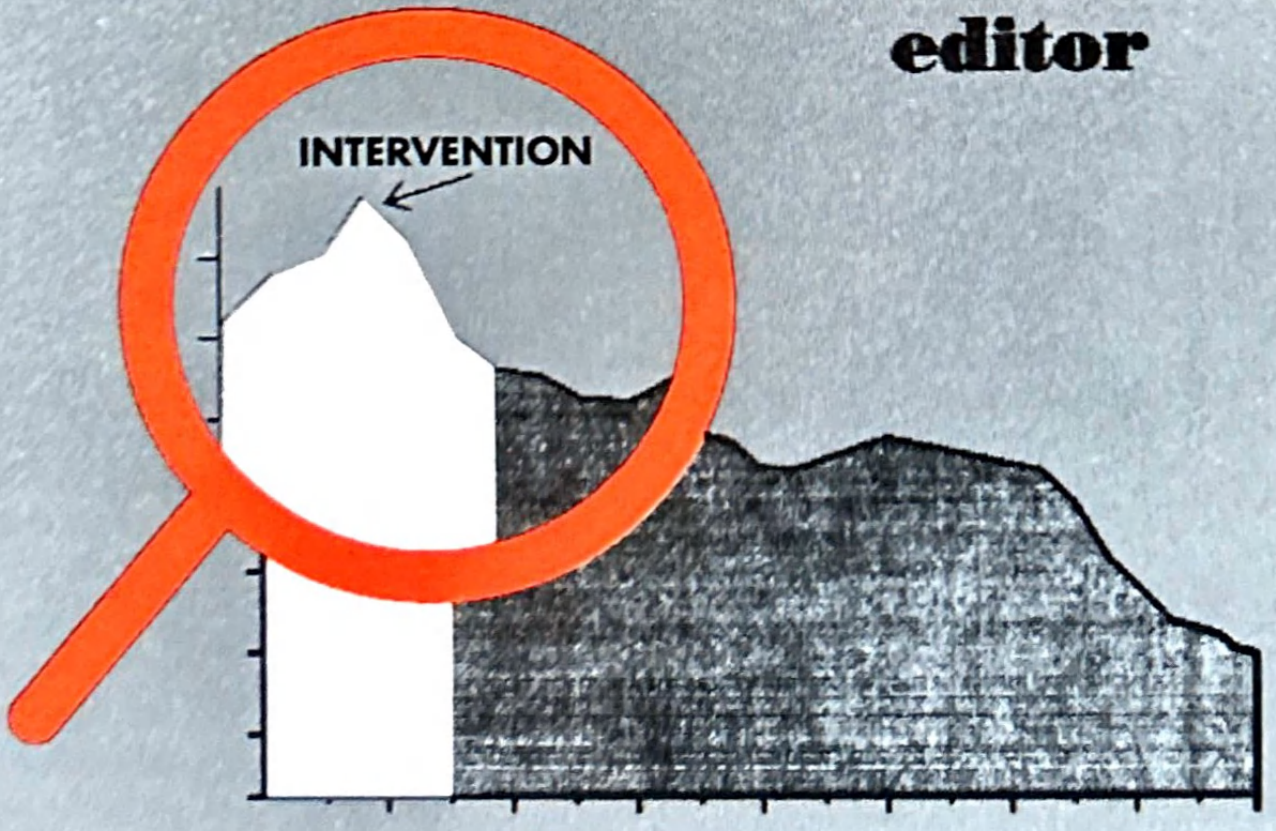
Second Edition

SITUATIONAL CRIME PREVENTION

SUCCESSFUL CASE STUDIES

Ronald V. Clarke
editor



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Preface

My training as a psychologist and years of employment in the British civil service have taught me that reports must invariably be brief, which may explain why I have always been daunted by the prospect of writing a book. So, when I came to believe that a book on situational prevention was needed, principally to make the approach better known in the United States, I immediately looked around for someone to help me write it. In fact, plans were developed with first one colleague and then another, but in both instances other duties and interests, their's and mine, intruded and in neither case was the book completed.

Had it been written, it would have documented the progress made since the concept of situational prevention was introduced in the mid-1970s by a small team, including myself, working in the Home Office. It would have traced the links between situational prevention and similar approaches in the United States, especially Crime Prevention through Environmental Design, or CPTED, and would have shown how the theoretical base of situational prevention has been strengthened by the development in recent years of routine activity and rational choice theory. It would have reviewed the evidence on displacement and drawn attention to the increasingly recognized, counterbalancing phenomenon of diffusion of benefits. Above all, it would have documented the successes achieved by situational measures in preventing a wide variety of crimes in an equal variety of contexts.

All of this has now been attempted in the *Introduction* to this collection of case studies. In addition, a new classification of situational techniques is presented which benefits from the experience accumulated during the twelve years since the publication of the first classification in *Designing out Crime* (Clarke and Mayhew, 1980), an earlier collection of studies undertaken by the Home Office. The new classification provides the main link with the case studies. Not all of these were explicitly undertaken within the framework provided by situational prevention, but all belong there by virtue of their methodology.

Many of the case studies originally appeared as journal articles, but often in journals that would not be readily accessible to the many people — police, security personnel, community leaders, local government officials, business managers and owners — who may be concerned in a practical way with preventing crime and who might be helped by a knowledge of situational prevention. For them, I should repeat some advice given by Marcus Felson (1991) in a recent *Security Journal* editorial: Situational prevention, like the practice of medicine, is as much an art as a science. Hard evidence about things

that work usually has to be supplemented by informed judgement about what is likely to work. This means that the case studies may be a source of ideas, but will rarely show exactly what to do.

In Britain as well as in some other European countries, situational prevention has become an integral part of government policy. In the United States, comparatively less success has been enjoyed by CPTED because of the failure of some ambitious projects funded by the federal government and also, I believe, because CPTED, unlike situational prevention, has generally been confined to projects involving buildings and facilities. Whatever the reason, the concept of reducing criminal opportunities is less widely accepted amongst American criminologists. One day the book will be written that I first had in mind for them. In the meantime, I hope that this collection of case studies, and the successes documented, will stimulate their interest.

Though this is not argued in the book, which seeks only to promote situational prevention on its own merits, there seem few grounds for optimism about any other form of crime control. If we could make our society more like that of Japan or Singapore, where people seem more willing to subordinate their personal wishes to those of the wider community, perhaps we could do without situational prevention. It seems to me, however, that the trend in our society is precisely in the opposite direction. We are daily seeking ways to expand our mobility and freedom of choice, which according to routine activity theory is the main reason for rising crime. Since we may be unable to strengthen generalized internal controls on behavior, we may need to introduce external controls in those specific contexts and situations where the absence of compliance may be particularly damaging.

In conclusion, I should mention two particular advantages of the case study format of the book. First, my publisher believes (and who am I to disagree!) that, by allowing a wider variety of perspectives to be represented, the case study format should make the book more suitable for use as a college text, even if it will need to be supplemented by more detailed treatments of such topics as displacement and difficulties of implementation. Second, it enables the contribution of some of my friends and colleagues whose studies are reproduced here to be more fully recognized. I am grateful to them and to those others whose studies have been reprinted for permission to include their work. I should also like to thank some other colleagues — Derek Cornish, Marcus Felson and Paul Wilson — whose work is not reprinted, but who have nevertheless been the source of inspiration and support.

RONALD CLARKE
Rutgers

Acknowledgements

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About the editor

Ronald Clarke is Professor and Dean at the School of Criminal Justice, Rutgers, The State University of New Jersey. Trained as a psychologist, he holds a master's degree (1965) and a Ph.D (1968) from the University of London. He was formerly Director of the British government's criminological research department (The Home Office Research and Planning Unit), where he had a significant role in the development of situational crime prevention. He also helped to establish the Home Office Crime Prevention Unit and the now regularly-repeated British Crime Survey. He has held faculty appointments in criminal justice at SUNY Albany and Temple University. His books include *Designing out Crime* (1980, with Pat Mayhew), *The Reasoning Criminal* (1986, with Derek Cornish), and *Suicide: Closing the Exits* (1989, with David Lester).

PART 1
Introduction

Introduction

Ronald V. Clarke

SITUATIONAL CRIME PREVENTION is a term of comparatively recent origin (Clarke, 1980; Clarke and Mayhew, 1980). It refers to a preventive approach that relies, not upon improving society or its institutions, but simply upon reducing opportunities for crime. This approach is thought to be no more than commonsense when, for example, individuals fit locks and bolts to protect their homes from burglary. It becomes controversial only when advocated at a local community or broader societal level. Indeed, considerable skepticism has met the claim, lying at the heart of situational prevention, that coordinated action to make crime more difficult or risky can achieve general reductions in the volume of crime.

This claim might have been better received had it not been made at a time when the limited effectiveness of offender treatments was becoming apparent (Martinson, 1974; Brody, 1976), and when criminologists and policy makers were tending to over-generalize the "nothing works" conclusions beyond rehabilitation to encompass all other forms of crime control. But poor timing is not the only reason for the resistance encountered by situational prevention. It is criticized on theoretical grounds (in particular, because most criminologists believe that opportunity plays a minor role in crime) and it offends both liberal

and conservative philosophies of crime control, the latter by eschewing punishment and the former by seeming to promote an uncaring and authoritarian society. Before exploring these points in greater depth, however, a more detailed account of situational prevention and its theoretical background is needed.

Definition of situational prevention

Situational prevention comprises opportunity-reducing measures that are, (1) directed at highly specific forms of crime (2) that involve the management, design or manipulation of the immediate environment in as systematic and permanent way as possible (3) so as to increase the effort and risks of crime and reduce the rewards as perceived by a wide range of offenders. A detailed classification of such measures is offered below, but they include: "target hardening" of the locks and bolts variety; more sophisticated forms of technology including intruder alarms, CCTV, breathalyzers and radar speed traps; the surveillance of specific locations provided by employees such as park-keepers, subway guards and concierges; the use of vandal resistant designs and materials in schools and other public facilities; block watch, neighborhood watch, "defensible space" and other attempts to capitalize upon the natural surveillance provided by members of the public; and some less easily categorized measures such as improved coordination of public transport with pub closing times and the separation of rival soccer fans in different enclosures at the stadium.

While all these measures share the purpose of reducing opportunities for highly specific forms of crime and thus fall within the definition of situational prevention, few have been explicitly developed within a situational prevention framework. Indeed, many originated through the efforts of hard-pressed public and private agencies seeking the most practical ways of solving their particular crime problems. In some instances, mistakes might have been avoided and less time taken to develop solutions had those involved been familiar with the elements of situational prevention. One purpose of this book, therefore, is to consolidate the knowledge obtained through these individual problem-solving efforts and to show how the criminological framework provided by situational prevention enables the lessons learned from dealing with specific crimes in specialized contexts to be more broadly generalized.

In one respect, therefore, situational prevention has been developed to provide a more formal theoretical basis for some practical and commonsense thinking about how to deal with crime. However, situational prevention was not developed in a theoretical vacuum. The genesis of the concept, which originated in the British government's Home Office Research Unit, can be traced directly to lessons learned from research on correctional treatments (Clarke and Cornish, 1983). This demonstrated the importance of immediate environment and

opportunity in accounting for misbehavior within the institution (Tizard *et al.*, 1975). In turn, this resulted in much greater awareness of a substantial literature concerned with the situational determinants of crime and, in an attempt to fill the crime-control policy void created by the demise of rehabilitation, more attention to the possibility of manipulating these to reduce crime (Mayhew *et al.*, 1976).

This "situational" thinking was combined with the action research model (in which researchers and practitioners work together to analyze and define the problem, to identify and try out possible solutions, to evaluate the results and, if necessary, to repeat the cycle until success is achieved, Lewin, 1947) in order to produce the basic elements of situational prevention. The influence of the action research paradigm can be seen in the following specification of the five stages of a situational prevention project:

1. collection of data about the nature and dimensions of the specific crime problem;
2. analysis of the situational conditions that permit or facilitate the commission of the crimes in question;
3. systematic study of possible means of blocking opportunities for these particular crimes, including analysis of costs;
4. implementation of the most promising, feasible and economic measures; and
5. monitoring of results and dissemination of experience.

Defensible space, CPTED and problem-oriented policing

While the concept of situational prevention was British in origin, its development was soon influenced by two independent (Jeffery, 1977), but nonetheless related, strands of policy research in the United States. These involved the concepts of "defensible space" (Newman, 1972) and "crime prevention through environmental design" or CPTED (Jeffery, 1971), both of which had preceded situational prevention, but, because of the trans-Atlantic delay in the dissemination of ideas, had not been the spur to its development.

Oscar Newman's "defensible space" ideas represented a brilliant attempt to use architectural form to rescue public housing in the United States from the depredations of crime. Newman, an architect, believed that the design of public housing projects discouraged residents from taking responsibility for public areas and from exercising their normal "territorial" instincts to exclude predatory offenders. In particular, he criticized the large scale of the buildings which made

it impossible for residents to recognize strangers, the multitude of unsupervised access points that made it easy for offenders to enter projects and to escape after committing crime, the location of projects in high crime areas, and their stark appearance which contributed to the stigma attaching to them. Newman supported these criticisms with statistical analyses of project crime. He also provided a wealth of detailed design suggestions for creating "defensible space" through reducing anonymity, increasing surveillance and reducing escape routes for offenders.

"Defensible space" has sometimes been described as merely an extension of Jane Jacobs' (1961) ideas about the relationship between crime and the lay-out of streets and land use in American cities. As noted by Coleman (1985), however, this fails to do justice to Newman's unique contribution. He was focused upon buildings and architecture rather than urban planning, he moved beyond description to undertake quantitative analyses of the relation between specific design features and crime, and he was deeply involved in implementing change through the introduction of design modifications in housing projects. Despite the criticisms of methodological inadequacy and theoretical naivete that have been made of his work by social scientists (see Mayhew, 1979a, for a review), Newman's ideas have greatly influenced the design of public housing in many parts of the world (Coleman, 1985).[1] Of particular relevance to the present discussion, they also stimulated efforts by the Home Office researchers engaged in situational prevention to undertake some early tests of "defensible space" notions in a British context (Wilson, 1978; Mayhew *et al.*, 1979).[2]

In addition to Jane Jacobs, other influences on Newman included architectural ideas about the relation between environment and behavior and ethological writings on "territoriality" by authors such as Ardrey (1966). This mix of ideas was rather different from that giving rise to C. Ray Jeffery's (1971) concept of "crime prevention through environmental design." An unorthodox criminologist, Jeffery claimed that the failures of the criminal justice system (in terms of limited reformative capacity, cruelty and inequity) stemmed from a flawed model of crime, in which "... the genetic basis of behavior is denied and... the environments in which crimes occur are ignored" (Jeffery, 1977: 10). Drawing upon a "biosocial theory of learning," he argued that punishment and treatment philosophies had to be abandoned in favor of a preventive approach which took due account of both genetic predisposition and the physical environment.

American criminology has been unreceptive to genetic explanations of behavior and Jeffery's general theory of criminal behavior has enjoyed less support than his concept of CPTED. Encompassing a broader set of techniques than "defensible space" and extending beyond the residential context, CPTED was adopted by the Westinghouse Corporation as the more suitable designation

for its program of research to extend the defensible space concept to school and commercial sites, where "territorial" behavior may be less natural (Jeffery, 1977: 45). Jeffery's ideas also provided encouragement to the Home Office team and have been developed in projects undertaken by some of his former students and associates, including Ronald Hunter and Patricia and Paul Brantingham, whose work is represented among the case studies included in this book.

"Problem-oriented policing" (Goldstein, 1979) constituted a somewhat later influence on the development of situational prevention. Goldstein believed that the route to greater operational effectiveness for the police was not through improvements in organization and management, but through the more detailed analysis of the problems that they are called upon to handle and the devising of tailor-made solutions. This process requires "identifying these problems in more precise terms, researching each problem, documenting the nature of the current police response, assessing its adequacy and the adequacy of existing authority and resources, engaging in a broad exploration of alternatives to present responses, weighing the merits of these alternatives, and choosing from among them" (Goldstein, 1979: 236).

Goldstein recognized the need for evaluation and his formulation of problem-oriented policing appears to reflect the same action research paradigm underpinning situational prevention (cf. Goldstein, 1990: 103). Nevertheless, some important differences exist between the concepts. In particular, problem-oriented policing is not exclusively focused on crime and is primarily a police management approach; situational prevention, on the other hand, is a crime control approach that can be utilized within any organizational or management structure and that is open, not just to the police, but to whoever can muster the resources and energy to tackle the problem in hand.

With respect to crime control, therefore, situational prevention represents a broader approach than problem-oriented policing. Because it encompasses the entire range of environments (and objects) involved in crime and because it encompasses legal and management as well as design solutions, situational prevention is also broader than CPTED (which tends to be focused on design of the built environment). For example, server intervention programs to control drunken driving and the provision of "call trace" facilities to private telephone subscribers as a deterrent to obscene phone calling would more readily fall under the definition of situational than CPTED measures.

Rational choice, environmental criminology and routine activities

Brief mention was made above of the theoretical origins of situational prevention, in particular of the stimulus provided by studies of institutional treatments for delinquents undertaken by the Home Office. These showed that

the probability of boys absconding or re-offending while resident in probation hostels or training schools seemed to be much more dependent on the nature of the regime than on the boys' backgrounds or personality (Sinclair, 1971; Clarke and Martin, 1971). Particularly important seemed to be the opportunities to misbehave that were provided by the institutional environment.

These findings, which were interpreted within a social learning theory context (Clarke and Cornish, 1983), did not sit well with the "dispositional" theories of crime prevailing at the time that emphasized the long-term influence on behavior of biological inheritance, of upbringing and personality, and of social and cultural factors. But they were quite consistent with psychological research on personality traits and behavior that was finding a greater than expected role for situational influences (Mischel, 1968), and with a more diffuse body of contemporary sociological theory that paid greater attention to transitory, situational influences. This included work by Matza (1964) who argued against deep motivational commitment to deviance in favor of a "drift" into misconduct, by Briar and Piliavin (1965) who stressed situational inducements and lack of commitment to conformity, and by Yablonsky (1962) and Short and Strodtbeck (1965) who evidenced the pressures to deviance conferred by working class gang membership.

The importance of environment and opportunity was also supported by some criminological research, including: Burt's (1925) studies of delinquency in London, in which he showed that higher rates of property offending in the winter were promoted by longer hours of darkness; Hartshorne and May's (1928) experimental studies of deceit, in which they showed that the chances of dishonest behavior by children depended on the level of supervision afforded; geographical studies which showed that the distribution of particular crimes is related to the presence of particular targets and locations such as business premises, drinking clubs, and parking lots (Engstad, 1975); and demonstrations that fluctuations in auto theft reflect the number of opportunities as measured by the numbers of registered vehicles (e.g. Wilkins, 1964).

Taken together, this body of work suggested a more dynamic view of crime than allowed by dispositional models. It appeared that criminal conduct was highly susceptible to variations in opportunity and to transitory pressures and inducements. It was also becoming clear from studies of residential burglary (Scarr, 1973; Reppetto, 1974; Brantingham and Brantingham, 1975; and Waller and Okihiro, 1978) that the avoidance of risk and effort plays a large part in target selection decisions. This dynamic view of crime provided a much more satisfactory basis for situational prevention than conventional criminological theory and led to the formulation of a simple "choice" model (Clarke, 1980). In addition to information about the offender's background and current circum-

stances, this required data about the offender's (i) immediate motives and intentions, (ii) moods and feelings, (iii) moral judgments regarding the act in question, (iv) perception of criminal opportunities and ability to take advantage of them or create them, and (v) assessment of the risks of being caught as well as of the likely consequences.

More recently, this model has been developed into a "rational choice" perspective on crime (Clarke and Cornish, 1985; Cornish and Clarke, 1986). Influenced by economic thinking, this 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 than normative rationality" (Cornish and Clarke, 1987: 933). It is further assumed that the decision processes and the factors taken into account will vary greatly at the different stages of criminal involvement (onset, continuance and desistance) and at the point of committing crime (the criminal event).

Similarly, and this is of special importance for situational prevention, it is assumed that the decision processes and information utilized will vary greatly between different offenses. To ignore these differences, and the situational contingencies associated with them, may be to reduce significantly the scope for intervention. Nor will it be enough to make the usual crude distinctions between crime categories, such as that between commercial and residential burglary. Thus, Poyner and Webb (1991) have shown that residential burglaries committed for cash and jewelry show a quite different pattern in two British communities than those committed for electrical goods. The former seemed to be committed primarily by opportunistic offenders working on foot, while the latter seemed to rely on the use of a car. These differences in modus operandi have implications for prevention; Poyner and Webb suggested, in particular, that to prevent burglaries of electrical goods, houses should face each other across the street and overlook access roads, while to prevent burglaries of cash and jewelry cover at the front of houses by shrubs or fences should be removed.

Rational choice premises have generally been supported, and numerous preventive suggestions produced, by recent studies in which offenders have been interviewed about motives, methods and target choices. The offenders concerned have included burglars (e.g. Walsh, 1980; Maguire, 1982; Bennett and Wright, 1984; Nee and Taylor, 1988; Cromwell *et al.*, 1991; Biron and Ladouceur, 1991), shoplifters (Carroll and Weaver, 1986; Walsh, 1978), muggers (Lejeune, 1977; Feeney, 1986) and bank and commercial robbers (New South Wales Bureau of Crime Statistics and Research, 1987; Kube, 1988; Nugent *et al.*, 1989). These studies of offender decision making constitute one

of two major analytic paths followed in the past decade by "environmental criminology," a term coined by Brantingham and Brantingham (1981) to refer to studies of the locational dimension of crime. The other path has involved "objective analysis of the spatial and temporal variation in crime patterns in order to discover aggregate factors influencing the patterns" (Brantingham and Brantingham, 1991: 239).

When such analyses involve aggregate crime rates or "macro" level data for countries or states, they rarely produce findings with preventive implications. "Micro" level analyses on the other hand, of specific categories of crime occurring in specific kinds of buildings or sites, are generally the most productive in preventive terms (Kennedy, 1990). This kind of research is represented among the case studies in this volume by the work of Jeffery and his associates who related specific features of convenience stores, such as their level of staffing and cash handling procedures, to their risks of robbery (*Case Study #16*). Analyses at an intermediate "meso" level can also lead to useful preventive suggestions as shown by Poyner and Webb's (1991) study mentioned above of residential burglary in two British communities. This study is also illustrative of research on the criminal's "journey to work" undertaken, among others, by Brantingham and Brantingham (1975), Maguire (1982) and Rengert and Wasilchick (1985). Among the findings of these studies are that the risks of commercial robbery may be increased by being located close to a main road and those of residential burglary by being located on the outskirts of an affluent area, in both cases because the offender's target search time is thereby reduced.

Research on the criminal's journey to work is related to another distinguishable body of criminological work — routine activities and crime — which, like environmental criminology, has contributed to the theoretical development of situational prevention. Routine activity theory (Cohen and Felson, 1979) assumes that crime occurs when a motivated offender and suitable target (or victim) converge in space and time in the absence of a capable guardian. Cohen and Felson (1979) demonstrated that increases in residential burglary in the United States between 1960 and 1970 could largely be explained by changes in "routine activities" such as the increasing proportion of empty homes in the day (due to more single person households and greater female participation in the labor force) and the increased portability of televisions and other electrical goods. Subsequent research has tended to support Cohen and Felson's theory and the interest generated by their work has ensured that opportunity will no longer be relegated to a subsidiary role in criminological explanation.

The twelve techniques of situational prevention

The original formulation of situational prevention included an eight-

category classification of opportunity-reducing techniques (Clarke and Mayhew, 1980). Experience has confirmed the utility of five of these: target hardening, target removal, natural surveillance, formal surveillance, and surveillance by employees. Developments in theory and practice have required modification of the remainder (removing the means to commit crime, environmental management, and reducing the pay-off) as well the addition of some new categories. The revised classification is discussed in detail below, but the main changes are as follows:

- Consideration of routine activity theory suggested that two of the original categories be re-labeled. The first change involves an extension of that theory's three minimal elements of crime to include a fourth[3] — *facilitators* of crime such as guns, alcohol and automobiles. This would assist consideration of a broader range of preventive options involving measures to restrict access to such facilitators. "Controlling facilitators" is therefore substituted in the revised classification as a more precise alternative for "removing the means to commit crime."

- Convergence of the three minimal elements of crime, routine activity theory's central premise, suggests a second change — that "deflecting offenders" be substituted for the less precise "environmental management."

- Examples of "reducing the pay-off" in the original classification included such diverse measures as property marking and check guaranty procedures, which have the purpose of making it harder to convert stolen goods to cash. It is now apparent that "identifying property" is a sufficiently important technique to warrant its own category, the first of the new ones included. The residual measures have been re-allocated among other categories in the classification.

- Identifying property reduces the inducements to theft. The work of social psychologists, such as Berkowitz, Zimbardo and Wise, has suggested ways of reducing inducements for other forms of crime, in particular violence and vandalism. These have been grouped together under the second new category, "removing inducements."

- As noted by Poyner (1984), an important category omitted by Clarke and Mayhew (1980) was "access control," despite its having featured in early discussions of defensible space. This is now included as the third new category in the revised classification.

- The increasing use of electronic technology for ensuring conformity with a variety of entry and exit requirements and prohibitions necessitates inclusion of a fourth new category: "entry/exit screening."
- "Rule setting," the last of the new categories, has been included less because of improved technology as of a somewhat broadened conception of situational prevention.
- In introducing the original classification it was noted that the measures listed served the three purposes, implicit in the rational choice assumptions of situational prevention, of (i) increasing the risks, (ii) increasing the difficulties, and (iii) reducing the rewards of crime. In the summary of the revised classification in Table 1, the twelve techniques of situational prevention are grouped to reflect these underlying purposes.

A fuller discussion of the twelve techniques, together with brief illustrations (many from the case studies included in this volume), follows below.

1. Target hardening. The most obvious way of reducing criminal opportunities is to obstruct the vandal or the thief by physical barriers. This "target hardening" involves the use, for example, of locks, safes, screens or reinforced materials. Measures of this kind can prove highly effective, and case studies included in this volume provide examples. Decker's (1972) study showed that the use of slugs in New York parking meters was substantially reduced by changes in design, including a slug rejector device (*Case Study #1*). Mayhew *et al.*, (1976) showed that the fitting in 1963 of steering column locks on all cars (old and new) in West Germany produced a 60 percent decline in the rate of car theft for the country (*Case Study #2*).[4] The fitting of transparent screens to shield the bus driver significantly reduced assaults on one transit system (Poyner *et al.*, 1988) and the installation of anti-bandit screens on post office counters in London in the early 1980s was conservatively estimated by Ekblom (1989) to have cut robberies by 40 percent (*Case Study #3*). Challinger (1991) identifies strengthened coin boxes as a significant factor in reducing incidents of deliberate damage to public telephones in two Australian states, South Australia and Northern Territory, from a peak of nearly 6000 in 1988 to just over 1100 one year later (*Case Study #4*). Finally, Pease (1991) has shown that a package of measures to prevent repeat victimization of houses on a public housing estate in Britain, including upgrades to door and window security, reduced burglaries on the estate from 526 in the year before intervention to 132 three years later (*Case Study #19*).

2. Access control. Access control's pedigree as a preventive technique may be as lengthy as that of target hardening — witness the portcullises, moats and

TABLE 1
THE TWELVE TECHNIQUES OF SITUATIONAL PREVENTION

INCREASING THE EFFORT	INCREASING THE RISKS	REDUCING THE REWARDS
Target Hardening	*Entry/Exit Screening*	*Target Removal*
Steering locks	Border searches	Removable car radio
Bandit screens	Baggage screening	Exact change fares
Slug rejector device	Automatic ticket gates	Cash reduction
Vandal-proofing	Merchandise tags	Remove coin meters
Toughened glass	Library tags	Phonecard
Tamper-proof seals	EPoS	Pay by check
Access Control	*Formal Surveillance*	*Identifying Property*
Locked gates	Police patrols	Cattle branding
Fenced yards	Security guards	Property marking
Parking lot barriers	Informant hotlines	Vehicle licensing
Entryphones	Burglar alarms	Vehicle parts marking
ID badges	Red light cameras	PIN for car radios
PIN numbers	Curfew decals	LOJACK
Deflecting Offenders	*Surveillance by Employees*	*Removing Inducements*
Bus stop placement	Bus conductors	"Weapons effect"
Tavern location	Park attendants	Graffiti cleaning
Street closures	Concierges	Rapid repair
Graffiti board	Pay phone location	Plywood road signs
Litter bins	Incentive schemes	Gender-neutral phone lists
Spittoons	CCTV systems	Park Camarro off street
Controlling facilitators	*Natural Surveillance*	*Rule Setting*
Spray-can sales	Pruning hedges	Drug-free school zone
Gun control	"Eyes on the street"	Public park regulations
Credit card photo	Lighting bank interiors	Customs declaration
Ignition interlock	Street lighting	Income tax returns
Server intervention	Defensible space	Hotel registration
Caller-ID	Neighborhood Watch	Library check-out

drawbridges of medieval castles. Access control is now widely practiced by large employers in offices and factories, particularly in the cities. It is also a central component of defensible space (arguably the start of scientific interest in situational prevention) and some evaluations of its role in this context have appeared. For example, Poyner and Webb (1987) found that a combination of access controls introduced on a South London public housing estate (South Acton), including installation of entryphones, fencing around apartment blocks and electronic access to the parking garage, achieved a significant reduction in vandalism and theft. They also found in a second study that the introduction of a reception desk on the ground floor of a tower block (Gloucester House) achieved a marked reduction in vandalism, graffiti and other incivilities (Poyner and Webb, 1987). In another context, Matthews (1990) has shown that blocking off streets to reduce access by cruising "johns" was one of the measures contributing to the rehabilitation of a red light district in North London (*Case Study #5*). Finally, a sophisticated form of access control lies in the use of electronic personal identification numbers (PINs) that are needed to gain access to computer systems and bank accounts.

3. Deflecting offenders. In response to a persistent problem of people urinating publicly in the streets of nineteenth century Italy, Lombroso suggested that those committing the offense should be locked up; his pupil Ferri suggested an alternative more in keeping with the spirit of this book: the provision of public urinals (Hackler, 1978: 12). Ferri's suggestion constitutes an example of deflecting offenders, a third technique of situational prevention. Litter bins and "graffiti boards," the latter of which are supplied for people's public messages, provide further examples. The red light districts in many large cities (often established with official connivance) represent, in the language of environmental criminology, a "meso" level application of the principle. In a similar vein, *Case Study #7* shows how the leasing of a downtown parking lot in Arlington, Texas, relieved congestion on weekend nights in nearby streets by providing a venue for teenage cruising. These are all examples of channeling behavior in more acceptable directions. Other ways of deflecting offenders can be illustrated by techniques that have been used to control soccer violence in Britain. Arrival and departure of supporters has been scheduled to avoid the long periods of waiting around that promote trouble. Within the stadium itself, rival fans have been physically separated to reduce the probability of fights (Clarke, 1983). Scheduling the last bus to leave immediately after closing time might interfere with another of Britain's less admirable traditions, the closing time brawl. Crowds of drunken young people on the streets at closing-time could also be reduced by avoiding the concentration of licensed premises in particular parts of the city (Hope, 1985). In *Case Study #6*, Poyner and Webb (1987) show how thefts from

shopping bags at market stalls in Birmingham, England, were reduced by over 70 percent within two years by the simple expedient of separating the stalls by wider gangways; by reducing congestion, this increased the difficulty of pickpocketing and other "stealth" thefts. Finally, *Case Study #22* provides a fascinating glimpse into the ways in which sophisticated crowd control and management greatly reduce the potential for crime and incivility in Disney World (Shearing and Stenning, 1984).

4. Controlling facilitators. The low rates of homicide in Britain, where handguns are much less readily available than in the United States, provide one reason for believing that effective gun controls can reduce levels of violent crime (Clarke and Mayhew, 1988). Controls on weapons need not be as sweeping as in Britain to be of value: Saloons in the Wild West routinely required patrons to surrender their weapons at the door because of the risk of drunken gun fights. In more modern times, the Scottish Council on Crime (1975) has recommended that, in pubs with a record of violence, glasses should be replaced by plastic mugs to prevent their use as weapons. Other crime facilitators, to which access might usefully be restricted, include alcohol (which facilitates almost all crime), automobiles (which provide entry to the huge pool of motoring offenses as well as facilitating crimes such as burglary), checks and credit cards (which facilitate fraud) and telephones (which may facilitate drug dealing, frauds and obscenity). Controls on all these facilitators have been proposed or introduced. Licenses and IDs restrict access to cars and alcohol for juveniles, the most crime prone group. Access to automobiles by intoxicated drivers can be restricted by the use of breathalyzers built into the ignition, a measure that is now being mandated by some courts for the automobiles of recidivist drunk drivers (Jones and Wood, 1989; Morse and Elliott, 1990). A faculty-student committee at Rutgers University recently decided that beer should be served from kegs rather than cases at dormitory parties on the grounds that, (1) cases are easier to conceal and (2) in the words of a student: "If you have one keg and a line of 20 people behind it, people will get less alcohol than if you had a refrigerator and people were throwing out beer. A keg is going to control how much people are getting" ("Beer kegs legal again at a Rutgers College," *New York Times*, September 13, 1991). Another recent newspaper article reports that in major cities: "Some telephone companies have removed public telephones from spots where drug dealers congregate, have altered them so they cannot receive incoming calls or, in a technological step backward, have replaced digital push-button units with old-fashioned rotary ones to make it more difficult to use electronic pagers" ("Phone companies hang up on druggies," *Law Enforcement News*, June 15/30, 1991). Two examples of the successful introduction of controls on facilitators are provided by the case studies in this book. Knutsson and Kuhlhorn (1981) show

in *Case Study #8* that the introduction of identification procedures in Sweden produced a dramatic decline in the number of reported check frauds, from a peak of 15,817 in 1970 to 10-20 percent of these figures in later years. *Case Study #9* provides good reason to think that the introduction in New Jersey of Caller-ID, a service which allows the person answering to read the number of whoever is making the call, led to a substantial reduction of at least 25 percent in obscene telephone calls (Clarke, 1990).

5. Entry/exit screening. Entry screening differs from access control in that the purpose is less to exclude people than to increase the risk of detecting those who are not in conformity with entry requirements. These requirements may relate to prohibited goods and objects or, alternatively, to possession of correct tickets and documents. Customs and immigration procedures on entering a foreign country provide familiar examples. Exit screens, on the other hand, serve primarily to deter theft by detecting objects that should not be removed from the protected area, such as items not paid for at a shop. Developments in electronics have resulted in the increasing use of these situational techniques, as evidenced by the spread in retailing of merchandise tagging, bar-coding and "electronic point of sales" or EPoS systems (Hope, 1991). One important success followed the introduction of baggage and passenger screening at most major airports in the world during the early 1970s; the number of skyjackings declined precipitately from about 70 per year to about 15 (Wilkinson, 1977, 1986; Landes, 1978). A second success has been achieved by book theft detection screens installed in thousands of college libraries across the country. *Case Study #10* reports one evaluation of these screens in which thefts of both books and audiovisual materials at one University of Wisconsin library were reduced by more than 80 percent (Scherdin, 1986). Finally, *Case Study #11* provides evidence that the redesign of tickets to facilitate their inspection on Vancouver ferries produced a two-thirds reduction in fare evasion (DesChamps *et al.*, 1991).

6. Formal surveillance. Personnel such as police, security guards and store detectives, whose main function is to furnish a deterrent threat to potential offenders, are the principal providers of formal surveillance. Their surveillance role may be enhanced by electronic hardware, for example by burglar alarms, radar speed traps, and closed circuit television (CCTV). The potential for such devices is shown by recent developments in traffic policing. Speed cameras and red light cameras, which automatically photograph the license plates of offending vehicles and even the driver, are widely deployed in Australia and are being tried in the United States (Johnson, 1989; Romano, 1991). Ways of enhancing police surveillance by enlisting the help of the public are also continually being expanded. Informant hotlines and "crime stopper" programs are two recent examples. "Curfew decals" on automobiles (Clarke and Harris,

in press[b]), which indicate to patrolling police that the vehicle is not normally in use late at night, represent a program directed specifically to auto theft prevention. Little has been published (except in relation to policing, cf. Clarke and Hough, 1984) about the deterrent value of formal surveillance, though two of the case studies included in this volume deal with this issue. *Case Study #12* shows that rates of vandalism, assault and fare dodging on subways and trams in three Dutch cities were substantially reduced by hiring 1,200 unemployed young people to serve as safety, information and control inspectors ("VICs") (van Andel, 1989). *Case Study #13* reports a problem-oriented policing initiative directed against auto theft in a large shipyard parking lot, in which intensive surveillance of the yard by police officers reduced thefts by more than one half, or by an estimated 450 incidents in a sixteen-month period. When CCTV was installed for the use of security personnel at a university's parking lots, Poyner (1991a) also found a substantial reduction in thefts, from 92 in the year before intervention to 31 in the year after (*Case Study #14*).

7. Surveillance by employees. In addition to their primary function, some employees, particularly those dealing with the public, also perform a surveillance role. They include shop assistants, hotel doormen, park keepers, parking lot attendants and train conductors. Canadian research has shown that apartment blocks with doormen are less vulnerable to burglary (Waller and Okihiro, 1978). In Britain, less vandalism has been found on buses with conductors (Mayhew *et al.*, 1976) and on public housing estates with resident caretakers (Department of Environment, 1977). Public telephones in Britain sited where they get some surveillance by employees, such as in pubs or railway stations, also suffer fewer attacks (Markus, 1984). Hunter and Jeffery's research reported in *Case Study #16* shows that one of the most effective steps taken to reduce convenience store robbery in Florida was a local ordinance requiring that there be two clerks on duty at night. Many ways of enhancing the surveillance role of employees exist, including training and incentive schemes, procedures for summoning help, strategic siting of their work stations or the provision of CCTV. For example, the installation of CCTV for the use of staff on four high risk stations on the London Underground was found to have reduced muggings and thefts (Mayhew *et al.*, 1979). Two further examples of the value of CCTV-enhanced employee surveillance are provided by case studies in this volume. *Case Study #15* shows that vandalism of seats on double-decker buses owned by a transit authority in the North of England was greatly reduced through the provision of CCTV for drivers. Only a few buses were fitted with CCTV, but the effect (which may have been enhanced by media coverage) was general, so that seat repairs for the fleet declined from a peak of about 80 per month to a third of that number subsequently (Poyner, 1988).

