} = .411$$

The WDQ determines the presence of displacement or diffusion in relation to changes in the treatment and control areas. Here there is a positive number, which indicates there was a diffusion effect.



Because the number is less than positive one ($<+1$) it means that while diffusion did occur, it was not greater than the reduction achieved in the intervention area. Nonetheless, this is a very favorable finding because the response effect is amplified by the presence of diffusion.

$$\begin{aligned} \text{TNE} &= [207(318/308) - 110] + [178(318/308) - 157] \\ &= 130.5 \text{ or } 131 \end{aligned}$$

The total net effect gives the overall outcome of the project. The positive number here means that overall the project achieved a positive outcome and because it is fairly large the effect was pretty substantial. Another way to say this is that with the reductions achieved in the treatment area as well as with the diffusion effects and in relation to the control area, the project resulted in a reduction of approximately 131 crimes.

A successful POP project!



Endnotes

- ¹ Eck (1993).
- ² For more on this, see Reppetto (1976).
- ³ Barr and Pease (1990); Bowers and Johnson (2003); Eck (1993); Guerette and Bowers (2009)
- ⁴ Barr and Pease (1990).
- ⁵ Clarke and Weisburd (1994).
- ⁶ Bowers and Johnson (2003); Chaiken, Lawless, and Stevenson (1974ab); Green (1995); Miethe (1991); Weisburd et al. (2006); Weisburd and Green (1995b).
- ⁷ Eck (1993); Hesselting (1994); Hill and Pease (2001).
- ⁸ Guerette and Bowers (2009).
- ⁹ Guerette and Bowers (2009).
- ¹⁰ McLennan and Whitworth (2008); Roman, Cahill, Coggeshall, Lagerson, and Courtney (2005).
- ¹¹ Braga (2007); Braga et al. (1999); Weisburd et al. (2006).
- ¹² Roman et al. (2005).
- ¹³ McLennan and Whitworth (2008).
- ¹⁴ Braga (2007).
- ¹⁵ Braga and Bond (2008).
- ¹⁶ Gabor (1990).
- ¹⁷ Guerette, Stenius, and McGloin (2005).
- ¹⁸ Eck (1993).
- ¹⁹ Adapted from Eck (1993).
- ²⁰ Cornish (1994).
- ²¹ Cornish and Clarke (1986).
- ²² Cornish and Clarke (1987).
- ²³ Clarke and Weisburd (1994).



²⁴ Adapted from Clarke and Eck (2005).

²⁵ Weisburd et al. (2006).

²⁶ Guerette and Clarke (2003).

²⁷ See Guerette and Bowers (2009).

²⁸ Glendale Police Department (1997).

²⁹ Fresno Police Department (1999).

³⁰ Yin (1980).

³¹ Brantingham and Brantingham (1981); Sherman, Gartin, and Buerger (1989); Pease (1998); Eck, Clarke, and Guerette (2007).

³² Weisburd and Green (1995).

³³ Weisburd and Green (1995).

³⁴ Guerette (2009).

³⁵ Bowers and Johnson (2003).



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