PROBLEM-ORIENTED POLICING IN VIOLENT CRIME PLACES: A RANDOMIZED CONTROLLED EXPERIMENT*

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Over the past decade, problem-oriented policing has become a central strategy for policing. In a number of studies, problem-oriented policing has been found to be effective in reducing crime and disorder. However, very little is known about the value of problem-oriented interventions in controlling violent street crime. The National Academy of Sciences' Panel on the Understanding and Control of Violent Behavior suggests that sustained research on problem-oriented policing initiatives that modify places, routine activities, and situations that promote violence could contribute much to the understanding and control

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of violence. This study evaluates the effects of problem-oriented policing interventions on urban violent crime problems in Jersey City, New Jersey. Twenty-four high-activity, violent crime places were matched into 12 pairs and one member of each pair was allocated to treatment conditions in a randomized block field experiment. The results of the impact evaluation support the growing body of research that asserts focused police efforts can reduce crime and disorder at problem places without causing crime problems to displace to surrounding areas.

Problem-oriented policing is currently promoted by practitioners and academics as a more effective response to urban crime problems than conventional policing methods. Problem-oriented policing challenges officers to identify and to analyze the causes of problems behind a string of criminal incidents or substantive community concern. Once the underlying conditions that give rise to crime problems are known, police officers develop and implement appropriate responses (Eck and Spelman, 1987; Goldstein, 1979, 1990). In recent years, academics have suggested that problem-oriented policing approaches could be effective in controlling crimes that cluster in discrete geographic areas (see, e.g., Eck and Weisburd, 1995). This idea developed from the "hot spots" of crime perspective, which suggests that crime does not occur evenly across the city landscape; rather, it is concentrated in relatively small places that generate more than half of all criminal events (Sherman et al., 1989; Weisburd et al., 1992). A number of researchers have argued that many crime problems can be reduced more efficiently if officers systematically focus their attentions on these deviant places (Sherman and Weisburd, 1995; Weisburd and Green, 1995b). Problem-oriented policing is seen as a useful framework to focus police efforts at high-activity crime places.

Although much time and effort has been devoted to understanding and preventing violence (see, e.g., Reiss and Roth, 1993), very little is known about the value of problem-oriented interventions in controlling violence. The National Academy of Sciences' Panel on the Understanding and Control of Violent Behavior observed that sustained research on problem-oriented initiatives that modify places, routine activities, and situations that promote violence could contribute much to the understanding and control of violence (Reiss and Roth, 1993:22). Researchers have found the problem-oriented policing approach to be effective in controlling property crimes and disorderly activity, such as residential burglaries in a privately owned low-income housing complex (Eck and Spelman, 1987), street-corner drug selling (Hope, 1994), and prostitution (Matthews, 1990). However, few assessments have examined the effectiveness of problem-oriented policing interventions in reducing violent crime problems; none

of the existing studies on problem-oriented policing provides very conclusive evidence or uses rigorous evaluation methods (Sherman, 1991, 1995; see cases in Goldstein, 1990; Eck and Spelman, 1987). Further, rigorous hot spots policing experiments have only examined the effectiveness of interventions such as intensive patrol (Sherman and Weisburd, 1995) and innovative crackdowns (Weisburd and Green, 1995b). Despite insightful research on the variety of situational factors that cause crime to cluster at particular places (see Eck and Weisburd, 1995) and calls for the implementation of tailored responses to the underlying conditions of crime problems (Clarke, 1992; Goldstein, 1990), most place-oriented interventions have comprised uniform tactics applied across heterogeneous places.

This research attempts to generate more knowledge on the usefulness of problem-oriented interventions to control violent places. The study uses a block randomized experimental design, in conjunction with qualitative indicators on local dynamics, to evaluate the effects of problem-oriented policing at high-activity violent crime locations in Jersey City, New Jersey. We begin by reviewing the literature on the salience of place in developing appropriate crime control strategies; describe the problem-oriented policing of violent crime hot spots programs; discuss the evaluation data and analytic techniques; present the evaluation findings; and conclude by integrating the results within the crime control literature.

THE IMPORTANCE OF PLACE IN PROBLEM-ORIENTED POLICING STRATEGIES

Place-oriented crime prevention strategies have begun to have an important role in problem-oriented crime prevention research and policy (Eck and Weisburd, 1995). The consideration of such approaches in crime control policy arose from research suggesting that micro-level variation in crime existed within communities. The observation that the distribution of crime varied within neighborhoods has existed for some time (see Hawley, 1944, 1950; Shaw and McKay, 1942; Werthman and Piliavin, 1967); however, little research examined this variance beyond the community level of analysis. With the advent of powerful computer systems and software packages, several recent studies have found that over half of all crimes in a city are committed at a few criminogenic places within communities (Pierce et al., 1988; Sherman, 1987). Even within the most crime-ridden neighborhoods, crime clusters at a few discrete locations and other areas are relatively crime free (Sherman et al., 1989). Further, research by Taylor and Gottfredson (1986) suggests that conclusive evidence links this variation to physical and social characteristics of particular blocks and multiple dwellings within a neighborhood. This uneven distribution of deviance within specific neighborhoods has been reported in studies of a

variety of crimes, including drug selling (Weisburd and Green, 1994; Weisburd et al., 1994), burglary (Pease, 1991), robbery (Hunter and Jeffrey, 1992), and auto theft (Clarke and Harris, 1992).

THE ROLE OF PLACE IN CRIME

The analysis of places to explain the variation of crime within communities has developed from an interest in improving crime control policies (Weisburd et al., 1992). This perspective, known as *environmental criminology*, calls on crime prevention efforts to consider a wider collection of characteristics of opportunity and physical space at places (Brantingham and Brantingham, 1991a). Although this perspective is primarily concerned with applied crime prevention, Weisburd and his colleagues (1992:48) suggest that "environmental criminology's basic contribution lay in its call for a change in the unit of analysis from persons to places." The attributes of a place are viewed as key in explaining clusters of criminal events. For example, a poorly lit street corner with an abandoned building, located near a major thoroughfare, provides an ideal location for a drug market. The lack of proper lighting, an abundance of "stash" locations around the derelict property, a steady flow of potential customers on the thoroughfare, and a lack of informal social control (termed *defensive ownership*) at the place generates an attractive opportunity for drug sellers. In many such cases, the police spend considerable time and effort arresting sellers without noticeably affecting the drug trade. The compelling criminal opportunities at the place attract sellers and buyers and thus sustain the market. If the police want to be more efficient at disrupting the market, this suggests they should focus on the features of the place that cause the drug dealing to cluster at that particular location (see e.g., Green, 1996). This perspective is considered a radical departure from traditional criminological theories, which focused prevention efforts on the individual and ignored the importance of place (Sherman et al., 1989; Weisburd, 1997).

The criminal careers of high-activity places have been found to be relatively stable, which suggests that place-oriented interventions have potential crime prevention value. Spelman (1995) analyzed calls for service at high schools, housing projects, subway stations, and parks in Boston; he found the risks at these public places remained fairly constant over time. Any changes in risks over time at these locations were attributable to random processes or seasonal changes. In Spelman's analyses, 50% of calls at hot spots were generated by the unique characteristics of those locations that create criminal opportunities (such as bars, abandoned buildings, the presence of valuable goods, and a lack of guardianship). On the other hand, 50% of calls were not attributed to the features of the place, and this suggests a substantial degree of instability in crime at hot spots over time.

Although long-run risks at the place were the most important source of variation, Spelman (1995) cautions against identifying hot spots based on short time periods (such as one month) because at some locations random errors and changes in risk were most important.

Beyond this observed clustering of criminal events, Eck and Weisburd (1995) identified four other concepts from the research literature that illuminate the role of place in crime. Facilities, such as bars, churches, and apartment buildings, have been found to affect crime rates in their immediate environment depending on the type of people attracted, the way the space is managed, or the possible crime controllers present, such as owners, security, or police. For example, Spelman (1993) found the presence of unsecured, abandoned buildings on city blocks was positively associated with criminal activity. Much research points to the relationship between bars and crime in proximate areas (Block and Block, 1995; Roncek and Meier, 1991). However, like places distributed throughout the city, most bars experience little crime while a few may be hot spots of crime (Homel and Clark, 1994; Sherman et al., 1992). As Eck (1997: ch. 7, p.10) states in his recent review of preventing crime at places, "the behavior of bartenders and bouncers may contribute to violence in these places and changes in bar management practices (from server training and changes in legal liability of bartenders) may reduce assaults, drunk driving, and traffic accidents."

The variety of physical and social characteristics known as site features can enhance or diminish the attractiveness of a place to offenders (Taylor, 1997a, 1997b). Eck (1994) revealed evidence suggesting that cocaine sellers favor small apartment buildings because they tend to be owned by people who cannot afford to control drug selling and because dealers also tend to prefer housing complexes that have secure access points. Likewise, the presence of attendants (Laycock and Austin, 1992) and closed-circuit television (Poyner, 1991) have been found to reduce the number of auto thefts in parking lots. In short, features such as easy access, lack of guardians, inept or improper management, and the presence of valuable items influence the decisions offenders make about the places they choose to commit their crimes (Eck and Weisburd, 1995).

In a similar vein, studies of offender mobility have been interpreted as evidence of "rational and deliberate target searching behavior and the influence of personal characteristics and the distribution of crime targets on this behavior" (Eck and Weisburd, 1995:16). Weisburd and Green (1994) reported a high degree of territoriality in nearby drug places; it was more likely for a repeat drug sales arrestee to be arrested in another district of Jersey City than in the adjacent drug market. In San Diego, Eck (1994) found a high proportion of drug dealers arrested at their home address. Offender mobility also seems to vary across gender, age, race,

and crime types. For instance, robbers who victimize individuals do not seem to travel as far from home as robbers who attack commercial facilities (Capone and Nichols, 1976). Brantingham and Brantingham (1991b) show that target selection is a direct outgrowth of offender mobility patterns. Logically, offenders are attracted to areas with many potential targets and move from places with few targets to places with many targets (Rhodes and Conley, 1991). Studies of offender interviews have concluded that their target selection decision-making processes exhibited bounded rationality (Eck and Weisburd, 1995). Rengert and Wasilchick's (1990) research on residential burglars revealed that these offenders seek places with cues that indicate acceptable risks and gains, such as homes that are located on the outskirts of affluent neighborhoods. Such places are found during intentional target searches and during their daily legitimate routines.