8. Natural surveillance. Householders may trim bushes at the front of their homes and banks may light the interior of their premises at night, in attempts to capitalize upon the "natural" surveillance provided by people going about their everyday business. This also provides much of the rationale for calls to improve street lighting, despite a general lack of evidence (with the exception of Painter, 1988) about its effectiveness in preventing crime (Tien *et al.*, 1979; Ramsay, 1989). Enhancing natural surveillance is a prime objective of defensible space, and also, more explicitly, of "neighborhood watch." While evaluations of the former have produced somewhat mixed results (Mayhew, 1979a), those of the latter have generally been even more disappointing (e.g. Bennett, 1990; Rosenbaum, 1988) and it may be that the capacity of "natural surveillance" to prevent crime has been overestimated. People rarely see crime occurring, and when they do, they tend to place some innocent interpretation on the event. They may be reluctant to intervene or believe that the victim may not want assistance. They may also have difficulty in summoning help in time. Nevertheless, improved natural surveillance was one element in the success of a number of the case studies reprinted here. Improved street lighting was one component of the successful program to prevent commercial burglary described in *Case Study #17*. Better lighting of indoor markets also helped to reduce thefts from shopping bags (*Case Study #6*). A modified version of Neighborhood Watch helped to reduce burglaries on a public housing estate in the North of England (*Case Study #19*). Finally, components of successful robbery prevention in convenience stores included an unobstructed view of the store's interior from outside and location of stores near evening commercial activity (*Case Study #16*).

9. Target removal. British Telecom analyses of public telephone vandalism found that the kiosk itself, and in particular the glass, is much more frequently attacked than the instrument. This has resulted in two examples of target removal: kiosks in high risk locations have been replaced by booths, while the smaller, highly vulnerable, glass panes in earlier kiosks have been replaced by larger panes in more recent designs (Markus, 1984). Further examples are provided by Moore (1987), who described a highly successful theft prevention program that consisted of persuading in-patients to surrender their valuables for safekeeping or not to bring them to the hospital, and Pease (1991) who identified the removal of gas and electric coin meters, frequent targets for theft, as an important element in reducing burglary on a British public housing estate (*Case Study #19*). The best documented examples of successful target removal, however, concern various cash reduction measures to reduce robbery. These include cash limits in convenience stores (*Case Study #16*) and betting shops (Clarke and McGrath, 1990) and exact change fares on public transport. For example, Chaiken *et al.* (1974) showed that bus robberies in New York dropped

from a high of 67 per month just prior to the introduction of exact fares, to 7 or less per month afterwards (*Case Study #18*).

10. Identifying property. Cattle branding is a crude, but effective way to identify property. Modern organizations pursue essentially the same logic when they mark their property with their logos. Property marking was extended to householder's valuables through the "operation identification" (OI) schemes that became popular in the 1970s (Zaharchuk and Lynch, 1977; Heller *et al.*, 1975). Laycock (1991) provides evidence that OI undertaken in three small communities in Wales, combined with extensive media publicity, nearly halved the number of reported burglaries, with 66 in the second year of the program compared with 128 in the year before (*Case Study #20*). However, the most developed programs of property marking relate to vehicles. Registration of motor vehicles was required in some U.S. states from almost the beginning of the century (6,428 vehicles were registered with the California Department of Motor Vehicles in 1905, Thomas, 1990). Illinois was one of the last states to require registration (in 1934) whereupon, according to Hall (1952), vehicle thefts declined from 28,000 in the previous year to about 13,000. Subsequently, all vehicles sold in the United States were required to carry a unique Vehicle Identification Number (or VIN) and, most recently, the Motor Vehicle Theft Law Enforcement Act, federal legislation enacted in 1984, has mandated the marking of all major body parts of "high risk" automobiles with the VINs.[5] Finally, electronics has made possible two sophisticated forms of property marking that have recently been deployed against auto theft—LOJACK and the use of PIN numbers on car radios (Clarke and Harris, in press). LOJACK is the trade name for a system involving the concealment of a small transmitter in the body of an automobile which facilitates its recovery if stolen. The preventive value of LOJACK is as yet unproved, but the theft rates of automobiles fitted with the new radios (that cannot be operated without knowledge of the PIN) have recently declined in Australia (NRMA Insurance Ltd., 1990).

11. Removing inducements. In certain parts of New York City it is unwise to wear gold chains in the street or to leave cars parked, such as the Chevrolet Camarro, which are highly attractive to joyriders (Clarke and Harris, in press[a]). Some inducements to crime are less obvious. For example, extensive experimental research has suggested that the mere presence of a weapon, such as a gun, can induce aggressive responses in some people. Known as the "weapons effect" (Berkowitz and LePage, 1967), this gives further support to gun control. The weapons effect barely enters the consciousness of potential offenders and James Wise (1982) has argued that this is also true of many inducements to vandalism, for example when the surface characteristics of a wall almost invite graffiti. Many of his suggestions for a "gentle deterrent" to vandalism consist of reducing

such inducements. For example, he has suggested that metal road signs should be replaced by plywood which would not satisfyingly "clang" when shot at, and that the glass covering fire alarm handles should be mirrored because bad luck would follow its breaking. It has also been frequently argued that leaving damaged items unrepaired is to invite further attack. Samdahl and Christiansen (1985) provided support for this idea by demonstrating that picnic tables that had been scratched and carved were two and a half times as likely to be damaged further than tables not marked. Zimbardo (1973) showed that a car left parked in poor condition in an inner city area rapidly attracted further depredation. Indeed, the benefits of rapid repair are dramatically illustrated by *Case Study #21*, Sloan-Howitt and Kelling's (1990) description of the remarkable success obtained by the New York Transit Authority in ridding its subway cars of graffiti. This was largely achieved through a policy of immediate cleansing of graffiti; this removed the gratification for the offender who could no longer see his handiwork publicly displayed.[6]

12. Rule setting. In order to protect themselves from crime, all organizations find it necessary to regulate the conduct of their employees. For example, most businesses have rules about the use of the telephone for private calls and all retail establishments require their employees to follow strict cash handling and stock control procedures. Organizations with a public service mission — libraries, hospitals, schools and colleges, parks and recreational facilities, bus and subway systems, and hotels and restaurants — must, in addition, regulate the conduct of the clienteles they serve. This is illustrated in vivid detail by Shearing and Stenning (1984) in their piece on social control in Disney World (*Case Study #22*). Any ambiguity in these regulations will be exploited where it is to the advantage of the individual. It is no accident, therefore, that most attempts to avoid federal tax relate to those sections of the IRS tax return that are more difficult to investigate (Klepper and Nagin, 1987). In other cases, procedures may be avoided because they are too irksome; for example, a library might lose books to theft because of its cumbersome checkout procedures (Boss, 1980). One important strand of situational prevention, therefore, is the introduction of new rules or procedures (and the improvement of those already in place). These are intended to remove any ambiguity between acceptable and unacceptable conduct. They make it harder for offenders to make excuses to themselves or, in Matza's (1964) language, to make use of "techniques of neutralization" such as "I am only borrowing it" and "Everyone else does it." The existence of these rules means that offenders must be prepared to incur higher costs in terms of fear or conscience.[7] Such rules would not normally require the backing of the law, but some highly specific laws and local ordinances have the character of situational measures. Examples would include the precise specification of

permissible blood/alcohol levels which is now a routine feature of drunk driving legislation and the recent establishment of drug-free zones around schools in New Jersey with especially severe penalties for drug dealing. Two recent attempts to impose local restrictions on public drinking, with its associated problems of disorder, have been evaluated in Sweden (Bjor *et al.*, in press) and England (Ramsay, 1991) with positive results.

The scope and effectiveness of situational prevention

Some of the techniques discussed above seem especially applicable to the prevention of particular kinds of crime. For example, deflecting offenders seems to be suited to controlling incivilities, and identifying property to preventing theft. It may be tempting to argue, therefore, that situational measures are only useful in respect of certain crimes, perhaps those with a strong "opportunistic" component, while other crimes that are more deeply motivated or committed by "hardened" offenders need to be tackled in other ways (cf. Trasler, 1986).

Whatever the merits of other forms of crime control, it would be a mistake to draw the line between them and situational prevention according to the strength of the criminal motivation involved. Some crimes may be the result of opportunities seized, rather than ones sought or created (Maguire, 1980; Bennett and Wright, 1984), but all classes of crime, even those motivated by deep anger or despair, are greatly affected by situational contingencies. Whether an assault becomes a homicide may depend not just on the availability of a weapon but also on its nature — for example, small caliber handguns are less likely to kill than large ones (Cook, 1991). Whether someone commits suicide is importantly determined by the availability of a suitable method (Clarke and Lester, 1989), as shown by the dramatic fall of suicides in Britain during the 1970s following detoxification of the domestic gas supply; as a result, suicidal people could no longer follow the traditional method of putting their heads in the gas oven (Clarke and Mayhew, 1988).

Evidence is now also accumulating of successes achieved by situational prevention in respect of some crimes usually thought to be the province of "hardened" offenders. The case of aircraft hijacking has been mentioned above (Wilkinson, 1986). Gabor (1990: 60) cites a number of North American studies showing that "in the realm of bank robbery, professionals have virtually disappeared as a result of increasing risks and declining profits," and Grandjean (1990) and Clarke *et al.*, (1991) provide further evidence from Switzerland and Australia of the apparent value of target hardening in banks. Evidence is presented later in this volume that situational measures can also successfully prevent armed robbery of post offices (*Case Study #3*), convenience stores (*Case Study #16*) and buses (*Case Study #18*).

Despite these points, Heal and Laycock (1986: 127) have nevertheless argued that, because violent crimes are less common and are less likely to cluster in time or space, they are also less amenable to situational controls. Their argument is based on practical rather than theoretical considerations, and is similar to that made by Gabor (1990: 68): "Situational programs are more difficult to implement in the private settings that serve as the site of much violent crime." This may be true to the extent that the measures considered are the traditional ones of target hardening and surveillance, but examples have been given above of ways to prevent violence by deflecting offenders or by controlling facilitators such as alcohol and guns. One particularly instructive example is provided by *Case Study #9*, New Jersey's experience of introducing Caller-ID: The resulting threat to the anonymity of callers seems to have substantially reduced the level of obscene phone calling. In the absence of this evidence, many people might have argued that obscene phone calling, a relatively uncommon sexual crime that seems to strike at random, is precisely the kind of offense that would not be amenable to situational control.

The moral is that the limits of situational prevention should be established by closely analyzing the circumstances of highly specific kinds of offenses, rather than by theoretical arguments about the presumed nature of motives for broad categories of crime such as personal or violent offenses. It is also likely that these limits will expand as wider experience accumulates in applying situational prevention, and as technology expands the scope of feasible action.

Displacement. The most heated debate about the scope and value of situational prevention has concerned displacement. This is the idea that blocking opportunities for crime will simply result in its being displaced elsewhere or to some other time, being committed in another way, or even being transformed into some other kind of offense (Reppetto, 1976; Gabor, 1978).

According to the dispositional assumptions of traditional theory, displacement would almost inevitably result from blocking opportunities. Since opportunities merely determine the occasion for offending, such occasions would readily present themselves again or could easily be sought out by the criminal. In fact, the rational choice perspective also predicts displacement, but only to the extent that alternative crimes present similar rewards without unduly greater costs in terms of risks or effort. This difference between the theoretical approaches, while one of degree, is important. Both approaches can accommodate changes in the nature and distribution of crime, but the rational choice perspective can also accommodate the possibility of genuine reductions. Since crime is always a choice, and not simply between illegal alternatives, but also between legal and illegal courses of action, crimes can be made so risky and difficult, or so relatively unrewarding, that rates could fall, in some instances drastically.

In fact, early empirical work on displacement was seen to support the dispositional view (cf. Gabor, 1990). A large increase in manpower in one New York City precinct brought about a reduction in street crimes, but also seemed to lead to an increase in such crimes in surrounding precincts (Press, 1971). The reduction in robberies achieved by exact fare systems on New York City buses (*Case Study #18*) was accompanied by an increase of robbery in the subway (Chaiken *et al.*, 1974). In Columbus, Ohio, a police helicopter patrol (Lateef, 1974) and, in Newark, a street lighting program (Tyrpak, 1975) appeared to shift crime to precincts not covered by the new measures. *Case Study #2* shows that in Britain the reduced risk of auto theft for new vehicles fitted with steering column locks was at the expense of older vehicles not fitted (Mayhew *et al.*, 1976). Finally, Allatt (1984) found that the decrease in burglary on a British public housing estate which had undergone a major program of "target hardening" was all but matched by an increase of property crimes in adjacent areas.

Gradually, however, studies began to appear, including many of those reprinted in this volume, which suggested that situational measures had achieved reductions in crime with little apparent displacement. For example, while steering locks seemed to achieve little in Britain, their installation on all cars, old and new, in West Germany was followed by a 60 percent reduction in auto theft (*Case Study #2*). The success, mentioned above, achieved by the airlines in reducing hijackings is a second powerful example, while a a third is provided by the reduction in check frauds in Sweden following the introduction of new identification procedures (*Case Study #8*). As a result, a consensus has now begun to develop (Barr and Pease, 1990; Gabor, 1990) that displacement is always a danger, but is rarely if ever complete ("This writer has yet to see evidence of 100 percent displacement of crime," Gabor, 1990: 47). Barr and Pease (1990) point out, in addition, that even complete displacement can be "benign" if it is to crimes of lesser seriousness or if it more evenly distributes the burden of victimization.

Unfortunately, in all the instances of apparent success, it can still be argued that offenders had been displaced to some other kinds of crime not measured in the study. For example, frustrated auto thieves in Germany may have turned to muggings or burglary and the former airline terrorists might have resorted to car bombing or kidnapping. Indeed, when the theoretical possibility is allowed, as it must, that displacement can be to some different form of crime, it may be impossible to know whether or not it has occurred. To quote Barr and Pease (1990: 293):

> If, in truth, displacement is complete, some displaced crime will probably fall outside the areas and types of crime being studied or be so dispersed as

> to be masked by background variation. In such an event, the optimist would speculate about why the unmeasured areas or types of crime probably escaped displaced crime, while the pessimist would speculate about why they probably did not. No research study, however massive is likely to resolve the issue. The wider the scope of the study in terms of types of crimes and places, the thinner the patina of displaced crime could be spread across them; thus disappearing into the realm of measurement error.

It may therefore have to be accepted that the issue of displacement cannot be resolved empirically and that recourse will have to be made in particular instances to theoretical arguments about its likelihood. It is unlikely, for example, that homemakers prevented by new security measures from continuing to shoplift in their local supermarket would be driven to find some new source of illegal revenue, say, mugging senior citizens. This is because mugging is an altogether different crime from shoplifting, requiring skills and a degree of callousness that many homemakers, however ready to shoplift, would not possess. Cornish and Clarke (1987, 1988) have developed this point in their concept of the "choice structuring properties" of crime, "those properties of offenses (such as type and amount of pay-off, perceived risk, skills needed, and so on) which are perceived by the offender as being especially salient to his or her goals, motives, experience, abilities, expertise, and preferences. Such properties provide a basis for selecting among alternative courses of action and, hence, effectively structure the offender's choice" (Cornish and Clarke, 1987: 935).

Consideration of choice structuring properties might help to narrow down the search for displacement. For example, Mayhew *et al.*, (1989) reasoned that, following a sharp reduction in motorcycle thefts in West Germany as a result of helmet wearing legislation (these offenses declined by over 100,000 per year, presumably because the need to have a helmet ruled out opportunistic theft), displacement should manifest itself in increased theft of cars and bicycles. The former might provide the same kind of joyriding "kicks" as motorcycles, while both would fill some of the needs for temporary transportation. In fact, while some displacement may have occurred initially (cf. Gabor, 1990), in the longer term little evidence of displacement to either alternative was found.

Some of the surprising results of reductions in opportunity might also be more explicable when considered in the light of the choice structuring properties of the acts concerned. Thus, the lack of displacement to other methods of suicide after detoxification of domestic gas in Britain (Clarke and Mayhew, 1988) is understandable in terms of the particular properties of gas suicide: it was readily available, needed little knowledge or preparation, and was painless, bloodless and lethal. These properties might favor its choice by the impulsive and less resourceful suicides, more easily deterred by the need to find an alternative

method. Another example is provided by Matthews' (1990) explanation of the fact that prostitutes were not displaced to nearby areas following the successful clean-up of a red-light district of North London (*Case Study #5*): It appeared from his interviews with the women concerned that their commitment to "the game" was comparatively fragile and many regarded prostitution as a relatively easy, and not unpleasant, way of earning a living. They traveled to London each day on cheap tickets and made use of small hotels in the red-light area. When this opportunity structure was disrupted, it seems that many may have preferred to drop out of prostitution altogether rather than try to establish themselves in some new and unfamiliar territory.

Matthew's study illustrates the way that interviews with offenders can usefully supplement geographical studies in the research on displacement. Barr and Pease (1990) have proposed another strategy for focusing such research, which involves their concepts of "benign" and "malign" displacement. For the most serious crimes, displacement can only be benign and can never be an excuse for not attempting to prevent them. For other crimes, malign displacement, which includes both the idea of "escalation" to more serious crimes (cf. Grandjean, 1990) and the deflection of crime to groups or areas that are already more highly victimized, is a real risk that should always be examined.

Diffusion of benefits. As evidence accumulates of the limits to displacement, it seems likely that much of the skepticism about the value of situational prevention will diminish. Indeed, the debate about effectiveness may take an altogether different turn with the newly growing realization that situational prevention can sometimes produce the "complete reverse" of displacement (Poyner, 1988), a reduction in crimes not directly addressed by the preventive measures. This phenomenon has been given a variety of names — the "multiplier" effect (Chaiken *et al.*, 1974), "spill over" benefits (Clarke, 1989), "free rider" effects (Miethe, 1991), the "drip feed" effect (Pease, 1991), the "halo" effect (Scherdin, 1986), and, in relation to police crackdowns, the "bonus" effect (Sherman, 1990) — and some standardization is needed. Clarke and Weisburd (in preparation) have proposed that it be known as "diffusion of benefits," since the geographical and temporal connotations of this term parallel those of the competing idea of "displacement of crime." The term also suggests, as does the notion of displacement, that the immediately contiguous times and locations might be most affected. To complete the symmetry, a readily shortened form of the term would be "diffusion."

Examples of possible diffusion are provided in three studies directed by Poyner reprinted in this book (*Case Studies #6, #14, #15*). He found that measures to reduce thefts from shopping bags in some city center markets seemed also to reduce thefts in other markets as well (*Case Study #6*). In his

evaluation of new CCTV system installed to reduce auto theft at a university, he found an equal reduction of crime in the parking lot not covered as the one covered by the cameras (*Case Study #14*). In his study of CCTV on buses he found: "Damage and other misbehavior was not only reduced on the five buses with live or dummy video cameras, but damage and cleaning problems reduced throughout the whole fleet of 80 buses" (*Case Study #15*). Poyner's explanation for this latter finding was as follows: "The children have learned...that the cameras will enable misbehaving individuals to be picked out and that action will be taken. They appear to believe that most buses have cameras, or at least they are uncertain about which buses have cameras." This is similar to the "deterrent" explanation provided by Scherdin (1986) for the "halo" effect of installing an electronic security system in a university library: Even though thefts of audiovisual cassettes could not be detected by the system, library users seemed to be unaware of this because thefts of cassettes declined as markedly as those of books (*Case Study #10*).

Deterrence need not always provide the explanation for diffusion; for example, the substantial drop in offenses of burglary and auto theft accompanying the successful drive against prostitution in North London area (*Case Study #5*) may have resulted simply because fewer undesirable outsiders were being attracted into the area. One of Ekblom's (1988b) explanations for the fact that the installation of anti-bandit screens in London post offices led to a reduction not just of over-the-counter robberies, but also robberies of staff and customers not protected by the screens was that would-be robbers had received "the very general message that something had been done to improve security at the sub-post offices" (*Case Study #3*). In a similar vein, Clarke *et al.* (1991) have suggested that the reduction in robberies of all commercial targets (including convenience stores, gas stations and betting shops) in Australia, that followed an intensive target hardening program in banks, might have been due to a feeling generated in the minds of many robbers, not just those specializing in banks, that this form of crime was no longer worth pursuing.

It is clear that much more needs to be learned about the nature of diffusion, in particular about the conditions in which it occurs and the mechanisms at work. It may increasingly provide the explanation for the apparently coincidental reductions of crime sometimes found in "control" areas when evaluating situational measures (see, for example, *Case Studies #1, #9, #19*). Pease (1991) has also suggested that deliberate advantage could be taken of diffusion by concentrating preventive efforts on the most highly victimized groups in a community; preventive benefits might then suffuse or "drip feed" to other members of the community. By holding out the promise of even greater benefits of situational prevention, these and other possibilities related to the concept of

diffusion provide an additional impetus to research and experimentation.

Issues of philosophy, politics and policy

Research undertaken during the last ten years has greatly strengthened situational prevention's theoretical and evidentiary base and there is now little reason to question its value in dealing with a quite broad range of crime problems. Whether it becomes a more important component of society's response to crime, however, may depend upon the resolution of a variety of philosophical and practical questions.

When first introduced, the concept of situational prevention provoked fears about two unwelcome developments in society. In its more unattractive, "target hardening" forms (barbed wire, heavy padlocks, guard dogs and private security forces) it suggested the imminence of a "fortress society" in which people, terrified by crime and distrustful of their fellows, barricade themselves in their homes and places of work, emerging only to conduct essential business. In its use of electronic hardware (CCTV, intruder alarms, x-ray scanning of baggage), it raised the specter of totalitarian, "big brother" forms of state control.

Experience with situational measures has dispelled some of these fears of a fortress society.[8] Many of the measures (such as parts marking of automobiles and the interior lighting of banks at night) are so unobtrusive as to be barely noticeable, while others (including street lighting, defensible space architecture, and uniformed security guards in shopping and leisure complexes) actually reduce the fear of crime. Yet other measures which enhance security, such as entryphone systems, bar coding of merchandise and central locking of automobiles, also have the advantage of increasing the convenience of everyday life.

Ironically, this very unobtrusiveness and convenience feeds another fear — that it may not be the fortress society that is imminent, but Huxley's "brave new world." If America is the harbinger of change for the rest of the world, how much more true might not this be of Disney World? The unobtrusive yet powerful social control exemplified there (*Case Study #22*), under which people willingly accept being corralled and shepherded from place to place, may soon be shaping much of our leisure behavior, if not our lives! Add to this the astonishing growth in the technological devices now available to the "new surveillance" (Marx, 1986), and the potential for state control, not of the iron fist but of the velvet glove, seems frightening.

While credible under fascism or a dictatorship, this scenario gives altogether too little credence to the power of democracy. People are not such sheep. Visitors to Disney World might temporarily surrender some autonomy, but only because they accept that a degree of regimentation may be necessary if they are to enjoy the spectacles in safety and at reasonable cost. People may increasingly be

willing to make this trade in their daily lives, but it will soon become apparent if they are not: Disney World will go broke. Moreover, while they may welcome powerful new forms of surveillance in guarenteeing national security or combating organized crime, they will fight its deployment in the everyday situations giving rise to most crime as soon as they perceive a threat to their civil liberties.

Nor is this vision, or perhaps nightmare, of the blanket application by the State of situational controls on behavior consistent with the essence of the approach: Situational measures cannot be applied wholesale; they need to be tailored to the particular circumstances giving rise to specific problems of crime and disorder. Moreover, they frequently need to be applied, not by the State, but by particular private or business organizations. Far from being enthusiastically embraced, their introduction is often strongly resisted by particular interest groups. Indeed, the problem is less one of the sweeping application of situational measures, than of the failure to apply them when they should have been.

Fears about the future of society are compounded by a variety of political objections to situational prevention. Conservative politicians regard it as an irrelevant response to the breakdown in morality that has fueled the post-war rise in crime. Those on the left criticize it for neglecting issues of social justice and for being too accepting of the definitions of crime of those in power (e.g. Young, 1988). Liberals, always suspicious of what Etzioni and Kemp (1973) call "technological shortcuts" to social change, resist the comparison between designing out crime and preventing accidents through improved engineering (Mayhew, 1979b; Poyner, 1986), and see situational prevention as a superficial response to the "fundamental" causes of crime such as poverty, deprivation, unemployment and poor schooling. Worse, they see it as diverting attention from these problems (Bottoms, 1990).

Situational prevention's neutrality on issues of social justice, social reform and deterrence is not accidental, but derives from its essentially empirical origins. It was developed in response to the collapse of the rehabilitative ideal (which in its dispositional assumptions is little different from the social reformist agenda of the liberals) and to a crisis of faith in deterrent sentencing, both of which resulted from a profusion of negative research. Its focus on the specific constituent elements of the aggregate of "crime," consistent with its action research paradigm, also means that it is inevitably committed to the incrementalism in social reform advocated by Karl Popper (cf. Tilley, 1991). Rather than seeking to improve society through dictates from the top, situational prevention starts at the bottom, by working to solve highly specific problems as experienced by particular communities or organizations.[9]

The grass-roots formulation of crime control measures has certain advan-

tages. In particular it encourages more realistic appraisals both of the costs (financial and otherwise) of particular crimes and the costs of control. It also encourages experimentation and, so long as evaluation is undertaken, the dissemination of good practice. In turn, this should encourage a more efficient use of the resources that society is willing to devote to crime control and should lead to responsibility for crime control being increasingly shifted away from a criminal justice system that is not only overburdened and inefficient, but inhumane and inequitable.

Unfortunately, the virtues of piecemeal policy do not lend themselves to eloquence in campaign speeches or political manifestos. Moreover, exhortations to adopt "defensive" situational measures can easily be criticized as "blaming the victim" (Karmen, 1984), as evidence of a retreat in the war against crime, and as the failure of political imagination and will in dealing with the serious social and economic problems confronting society. This may help to explain why the initial "situational" charge of the Home Office Crime Prevention Unit has been gradually expanded to encompass an agenda of softer "social" measures, including inter-agency cooperation, victim support, community development and youth services (Tilley, 1991). That this has occurred despite the Unit's establishment within the Police Department of the Home Office and under supposedly hard-nosed Thatcherite administrations is all the more remarkable. It suggests that, even with greater awareness of the limitations of existing crime control policies, the limited appeal of situational prevention may confine it to a relatively marginal role in the political response to crime.

Even were it to play a marginal role, some difficult issues for policy would still remain. One of these concerns the best means of encouraging a situational, problem-oriented approach among the police (cf. Eck and Spelman, 1988; Goldstein, 1990), whose lead is crucial in promoting situational measures at the local level. Another concerns the role of government in the solution of problems that are encountered by private business. For example, what role should governments take in the prevention of shoplifting which, apart from occasions when prosecutions become a burden on local criminal justice resources (Ekblom, 1986), is mainly a problem for the profitability of individual retailers (Pease, 1979)? Without a lead from government, however, many crime problems affecting businesses and their clienteles might not be tackled and, without government research funding, it is unclear how the requisite body of knowledge about preventing crime in commercial establishments would be accumulated.

In the United States, the responsibility for promoting situational prevention in the private sector might conceivably devolve upon the American Society of Industrial Security (ASIS), the security industry's leading professional organization. Indeed, the recently established ASIS Foundation has begun a modest

program of research support which could help to develop situational prevention as a component of security work. Without a major paradigm shift, however, no significant in-roads are likely to be made on the industry's primary functions of providing hardware and guard services (Nalla and Newman, 1990). Such a shift might only result from increased competition or declining profits.

In Britain, the government has entered into a partnership with private enterprise to fund an agency with charitable status, Crime Concern, that might eventually be the primary stimulant of situational prevention in the commercial and private sectors (Tilley, 1991). In the meanwhile, the Home Office Crime Prevention Unit continues with an active program of publicity and demonstration projects in the private sector. For example, a recent publication with the revealing title "Making Crime Prevention Pay" presents information about a number of initiatives taken by shops and other businesses that successfully prevented crime and also saved money (Burrows, 1991).

Implementation difficulties

> Crime prevention is no longer the inoffensive and neutral activity it once was in the days when it consisted purely of publicity exhorting people to lock it or lose it, and advice from the police on locks and bars. Now it involves the police and central/local government seeking to influence the civil behavior of particular individuals, private companies and local authority departments responsible for the creation of criminal opportunities or motivation; instead of tackling the 'common enemy, crime', it cuts across conflicting public and private interests and policies, and has to compete for resources with other goals and needs, not always as a front runner. Reconciliation of all this conflict and competition means that crime prevention has to be slipped in by changing attitudes and expectations, by good salesmanship, clever design, close attention to cost effectiveness, sometimes piggybacking on other facilities and changes in an organization, and using data recording systems developed and maintained primarily for other purposes (Ekblom, 1987a: 11-12).

This extended quote may be a useful corrective to the case studies reprinted in this volume which are largely silent about the difficulties encountered during a situational project. In fact, these may arise at any one of the five stages of a project — collection of crime data, analysis of the contributory factors, identification of feasible measures, implementation of measures and evaluation (Eck and Spelman, 1988; Ekblom, 1987a; Gladstone, 1980; Heal, 1983; Hope, 1985). Many of those met with at the analytic and evaluative stages are familiar problems of applied social research. Particular manifestations in the present context are: (i) that the crimes in question may be too infrequent to reveal any

TABLE 2
REMEDIES FOR DRINK-RELATED DISORDER IN CITY CENTERS

TIME-SPECIFIC DISORDERLINESS

- Stagger pub closing times to avoid a concentration of drinkers inside pubs and on the street.
- Increase the number of late-night premises through permissive licensing — to achieve the same effect but under somewhat more restrictive controls (i.e., special-hours certificates).
- Increase police supervision of premises and public spaces at closing time.
- Train bar staff in interpersonal relations and management techniques - to lower the risk of confrontation with customers at closing time.
- Facilitate the dispersal of people from the city center — increase public transport to speed the removal of people and avoid the gathering of disruptive crowds.

SITUATION-SPECIFIC DISORDERLINESS

- Revoke licenses or impose conditions on premises which have a record of disorder.
- Alter the number and density of licensed premises.
- Alter the character of pubs and clubs - encourage the development of premises where the facilities are unlikely to lead to disorder.
- Discourage the concentration of youth-oriented leisure facilities in city centers.
- Improve the ability of bar staff to cope with disorder, through better training and management practice.
- Encourage management practices that will result in the keeping of orderly premises.
- Improve the ability of the police to supervise licensed premises and respond to disorder.
- Reduce the amount of indefensible public space in city centers by urban planning and design.

Source: Adapted from Hope (1985:57)

patterns or regularities, which may make it difficult to identify preventive measures or justify their implementation (Ekblom, 1988a), and (ii) that it may be impossible to allocate responsibility for effects among the variety of preventive measures that may be implemented within the scope of a single project (Ekblom, 1990).

In most cases, there are many alternative means to block opportunities for specific classes of crime (cf. Hope, 1985; Smith, 1987). For example, Hope (1985) identified thirteen different ways of tackling problems of drink-related disorder in city centers (see Table 2). Consequently, identifying potential measures is rarely a difficult part of the preventive process. Those eventually implemented are unlikely to be completely novel and most of the suggestions generally come from the various parties already involved in dealing with the problem. In some cases, however, interviews with offenders about motives and methods may expand the options to be considered.

Choosing from among the possible measures may present greater difficulties, involving the need for detailed exploration of acceptability, logistics and costs. A frequently intractable problem is that those who need to take action cannot be persuaded of their responsibility to do so. In the words of Engstad and Evans (1980: 151):

> It is most unlikely that the group or corporate body to whom responsibility is being shifted will immediately acknowledge that their property or operations are generating a substantial strain on police resources, accept that they have a duty, up to their level of competence, for the control of specific crimes, and take appropriate action. In our view, the failure of many well intentioned and theoretically sound community based crime control efforts can be attributed to the absence of some means for ensuring that members of the community involved accepted and effectively discharged their responsibility.

This problem is illustrated by the failure of motor manufacturers to build more secure cars, even though this affords the only realistic way to substantially reduce levels of auto theft (Clarke and Harris, in press[b]). Manufacturers have very little incentive to improve security since this complicates the design and manufacturing processes and raises costs without, in their view, yielding any commensurate increase in the appeal and sales of the vehicles they produce. In the meanwhile, the costs of auto theft are borne by individual victims, the criminal justice system and, through higher insurance premiums, the public at large. Under these conditions, governments with the will and capacity to tackle the problem may have to provide incentives or introduce penalties to ensure the necessary action.

Even when responsibility is accepted, it may be difficult to achieve the co-

ordination among the parties concerned to ensure that measures decided upon are actually implemented. Co-ordination problems have much occupied Home Office researchers in their efforts to promote "community" responsibility for crime prevention (cf. Gladstone, 1980; Heal, 1983; Hope, 1985; Ekblom, 1987a). Gladstone (1980) reports that only the most simple measures, involving routine action by just one local authority department, were implemented out of a package identified to deal with a problem of school vandalism in Manchester. Ekblom (1987a: 6) relates how "in trying to get a number of security schemes going on the London Underground... such as the provision of passenger alarms on stations and enhanced CCTV, people from Operations, Signalling, Engineering, Permanent Way, Marketing and Personnel all needed to be repeatedly consulted as the plans progressed. There are natural channels in such organizations for, say, the prevention of physical accidents; but the prevention of crime was a complete new function which had to be threaded through the maze of competing considerations. It has been a bit like re-wiring an old house."

Given the effort needed to conclude a situational project successfully (and the case studies show that this can be done), it is tempting to think that the problem has been permanently solved. Unfortunately, this is rarely the case. Where the stakes are high, criminals are likely to test the limits of the new defenses and in due course may succeed in identifying vulnerabilities. This process may be assisted by the arrival on the scene of more resourceful or desperate criminals than was previously the case. And this again may sometimes result in the greater use of violence. For the less serious forms of crime, measures that depend upon natural surveillance or the vigilance of employees may lose their value as people become more complacent. To point out that preventive measures may have a limited life is not a counsel of despair; rather, it is a fact that must influence the choice among preventive options of varying difficulty and cost. It also means that the commitment to situational prevention has to be long term, which for many organizations and agencies will mean developing a permanent in-house capability.

The selection of case studies

Given the ever-present threat of displacement and the implementation difficulties discussed above, it should not be surprising that some of the situational initiatives reported in the literature have failed to achieve their objectives (see, for example, Gladstone, 1980; Allatt, 1984). The need for wider understanding of the reasons for failure might have been a reason for reprinting some of these studies, but of greater importance at this stage in the development of situational prevention is to show that it can be effective in dealing with a wide range of offenses in a variety of contexts. Without this evidence, no amount of theoretical dlscussion will dispel the skepticism of quite large sections of the

criminological community; without a variety of examples, practitioners in many fields that might benefit from situational prevention would have little incentive to proceed. Hence, this volume's focus on "successful" case studies, that is to say, studies reporting substantial reductions in the offenses addressed. (In many cases these reductions were of the order of 50 percent or greater, largely precluding the need for sophisticated statistical treatment of data.) Only the final study reprinted, Shearing and Stenning's description of crowd management in Disney World, which includes no evaluation, falls outside this definition. However, there can hardly be a criminologist in the western world who has visited Disney World (and probably most of them have) who would not agree with the authors' conclusions about the security and safety of that environment.

In each case the studies reprinted report a deliberate effort to prevent crime — studies that have merely found a relationship between situational variables and crime have not been included. Not all the studies reprinted, however, were undertaken explicitly within a situational prevention context; indeed, a reading of their bibliographies would suggest that some were undertaken in complete ignorance of the crime prevention literature. Nevertheless, the methodology and general approach adopted in each case qualifies them for inclusion.

Just as space precluded the reprinting of failed projects, so it prevented the inclusion of all successes. In some instances, for example Moore's (1987) study mentioned above of the prevention of thefts from hospital patients, the measures were so straightforward and the evaluation so unproblematic that little academic purpose would have been served by reprinting the original paper. In others, for example Clarke and McGrath's (1990) study of cash reduction in betting shops and Poyner *et al.*'s (1988) study of screens to protect bus drivers from assault, the successful use of the techniques in question was better illustrated by other studies. For a third group, including analyses of the prevention of airline hijackings, none of the articles or reports available could be included without major editing which was not considered a practical possibility. (In fact, only very minor editing was undertaken of the studies included).

An important consideration governing the choice among the remaining eligible studies has been mentioned above — the need to cover a variety of situational techniques, environmental contexts and offenses. All twelve situational techniques are represented; indeed, the sequence of studies was determined by the techniques illustrated by each study (see Table 3). Numerous environmental contexts are covered (e.g. automobiles, private homes, university libraries, shops, post offices, convenience stores, parking facilities, public telephones, street markets, red light districts, leisure complexes and different forms of public transport), as well as a variety of forms of crime and disorder (thefts, fraud, burglary, robbery, vandalism, graffiti, cruising and soliciting, fare

evasion and obscene phone calling). Finally, where there was a choice between similar studies, those that more adequately addressed the issue of displacement or that permitted comment (in the editorial note preceding each study) on some other important issue were selected.