The study of criminal events at places is influenced and supported by three complementary theoretical perspectives: rational choice, routine activities, and environmental criminology (see Clarke, 1992). The rational choice perspective assumes that "offenders seek to benefit themselves by their criminal behavior; that this involves the making of decisions and choices, however rudimentary on occasion these choices may be; and that these processes, constrained as they are by time, the offender's cognitive abilities, and by the availability of relevant information, exhibit limited rather normative rationality" (Cornish and Clarke, 1987:933). This perspective is often combined with routine activity theory to explain criminal behavior during the criminal event (Clarke and Felson, 1993). Routine activity theory posits that a criminal act occurs when a likely offender converges in space and time with a suitable target (e.g., victim or property) in the absence of a capable guardian (Cohen and Felson, 1979). Rational offenders come across criminal opportunities as they go about their daily routines and make decisions whether to take action.

Environmental criminology, also known as *crime pattern theory*, explores the distribution and interaction of targets, offenders, and opportunities across time and space (Brantingham and Brantingham, 1991a). According to Eck and Weisburd (1995:6),

> It does so because offenders engage in routine activities. Just like other, non-offending individuals, offenders move between home, school, work, shopping, and recreation. As they conduct their normal legitimate activities, they become aware of criminal opportunities. Thus, criminal opportunities that are not near areas offenders routinely move through are unlikely to come to the attention of offenders . . . criminal opportunities found at places that come to the attention of offenders have an increased risk of becoming targets.

Understanding the characteristics of places, such as facilities, is important because these attributes give rise to the opportunities that rational offenders will encounter during their routine activities.

These perspectives on crime and place fit naturally with situational crime prevention. Situational crime prevention measures seek to reduce opportunities for specific categories of crime by increasing the associated risks and difficulties and reducing the rewards (Clarke, 1992). Specific applications of problem-oriented policing and situational crime prevention are conceptually related (Hope, 1994). As Clarke (1992) points out, Goldstein's (1990) formulation of problem-oriented policing reflects the same action research model underpinning situational crime prevention.

CONTROLLING VIOLENCE AT PROBLEM PLACES

Most situational crime prevention measures used in problem-oriented policing strategies have focused on very specific categories of crime, such as opportunistic property crimes (Clarke, 1992; Goldstein, 1990). Some observers have suggested that violent crime is less amenable to situational interventions because it is less likely to cluster in time and space (Gabor 1990; Heal and Laycock, 1986) and is committed by deeply motivated or desperate offenders (Trasler, 1993). To date, most violence prevention programs have focused on criminals and not on crime places. Research has confirmed that it is very difficult to identify who is likely to become a serious offender and to predict the timing and types of future crimes repeat offenders will commit (e.g., Blumstein and Cohen, 1979; Ellliot et al., 1987; Gottfredson and Gottfredson, 1992). As Weisburd (1997) observes, situational prevention strategies that focus on crime places provide a promising alternative to traditional offender-based crime prevention policies.

This research grew out of the idea that problem-oriented policing strategies could be used to good effect in controlling violence at problem places. Studies on crime clustering have confirmed that places are important in the distribution of violent street crime across the city landscape. In the well-known Minneapolis hot spots research, all robbery calls for service were concentrated at only 2.2% of all places and all assault calls were concentrated in 7% of all places (Sherman et al., 1989). The clustering of violent crime at places suggests that there are important features or dynamics at these locations that give rise to violent situations; focused crime prevention efforts could modify these criminogenic conditions and reduce violence. Situational prevention measures have been found to be successful in substantially reducing robberies at post offices, convenience stores, and banks (Clarke, 1992). Many violent crimes are also greatly affected by situational contingencies; for example, whether an assault becomes a homicide depends greatly on the presence of a lethal weapon

such as a firearm (Cook, 1991) or other factors, such as the proximity of emergency medical services.

Other research suggests that the best way to prevent violent crimes such as robbery and stranger assaults may be to prevent disorder (Wikstrom, 1995). In their seminal "broken windows" article, Wilson and Kelling (1982) argue that social incivilities (e.g., loitering, public drinking, prostitution) and physical incivilities(e.g., vacant lots, trash, and abandoned buildings) cause residents and workers in a neighborhood to be fearful. Fear causes many stable families to move out of the neighborhood and the remaining residents isolate themselves and avoid others. Anonymity increases and the level of informal social control decreases. The lack of control and the escalating disorder attract more potential offenders to the area and this increases serious criminal behavior. Although some have criticized the "broken windows" hypothesis (Greene and Taylor, 1988), Skogan's (1990) survey research found disorder to be significantly correlated with perceived crime problems in a neighborhood even after controlling for the population's poverty, stability, and racial composition. Further, Skogan's (1990) analysis of robbery victimization data from 30 neighborhoods found that the links between economic and social factors and crime were indirect and mediated through disorder. In their closer look at crime in Minneapolis hot spots, Weisburd and his colleagues (1992:55) found that calls for service for assault and for robbery of persons were significantly correlated with "drunken person" calls for service at .46 and .50, respectively.

Experimentation with policing tactics has further illuminated the connection between crime and disorder. Research evidence from numerous community policing projects suggests that serious crime and fear can be affected by reducing disorder (Pate et al., 1986; Police Foundation, 1981; Reiss, 1985; Skogan, 1990; Trojanowicz, n.d.). An analysis of robbery rates in 156 American cities revealed that aggressive policing of disorderly conduct and driving under the influence reduces robbery (Sampson and Cohen, 1988). Sherman and Weisburd (1995) found that substantial increases in police patrol in hot spots can cause modest reductions in crime and impressive reductions in disorder. Further, a traditional crackdown on a disorderly street-level heroin market in Lynn, Massachusetts, not only reduced drug sales, but also reduced violent crimes and property crimes and improved the quality of life in the area (Kleiman, 1988). This body of research suggests that problem-oriented policing strategies that modify the criminal opportunity structure at places could have an important impact on violent behavior.

THE JERSEY CITY POLICE DEPARTMENT'S PILOT PROGRAM TO CONTROL VIOLENT PLACES

Although the United States experienced a decrease in the overall crime rate between 1983 and 1993, the number of reported violent crimes increased nationally by 35% (Flanagan and Maguire, 1993). This rise was even more pronounced in our nation's metropolitan areas such as Jersey City, New Jersey. Between 1987 and 1993, Jersey City experienced increases in arrests for robbery and aggravated assault of 52% and 76%, respectively (Gajewski et al., 1993). In response, the Jersey City Police Department (JCPD), in collaboration with Rutgers University's Center for Crime Prevention Studies, and sponsored by the National Institute of Justice, implemented and evaluated an innovative response to urban violent crime problems. The strategy combined the hot spots and problem-oriented policing approaches in a pilot program to control violent places. Using computerized mapping technologies, the JCPD and Rutgers researchers identified violent crime hot spots; the 11 officers of the JCPD Violent Crimes Unit (VCU) were responsible for developing appropriate problem-oriented strategies at these places. This unit was chosen to carry out the intervention because it had the advantage of experience in focusing on violent crime and did not carry the burden of responding to 911 emergency calls for service.

The problem-oriented policing program and evaluation design followed the well-known steps of the SARA model (scanning, analysis, response, assessment; see Eck and Spelman, 1987). The phases are discussed briefly below.

SCANNING PHASE: DEFINING VIOLENT CRIME HOT SPOTS

Using computerized mapping and database technologies, all 1993 robbery and assault incidents and emergency citizen calls for service were matched and counted to "intersection areas" in Jersey City.[1] Simple temporal analyses and ranking procedures were used to identify the intersection areas that had consistently high levels of violent crime over time (see Braga, 1997, for a detailed discussion of this procedure). For each of the high-activity violent crime intersection areas, the VCU officers identified the source and extent of the violent crime problems. Although such efforts usually are applied in the analysis phase rather than the scanning phase of the SARA model, for our experimental purposes it was necessary

1. An intersection area is the intersection and its four adjoining street segments (Weisburd and Green, 1994). In comparison to addresses, the intersection area is not as sensitive to coding errors or short movements of offenders (Weisburd and Green, 1994). For further discussion of the limitations of using addresses as the base unit of analysis see Buerger, 1993; Weisburd and Green, 1994; and Weisburd et al., 1992.

to complete the construction of the violent crime hot spots and subsequent matching of these places into pairs. After the officers' input was considered, decisions on intersection area links were structured based on geographic layout (i.e., whether both intersection areas were adjacent or shared a common landmark, such as a park or school) and problem definition. This process left 56 discrete high-activity violent crime places in Jersey City for inclusion in the experiment. The hot spots consisted of 268 intersections and street segments (6% of the total in Jersey City). In 1993, these places accounted for 1,103 assault and 482 robbery incidents (24% and 20% of their respective totals) and 5,193 assault and 904 robbery emergency calls for service (25% and 24% of their respective totals).

After the 56 violent crime places were identified, they were matched into 28 pairs for evaluation purposes (i.e., control and treatment groups). Simple, but deliberate matching exercises ensured that any peculiarities found in one sample would most likely occur in the other as well (see Blalock, 1979; Rossi and Freeman, 1993). Our matching method was primarily a qualitative exercise informed by simple quantitative analyses of the official crime data. The 56 violent crime places were initially grouped based on similar numbers of 1993 violent crime calls and incidents; in other words, places with lower numbers of robberies and higher numbers of assaults were grouped together, places with higher numbers of robberies and lower numbers of assaults were grouped together, and so forth. Within these groups, using the qualitative information gathered by the VCU during the scanning phase, places were compared on the types of problems at a place (e.g., robberies of commuters vs. robberies of convenience stores), known dynamics of the place (e.g., the presence of disorderly groups or an active drug market), and physical characteristics (e.g., presence of park or school). Final matches were made based upon the degree of similarity across these key qualitative dimensions. Sociodemographic data for the places were considered during the matching process, but did not provide much additional information about the places since the majority of the locations were in minority, low-income neighborhoods.

ANALYSIS PHASE

The analysis phase of the problem-oriented policing program started with the random allocation of the initial places for treatment. The 28 pairs of places were presented to the Violent Crimes Unit and the officers selected 12 pairs for random allocation. Their selections were directed by two guidelines: First, the officers were instructed to select a caseload of places that would not be initially overwhelming (a mix of high-, medium-, and low-activity places); second, in order to conduct appropriate displacement analyses, the officers were not allowed to choose pairs of places that

were spatially adjacent. A coin was flipped by the researchers to determine randomly which of the places within the pair would receive the problem-oriented policing treatment. The locations that were not selected from each of the pairs were control places. Table 1 presents a comparison between the control and treatment places on key qualitative dimensions.