TABLE 3
THE TWELVE TECHNIQUES OF SITUATIONAL PREVENTION AND ILLUSTRATIVE CASE STUDIES

The techniques	*The case studies**
1. Target Hardening	1, 2, 3, 4, (17, 19)
2. Access Control	5, (14, 22)
3. Deflecting Offenders	6, 7, (22)
4. Controlling Facilitators	8, 9
5. Entry/Exit Screening	10, 11, (12)
6. Formal Surveillance	12, 13, 14, (4,5)
7. Surveillance by Employees	15, 16, (22)
8. Natural Surveillance	17, (6, 14, 16, 19)
9. Target Removal	16, 18, 19
10. Identifying Property	20
11. Removing Inducements	21
12. Rule Setting	22

*Parentheses indicate secondary illustration

In conclusion, it should be clear from the case studies that situational prevention is of proven value in controlling crimes committed in a great many contexts. The next wave of research will be able to build on this base to advance our knowledge in some significant ways. We need to understand the conditions under which particular measures work or do not. We need to know much more about the relative power of different situational techniques (cf. Poyner, 1991b). We will have to find reliable ways of predicting the direction and extent of displacement. We will need to become much more sophisticated in undertaking cost-benefit analyses. We will need to discover how to harness publicity in enhancing the value of crime prevention initiatives. We will have to learn how best to counter skepticism and indifference. Finally, we will have to become knowledgeable about efficient ways to promote change and coordinate action. This may be an ambitious agenda and one that seems remote from the traditional preoccupations of criminology, but it has to be followed if the discipline is to make a truly practical contribution to crime control.

NOTES

1. The fact that high rise buildings have now fallen out of favor for public housing is partly due to his influence.
2. Coleman (1985: 16) is quite mistaken in describing the Home Office studies as being undertaken "to refute Newman's thesis." On the contrary, the limited support for his ideas provided by this research was a considerable disappointment to the researchers involved.
3. That there is nothing sacrosanct about the number three is shown by Felson's (1986) own proposal for a fourth "minimal element" (the handled offender), made to accommodate social control theory.
4. According to a recent assessment of ways to reduce auto theft, improved built-in security at manufacture affords the greatest potential (Clarke and Harris, in press).
5. Harris and Clarke (1991) have argued that, because of flaws in the legislation (but not in the concept of parts marking) it will fail to be effective.
6. The arguments in favor of rapid repair and good maintenance have been taken a step further by Wilson and Kelling (1982) in their well-known "broken windows" piece. In promoting their vision of community policing, they have argued that the failure to deal promptly with minor signs of decay in a community, such as panhandling or soliciting by prostitutes, can result in a quickly deteriorating situation as hardened offenders move into the area to exploit the break-down in control.
7. A fine line may exist between the "character-forming" and "opportunity-reducing" purposes of rules; indeed, many rules are intended to serve both purposes. Discussions of corporate ethics (see Frank, 1985; Nalla and Newman, 1990) emphasize the constant clarification and presentation of rules of decency, honesty, loyalty, etc., in fostering a corporate climate in which unethical behavior becomes both more difficult for the employee and more "costly" in terms of conscience and the social disapproval of colleagues.
8. Though not all, as shown by Bottoms'(1990) "nightmare" of "a society with massive security hardware protecting individual homes, streets, and shops, while all adult citizens would carry personal alarms, and even guns, for individual protection while moving from place to place" (p. 20).
9. Though this may mean beginning with the problem as defined by those who "own" it, it does not follow that the definition must continue to be accepted in those terms. To take an example from some early work undertaken by the Home Office, a problem of "vandalism" of school premises turned out in reality to be largely a problem of accidental damage caused by the inappropriate siting of a playground for ball games (Gladstone, 1980). In other cases, problems of "vandalism" on public housing projects have proved to be largely problems of poor design and maintenance (Burbidge, 1984).

PART 2
Case Studies

1. Curbside deterrence?

John F. Decker

EDITOR'S NOTE: Making use of New York City records of slug use, Barry (1969) undertook a policy-oriented analysis of the problem which included the mechanics of parking meters, the methodology of meter collections, the difficulties of apprehension and the feasibility of alternative responses to the problem. His analysis gave rise to the present case study, first published as an article in Criminology *(Decker, 1972), which evaluates two schemes implemented to cut slug use. These comprised the posting of warning labels on meters and the introduction of redesigned "Duncan" meters with a slug rejector device and a window to show the last coin inserted. Decker concludes that the warning labels had at best a small, temporary effect on slug use, but that the introduction of the Duncan meters achieved an immediate reduction in slug use of between 30 and 80 percent. It was not possible to determine whether the coin window or the slug rejector device was responsible for the decline. Decker argues, given the limited effect of the warning labels, that the coin windows may not have been much of a deterrent to slug users. However, there is an important difference in being reminded of the penalties for slug use (the purpose of the labels) and running the immediate*

risk of being identified as a slug user (the point of the coin window). Indeed, most research on deterrence has concluded that the certainty of apprehension is much more potent than the severity of punishment. A final note: This work on slug use was undertaken in the Criminal Law Education and Research Center of New York University, under the direction of my colleague, Gerhard Mueller, now at Rutgers. Sitting in his office is one of the old parking meters without slug rejector or coin window. Would that more criminologists had such tangible evidence of the practical value of their work!

WITH THE INCREASED utilization of parking meters by many American cities has come an increase in associated criminal problems. In New York City, for example, parking meters are frequently vandalized, broken into, and completely stolen. Far more common, however, is the rapidly growing problem of illicit slug usage in the meters.

Data on New York City parking meter use for the last thirteen years in shown in Table 1.

TABLE 1
SLUG USAGE IN NEW YORK CITY 1958-1970

Year	Revenue	Slugs	Slugs per 1,000 Insertions
1958	6,963,913.12	62,060	0.9
1959	7,112,264.41	67,387	0.9
1960	7,347,825.59	71,516	1.0
1961	7,164,410.85	76,920	1.1
1962	7,199.223.40	131,845	1.9
1963	9,094.984.19	506,911	5.6
1964	9,216,485.17	818,200	8.9
1965	9,858,604.79	1,307,237	13.3
1966	9,817,906.77	2,065,126	20.8
1967	9,667,350.75	2,452,904	25.0
1968	10,564,740.99	3,903,845	35.7
1969	11,213,740.59	4,211,182	35.7
1970	11,603,073.27	3,826,956	32.3

Between 1958 and 1970 the number of slugs placed into the meters rose from a low of 62,060 in 1958 to a high of 4,211,182 in 1969, an increase of 6,167%, although in 1970 the figure dropped to less than 4,000,000. In terms of rate of slug use, this means that in 1958 one slug was found in every 1,128 coins collected from the meters, while in 1970 every thirty-first object inserted into a meter was a slug. In terms of revenue, we find one slug for every $112 revenue in 1958, and one slug for every $3 of income in 1970.

During 1958 through 1961, rate of slug use never rose by more than 5% over the preceding year. In 1958, rate of slug use (in terms of slugs per 1,000 insertions) was approximately 0.9, and, in 1961, the figure was 1.1. This increase could be attributed to the general rise in petty larceny. However, a high of approximately 36 slugs per 1,000 insertions was observed in 1969, an increase of nearly 4,000% from 1958, although the rate of slug use then decreased somewhat in 1970 to 32 slugs per 1,000 insertions.

This sharp increase in illicit meter use cannot be attributed to a similar increase in either the number of meters or the amount of their use. In 1961, there were approximately 57,000 meters in New York City; today there are approximately 72,000 meters, an increase of about 26%. Revenue from 1958 to 1970 increased by 67%, from nearly $7 million in 1958 to over $11.5 million in 1970. The number of coins inserted into New York City parking meters in 1961 was approximately 71 million, and in 1970 approximately 119 million, an increase of 68%. A corresponding increase of 68% in slugs from 1958 to 1970 would show 104,000 slugs collected in 1970, whereas the actual figure was nearly 4 million.

It is interesting to note that when monthly data on meter use in New York City was examined for the years 1966 to 1970, seasonal variations in illicit meter use were observed, as shown in Figure 1.

The periods showing the greatest number of slugs were spring and autumn, with May and October highest in slug usage. The least illicit meter use occurred in February and August, and there was a rise and fall in slug usage between the seasonal highs and lows. Thus it seems the amount of slug use decreased during extreme weather conditions, be they hot or cold, while during periods of more moderate weather the slug problem increased. Revenue followed a similar trend in seasonal variation. To analyze these seasonal variations quantitatively, we developed the index of seasonal variation in slug use for the five years studied, shown in Table 2. The January index of 87 indicates that over the five-year period, slug usage in January was 13% below the average. The month with the highest index was October, showing an amount of slug use 14% above the average.

FIGURE 1
RATE OF SLUG USE IN NEW YORK CITY PARKING METERS
(SLUGS PER 1,000 INSERTIONS)

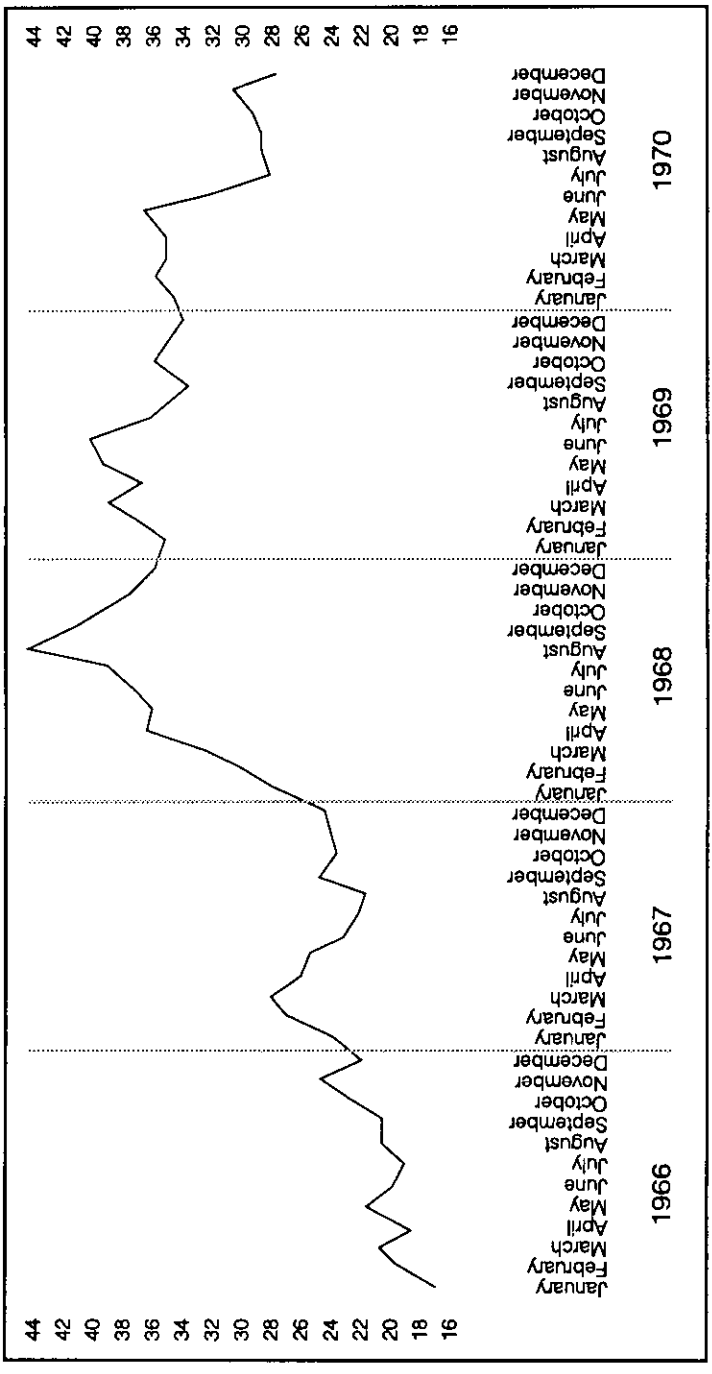


TABLE 2
INDEX OF SEASONAL VARIATION IN SLUG USAGE 1966-1970

Month	Index
January	87
February	74
March	105
April	106
May	112
June	107
July	98
August	96
September	100
October	114
November	98
December	103

Schemes undertaken to decrease slug use

In the last several years, various proposals were presented and attempts made to decrease slug use in New York City parking meters.

One attempt by the city of New York is the introduction of a parking meter which mechanically rejects certain types of slugs, and also supposedly deters potential slug users through use of a coin-view window. The decision to install parking meters with both these devices was made following a study conducted by the city which projected that such meters would retard illicit meter use. The slug-rejector device prevents the meter from registering time if a slug with a hole in it is inserted into the parking meter. Mechanically, any object inserted into a meter with this device rubs against a pin in the meter. If the object inserted has a hole in it, it passes through the pin and drops into the coin box without registering time. Since the vast majority of slugs inserted are of a washer or pull ring variety from a soft drink or beer can, theoretically much of the slug use will be eliminated. A meter with a coin-view window displays the last object inserted into the meter. Hence, if a slug user inserts a slug into the meter it will be visible to everyone, including the police or metermaids.

Theoretically, this window, which is made of strong durable plastic called "lexon," also deters slug use. The new meters, which the city began installing in April of 1969, are the Duncan "VIP" meters, which have both the slug-rejector

device and the coin-view window.

Another scheme, which was constructed by this writer, used warning labels affixed to the meters. Three sets of labels warned potential offenders that use of a slug is a violation of the respective federal, state, and city laws, and is punishable by imprisonment or fine or both. Theoretically, these warning labels would deter potential slug users from placing slugs into the meters.

Analysis of the two schemes to reduce slug usage

In order to evaluate the effectiveness of the Duncan meter in deterring slug usage, ten regions with 100 to 400 meters each, located in Manhattan, Brooklyn, and the Bronx, covering a wide variety of socioeconomic levels, were studied during 1968, 1969, and 1970. The study was to provide an estimate of any change in illicit meter use following installation of meters with the slug-rejector device and the coin-view window to determine their effectiveness as deterrents to slug usage. The new Duncan VIP meters were installed during the first six months of 1969.

The study revealed a marked decrease in amount of slugs used in each area from 1968 to 1969, following installation of the new meters. Examination of revenue, however, showed smaller variation from year to year, and rate of slug

TABLE 3
RATE OF SLUG USAGE (SLUGS PER 1,000 INSERTIONS)

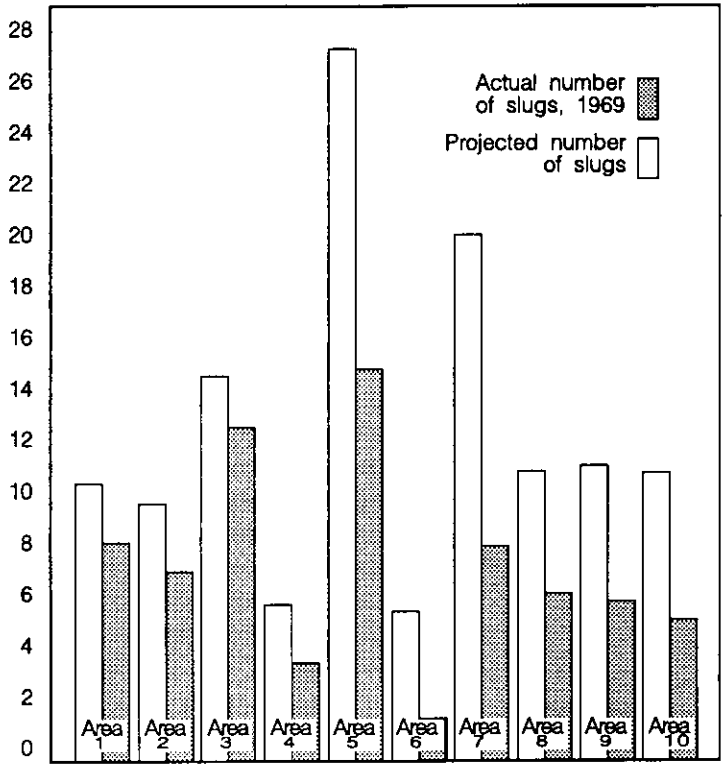
Area	Year			% Decrease after Installation of New Meters (1968-1969)
	1968	1969	1970	
1	33.7	23.8	13.3	29.4
2	19.4	13.4	6.7	30.9
3	34.8	25.9	16.1	25.6
4	215.3	65.1	153.4	69.8
5	182.0	53.5	60.7	70.6
6	55.9	12.6	13.5	77.5
7	138.5	28.4	25.2	79.5
8	68.1	28.1	23.6	58.7
9	91.2	31.7	34.1	65.2
10	68.1	24.4	24.4	64.2

usage for all ten regions decreased substantially from 1968 to 1969. This downward trend in rate of slug usage continued from 1969 to 1970 in five of the areas; in one area, the rate did not change. Two areas showed a slight increase in rate of illicit meter use from 1969 to 1970, and two other areas were not considered due to lack of meaningful data for the year 1970. However, the rates for both 1969 and 1970 were far below that of 1968 in *all* areas.

Figure 1 shows that the peak period of slug usage was the last quarter of 1968, after which began a gradual decline in illicit meter use that has continued to the present. This would indicate that installation of the coin-view window and slug-rejector device in New York City parking meters, begun in early 1969, has had a significant impact on the citywide rate of slug usage.

Table 3 shows a great percentage decrease in slug use from 1968 to 1969, immediately following installation of the new meters, in areas 4 and 5, which were the two most economically deprived regions under study.

FIGURE 2
1969 PROJECTED NUMBER OF SLUGS AND
ACTUAL NUMBER OF SLUGS (1,000S)



The least decline in slug usage was observed in areas 1, 2, and 3, which were the most affluent regions under study. It should also be noted that the greatest meter use was also found in these three districts, which indicates the least decline in illicit meter use occurred in areas where meter use was greatest.

As a further look at the decreased rate of illicit meter use, the 1968 rate of slug use, prior to the installation of the new meters, was projected to 1969, and comparison was made between the actual number of slugs collected in 1969 and this projected figure. Figure 2 illustrates graphically the substantially lower number of slugs illegally placed in the Duncan meters in 1969.

The second scheme

The second part of the study conducted by this writer examined whether potential slug users were deterred by use of warning labels affixed to the meters. Analysis was made to determine whether the number of slugs found in those parking meters decreased from previous years or from that of other meters in the city without warning labels. Specifically, there were three types of labels, each applied to a selected group of meters. All the labels were approximately six inches long and two inches wide, with bold black lettering on a bright yellow background, and yellow lettering on black (see Figure 3). Labels on meters in the first area read:

SLUG USE IS A VIOLATION OF NEW YORK CITY ORDINANCE[1]

Meter labels in the second area read:

SLUG USE IS A VIOLATION OF STATE LAW
3 MONTHS IMPRISONMENT AND $500 FINE[2]

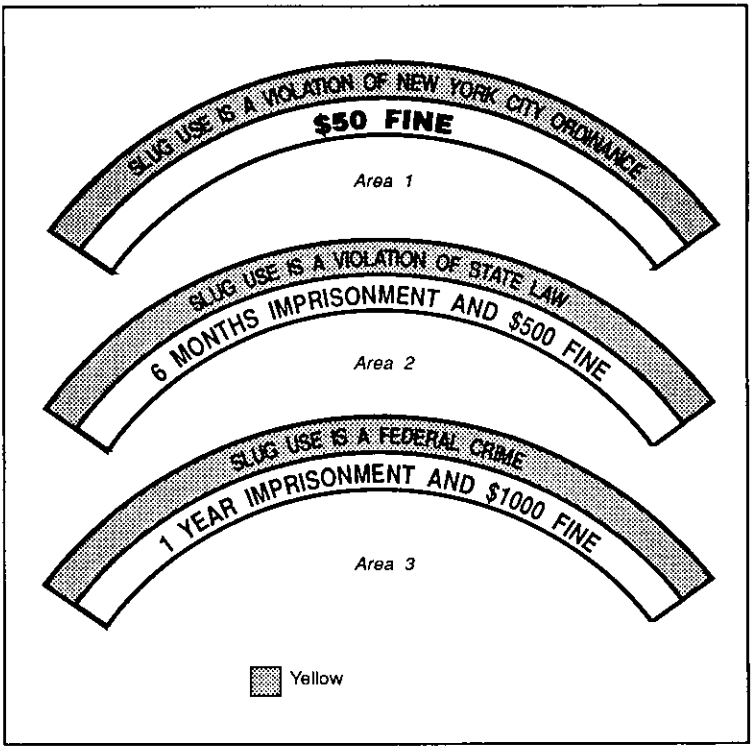
Labels in the third area read:

SLUG USE IS A FEDERAL CRIME
1 YEAR IMPRISONMENT
AND $1,000 FINE[3]

A control area where no labels were attached to the meters was also used for comparison purposes.

The four areas studied were in the same borough, in areas of similar socioeconomic backgrounds, and had similar histories of slug problems in the past, although none of the areas was immediately adjacent to another. The four regions, each of which had approximately 100 meters, were studied during the first five months of 1971. The various warning labels were affixed to the respective meters the last week of February. None of the meters under observation was equipped with any other slug deterrent device, such as the slug-

FIGURE 3
WARNING LABELS AFFIXED TO METERS IN
EACH EXPERIMENTAL AREA



rejector or coin-view window. Thus, differences in slug usage observed within any area could be attributed to the warning labels affixed to the meters in that region.

Initially, a comparison was made of the 1970 rate of slug usage in each of the four areas under study with the comparable 1970 citywide monthly rates in order to learn of the relative significance of illicit meter use between the regions under study and the entire city. Table 4 shows that for all months under study, slug usage in 1970 was greater in the four regions being observed than it was for the city as a whole. In 1971, the control region continued to experience a greater rate of slug usage than the citywide rate throughout the five months studied. The region where federal warning labels were used also showed greater slug usage than the citywide rate, both prior to and after application of the warning labels,

whereas the area where state warning labels were used showed a greater rate prior to use of the labels and a lesser rate after use of the labels. However, in May, the rate in the state area once again was greater than the citywide rate. This might indicate the deterrent effect of the state labels was short-lived. Examination of the 1971 rate of slug usage in the region where city warning labels were applied showed this area experienced a lesser rate of slug usage than the citywide rate throughout the entire study, until May 1971, when the rate was somewhat higher.

Examination of meter use data within each of the four areas under observation showed that for all months under study the monthly rate of illicit meter use in each area was less in 1971 than it had been in 1970, as shown in Table 4.

TABLE 4
RATE OF SLUG USAGE IN COMPARISON WITH CITYWIDE RATE (SLUGS PER 1,000 INSERTIONS)

	Types of Label				
	Federal	State	City	Control	Citywide (no labels)
January					
1970	56.5	82.0	52.6	52.1	34.8
1971	45.5	44.1	26.5	40.0	29.2
February					
1970	86.2	63.3	36.5	63.7	35.3
1971	31.2	33.2	22.2	38.3	29.8
March					
1970	65.8	70.4	41.8	56.2	35.2
1971	40.3	27.3	18.4	34.7	29.5
April					
1970	68.5	61.0	36.6	52.9	34.8
1971	38.6	27.5	21.3	42.7	28.2
May					
1970	57.1	57.5	43.9	49.3	35.2
1971	55.9	38.9	30.3	45.9	29.3

Even the months of January and February, prior to the application of the warning labels, experienced a decreased rate in slug use from 1970 to 1971. Also, the control group, where no labels were affixed to the meters, showed a decline

in illicit meter use for all months. Thus, unlike in the study of the deterrent effect of the slug-rejector device and coin-view window, no immediate effect of the warning labels was obvious. Rate of slug usage decreased in the months prior to the use of the warning labels, as well as in the months after their application. Although it seems difficult to account for this decrease in areas which do not have the slug-rejector device and coin-view window, it is possible that such decreases might be attributed to the experiences of slug users having their slugs rejected by nearly identical meters which were equipped with the slug-rejector device. But whatever the cause of this decline, we obviously cannot attribute all the decreased illicit meter use observed in March, April, and May 1971 entirely to the warning labels.

Examination of the percentage of decreased monthly slug usage from 1970 to 1971 also revealed no immediate trend, as shown in Table 5. The most obvious effect of the warning labels was seen in the area where state labels had been used, where the percentage of decrease in illicit meter use was 90.5% from February 1970 to February 1971 (prior to the use of the warning labels), and 157.7% from March 1970 to March 1971 (after application of the labels). The percentage decrease was also great comparing April rates (121.3%). However, in May the figure dropped to 47.7%, perhaps indicating that the deterrent effect of the state labels was short-lived.

The area where city labels were applied also showed a great percentage of decrease in slug usage from March 1970 to March 1971, the month after application of the warning labels in 1971, 127.2%. But the April percentage decrease dropped to 72.2% less than the January decline of 98.9%, and in May the figure was 44.7%. It might be argued that the deterrent effect of the city warning labels was also short-lived.

The area where federal warning labels were used showed greatest monthly percentage decrease in February (176.7%), *prior* to the use of the labels. But, in March and April, *after* application of the labels, the respective decreases were only 63.2% and 77.4%, and in May the figure was a mere 2.3%. Thus, no noticeable deterrent effect of the federal warning labels was observed.

The control region showed nearly the same percentage of decrease in slug usage from 1970 to 1971 for the months of February and March, giving further weight to our statement that the state and city warning labels did have a noticeable effect immediately after their application to the meters, although the effect was only temporary. As a final analysis, one-way analysis of variance showed no significant difference in illicit meter use in any of the four regions after the warning labels were applied.

Conclusion

Illicit meter use in the ten areas under study showed a dramatic decline

TABLE 5
PERCENTAGE DECREASE IN SLUG USAGE
1970 TO 1971 COMPARISON BY MONTH

Federal Warning Labels	
January	24.3
February	176.7
March	63.2
April	77.4
May	2.3
State Warning Labels	
January	86.1
February	90.5
March	157.7
April	121.3
May	47.7
City Warning Labels	
January	98.9
February	64.6
March	127.2
April	72.2
May	44.7
Control Area	
January	30.2
February	66.2
March	61.8
April	23.8
May	7.4

following installation in 1969 of the Duncan "VIP" meters with coin-view window and slug-rejector device. In fact, the decrease was so great that it affected citywide slug use totals for 1969 and 1970, although only 16,074 of the city's approximately 72,000 meters were the new type of meters. Rate of illicit meter use in both 1969 and 1970 were significantly lower than the 1968 rate (before installation of the Duncan meters). In addition, the majority of the areas studied showed 1970 slug usage was significantly less than even the 1969 rate. However, in two of the areas under study the rate of illicit meter use *increased* substantially between 1969 and 1970, although, as previously stated, the rates for both 1969

and 1970 were *far* below that of 1968. Whether this subsiding in illicit meter use will continue can only be revealed by future studies.

The districts with the greatest slug problem when the study was initiated were the areas which experienced the greatest rate of decrease in illicit meter use following installation of the new meters. Areas with the greatest amount of meter use showed the least percentage decrease in slug usage with the new Duncan meters. And these areas were the most affluent of the regions under observation.

The decreased illicit meter use shown by this study is attributed to the new meters. However, since all meters in the districts studied had both the slug-rejector device and the coin-view window, it was not possible to test which of these devices afforded the greater deterrence. It is contended by some that the coin-view window invites vandalism and future meters should be equipped with only the slug-rejector device. Due to the successful deterrence by the present meters with both devices, it would seem wise that two studies be made before initiating any change in the meters: (1) a study of slug usage with meters having only the slug-rejector device, and (2) a study of vandalism in meters with the coin-view window.

In the second aspect of the study, various methods of analysis showed the federal warning labels had no noticeable effect, while the state and city warning labels had a noticeable, although short-lived, effect. It appeared that warning potential offenders that slug use is a violation of the law and punishable by substantial sanctions had little deterrent value.

It is obvious that the parking meters with the coin-view window and slug-rejector device were more effective in reducing illicit slug use than use of warning labels. The minimal deterrent value of the labels can probably be attributed to the slim chance a slug user will be apprehended, much less convicted and subjected to the maximum penalty. This might indicate that potential slug users are not greatly deterred by the coin-view window either, since the object of the window is also to instill fear of apprehension. Hence, it seems that a mechanical device, such as the slug-rejector, which makes law violation difficult, is superior to a scheme or device which is dependent upon the potential violator's fear of apprehension. This finding is critical in light of the theoretical structure of criminology based on a punishment-deterrence-rehabilitation model, and it suggests a serious look at programs based on a prevention model and environmental design (see Jeffery, 1971).

NOTES

1. New York, N.Y., Traffic Regulations art. 8, §93(f).
2. N.Y. Revised Penal Law §170.55; N.Y. Revised Penal Law §70.15 (2); N.Y. Revised Penal Law §80.05(2).
3. U.S.C.A. §491(a).

2. Steering column locks and car theft

Pat Mayhew, Ronald V. Clarke and Mike Hough

EDITOR'S NOTE: This case study was originally published as a chapter in Mayhew et al. (1976), Crime as Opportunity. *This was the first Home Office Research Unit report to deal with situational crime prevention, which it referred to as "physical" prevention. Only later was the term "situational" substituted in recognition of the fact that opportunity-reducing measures (which were contrasted with "social", character-forming measures) were not necessarily of a "physical" kind. Another distinction made in* Crime as Opportunity, *between "specific" and "general" displacement, was also later abandoned, this time in favor of Reppetto's (1976) more detailed five-fold classification. In fact, the main contribution of this case study concerned displacement, which it examined in the context of the introduction of steering column locks for automobiles in West Germany and England and Wales. In England and Wales, the locks were introduced only for new cars with the result that theft was displaced to older, unprotected vehicles. In Germany, the locks were introduced at the same time for all cars, old and new, with the result that car thefts declined by more than 60 percent. In neither case was it*

possible to examine whether any "general" displacement to other forms of crime occurred. However, a subsequent piece of research by two of the same authors (Mayhew et al. 1989), used German data to examine whether thefts were displaced to cars and bicycles, when the opportunities for motorcycle theft were reduced. Despite a substantial decline of about 60 percent in motorcycle theft, there was little evidence over a five-year period of a resultant increase in thefts of cars or bicycles. A journal reviewer of Crime as Opportunity *said that the idea of reducing opportunities for crime would "never catch on;" this is a measure of the progress that has in fact been made by situational prevention.*

SINCE JANUARY 1971, all new cars imported to and manufactured in England and Wales have been fitted with a steering column lock as standard equipment. These locks, which are automatically brought into operation when the ignition key is removed, were introduced in the face of increasing autocrime in preceding years to make it more difficult for vehicles to be illegally driven away.[1] The potential savings to be offset against the cost of fitting new vehicles with anti-theft equipment (approximately £10 a vehicle at 1971 prices) were considerable. Autocrime involves a great deal of police time and effort (it accounts for no less than 24% of recorded indictable crime)[2], and there are losses to insurance companies which are passed on to car owners through the premiums they are required to pay. It also presents considerable hazards to road safety: according to a recent, unpublished paper by the Federal Bureau of Investigation, a stolen vehicle is 200 times more likely to be involved in a car accident than one which is not stolen. This may be because many of those who take cars are young and inexperienced drivers: 76% of those caught for taking cars in England and Wales in 1973 were under the age of 21, and of these almost half were under the minimum legal driving age of 17.

Although it was hoped that fitting new cars with steering column locks would lead to a reduction in the overall level of vehicle theft and unauthorized taking, this has already been confounded by a remarkable increase in these offences since the beginning of 1971. In the Metropolitan Police District in 1974, for instance, vehicle theft and unauthorized taking was some 80% higher than in 1970. (Other indictable crime rose by 22% over the same period.) This increase, however, does not necessarily mean that steering column locks are ineffective, since published statistics make no distinction between cars protected by locks and those not;[3] the overall increase in theft and unauthorized taking may well be accounted for by offences involving unprotected vehicles.

The study reported below aimed to assess the extent to which the increased

security of vehicles manufactured since 1971 has prevented their unauthorized use, and given the continuing increase in theft and unauthorized taking, to examine the question of whether higher levels of protected cars will eventually reduce the overall incidence of these offences. Thus, the study analyses car theft in terms of one of the sources of opportunities for crime, namely lack of physical security. At the same time, it also provided a chance to study another aspect of opportunity through an examination of Wilkins' (1964) hypothesis of a direct relationship between the abundance of vehicles on the road and the frequency of their unauthorized use and, more generally, to comment on the long-standing question of whether preventive measures actually reduce crime or simply displace its pattern.

The effectiveness of steering column locks

The method employed in evaluating the effectiveness of steering column locks was to see whether a smaller proportion of 'new' cars were stolen or driven away in 1973 (i.e. since the introduction of the locks) than in 1969 (before their introduction). In both years 'new' cars were defined as those which, according to their licence numbers were three years old or less.[4] In 1973 all 'new' cars would have steering column locks, whereas in 1969 the great majority would not.

1969 rather than 1970 was taken to represent the 'before' situation since a small number of new cars introduced in 1970 were fitted with anti-theft devices in anticipation of the 1971 measure. Cars on the road in 1969 would have included a number of foreign models some of which had anti-theft devices and, although for strict accuracy some account should have been taken of these, the difficulties of doing so were incommensurate. In any case, the numbers involved would have been small; from information given to us by the Society of Motor Manufacturers relating to new foreign cars registered in this country it can be estimated than in 1969, in the country as a whole, foreign cars accounted for about 5% of the total cars on the road. And not all of them were fitted with anti-theft devices.

Sample

The sample was drawn from the Metropolitan Police District's statistical records. These maintain a distinction between theft of vehicles and unauthorized taking: a vehicle is considered stolen if it is not recovered with 30 days, otherwise it is recorded as having been taken without authority. The sample comprised, in 1969 and 1973, the last 20 cars recorded as taken without authority and the last 20 (or as many as were available) recorded as stolen in each of the 23 main divisional stations of the MPD. Most of the cars in the sample were taken between August and December; although in 1969 and 1973 the number of cars taken at

the very end of the year was rather high, there is no reason to think that for our purposes bias has been introduced by sampling car theft and unauthorized taking mainly from the second half of the year.

Results

Table 1 shows that in 1969 'new' cars represented 20.9% of all cars illegally taken, whereas in 1973 the figure had dropped to 5.1%, a difference we would attribute to the protection afforded by anti-theft devices.[5] Moreover, since in 1973 'new' cars represented a greater proportion of the total number of cars on the road (an estimated 37%) than in 1969 (34%), the difference is a little more accentuated than it appears.

TABLE 1
'NEW' CARS (I.E. THOSE 3 YEARS OLD OR LESS) AS A PROPORTION OF CARS STOLEN AND TAKEN WITHOUT AUTHORITY IN THE METROPOLITAN POLICE DISTRICT IN 1969 AND 1973.

	1969			1973		
	Unauthorized taking	Theft	Total	Unauthorized taking	Theft	Total
All cars taken	460	457	917	460	458	918
New cars taken	93	99	192	30	17	47
% new cars	20.2%	21.7%	20.9%	6.5%	3.7%	5.1%

The 47 'new' cars sampled which were stolen or taken without authority in 1973 despite being protected by steering column locks were not all, of course, necessarily moved by tampering with the locks themselves. Although from the data examined it was not possible to tell how many of the 'new' cars were left insecure, it is quite likely that some of the cars would have been left with the keys either in them or readily available. A United States President's Commission report (1967) on crime suggested that 42% of cars stolen had unlocked ignitions, while in this country Baldwin (1974) has shown, similarly, that a disproportionate number of cars left insecure are taken and driven away, or have property stolen from them. Thus, if steering column locks are less effective than might

be expected from their technical design, some degree of carelessness on the part of car owners is likely to provide part of the explanation.

Although Table 1 shows a greater decline in theft than in unauthorized taking, this was not statistically significant ($\chi^2 = 3.6$; 1 df). Steering column locks might have been expected, in fact, to have had a greater impact on unauthorized taking than on theft, given that 'stolen' cars are often regarded as being taken by determined thieves interested in resale, but cars recovered within 30 days as being taken by more opportunistic 'joy-riders', or those in need of transport. It is becoming increasingly difficult, however, to maintain the distinction between theft and unauthorized taking on the basis of a 30-day retrieval period, since more than half the cars recorded as stolen in the MPD are eventually recovered. In easier circumstances, they might have been recovered sooner and thereby have been classified as taken without authority. Moreover, in the present sample, there was no evidence, as one might have expected, that stolen cars were newer than those taken for more casual purposes, since the distribution of cars of various ages between the two categories of theft and unauthorized taking was statistically indistinguishable. This again suggests that the present distinction between the two categories is insufficiently sound to test whether steering column locks have less of a deterrent effect on professional thieves than on more casual car takers.

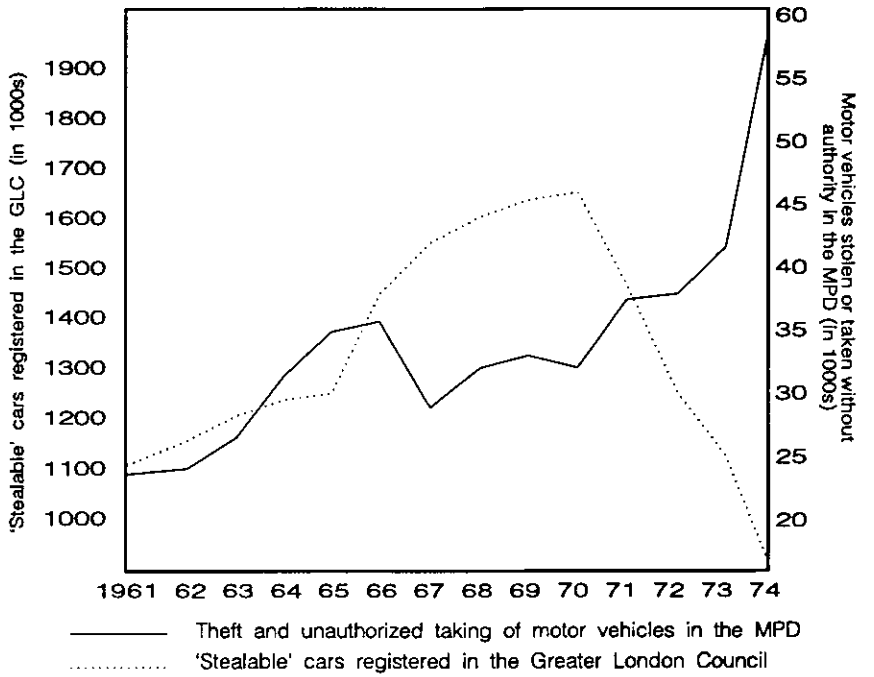
The possibility that some factor other than increased vehicle security had intervened since 1969 to reduce the vulnerability of 'new' cars in 1973 was dismissed as remote given that the theft of 'new' commercial vehicles and 'new' motorcycles (neither of which had been covered by any comparable requirement for additional security) had not dropped since 1969. On the contrary, a limited sample of these vehicles was examined, and the proportion of 'new' models stolen was found to have increased from 19% in 1969 to 22.5% in 1973.