Table 1. Key Qualitative Dimensions of Treatment and Control Places

Place	Problem(s)	Dynamics of Place	Physical Characteristics
Treatment Place 1	Assault and robbery of commuters	Transients; disorderly groups	Train and bus terminal; restaurants and retail
Control Place 1	Robbery of commuters; strong-arm robbery	Transients; shoppers	Large shopping mall; train station
Treatment Place 2	Street fights; drug market violence	Active drug market; public drinking	Major street; bodega; abandoned buildings
Control Place 2	Street fights; drug market violence	Active drug market; public drinking; gambling	Vacant lot; bodega; poorly lit street
Treatment Place 3	Assault and robbery of students; street fights	Students commuting; transients; disorderly groups	College campus; Multiple bus stops
Control Place 3	Strong-arm robbery	Shoppers; transients	retail stores; bus stops
Treatment Place 4	Robbery of students; carjacking	Disorderly youth; commuters	Major intersection; grammar school
Control Place 4	Assaults between youths; carjacking	Disorderly youth; commuters	Major intersection; youth house
Treatment Place 5	Robbery of stores; street fights	Disorderly youth; shoppers; minor drug sales	Major thoroughfare; retail stores
Control Place 5	Robbery of stores; street fights	Disorderly groups; small active drug market	Restaurants; retail stores
Treatment Place 6	Drug market violence	Very active drug market on street corner; public drinking; loitering	Liquor store; major intersection; low-income housing
Control Place 6	Drug market violence	Very active drug market on street corner; public drinking; loitering	Liquor store; major thoroughfare; low-income housing
Treatment Place 7	Robbery of elderly	Middle-class neighborhood; large volume of pedestrian traffic	Senior citizen housing complex
Control Place 7	Robbery of elderly; street assaults	Middle-class neighborhood; disorderly youth at night	Senior citizen housing complex
Treatment Place 8	Drug market violence; bar fights; street fights	Disorderly groups; loitering; public drinking	Large apt. building; taverns; major thoroughfare
Control Place 8	Drug market violence; bar fights	Disorderly groups; popular youth hangout	Taverns; major thoroughfare
Treatment Place 9	Street fights	Indoor drug market	Drug house
Control Place 9	Street fights	Indoor drug market	Tavern

Place	Problem(s)	Dynamics of Place	Physical Characteristics
Treatment Place 10	Robbery of convenience stores	Disorderly groups; large volume of vehicle traffic	Major thoroughfare
Control Place 10	Gas station robberies	Large volume of vehicle traffic	Major thoroughfare
Treatment Place 11	Street fights	Active drug market located in residential neighborhood	Abandoned building
Control Place 11	Drug market violence	Active drug market located in residential neighborhood	Drug house
Treatment Place 12	Drug market violence; bar fights	Disorderly groups; public drinking; loitering	Park; taverns; major intersection
Control Place 12	Drug market violence; street fights	Disorderly groups; public drinking; loitering	Park; abandoned buildings

While analyzing problems at treatment places, the officers were required to follow a set sequence of steps. For each problem at a place, the VCU officers had to complete a report based upon the results of their analysis of the place. The officers spent time analyzing official data sources and discussing problems with community members. Contact with community members (e.g., through a block group meeting or short survey) was considered essential during this phase. No a priori protocol was provided by the JCPD or the Rutgers research team to guide the development of relationships between the VCU officers and community members. During the planning of the problem-oriented strategies, community members were engaged by the VCU solely as informers on the problems of a place. Throughout the program, community members were used as an information source rather than viewed or recruited as "partners" or "co-producers" of public safety. Conversations between the officers and community members revolved around the nature of problems, the possible effectiveness of proposed responses, and the assessment of implemented responses. This observation is consistent with other studies examining citizen roles in problem-oriented policing programs (see e.g., Capowich and Roehl, 1994). As Buerger (1994:271) suggests, "the police establishment assigns a role that simply enhances the police response to crime and disorder."

When the problem description paperwork was completed, the VCU officers submitted reports to their sergeants. The sergeants reviewed the paperwork and approved the report if they judged the description to be completed in a satisfactory manner. The officers' data collection and analysis at the places revealed that the clustering of violent crime was related to many problems and underlying conditions (see Braga, 1997). Although the places were identified based on high counts of violent crime events, robbery was identified as a problem at only five places and street fights at

nine places. Loitering, public drinking, trash, and drug selling were the most frequently identified problems; all 12 places had problems with social incivilities and 11 suffered from physical incivilities such as abandoned buildings, vacant lots, and graffiti.

Policing at Control Places

The control places were not assigned to a traditional enforcement unit. Rather, the control places received the routine amount of traditional policing strategies that such places in Jersey City would experience without focused problem-solving efforts—arbitrary patrol interventions and routine follow-up investigations by detectives. The Violent Crimes Unit was instructed not to engage any problem-solving activities at control locations during the experiment.

RESPONSE PHASE

Once the problems of the treatment places were analyzed in a satisfactory manner, the officers developed and implemented responses that were logically linked to what they had identified as the causes of those problems. The officers used a guide provided by Rutgers researchers to develop situational interventions when completing their response worksheets. After the officers contemplated these possibilities, they submitted a report on the proposed responses for each place to their sergeant for approval. If the sergeant was satisfied with the proposed responses, he allowed the officers to implement the strategies. During the implementation of responses, the officers were required to keep activity logs documenting their progress. The sergeants monitored these logs and were required to sign off on each activity as it was completed.

Although this article does not detail the experiences of the problem-oriented policing officers in developing appropriate responses to the problems of a place (see Braga, 1997, for a thorough qualitative description of the process), a brief summary is necessary. Consistent with the literature that links disorder and violent crime (Kelling and Coles, 1996; Skogan, 1990; Wilson and Kelling, 1982), the VCU officers believed that the violence that distinguished these places from other areas of the city was closely related to the disorder of the place. Therefore, many plans to control the violence at a place were actually targeted at these social and physical disorder problems. Although specific tactics and priorities varied from place to place, the officers did not limit themselves to addressing violent crime; the officers generally attempted to control their places by cleaning up the environment through aggressive order maintenance and making physical improvements, such as securing vacant lots or removing trash from the street.

Table 2. Problem-Oriented Policing Strategies at Treatment Places

Responses	Number of Places
Aggressive Order Maintenance	12
Drug Enforcement	9
Required Store Owners to Clean Store Fronts	5
Public Works Removed Trash on Street	5
Robbery Investigations	4
Increased Lighting of Area	4
Housing Code Enforcement	3
Erected Fences Around Vacant Lot	3
Cleaned Vacant Lot	3
Boarded and Fenced Abandoned Buildings	3
Hung Signs Explaining Rules (e.g., No Drinking)	3
Surveillance of Place Using Videotapes	3
Evicted Troublesome Tenants	2
Improved Building Security by Adding Locks	2
Dispensed Crime Prevention Literature	2
Code Investigation of Tavern	2
Parking Enforcement	2
Razed Abandoned Building	1
Added Trash Receptacles	1
Changed Style of Trash Cans to Discourage Loitering	1
Opened and Cleaned Vacant Lot for Youth Recreation	1
Removed Graffiti from Building	1
Directed Patrol after School Hours	1
Removed Trash and Drug Paraphernalia from Alley	1
Remove Drug Selling Crew's Stashed Guns	1
Fixed Holes in Fence	1
Helped Homeless Find Shelter and Substance Abuse Treatment	1
Removed Piles of Lumber to Discourage Loitering	1

In this evaluation, the treatment was a collection of specific problem-oriented tactics that could be broadly categorized as a "policing disorder" strategy. Therefore, the treatment, or independent variable, was a meta-method, problem-oriented policing, which comprised a number of specific operational tactics implemented by the officers to control the physical and social disorder at experimental violent places. Problem-oriented policing is an analytic approach, not a specific set of technologies (see Kennedy and Moore, 1995). Problem-oriented interventions arise from diagnoses of problems, and depending on the nuances of particular problems, the responses that are developed, even for seemingly similar problems, can be very diverse. Twenty-eight types of responses were implemented across the treatment places (see Table 2). Situational interventions designed to modify the characteristics of a place were implemented at 10 of 12 treatment places; the strategies varied according to the nuances of the problems at places (e.g., razing an abandoned building or the code inspection of a disorderly tavern). At all locations, a number of aggressive order

maintenance interventions were used to control the social disorder of the place. These tactics included repeat foot and radio car patrols, dispersing groups of loiterers, issuing a summons for public drinking, and "stop and frisks" of suspicious persons. The next most frequent response was to initiate investigations to disrupt drug markets. The officers believed that an increased presence and the harassment of illicit users of the place would quell egregious disorder, at least temporarily, until a better plan could be developed and implemented. According to the officers, aggressive order maintenance was a treatment that could affect all illicit activity no matter what the variation: drug selling, loitering by teenagers, homeless panhandlers, predatory robbers—all could be affected by an increased presence in a bounded geographic area.

ASSESSMENT PHASE

The assessment of interventions was designed to be a routine process. The VCU officers relied upon the JCPD computer system to evaluate responses to the problems at their places. The officers recorded monthly totals of violent crime calls, investigations, and arrests at each place. The problem solvers also made regular contact with key community members on their progress in alleviating the problem(s) of the place. The community contacts and crime data analysis enabled the officers to monitor any changes in the crime problems at the hot spot. If the implemented strategies were found to be ineffective or if the nature of the problem changed, the officer responsible for the violent crime place reanalyzed the problem(s) and developed new responses. Alternatively, if the officer found that the problem(s) had been reduced, the place would be examined closely to determine if the place should be "closed down." "Close down" was a status that indicated the problems of the place were alleviated and the location no longer received the problem-oriented policing treatment. The officers were required to fill out a report documenting their reason for halting the intervention; this report documented their perceptions of a place changes in official crime statistics at a place, and input from community members at a place.

IMPACT EVALUATION DATA AND ANALYTIC TECHNIQUES

The problem-oriented policing program was not a citywide commitment to reduce violent crime through problem solving. Rather, the program was a pilot study that tested the feasibility of using problem-oriented methods to deal with local violent crime problems. Therefore, the evaluation design did not focus on whether violent crime decreased across Jersey City as a result of this program; the evaluation design compared places

that received the intervention to similar places that did not. The evaluation was also designed to measure the efficacy of the problem-oriented approach in controlling problem places and did not attempt to parse out the varying effects of the specific initiatives that were implemented. Thus, the treatment that was tested was the "problem-oriented policing approach" and not any one particular tactic or activity engaged by the officers.

EVALUATION DATA

Our study used crime incident report data and citizen emergency calls for service data as official indicators of crime. Although official data are widely used for assessing trends and patterns of crime, these data do have shortcomings. For instance, crime incident data are biased by police decisions not to record all crimes reported by citizens (see Black, 1970); call data are subject to underreporting (e.g., a lack of phones in poverty-stricken places) and overreporting (e.g., five separate calls reporting the same incident risk being counted as five distinct events; see Klinger and Bridges, 1997; Sherman et al., 1989). Call data, however, are suggested to be more reliable measures of crime and crime-related activity than incident data or arrest data (Pierce et al., 1988; Sherman et al., 1989). Most notably, citizen calls for service are affected less heavily by police discretion than other official data sources (Warner and Pierce, 1993). Therefore, call data are regarded as "the widest ongoing data collection net for criminal events in the city" (Sherman et al., 1989:35; but see Klinger and Bridges, 1997).

Physical and social incivilities in neighborhoods are often targeted by problem solvers because they generate fear and induce avoidance and defensive behaviors among area residents (Ferraro, 1995; Skogan, 1990). Evaluating the effects of problem–oriented interventions on community concerns such as disorder is a critical component of the community-policing movement that is still developing (see Alpert and Moore, 1993; Kennedy and Moore, 1995). The diversity of community problems and their varying effects at a place suggest that a wider array of data must be collected on a number of different dimensions to detect changes that would otherwise elude police statistics. Alternative policing strategies call for performance measures that go beyond "policing by numbers," the traditional method of evaluating police performance, such as arrest rates and low response times (Spelman, 1988). In this study, physical observation data were collected to detect changes in physical incivilities at the place,

such as vacant lots, trash, graffiti, broken windows. The physical characteristics of the 12 treatment locations were videotaped and coded.[2] Social observation data were collected at control and treatment places to examine variations in social incivilities, such as drinking in public and loitering.[3]

ANALYZING RESULTS

MAIN EFFECTS

Randomized experimental designs allow researchers to assume that the only systematic difference between the control and treatment groups is the presence of the intervention; this permits a clear assessment of causes and effects (Campbell and Stanley, 1966; Cook and Campbell, 1979; Sechrest and Rosenblatt, 1987). This randomized trial tested the overall effectiveness of problem-oriented policing at treatment places compared to control

2. The physical characteristics of the 12 treatment places were recorded to monitor any changes in the environment due to the intervention. After the places were allocated, the treatment locations were videotaped on a segment-by-segment basis. After the taping was completed, the videotapes were viewed and the physical characteristics of the places were reproduced onto maps. All physical characteristics of the place were recorded; this included types of houses (multifamily, single family, or apartment building), material houses were built from (aluminum siding, brick, or wood), number of stories of the house, vacant buildings, vacant lots, trash, graffiti, bus stops, street lights, schools, businesses, parks, fences, and other site features. These maps were coded and entered into a database for analysis. To ensure reliability, an analysis of 30% of all coded street segments was conducted. These segments were randomly selected and reviewed and recoded to assess any differences in perception of the physical environment by coders. The analysis revealed no significant differences in the perception of physical characteristics between coders.

3. The objective of the social observations was to get a measure of the amount and types of social activity occurring in the violent crime places during times they were known to be criminally active. These data were collected at control and treatment places during the pretest and posttest periods. Data on citizen calls for service and incident data at each place in the 12 pairs were analyzed for temporal variations in violent crime activity. All places were visited three times for a duration of five minutes at the time of day (morning, afternoon, or night) the location was most active. For example, if the official data indicated that the place was active only at night, all three observations occurred at night. On the other hand, if the place was active mostly at night, but also during the afternoon, the area was visited twice at night and once in the afternoon. For social observation and physical observation data, our methodologies were derived from a developing literature that suggests places have standing patterns of behavior or rhythms of recurring behavior and activity that are somewhat predictable and routine (see Felson, 1995; Taylor, 1997b). Green Mazerolle et al. (1998) suggest that the reliability and validity of on-site observations increase as the unit of analysis decreases. Their research proposes that street blocks and other small units of analysis have fewer and less complex patterns of street activity than neighborhoods, communities, or other larger units of analysis that have more complex and varied patterns of social behavior.

places. Official crime data and social observation data were true experimental measures because these data were collected for treatment and control places. The physical observation data were collected only at treatment places; these data provided nonexperimental qualitative evidence of effects of the treatment along these important dimensions at the target locations.

In order to assess the effects of the problem-oriented policing intervention on the treatment places relative to the controls, citizen calls for service and reported criminal incidents were compared for six-month preintervention and postintervention periods. The intervention period was not examined because the incidence of calls and crime reports were presumably biased by the problem-oriented strategies at the places. For example, community members at the treatment places were strongly encouraged by the officers to report criminal activity; also, the officers' increased presence at a place could produce increased numbers of arrests and crime incident reports during this time period. The randomization procedure allows the assumption to be made that there were no systematic differences in the policing activities at treatment and control groups during the six months prior to the experiment.

A randomized complete block design was used to assess the main effects of the intervention on citizen calls for service and reported crime incidents. Twenty-four places were matched into 12 homogeneous blocks and one member of each block was then randomly allocated to treatment conditions. The blocking process increases the power of the experimental design to reject the null hypothesis when an effect is actually present (Weisburd, 1993);[4] according to Daniel (1974:198), "the objective in using the randomized complete block design is to isolate and remove from the error term the variation attributable to blocks, while assuring that the treatments will be free of block effects." The effects due to block were treated as fixed since the blocks did not represent a random sample of the population; although it was necessary to control for block to examine treatment effects, the block effect was not of substantive interest in this analysis. A significant result for block would only indicate that the matching procedure did well in finding homogeneous blocks that differed from each other.

Generalized linear models (see Dobson, 1990; McCullagh and Nelder,

4. Statistical power is a very complex problem, especially in experimental research. Power estimates are often based simply on the number of cases in the study. By this measure, our estimate for power is relatively low. Using a standard sign test with 24 cases, our statistical power is about .40. However, as Weisburd (1993) points out, the number of cases is often a misleading measure. He finds that the smaller the experiment, the better control of variability in treatment and design. Statistical power may, in fact, be larger than expected.

1989) were used to analyze the randomized complete block group design.[5] Generalized linear models are an extension of traditional linear models that allow "the mean of a population to depend on a *linear predictor* through a nonlinear *link function* and allows the response probability distribution to be any member of an exponential family of distributions" (SAS Institute, 1993). This allows the technique to be applied to a wider range of problems. Generalized linear models are constructed by selecting the appropriate link function and response probability distribution (SAS Institute, 1993:4). For this study, a Poisson regression in a log linear model was selected to model the cell counts in the experiment (see SAS Institute, 1993; also Dobson, 1990; McCullagh and Nelder, 1989). The basic model was as follows:

log(count of crime events in posttest) = Intercept + (effect due to group) + (effect due to block) + log(count of crime events in pretest) + error.

The SAS Institute's (1993) GENMOD procedure was used to calculate the maximum likelihood estimate of the parameter for group (treatment relative to control conditions) and to compute the associated probability values; this provided an estimate of the effects of the problem-oriented policing treatment at the experimental locations compared to the control locations. Following social science convention, the two-tailed .05 level of significance was selected as the benchmark to reject the null hypothesis of "no difference." The likelihood-ratio test was used to determine whether adding the group variable provided statistically significant improvement of the model fit to the data (Aldrich and Nelson, 1984:55). The logged number of events during the pretest was used to account for baseline levels of criminal activity at experimental and control places before the intervention period. Finally, the deviance statistic was used to determine whether significant effects estimated by the model were the result of a nested effect (SAS Institute, 1993), that is, a very strong effect at only one or two places driving a significant overall finding for all the places.

For the social and physical observation data, significance testing was performed using the nonparametric sign test. In experiments with a small number of cases, it is appropriate to use an application of the binomial distribution known as the sign test (Blalock, 1979). This test examines the probabilities of getting an observed proportion of successes from a population of equal proportions of successes and failures. Sign tests assume independence of trials; this requirement was met by the random allocation

5. We realized that the number of events in the pretest period should be treated as a random effect. Because there was only a single measurement during each period, there were insufficient degrees of freedom for the estimation of a random effect. Therefore, we concluded that the GENMOD model was more appropriate for these data.

within the pairs. Social observations were analyzed to determine if there were positive or negative changes at the treatment locations compared to the control locations. Physical observation data were examined for positive pretest versus posttest changes.

Displacement and Diffusion Effects

Under traditional dispositional views of crime and criminality, policing strategies that are focused on specific types of events or treat specific locations are thought to result in the displacement of crime (Reppetto, 1976). However, in recent years, a growing body of evidence suggests that displacement is never complete and often inconsequential (for a review, see Hessling, 1994). Several scholars have suggested that crime prevention efforts may result in the complete opposite of displacement—that anticipated crime control benefits were greater than expected and "spill over" into places beyond the target areas. Generally referred to as diffusion of benefits, these unexpected benefits have been reported by a number of studies on crime prevention measures (for a review, see Clarke and Weisburd, 1994). Displacement can take many different forms (Gabor, 1990) and is a complex phenomenon to measure (see Barr and Pease, 1990). Most studies of crime prevention efforts are designed to measure main effects and the measurement of displacement is often neglected until it is time to defend claims of crime control gains; some researchers suggest that evaluations should be planned to study main effects and possible displacement or diffusion effects (Weisburd and Green, 1995a). Although the evaluation design was focused on the direct effects of treatment, this study was also specifically designed to measure immediate spatial displacement and diffusion effects. When the officers selected pairs of places for random allocation, the randomization rules minimized the selection of places within two blocks of each other. A two-block catchment area was constructed around each of the 24 places;[6] pretest and posttest official crime data in the areas surrounding control and treatment locations were compared to assess the diffusion and displacement effects for crime types that

6. The two-block catchment area was borrowed from other studies designed to measure immediate spatial displacement and diffusion. As Weisburd and Green (1995a:354) describe, "we decided upon a two-block radius for the 'catchment' area because we felt it a reasonable compromise between competing problems of washout of displacement impact and a failure to provide adequate distance to identify immediate spatial displacement. While we recognized at the outset that we would miss the movement of crime more than two blocks away from a hot spot, given our measure of crime as a general rather than specific indicator we did not think it practical to identify all potential places that might provide opportunity for displaced offenders"; see also Green (1995).

were affected by the intervention at the treatment places.[7] Proximate spatial effects were measured using the same analytic techniques (that is, the randomized complete block design and generalized linear models) as the analysis of main effects.