It seems, then, that steering column locks are efficient in reducing the risk of cars fitted with them being illegally driven away. In fact, extrapolating from our sample, the risk of a 'new' car being stolen or taken without authority in the MPD was about three times less in 1973 than in 1969. The risk to 'old' cars, on the other hand, nearly doubled over the same period and it seems most likely that part of this increase in risk reflects the greater security of 'new' cars—protecting these may well have re-directed some thieves to easier targets.

Future levels of theft and unauthorized taking

While, at present, steering column locks are not providing the police with any overall benefit, their effectiveness in preventing the theft and unauthorized taking of cars to which they are fitted suggests that as the proportion of protected cars increases, the numbers of these offences might fall. For various reasons, however, it is difficult to make any precise estimate of when steering column

FIGURE 1
THEFT AND UNAUTHORIZED TAKING OF MOTOR VEHICLES IN THE METROPOLITAN POLICE DISTRICT AND NUMBERS OF 'STEALABLE' CARS (I.E., WITHOUT STEERING COLUMN LOCKS) REGISTERED, 1961-1974



Note (i) The figures representing 'stealable' cars on the road (estimated from the GLC registration data) relate to cars and vans alone, while the figures for vehicles stolen and taken without authority (from MPD crime statistics) also include lorries and two-wheelers. Since the number of cars and vans is a proportion of all vehicles stolen and taken has steadily increased since at least 1968, the increase in theft and unauthorized taking shown above would have been greater had other vehicles been excluded from the calculations.
(ii) The boundaries of the MPD and GLC do not quite coincide, though the discrepancy between them is not great. Since the boundaries for the GLC were established in 1964, the figures for cars registered in the area before then are estimated.

locks might begin to have such an effect. In the first place, like other locks, steering column locks become easier to 'break' as they become worn, so that the protection they give may diminish with age. Again, as more cars have locks, it is arguable that the need for the unauthorized user to 'break' them will increase and he may become increasingly ingenious in his attempts. This might be

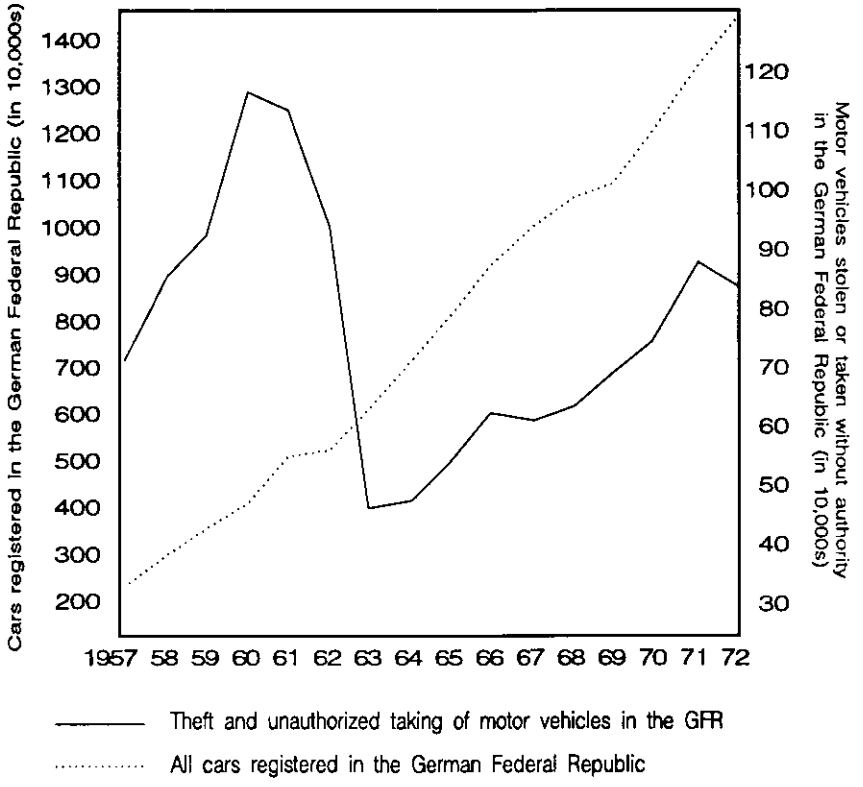
especially applicable to those who make a living from stealing cars (by resale of the vehicle, or its parts) since the value of old, unprotected cars will diminish as the proportion of cars with locks increases. Lastly (and this is particularly likely if locks maintain their effectiveness, or are supplemented by more elaborate security devices), professional thieves may respond by changing their *modus operandi*. For instance, they may increasingly acquire cars from locations such as garage forecourts where the keys are likely to be available, or by fraudulent means from car hire firms.

The central difficulty in making reliable predictions about future levels of autocrime, however, is that our findings show that the number of 'stealable' cars[6] on the road (i.e. those without steering column locks) does not clearly or directly influence the level of theft and unauthorized taking. Figure 1 shows a progressive increase in theft and unauthorized taking since 1961 (notably sharp in 1974) which has not been affected by the reduction in the number of 'stealable' vehicles following the 1971 measures. Although the number of 'stealable' vehicles was even lower in 1974 than in 1961, the volume of car theft and unauthorized taking was 160% higher at the later date than at the earlier one. Theft and unauthorized taking is apparently not dictated solely by the number of easy opportunities available, and reducing opportunities by fitting an increasing proportion of cars with anti-theft devices might not effect the level of theft in any predictable way.

The increase in theft and unauthorized taking shown in Figure 1 also calls into question the hypothesis that autocrime is fairly closely related to the number of vehicles registered, as Wilkins (1964) has argued was the case in England and Wales between 1938 and 1961. If the number of cars *without* steering column locks is taken as an index of opportunity to steal cars, his hypothesis is, as indicated above, clearly untenable; if the total number of cars *registered* is taken as this index, the data still disproves the hypothesis as it stands; for instance, in 1974 there was a 34% increase over 1973 in the number of thefts and unauthorized takings, but a slight decrease in the total number of cars registered.[7]

A more sophisticated model to explain levels of car theft has been proposed by Gould and his associates (Gould, 1969; Mansfield *et al.*, 1974) which takes into account the changing relationship between the 'supply' of vehicles and the 'demand' for them from various sections of the population. Explaining varying levels of autocrime at different periods and in different countries, they have claimed that when vehicles are in short supply they are the preserve of the professional thief, but when they are abundant they are stolen mainly by amateurs (for instance by those who wish to keep a vehicle for their own use). The model, however, does not adequately accommodate the pattern of autocrime in this country. For instance, while it is claimed that vehicle thefts peak and begin to decline when there are about 160-200 cars per thousand of population, there

FIGURE 2
THEFT AND UNAUTHORIZED TAKING OF MOTOR VEHICLES IN THE GERMAN FEDERAL REPUBLIC, AND NUMBERS OF CARS REGISTERED, 1957-1972



is no sign that vehicle thefts in this country are beginning to decline even though vehicle registrations are now well beyond the level specified. Moreover, the steep increase in theft and unauthorized taking that has occurred in this country recently cannot be easily explained in terms of supply and demand since the number of vehicles on the road has not greatly altered.

One shortcoming of the predictive models of both Wilkins and Gould would appear to be that no weight is given to varying levels of vehicle security. More precisely, their models may only be tenable when the abundance of similarly insecure vehicles is the only changing factor over time. They fail to accommodate situations in which the overall level of vehicle security is raised, as we explain below has been the case in the German Federal Republic, and those in

which a proportion of the cars on the road are made more secure.

The importance of vehicle security has been confirmed by our findings that cars protected with locks are much less likely to be taken or stolen than they would otherwise have been. Other evidence (Bundeskriminalamt, 1973) of its importance is provided by the pattern of autocrime in the German Federal Republic since 1963 when all cars, both new and old, were required to be fitted with anti-theft devices (see Figure 2). Increasing the security of the total population of cars in this way produced a very marked decrease (62%) in car theft during the first complete year (1963) when all cars were protected over the last complete year when no cars were protected (1960). In fact, security protection decreased the risk of a car being stolen or taken without authority by a factor of nearly *four*, and this decrease has endured: the risk of a car being stolen was virtually identical in 1972 as in 1963, taking into account an 86% increase in registrations. In other words, the German case indicates that the incidence of car theft is related not only to the number of cars on the road (as Wilkins suggests), or the changing demand for them by different types of car thief (as in Gould's argument), but also to the degree to which they are secured.

There are considerable problems, therefore, in accurately predicting future levels of car theft and unauthorized taking in this country. The apparent fact, however, that a substantial proportion of cars taken involve youths who 'joy-ride' or miss the last bus home perhaps suggests that anti-theft devices will eventually reduce the overall level of autocrime. According to MPD statistics for 1973, 85% of cars stolen or taken without authority were recovered, the great majority of them within 30 days. For the most part, these cars can reasonably be assumed to have been taken by casual unauthorized users who were probably responding to the opportunity presented by the large number of relatively insecure vehicles on the road.

One might well expect that the fitting of steering column locks to an increasing proportion of vehicles will eventually be reflected in a lower incidence of 'joy-riding' and 'journey-making' on the part of the less painstaking, more opportunist, thief. For eventually the absolute numbers of unprotected cars on the road will fall to figures low enough to alter materially the ease of finding a car for illegitimate use. Thus in the MPD in 1973, 1:32 unprotected cars were stolen or used without authority at a time when cars with steering column locks accounted for about 37% of cars on the road. In the MPD in 1977, protected cars will account for about 68% of cars, and in 1980 for about 81%[8]. It is worth noting that at these two levels some 1:20 and 1:13 unprotected cars would have to be stolen or taken without authority if the same number of such vehicles were to be taken as in 1973. On the face of it, either proportion seems untenably high given (apart from anything else) that risks of these magnitudes would hardly be

accepted complacently by owners of old cars — or by their insurers.

Displacement

A main finding of the present study is that although steering column locks have substantially reduced the risk of cars fitted with them being illegally driven away, they seem also to have had the effect of redirecting thieves to cars without them. The results are therefore compatible with a 'specific' displacement effect. Or, at least, the findings support 'specific' displacement in the current situation when, given the 1973 level of cars with steering column locks (in the MPD about 37%) the absolute number of unprotected cars (some 1.2 million) seemed quite adequate to allow displacement to these: the potential thief or joy-rider would have little difficulty in finding an unprotected car when he wanted one. We have already pointed out, however, some of the difficulties of knowing whether displacement to unprotected targets will as readily occur when the number of these is heavily outweighed by the number of cars protected by anti-theft devices.

As it becomes increasingly difficult to find unprotected cars, the 'specific' displacement that will occur may be of the kind whereby car thieves — or, more precisely, some car thieves — change their methods of operation. It seems likely that those who at the moment steal cars for re-sale will, as well as developing more sophisticated methods of moving secure cars and devoting more effort to the fraudulent acquisition of cars, also displace some of their present activities to related offences such as stealing parts and contents without moving the car and stealing relatively vulnerable commercial vehicles. In contrast, displacement to other autocrime is less likely to occur among those who casually and opportunistically take cars for purposes (for instance, a ride home) which would not be obviously served in other ways.

While this study provides evidence that curtailing opportunities for autocrime might lead to a degree of 'specific' displacement, it says nothing of course about the extent to which reduced opportunities for car theft will 'generally' displace behavior to other forms of deviance. We ourselves would be hesitant to suggest that, with higher levels of vehicle security, there will be any greater incidence of other crimes whose ends are not congruent with those presently served by autocrime, and for which different internal and external sanctions might apply. Thus, in relation to those casual car users whose activities are unlikely to be 'specifically' displaced to other forms of autocrime, we would argue also that their energies are unlikely to be 'generally' displaced to mugging passers-by for money to get home, hijacking taxis, or assaulting bus conductors.

General implications for crime prevention

The implications of this study for crime prevention, then, are of some weight.

For having shown that steering column locks have, for the time being at least, probably displaced some autocrime to unprotected cars, we have shown how optimistic was the hope that overall levels of car theft might be reduced through a securing of a proportion of those vehicles at risk. A clear lesson of this research is that the police will derive only limited benefit from preventive measures which protect only a proportion of vulnerable property — as indeed has already been argued by Riccio (1974) in relation to autocrime in the United States. If within easy reach there is equally vulnerable and equally attractive property, anti-social behavior will probably be displaced to this. To derive real benefit the whole class of property must simultaneously be secured — a principle, of course, which has been borne out by the successful German experience of anti-theft devices on cars.[9]

Inevitably, however, a total securing of a class of property will cost more than a partial securing of it; and it is worthwhile trying to assess whether, in Germany for instance, the cumulative cost of fitting all cars on the road with anti-theft devices has been justified in terms of some of the more definable savings made. Indeed, since locks on cars serve no obvious purpose other than increasing car security, their cost-effectiveness as a crime prevention measure is particularly well worth considering.

Between 1961 and 1973, the cost of fitting all cars at risk in the German Federal Republic with anti-theft devices can be estimated at £177m, on the assumption that the cost of equipping each existing car was £15 and each newly-produced car £10. On the further assumption (and it is a very optimistic one) that, of all cars registered, the proportion stolen or taken without authority in each year since 1960 would have stayed at the 1960 level, the loss of some 2.6m cars has been prevented over the 12 year period — apparently by the universal fitting of anti-theft devices. Leaving aside that the protection of many newer vehicles will be of continuing benefit after 1973, the total cost to car-owners of £177m, when averaged over these 2.6m cars, gives a figure of about £70 per theft prevented, i.e. to prevent the loss of one car, some seven individual car-owners have each had to bear the relatively small expense of £10 to protect their car with an anti-theft device. This cost can be offset against the cumulative savings made from the total number of prevented losses in terms of police time, the costs to insurance companies, the material costs to owners of stolen vehicles, and the cost associated with the road accidents in which stolen vehicles are often involved. While it is difficult to put a figure on these savings (and we acknowledge that for cars retrieved quickly and undamaged, the inconvenience costs might be greater than the material ones) it would seem, on the face of it, that the fitting of steering column locks in Germany has been cost-effective.

Up to the present time, steering column locks have been cost-effective in this

country only for the owners of cars to which they have been fitted — a small additional sum on the price of a new car has conferred the benefit on these owners of a substantially reduced chance of their car being stolen. But the fitting of steering column locks to new cars has not been of any great collective benefit since, on our argument, the protection of only a proportion of cars on the road has in all probability meant that car theft has been displaced to continuingly vulnerable (though admittedly less valuable) older vehicles.

At first sight, then, the argument for requiring old cars as well as new ones to be fitted with anti-theft devices might seem a strong one. In fact, even discounting the difficulties of gaining public agreement, the time that would elapse before action could be taken (realistically perhaps three years) might render the measure superfluous. By 1978, an estimated 73% of cars in the GLC will be protected by anti-theft devices anyway, and as we have said, the owners and insurers of the remaining vehicles may not be prepared to run the enhanced risks of these cars being removed illegally.

In the meanwhile, the disproportionate increase in theft and unauthorized taking over the past few years requires some explanation, and this will be helped by more accurate information about the purposes for which cars are taken, the immediate inducements which operate, and the ways in which different types of illegal users acquire cars. Nevertheless, it would seem - given the still large proportion of cars recovered intact - that casual offenders are heavily implicated in the recent increase in autocrime. In direct practical terms, then, though we have argued that steering column locks will ultimately prevent much casual taking of vehicles, perhaps the benefits of such locks should be maximized by making it more difficult for drivers to leave keys in the car (through the use of spring-ejection locks and key warning systems), and more difficult for keys to be acquired fraudulently. To the extent, however, that some of the increase in car-taking is in the furtherance of theft of contents, it would be worth trying to improve door locks. In any event, a technical approach to the problem of vehicle security is likely to prove more acceptable than at least the alternative of introducing legal sanctions against drivers who leave their cars insecure.

NOTES

1. The agreement to fit steering column locks to cars (and vans derived from cars) was a voluntary one negotiated by the Home Office with the Society of Motor Manufacturers and Traders. Though the agreement allowed for alternative anti-theft devices, in practice most cars have been fitted with steering column locks. Thus, for convenience, all devices covered by the 1971 agreement are referred to in this report as steering column locks.
2. *Criminal Statistics: England Wales, 1973.* Autocrime here is unauthorized taking of vehicles, vehicle theft and the theft of property from vehicles. Vehicles in this case

comprise commercial vehicles and two-wheelers as well as private cars and vans.

3. At the same time, given increasing skepticism about the validity and reliability of official criminal statistics, it is worth making the point that statistics relating to cars which are illegally driven away are unusually accurate, at least as far as the reporting of offences is concerned. Because of insurers' requirements that the police be notified when a claim for theft is made, and because of the owner's dependence on the police to help retrieve cars, failure to report missing vehicles is rare (cf. Mansfield *et al.*, 1974).
4. The age of a vehicle cannot always be determined from its registration number. For example, second-hand cars imported from abroad are registered by year of import rather than manufacture, and some owners of new cars, especially expensive ones, obtain personalized number plates. These and other exceptions were rare enough to be discounted in the analysis. Because of the practice since 1967 of changing the suffix to licence numbers on August 1, J registration cars were subdivided into those registered before February 1, 1971 (assumed to be without security protection) and those registered after that date (assumed to be fitted with anti-theft devices).
5. Two other categories of autocrime maintained in MPD statistics are theft of property from a vehicle which is not moved and theft from a vehicle which is moved. Since 1969, theft from vehicles which have been moved has continued to rise along with unauthorized taking and theft, confirming that steering column locks have not improved the overall picture of car theft. At the same time, it appears from some rather limited data we collected that moving a car and taking property from it occurred very infrequently among vehicles fitted with steering column locks, again suggesting that such locks are effective anti-theft devices.
6. 'Stealable' cars are those assumed to be without steering column locks on the grounds that they were first registered before 1971. The number of such vehicles on the road in subsequent years was estimated by subtracting new registrations from the total number registered in each year, allowing for a small amount of 'wastage' of vehicles first registered after January 1971.
7. There are other problems with Wilkins's analysis. In relating the level of vehicle registration to the volume of *theft from* motor vehicles, rather than to the *theft of* or to the *unauthorized taking* of these vehicles, Wilkins appears to have chosen the index of autocrime which supported his proposition best. Moreover, even this rather convenient measure of autocrime has not related well since 1961 (when his analysis finished) to the increase in vehicle registration.
8. These estimates assume that the yearly level of new registrations will remain constant at its 1973 level, and that the 'fall-off' in registrations of old cars will conform to present patterns in the GLC (as they appear from GLC car registration data). No attempt has been made to predict the situation beyond 1980.
9. Another interesting example of a legislative measure which has been applied to a total class of vulnerable property is the requirement brought into operation on 1 June 1973, that all riders of motor-cycles (and similar two-wheelers) wear protective headgear. While the measure was introduced for reasons of road safety, there is evidence that an unintended but valuable consequence of the regulation has been a reduction in the number of two-wheelers stolen and taken without authorization. The number of two-wheelers so removed in the MPD fell from 5280 in the 12 month period immediately

prior to the introduction of the protective headgear regulations to 3997 in the subsequent twelve months (a decrease of 24%). This was particularly noticeable in relation to unauthorized taking, and contrasts with a rise of 35% in the theft and unauthorized taking of other motor vehicles in the same period. To the extent that vehicle theft is opportunist, it is reasonable to think that some potential users (aware of what was a well-published requirement) have been deterred from illegally taking two-wheelers because of their increased visibility if not wearing a crash helmet. It is not unlikely, of course, that some small proportion of the rise in 1973 in the theft and unauthorized taking of other motor vehicles could be accounted for by displaced two-wheeler theft. Indeed, such an effect would be a good illustration of how 'specific' displacement might operate between two categories of similar offences involving property which serves generally similar ends.

3. Preventing post office robberies in London: effects and side effects

Paul Ekblom

EDITOR'S NOTE: First published as Ekblom (1988b), in a special issue of the Journal of Security Administration *on situational prevention, this is a summary of a Home Office Crime Prevention Unit project. Brief as it is, the case study is notable for three things. First, it is one of several recent studies to provide evidence of the value of screens in preventing attacks on vulnerable employees. The installation of fixed and "pop-up" screens is believed to have been an important element in reducing over-the-counter bank robberies in Australia (cf. Clarke et al., 1991) and Poyner et al. (1988) have found that screens reduced attacks on bus drivers in a North of England transit authority. Second, in his ingenious evaluation, which attempted to take account of a general decline in robbery in London coincident with the security initiative in the sub-post offices, Ekblom found evidence of what has been called "diffusion of benefits" (see the* Introduction*): Not only did over-the-counter robberies decline, but so also did robberies of staff and customers in the non-*

secured area of the premises. Ekblom suggested that the reason may have been that would-be robbers had been put off "by the very general message that something had been done to improve security at sub-post offices". He notes that interviews with robbers might have permitted his hypothesis to be checked. Third, the fact that robbers made greater use of firearms after the security upgrade, but with no more success and without more serious consequences for the post office employees, permits Ekblom to make some highly pertinent observations on the phenomenon of "escalation."

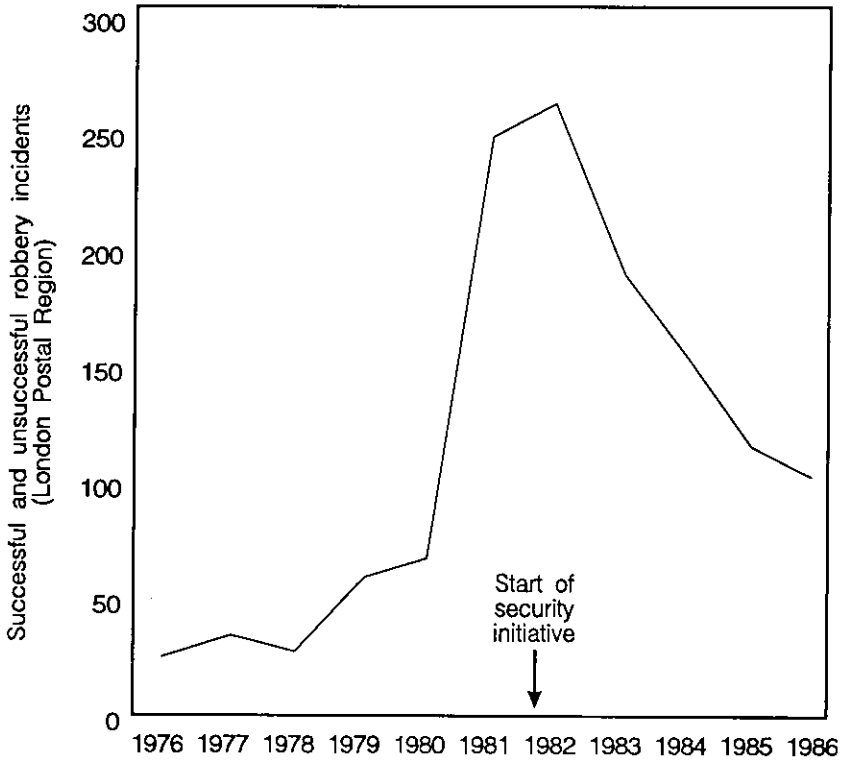
THE BRITISH sub-post office is something of a neighborhood institution. Sited in a general store, a newsagent's, or a candy shop, it sells stamps and dispenses pensions and state benefits. It takes in savings deposits and deals with a range of administrative matters ranging from vehicle excise duty to dog licenses. Handling, as they do, considerable amounts of cash and valuables, they are a target for robbery.

In the early 1980s, the number of robberies of London sub-post offices dramatically rose from 70 in 1980, including attempts, to 250 in 1981. The Post Office (PO) responded by analyzing the methods of attack. It concluded that existing anti-bandit counter screens were inadequate (the screens were being smashed by sledgehammers or occasionally just torn down). The PO also concluded that security procedures, such as the locking of doors to the secure area behind the counter, were deficient. They embarked upon a program of upgrading the screens in all 1300 sub-post offices in the London Postal Region and training the staff. The robbery rate peaked at 266 in 1982 and then steadily fell back to 121 in 1985. Figure 1 shows this pattern. (The data for this research came mainly from the Post Office Investigation Department's own records which supplied details of every incident.)

On the face of it, the security initiative was an outstanding success. However, after conducting a more thorough evaluation, the answer was really far from clear. It was necessary, first, to establish that there had been a real fall in robbery rates rather than mere random fluctuations, and to estimate the size of the real fall and, second, to determine how much of the fall could be accredited to the PO initiative rather than to coincidental events such as police action, which produced what could be called the background fall.

Since this was a retrospective study, it was not possible to establish a control design for the evaluation. Instead, the strategy was to identify indicators for the size of the background fall which could then be subtracted from the total fall,

FIGURE 1
NUMBER OF SUCCESSFUL AND UNSUCCESSFUL P.O. ROBBERY INCIDENTS BY YEAR



Adapted from Ekblom (1987b)

yielding as a remainder the estimate for the fall due to the security initiative. As a means of coping with the high degree of uncertainty in the evaluation, three different estimates were derived.

Estimate 1 simply assumed that the entire fall could be acredited to the PO and that there was no background fall at all.

Estimate 2 used as indicator of the background fall the rate of robberies of all non-sub-post office business premises in the (London) Metropolitan Police District (corrected for possible displacement from SPOs themselves).

Estimate 3, by contrast, used one of the sub-post office robbery methods, itself, to indicate the background fall. The method in question was the attacks on staff or customers outside the secure area, where neither the upgraded screen nor the improved security procedures could be expected to have much of a direct impact.

For each of the three estimates, a figure was calculated for robberies prevented which could have involved a loss of cash or valuables (successful robberies) and another for all incidents prevented, including failed attempts (unsuccessful robberies). (Obviously, this involved comparison of expected levels of successful robberies, say, after the initiative with actual levels).

Main effect of security initiative

A detailed account of the method of evaluation and its assumptions is presented in Ekblom (1987b). The individual values of the estimates should not be taken too literally, as they are only points lying within a fairly broad range of uncertainty. Estimate 1 of the fall due to the security initiative shows a remarkably good achievement by the Post Office (107 successful incidents prevented per year from January 1984 to March 1986, the "After" phase of the evaluation) equivalent to nearly 65% fewer than expected. For successful and unsuccessful robberies combined, the figure is 198 incidents prevented or just over 60% fewer than expected. Estimate 2 gives only slightly smaller figures (87 successful incidents prevented per year, equivalent to nearly 60% fewer than expected or 158 successful and unsuccessful incidents, equivalent to nearly 55% fewer than expected). By contrast, Estimate 3 is modest — seven successful incidents prevented per year from 1984-6, or about 10% fewer than expected. For successes and failures combined, there are 8 incidents more than expected with reference to the background fall.

Pooling the 3 estimates, the evaluation concluded, with a wide margin of error, that the security initiative had reduced the rate of successful robberies by about 45 per year. Or, put another way, it cut the robberies by something over 40% of the level expected, had the background fall operated alone. When failed robbery incidents are added to the picture, however, the estimate of the preventive effect is smaller in proportional terms (35%) although larger in absolute terms (75 incidents prevented per year).

There are two points of particular interest to emerge from these findings. First, the difference between Estimates 2 and 3: Estimate 3 was calculated using, as a indicator of the background fall, the rate of attacks on SPO staff and customers outside the secure area, since this method could not have been impeded by the improved screens and tighter door security of the initiative. (There was, moreover, no evidence of displacement to this method which would

have interfered with its function as indicator.) It is possible, however, that the security initiative had its impact on robbery less through direct physical deterrence and more through putting off would-be robbers by the very general message that something had been done to improve security at sub-post offices.

Estimate 3 fails to register this by definition, since any such effect would serve to reduce the rates of robbery by all methods equally, including the method used as indicator of the background fall. Consistent with this interpretation is the pattern of changes in the proportion of the various methods of attack which were successful. Those attacks which exploited the physical weakness of the screen and procedural insecurities might have been expected to show a marked fall in the successful proportion simply because they were becoming harder to commit. In the event, though, relevant attacks showed only a modest decline (0.65 physical attacks successful at the peak phase of robberies to 0.47 in the final, post-initiative phase; 0.87 insecure attacks successful, falling to 0.73) — supporting the view that robbers' actual experience of increased difficulty in attacking the sub-post offices may have been less significant in deterring them than their perception of increased difficulty.

The second point of interest is that the security initiative seems to have had a greater impact on successful robberies than on failures. The key to understanding this lies with displacement. Displacement is obviously very important, although opponents of the situational approach argue there is no point in trying to prevent robberies — since the robbers, being determined and "professional", will always find another way or another target.

Displacement — the side effects

By looking at the changes in robbery rates for individual methods of attack on the SPOs, it was possible to put together a plausible interpretation of the pattern of changes — a pattern which, it must be repeated, has a broad margin of error. Basically, what seems to have happened following the security initiative was displacement to a method more likely to fail. Perhaps it is best to explain in terms of good news and bad news. First, the good news. Relative to the background fall, the Post Office's security initiative succeeded in considerably reducing both physical attacks on the screen and the attacks which took advantage of insecurities such as open doors or parcel hatches. The bad news was that robbers turned to other methods — in most cases they resorted to simple firearms threats at the screen. However, the silver lining to this cloud was that altogether there were twice as many failures as successes in these displaced incidents.

Why did the robbers' move to the firearm threat more frequently result in failure than success? It is worth exploring this in some detail. In Britain (where

the use of guns in the furtherance of crime is still, in general, much less than in the USA) displacement to firearms is seen as a major impediment to the effectiveness of situational means of preventing robbery. Relative to the other methods of attack, firearms threats at the screen have a consistently higher failure rate. More than twice as many firearms threats at the screen fail as succeed (71% of firearms threats failed in the final phase of the evaluation, compared with 53% of physical attacks on the anti-bandit screen). For robbers intending in advance to make a gun the centerpiece of their attempt, a naive faith in the weapon may prevent them from adequately preparing for the raid, or encourage otherwise nervous or unskilled people to make the attempt. Where the switch to the gun is not made until the raid is under way, for example as a tactical move in an endeavor to recover from the debacle of the sledgehammer rebounding from the screen, the robbers will commence their firearms threat from a position of a psychological disadvantage, in a game where bluff is more important than actual use of weaponry.

The conventional image of displacement would see target hardening of the screen leading robbers to go off and return with a gun. The move to the firearms threat did not conform to this stereotype! What happened instead, seems less like the addition of a new and more deadly resource, than a restriction on the previous alternatives open to robbers. In a tactical shift, they were forced to abandon their sledgehammers and fall back on the gun (that many of them were carrying already) as a second line of offense. In support of this, it can be said that 2/3 of the physical attacks on the screen were conducted by robbers carrying guns anyway. Indeed, some of the physical attacks were made using the butt of a sawed-off shotgun.

The presence of firearms might be expected to increase the likelihood of success of any method of robbing sub-post offices. However, looking at the methods of attack at the screen other than firearms threat (where firearms are always present by definition), the presence or absence of a gun made no difference to the success rate. Taken together, these findings suggest that the gun is not always the "equalizer" it is supposed to be. This runs contrary to some American findings; for example, Skogan (1978) found that success rates for commercial robberies were highest when a gun was involved (94% succeeded, compared with 65% of those where the weapon was a knife, and 48% when other weapons were produced). However, it is consistent with earlier research by Conklin (1972), who found from a sample of robberies in Boston that offenders unequipped with firearms tended to increase the physical intimidation of victims by pushing and shouting, to achieve the same level of compliance.

With the increase in raids where firearms occupy center stage, are SPO staff actually worse off as a result of the security initiative? Broadly, they are not. For

one thing, failed attacks are generally over in less than a minute and normally involve no injuries; moreover, many SPO staff, rather than being traumatized, feel that they have beaten the bandit.

So far, discussion has focused on displacement between methods of robbery. There may have been some displacement of attacks from inside sub-post offices to raids on deliveries to SPOs of cash and stamps. In these incidents, the robbers lie in wait for the mail van and spring out when the valuables are being carried across the sidewalk. Delivery raids have increased in recent years — although not far enough to neutralize the preventive gains made within sub-post offices. But, there are grounds for believing that the increase is not wholly attributable to the PO security initiative. First, the rise in PO delivery raids seemed to start before the PO security initiative. Second, in London and elsewhere, there was a general move away from robberies of all types of cash-handling premises in favor of delivery raids. It seems as if the increased occurrence of delivery raids is determined as much by pull — the pickings are richer elsewhere — as by push. Third, while the evidence is only anecdotal, the PO Investigation Department believes that there is relatively little overlap between SPO robbers and delivery raiders, the delivery raiders requiring a great deal more determination and planning.

In drawing together this discussion of displacement, three things can be concluded: 1) there has been displacement within the SPOs — in fact, an excess of displacement — but the displacement has been from methods which were once successful to methods which tend to fail. Presumably, in the longer run, robbers will realize this and give up; for the moment, they try, try, and try again. Greater publicity given to the security initiative might speed up this learning process, although care must be taken when doing so to maximize the broad deterrent message rather than inform the robbers of the precise details and the limitations of action taken; 2) There has been a shift towards methods that solely rely on guns but in many cases the guns were there already as a backup. Coping with the excess of failures and more prominent deployment of weapons has not, however, seemed to tip the SPO staff from the frying pan into the fire, as critics of situational crime prevention fear; 3) There has perhaps been some displacement from SPO robberies to delivery raids, but not enough to nullify the preventive gains of the security initiative. Besides, there is a good argument that one should not neglect a known and remediable source of vulnerability simply because of a fear that there could be other weak spots in the cash handling world.

The real test of security measures, however, does not come until all targets are equally hardened, and offenders have to make equally hard choices whether to persist in the face of greater effort, cost, and risk; to seek a radically different set of targets; or to drop out of robbery altogether. Such strategic decisions as

these are discussed in Cornish and Clarke (1986), who also cover the more tactical decision-making that appears to underlie the offender's behavior in initiating and carrying through individual criminal acts.

Are these robbers professionals?

The professionalism of offenders is a complex concept: relevant features include their skill, planning, determination, and coolness. Whatever the case, it is often assumed that commercial robbers fit the picture. The SPO robbers did not. A similar conclusion was made by Feeney (1986) and Normandeau and Gabor (1987) based on their respective research into armed robbery in North America.

It was already argued that many guns used served to prop up an otherwise shambolic operation; more generally, about half the attacks ended in failure. While no data were available for direct comparison with raids on other cash-handling premises, the failure rate of armed robberies in the whole of England and Wales is considerably higher at SPOs than at building societies or banks (Home Office, 1986). Some explanations focus on the nature of SPOs themselves, their staff, and their earsplitting anti-bandit alarm; others suggest that those who choose to raid sub-post offices may be particularly inept or nervous individuals whose reliance on guns is all the greater and who may mistakenly believe that sub-post offices are easy targets.

Some examples taken from PO incident records show how easily robbers were deposed from control or never even made it that far. One robber queued up at the counter, and when, eventually, it was his turn to be served, made his demands. The sub-postmaster informed him that the PO part of the shop was now closed, and he promptly fled. Another one attempted to ignite some gasoline as a threat, but the matches repeatedly failed to strike. A third leveled his gun at the assistant working in the open part of the shop and demanded that the sub-postmaster open up the secure door. The assistant responded with a cry of "Knickers to you! Sound the alarm!", at which event the robber bolted. Another one made it past the security door but cut and ran when the handle of the safe came away in his grasp. And last of all, in headlong flight, one robber sought to divert possible pursuers by throwing a smoke bomb, a clever move, had it not merely served to attract the attention of a passing police car. If displacement depends on robbers being determined and resourceful, then many of the amateurish performers, fleeing empty-handed from SPOs, seem unlikely to persist for long.

Final points

Setting aside any displacement to delivery raids, the PO security initiative has (on the strength of the pooled estimate) already paid for itself. It is yielding

a good annual return of a third to a half the initial capital outlay. The PO has taken steps to introduce similar security measures in individual sub-post offices in other parts of the UK, chosen for their location and vulnerability to attack.

A degree of control of the current problem should not lead to complacency, because the robbery scene is always changing as robbers develop new methods and technological developments give one or the other side momentary advantage in a kind of arms race. Most crime prevention initiatives are likely to have only a limited useful life, especially if they rely on deterrence whose basis is more psychological than physical.

The PO, like other cash-handling agencies and, indeed, the police, will always be somewhat behind developments in robbery methods. The initiative lies with the robbers, and it takes time to reliably detect the emergence of a new pattern and then to devise and implement a response. The lag before an intelligently targeted response is made can be greatly reduced by the PO's use of crime analysis on a routine basis; computerization of robbery incident records would make this still faster and easier (see for example Ekblom, 1988a).

Evaluating this security initiative has shown that it is vital to look at shifts in robbers' methods over time. This helps the practitioner understand exactly what has happened, in terms of effects and side-effects, and to anticipate what might happen in the near future. This study had to rely on plausible inferences about robbers' decision making based on detailed analysis of incident records. It would have helped enormously to clarify and to confirm (or refute) the conclusions if interviews had been conducted with a sample of convicted PO robbers. Interviews should cover the way they perceived the target, methods preferred and associated costs, risks, and payoffs. This is to be recommended for future practically oriented research. In fact, it is being pursued by the author in a project aimed at preventing robbery, pickpocketing, and assault against passengers on the London Underground.

4. Less telephone vandalism: How did it happen?

Dennis Challinger

EDITOR'S NOTE: This case study, originally published as a Security Journal *article (Challinger, 1991), describes the way in which Telecom Australia substantially reduced attacks on its pay phones. Wilson (1990) had argued that the success was due to target hardening measures which increased the difficulty of theft from the cash box. A similar program had earlier been found successful in Britain (Markus, 1984). Challinger puts forward the alternative explanation that the reduction was not due simply to target hardening, but flowed from an improved management philosophy, consequent upon the "privatization" of Telecom Australia, which gave higher priority to reducing costs and improving profits. A pay phone division was created in the company which, like existing ones, had to show a profit. Consequently, this division assumed "ownership" of the problem of deliberate damage, which at one time was costing the company A$18 million. It also had the incentive to tackle the problem, which it did through a variety of management initiatives described by Challinger. The case study may help to*

explain why it is unusual to find pay phones in the United States rendered inoperative by damage. Since these have always been provided by private telephone companies, the need to make a profit may have ensured that the equipment is designed to withstand assaults and, when damaged, is quickly restored to service. (Incidentally, the pay phone equipment installed in Australia is designed in Japan, not a country noted for its problem of vandalism). A final point: Challinger who now has full-time responsibility for crime prevention within Telecom Australia is an experienced criminologist who has held senior government and university positions. He may be the prototype of a new breed of security manager, with a sophisticated knowledge of practical criminology.

ANY MARKED reduction in reported crime invites attempts to explain it. Obviously, if the factors that explain any reduction can be confidently identified, they may be valuable for future crime prevention (or reduction) activities.

The major strength of retrospective analysis of reductions in crime is that, with the benefit of hindsight, relevant factors can be documented and assessed, even if they cannot be disentangled. The danger with that sort of analysis is that it may still either miss vital factors or attribute too much to minor factors.

Australian public telephone vandalism

Public telephone vandalism in Australia is a particular offense that occurs less today than it did 4 years ago. Accordingly, it invites explanation.

Unfortunately, reliable statistics of the actual frequency of that vandalism are not available. In part, this is because a damaged public telephone may not necessarily be classified as vandalized by the technician who attends and repairs it. Data relating to the prevalence of this offense, therefore, are incomplete, spasmodic, and localized. Notwithstanding that, the costs to Telecom Australia of repairing damaged public telephones (which are generally sited in public places in custom-built glass and aluminum booths) have been reduced from about A$18 million 4 years ago to around an annual A$7 million at present. Note that this measure of crime is cost, rather than the number of incidents.

As the number of public telephone booths has actually increased by about 15% over the 4-year period—currently 35,000—cost appears to be a reasonable measure. However, if the cost of repairing the damage to one vandalized phone had, say, been halved in the period, the number of incidents may not necessarily have been reduced at all. Therefore, any analysis, including this one, would be

a waste of time.

In fact, labor and material costs have certainly not been reduced over the 4 years, so total cost of repair is a reasonable measure. Nevertheless, confident analysis of what appears to be a reduction in the offense is difficult, and although a recent attempt at this by Wilson (1990) does identify important factors, many others exist that need to be acknowledged.

Defining the offense

An essential part of assessing a crime prevention measure is to obtain data on the particular crime problem through all sources including close local scrutiny and research (Ekblom, 1988a). It is no less important in a retrospective study to fully understand the problem in its entirety.

Quite simply, damage to public telephones may not result from criminal activity. This is not exceptional: Gladstone's (1978) research into "school vandalism" revealed that in half of the schools under review accidental damage was the major problem. Public telephone damage can be conveniently grouped into the following four categories, some of which are plainly not strictly speaking vandalism nor would be able to be prevented:

1. *Incidental damage* occurs in conjunction with some criminal attack on the public telephone, most commonly the theft or attempted theft of the coin box or coin. Cohen (1973) calls this "acquisitive vandalism," but that phrase does not reflect the fact that damage occurs in conjunction with another crime rather than its being the sole intention of the offender.

It is important, especially when considering the prevention of vandalism, that the reason behind the property damage is acknowledged. Concentrating on vandalism rather than theft confuses the issue. This occurred when a (Sydney) magistrate claimed in 1986 that public telephone vandalism was "an organized crime costing the community millions of dollars a year" (Fitzgibbon, 1986). Those comments were actually made when sentencing to prison an offender found guilty of 34 charges of stealing cash and 35 charges of damaging or interfering with public telephones. It was indicated to the court that the cost or repair of the relevant telephones was A$21,000 — expensive vandalism to be sure but not the offender's prime motive. He was a thief, and the damage was incidental.

Not all thefts of cash from public telephones involve damage. In the past, employees of Telecom Australia have been prosecuted for such offenses. Physical measures, including key-traps and rekeying coin box access, have prevented further such thefts that generally involve little damage.

However, thefts committed by the public invariably do cause damage. Interviews with youths from a high-crime area in Britain revealed that most were

aware of techniques used to steal coins from public telephones. Giller (1988, p. 12) reports for those youths that "theft was the most common cited motivation for damage to public payphones"; that is, the damage was a necessary part of the theft. Even though the damage to the public telephone was deliberately inflicted, the purpose of that was to enable theft.

2. *Malicious damage* occurs where an offender deliberately damages a public telephone. Markus (1984) draws attention to the important distinction between damage to the cabinet (including window breakage, graffiti, and amateur bomb attacks) and damage to the telephone instrument itself (including smashed handsets and damaged dials). Notwithstanding, this category includes a variety of dissimilar events such as the small shop owner who regularly cut the handset cords on the two public telephones outside his shop to increase the use of the coin-operated phone he had installed for his customers' use, and the youths who kicked in a phone box "just for fun."

British Telecom research indicates that their public telephone vandalism problem falls mainly under this heading. Their major study shows that while 10-12-year-old vandals are simply destructive, different motives hold for older youths. In particular, they say, teen-age vandals were "rebellious, creating problems at home and were anti-everything." Their vandalism "coincided with puberty, and the telephone was often the victim of anger and frustrations that could not be expressed anywhere else" (British Telecom, 1988: 13).

3. *Frustration-related damage* occurs when a public telephone user inflicts spontaneous damage on it following a technical difficulty that prohibited a call being made or concluded; an unsatisfactory personal call; or indeed, an unrelated matter. A recent example of the last is the 18-year old youth who kicked in the glass panels of a phone box because he was angry with a drunken, elderly man who jumped the taxi queue and hit him with a newspaper (He was fined A$360).

4. *Accidental damage* occurs as a result of carelessness or mishap, most frequently involving a motor vehicle. Each month, 35 street-located public telephones in Australia are knocked over by motor vehicles, the vast majority being pushed off their concrete bases following cars parking or performing U-turns.

It is exceedingly difficult to apportion either the financial cost, or numbers of incidents, of damage to public telephones across these categories. Indeed, the basis for all statistical data on public telephone damage is the technicians' reports completed after they attend a public telephone reported as out of order. Faced with a physically damaged public telephone, and without any specific guidance about classification, a technician might define a broken window as accidental, malicious, or frustration-related, depending on his or her subjective assessment, diligence, or imagination. The best that can be said is that it appears that many

of Telecom Australia's current problems are theft-related and, therefore, can best be described as incidental damage.

British Telecom confidently states that "nearly 30 percent of all public telephone faults can be directly traced to vandalism" (British Telecom, 1988). This could be true for Australia, but the precision of available statistics is not sufficient to confirm that.

As Wilson (1990) points out, this lack of reliable statistics presents real problems for evaluating possible explanations for reduced vandalism to public telephones. More seriously, the inability to distinguish between noncriminal (accidental) damage and criminal (malicious or incidental) damage complicates any analysis because the costs of repairing accidental damage are included in the measure of crime introduced earlier. Installing guardrails around public telephones in shopping center parking lots may have reduced future costs of repair but cannot be said to have prevented crime. Nor can that sort of action explain more than part of the drop in the costs of repairing damage to public telephones.

Telecom Australia's response

The major explanation for the marked decrease in the costs of vandalism and damage to public telephones is that the management of this part of Telecom Australia's business has changed.

In particular, management consultants pointed out in 1987, when there were high levels of damage to public telephones, that around 16 separate sections of Telecom Australia were actually involved in public telephone management. That diversity of interest and lack of focal supervision were resolved with the establishment of the Payphones Division in mid-1988. That division's enthusiastic and professional approach to improving public telephone serviceability, eliminating losses, and promoting the use of public telephones is in great part the explanation for reduced vandalism in the public telephone area.

It is important to note that the management change was not introduced as a crime-prevention measure to reduce vandalism. Rather, it was introduced to improve performance in the public telephone area, and part of getting public telephones operational involved tackling vandalism and damage.

The new management adopted considered direct and common sense responses to their existing problems, including that of crime. Those resources mirror the common-sense approaches that have been developed to reduce crimes associated with, for instance, sales tax avoidance and theft in hospitals (Smith and Burrows, 1986).

Additionally, the change in management responsibility cannot be simply described as a "multifaceted campaign designed to reduce telephone vandalism" (Wilson, 1990: 149). The action taken by the new management did include

positive action to address vandalism to the public telephone system, but its major thrust was directed at getting those telephones operational and enhancing Telecom Australia's business activities.

New management approaches

The particular activities that were implemented, and that have helped reduce the costs of repairing damaged (including vandalized) public telephones, are set out below. It is important to note that there are far more of these activities, and they are far broader, than those suggested by Wilson (1990) in his analysis.

It is most convenient to list the various initiatives by reference to the seminal work of Clarke (1978: 71-74), which suggested that vandalism against public property merited measures to directly protect it. The five measures he suggested that are relevant to public telephones are as follows:

1. *Target hardening*. A great many protective physical measures have been introduced over the last few years, particularly in response to malicious and incidental damage. Target hardening to reduce malicious damage to public telephones has included:

- Replacement of the bottom glass sections of full public telephone booths with steel mesh.
- The removal of doors, traditionally a major target for vandalism, where weather conditions do not require doors.
- Design of new improved half-booths comprising a low-maintenance stainless steel and glass upper structure supported on a single pole.
- Strengthened handsets, stainless steel cords and redesigned dials.

Physical target hardening to reduce thefts of coins, and associated incidental damage has included:

- The strengthening of the coin box and its security through development of the "Kirk safe," Barker link," and wave door.
- Modified coin refund chutes that are hard to block.
- New metal coinheads that restrict direct access to the coin-race and make it difficult for thieves to block the race and recover trapped coins at a later time.

There is absolutely no doubt that the introduction of these physical changes has led to a reduction in vandalism and coin theft, as Wilson (1990) has pointed out. To elaborate, the "Kirk safe" was developed in 1985 by Telecom artisans following a rash of oxyacetylene and other attacks on the locking mechanisms

protecting the public telephone coin box, particularly in the State of New South Wales (NSW). The inventors of the "Kirk safe" were rewarded for their innovation with an award of A$15,000 from Telecoms' Staff Suggestions Board, and it was installed in NSW, particularly where the coin box attacks, and incidental damage, had occurred.

In the adjoining State of Victoria, where organized attacks on public telephones had not been a problem, Kirk safes were not widely installed. That fact did not escape the attention of NSW coin thieves who, in a classic example of displacement, crossed the border and plied their trade in Victoria. By the end of May 1986, nine offenders were apprehended as a result of formal surveillance. Six were sentenced to prison terms for the 353 attacks on public telephones for which they were found guilty.

The "Kirk safe" is not cheap, and there were many public telephones in Victoria that were still without it during 1987. The middle of that year saw the arrest, after formal surveillance, of a gang of five who were convicted of 138 counts of theft and 138 counts of malicious damage. Three of those offenders admitted having learned how to steal the coin boxes while they had been serving time in prison.

Thereafter, the vast majority of coin boxes in Victoria were target hardened, but not with "Kirk safes." Instead, the Victorians devised a much cheaper measure — welding a piece of hardened angle iron over that part of the steel door that protected the locking mechanism. That, too, won an award from the Staff Suggestions Board and was successful insofar as the next gang of four offenders, apprehended in April 1988 following formal surveillance, had tackled only public telephones not having the angle iron attachment.

The next adjoining state of South Australia had not suffered the level of organized thefts in Victoria but readied itself in early 1988 by starting to install its own local response — the "wave door," originally developed in Western Australia. The wave door also further protected the coin box locking mechanism from attack, but at only a tenth of the cost of the "Kirk safe." It was, therefore, preferred. A marked upsurge of coin box thefts, possibly displaced from the Eastern States, helped speed up the replacement of the standard, and often compromised, coin box doors with wave doors, and by late 1988, they had been installed across the state.

The above clearly illustrates that physical target hardening reduced incidental damage to public telephones in Australia over the period of 1986-88. However, it also indicates that the various regions were independently tackling the problem at their own pace — no coordinated approach or formal campaign was responsible for these activities at that time.

The subsequent coordinated management approach has built upon these

physical responses with the introduction of the Phonecard, which designs out opportunity rather than actually target hardening. This prepayment card, which allows use of a public telephone without the need for coins, has now been introduced in Australia. Obviously, coinless public telephones will considerably reduce the prevalence of incidental damage. But they may also impact upon other vandalism. Scotland provides a good example: In 1987, vandalism of the public telephones on one Glasgow housing estate reached the point "where it became difficult for British Telecom, to maintain a service." After overcoming resident resistance, and with a considered publicity and education program on the estate, the phones were converted to phonecard operation. In the following 2 months, not one of the phones was damaged (OFTEL, 1988:48).

2. *Formal surveillance.* As indicated above, Telecom Australia has achieved some modest, but considerable success through formal surveillance of high-risk telephone boxes with its own security staff. By way of further example, in late 1984, public telephone box thefts were running at around 400 a month in the Sydney metropolitan area. This led to a special public telephone surveillance team being established and, over the next 12 months, the theft rate fell to about 50 a month.

Surveillance is, of course, a most expensive exercise, and it is viable only where major and persistent incidents of incidental damage occur. Electronic surveillance has been used but found to be of modest success when costs are taken into account. The best, and Telecom Australia's continuing approach to, surveillance is to use it where major problems arise.

3. *Natural surveillance.* Natural surveillance is a variation of defensible space. Very simply, if a telephone booth is situated in a busy public place or is otherwise observable, for instance from adjacent buildings, then it is provided with natural surveillance (see Mayhew *et al.*, 1980). Moran and Dolphin's (1986) study of the characteristics of public telephone locations in Dublin did not find that features such as levels of vehicular and pedestrian traffic, accessibility, and local vandalism could be used to identify locations that suffered greater damage.

Nevertheless, by removing or resiting many public telephones that were situated in dark or quiet locations, Telecom Australia has effectively increased the percentage of public telephones that are provided with some sort of natural surveillance.

One way in which natural surveillance is increased for Australia's public telephones is through keeping booth lighting operational. Lighting is provided to make public telephones identifiable from 400 meters away and to assist with the operation of the phone. However, a working light inside the booth also reduces the soiling of public telephone booths and seems to lead to greater usage

as well as increased visibility of the phone use to the passerby. All of which leads to additional natural surveillance.

4. *Employee surveillance.* Surveillance by employees in the normal course of their work has long been observed to reduce damage in the workplace. Caretakers, doormen, bus conductors, shop assistants, bartenders, and many others all play this role (Mackay, 1988: 89). It is not surprising that increased attention from Telecom Australia technicians, cleaners, and coin collectors have also contributed to the decrease in public telephone vandalism that has occurred in recent years.

Fortnightly cleaning of public telephones is now the national standard (although some remote and country locations are cleaned less frequently). A system has been introduced so that cleaners dial a special telephone number and report not only that they have cleaned a particular public telephone, but also any maintenance work that is needed.

Telecom Australia now undertakes the majority of coin collecting from public telephones, having terminated arrangements with Australia Post. This has led to more frequent clearances of coin (itself a problem in the past in that a full coin box renders a public telephone inoperable). It has also led to a further presence at the public telephone, another avenue through which damage is noted and a less attractive theft target as coin boxes contain less cash.

Recently, Telecom Australia has commenced selling *advertising* space in and on public telephone booths. It has been claimed, by advertising proponents, that such advertising has proved dramatically effective in reducing vandalism and graffiti. All that can be said at present is that the advertising itself has not attracted separate and major attacks. However, it has not been widely introduced. Indeed, it appears that many local councils disapprove of it and see it as aesthetically offensive — even perhaps as offensive as graffiti.

The related problems appear to be two. First, that booth advertising will mask the public service nature of the public telephone and encourage defacement. Second, that others will be encouraged to add their unauthorized decals and posters on booths (even over Telecom Australia's how-to-call instructions).

In some areas, Telecom Australia has actually used their own *decal* to address vandalism problems. One decal with relevant graphics reads, "this public telephone could save your life," and it is plainly intended to deflect offenders. Its effect is not easily measured, and its use is also not wide enough for its effect to be reflected in general statistics.

5. *Rapid repair.* There is absolutely no doubt that public property that is well maintained and obviously well cared for is far less likely to be damaged. What is also important is that when damage is noted it is quickly repaired.

To achieve this, specialist public telephone technicians have been recently

introduced to act promptly on the problems reported from any source.

A further innovation is the public telephone monitoring system whereby a mechanism will report direct to a central computer when the coin box is almost full, the handset has been removed, or the phone has not been used for 2 days. While still under trial, this system when fully operational will provide another valuable source of information for technicians to ensure that public telephones are kept operational.

Employee surveillance and rapid repair directly reflect the new management approach of Telecom Australia to the public telephone business. Again, they were not introduced specifically as crime prevention measures but they have plainly had their own impact upon vandalism.

The value of each of the last three approaches has been documented in the literature. For instance, Mayhew *et al.* (1980) showed that "supervised" public telephones in cinemas, cafes, laundromats, and the like were less likely to be damaged. Wilson and Kelling (1982) also indicated that vandalism was more likely where property showed signs of being uncared for.

Public activity

Apart from the above five measures that have been implemented within Telecom Australia, a number of initiatives directly involving the public have also been introduced.

These need to be seen in light of Telecom Australia's considerable public exposure. Media coverage and advertising ensure Telecom Australia is almost constantly in the public eye. In the public telephone area, a recent campaign has publicized the fact that "Nine Out of Ten" public telephones are now operational. The public are thus made aware that public telephones are now being maintained efficiently and being cared for, and are also being encouraged to make greater use of them.

A public telephone that is used more might be expected to suffer more damage (reflecting constant wear and tear) or less damage (because they are a valued and highly utilized community resource). Existing (British) research on this topic is equivocal. Mawby's (1977) study found that telephone kiosks for which takings were highest were the most heavily vandalized. A more extensive study by Mayhew *et al.* (1980) found no such strong relationship, and Markus (1984) asserts that "the heavily used kiosk suffers relatively little." No relevant Australian data exists, so the effect of any marketing publicity on damage or vandalism cannot be stated. Nevertheless, even seemingly neutral public activities could have some effect on vandalism.

A specific public activity that directly addresses vandalism is the Adopt-A-Phone program that aims to reestablish the public telephone as a community

resource and encourage community members to assist in caring for it. The program is mostly aimed at school children, although some Neighborhood Watch groups have also taken to overseeing their local public telephones. In the formal program, the children design and paint a motif on the public telephone booth, clean it, and regularly check its condition.

On the face of it, this program has been most successful, with maintenance calls and costs being reduced noticeably since its introduction. One of the best examples is provided by the Driver High School in the Northern Territory where the program was first introduced. The public telephone adopted by students at that school had needed over 100 maintenance calls a month prior to its "adoption" by the students, but has now averaged less than 10 a month for the 2 years the program has operated. In that time, there have been four acts of vandalism, compared with that number per month prior to "adoption".

This program was implemented at the same time that target hardening was taking place in the region through installation of wave doors and Kirk safes. Wilson provides statistics relating to the target-hardening exercise in the region (Wilson, 1990: 152), and although he is quite right that those "measures were clearly effective," it must be noted that the Adopt-A-Phone program was introduced at the same time with the same primary objective (See Table 1).The data for recorded incidents of vandalism cover a 39-month period including the 20 months documented by Wilson (1990) in his analysis.

Some effort has been put into the introduction of *educational materials* specially prepared for primary schools. These materials emphasize the ways in which telephones, and public telephones in particular, are essential and valuable to the community. Any impact that such material would have on a vandalism problem would not be expected to be instant. Rather, by emphasizing the community ownership of public telephones, the impact should be noticed in the long term.

More organized attempts have been made to *encourage the public to report* any malfunctioning public telephones through the 1100 number. This has involved public pleas through the media and the distribution of pamphlets. Again, this action does not itself lead to a direct attack on the problem, but rather serves the purpose of allowing rapid repair.

Financial awards are available for presentation to members of the public who help identify offenders who have damaged public telephones. Although this is not widely publicized as a matter of course, the possibility of a reward is often mentioned by Telecom Australia representatives in media interviews and the like. It would be wrong to attribute any great impact to the granting of rewards, but it does alert the public to the problem in another way. Indeed, all media coverage of Telecom Australia's problem, and vandalism in general, sensitizes

TABLE 1
PUBLIC TELEPHONE VANDALISM AND ACTIVITY IN THE SOUTH AUSTRALIA/NORTHERN TERRITORY REGION, JULY 1987 - SEPTEMBER 1990

Quarter Ending	Recorded Incidents of Vandalism	Notable Developments
September 1987	1373	Region's public telephones virtually unprotected despite Eastern states problems and target-hardening activity
December 1987	1821	
March 1988	3459	Marked upsurge in coin box thefts and incidental damage
June 1988	5666	Gradual introduction of target hardening with wave doors, Kirk safes, and modifled coin heads
September 1988	5062	Payphones Division established to manage Telecom Australia's public telephone business. New policies for maintenance, cleaning, and coin collecting developed Adopt-A-Phone program commenced in the Northern Territory. After reductions in damage to telephones "adopted" by local schools, program extended to South Australia
December 1988	2775	
March 1989	1167	On-site media conferences to publicize vandalism problem. TV crews film repair teams at work. (Two thieves arrested in the following week after information from public)

TABLE 1 (CONT.)
PUBLIC TELEPHONE VANDALISM AND ACTIVITY IN THE SOUTH AUSTRALIA/NORTHERN TERRITORY REGION, JULY 1987 - SEPTEMBER 1990

Quarter Ending	Recorded Incidents of Vandalism	Notable Developments
June 1989	773	All public telephones in South Australia now target-hardened, mostly with wave doors
September 1989	1009	More media publicity. Eight citizens publicly presented with total A$1500 in rewards for information leading to apprehension of offenders
December 1989	1170	
March 1990	985	
June 1990	1106	Phonecard introduced, majority of public telephones converted for its use
September 1990	1112	

the public to the offense. That public awareness further complicates any analysis as it could help reduce vandalism by condemning it or increase it by encouraging copycat incidents.

All the activities discussed above have contributed in some way to the reduction of public telephone vandalism in Australia. Disentangling the effect of any one is impossible. Table 1 uses the reasonably reliable statistics of vandalism for the South Australian—Northern Territory Region of Telecom to illustrate this point. Although the number of incidents shows a decrease from late 1988, the separate contribution of relevant activities listed in that table cannot be established.

Conclusions

Evaluation of crime prevention measures is bedeviled by the multiplicity and interplay of factors that could influence the prevalence of the crime under

question. Retrospective evaluation provides an opportunity for, and should incorporate, discussion of all such factors. Providing an analysis of only some factors tells only some of the story and runs the risk of falsely elevating some factors to a status of crime preventers that they do not merit.

The recent analysis by Wilson (1990) of public telephone vandalism in Australia illustrates this proposition. The factors he identifies are certainly some of those that help explain why Telecom Australia now spends less than half what it used to spend 4 years ago to repair damage to its public telephone system. But there are a number of other important factors, the major one being the new, concentrated, professional approach to public telephone management that was adopted by Telecom Australia in creating the Payphones Division. That move unequivocally established the "owner" of the crime problem.

That professional approach involved physical target hardening and changing the payphone's physical environment. However, "caring" for the facilities has probably produced the more substantial and lasting result. Despite the improvement, Telecom Australia still has a problem with vandalism and thefts from public telephone coin boxes continue to be a sizable problem. Addressing those problems from a crime prevention perspective requires the collection of accurate and specific data on the "victimization" of public telephones. The new management team is collecting such data, and, hopefully, some prospective evaluation of preventive approaches may be possible in the future.

For the present, the reduction of costs in repairing damage to public telephones has been considerable. The Payphones Division itself put the problem in perspective. As a result of the initiatives outlined above, it says that in some areas "a public telephone which may have been damaged every day now lasts unscathed for at least nine days." It would be excellent if that rate of improvement could be maintained.

5. Developing more effective strategies for curbing prostitution

Roger Matthews

EDITOR'S NOTE: The process by which a red light district in the north of London was transformed into a tranquil residential area in less than two years is described in this case study, first published as a Security Journal *article (Matthews, 1990). The measures taken against street prostitution and associated problems of cruising consisted of intensive policing against prostitutes and pimps and a road closure scheme which severely restricted the opportunities for cruising. Not only were these measures highly successful, but they also produced some "diffusion of benefits". Recorded offenses of auto theft and burglary declined substantially, presumably because fewer undesirables were being attracted to the district. Perhaps the most unexpected result concerned the apparent lack of displacement. The surrounding streets were unaffected and there was little evidence that the prostitutes had moved to nearby red light districts. It appears from interviews with the women involved, that many of them, especially the "away day" girls who*

traveled to London each day by rail, may have simply desisted from an occupation to which they were only marginally committed (Matthews, 1986). The most frequently endorsed reason for involvement in prostitution given by 70 of the women interviewed was, "Because you can earn better money than elsewhere" (68%).

THE PROBLEMS associated with curb-crawling (i.e., cruising or seeking prostitutes) and prostitution have become a major concern among a wide range of communities in a number of countries in recent years (Cassels, 1985; Levine, 1988; Lowman, 1986; Shaver, 1985). In each of these countries, the problem may display different characteristics, but usually involves a number of predictable attributes. Primarily, it tends to heighten the level of harassment and intimidation on the street, particularly for the female population living in the area. Relatedly, this harassment is often compounded by other forms of nuisance and disturbance associated with a continuous stream of traffic throughout the day and night. The combined effect of these pressures is to heighten the general sense of insecurity, to fragment community networks, and to limit personal mobility and restrict freedom of movement. In London, it was found that many residents living in the inner city refrain from going out because of the fear of crime (Jones *et al.*, 1986). Among women, this results in what amounts to an informal curfew. In "red-light" districts, these problems and restrictions tend to be compounded. In poorer neighborhoods characterized by high levels of incivilities, the result is often, as Wilson and Kelling (1982) have suggested, a spiral of decline in which the message is transmitted that the area is a legitimate target for a variety of crimes.

It is not only that curb-crawling and prostitution are simply the causes of decline, but it may well be that they are attracted to areas where decline and social disorganization are already taking place. The important point is that, once curb-crawling and prostitution become established in an area, the rate of decline is almost invariably accelerated. Even though the problem tends to have a relatively low priority nationally, it can become the major concern in the specific areas in which it occurs (Pease, 1988; Jones *et al.*, 1986).

It is significant that the degree of concern that residents in "red-light" areas have expressed in relation to this problem has increased significantly in recent years. This is not simply a matter of the objective problem itself becoming more pronounced. Changing attitudes appear to involve changing levels of public tolerance, growing demands for greater freedom of movement, as well as

profile that emerged of the average "punter" (John) was that he was between 35 and 45 years of age, married, and living in surrounding suburban areas. The vast majority were, according to police classifications, "white Europeans" or of "Mediterranean appearance." The occupational distribution of the 79 curb-crawlers for whom formal cautions were issued was that 15 were unemployed, 14 were manual workers, five were from service occupations, 10 were salesmen, 23 were tradesmen (many of whom worked in the building industry), and 12 were from the managerial and professional classes.

Thus, it transpired that the motivation of both the prostitutes and their clients was highly differentiated, and, in many cases, they exhibited a much lower level of commitment than was expected. Through a combination of interventions that embodied proactive, attritional, and deterrent elements, the problem was reduced with an apparently low level of displacement.

Conclusions

There can be little doubt that the problems associated with prostitution and curb-crawling could have been effectively overcome only through a multi-agency initiative. A comprehensive resolution to the problem required not only a diverse police initiative aimed simultaneously at soliciting and curb-crawling as well as pimps and brothel keepers, but also required environmental changes. It is also essential to have an organized residents association able to initiate, coordinate, and monitor the various processes. The interventions of the police and the council proved to be mutually reinforcing. It became apparent after a year or so that the police on their own may well have been able to maintain the problem within reasonable limits, but the situation required a more permanent disincentive if it was to achieve a satisfactory long-term solution. By the same token, the road-closure scheme on its own, without any organized police presence, may have created a more entrenched and contained "red-light" district. Thus, the sequence of intervention is crucially important, since it seems necessary to establish a police presence in the area *before* the environmental changes take place. If the initiatives occur in the reverse order, prostitution could take forms that might aggravate and intensify the problems.

Clearly, implementing such a multi-agency offensive does not guarantee automatic and inevitable results. The context in which the strategy is implemented may well affect the manner of intervention and the possibilities of obtaining a positive outcome. Therefore, if this type of approach is to be replicated, there are a number of questions that require more detailed examination. First, we need to find out how this strategy needs to be adapted in order for it to be effective in different situations. Second, the issue of displacement requires further investigation. Displacement is clearly the Achilles' heel of crime

prevention initiatives. It is therefore important that more extensive measures of displacement be developed and employed in future studies of this type. Third, we also need to know more about the commitment to prostitution and curb-crawling of the men and women involved. The indication is that it is a great deal less than most people believe. Any comprehensive theory of crime prevention must incorporate an assessment of the motivation of offenders and examine the relationship between victims and offenders in more detail. The evidence from Finsbury Park certainly indicates that curb-crawling and prostitution may be far more "opportunistic" crimes than is generally imagined. It appears to be not so much the outcome of a fixed biological need meeting an ineluctable economic force as that of a relatively contingent and flexible arrangement that is certainly reducible and may well be removable. If we are to respond constructively to growing community pressures to deal with this problem, then it seems we need to develop and refine the type of multi-agency approach that proved so successful in North London.

6. Reducing theft from shopping bags in city center markets

Barry Poyner and Barry Webb

EDITOR'S NOTE: This case study is one of three reprinted here that were directed by Barry Poyner. It first appeared in a Tavistock Institute of Human Relations' publication (Poyner and Webb, 1987) and has been edited by the authors for inclusion in this volume. It developed from an earlier study of "street attacks" (violent and sexual assaults, robbery and thefts from the person) in Birmingham and Coventry, two large cities in the Midlands of England. Of the 552 "attacks" recorded by the police in Birmingham between September 1977 and August 1988, 205 (37%) were found to be thefts from shopping bags (Poyner, 1981). Of these 205 incidents, 158 (77%) occurred at markets in the city center. Because of their concentration in the central part of the city, with excellent rail and bus connections, these markets attracted thieves like bees to a honey pot. Conditions at the markets also facilitated theft. In the covered markets the lighting was so poor and the shoppers so close pressed by the arrangement of stalls that it was easy for

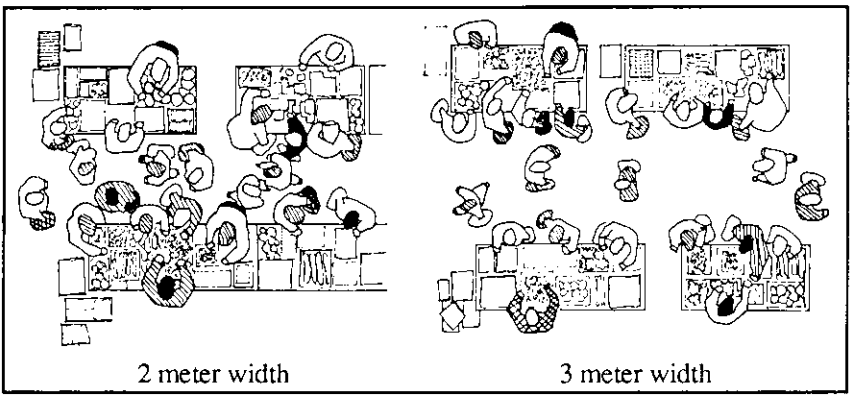
thieves to remove purses from shopping bags without being noticed. According to the evidence of the case study, the installation of improved lighting (to enhance natural surveillance) and the widening of spaces between stalls (deflecting offenders) in the worst-affected markets substantially reduced these thefts. There seems also to have been some diffusion of benefits in that thefts in nearby markets also declined, perhaps because: "The general attractiveness of this area for thieves has reduced". A final point: As Poyner and Webb note below, theirs is some of the only evidence that improved lighting can reduce crime and "It is perhaps paradoxical that the crime concerned only occurs during daylight hours!"

ONE OF THE clear findings to emerge from an earlier study of street attacks in the city center of Birmingham was the existence of a large number of thefts of purses from shopping bags, usually carried by women (Poyner, 1980, 1981, and 1983). These thefts were concentrated almost exclusively in the Birmingham Bull Ring, well known as the center of one of the largest retail markets in England. In all there are well over a thousand stalls some occupied six days a week selling fresh food of all kinds, clothing, household goods and even antiques. There are four main market areas: two Bull Ring Markets open six days a week, an indoor market hall where most of the meat, fish and poultry are sold and the Bull Ring Open Market which has many fruit and vegetable stalls. The other two markets open three days a week. They are the Rag Market which is under cover and the Flea Market which is outdoors. These markets concentrate more on clothing, household goods, antiques, toys, etc.

The crime which is the subject of this case study is not a specific crime as defined in police statistics but is a sub-group of "thefts from the person of another". In the earlier study it was found that there was a clear set of thefts which involved the offender removing a purse or wallet from the top of an open shopping bag or from a side pocket. The victim often claimed that the shopping bag must have first been unzipped by the thief, but often it was possible to observe women with purses or wallets pushed into the top of shopping bags or plastic carrier bags. Thefts of this type only occurred in crowded places and the victim was not aware of the theft happening until shortly afterwards. The result was that few offenders were ever seen by victims and few caught.

Because these thefts occurred mainly in the market areas of the Bull Ring, it was hypothesized that offenders would probably follow likely victims, usually older women, around the market stalls and while the victim was preoccupied

FIGURE 1
EFFECTS OF DIFFERENT GANGWAY WIDTHS ON MARKETS



with her search for suitable purchases or while waiting to be served, the offender would take her purse.

Two particular features of this type of crime were identified which were believed to offer approaches to the prevention of the theft. Firstly, the offences occurred in a very specific area of the city center and at remarkably specific times. Not only did these thefts tend to occur on three days in the week — on Tuesday, Friday, and Saturday, the busiest three market days — but they also tended to be restricted to quite narrow periods, i.e., between midday to 2.00pm on Tuesdays and 1.00-4.00pm on Fridays and Saturdays. It also seemed that the crime was seasonal, occurring mainly in the summer months. These factors together suggested that some form of intensive policing of the markets where theft occurred would discourage would-be thieves.

The second feature of this crime was that it was found to occur most in the two markets with the more densely packed stalls and less in the other market areas with a more spacious layout. The study proposed that as an alternative to intensive policing, it may be that changing the layout of the market stalls so that they were all more spaciously arranged would reduce this kind of theft. It was suggested that the gangway widths might be increased from about 2 meters to 3 meters. It was hypothesized that wider access ways made it more difficult for offenders to steal without being noticed by other shoppers in the crowded gangways as Figure 1 illustrates.

At the time these proposals tended to be treated as an academic exercise and the research team had little expectation that any action would be taken. However, a visit to Birmingham in the summer of 1984 revealed that one of the markets

with a high level of theft had been replanned and the narrowest access ways between stalls had been increased to a design width of 10 feet, which was exactly the dimension (i.e., 3 meters) proposed in the earlier study. In addition the area had been planned more spaciously in other ways such as providing more space behind the stalls and wider cross accessways. It was therefore decided that a study would be made of the effect of these changes.

It was only later when data were being collected from police records that the research team discovered that in 1982 (probably beginning in late 1981) the police had set up a Divisional Support Unit to deal with street crime in the city center. Two teams were formed, one of which had the specific brief to look into the problem of theft from the person in the markets. The policing work was a covert operation with officers not normally wearing uniform. Several techniques were tried by this team including using a policewoman dressed as a woman shopper as a decoy. This approach was felt to be unsuccessful and so forms of detection were used. The Bull Ring Open Market, which was the area later replanned was observed from nearby roofs by some of the team to try to identify intending offenders. These officers then directed some officers on the ground to follow likely suspects. In the opinion of the sergeant in charge of the team the exercise was successful, but not in terms of many arrests. A few arrests were made, but it soon became known that the police were making observations because details had to be given in court. He felt that it soon became a game. The offenders and police knew who each other were and so the offenders gave up offending while the police were about. Nevertheless, the police action was seen as a strong deterrent to this kind of theft. The Unit was disbanded by the end of 1982. This was about the same time as the Open Market was being replanned.

Although the police action did not acknowledge any influence from the original research study, it is very hard to believe that none of the senior officers who set up the Divisional Support Unit knew of the study. The research findings had been formally presented to a group of senior officers of the West Midlands Police in 1980 and the report made available to the Chief Constable and other senior officers. The work was also reported in the autumn 1981 edition of Police Research Bulletin (Poyner, 1981). The publication of this article and the setting up of the Division Support Unit seem to have occurred within weeks of each other. The influence on the new market layout is much less certain. It is quite possible that the designer made the decision to increase the design width of gangways to 10 feet for other very good reasons than to reduce crime.