IMPACT EVALUATION RESULTS

OFFICIAL DATA

The effects of the problem-oriented intervention were measured by analyzing aggregate crime counts and six specific categories of citizen calls for service and six specific criminal incident categories: the six citizen call categories were robbery calls, street-fight calls, property crime calls, nuisance/disorder calls, drug offense calls, and total calls; the six criminal incident categories were robbery incidents, nondomestic assault incidents, property crime incidents, narcotics arrests, and total incidents.[8] Table 3 presents the parameter estimates of the effects of the problem-oriented policing intervention on all criminal incidents and citizen calls for service at a place. The chi-square result and statistical significance of the parameter estimate, the likelihood-ratio test result, and deviance analysis result are also displayed. The total number of criminal incidents and the total number of citizen calls for service were significantly reduced at the treatment places relative to the control places. For these significant results, the likelihood-ratio test results confirmed the improvement in the fit of the model by adding the group variable. The deviance statistic, divided by the model degrees of freedom, was not significant; this suggests that the findings of the models were not driven by nested effects (i.e., large effects at

7. In order to set the widest possible net for examining potentially complex displacement and diffusion effects, all crime data were analyzed. However, it is important to recognize that if a crime category at the place did not experience crime control benefits from the treatment, it is not reasonable to attribute displacement or diffusion effects in the surrounding areas to the intervention. In other words, if the number of robbery incidents at the place was not positively affected by the intervention, there was no reason to believe that the robbery incidents would be either displaced to the catchment area or the benefits of the problem-solving treatment would be diffused into the catchment area.

8. For the assault data, we used subcategories of the broader assault call and incident categories. A close look at the JCPD data codebook revealed that assault incident data were confounded by the coding of domestic violence incidents in these broader categories. Since the program was designed and implemented with a focus on street crimes, domestic violence was not specifically targeted by the intervention. We did analyze domestic violence assault incidents and domestic dispute call data and found no significant differences at treatment places relative to control places. Further, due to the presence of zeros in the data, we did not log pretest robbery incidents. See Braga (1997) for a full discussion.

Table 3. Main Effects—Aggregate Crime Categories

Dependent Variable	Parameter Estimate for Treatment	Chi^2	*P* Level	Likelihood Ratio	Deviance/ D.F. Result
Criminal Incidents	–0.3858	39.976	0.0045*	41.02*	11.15
Calls for Service	–0.1508	18.2893	0.0000*	18.21*	17.51

* $p < .05$.

one place driving the significant finding for all places).[9]

Table 4 presents the parameter estimates of the effects of the problem-oriented policing treatment on the disaggregated categories of citizen calls for service and criminal incidents. It is important to note that these strong reductions in the total number of criminal incidents and the total number of calls for service were not driven by a large reduction in only one crime type. All the crime type categories at the treatment places were reduced to varying degrees compared to control places. Street-fight calls were significantly reduced at treatment places relative to control places, but nondomestic assault incidents were not significantly reduced at treatment places as compared to control places. However, the nondomestic assault incidents do show a noticeable reduction that is statistically significant at a less restrictive level ($p < .10$). Robbery calls did not decrease at experimental places relative to control places, but robbery incidents at the treatment locations decreased significantly between observation periods compared to control locations. Property crime calls for service and incidents at the treatment places relative to control places were significantly reduced between observation periods. Disorder calls and incidents did not change significantly at the experimental locations compared to the control

9. The results of dividing the deviance statistic by the degrees of freedom also suggest that the Poisson regression model may not be appropriate for these data. Values larger than one suggest that the data may be overdispersed. However, these larger values may also be due to the presence of outliers in the data and/or model mispecification (SAS Institute, 1997:285). Analysis of residuals and scatterplots revealed that these data do have outliers. Although these outliers are problematic from an analytic perspective, they are not remarkable when the nuances of the control and treatment places over the course of the experiment are considered. Standard methods of dealing with outliers, such as dropping the outlying case or truncating values, are problematic for these analyses. Dropping the outlying case would cause both places in the pair to be dropped from the analyses; this would decrease the number of cases in an already very small experiment. Truncating the values would artificially place bounds on the effects of the experiment. There are also other independent variables that we do not specify in our models, such as identifying distinct types of places (e.g., residential, commercial, or mixed), that could also result in the larger deviance divided by degree of freedom results. Due to these considerations, we present the results without a correction for overdispersion.

Table 4. Main Effects—Citizen Calls for Service and Criminal Incidents

Dependent Variable	Parameter Estimate for Treatment	Chi^2	*P* Level	Likelihood Ratio	Deviance/ D.F. Result
Calls by Type					
Robbery	–0.0915	0.3225	0.5701	0.315	2.39
Street Fight	–0.5993	5.7927	0.0161*	6.02*	2.75
Property	–0.1958	7.1501	0.0075*	7.07*	4.96
Disorder/Nuisance	–0.0683	1.0346	0.3091	1.04	7.43
Narcotics	–0.2849	8.6939	0.0032*	8.68*	10.34
Incidents by type					
Robbery	–0.6305	4.6069	0.0318*	4.88*	2.33
Nondomestic Assault	–0.3639	2.8672	0.0904	2.95	3.86
Property	–0.5185	25.591	0.0000*	26.05*	4.40
Disorder/Vandalism	–0.2547	1.068	0.3012	1.11	9.57
Narcotics Arrests	–0.0785	0.3116	0.5767	1.31	1.83

*$P < .05$.

places. Citizen calls for narcotics offenses decreased significantly between observation periods at the experimental places relative to control places, but the number of narcotics arrests did not change significantly.

One possible explanation for the discrepancy between the significant effect of the problem-oriented policing intervention on robbery incidents and the lack of effect on robbery calls may be a change in citizen reporting behavior for robbery incidents. During the intervention period, VCU officers aggressively encouraged community members to report violent crimes to the police department. Although this would suggest an increase in calls corresponding to that for assaults, robbery is the most feared of all street crimes and is the most likely to cause widespread anxiety and defensive behavior (see Garofalo, 1979; Liska et al., 1982). Therefore, warnings and pleas for information about robberies by law enforcement officials may prompt more of a reaction among citizens than for other crime types.

Although the intervention comprised tactics to reduce social and physical disorder, the treatment did not result in a statistically significant reduction in the disorder and narcotics offense indicators at the experimental places relative to control places. Regardless of actual reductions in social and physical incivilities at the place, the narcotics offense and disorder crime categories were necessarily influenced by policing activity at the experimental places during the posttest period. After the places were "closed down" and active problem solving ceased, the VCU officers did attempt to maintain their places. Since the problem-oriented policing strategy was based on controlling disorder, the VCU officers were more

likely to initiate investigations into drug sales and disorderly incidents during the posttest period than in the pretest period. Disorderly behavior and drug selling may also have been more likely to be reported by the community during the posttest period due to an awareness that such complaints would be taken seriously by the police. Given the limitations of the official data in measuring the effects of the treatment on disorder, the physical and social observation data provide more reliable and valid performance measures as to whether the strategy actually controlled incivilities at the treatment places.

OBSERVATIONS OF SOCIAL AND PHYSICAL INCIVILITIES

Table 5 presents the pretest and posttest mean numbers of persons engaged in various disorderly behaviors across three observations in the treatment and control places. The table also displays an assessment of whether the social dynamics at the treatment places improved compared to the control places. One case was excluded from these analyses because the observational data were inappropriately collected. Social disorder was alleviated at 10 of the 11 (91%) treatment places compared to control places. This result was statistically significant; the observed sign-test proportion was .0909 and the exact binomial two-tailed probability was .0117. Table 6 presents the pretest and posttest counts of various types of urban blight for the treatment places. The table also displays an assessment of whether the physical conditions at the treatment places improved. One place did not suffer from pretest urban blight and was excluded from these analyses. Physical disorder was alleviated at 10 of 11 (91%) treatment places. This result was statistically significant according to the sign test; observed proportion was .0909 and the exact binomial two-tailed probability was .0117.

Table 5. Pretest and Posttest Means from Three Social Observations of Disorderly Activity at Treatment Places Versus Disorderly Activity at Control Places

Place	Pretest Means	Posttest Means	Improvement?
Treatment Place 1	4 loiterers 2 "homeless"	0 loiterers 0 "homeless"	Yes
Control Place 1	No illicit activity	No illicit activity	
Treatment Place 2	14 loiterers 2 disorderly persons 2 public drinkers 2 suspicious persons	3.7 loiterers 0 disorderly persons 0 public drinkers 0 suspicious persons	Yes
Control Place 2	26 loiterers 4.7 disorderly persons 1 person playing loud music 5 suspicious persons 5 public drinkers	24.3 loiterers 0.7 disorderly 1 person playing loud music 0.3 suspicious persons 7.3 public drinkers	

Place	Pretest Means	Posttest Means	Improvement?
Treatment Place 3	2 loiterers 1 public drinker	2.7 loiterers 0 public drinkers	No
Control Place 3	11.7 loiterers 1.3 public drinkers 2.7 "homeless"	7.7 loiterers 3.7 public drinkers 2 "homeless"	
Treatment Place 4	5.7 loiterers 2 "homeless" 2 public drinkers	0.7 loiterers 0 "homeless" 0 public drinkers	Yes
Control Place 4	7.3 loiterers 1 public drinker 0.7 persons playing loud music	4 loiterers 1 public drinker 0 persons playing loud music	
Treatment Place 5	4.7 loiterers 2 disorderly persons	1.7 loiterers 0 disorderly persons	Yes
Control Place 5	0.3 loiterers	4.3 loiterers 0.3 persons playing loud music 0.3 public drinkers	
Treatment Place 6	12.7 loiterers 4.3 public drinkers 1 person playing loud music	3.3 loiterers 0.7 public drinkers 0 persons playing loud music	Yes
Control Place 6	9.7 loiterers 0.3 public drinkers 0.3 loud music	8.7 loiterers 0.3 public drinkers 0.3 loud music	
Treatment Place 7	N/A		
Control Place 7	N/A		
Treatment Place 8	24 loiterers 5 public drinkers 1 person playing loud music	6 loiterers 1 public drinker 0 persons playing loud music	Yes
Control Place 8	14.7 loiterers 3.7 public drinkers 1 disorderly person 0.7 suspicious persons 0.3 "homeless" 0.3 persons playing loud music	18.3 loiterers 1 public drinker 0 disorderly persons 0 suspicious persons 0 "homeless" 1.3 persons playing loud music	
Treatment Place 9	25.7 loiterers 1.7 disorderly persons 4.3 public drinkers 2 suspicious persons	5 loiterers 0 disorderly persons 0 public drinkers 0 suspicious persons	Yes
Control Place 9	9.3 loiterers 0.7 public drinkers 1.3 suspicious persons	13 loiterers 3.3 public drinkers 0 suspicious persons	
Treatment Place 10	4 loiterers 0.7 persons playing loud music	0.7 loiterers 0 persons playing loud music	Yes
Control Place 10	1.3 loiterers 0.3 public drinkers	2.3 loiterers 0 public drinkers	
Treatment Place 11	9.7 loiterers 2 public drinkers	6 loiterers 0 public drinkers	Yes
Control Place 11	5.7 loiterers 1 public drinker	18.7 loiterers 2.3 public drinkers	
Treatment Place 12	4.7 loiterers 2 suspicious persons 1 person playing loud music	1.3 loiterers 0 suspicious persons 0 persons playing loud music	Yes
Control Place 12	8 loiterers	7.3 loiterers 2 disorderly persons	

Table 6. Observations of Physical Incivilities at Treatment Places

Place	Pretest Conditions	Posttest Conditions	Positive Change
Treatment Place 1	2 street segments with trash; 2 abandoned buildings	no trash; 2 abandoned buildings secured	Yes
Treatment Place 2	3 street segments with trash; 3 trash-filled vacant lots; 4 abandoned buildings	1 street segment with trash; vacant lots cleaned and secured; abandoned buildings remained, but were placed on waiting lists to be demolished	Yes
Treatment Place 3	1 street segment with trash; 1 trash-filled vacant lot; 2 buildings with graffiti	0 street segments with trash; vacant lot cleaned and secured; 1 building with graffiti	Yes
Treatment Place 4	No physical incivilities		———
Treatment Place 5	3 buildings with graffiti; 1 street segment with trash; 5 abandoned buildings; 2 vacant lots	3 buildings with graffiti; 1 street segment with trash; vacant lots and abandoned buildings remained because they were not viewed as problems	No
Treatment Place 6	2 street segments with trash; 3 buildings with graffiti	0 street segments with trash; 3 buildings with graffiti	Yes
Treatment Place 7	1 street segment with trash; 1 building with graffiti	0 segments with trash; 0 buildings with graffiti	Yes
Treatment Place 8	7 street segments with trash; 2 buildings with graffiti	3 street segments with trash; 0 buildings with graffiti	Yes
Treatment Place 9	3 buildings with graffiti; 4 street segments with trash; 6 abandoned buildings	5 buildings with graffiti; 2 street segments with trash; 2 abandoned buildings demolished, 4 secured and waiting to be razed	Yes
Treatment Place 10	2 street segments with trash; 3 buildings with graffiti	1 street segment with trash; 3 buildings with graffiti	Yes
Treatment Place 11	2 street segments with trash; 5 buildings with graffiti; 3 abandoned buildings	1 street segment with trash; 2 buildings with graffiti; 3 abandoned buildings cleaned and secured	Yes
Treatment Place 12	3 street segments with trash; 5 buildings with graffiti	1 street segment with trash; 5 buildings with graffiti	Yes

DISPLACEMENT AND DIFFUSION EFFECTS

Displacement and diffusion effects were assessed by comparing citizen calls for service and reported criminal incidents in the two-block catchment areas immediately surrounding the control and treatment groups for the six month preintervention and postintervention periods. Table 7 presents the parameter estimates of the effects of the problem-oriented policing treatment on the selected categories of citizen calls for service and criminal incidents in the areas immediately surrounding the treatment places relative to the areas immediately surrounding the control areas. The chi-square result and statistical significance of the parameter estimate, the likelihood-ratio test result, and the deviance analysis result are also displayed.

The displacement and diffusion experimental analyses revealed that the majority of crime types in the treatment catchment areas were not significantly displaced or diffused as a result of the problem-oriented strategy in the target areas. Robbery calls and incidents, assault calls, property calls, drug offense calls and arrests, street-fight calls, disorder incidents, and total incidents were not displaced into the areas immediately surrounding the treatment places relative to the areas immediately surrounding the control places. Disorder calls, assault incidents, and the total number of calls in the treatment catchment areas may have reflected a significant diffusion of crime control benefits relative to control catchment areas. Property crime incidents, however, were significantly displaced into the treatment catchment areas compared to the control catchment areas. For the significant results, the likelihood-ratio test results confirmed the improvement in the fit of the model by adding the group variable. With the exception of total calls,[10] the deviance analysis result was not significant for all the displacement and diffusion models; this result confirms that the findings of these models were not driven by nested effects. As raised previously in the methods section, these findings must be interpreted with caution; immediate spatial displacement is a very complex phenomenon to measure and, as Weisburd and Green (1995a:358) observe, "statistics that appear solid on paper may reflect the difficulties of analyzing this process as much as any real substantive findings."

The significant displacement of property incidents into the treatment

10. The significant reductions for total calls in the treatment catchment areas relative to controls seem to be driven by two huge increases in total calls in the control places in two pairs. Further analysis is necessary to specify what mechanisms are at work across the pairs and the crime types in the total calls category, but it is really not necessary for this study. The important finding here is that total calls were not displaced into the experimental catchment areas relative to controls.

Table 7. Displacement and Diffusion Effects—Citizen Calls for Service and Criminal Incidents

Dependent Variable	Parameter Estimate for Treatment	Chi^2	*P* Level	Likelihood Ratio	Deviance/ D.F. Result
Calls by Type					
Robbery	0.1622	2.6560	0.1032	2.66	5.84
Street Fight	0.1118	0.8877	0.3688	0.81	2.70
Property	0.0212	0.2449	0.6207	0.25	9.72
Disorder/Nuisance	–0.1119	4.5474	0.0330*	4.58*	13.95
Narcotics	0.0183	0.0706	0.7904	0.07	11.50
Total	–0.0856	11.2760	0.0008*	11.34*	34.21*
Incidents by type					
Robbery	0.1342	1.4216	0.2331	1.42	3.39
Assault[a]	–0.2188	5.6512	0.0174*	5.75*	2.47
Property	0.1813	8.3352	0.0039*	8.32*	4.81
Disorder/Vandalism	0.0095	0.0053	0.9420	0.00	4.43
Narcotics Arrests	0.0795	0.7505	0.3863	0.75	10.77
Total	–0.0035	0.0084	0.9271	0.012	10.25

* $p < .05$.

[a] These data are confounded by domestic violence incidents. The resources did not exist for the tedious task of locating, reading, and coding another 1,404 assault incident reports into domestic and nondomestic assaults. Although it is possible that the presence of domestic violence, family violence, or other such assaults is negating these diffusion effects or masking a displacement effect, the available evidence does not support this suggestion. The confounded assault data reflect a significant reduction in experimental catchment areas compared to control catchment areas; a very large discrepancy between nonstranger and stranger assaults would be necessary to change this result to a significant increase in the experimental catchment areas compared to control catchment areas. Further, the experimental analyses of nondomestic assault incidents and street-fight call data at the place found these assault data to be positively affected by the intervention in a fashion similar to that for the other crime data types at the place. This pattern seems to be present in the displacement/diffusion quasiexperimental analyses. Other than property crimes, no other crime category suggests a displacement effect. An examination of street-fight call data shows a lack of displacement; it is likely that the nondomestic assault incidents follow suit.

catchment areas relative to the control catchment areas does not necessarily discount the impressive gains in property crime control achieved by the intervention in the treatment places. When the choice structuring properties (see Cornish and Clarke, 1987) of property crime and the restrictions imposed on enforcement patterns by the experimental design are considered, the displacement is not remarkable. The areas surrounding the experimental locations may not have had the same features that made the hot spots attractive places to congregate, behave disorderly, sell drugs, and engage in violent behavior; however, it is likely that the proximate areas had attractive opportunities for property crimes, such as homes to be burglarized and cars to be broken into and/or stolen. The field experiment limited the intervention to discrete geographic boundaries. As such, the

opportunities for property crime in the adjacent unprotected areas were most likely exploited by offenders. In their examination of the decision-making processes of persistent property offenders, Shover and Honaker (1992) found that serious property offenders are very casual in their assessment of risks; the amount of effort and the potential reward are more important in the decision to commit a crime. Due to the proximity of intensive policing tactics, the perceived risk of being apprehended for criminal activity in the catchment areas may have been overestimated by many types of criminals. Property offenders, however, may not consider this risk as much in their decisions to commit property crimes. As such, property offenses increased in proximate areas when other crimes did not. In the real world, the problem-oriented policing strategy would not be restricted to small places at the expense of areas not protected by the intervention. Therefore, this significant displacement result could be viewed as an artifact of experimental conditions.

DISCUSSION

The impressive gains in crime control across numerous crime categories were associated with problem-oriented policing strategies focused on the social and physical disorder of a place. Analyses of the observational data suggest that the strategies were successful in alleviating social and physical incivilities at the place. The difficulties inherent in evaluating problem-oriented policing programs that utilize a broad mix of tactics prevent us from specifying the specific interventions responsible for these gains in crime control. However, we can speculate on how the problem-oriented policing program's focus on disorder may have changed the dynamics of a place in important ways. The rational choice perspective and routine activities theory provide useful frameworks to discuss the theoretical mechanisms underlying policing disorder at places.[11] According to the rational choice perspective, offenders consider risks, effort, and rewards when contemplating criminal acts (Cornish and Clarke, 1986). The increased presence and order maintenance activities of the VCU officers at the places may have served as a powerful deterrent to criminal and disorderly conduct. These tactics may have increased the certainty of detection and apprehension at the place, communicated that disorderly behavior would no longer be tolerated at the place, and raised the potential offender's perceptions of risk at the place (Cook, 1980; Zimring and

11. This study did not gather appropriate data to shed light on the specific causal mechanisms responsible for the gains in crime control. Additional research, such as the interviewing of offenders, is necessary to delineate the mechanisms that underlie gains in crime control. Applying theoretical knowledge is illuminating but should not be regarded as anything more than speculation.

Hawkins, 1973; also Koper, 1995). These perceptions of increased risks may have influenced the behavior of an array of would-be offenders; for example, Kleiman (1988) credits the corresponding reductions of property crimes and violent crimes to the increased risks associated with the heightened police presence during the heroin market crackdown. Changes in the physical environment may also discourage potential offenders from frequenting an area by altering criminal opportunities at a place. Abandoned buildings, for instance, attract offenders to places (Spelman, 1993). The abandoned building may serve as a location for muggers to conceal themselves while waiting for a victim to pass, a drinking spot for disorderly youth, or as a space to stash or sell drugs; if this facility was secured, fewer potential offenders would enter the area because the necessary effort to commit crimes at the place would increase. The VCU officers' strategies to ameliorate physical incivilities (thereby changing site features and facilities) may have diminished the number of easy opportunities at the place and, thus, discouraged offenders from frequenting the experimental place.