The data

The crime type that was the basis of the original work was not a recognized police crime category but a sub-set of "theft from the person", with a few

incidents categorized as "other theft". Because the coding of crime used by the police does not specifically identify these thefts, it was not possible to obtain data on this crime pattern from any computer search through police data sources. The only way to identify reliably all the crimes which occurred in these market areas was to go back to the original police files and select incidents by hand.

This task of working through all available crime files of a busy city center police sub-division is a very time consuming and dusty business. It had been found in the original study that 75% of the thefts occurred in the six months April to September. It was decided that only searching files for these six month periods would reduce the search time by 50% but would still provide a 75% sample of each year's thefts.

Apart from the practical difficulties of handling box files scattered around a police station undergoing extensive refurbishing, it was very easy to identify the thefts required and the authors are quite confident that the selection work was accurately carried out.

In the event, data on these thefts were obtained for four complete summer periods (1982-1985). These data are presented alongside the analysis from the original report in Table 1.

TABLE 1
THEFTS FROM SHOPPING BAGS IN BIRMINGHAM MARKETS (FIGURES FOR THE PERIOD OF MARCH TO AUGUST IN EACH YEAR)

	1978	1982	1983	1984	1985
Rag Market	52	82	54	17	12
Open Market	54	21	45	33	12
Market Hall	20	4	11	12	9
Flea Market	—	—	2	2	—
Totals	126	107	112	64	33

Discussion

First, looking at the totals in Table 1 there is very clear evidence of progressive significant reduction in the crime from 1983, the year in which the layout of the Open Market was changed. There seems little doubt that whatever the precise details of the changes which have taken place the markets area is no longer seriously plagued by this particular crime. The crime reduction from 1983 to 1986 amounts to a 40% reduction in the first year and over 70% reduction in two years.

Policing. Having recognized that the overall figures show a very substantial reduction in thefts, it is even more interesting to look more closely at the analysis in Table 1. If we compare 1982 data with the data from the original study, we find that overall there is a roughly similar level of crime but that the distribution between market areas is quite different. The Bull Ring Open Market and Market Hall have much lower levels of theft while theft increased in the Rag Market.

From what is now known of the activity in the Markets this appears to be the result of the intensive policing by the team from the Divisional Support Unit. Their impact on the Open Market and its immediate neighbor the indoor Market Hall is clear. However, the overall picture does not seems to justify the claim of crime reduction. On the face of it, police action seems to have redistributed much of the crime rather than prevented it. For the most part these thefts had been *displaced* into the Rag Market. The Rag Market was the largest of the markets with smaller stalls than the Bull Ring Open Market but with the same narrow gangways. The more important difference is that the Rag Market is a large shed structure. It would not have been so easy for the police to make observations as in the Open Market which is partly surrounded by buildings with many vantage points for observation. As the sergeant of this team explained, the would-be offenders became fully aware of what the police were doing, and so it can only be assumed that the offenders adapted by operating in more, for them, congenial surroundings.

Markets management. If the policing had not reduced the overall level of these crimes, what did? It was clear from the figures in Table 1 that from 1983 crime did drop in both the Rag Market and the Open Market and some clarification of what changes might be responsible was required. To do this a meeting was held with the General Manager of the City of Birmingham Market Department. The result of this meeting and a further interview with a member of the Markets own security staff revealed that there were a number of factors that may have contributed to the decline in theft. These are best discussed under a series of separate headings.

Density of use and congestion. The Birmingham Markets had been long regarded as a thriving business and the improvements already mentioned to the Bull Ring Open Market had also been accompanied by a number of other improvements. Over the last few years the number of market stalls had been increased substantially. Most of these changes had been to extend the Flea Market. In fact when the original study was made in 1978/9 this market comprised only a few stalls. The number of stalls at April 1985 are given in Table 2. The figures for the Rag, Open and Indoor markets are little changed since 1979, but the Flea Market has become a major element of the market complex. Like the Rag Market the Flea Market only operates on Tuesdays, Fridays and Saturdays.

TABLE 2
NUMBER OF RETAIL MARKET STALLS
AVAILABLE IN APRIL 1985

Rag Market	552
Flea Market	231
Bull Ring Market Hall	197
Bull Ring Open Market	158

While the increase in the size of the markets area has taken place, many traders have commented that trade has reduced. Unfortunately, by the very nature of the organization, there are no reliable statistics for the amount of trade, but it does seem that either due to the increased number of stalls or because of a decrease in trade combined with the increase of stalls, the general impression is that the markets are not quite so busy as they used to be. If this is the case, this in itself could account for some of the reduction in theft. It is clear that thefts from bags relies on the existence of crowded areas and if these are reduced so is the opportunity to steal.

Design changes. Apart from the development of the Flea Market, the main design changes that had taken place in the markets since the original study had been made, were the replanning of the Open Market, part of which is now roofed over, and the up-grading of the building that houses the Rag Market. In this case the front of the building was given a face lift and inside a ceiling was added with an improved lighting system. It is worth noting that the lighting system was not a minor improvement but one carefully designed for modern conditions. It won a certificate of commendation in the "Energy Management of Lighting" Award Scheme. This scheme is administered by the Electricity Council and the Lighting Industry Foundation, designed to encourage the most effective use of electricity.

The redesign of the Open market came first and was carried out within the first three months of 1983. Although the upper part of the old layout was a series of free standing hexagonal stalls with 10-feet between stalls the lower and busiest area (adjacent to the Woolworth store and the Indoor Market Hall) had stalls with 8-feet gangways often further narrowed with boxes. The new layout has a similar number of stalls but the space around the stalls is more evenly distributed. The minimum gangway width between stalls is 10-feet and some are a little wider. There are also more cross access ways. The design also gives more space for the traders to stow the stock and this has helped to reduce the obstructions in the gangways. The overall effect is much more space and less congestion and for the most part movement around the stalls is much more free (see Figure 1).

At first sight the increase in crime in the Open Market from 1982 to 1983 could indicate that the new layout had no impact, but it must be remembered that the policing team were at work in 1982. In fact if 1982 is ignored, the pattern of theft in the Open Market is consistently down from the original study through 1983 (when the layout was changed), and 1984/5. The crime reduction over the first two years of the new layout amounts to well over 70%, which is the same proportion as the reduction for the markets area as a whole. It seems quite reasonable to claim that the new layout with wider gangways has reduced crime.

The Rag Market also shows a significant reduction in theft. But here there was no change in the layout of the stalls. The most significant change was the new lighting system. As can be appreciated from Table 2, the Rag Market is a very large shed with over 550 stalls. These stalls are little more than trestle tables used mainly on Tuesdays, when it is particularly crowded around lunchtime. Being in a relatively poor standard of accommodation compared with the Bull Ring Market Hall, the general level of lighting was poor and the combination of moderate levels of illumination and narrow crowded gangways seems to have been attractive to thieves. The improvement to the lighting seems to have made the difference. The new lighting system was installed towards the end of 1983 which accounts very well for the considerable drop in crime in this market between the summers of 1983 and 1984. This is the first clear evidence found by the authors to show that improved illumination levels reduce crime. It is perhaps paradoxical that the crime concerned only occurs during daylight hours!

Conclusions

There is little doubt that the two original hypotheses about policing in the markets and about the increasing of gangway widths have been proved to a considerable extent. In addition to this it has been found that increased levels of illumination appear to have deterred would-be thieves. This finding fits in very well with the ideas of the original study which emphasized the importance of would-be offenders being exposed to the view of other shoppers as a means of preventing crime. Both reducing congestion around the stalls and increasing the illumination increases the risk of thieves being seen to steal by other members of the public.

The problem with the use of intensive policing appears to be that it has not reduced crime overall but merely redistributed it. However this is not the case for the design changes to the markets. There was no evidence of displacement of theft to other markets or shopping areas. Indeed, quite the opposite has happened. The reductions in the Rag and Open Markets were accompanied by smaller reductions in the surrounding area. What seems to have happened is that by improving the worst areas of risk, the whole markets area has benefited. The

general attractiveness of this area for thieves has been reduced.

Of course, those who believe unswervingly in the universality of the displacement theory will claim that the thieves have merely gone elsewhere. However, if they have gone elsewhere they will almost certainly have had to adopt other forms of theft because the original study showed very clearly that this type of crime occurred almost exclusively in these market areas, and there was no evidence to the contrary in the more recent review of crime files.

One final point, the markets security staff had a clear view that congestion was one of their main problems with crime. Apart from the more dramatic changes referred to above, they also felt that it was possible to manage the markets in such a way to reduce congestion. Apparently a few years ago the back of the Rag Market was particularly crowded because groups of stall holders used a particular sales approach. They liked to gather a large crowd around and make a direct sales pitch rather than wait for customers to approach their stall. To reduce this congestion these stall holders were moved and dispersed to less congested locations.

7. Cruising Cooper Street

John Bell and Barbara Burke

EDITOR'S NOTE: On Friday and Saturday evenings, city center pubs in Britain are crowded by young men and women who are there to see and to be seen. In Mediterranean countries, especially when the evening is warm, they fill the cafes and stroll on the piazza. In North America, late on fine evenings in spring and summer, they "cruise" the local strip in their automobiles, sometimes in the hundreds or even thousands, snarling the traffic and bringing commerce to a halt. Cruising may also bring problems of litter, urinating in public, under-age drinking, vandalism and worse. Many of the 229 cities that replied to a recent survey (Boise Police Department Planning Unit, 1990) rely upon cruising ordinances or heavy enforcement of traffic and parking ordinances to deal with the problem. Others have made use of traffic barriers (see Patterson and Barbour, 1989). This case study, originally published in Police Chief *(Bell and Burke, 1989), describes the approach taken in Arlington, Texas, when enforcement strategies and the use of barriers failed to solve the problem. A "cruising committee" was formed including representatives of the police, city council, local businesses, and parks and recreation and transport departments. They proposed leasing a downtown parking lot on Friday and Saturday nights, opening it to the*

cruisers, staffing it with police, equipping it with portable restrooms and cleaning it up next morning. Despite skepticism from various quarters, this scheme to deflect offenders was adopted and has proved highly effective. Traffic now flows smoothly, local people no longer endure litter and vandalism, and up to 1000 cars an evening, driven by teenagers and young adults, may cruise or park on the lot.

UNTIL LAST APRIL, Friday and Saturday nights in Arlington, Texas, saw several thousand partying teenagers take over a major city street for the ritual of cruising. To the adolescent burning up countless gallons of gasoline crawling through the city streets at night, cruising was a rite of passage. But to the Arlington Police Department, charged with making some sense of the resulting chaos, cruising was a chronic headache that defied solution.

Weekend teen cruising isn't unique to Arlington. A national phenomenon glorified by movies like *American Graffiti*, cruising has become a way of life for teens in many communities across the country. What separates Arlington from the others, however, is a city council-initiated program that has won rave reviews, not only from the police department, but from adjacent businesses, neighbors and the teens themselves.

A 98-square-mile suburb located in the middle of the Dallas-Fort Worth metroplex, Arlington is served by a police department of 365 sworn officers. Like residents of other southwest cities, Arlington's citizens have an affinity for the automobile. Mass transit exists in Dallas and Fort Worth but has never been palatable to a city like Arlington, which has one of the highest per capita incomes in the state of Texas.

During the day, Cooper Street is a heavily traveled state highway that traverses a major university (the University of Texas at Arlington) and a commercial strip of dining establishments, fast-food restaurants and small retailers. But until recently, on Friday and Saturday nights it was transformed by up to 4,000 cruising teens.

By 1984, the Cooper cruising situation was freezing traffic for hours at a time. A major north-south street serving a city of more than 250,000 had become impassable — even to emergency vehicles trying to reach one of the city's two hospitals three miles north of the Cooper cruising scene. Arlington had made several unsuccessful attempts to solve the problem when, in the spring of 1988, a city council committee, working with a coalition representing the police department, transportation department, parks department, Cooper street business owners, Teen Court and area residents, found a solution.

Initial response

Enforcement was central to the police department's initial response to the Cooper Street cruising problem. The traffic division's motorcycle unit was assigned to the area to step up enforcement and discourage the teens from cruising Cooper. But the officers quickly discovered they weren't dealing solely with traffic issues. Crowd control needs were escalating. The overflow from the streets drifted onto business parking lots and the teens weren't necessarily staying on the right side of the law. The hordes of teenagers blocked access from the street and, once off the street, congested commercial parking lots to such an extent that business diminished for most establishments. Patrons didn't want to confront the traffic congestion, let alone thousands of teenage revelers.

The motor units split into two teams; one took a high-profile enforcement posture with traffic violations, and the other worked crowd dispersement in the parking lots. The 15 officers wrote as many as 600 tickets a night — many for minor violations.

"We almost write tickets for loud seat covers," Chief David Kunkle told the city council during one Cooper cruising control discussion. But the teens were undaunted and the ultimate ticket holders — the parents — felt that the police should direct their efforts towards the "real criminals." Nor did it help when a magazine rated Cooper Street as one of the top five cruising strips in the nation. After two years, the city wearily decided that enforcement produced no appreciable reduction in the size or scope of the problem.

Subsequent attempts

What happens when an irresistible force meets an immovable object? On Cooper Street, we set up barricades.

In cooperation with the transportation department, barricades were placed at several sites to divert and break up the flow of traffic. The police traffic units were split, with half monitoring the barricades and the others assigned to the target areas. Only emergency vehicles could gain access. Other vehicles were diverted several blocks and offenders were ticketed.

But crowd control was still at the core of the Cooper Street cruising problem. Although most of the teens were law-abiding, fights, alcohol and drug abuse, vandalism, littering and theft were becoming more commonplace, and businesses were calling for an end to the harassment. Merchants were encouraged to post "no littering" signs and the council reacted with a new city ordinance that prohibited the consumption of alcoholic beverages in motor vehicles. Unfortunately, there just wasn't enough manpower to effectively enforce the laws.

Barricades created mixed results. Although the size of the gridlock area was

cut in half, the cruisers remained, moving some of the activity from Cooper to Mitchell, an intersecting east-west street. But criticism was louder than ever. Those in transit resented the imposition posed by detours and the neighbors just east of Cooper became inducted into the Cooper Street mess.

Area residents joined the chorus demanding a solution to the Cooper Street problem when the barricades inadvertently diverted the teens into neighboring residential areas. The teens would trespass through yards, and their loud and raucous nature disturbed the otherwise quiet setting. And all too frequently, they used the residential streets and yards as public toilets. The police department and transportation department removed those first barricades and staged them at different locations, putting an end to the neighborhood problem. But it was obvious that barricades could not solve the initial cruising problem.

The solution

By the spring of 1988, the city of Arlington had exhausted most of the conventional means used by other cities to control teenage cruising. Education and enforcement efforts were ineffective, pleas to parents fell on deaf ears, and the earlier ideas of structuring alternative activities for teenagers to pursue in lieu of cruising never materialized. Activities based on adult concepts of what teens *ought* to be doing tend to run counter to the idea of cruising, which is an escape from supervision and authority.

With that, City Councilmember Ken Groves proposed an "if we can't beat 'em, join 'em" approach. Groves said that the Cooper Street cruising problem had two "givens" — that teens want an unstructured, unsupervised environment in which to mingle, and that the lack of restroom facilities aggravated the street cruising problem. He reasoned that, if given what they needed, most teenagers would appreciate it enough to act reasonably. A South Cooper Street Cruising Committee was created, composed of representatives from the city council, police, parks and recreation and transportation departments, Cooper Street businesses, area neighbors, Teen Court, Cooper cruisers and the University of Texas at Arlington (UTA), which fronts Cooper. Groves suggested that the city lease a large parking lot from UTA at Cooper and Mitchell, known as the South 40, open it to the cruisers on weekend nights, staff it with police, equip it with portable restrooms and sweep up each morning following the previous night's foray. Despite the vehement opposition of one councilmember and skepticism from various fronts, Groves was persistent and the city council adopted the plan on a two-month trial basis. The plan was promoted as a unique way to handle a unique problem and promotions emphasized that the city wasn't condoning cruising, but basically trying to address the negative fallout to businesses and residents.

The experimental plan began in the first weekend in April to a less-than-enthusiastic showing. About 50 cars ventured into the 1,000-space lot on opening night. But the following weekend, the cruisers had discovered they could mix with the opposite sex just as easily in a parking lot as they could on Cooper Street. It's not uncommon now for upwards of 1,000 cars to be parked or circling through the lot on weekends.

Police presence has been a key component of the plan. Police Chief Kunkle and Lt. Martha Willbanks of the Special Operations Division realized the need to create an atmosphere on the South 40 parking lot that would be security-conscious, yet unstructured enough to be accepted by the young people. Willbanks used a foot patrol team on the parking lot, supplemented by mounted patrol officers who had greater mobility and a better vantage point to detect developing problems. Additionally, Willbanks manned a command post to monitor the police detail and respond quickly if a marked patrol car was needed. Traffic division units continued to work the immediate geographic area around the parking lot. Within a month, the city council addressed a foreseeable problem by approving a 10 mph speed limit for the parking lot. Although the parking lot cruisers seemed to adopt their own rules to preclude accidents, and no major accidents or real problems were observed, police had feared the mixture of pedestrians and traffic might eventually cause a serious accident in the lot, and a posted speed gave them greater control over the traffic.

When the party was over, the city's parks and recreation department, headed by director Donna Brasher, had the unenviable job of cleaning up the morning after. According to the contract with the university, the removal of the debris and portable toilets from the 40-acre lot had to be accomplished by the following morning.

Conclusion

The South 40 plan was deemed a success by all involved for accomplishing what other plans had failed to do in the past — eliminate the weekend Cooper Street gridlock. Traffic now flows as smoothly as it ever did on Cooper, customers have rediscovered several blocks of businesses that previously had been off-limits, and neighbors were freed from the onslaught of beer cans, vandalism and restroom use in their front yards.

When the two-month trial phase expired, there was little hesitation in extending the contract, despite a $4,600 monthly cost for lot rental, police salaries, portable toilets and the maintenance and repair of the lot. Since the clear flow of traffic Cooper Street proved that the South 40 plan was working when other cruising control plans had failed, the parking lot program was funded by the city council through the 1988-89 budget year.

8. Macro-measures against crime: the example of check forgeries.

Johannes Knutsson and Eckart Kuhlhorn

EDITOR'S NOTE: This case study, first published as an information bulletin by the Swedish National Council for Crime Prevention (Knutsson and Kuhlhorn, 1981), is distinguished by its particularly careful study of displacement. Having established that the introduction in 1971 of new identification procedures had reduced check frauds in Sweden by 80-90 percent, Knutsson and Kuhlhorn found that other crimes, which could provide alternative sources of income and which might therefore have been expected to increase as a result of displacement, had also somewhat declined after 1971. This more general fall in crime was thought to be the result of a decline in drug abuse in 1973 and 1974. As the crime statistics did not permit firm conclusions about displacement, the authors adopted another approach. They followed up the subsequent criminal careers of a sample of those convicted of check fraud before the introduction of the new procedures. They were still unable to find any evidence of a systematic switch to other forms of

crime. More particularly, they were unable to find any evidence of "escalation" which is frequently supposed to be the result of situational impediments: Not one of the sample was convicted of robbery in the two years following their conviction for check fraud. Currently, there is less concern about the fraudulent use of checks than of credit cards. Between 1988 and 1990, credit card sales doubled worldwide and in 1990 MasterCard's worldwide fraud losses were $240.8 million and those of Visa were $355 million (Levi et al., 1991). This might seem to be a form of "displacement" except that most of the credit card offenders are probably responding to the opportunities created by the proliferation of credit cards rather than being diverted from check fraud (Tremblay, 1986). These opportunities for credit card fraud would seem to be particularly amenable to situational prevention, and the Home Office Crime Prevention Unit is rising to the challenge (Levi et al., *1991).*

Check abuse

Various changes that have occurred in society have had an impact on the structure of opportunities for committing crimes. In general, these changes have been to the detriment of obedience to the law. Obvious examples of this trend may be seen in the introduction of the self-service principle in department stores and the advent of the automobile era.

In the present article, we intend to report on one type of crime which arose during the 1960s: check forgery. In contrast to most other types of crime, however, efforts to halt this accelerating criminality by means of preventive measures proved successful. Indeed, this case represents one of the few examples in which crime prevention measures have been successful.

Check forgeries became increasingly common in connection with the introduction of the check as a means of payment in the 1960s. In Stockholm, the number of such crimes sextupled between 1965 and 1970, growing from 2,663 crimes in 1965 to 15,817 in 1970. Nationwide, the increase in such crimes was not as dramatic. The number of crimes grew from around 10,000 to around 40,000, i.e., a four-fold increase (Table 1).

The attention of the police was directed to this problem primarily as a result of the fact that they began to be burdened with an increasing volume of investigations of crimes involving check forgeries. In many cases, police departments had to add new staff to the fraud division.

The immediate background to the crime was usually that the criminal in one way or another, generally by theft, gained possession of checkbooks. The checks

TABLE 1
NUMBER OF REPORTED CHECK CRIMES IN STOCKHOLM
AND IN ALL OF SWEDEN, 1965-1970

	Stockholm		All of Sweden	
Year	No. of crimes	Index	No. of crimes	Index
1965	2,663	100	10,019	100
1966	4,785	180	13,001	130
1967	5,127	193	13,952	139
1968	9,182	345	21,808	218
1969	7,236	272	23,210	232
1970	15,817	594	39,337	393

were then used as means of payment in stores or banks as a way of obtaining cash. In the majority of cases, the checks were used in stores. In addition, these checks were often used as means of payment in "the underworld". Most frequently, they were used in this way by drug addicts in their attempts to settle debts or buy drugs. This trade was concentrated in Stockholm in notorious spots frequented by drug addicts.

In purchases of goods or services in stores, restaurants and similar places, the amount of the check was generally under 300 Swedish kronor. The existence of this particular limit was closely connected to the basic precondition for check forgeries in Sweden, the so-called *bank guarantee*. Under the terms of the bank guarantee, any person accepting false checks was indemnified by the drawee bank up to a maximum of 500 kronor per check if the person paying by check had been required to show identification. For amounts under 300 kronor, the person accepting the bad check would be indemnified even if no identification had been required. In other words, for amounts under 300 kronor, the store, etc. accepting the check had no interest in determining whether or not the checks were good, since the store could not suffer a loss in any event. The banks collected the bad checks and then reported the case of check forgeries to the police.

The police, in turn, often had whole series of crimes to work with, since each check used was counted as one crime. A single missing checkbook could, as a result, give rise to many separate crimes. From the strictly investigative angle, these crimes had some relatively positive aspects, since there was often some bit of evidence that could be pursued. Various clues in the form of fingerprints,

signatures or notes concerning identification documents played an important role. In many cases, the same criminal had used all of the checks in a checkbook. Thus, if the police could link him to any one of the checks, they could clear up all the crimes connected with that book. The simultaneous solving of a series of crimes in this manner was relatively common. These were undoubtedly the factors which accounted for the high general rate of cleared crimes, which was always over 50%.

The police responded quickly to the increase in crime. At an early stage, they initiated negotiations with representatives of the banks and the retail trade in an attempt to cope with this accelerating form of crime. The discussion centered on two points. The police called, first of all, for the removal of the bank guarantee. Secondly, they wanted it to be required for check-users to show proof of identification. These proposals met with relative indifference on the part of both the banks and the retailers. The negotiations drew out in time. The banks tended to play down the situation from the beginning, arguing that this was actually an information problem which could be resolved with the help of information campaigns. Meanwhile, check fraud shot up. Not until 1970 did the parties manage to reach an agreement which stipulated that the bank guarantee would cease to apply from July 1, 1971, and that henceforth check users would be required to present identification when paying by check or cashing a check.

The adoption of these measures led to a lively debate on the possible consequences of the action. Many observers feared that check forgers would be "forced" to commit other, more serious crimes in order to obtain compensation for their loss of income. Some people even feared that robberies would increase. However, no really serious attempts were made to study the actual consequences of the measures.

The question of displacement effects, i.e., the switch by criminals to other types of crime when they are prevented from committing a particular category of crime, is not a simple matter. From the purely theoretical standpoint, it might be expected that there is a great risk if, on the one hand, the criminals have a great "need" for crime, owing to drug addiction, for example, and, on the other hand, if the crimes that have been prevented are critical for the criminals' "livelihood". If the "need for crime" varies in strength and the crime is more of a "peripheral" nature, the risk of displacement effects is less.

Effects of the measures

In the years immediately following the new measures, checks virtually disappeared from the retail trade. When they subsequently did return to the scene, identification was required of persons using checks. This represented a change in the opportunity structure as well as in the social control. The opportunities for

crime decreased at the same time that a situational control was introduced. The positions were advanced from the traditional formal control after the fact in instances when a crime had been committed and detected to a type of control in the situation which affected everyone who used checks.

The effects of the measures against check forgeries could soon be seen in the crime statistics (Table 2). From a peak level in 1970, the number of crimes reported dropped to a level which has since been around 10-20% of these former figures. Thus, the efforts have to be considered a success as far as the prevention of this type of crime is concerned.

Society's traditional measures proved to be ineffective in combatting and preventing these crimes. The rate of cases solved was constantly very high, and most of the relatively active check forgers were caught and sentenced to various penalties. What this policy of deterrence failed to achieve was attained rapidly by the crime prevention measures which were implemented. An expensive and ineffective system of formal controls was supplemented by an inexpensive and effective situational control.

What, then, was the effect on other crimes? An examination of conceivable alternative crimes, e.g., burglary from homes, basements, and attics and thefts of and from cars, shows that they *declined* in the two years immediately following the implementation of the measures. This downward trend during 1972 and 1973 applies to all crimes of theft. Based on a simple notion of displacement effects, the results are surprising, since one would have expected to see an increase. During 1974 and 1975, the figures for these other crimes did in fact increase.

What can be the explanation for the decline in reported crimes of theft in 1972 and 1973 and the renewed rise in 1974 and 1975?

One explanation might be that it is not actually a question of real changes in crime rates, but rather a change in the rate of reporting crimes. Closer examination indicates, however, that it is difficult to find factors that might yield such results. It is most likely that these variations of reported crimes do reflect genuine changes in crime rates.

However, there is a possibility that these variations are due to changes in the narcotics situation. We know that many of the criminals are drug addicts. Moreover, most drug addicts are criminals. Criminals who are drug addicts have a higher crime intensity than criminals who do not use drugs. Under these conditions, it is conceivable that the scope of the drug abuse may influence the crime level in such a way that when the abuse is of a greater extent, criminality is also greater. The data indicate that drug abuse in Stockholm declined in 1972 and 1973 and that it increased in 1974 and 1975. It therefore might be these changes which explain the recorded variations in the number of reported crimes.

We would, however, like to stress that this line of thought is of a speculative nature.

However, it can be asserted that the crimes would have been reduced even more in 1972 and 1973 and would have increased more slowly afterwards if the possibilities of check fraud had not been largely eliminated.

These arguments show that the question of displacement effects cannot be decided with data of this type. What is required is information on the crime repertoire of check forgers and how it was changed after the measures were taken. This information is provided in the following individual-based analysis.

TABLE 2
NUMBER OF REPORTED CHECK CRIMES IN STOCKHOLM AND IN ALL SWEDEN, 1970-1978.

Year	Stockholm		All of Sweden	
	No. of crimes	Index	No. of crimes	Index
1970	15,817	100	39,337	100
1971	7,835	50	23,810	61
1972	2,198	14	7,315	19
1973	1,668	11	4,926	13
1974	1,496	9	5,800	15
1975	1,867	12	7,069	18
1976	2,548	16	8,279	21
1977	3,107	20	9,228	23
1978	2,066	13	5,667	14

The check forgers

The purpose of the individual study is to shed light on the career of the check forger. Our analysis is based on two populations — persons who had committed such crimes during the heyday of check forgery before the elimination of the bank guarantee on July 1, 1971, and persons who had committed such crimes after this measure, i.e., when this type of criminality had been reduced to a fraction of its former level.

The target population was the 1970 check forgers in Stockholm (all persons apprehended for check forgery), while the 1975 check forgers constituted a comparison group. However, it is difficult to determine whether any differences between the 1970 and 1975 populations can be traced back to the elimination of possibilities of check forgery. They may also have their roots in altered police routines, changes in legal practice, etc. In order to bring these factors under

control, we chose two additional comparison populations: persons who had been sentenced for crimes of appropriation of property in 1970 and 1975 (all crimes under Chapter 8 of the Swedish Penal Code).

After having identified the individuals behind the crimes, we decided to conduct the investigation in such a way as to ensure an equal number of persons in the groups. To do so, we took 1/17 sample of the 1970 group of persons who had committed crimes of theft and a 1/23 sample of the corresponding 1975 group.

The persons identified in this manner were then studied with respect to *convicted criminality* in the police files (including cases in which prosecution was waived, etc.). If, during a one-year period from the time of the crime in question, they had been convicted of a criminal files crime, they were included in the target population. In this manner, the populations were made comparable with one another.

The first conclusion that could be drawn was that the check forgers criminality during the period in question (the one-year period before and after the crime) included many types of crime. More than half of the check forgers had also committed crimes of theft of property during the period in question, and over a third of the appropriation criminals had committed check forgeries. Thus, there is no such person as a typical check forger with chronic recidivist tendencies for only check forgery.

The age of the offenders was around 30 years at the time the crime was reported. Approximately 15% were women. Over two-thirds of criminals investigated had been previously convicted of crimes.

Recidivism

Since the possibilities of continued criminal activity were to some extent blocked for the 1970 check forgers, we attempted to answer the following two questions:

1. To what extent did the 1970 check forgers become involved in new crimes, especially in unpleasant types of monetary transactions such as robbery?

2. What is the pattern of recidivism for the 1970 check forgers?

We investigated the involvement of the four groups in different types of crime both during a two-year follow-up period after the crime and during the entire decade of the 1970s after the crime. We were unable to detect any trend towards a systematic switch to other types of crime. Not one of the 1970 check forgers had been convicted of robbery during the two years following their original crime — a fact which ran directly counter to the assumptions made in

the debate on this topic.

Generally speaking, the 1975 check forgers — an important comparison group — committed somewhat more serious crimes (especially crimes of violence) during the two-year follow-up period than did the group of 1970 check forgers. Thefts were an exception in this respect. A greater number of the 1970 check forgers were convicted of grand larceny and fewer of theft than the 1975 check forgers. Since a similar trend exists for the corresponding groups of persons convicted of crimes of theft of property, it is likely that this can be ascribed to a change in legislation and in legal practice.

We also analyzed the offenders' repertoire of crime before the period in question and during that period. The results of this analysis suggest that check fraud should be viewed as a form of supplementary criminality which varies with the opportunity structure. Hence, we were unable to find corroboration for the thesis of a switch to more serious crime.

To offer a correct answer to the rate of recidivism of the 1970 check forgers as compared to that of the other groups, consideration has to be taken of the individual's prognosis. We therefore calculated such a prognosis, using multiple regression analysis and available data, on the client's previous criminality and personal data such as age and sex. On the basis of this prognosis, we could establish that the group of 1970 check forgers with the most serious criminal records had a lower rate of recidivism during a three-year follow-up period than did individuals in the other three groups with corresponding records. These results corroborate previous findings: the elimination of possibilities for check fraud seems to have been more effective in reducing crime than in displacing it.

We would, however, like to register certain general observations. The methods employed here are fairly rough ones, whereas the changes in crime which may have occurred are relatively minor. Further, we do not know whether or not the 1970 offenders may have sought compensation for loss of income from check forgery by stealing larger amounts, for instance, without this being reflected in the number of crimes and the categorization of the crimes.

On the other hand, the sources of error in the other direction are not to be neglected, either. Waivers of prosecution under Item 2, Article 7, Chapter 20, of the Code of Legal Procedure have increased considerably. These crimes, which are stricken from the police files after a short period, are thus on the rise. Further, it is probable that the number of crimes per conviction or item in the individual's criminal record has increased. In addition, the risks of detection have declined substantially during the 1970s. All of these factors suggest that actual differences in rates of recidivism between the check forgers from 1970 and 1975 are larger than reported. Finally, one should not lose sight of the fact that the number of check forgers dropped considerably between the two years.

The multiplier effect of drugs

We also studied the role of drug abuse. We investigated two populations — the 1970 and 1975 check forgers — with respect to the occurrence of drug abuse. The data for this part of the investigation was taken from a file which includes all of the approximately 7,500 persons who at any time between April 1965 and December 1979 in the Stockholm Remand Prison showed needle marks from injection abuse. This file was set up by Professor Nils Bejerot, a social medical officer in Stockholm, and it also contains information on the individual's debut with respect to drug abuse. It would appear that this file contains the great majority of injection addicts in Stockholm. Despite the fact that only around 0.5% of the adult population of Stockholm belongs to this category, they accounted for around 50% of the two check forger populations. These 50% accounted for two-thirds of the crimes recorded during a three-year follow-up period after the one-year base period.

The significance of narcotics for continued criminality was approximately as great as that of all other data on previous criminality, age, sex, etc. together.

Approximately half of the drug addicts had had their crime debut before their first injection. However, it should be noted that this data is very rough. The first instance of injection abuse may have been preceded by a more or less lengthy period of drug abuse with other modes of administration of the drug. Furthermore, the debut crime in the police files is not infrequently the visible tip of a "criminal iceberg" which has been recorded by the child welfare authorities. An analysis of these rough data does, however, indicate that drug abuse and criminality tend to accelerate one another and pave the way for recidivism.

Drug addicts have crime rates which are two to three times as high as those of other criminals who are not addicted to drugs, and this goes for virtually all types of crimes. However, this is only a rough estimate of the multiplier effect of narcotics, although it does agree with international findings.

Better knowledge of the multiplier effect of drugs requires more information than that available to us. (An investigation with this aim in mind is currently being planned). However, it is certain that narcotics do accelerate the type of crime being studied here and drug abuse is of tangible significance for the overall crime levels in Stockholm.

Concluding comments

There is little doubt that the measures taken — the elimination of the bank guarantee and the introduction of identification requirements — were effective.

It is important to remember that they were implemented on the macro-level and not, as is customary, on an individual level. The measures meant that

everyone who used checks was affected. The great majority of legal checking account users had to put up with increased restrictions so as to make it possible to cope with the abuses of a relatively small group.

Beginning in the late 1970s, a new type of crime has arisen. Charge account and credit card frauds have begun to spring up in the wake of these cards. There are many parallels to the case of check forgeries (Knutsson, 1980). The police have initiated negotiations with the credit card companies in an attempt to develop measures which can stem the new forms of criminality. The aim of the police is to avoid, in so far as possible, contacts with credit card abusers, i.e., to avoid micro-measures of the traditional type. It remains to be seen whether a regulation of the type studied in the present report can be achieved.

In addition to the conclusion regarding the effectiveness of the measures, this study also contains important implications for two scientific theses which, although unproven, are often presented in connection with discussions on anti-crime measures: the thesis of "objective interests" and the thesis of "the constancy of vices".

The thesis of "objective interests" states that established social institutions are interested in maintaining certain types of crimes in order to justify their own existence and/or to reap economic gains. The show-piece example is the alleged interest of the insurance companies in the continuation of crimes against property. As far as the police are concerned, certain criminologists have asserted that the police maximize their profits by taking measures against minor offenses of a traditional nature while avoiding conflicts with the establishment. Taking action against minor offenses is ineffective but visible. Since criminality of this kind is constantly growing, the resources and power of the police will also continue to grow. Since the perpetrators of such crimes are among the weakest members of society, the risk of effective protests against police injustices and false priorities is minimal.

Judging by the current study, the thesis of "objective interests" would appear to be incorrect. According to this thesis, popular in many circles, the police ought not to have attempted to persuade the banks to alter their routines in order to cope with check forgeries. The police should instead, according to this notion, have stuck to traditional action against these crimes — which, from the standpoint of police investigation, are quite convenient — in order to become more powerful.

With respect to the banks, another observation can be made. They were prepared to accept the losses occasioned by the check forgeries. The check system apparently yielded such large earnings for them that this expense was negligible.

In a cost analysis, however, the costs incurred by society must not be ignored. The judicial apparatus is highly expensive for the taxpayer. The extra efforts on

the part of the police, the courts and the correctional system which were caused by the check forgeries also have to be taken into consideration.

The second thesis can be summarized in the formula that "the sum of vices is constant". Once such a thesis is accepted, it is easy to end up in a fatalistic attitude; it is useless to try to prevent crime, since the criminals will seek compensation by committing other crimes. Our findings, in any case, show that this thesis does not hold in the example of check forgeries. There was no increase in other forms of crime. We were unable to establish a switch from check forgery to other, more serious crimes. Rather, forgers with the most serious criminal records appeared to have reduced the level of their criminal activity. Furthermore, the thesis of the constancy of vices has been cast into doubt in an earlier NCCP report relating to an analysis of crime trends in Stockholm after implementation of police measures (Kuhlhorn, 1976).

The inadequacy of the thesis of the constancy of vices is exemplified in no area more clearly than that of alcohol policy. It would appear that many people do believe in the thesis of the constancy of vices. It is asserted that reduced legal availability of alcohol — for instance, through the use of some form of rationing cards — would be compensated for by bootlegging, smuggling or "perverted stimulation" (forbidden fruit tastes sweetest). But it can be shown that after the introduction of rationing cards in Sweden in the early years of this century, alcohol consumption did decline, while home distilling and bootlegging did not develop into Sweden's leading national disease. It was also possible in the context of alcohol policy to demonstrate that the sum of vices could be increased without difficulty. The alcohol policy effort to get Swedes to drink wine instead of stronger alcoholic beverages met with notable success as far as a sharp increase in wine consumption was concerned; however, there was no offsetting decline in liquor consumption so as to result in a constant level of vices.

Another example which tends to refute the thesis of constancy of vices may be found in the area of traffic law. Speed limits, for instance, have proved to be effective as regards the prevention of accidents. But there are no indications that motorists have — in accordance with the thesis of the constancy of vices — attempted to obtain compensation by running through red lights or by always driving the shortest route, even if it means driving the wrong way down a one-way street.

In conclusion, we would like to state once again that this investigation lends support to the notion of macro-measures. The fact that macro-measures apparently can be effective must not, however, be interpreted as proof that they can replace individually oriented measures. We have, for instance, shown that drugs have a strong crime-generating effect. This effect is so strong that our social welfare authorities should seriously consider which methods can best stimulate drug addicts to seek immediate treatment for their drug problems.

9. Deterring obscene phone callers: The New Jersey experience

Ronald V. Clarke

EDITOR'S NOTE: It is not so long ago that anyone wishing to make a telephone call had to place it through an operator. Since the operator might know the caller's identity as well as telephone number, this imposed a significant control on the telephone as a facilitator of crime. Now that numbers are dialed by callers who can remain anonymous, phones can be used for fraudulent sales, for extortion, for bomb hoaxes and false fire alarms, to set up robberies of delivery services, and to assist burglary (by calling to check whether a home is empty). Above all, they can be used to make obscene and harassing calls, the subject of this case study. First published as a Security Journal *article (Clarke, 1990), it evaluates the effect on such calls of the introduction in New Jersey of Caller-ID, a service that permits subscribers to read the numbers of incoming calls on a device attached to their telephone. Caller-ID has been heavily promoted in TV commercials as a deterrent to annoyance calls and the results of the study,*

though not wholly unequivocal, lend support to this claim. Requests to the New Jersey Bell Annoyance Call Bureau to trace the origins of annoyance calls declined by at least 25 percent in areas where the new technology was available, even though only a tiny proportion of customers had subscribed to Caller-ID. The introduction of Caller-ID in other states is being strenuously resisted in the courts by civil libertarians, unfortunately with some success, on the grounds that the privacy of the caller *is infringed by the new technology. This is particularly ironic in that technology gave them that anonymity in the first place. A final point: Surveys undertaken in Britain, referenced in the case study, reveal that victims consider obscene calling to be a serious form of sexual harassment, not the trivial and even amusing behavior that it is sometimes portrayed.*

OBSCENE PHONE CALLS are a particularly troublesome form of crime. They are common, can cause considerable distress to victims and are hard to prevent or prosecute. Ten percent of women questioned in the British Crime Survey (Pease, 1985) and about fifteen percent of households polled by New Jersey Bell reported that they had received at least one such call in the previous year (New Jersey Board of Public Utilities, 1989). Victims often report anger, shame and disgust, feelings which may persist for weeks or months (Savitz, 1986). Some may change their telephone numbers or obtain an unlisted number, while those who think the caller knows where they live may keep their doors locked and not go out alone.

These consequences belie the common attitude, especially among men, that the offense is a comparatively trivial one. Indeed, Pease (personal communication) reports that a Gallup poll conducted in 1989 for a British television program found marginally higher levels of worry, upset and fear among victims of obscene phone calls than among victims of burglaries, robberies and snatch thefts. Moreover, if obscene phone calls included a threatening component (which about a third did) they attracted seriousness ratings equivalent to those of a domestic burglary.

Because of the anonymity presently afforded to the caller by the phone, it is very difficult for the victim (almost always a woman) to protect herself from the isolated call, especially as she may initially assume that it is from someone she knows (Warner, 1988). For repeated calls, various steps can be taken such as blowing a whistle down the phone, installing an answering machine, having someone else answer or changing one's number. The police or telephone companies can take effective action only in more persistent cases. For these, a device called a "trap" can be physically placed on the incoming line to record

all calling numbers, which, together with the customer's log of obscene calls, may permit the originating phone to be identified. This is an expensive and cumbersome procedure. It also results in few convictions of offenders,[1] though a warning delivered by the police will often be enough to stop the problem.

The new technology

As in so many other areas of modern life, developments in technology are now changing the picture. Essentially, these remove some of the anonymity afforded the caller by making it much easier to identify the calling number. Various systems are being developed, but in the New Jersey Bell area, the first to deploy the technology, two such systems are now available in districts where the central office exchanges have been technically equipped.[2] The first, "Caller-ID", is a device attached to the customer's telephone with a modular jack which displays the incoming call's number and keeps a record of these. The display unit costs at present about $70 and residential customers are charged $6.50 per month for the service. The second, "Call Trace", is a service through which customers can punch in (or dial) a simple code to have the number recorded of the last telephone call received. Unlike Caller-ID, this service requires no special equipment nor payment of a monthly charge. Instead, there is a $1 charge for each use of this service. A further difference between the two systems is that with Call Trace the number is made available not to the customer, but only to "legally constituted authorities".

These situational preventive measures (Clarke, 1983) promise to undermine the opportunity structure for obscene phone calling since they greatly increase the attendant risks, even for isolated acts.[3] This assumes that many such calls are opportunistic and are made from home or business phones. Although little is known about the circumstances of obscene phone calling — most studies are based on very small samples of men under treatment for compulsive calling (e.g., Goldberg and Wise, 1985; Dalby, 1988) — this seems a reasonable assumption as it is difficult see how a public telephone would allow repeated dialing of victims or the drinking and masturbation which frequently seem to accompany the offense (Savitz, 1986).

The introduction of the new technology should therefore result in a marked decline of obscene phone calls and, indeed, this was reported for Hudson County, New Jersey, where Caller-ID was first offered on trial to about 200,000 customers at the end of 1987. Though less than 1% of the customers in Hudson County had subscribed to Caller-ID in the first six months of the service, traps set by the New Jersey Annoyance Call Bureau declined by a third compared with an equivalent period in the previous year. At the same time, demands for traps in the remainder of New Jersey increased by more than 50 percent (New Jersey

Board of Public Utilities, 1988).

Unfortunately, the Hudson County results do not prove that Caller-ID is an effective deterrent to obscene calls. First, traps can be requested to deal, not just with obscene calls, but with a variety of other annoyance calls involving pranks, threats and harassment; it is possible that the decline in traps may principally reflect a decline in these other kinds of annoyance calls rather than obscene calls *per se*. Second, any initial deterrent effect of Caller-ID may dissipate as obscene callers discover that the risk of chancing upon someone with the device is in reality rather small. An analogous result was found following the introduction of the breathalyzer in Britain, where an initial sharp decline in drunken driving rapidly dissipated, presumably as offenders made more realistic assessments of their chances of detection (Ross, 1973). Third, the fact that demands for traps in other parts of New Jersey increased so greatly during the trial may be indicative of displacement of annoyance calls away from customers in the Hudson County area to those elsewhere. Fourth, there may have been little or no decline in obscene calls, but a change in the way that telephone company employees handled complainants; it is likely, for example, that victims may have been given the option of purchasing Caller-ID when they might previously have been advised to apply for traps.

It would be difficult to check the latter possibility without surveying customers in exchange areas with and without Caller-ID (see below). However, the fact that Caller-ID has now (i.e., November 1989) been more widely available in New Jersey for nearly a year permitted the present investigation of the possibilities that: (i) Caller-ID may deter some kinds of annoyance calls more easily than others, (ii) its deterrent effect might be short-lived, and (iii) it might displace annoyance calls into adjacent exchange areas without Caller-ID. Two separate analyses were undertaken using records maintained by the New Jersey Bell Annoyance Call Bureau to consider the effect of the new technology on, (a) the *volume*, and (b) the *nature* of complaints about annoyance calls.

The volume of annoyance calls

In considering the effect on the volume of annoyance calls, it was necessary to take account of the fact that wherever Caller-ID has been made available, so has Call Trace[4] which can be used by any customer without special equipment or payment of a monthly fee. This makes it impossible to distinguish the effects of the two separate systems. It also makes it necessary to examine not just the volume of traps (as was done for the Hudson County trial), but also the volume of "call trace cases" which the Annoyance Call Bureau can now establish instead of traps for customers in areas with the new technology.[5]

Annoyance Call Bureau monthly records of "traps" and "call trace cases" were compared for two sets of exchange areas: (i) 57 areas where Caller-ID and Call Trace were available to customers during June-September 1989 and, (ii) the remaining 155 New Jersey Bell exchange areas without the new technology.[6] The comparison was made for two periods of time: June to September 1989 and the same months for the previous year. A limitation of this comparison is that six of the 57 areas (i.e the original six central office exchange areas of the Hudson County trial) were already equipped with the new technology in June to September 1988 and, presumably, had therefore already obtained whatever benefits were to be had. This somewhat contaminates the design; the practical consequence is that any decline observed in the second period in the number of traps and call trace cases established for the 57 areas by the Annoyance Call Bureau would underestimate the technology's true effect by about 10 percent (i.e., the six Hudson County trial areas constitute about 10% of the total).

The results (Table 1) indicate that the sharp decline (of the order of 70%) in the number of traps placed in Caller-ID/Call Trace areas was accompanied by a large increase in the number of call trace cases established, from an average of around 10 per month during the three months in 1988 to about 300 per month in the same three months in 1989. However, the *combined* count of traps and call trace cases for the 57 Caller-ID/Call Trace areas still shows that there was an overall decline of approximately 25% in action taken by the Annoyance Call Bureau. (As mentioned above, this decline would have been greater had it been possible to exclude the original six areas of the Hudson County trial from the group of 57.) For the remainder of New Jersey there was also a decline, but a much smaller one of only about 4 percent, in the number of traps and call trace cases established. That there was no *increase* for the remainder of New Jersey, rules out the possibility of displacement of annoyance calls to areas without the new technology.

The nature of annoyance calls

The second analysis, concerned with the *nature* of complaints about annoyance calls compared information about all traps placed in Caller-ID/Call Trace areas between March 1, 1989, and April 14, 1989, with a one-in-three sample of traps placed in the remaining areas of New Jersey. This yielded 352 cases for Caller-ID/Call Trace areas and 359 for the other areas of New Jersey.

Table 2 shows that there was no statistically significant difference between the Caller-ID/Call Trace areas and the remainder of New Jersey in the nature of requests for traps. This suggests that the technology has had no more effect on some kinds of annoyance calls than others. The analysis also reveals that, for both areas combined, obscene calls constitute about 15% of the grounds for request-

TABLE 1
COUNT OF CUSTOMERS FOR WHOM TRAPS AND CALL TRACE CASES WERE ESTABLISHED, NEW JERSEY, JUNE-SEPTEMBER 1988/89*

	Non-Caller ID/Call Trace Exchanges (N=155)	Caller ID/Call Trace Exchanges (N=57)		
	Traps	Traps	Call Trace Cases	Traces + Traps
June 1988	701	689	4	693
July 1988	664	649	12	661
Sept 1988	732	665	11	676
Total	2097	2003	27	2030
June 1989	750	241	351	592
July 1989	693	203	298	501
Sept 1989	573	178	254	432
Total	2016	622	903	1525

*Because of a work stoppage, figures for August 1989 were incomplete.

ing traps, a smaller proportion than either harassing (20%) or threatening (26%) calls. The biggest single category were ring/hang-ups (34%).

Summary and discussion

The present study has found that action taken by the Annoyance Call Bureau in response to complaints about annoyance calls (15% of which were obscene calls) has declined in one year by at least 25% for those areas in New Jersey with the new telephone technology. This suggests that the similar result achieved earlier in the Hudson County trial was not due simply to the novelty of the technology. Furthermore, the fact that (unlike in the Hudson County trial) there was almost no change in the number of traps for other areas suggests that not only was the technology responsible for the decline, but there was no displacement of annoyance calls to areas without the technology. Finally, it appears that the technology may have had an equal effect upon all forms of annoyance calls.

These are encouraging results, though, unfortunately, they do not permit a judgment to be made concerning the comparative effectiveness of the two forms of the new technology, nor do they prove that the technology has led to

TABLE 2
NATURE OF CALLS FOR WHICH TRAPS ESTABLISHED, NEW JERSEY, MARCH AND APRIL 1989

	Non-Caller ID/Call Trace Exchanges	Caller ID/Call Trace Exchanges
Ring/Hang-ups	120	124
Threatening	87	100
Harassing	71	73
Obscene	68	40
Other/No Information	13	15
Total	359	352

$\chi^2 = 8.31$, N.S.

a decline in annoyance calls. It may not be the volume of such calls that has been affected, but only the means of dealing with them. There are several ways in which the latter could result. For example, rather than establishing a trap, the telephone company employees could advise complainants to purchase Caller-ID or to use Call Trace. Alternatively, instead of reporting the call, a customer with Caller-ID could tell the caller that if he persisted with the behavior his number would be reported to the authorities, or customers could satisfy themselves by establishing a trace in the knowledge that, were the call to be repeated, they could make a complaint with more confidence that something would be done. In October 1989, customers activated Call Trace on 23,728 occasions.

It is unlikely that a choice could be made among the various possibilities discussed above without mounting a survey of subscribers in areas with and without the technology. This would seek to establish the incidence of obscene and other annoyance calls, as well as differences in the ways of dealing with them. Even if the only result of the new technology were found to be that customers dealt differently with annoyance calls, this may still be considered a considerable benefit, not just for the phone company which is thereby saved the cost of dealing with such calls, but also for customers who have been "empowered" to take effective action themselves.

Whatever the benefits of the new technology, it is not without its critics (Marx, 1989). It is argued that Caller-ID significantly infringes the privacy of those making telephone calls; that it may violate some state wiretap laws and federal privacy legislation; that it can reveal unlisted telephone numbers

as well as the numbers of those, such as battered women in refuges, with legitimate needs to keep their whereabouts secret; and that it may inhibit use of hotlines and the anonymous passing of information. Further, it does inhibit small deceits such as claiming to be at the office when in reality at a bar, though it facilitates some others such as ignoring an unwanted call on the pretext of being absent from home.

In response to some of these concerns, it has been suggested that Caller-ID be made available only with a facility that alerts the caller that his or her number is being displayed. Another possibility would be to provide Caller-ID only with a facility which enables callers to block display of their numbers. New Jersey Bell has claimed that the latter option would not only be expensive to provide (of the order of $9-15 million), but would be detrimental to the community at large since it would undermine Caller-ID's ability to deter annoyance and obscene calls (New Jersey Board of Public Utilities, 1988). It would certainly detract from the benefits of Caller-ID for businesses such as pizza delivery outlets for whom immediate display of the calling number has great advantages. The blocking option is also resisted by the police, fire companies and emergency service providers, although, for them, urgent calls are increasingly received via the new 911 system which also displays the calling number. Many of these objections could be met by providing the blocking option on a selective basis and, indeed, the Pennsylvania Public Utility Commission ruled in November 1989 that Caller-ID be made available in the commonwealth with a per call blocking option for "at risk" customers, such as those in women's refuges or in some law enforcement positions.

A more radical step would be to make only Call Trace available since numbers identified under this system are not directly accessible to the customer. This would still allow annoyance calls to be dealt with more effectively than by setting "traps", but without infringing the caller's rights to privacy. This is resisted by the telephone companies, not just because of the potential loss of revenues associated with Caller-ID, but because both marketing studies and take-up of the new service shows that Caller-ID is much in demand (New Jersey Board of Public Utilities, 1988). In other words, the telephone companies believe that Caller-ID is what the public wants.

With so much at stake, the competing costs and benefits of Caller-ID, Call Trace and other systems that reduce the anonymity of telephone callers need to be more clearly established. This will require a much greater investment in research by the telephone companies and the public bodies charged with their regulation. Such research should include carefully designed comparative surveys of customers in areas with and without the new technology to identify

differences in the experience of receiving and dealing with annoyance calls; without such surveys the deterrent value of the new technology may be difficult to prove.

NOTES

1. For example, of 52,334 "abusive" phone calls (including 11,793 obscene calls) reported by customers to the Bell Telephone System in October 1967, only 78 resulted in court convictions (U.S. Congress, 1968)
2. A third service, "Call Block", prevents receipt of calls from up to six designated numbers.
3. Offender's who know their victims may also know whether they possess Caller-ID. (Pease, personal communication, reports that about 25% of the British recipients of obscene calls identified in the poll referred to above thought they knew the identity of the offender).
4. This appears also to have been true for the Hudson County trial though the facility was not publicized at the time.
5. A "call trace case" has to be initiated by the police on the basis of a complaint made by a telephone customer. Unless there is a threat to life, three to five successful traces usually have to be made by the complainant before the police will initiate a "case". While call trace cases and traps are alternative methods now open to be used by the Annoyance Call Bureau for customers in areas with the new technology, it should be noted that there are important differences in the administrative and physical procedures involved. Caution is therefore needed in comparing statistical counts of traps and call trace cases.
6. The 57 areas with the new technology serve approximately 1.6 million customers, about half of all New Jersey Bell's subscribers.

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10. The halo effect: psychological deterrence of electronic security systems

Mary Jane Scherdin

EDITOR'S NOTE: As an undergraduate in the early 60s, I can remember shelves being installed at the entrance to the university's main library on which users were required to leave their bags. This was an attempt to control facilitators at a time when book theft was emerging as a significant problem for universities. Another method frequently employed at the time consisted of searches on exiting and, since then, a variety of other methods have been found useful including speeding-up check-out (Boss, 1980) and redesign of the exit to facilitate inspection of books and bags (Greenwood and McKean, 1985). By the end of the 60s, however, most large libraries were installing electronic theft detection systems. These rely upon exit screens that sound an alarm if a book is removed from the library without its concealed tag having been desensitized at check-out. By 1979, it was estimated that 6,500 libraries worldwide had installed such systems (Shaughnessy, 1984). Librarians are apparently convinced of their usefulness even though comparatively few

evaluations have been published (cf. Bahr, 1981; Knight, 1980). While some of these (e.g. Bommer and Ford, 1984) have employed sophisticated methods of estimating theft that might be transferable to other situations, the present case study, originally published in Information Technology and Libraries *(Scherdin, 1986), was selected for inclusion because it provided evidence of "diffusion of benefits", or what the author calls the "halo" effect of installing an electronic detection system in one university library. Not only did theft of books decline by more than 80 percent, but so also did thefts of video cassettes and other materials that could not be electronically tagged. Moreover, this diffusion of benefits was anticipated at the outset on the grounds that users would assume that all materials had been tagged. In conclusion, it is evident that attempts to control library theft have proceeded with little or no knowledge of the crime prevention literature. They have been nonetheless successful, however, because the procedures followed are the logical ones employed in any situational project.*

LIBRARIES LACK sufficient information on the problems of theft. Not only is greater awareness of the amount of loss needed but also effective policies and procedures for dealing with collection security (Hanff, 1984).

Libraries large and small are turning toward more sophisticated security programs. In 1984 the total number of electronic security systems in the U.S. was more than thirty-five hundred. However, in a special issue of *Library Trends* on protecting the library, Richard Boss asks, "Are the collections protected by such systems truly secure from theft, or do the librarians have a false sense of security?" (Boss, 1984).

Even a cautious estimate of library collection loss nationwide indicates that replacement would cost more than 10 percent of a library's annual budget. The cost may be even higher when the loss involves not only books but audiovisual materials. Videocassettes, microcomputer diskettes, and audiocassettes are popular targets for thieves. For example, in 1979 Tucson Public Library (Arizona) reported a loss of 54 percent of the nonprint materials at the Woods branch and 52 percent (3,590 items) at the Wilmot branch (Library Journal, 1979)

Replacement and reprocessing of materials represent a drain of budget and staff time, and items are increasingly found to be out of print. In addition, inconvenience to users and potential loss of good will when materials cannot be found are even more difficult to measure.

It has been estimated that if a library annually loses 1 percent of a collection containing forty thousand books, an electronic security system can pay for itself

in one year. This cost-benefit figure includes putting detector strips in 20 percent of the collection (Bahr, 1984). However, sensitizing large collections is a fairly expensive procedure. Is it wise to save money by placing detection strips only in selected materials? A study of Sheridan and Martin at Levittown, New York, concluded that the greater the sensitized portion of the collection, the lower the loss rate (Sheridan and Martin, 1972: 16). In contrast it has been stated that "the presence of the detection equipment alone would be sufficient to decrease the theft rate significantly" (Bommer and Ford, 1974). In an article on bookstore security, John Boscoe of Checkpoint Systems emphasizes that those who are determined to pilfer will always find a way around every system. However, Boscoe adds that the major advantage of electronic security systems is that the technology intimidates most people, including legions of casual shoplifters. "There's no question that 80% of the effectiveness of these systems is in deterring those who might otherwise be tempted. They'll see the setup and figure, 'Why bother?'" (Tuller, 1984).

A study done at the University of Wisconsin-Whitewater attempted to determine if there was a significant difference in the rate of loss before and after installation of an electronic security system. An even more burning question for the author was the psychological deterrent effect of the security system.

Located approximately halfway between Madison and Milwaukee, UW-Whitewater is part of the University of Wisconsin system. Its campus includes more than eleven thousand students and six hundred faculty and academic staff. This study was conducted in the Learning Materials Center (LMC), which has dual functions: a curriculum center for the College of Education and a media center for the entire university.

Because approximately one-third of the LMC collection is made up of audiovisual materials, a decision had to be made regarding the securing of these materials when an electronic security system was purchased. Since the contents of audiocassettes, videocassettes, and microcomputer diskettes are lost if they come into contact with the activator/deactivator unit of a security system, these materials must be treated differently from books. If detector strips were placed in them, they could not be deactiviated and would have to be "bypassed" or passed around the sensing screens by hand each time someone left the LMC. If the materials were carried into the main library, located in the same building, the "bypassing" would have to be repeated. College students are more apt to go in and out of the building with their materials than public library patrons who check out materials and do not come back until they have finished using them. Furthermore if some audiovisual materials were stripped and other weren't, student assistant would have to remember to only deactivate materials that wouldn't be damaged by the deactivator.

Since the staff believed that a great part of the success of security systems is due to psychological deterrence, it was decided to protect book materials with detector strips, but not to put strips in the audiovisual materials. It was hypothesized that theft of all materials would be reduced, anticipating that students would not realize that audiovisual materials were not "stripped" and would not notice that they were not deactiviated at checkout.

Data for this study are taken from yearly inventories of the LMC collection, whose size grew at a very healthy rate from 1980 to 1985. As of February 1985, there were 14,289 print titles and 9,140 audiovisual titles. The print materials that were inventoried included the children's literature collection, the professional methods books for prospective teachers, and the reference collection. Inventoried audiovisual materials were audiocassettes, videocassettes, filmstrips, charts, study prints, film loops, games, kits models, maps, globes, records, slides, and transparencies. Microcomputer diskettes were not included as they are shelved with reserve materials rather than on open shelves with all other materials.

The security system was installed in the summer of 1982, and loss figures from two years before and two years after the installation will be used (see Table 1). It should be noted that library hours and checkout periods remained virtually the same during these years. Inventories were taken in the summer of each year, and searches for missing items were made several times during the following year. Circulation data for these years will also be shown, since it is believed that book loss and book use are directly correlated (Michalko and Heidtmann, 1978).

It was shown that although circulation data between 1981 and 1984 showed an increase of 8 percent for audiovisual materials and 24.9 percent for print materials, loss rates went down 80.6 percent for audiovisual and 83.2 percent for print materials.

In 1981 the first thorough inventory in several years was taken, which accounts for the particularly high rate of loss for that year. In terms of total numbers, the children's books showed the highest rate of loss before the security system was installed: 232 books were unavailable in the 1981 inventory, 108 in 1982; but with the security system only 18 were missing in both 1983 and 1984.

Professional methods books had the greatest loss rate in proportion to collection size. This collection of "idea books" that are used to plan activities for the classroom was begun in 1979 and contained 201 titles in August 1980. The 1981 inventory revealed 36 losses, or 18 percent of the collection; 1982 losses were 46, but dropped to only 12 in 1983. In February 1985, the collection had grown to 1,630 titles; the 1984 inventory showed losses of 27, or .06 percent. This was the highest number of losses in any of the print or audiovisual categories

TABLE 1
EFFECT OF SECURITY SYSTEM ON LOSSES AND COMPARISON OF THEFT AND CIRCULATION

	Before		After	
	1980-81	1981-82	1982-83	1983-84
Print	268	154	31	45
Audiovisual	124	94	33	24
Total	392	248	64	69

Comparison of theft and circulation

	Print			Audiovisual		
Year	Theft	Circ.	%	Theft	Circ.	%
1980-81	268	10,043	2.67	124	4,884	2.54
1981-82	154	10,766	1.43	94	6,173	1.52

during 1984. The professional methods books have a very high circulation rate: in 1983-84 while only 7 percent of the collection comprised these books, they accounted for 14 percent of the circulation. Neither the collection size nor the circulation rate accounts for the high loss rate — 39 percent of the total losses in 1984. One student pointed out that not only are these books valuable and full of practical ideas but also contain materials that cannot easily be found elsewhere. These, then, might be an example of materials that people are "determined to pilfer."

Each year the largest losses in the audiovisual collection were in audiocassettes. These are high-risk items that can easily be put in someone's pocket; furthermore, the LMC collects some popular music on cassettes. The losses were 44 in 1981 and 55 in 1982, dropping to 6 in 1983 and 7 in 1984. The deterrent effect of the security system was demonstrated when it was discovered that 5 musical-theater recordings were missing, but their empty cases were still on the shelf. The assumption was probably that there was a detector strip in the case.

Previously, there were no videocassette losses. However, since half-inch VHS tapes have been added to the collection, a few videocassettes have begun to disappear. (This, of course, is the format used in most homes.)

The final inventory in 1984 showed a total of 69 losses from a collection of 23,429 — less than one third of 1 percent (.29 percent). A dramatic decline in the loss of both print and audiovisual materials resulted after installation of the security system, especially when growth and circulation figures are considered.

No system is 100 percent effective, but the staff at the UW-Whitewater LMC believes that the theft rate has been brought down to more manageable levels in both the print and audiovisual areas. This can be attributed to the psychological deterrence of the security system.

11. The British Columbia transit fare evasion audit

Scott DesChamps, Patricia L. Brantingham and
Paul J. Brantingham

EDITOR'S NOTE: Public transit systems rarely show a profit and many rely upon government subsidies for their continued operation. One costly drain on resources plaguing many systems is fare evasion. For example, somewhere between 5-7 percent of passengers on the New York subway failed to pay fares in 1990, at an estimated cost to the Transit Authority of $80 million (Sims, 1991b). Case Study #12 describes one solution which is to restore the inspection function lost as a result of shedding conductors and guards from transit authority work forces. Another solution implemented by subway systems such as the Metro in Washington, the London Underground and Hong Kong's new Mass Transit Railway (Gaylord and Galliher, 1991) involves the use of electronic ticket machines that will only allow passengers onto the system with pre-paid fare cards. By the end of the 90s, the New York subway will have also have adopted this method of fare collection (Sims, 1991a). This case study, originally published as a Security Journal *article (DesChamps et al., 1991), was directed by Pat and Paul Brantingham. It*

evaluates some relatively low-cost measures to combat fare evasion introduced by the Vancouver Regional Transit System (VRTS). It was found that the posting of additional attendants during rush hours to inspect the tickets of passengers entering the ferries produced an estimated 20 percent reduction in evasion, while redesign of the monthly pass to facilitate inspection achieved an even more impressive 60 percent reduction. Perhaps the most interesting finding, however, was that fare evasion on the VRTS is a collection of specific problems, each requiring its own solution. Proving once again, that in crime prevention, it pays to think small.

ONE OF THE major security issues facing any public transit system is the problem of fare evasion and how to control it.[1] Revenue lost to fare evasion can quickly mount into millions of dollars and severely effect a transit system's operating budget. Yet fare evasion is similar to much everyday crime: the loss incurred from any individual case is quite minor; only the *aggregate* effect is important. A traditional law enforcement approach stressing investigation and prosecution of individual fare evaders is not a cost effective control strategy. A situational crime prevention strategy that looks at the key characteristics of specific problems and uses prevention techniques designed to address those characteristics (Clarke, 1980) is much more likely to produce useful aggregate reductions in the problem.

Since 1986, the BC Transit Corporation, which is responsible for providing public transit across the province of British Columbia, has conducted an ongoing analysis of fare evasion in its Vancouver Regional Transit System (VRTS). It has developed a situational crime prevention *process*, based on information from periodic "fare evasion audits" of its passengers, that it uses to estimate passenger volume, to assess the level of fare evasion at specific locations under specific situations and to design and evaluate situation-specific prevention strategies.

This article describes the VRTS Fare Evasion Audit Program in some detail. In order to do this, the article must present fairly detailed descriptions of the transit system and the information collected for the Fare Evasion Audit Program followed by descriptions of several of the evasion prevention strategies tried to date.[2]

Background

Although British Columbia is larger than Texas in area, its population is almost 80 percent urban and heavily concentrated in two metropolitan regions centered on the cities of Vancouver and Victoria. Combined, the two regions

have a population of about 1.6 million, slightly more than half of the total population in the province.

BC Transit is the authority responsible for public transit systems throughout the province. BC Transit Police Services is the department of BC Transit that provides police and security services to transit facilities throughout the greater Vancouver and Victoria areas. The Fare Evasion Audit Program is administered by BC Transit Police through non-police security personnel and is centered in the Vancouver Regional Transit System.

Vancouver Regional Transit System. BC Transit Corporation's Vancouver Regional Transit System (VRTS) is the largest single transit service area in Canada. Both the Vancouver metropolitan area and its transit system are growing rapidly. The Vancouver Regional Transit System covers 1,500 square kilometers and serves more than 1.2 million people. The VRTS carried approximately 125 million revenue passengers in fiscal year 1990/91, approximately 416,000 passengers per weekday. Revenues from passenger fares contribute about one-third of the system's operating dollars: almost $110 million of a total operating budget of $342 million in 1989/90, for instance.

The VRTS has several major characteristics: 1) It uses a range of transit modes. 2) Fares vary by geographic zone, by time of day, by fare payment method and by passenger characteristics. In general, fares increase with the number of geographic zone boundaries crossed rather than the distance between particular destinations. 3) The system uses numerous methods for fare payment (called fare media). 4) The system tries to be open and accessible.

Range of transit modes. Greater Vancouver spreads from coastal mountains to the Pacific ocean astride the Fraser River valley. It is carved into segments by fjords, tidal marshes, rivers and ridges. While the topography is beautiful, it creates transit problems. No single mode of transit can serve the area effectively. The VRTS operates three major transit modes to provide public transit across this complex service area: a conventional bus system comprised of more than 650 diesel buses, about 250 electric trolley buses, and a variety of custom vehicles for special needs passengers such as those who use wheelchairs; a ferry system currently comprised of two custom-developed catamarans called *SeaBuses*; and an automated light rail rapid transit system called *SkyTrain*. Both the SeaBus and the SkyTrain systems are scheduled for expansion in the immediate future.

The VRTS began operating SkyTrain in January, 1986. Primarily elevated, SkyTrain provides an automated, 24.5 kilometer long rail connection between the large and fast-growing suburbs east of the City of Vancouver and the metropolitan area's downtown core. With 17 stations and 114 cars in the system, traveling time from one terminal to the other is 32 minutes. BC Transit personnel are positioned at various points along the system to handle various technical

problems and emergencies, to check fares and to address requests for help from the public.

Fare zones and media. The Vancouver Regional Transit System is divided into three geographic fare zones. During rush hours the amount a transit passenger must pay depends on the number of fare zone boundaries crossed. During off-peak (i.e., non-rush) hours, a passenger can travel one-way anywhere on the system for the price of a single zone fare. Fares are tied to time and zone, and remain the same whether travel is by bus or trolley, by SkyTrain, by SeaBus, or by some combination of transit modes.

The VRTS uses a broad range of *fare media* (methods by which passengers pay fares) in order to make traveling on public transit attractive. There are 54 different forms of fare media. Most can be classified as either tickets or passes. The most common are:

> MONTHLY FARECARD. These are transferable passes valid for one month for unlimited travel anywhere in the Vancouver Regional Transit System. There are four types of FareCards: One-Zone, Two-Zone, Three-Zone, and Concession cards for students and seniors.
>
> SINGLE TICKET. Available from self-serve Ticket Vending machines located at all SkyTrain stations and SeaBus terminals, single tickets serve as fare receipt/transfer and are valid on all modes of travel.
>
> FARESAVER TICKET. These are sold in books of ten at a 10% discount off single ticket prices. FareSavers have no expiry date. A FareSaver ticket is only acceptable as formal proof-of-payment when validated with date and time stamps through a Ticket Vending Machine. FareSavers are available in One-Zone, Two-Zone and Three-Zone versions and are also available for Concession fares.
>
> DAYPASS. DayPasses can be purchased either in advance through a retail outlet or from a Ticket Vending Machine. These passes are good for one day's unlimited travel on all modes after 9:30 a.m. weekdays and all day Saturday, Sunday and holidays.
>
> ADDFARE. One and Two-Zone FareCards, FareSaver Tickets and One-Zone Concession Tickets can be upgraded to cross additional zone boundaries during rush hours. AddFares can be purchased from Ticket Vending Machines or by depositing the additional amount in the fare box on buses.

> TRANSFER. A Transfer is required to make a transit connection on the way to a destination. Fare receipt/transfers are issued only at the time fare is paid and are valid for 90 minutes of unlimited travel.

Valid *proof-of-payment* must be carried when transferring from one transit vehicle to another, when crossing a zone boundary during rush hours and at all times when in a *fare-paid-zone*. Fare-paid-zones include all SkyTrain Cars, stations and boarding platforms; and all SeaBus vessels and terminals. All the preceding fare media constitute proof-of-payment. Persons found without valid proof-of-payment in a fare-paid-zone are subject to penalties and/or prosecution.

Open access. The introduction of SkyTrain also brought the concept of *open accessibility* to the VRTS, under which the onus is placed on riders to purchase fare media appropriate for passage. The SkyTrain system is truly open. There are no gates or turnstiles. Rather, there is a designated fare-paid-zone inside which one must be in possession of a valid proof-of- payment. SkyTrain staff conduct continuous random fare checks throughout the system.

The fare evasion problem

A complex fare schedule, such as the one used in the VRTS, that is structured around multiple geographic zones, time blocks, age concessions, and separate (yet integrated) transit modes using many different forms of fare media presents many opportunities for *fare evasion*, an irregularity in proof-of-payment that is associated with lost revenue. Fare evasion may be conscious and deliberate; or it may be produced by forgetfulness, ignorance or misunderstanding of the sometimes complicated rules that determine the appropriate fare for a given rider at a given time and place on the system.

The introduction of SkyTrain, with its open honor fare-payment system, increased BC Transit's awareness of the fare evasion problem. SkyTrain operating budgets were, from the outset, based on the assumption that revenue losses on the order of 1 to 2 percent of total SkyTrain revenues would accrue from fare evasion.

Early in 1986, soon after the SkyTrain began operations, Transit staff conducted some initial checks on fare payment patterns. On the basis of these exercises, staff estimated that SkyTrain was experiencing a 14 to 16 percent revenue loss from fare evasion. These SkyTrain fare checks constituted the first recorded examination of fare evasion anywhere on the Vancouver Regional Transit System. Since each percentage point of SkyTrain revenue represented approximately $200,000 in lost revenue, the results were both unexpected and shocking.

Following the initial SkyTrain fare checks, the Security Department of BC Transit Police was given responsibility for conducting a series of short *fare*

evasion audits across the entire VRTS. The audits estimated fare evasion rates on buses and trolleys, and on the SeaBus as well as on the SkyTrain. These short audits estimated that the system-wide fare evasion rate was about nine percent. Though lower than the estimates derived from the initial SkyTrain checks, this level was still unacceptably high.

Fare evasion audits

Realizing that a more rigorous fare payment monitoring process was needed to address the problem, BC Transit developed a highly structured Fare Evasion Audit Program designed to produce reliable estimates for the entire regional system. Systematic fare evasion audits began in 1987. They are conducted three times a year.

The fare evasion audit is both an information collecting process used to estimate levels of fare evasion on the system as a whole, and, on the SkyTrain in particular, a fare payment enforcement mechanism. Trained security personnel check *all* passengers present at sampled times and locations. Passengers found without proper proof-of-payment are dealt with by a BC Transit Police Constable.[3] Given resource constraints, the audit team is small. Eight full time staff audit the modes, times, and locations selected by the sampling procedure. Around 75,000 transit riders are checked in each audit.

Sampling for the initial short audits focused on perceived trouble spots. When it was realized that a more structured audit process would be required, BC Transit, using a sampling methodology developed by the Urban Mass Transportation Administration (1985) in the United States, designed a representative sample of time periods and transit routes. The sample size was determined based on a 95% confidence level and a 5% tolerance.[4] Using this more rigorous sampling frame, the evasion rate was estimated to be around 3.5 to 4 percent of all passengers. This was less than estimates derived from the initial SkyTrain fare checks and system-wide short audits, but still well above the expected 1 to 2 percent fare evasions.

Information collected. The fare evasion audits are designed to collect detailed information that reflects the complexity of the transit system including the varying levels of usage, the three major transportation modes, and the range of methods of paying fares. The audits provide details about fare evasion and how fare evasion patterns relate to the overall structure of the transit system. As a consequence, the audit process has a situational prevention capacity designed into it.

Passenger volumes. The audit sample design collects information based on expected differences in daily passenger volumes. Information is collected by service categories: AM-Peak (morning rush hour); Day-Base (weekday, non-

rush hour); PM-Peak (afternoon rush hour); Evening-Base; and Saturday and Sunday blocks.

Transportation mode. Each mode is sampled. The SkyTrain is divided into its 17 stations. Bus and trolley service is sampled by operating center, run and route. SeaBus riders are audited at the two terminals.

Method of fare payment. The sampling frame is designed to collect information about a broad range of fare evasion methods: almost 50 fare media/fare evasion categories are audited.