Complementing rational choice, routine activities theory focuses on the criminal event and posits that criminal events occur when potential offenders and suitable targets converge in space and time in the absence of a capable guardian (Cohen and Felson, 1979). The increased presence of police augmented the level of guardianship in the treatment places. Heightened levels of patrol may have prevented crimes by introducing the watchful eye of the police as a guardian to protect potential victims from potential offenders. According to the "broken windows" hypothesis, reductions in physical and social incivilities at places also send clear signals to potential criminals that lawbreaking will no longer be tolerated. Offenders make choices about the places they frequent based on cues at the site and are likely to select places that emit cues that risks are low for committing crimes (Eck and Weisburd, 1995). Changing the perceptions of potential offenders by controlling disorder may reduce their numbers at the place. Therefore, since victims and offenders often share the same social milieus (Garofalo, 1987; Lauritsen et al., 1991), these changes will also reduce the number of potential victims at the place. Kleiman (1988:23) suggests this phenomenon in the reductions in violent crime and property crime from a crackdown on street-level heroin sales:

> A plausible explanation would be that street drug markets involve concentrations of both likely aggressors and attractive victims: attractive both because they have money and drugs worth stealing and because they are less likely than average to complain to the police. In addition, business disputes among drug dealers and between drug dealers and drug customers may result in violence rather than litigation. Breaking up the drug market disperses potential victims and

offenders making it less likely they will come in contact with one another.

The problem-oriented interventions may have changed the relationships between offenders, targets, and guardians at the treatment places; reduced crime rates followed these changes in the dynamics of the place.

CONCLUSION

The Jersey City Police Department's pilot problem-oriented policing program was successful in reducing crime and disorder at violent places with little evidence of displacement. The results of this research have not been replicated and caution must be used in generalizing these findings to other settings. The Minneapolis RECAP (Repeat Call Address Policing) experiment, for example, did not find problem-oriented policing to be effective in controlling addresses that generated a disproportionate amount of calls (Buerger, 1993). Nevertheless, this research supports the growing body of research that asserts focused police efforts can reduce crime and disorder at problem places (Clarke, 1992; Goldstein, 1990; Sherman and Weisburd, 1995; Weisburd and Green, 1995b). Moreover, this study bolsters the position that focused enforcement efforts do not necessarily cause crime problems to be displaced to surrounding areas (Barr and Pease, 1990; Gabor, 1990). As many observers suggest (Eck, 1993; Hessling, 1994), displacement is not an inevitable consequence of focused crime prevention efforts.

The results of this experiment suggest that focused police efforts modifying the places, routine activities, and situations that promote violence may be effective in reducing violent behavior. Although the magnitude of the effects of the policing strategy was inconsistent across the various robbery and assault crime categories, all violent crime indicators experienced noteworthy reductions in treatment places relative to control places. Law enforcement agencies interested in controlling violence should consider implementing problem-oriented policing programs that focus on the places where violence clusters by developing tailored interventions addressing the underlying conditions and dynamics that give rise to violent situations.

REFERENCES

Aldrich, John and Forrest Nelson

1984 Linear Probability, Logit, and Probit Models. Paper Series on Quantitative Applications in the Social Sciences. Series no. 07-045. Beverly Hills and London: Sage.

Alpert, Geoffrey and Mark Moore
1993 Measuring police performance in the new paradigm of policing. In Bureau of Justice Statistics, Performance Measures for the Criminal Justice System. Princeton Study Group on Criminal Justice Performance Measures. Washington, D.C.: Bureau of Justice Statistics.

Barr, Robert and Kenneth Pease
1990 Crime placement, displacement, and deflection. In Michael Tonry and Norval Morris (eds.), Crime and Justice: A Review of Research. Vol. 12. Chicago: University of Chicago Press.

Black, Donald
1970 Production of crime rates. American Sociological Review 35:736–748.

Blalock, Hubert
1979 Social Statistics. Rev. 2d ed. New York: McGraw–Hill.

Block, Richard and Carolyn R. Block
1995 Space, place, and crime: Hot spot areas and hot places of liquor-related crime. In John E. Eck and David Weisburd (eds.), Crime and Place. Monsey, N.Y.: Criminal Justice Press.

Blumstein, Alfred and Jacqueline Cohen
1979 Estimation of individual crime rates from arrest records. Journal of Criminal Law and Criminology 70:561-85.

Braga, Anthony A.
1997 Solving Violent Crime Problems: An Evaluation of the Jersey City Police Department's Pilot Program to Control Violent Places. Doctoral Dissertation, Rutgers University. Ann Arbor, Mich.: UMI.

Brantingham, Paul J. and Patricia L. Brantingham (eds.)
1991a Environmental Criminology. 2d ed. Prospect Heights, Ill.: Waveland Press.

Brantingham, Paul J. and Patricia L. Brantingham
1991b Notes on the geometry of crime. In Paul Brantingham and Patricia Brantingham (eds.), Environmental Criminology. 2d ed. Prospect Heights, Ill.: Waveland Press.

Buerger, Michael
1993 Convincing the recalcitrant: An examination of the Minneapolis RECAP experiment. Unpublished doctoral dissertation, Rutgers School of Criminal Justice, Newark, N.J.
1994 The limits of community. In Dennis Rosenbaum (ed.), The Challenge of Community Policing: Testing the Promises. Thousand Oaks, Calif.: Sage.

Campbell, Donald T. and Julian Stanley
1966 Experimental and Quasi-Experimental Designs for Research. Chicago: Rand McNally.

Capone, Donald L. and Woodrow Nichols
1976 Urban structure and criminal mobility. American Behavioral Scientist 20:199–213.

Capowich, George and Jan Roehl
1994 Problem-oriented policing: Actions and effectiveness in San Diego. In Dennis Rosenbaum (ed.), The Challenge of Community Policing: Testing the Promises. Thousand Oaks, Calif.: Sage.

Clarke, Ronald V. (ed.)
1992 Situational Crime Prevention: Successful Case Studies. Albany, N.Y.: Harrow and Heston.

Clarke, Ronald V. and Marcus Felson
1993 Introduction: Criminology, routine activity, and rational choice. In Ronald V. Clarke and Marcus Felson (eds.), Routine Activity and Rational Choice. Advances in Criminological Theory. Vol. 5. New Brunswick, N.J.: Transaction Press.

Clarke, Ronald V. and Patricia Harris
1992 Auto theft and its prevention. In Michael Tonry and Norval Morris (eds.), Crime and Justice: A Review of Research. Vol. 16. Chicago: University of Chicago Press.

Clarke, Ronald V. and David Weisburd
1994 Diffusion of crime control benefits: Observations on the reverse of displacement. Crime Prevention Studies 2:165–184.

Cohen, Lawrence E. and Marcus Felson
1979 Social change and crime rate trends: A routine activity approach. American Sociological Review 44:588–605.

Cook, Philip
1980 Research in criminal deterrence: Laying the groundwork for the second decade. In Norval Morris and Michael Tonry (eds.), Crime and Justice: An Annual Review of Research. Vol. 2. Chicago: University of Chicago Press.
1991 The technology of personal violence. In Michael Tonry (ed.), Crime and Justice: A Review of Research. Vol. 14. Chicago: University of Chicago Press.

Cook, Thomas and Donald Campbell
1979 Quasi-Experimentation: Design and Analysis Issues for Field Settings. Boston: Houghton Mifflin.

Cornish, Derek and Ronald V. Clarke (eds.)
1986 The Reasoning Criminal: Rational Choice Perspectives on Offending. New York: Springer-Verlag.

Cornish, Derek and Ronald V. Clarke
1987 Understanding crime displacement: An application of rational choice theory. Criminology 25:933–947.

Daniel, Wayne
1974 Biostatistics: A Foundation for Analysis in the Health Sciences. New York: John Wiley & Sons.

Dobson, Annette
1990 An Introduction to Generalized Linear Models. New York: Chapman and Hall.

Eck, John E.
1993 The threat of crime displacement. Criminal Justice Abstracts 25:527–546.
1994 Drug markets and drug places: A case-control study of the spatial structure of illicit dealing. Unpublished doctoral dissertation, University of Maryland, College Park.
1997 Preventing crime at places. In University of Maryland, Department of Criminology and Criminal Justice (eds.), Preventing Crime: What Works, What Doesn't, What's Promising. Washington, D.C.: Office of Justice Programs.

Eck, John E. and William Spelman
1987 Problem-Solving: Problem-Oriented Policing in Newport News. Washington, D.C.: National Institute of Justice.

Eck, John E. and David Weisburd
1995 Crime places in crime theory. In John E. Eck and David Weisburd (eds.), Crime and Place. Monsey, N.Y.: Criminal Justice Press.

Elliott, Delbert, Franklyn W. Dunford, and David Huizinga
1987 Identification and prediction of career offenders utilizing self-reported and official data. In J.D. Burchard and Sara N. Burchard (eds.), Prevention of Delinquent Behavior. Newbury Park, Calif.: Sage.

Felson, Marcus
1995 I got rhythms: Crime rhythms and routine activities. Paper presented at the 47th Annual Meeting of the American Society of Criminology, Boston, Mass.

Ferraro, Kenneth
1995 Fear of Crime: Interpreting Victimization Risk. Albany, N.Y.: SUNY Press.

Flanagan, Timothy and Kathleen Maguire (eds.)
1993 Sourcebook of Criminal Justice Statistics. Washington, D.C.: Bureau of Justice Statistics.

Gabor, Thomas
1990 Crime displacement and situational prevention: Toward the development of some principles. Canadian Journal of Criminology 32:41–74.

Gajewski, Frank, David Weisburd, Lorraine Green, and William Spelman
1993 Controlling violent places in Jersey City: A problem-oriented approach. Funded proposal, National Institute of Justice, Washington, D.C.

Garofalo, James
1979 Victimization and the fear of crime. Journal of Research in Crime and Delinquency 16:80–97.
1987 Reassessing the lifestyle model of criminal victimization. In Michael Gottfredson and Travis Hirschi (eds.), Positive Criminology. Newbury Park, Calif.: Sage.

Goldstein, Herman
1979 Improving policing: A problem-oriented approach. Crime and Delinquency 25:236–258.
1990 Problem-Oriented Policing. Philadelphia: Temple University Press.

Gottfredson, Stephen and Don Gottfredson
1992 Classification, Prediction, and the Criminal Justice System. Rockville, Md.: National Criminal Justice Reference Service.

Green, Lorraine
1995 Cleaning up drug hot spots in Oakland, California: The displacement and diffusion effects. Justice Quarterly 12:737–754.
1996 Policing Places with Drug Problems. Thousand Oaks, Calif.: Sage.

Green Mazerolle, Lorraine, Colleen Kadleck, and Jan Roehl
1998 Controlling drug and disorder problems: The role of place managers. Criminology 36:371–404.

Greene, Jack and Ralph Taylor
1988 Community-based policing and foot patrol: Issues of theory and evaluation. In Jack Greene and Stephen Mastrofski (eds.), Community Policing: Rhetoric or Reality? New York: Praeger.

Hawley, Amos
1944 Ecology and human ecology. Social Forces 23:398–405.
1950 Human Ecology: A Theory of Urban Structure. New York: Ronald Press.

Heal, Kevin and Gloria Laycock
1986 Situational Crime Prevention: From Theory into Practice. London: Her Majesty's Stationery Office.

Hessling, Rene
1994 Displacement: A review of the empirical literature. Crime Prevention Studies 3:197–230.

Homel, Ross and Jeff Clark
1994 The prediction and prevention of violence in pubs and clubs. Crime Prevention Studies 3:1–46.

Hope, Timothy
1994 Problem-oriented policing and drug market locations: Three case studies. Crime Prevention Studies 2:5–32.

Hunter, Ronald and C. Ray Jeffrey
1992 Preventing convenience store robbery through environmental design. In Ronald V. Clarke (ed.), Situational Crime Prevention: Successful Case Studies. Albany, N.Y.: Harrow and Heston.

Kelling, George and Catherine Coles
1996 Fixing Broken Windows: Restoring Order and Reducing Crime in Our Communities. New York: Free Press.

Kennedy, David M. and Mark Moore
1995 Underwriting the risky investment in community policing: What social science should be doing to evaluate community policing. The Justice System Journal 17:271–290.

Kleiman, Mark
1988 Crackdowns: The effects of intensive enforcement on retail heroin dealing. In Marcia Chaiken (ed.), Street-Level Drug Enforcement: Examining the Issues. Washington, D.C.: National Institute of Justice.

Klinger, David and George Bridges
1997 Measurement error in calls-for-service as an indicator of crime. Criminology 35:705–726.

Koper, Christopher
1995 Just enough police presence: Reducing crime and disorderly behavior by optimizing patrol time in crime hot spots. Justice Quarterly 12:649–672.

Lauritsen, Janet, Robert Sampson, and John Laub
1991 The link between offending and victimization among adolescents. Criminology 29:265–292.

Laycock, Gloria and Charles Austin
1992 Crime prevention in parking facilities. Security Journal 3:154–160.

Liska, Allen, Joseph Lawrence, and Andrew Sanchirico
1982 Fear of crime as a social fact. Social Forces 60:760–771.

Matthews, Roger
1990 Developing more effective strategies for curbing prostitution. Security Journal 1:182–187.

McCullagh, Peter and John Nelder
1989 Generalized Linear Models. 2d ed. New York: Chapman and Hall.

Pate, Anthony, Wesley Skogan, Mary Ann Wycoff, and Lawrence Sherman
1986 Reducing Fear of Crime in Houston and Newark: A Summary Report. Washington, D.C.: Police Foundation.

Pease, Kenneth
1991 The Kirkholt project: Preventing burglary on a British public housing estate. Security Journal 2:73–77.

Pierce, Glenn, Susan Spaar, and LeBaron Briggs
1988 The Character of Police Work: Strategic and Tactical Implications. Boston: Center for Applied Social Research.

Police Foundation
1981 The Newark Foot Patrol Experiment. Washington, D.C.: Police Foundation.

Poyner, Barry
1991 Situational prevention in two car parks. Security Journal 2:96–101.

Reiss, Albert J., Jr.
1985 Policing a City's Central District: The Oakland Story. Washington, D.C.: National Institute of Justice.

Reiss, Albert J., Jr., and Jeffrey A. Roth (eds.)
1993 Understanding and Preventing Violence. Washington, D.C.: National Academy Press.

Rengert, George and John Wasilchick
1990 Space, time, and crime: Ethnographic insights into residential burglary. Report submitted to U.S. Department of Justice, National Institute of Justice, Washington, D.C.

Reppetto, Thomas
1976 Crime prevention and the displacement phenomenon. Crime and Delinquency 22:166–177.

Rhodes, William and Catherine Conley
1991 Crime and mobility: An empirical study. In Paul J. Brantingham and Patricia L. Brantingham (eds.), Environmental Criminology. Newbury Park, Calif.: Sage.

Roncek, Dennis and Pat Meier
1991 Bar blocks and crimes revisited: Linking the theory of routine activities to the empiricism of "hot spots." Criminology 29:725–755.

Rossi, Peter H. and Howard Freeman
1993 Evaluation: A Systematic Approach. 5th ed. Newbury Park, Calif.: Sage.

Sampson, Robert and Jacqueline Cohen
1988 Deterrent effects of the police on crime: A replication and theoretical extension. Law & Society Review 22:163–189.

SAS Institute
1993 SAS/STAT Software: The GENMOD Procedure, Release 6.09. Technical Report P-243. Cary, N.C.: SAS Institute, Inc.
1997 SAS/STAT Software: Changes and Enhancements Through Release 6.12. Cary, N.C.: SAS Institute, Inc.

Sechrest, Lee and Abram Rosenblatt
1987 Research methods. In Herbert C. Quay (ed.), Handbook of Juvenile Delinquency. New York: Wiley.

Shaw, Clifford and Henry McKay
1942 Juvenile Delinquency and Urban Areas. Chicago: University of Chicago Press.

Sherman, Lawrence
1987 Repeat Calls to Police in Minneapolis. Crime Control Reports Number 4. Washington, D.C.: Crime Control Institute.
1991 Herman Goldstein: Problem-oriented policing. Journal of Criminal Law and Criminology 82:693–702.
1995 Public regulation of private crime prevention. Annals of the American Academy of Political and Social Science 539:102–113.

Sherman, Lawrence and David Weisburd
1995 General deterrent effects of police patrol in crime hot spots: A randomized controlled trial. Justice Quarterly 12:625–648.

Sherman, Lawrence, Patrick Gartin, and Michael Buerger
1989 Hot spots of predatory crime: Routine activities and the criminology of place. Criminology 27:27–56.

Sherman, Lawrence, Janell Schmidt, and Robert Velke
1992 High Crime Taverns: A RECAP Project in Problem-Oriented Policing. Final Report to the National Institute of Justice. Washington, D.C.: Crime Control Institute.

Shover, Neal and David Honaker
1992 The socially bounded decision making of persistent property offenders. The Howard Journal of Criminal Justice 31:276–293.

Skogan, Wesley
1990 Disorder and Decline: Crime and the Spiral of Decay in American Neighborhoods. New York: Free Press.

Spelman, William
1988 Beyond Bean Counting: New Approaches for Managing Crime Data. Washington, D.C.: Police Executive Research Forum.
1993 Abandoned buildings: Magnets for crime? Journal of Criminal Justice 21:481–495.
1995 Criminal careers of public places. In John E. Eck and David Weisburd (eds.), Crime and Place. Monsey, N.Y.: Criminal Justice Press.

Taylor, Ralph
1997a Crime, grime, and responses to crime: Relative impacts of neighborhood structure, crime, and physical deterioration on residents and business personnel in the Twin Cities. In Steven P. Lab (ed.), Crime Prevention at a Crossroads. Cincinnati, Ohio: Anderson.

1997b Social order and disorder of street-blocks and neighborhoods: Ecology, micro-ecology, and the systematic model of social disorganization. Journal of Research in Crime and Delinquency 34:113–155.

Taylor, Ralph and Stephen Gottfredson
1986 Environment design, crime, and prevention: An examination of community dynamics. In Albert J. Reiss, Jr., and Michael Tonry (eds.), Communities and Crime. Chicago: University of Chicago Press.

Trasler, Gordon
1993 Conscience, opportunity, rational choice, and crime. In Ronald V. Clarke and Marcus Felson (eds.), Routine Activity and Rational Choice, Advances in Criminological Theory. Vol. 5. New Brunswick, N.J.: Transaction Publishers.

Trojanowicz, Robert
N.D. An Evaluation of the Neighborhood Foot Patrol Program in Flint, Michigan. East Lansing: Michigan State University.

Warner, Barbara and Glenn Pierce
1993 Reexamining social disorganization theory using calls to the police as a measure of crime. Criminology 31:493–518.

Weisburd, David
1993 Design sensitivity in criminal justice experiments. In Michael Tonry (ed.), Crime and Justice: A Review of Research. Vol. 17. Chicago: University of Chicago Press.
1997 Reoriented Crime Prevention Research and Policy: From Causes of Criminality to the Context of Crime. Research Report. Washington, D.C.: National Institute of Justice.

Weisburd, David and Lorraine Green
1994 Defining the drug market: The case of the Jersey City DMAP system. In Doris L. MacKenzie and Craig D. Uchida (eds.), Drugs and Crime: Evaluating Public Policy Initiatives. Newbury Park, Calif.: Sage.
1995a Measuring immediate spatial displacement: Methodological issues and problems. In John E. Eck and David Weisburd (eds.), Crime and Place. Monsey, N.Y.: Criminal Justice Press.
1995b Policing drug hot spots: The Jersey City DMA experiment. Justice Quarterly 12(4):711–736.

Weisburd, David, Lisa Maher, and Lawrence Sherman
1992 Contrasting crime general and crime specific theory: The case of hot spots of crime. Advances in Criminological Theory 4:45–69.

Weisburd, David, Lorraine Green, and Debra Ross
1994 Crime in street level drug markets: A spatial analysis. Criminologie 27:49–67.

Werthman, Carl and Irving Piliavin
1967 Gang members and the police. In David Bordua (ed.), The Police: Six Sociological Essays. New York: John Wiley and Sons.

Wikstrom, Per-Olof
1995 Preventing city-center street crimes. In Michael Tonry and David Farrington (eds.), Building a Safer Society: Strategic Approaches to Crime Prevention. Chicago: University of Chicago Press.

Wilson, James Q. and George Kelling
1982 Broken windows: The police and neighborhood safety. Atlantic Monthly, March:29–38.

Zimring, Franklin and Gordon Hawkins
1973 Deterrence: The Legal Threat in Crime Control. Chicago: University of Chicago Press.

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