Results of the Fare Evasion Audit Program

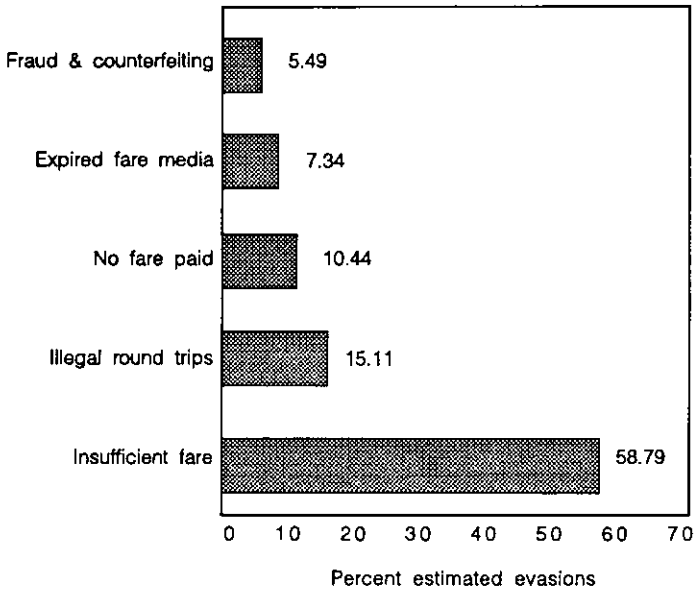
The Fare Evasion Audit Program forms the organizational basis for an established situational prevention *process*. The audits are used to identify specific fare evasion problems at particular times and places. Situational solutions to those specific problems can then be developed and implemented at those times and places. Subsequent fare evasion audits can then be used to assess the efficacy of those solutions. Since the VRTS is an extremely complex system, fare evasion problems tend to be highly specific. Reduction in the overall fare evasion problem is pursued through a lot of small, incremental solutions addressing discrete situations at many different times and locations.

Although the early audits showed fare abuse to be most prevalent on SkyTrain, they also showed fare evasion to be a pervasive problem at the SeaBus terminals and on the buses and trolley buses as well. The early audits also revealed that passengers used many methods for evading the payment of fares, though nearly all evasions fall into just five categories: payment of insufficient fare for the time and zones involved; illegal round trips; failure to pay at all; use of expired fare media; and fraud and counterfeiting. Figure 1 illustrates the relative importance these five types of fare evasion for 1989.

Most forms of fare evasion were previously unknown; no one had examined the problem of fare evasion carefully prior to SkyTrain. Passengers usually present "something" as valid proof-of-payment to transit staff when requested. The early audits showed that it was that "something" that needs close examination. Common techniques of fare evasion found in the early audits included: carrying unvalidated FareSaver tickets until caught, then claiming "I forgot to validate it"; altering FareSaver tickets to allow reuse, by erasing or "whiting out" the validation stamp or by using wax or cellophane tape so that the validation ink could simply be wiped off; and using photocopied FareCards made with sophisticated color photocopying equipment.

BC Transit Fare Inspectors and other staff are now trained in recognizing the range of fare evasion methods identified by the audits. They are specifically trained to make visual and physical examinations of all fare media produced by

FIGURE 1
FARE EVASION TYPE, 1989



passengers. They are also taught to be tactful in dealing with passengers who resist a request for proof-of-payment and are trained in handling those caught evading fares.

Current situational prevention strategies

The BC Transit Police have used the findings of the fare evasion audits to develop and implement a number of situational prevention strategies. The following sections describe four prevention programs that have been implemented, but not yet evaluated by fare evasion audits; and two prevention programs that the audits show to have had strong, continuing effects.

The four new situational prevention programs are as follows:

1. Redesigned ticket machines. The audits established the existence of a substantial number of passengers who either fail to purchase a ticket or to deposit adequate cash into bus fare boxes. Analysis of the data suggested that this type of fare evasion includes a mix of deliberate evasion and of mistakes in using automatic ticket machines.

Both British Columbia and the Vancouver region have high immigration rates; a substantial proportion of the population has trouble reading English. The first prevention effort in this area has focused on reducing fare evasion by

mistake. BC Transit has altered the design of its ticket vending machines to try to reduce their complexity. Instructions now feature simple wording and color coding. The changes have been highly graphic: color-coded maps of travel zones are tied to colored buttons that have to be pressed to determine the fare. Future fare audits should provide evidence on how much these changes have helped in reducing fare evasion by mistake; and should also give a clearer indication of the dimensions of the deliberate evasion problem.

2. Promote pass purchase. The audits have also shown that the highest evasion rate occurs among cash fare users. As a result of this finding, BC Transit is attempting to reduce the proportion of passengers using cash fares by promoting pass purchase. This is being done through advertising.

The impact of this strategy has not yet been evaluated, but may well prove small. Cash passengers are probably infrequent public transit travelers. Frequent transit users already probably buy tickets or passes to save money. Advertising is most easily directed at frequent users, but they are the least likely cash fare evaders. Still, there are no obvious alternative solutions to this problem unless cash payments are prohibited, a policy followed in some other cities. Experience in those cities suggests that such a policy reduces overall use of public transit and may well also decrease overall system revenue. As a result, the pass promotional advertising strategy has been implemented. Its effectiveness will be tracked through future fare evasion audits.

3. Pass redesign. One of the major problems identified by the fare evasion audits was two-zone passes being used to travel through all geographic zones. The pass was redesigned to designate specifically *which* two zones are authorized. This strategy has not yet been evaluated, but it is expected that the redesign will make the misuse of the passes more difficult by making it more obvious to both the passenger and staff when a pass is being used in the wrong geographic zone.

4. Counterfeit fare media. The fare audit process has identified a number of different ways that people alter or counterfeit fare media. This type of fare evasion cannot be considered inadvertent. As a result, BC Transit Police now conduct focused investigations targeting counterfeiting and fare media alteration. Fare evasion audit data are analyzed for patterns which reveal black markets in counterfeit or forged fare media; investigations can then be directed at visible situations and suspects. In addition, BC Transit has redesigned some fare proof-of-payment media to make them more difficult to counterfeit. It is too soon to tell whether the fare media redesign has worked, but future fare evasion audits should provide evidence.

The two tested situational prevention programs are:

1. Reduced evasion on the SeaBus. The fare evasion audits revealed an

unexpectedly high incidence of fare evasion at the SeaBus terminals. These terminals have three components: an entry area where fare media can be purchased from sophisticated vending machines; a long, connecting, fare-paid-zone passageway leading to the SeaBus dock; and a passenger loading area on the dock. The loading area is entered through turnstiles where Transit staff may ask to see proof-of-payment.

One source of the SeaBus fare evasion problem was traced to rush hour when the limited number of staff on duty in the passenger loading area proved unable either to examine more than a small proportion of the passengers entering the system or to project a presence that might make evading passengers think that they faced a significant chance of being caught. In response to this analysis, the number of SeaBus attendants assigned to check fare media during peak hours was increased following the Fall 1988 fare evasion audit. Before the Fall 1988 audit there were always one or two attendants on duty. After the problem was identified the minimum number of attendants, during rush hour, was set at two. The number of attendants was frequently increased during peak hours to three and sometimes four during the period when the risk of fare evasion was highest.

TABLE 1
FARE EVASION — SEABUS

	Pre-Intervention		Post-Intervention	
Audit Date	Fall '87	Fall '88	Fall '89	Fall '90
Number Audited	14,762	12,530	8,947	12,674
Number Evaders	755	626	369	520
Percent Evaders	5.11	5.00	4.12	4.10

As Table 1 shows, the SeaBus fare evasion rate has dropped 20 percent, from a little over 5 percent of audited passengers in pre-intervention fare evasion audits to a little over 4 percent of audited passengers in the post-intervention period. Moreover, the drop has been sustained over a period of two years.[5]

2. *Reduced FareCard evasion.* The early fare evasion audits showed that misuse of FareCard, the monthly pass, was a continuing problem. The design of the FareCard was such that it was difficult for staff to determine at a glance whether the card was valid. The FareCard was redesigned to make checking it easier and thereby discourage misuse for fare evasion. As Table 2 shows, the redesign appears to have had a significant impact, producing a continuing two-thirds reduction in the level of FareCard evasion.

TABLE 2
FARECARD EVASION

Audit Date	Pre-Intervention Fall '88	Post-Intervention Winter '89	Spring '89	Summer '89	Fall '89
FareCards in Audit	21,423	10,310	9,510	17,285	17,812
Evasions	188	33	33	44	58
Percentage	0.9%	0.3%	0.3%	0.3%	0.3%

Conclusions

Situational crime prevention strategies based on analysis of the specific conditions that make a particular crime problem possible have been shown, repeatedly, to have a powerful capacity to reduce the quantity of the crimes they address (see, e.g., Poyner, 1991a; Pease, 1991). This study further illustrates the power of situational prevention in showing how modifications of the conditions surrounding fare evasion on the SeaBus and in the use of FareCard passes were able to produce sustained reductions in fare evasion, by 20 percent in the SeaBus situation and by 67 percent in the FareCard situation.

This study also illustrates another of the important characteristics of the situational prevention approach: many crime facilitating situations are particular to a specific time and place. This means, we think, that many crime problems are themselves particular to the conditions found in specific spatio-temporal settings. There will be few crimes in which a single uniform prevention technique will address problems everywhere: each problem will have to be addressed by prevention tactics adapted to its specific situation. The specificity of solutions is illustrated in the way that BC Transit has tried to address different problems with different solutions: the payment of insufficient fares has been addressed by changing ticket machines to make it easier for passengers to know what the correct fares are. Counterfeiting of fare media has been addressed by making tickets and passes more difficult to copy and by focusing traditional criminal investigation techniques on the problem in order to catch the counterfeiters. The problem of evasion by cash fare passengers is being addressed through a program intended to discourage cash fare riders and make various passes and ticket books more attractive.

Finally, we note that crime problems are not static entities; they change, evolve and adapt over time as the concrete, legitimate physical and social conditions that create niches for criminal activity (Brantingham and Brantingham,

1991; Felson, 1983) and define situations in which crimes repeatedly occur (Clarke, 1980) themselves change. The BC Transit Police Fare Evasion Audit Program is both an ongoing prevention tool and an ongoing problem measurement tool. Additionally, the program provides BC Transit with its only official enforcement presence in some transit situations. While the fare audit program would doubtless benefit from additional resources allowing refinement of the situations that could be analyzed, the audit *process* has proved itself by helping identify specific problem situations and suggesting potential situational solutions. Moreover, its continuing nature allows for ongoing monitoring of the continuing effect of prevention programs and of the development of new crime problems as the transit system itself evolves and changes over time. We conclude that the development of continuing, organizationally structured crime analysis and prevention program monitoring tools, in some form, is a critical step in the development of effective situational crime prevention strategies.

The central conclusion that we draw from consideration of the Fare Evasion Audit Program is that a situational crime prevention strategy is powerfully enhanced when it is embedded in an established organizational process that identifies problems, mounts situational solutions, and tests solution efficacy on the basis of continuing, standardized measurement procedures.

NOTES

1. For discussions of vandalism problems, see Sloan-Howitt and Kelling, 1990; Sturman, 1980. For more general discussions of crime and public transit, see Brantingham, Brantingham and Wong, 1991; Felson, *et al.*, 1990; Levine and Wachs, 1985; Shellow, Romualdi and Bartel, 1974.
2. This article cannot present the complete details of the Fare Evasion Audit Program. For further information contact Constable Scott DesChamps, BC Transit Police, 1296 Station Street, Vancouver, B.C., Canada V6A 2X3.
3 BC Transit realized very quickly that the quality of the audit process might be jeopardized each time an interruption occurred due to an enforcement action. Consequently, extra manpower is factored into scheduling to allow for this. However, if an enforcement interruption does occur, the audit is stopped at that particular place and point in time. The sampling segment is rescheduled.
4. In other words, the sample estimate of evasion would be within 5% of its true value 95% of the time. The same method has been used since 1987.
5. Comparisons are made for successive Fall audits because the fare evasion data appear to fluctuate seasonally. Using data from audits conducted at similar times each year controls at least partially for this seasonal tendency.

12. The care of public transport in the Netherlands

Henk van Andel

EDITOR'S NOTE: One of the empirical projects included in Crime as Opportunity *the Home Office's first venture into situational prevention (see Mayhew* et al., *1976), dealt with vandalism on double-decker buses. Its findings suggested that bus conductors perform a valuable crime prevention role because vandalism was much greater on buses operated without them. Dispensing with conductors was a cost-saving measure, and public transit systems throughout the world have employed the same rationale to shed staff such as porters, guards, and ticket collectors who exercise an informal surveillance function. It may not be extrapolating too far from the Home Office study to suggest that the almost universal increase of crime and vandalism on public transport may have been the result of this policy. This case study, first appearing as an article in the* British Journal of Criminology *(van Andel, 1989), reports an enlightened attempt by the government of the Netherlands, influenced by the important crime prevention work of Jan van Dijk and others in the Dutch Ministry of Justice, to reverse the damage. Public funds were provided to permit the employment of some 1,200 indi-*

viduals to serve as "safety, information and control" officers on the bus, tram and metro systems in three major cities. Together with a new boarding procedure, which meant that bus passengers had to show their tickets to the driver, this led to a substantial decline in fare evasion and some reduction of vandalism. While the resultant savings did not pay for the new positions, these were filled by unemployed young people, especially by women and minorities. As van Andel argues, these important social benefits have to be part of the cost-benefit calculation.

AN EXPERIMENT has been carried out in the Dutch public transport system to tackle fare-dodging, vandalism, and aggression. On the tram and metro system the level of inspection has been increased by employing about 1,200 young people. On buses the boarding procedure has been changed. The results show that the percentage of fare-dodgers fell after the introduction of the measures. The number of incidents decreased during the project; feelings of insecurity did not decrease. Damage experts, passengers, and staff agree that the measures put a halt to the increasing trend in vandalism. Given costs and benefits, the measures made an important contribution to cutting petty crime on public transport and thereby improved the quality of service.

Introduction

When the present government came to power in the Netherlands it expressed concern that the massive scale of minor traffic offences, petty offences against property, and other forms of minor vandalism were seriously endangering safety on the streets. The response of the minister of justice was to set up a special committee in September 1983. The minister took the line that petty crime not only had a negative impact on the quality of life in the Netherlands but also placed enormous demands on the police and courts.

The committee's first report, published in December 1984, contained an attempt to apply the theory of situational crime prevention to the phenomenon of petty crime.[1] According to this theory, certain forms of crime are committed simply because numerous opportunities for doing so present themselves (Mayhew *et al.*, 1976; Clarke, 1983). It is not poverty or a personality defect that makes the thief, but opportunity.

In addition to the question of whether the temptation does or does not exist, there is the importance of security measures. In view of the limited success of technical security measures (Mayhew, 1984), the committee recommended tackling petty crime by reinstating service personnel (instead of machines) to perform supervisory functions in otherwise impersonal situations (the concept

of occupational surveillance).

One of the areas considered by the committee was public transport. The increase in fare-dodging and vandalism on Dutch public transport is a good example of petty crime which can largely be attributed to a decline in functional supervision (i.e., the theory of opportunism). Conductors disappeared for economic reasons as long ago as 1963. This entailed a change in procedure on boarding a bus or tram: the driver was now responsible for selling and checking tickets. The introduction in 1966 of automatic machines to stamp tickets relieved the driver of some of this responsibility but at the same time increased opportunities for fare-dodging. In the case of trams the problem was compounded by the introduction of a new design of vehicle with more than one door. Responsibility for ensuring that passengers had a valid ticket shifted from driver to individual passenger, and contact between the two parties was reduced; supervision of passengers in bus or tram largely disappeared (Hauber, 1977).

In response to these developments, the minister of transport and public works announced in December 1984 the introduction of two measures: one for the tram and metro system and one for the bus system. The public transport companies operating tram and metro services in the three major cities (Amsterdam, The Hague, and Rotterdam) were thus authorized to take on, as an experiment for a period of three years, approximately 1,200 unemployed young people to tackle fare-dodging, vandalism, and aggression on the tram and metro system and to improve the information and service available to passengers. These new officials are known in Dutch as VIC (corresponding to *Veiligheid, Informatie, Controle* — safety, information and control). A sum of 33 million guilders was set aside each year for this purpose, reflecting the government's concern with combating petty crime and with practical steps to reduce youth unemployment and for opening up employment opportunities for women and members of ethnic minorities. In calculating this sum, allowance was made for some 13 million guilders per year in extra revenue for the public transport companies and a saving of 3 million guilders on the costs associated with vandalism. Thus the total budget for the tram and metro experiment was 49 million guilders per year. The second measure introduced involved changing the procedure when boarding a bus. All passengers must now walk past the driver, who checks their tickets to see if they are valid and sells them a new one if necessary.

The two measures — the VIC project (tram, metro) and the change in the boarding procedure on buses — have been jointly evaluated by the Ministry of Transport and Public Works, the Ministry of Justice[2] and the public transport companies of the three cities. This article briefly assesses the extent to which the goals of the project were realized in the first two years of operation. The following questions are considered. Have the appointment of VICs and the

change in the boarding procedure on the buses reduced fare-dodging and thus increased public transport revenue? Has vandalism in vehicles, at bus and tram stops, and in metro stations declined? Has passenger information improved? Do passengers and employees feel more secure? Discussion of the results is preceded by a brief description of the measures themselves and the design of the evaluation.

Description of the measures

VIC project. In autumn 1984, the public transport companies of Amsterdam Rotterdam, and The Hague were given permission to recruit 1,200 new VIC employees as a way of increasing safety, information, and control. The companies were allowed to organize the project as they considered appropriate for their own situation.

The recruitment campaign was geared to employing unemployed people aged 19-28 and every effort was made to ensure that women and ethnic minorities were well-represented in the intake. There was a good response to the campaign. Requirements were low, but employees had to be able to cope with unfriendly passengers and fare-dodgers: in the end, only one in ten applicants could actually be recruited as VIC, many proving unsuitable for lack of the required social skills. Of those taken on, 50 percent had been unemployed, 30 percent were women, and 25 percent came from ethnic minority groups (blacks, Mediterranean, etc.).

On January 1, 1987, 535 VICs were employed in Amsterdam, 375 in Rotterdam and 230 in The Hague. All VICs received short (2-3 month) training comprising a number of courses in criminal law and legal theory and practical exercises in ticket inspection. In general the VICs performed well in their new function.

VICs are deployed in different ways in the three cities. In Amsterdam and Rotterdam they are authorized to impose fines. In Amsterdam they work in groups of 2-4, checking trams and the metro system on a random basis. Once they have checked a tram or metro train they get out and board another one. In Rotterdam the VICs check trams on a random basis, but man the metro stations permanently. However, their role in the metro stations is not to check passengers but to provide information and fulfil a preventive function. The Hague opted for a 'customer friendly' approach. VICs travel in pairs the full length of the tram route and are not authorized to impose fines. Passengers caught without a valid ticket are given the choice of buying one from the driver or leaving the tram.

In the event of problems with passengers, VICs in all three cities can obtain support from a special team or from the police as the tramdriver can use his radiotelephone to summon assistance which should arrive within minutes.

Change in boarding procedure on the buses. Until the 1970s, responsibility for both ticket sales and ticket inspection rested with the bus driver. Automatic machines for stamping tickets were introduced as a means of speeding up the service and improving punctuality. This reduced direct contact between the driver and passengers and was followed by an increase in fare-dodging. After a successful pilot project in which all passengers were required to board the bus at the door nearest to the driver and show their tickets or buy a new one, the new procedure was introduced on a permanent basis in Amsterdam in 1985 and in Rotterdam and The Hague a year later. The automatic machines for stamping tickets in buses have been taken out of service or removed altogether.

Design of the evaluation

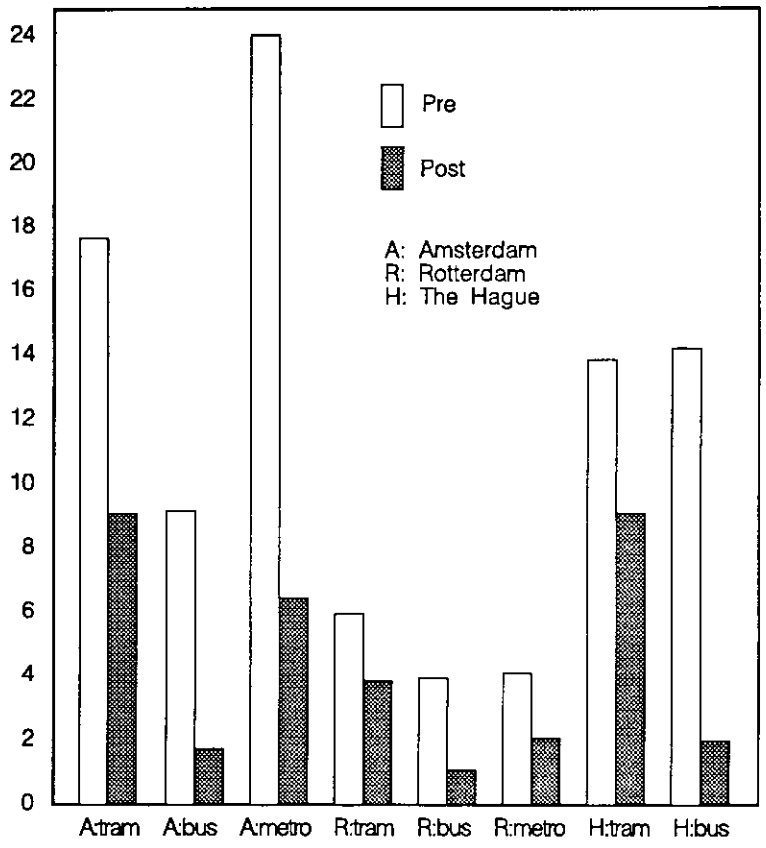
The research was designed to be quasi-experimental, involving both a pre-test and a post-test (Cook and Campbell, 1979) and comprised three elements:

1. *Quantification of the extent of fare-dodging.* The purpose of this was to discover the extent to which the number of people illegally using public transport has fallen since the deployment of VICs and the introduction of the new boarding procedure for buses. For this purpose, the public transport companies carried out a series of counts, making random checks on all passengers in a tram, bus or metro train.[3] These took place in March 1985 (base figure), November 1985, March 1986, and November 1986.[4]

2. *Following trends in the costs associated with vandalism.* This research used the costs of repairing damage and drew on the opinions of damage experts, passengers, and staff.

3. *Interviews with passengers and staff.* The measures taken were expected to make public transport safer and more attractive. In order to ascertain whether this was indeed the case, a survey was carried out among passengers and staff (including VICs). A representative sample of public transport users (N=900) were asked before and after the introduction of the new measures to assess a large number of aspects of the public transport system.[5] They were also asked about their experiences as regards safety, vandalism, information, and inspection. The first survey was conducted in November 1985, the second in September 1986. A preliminary survey revealed that passengers regarded safety as the most important of the three VIC responsibilities for ensuring a high standard of public transport. A questionnaire was also carried out in September 1986 among regular

FIGURE 1
PERCENTAGE OF FARE-DODGING:
BEFORE AND AFTER THE NEW MEASURES



staff and VICs. The survey among VICs was useful for determining whether they considered their job worthwhile and whether they were motivated.

Results

Fare-dodging. It is clear from the counts that the percentage of fare-dodgers fell in all three cities after the introduction of the VICs and the change in the boarding procedure for buses (Fig. 1). The decline was most pronounced during the rush hour on weekdays, largely because of the hours worked by the VICs:

a 32-hour week with a heavy bias towards normal working hours; deployment is less at weekends and late at night, and this is reflected in the higher percentage of fare-dodgers at these times.

In Amsterdam the introduction of the VICs produced a sharp fall in the percentage of fare-dodgers on the tram (from 17.7 percent to 9.0 percent) and the metro (23.5 percent to 6.5 percent). The largest drop occurred in the first year. The publicity surrounding the intensification of ticket inspection probably led to a sharp initial decline in fare-dodging which subsequently stabilized. the new boarding procedure on the buses also led to a sharp decline (from 9.2 percent to 1.7 percent).

A reduction in fare-dodging was also evident in Rotterdam, despite the fact that the percentage of fare-dodgers before the introduction of the measures was already low. On the trams the percentage of fare-dodgers fell from 5.8 percent to 3.7 percent, on the metro from 4.0 percent to 2.6 percent, and on the buses from 3.8 percent to 1.3 percent. The Hague experienced an initial decline in the percentage of fare-dodgers on the trams (from 13.7 percent to 9.5 percent), but this was not followed by any subsequent drop. The change in the boarding procedure on the buses produced a large drop (from 14.1 percent to 2.4 percent).

The survey carried out among passengers revealed that they had noticed an increase in ticket inspections, more so in Amsterdam and The Hague than in Rotterdam. This can be explained by the proportionately greater increase in the number of ticket inspectors in these two cities. Rotterdam already employed a relatively large number of inspectors before the introduction of the VICs. The changes have produced a significant, across-the-board increase in passenger satisfaction on this issue. In the 1985 survey passengers often awarded a low score to the transport company for the frequency of ticket inspection, a year later most considered this aspect highly satisfactory. Passengers apparently like being asked to show their tickets. The increase in passenger satisfaction is connected with passengers' impression that fewer people are dodging fares than they used to before the VICs. However, a quarter of passengers still think that fare-dodging is acceptable in certain situations (e.g., for people on low incomes).

As a result of increased ticket inspection, respondents claim that they no longer dodge fares or that they do so less than before. There seems to be a strong correlation between behavior and a person's views on fare-dodging: those who regard it as acceptable show a greater tendency to dodge fares.

A closer analysis of fare-dodgers as a group reveals the following:

- Young people dodge fares more often than old people and have been least influenced by the new measures; the average age of the fare-dodger has fallen in the period covered by the evaluation. Old people

are apparently more afraid of being caught without a ticket or take being caught more to heart.

- Men dodge fares more often than women; however, the difference has become less pronounced as a result of a more marked decline in fare-dodging among men aged 25-40.

There remains, therefore, a specific group of young passengers who are little affected by the increased controls.

Safety. The number of violent incidents on public transport has fallen during the project. In 1985, 11 percent of passengers reported having seen someone attacked or harassed in the three months preceding the survey, and 5 percent had themselves been the victim of such an attack. A year later, in 1986, the percentages had fallen to 3 percent and 2 percent respectively.

One in three passengers thinks that safety has improved because of the increase in the number of staff. However, the level of feelings of insecurity has declined only slightly and such feelings remain common: 24 percent of passengers sometimes feel unsafe, and 13 percent occasionally avoid public transport for this reason (the corresponding figures before the changes were 27 percent and 15 percent). Clearly, feelings of insecurity are influenced by many social factors, and being the victim of an incident makes a lasting impression on a person's perception of the situation (Heijden, 1984).

Vandalism. In the years preceding the new measures, public transport companies were faced with ever-rising costs as a result of vandalism. Deploying VICs to combat vandalism is just one of many projects which have been started in response to this problem. Municipal authorities, for example, have initiated various projects to tackle vandalism and apprehend young vandals, and public transport companies have invested large sums in materials designed to withstand vandalism.

A slight reduction in repair costs for vehicles and rolling stock was evident in Amsterdam in 1986 after the introduction of VICs,[6] but there was no noticeable difference for metro stations. The reduction in the other two cities was less marked. The figures show no consistent trend.

A study was carried out in Amsterdam into cleaning times for two virtually identical tram routes. For a three-week period, VICs were present in the trams on one line for 29 percent of the time but never boarded trams on the other line. All trams on both lines were inspected every night and cleaned and repaired as thoroughly as possible ready for reuse. Trams on the line without VICs took roughly 15 percent longer to clean than those on the line patrolled by VICs. In Rotterdam and The Hague, the decline in damage and graffiti in buses and trams does not show up in the figures, but experts and depot managers nevertheless

have the impression that less time has been spent on vehicle repairs and cleaning to remedy the effects of vandalism.

Since VICs have been on duty in the metro stations in Rotterdam the amount of graffiti on external walls has remained virtually unchanged, but the amount inside the stations has fallen by roughly 30 percent.[7] There has also been a decline in the number of broken windows in metro stations. At tram and bus shelters at street level, however, the number of windows that had to be replaced in the same period doubled.

Passengers reported seeing fewer cases of people damaging or defacing property in 1986. In the survey they expressed greater satisfaction with the appearance and cleanliness of the public transport system.[8] As would be expected, vandalism usually occurs out of sight of employees, but a quarter of the staff interviewed did discover at the end of the shift, anything from several times a week to every day, that something had been damaged or defaced. However, at least half the staff felt that vandalism had declined since the introduction of VICs.

It is impossible on the basis of the various figures available to draw any firm conclusions about the impact on costs associated with vandalism. The variations are too marked, and vandalism also depends on other factors. However, damage experts, passengers, and staff unanimously agree that the VICs and new boarding procedures on the buses have stemmed the long-standing increase in vandalism.

Information. Passengers' assessment of the information provided on public transport has been almost unaffected by the measures, although they are pleased that there are more opportunities for asking staff questions. The proportion of people dissatisfied on this score has fallen from 37 percent to 26 percent. The proportion of people who regularly ask employees questions inside the vehicles has increased from 9 percent to 28 percent.

What the changes mean to passengers and staff. The introduction of VICs and the change in boarding procedures on buses have not gone unnoticed among passengers and have improved the image of public transport. Passengers now give a higher rating to many aspects which affect the quality of public transport. Aspects which were rated unsatisfactory before the introduction of VICs (such as ticket inspection) are now judged satisfactory.

Despite the fact that passengers give a positive verdict on the performance of the VICs and have noted a number of improvements, this has not led to an increased use of public transport in Amsterdam and Rotterdam. Only in The Hague do 7 percent of respondents now claim to use the system more frequently. On the other hand, there is no indication that former fare-dodgers have abandoned public transport: it can therefore be inferred that they are now more likely to buy a ticket.

Employees are in general well disposed to the new measures. A large percentage of the staff believe that thanks to VICs the number of fare-dodgers and incidence of vandalism have decreased and information on services has improved. Tram drivers do not feel that their personal safety has improved, but do feel less lonely. There has been no change in the level of aggression by passengers against tram drivers. Bus drivers feel that they now have more authority and are in favour of the new boarding procedure.

The VICs themselves take a positive view of the project. They think their work is effective and have a high opinion of the co-operation and supervision from the public transport companies. The VICs feel that they have managed to establish a clear role in the eyes of the passengers. Their only regret is that they cannot devote more time to the safety aspect of their work which, they feel, has yielded the fewest results.

Evaluation

Deployment of VICs. The public transport companies have adopted different policies as regards the powers allocated to VICs and the way in which they are deployed. The principal differences relate (a) to whether they are authorized to impose fines and (b) to whether they carry out random checks or travel on particular vehicles.

One of the most important tasks of the VICs is to inspect tickets on trams and in the metro. Counts show that the percentage of fare-dodgers have fallen sharply on all three public transport systems. In The Hague, however, the percentage soon stabilized at a relatively high level. Passengers, and fare-dodgers in particular, quickly realized that the VICs in The Hague were not authorized to impose fines, and this has undermined the effectiveness of the checks. People would pay only if confronted by a VIC, and even then would not receive a fine. Further, the disadvantage of the system of assigning VICs to particular trams is that passengers can see whether there are VICs on board and decide to wait for the next tram instead. With 250 VICs working in pairs, it is never possible to man more than 20 percent of the tram services in The Hague.[9]

The greatest improvement in safety seems to have been achieved in those places where staff (VICs) monitor the situation for longer periods of time. In particular, the passengers on the trams in The Hague, where VICs accompany particular vehicles, and on the metro in Rotterdam, where they are deployed in a particular metro station, feel that safety has improved.

The decrease in graffiti and damage in the metro stations in Rotterdam which are permanently manned by VICs and the lower cleaning costs on tram lines in Amsterdam which are inspected by VICs suggest that VIC presence over a longer period of time has a stronger preventive effect on vandalism.

The foregoing suggests that from the point of view of ticket inspection, VICs who accompany particular trams for the length of their journey are less effective than those who carry out random checks, because their movements are more predictable. On the other hand, the presence of VICs in a particular place for longer periods improves safety and reduces vandalism. If VICs are to carry out their inspection duties effectively they must be authorized to impose fines.

Financial costs and benefits of the VIC project. Deploying the VICs costs 49 million guilders per year: 43 million guilders for wages; 2.5 million guilders for management costs; and 3.5 million guilders for overheads.

The benefits which the public transport systems derive from the deployment of VICs may be classified as follows:

- A significant decline in fare-dodging. Depending on the type of journey and the sort of ticket bought, the extra revenue from ex-fare-dodgers on the trams and metro is estimated at between 12 and 14 million guilders.
- An increase in the number of fines imposed. The extra revenue generated (for the Ministry of Justice) is estimated at 1 million guilders per year.
- Costs associated with vandalism have stabilized or even fallen slightly. However, these changes cannot be ascribed exclusively to the introduction of VICs, as other measures to tackle vandalism have undoubtedly also played a part. A sum of 1.5 million guilders has been credited on the benefit side of the project: this does not represent an actual cost reduction but a leveling off of the trend of increasing costs.

Given that the benefits to the public transport systems are worth between 14.5 and 16.5 million guilders and total costs are 49 million guilders, the VIC project in its current form covers roughly one third of its costs. This is more or less what was expected when the project was started.

Financial costs and benefits of the new boarding procedure on the buses. Reactions to the new boarding procedure have been overwhelmingly positive, even though buses are delayed longer at the stops as a result. This has forced the bus companies to put on extra buses on some routes, given that passengers regard punctuality as the most important criterion in their assessment of public transport.

The new boarding procedure entails costs of 6.1 million guilders. The benefits take the form of increased revenue because fewer people are dodging fares. One obvious difference between this and ticket inspection by VICs is that

everyone boarding the bus is checked. The benefits for the three cities together are estimated at 3.6 million guilders. In Amsterdam and The Hague the new boarding procedure almost completely covers its costs. In Rotterdam, where an effective inspection system already operated so that the percentage of fare-dodgers was relatively low in the first place, the costs were relatively high.

Social benefits. In addition to the financial costs and benefits, which are important for the public transport companies, the measures also have a social significance. As in most cases it is impossible to place a monetary value on the social benefits, they are described below largely in qualitative terms:

- The measures have made an important contribution to cutting petty crime on the public transport system. This improves the quality of public transport.
- The VIC project has created approximately 1,200 new 32 hour-a-week jobs. Savings on unemployment benefits amount to some 21 million guilders per year. Many of the new jobs have been taken by young unemployed people, who thereby gain work experience and training.
- The VIC project has provided an opportunity for putting into practice the government's policy of opening up employment opportunities for women and members of ethnic minorities.

Discussion

In the light of the results, the increased level of ticket inspection achieved by the deployment of VICs on trams and metro and the introduction of tighter controls when boarding buses may be said to have succeeded in the short term in reducing petty crime on public transport. Increased staff presence did not, however, reduce passengers' feelings of insecurity, although safety in a number of places did improve. Certain other effects may become apparent in the longer term. Feelings of insecurity, for example, might still diminish. Passengers think that fewer people dodge fares, and this may lead to a shift in norms: fare-dodging may come to be seen as less acceptable. The employees' positive attitude towards the VIC project probably has an effect on their manner towards passengers, which can in turn improve relations between staff and passengers and increase social control. So the results can be seen as a confirmation of the close link between the concepts of situational crime prevention and occupational surveillance. Shaw (1986) came to similar conclusions in evaluating the effect of crime-prevention projects: employing caretakers is more effective in preventing crime than any amount of hardware.

NOTES

1. The Committee defines the term 'petty crime' in its first report (p. 12) as follows: 'punishable forms of behavior occurring on a large scale which can be dealt with by the police on a discretionary basis or, in the case of a first offence, are generally handled by the Public Prosecutor or are dealt with by the courts at the most through the imposition of a fine and/or a conditional custodial sentence and which — mainly because of the scale on which they occur — are a source of nuisance or engender feelings of insecurity among the public'.
2. Following its first report the committee received funds to carry out a number of experiments. These built on the recommendations to the minister of justice made in the plan for fighting crime entitled *Crime and Society* (Bottomley, 1986). The evaluation of the VIC project is just one instance of this.
3. The research used a national registration system in which the public transport network was divided into a number of equal areas/routes. For each area and time of day (peak hours, off-peak hours, and evening), a sample was taken among those passengers who had their tickets checked.
4. In Rotterdam the measure for the base figure was taken in November 1985.
5. The study began at a time when the change in boarding procedure had been operating for over six months in Amsterdam and only one month in The Hague. Some transport companies had already recruited the full number of VICs on certain sections of the system. Because of this, and because changes in attitude and behavior take much longer to manifest themselves than the period covered by the counts, the results do not convey a complete picture. The results should be seen as an indication of what actually happened.
6. The damage repair costs represent the adjusted calculations of damage clearly identified as being the result of vandalism. Repair costs are calculated on the basis of repair work and replacement costs using new and old parts which are still in stock and in working order. In some cases repairs are combined with regular servicing. Not all costs are recorded immediately. Damage to vehicles and street furniture as a result of football hooliganism or squatters' riots is included in the general figures.
7. However, most graffiti is done after 23.00 hours when VICs are no longer on duty in the metro stations.
8. In Amsterdam in particular, it was found that benches, arm and back rests, and seats were damaged less frequently. This is partly connected with the fact that seats with padding, which are easily slashed, have been replaced by hard, polyester ones that are less easily vandalized.
9. The Hague has since experimented with a new approach. At the end of 1986, in an effort to increase the surprise factor in inspections, the transport company started to deploy VICs on particular sections of a route; on certain sections of a tram route all vehicles are manned by VICs.

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13. Thefts from vehicles in shipyard parking lots

John Eck and William Spelman

EDITOR'S NOTE: As explained in the Introduction, *problem-oriented policing (Goldstein, 1979, 1990) adopts essentially the same methodology as situational prevention, but it is the police who take the lead. They undertake the analysis of problems and try to persuade those in the community who "own" the problem, and who may have the necessary authority and resources, to take the required preventive action. This case study is reprinted from Eck and Spelman (1988), a Police Executive Research Forum monograph on problem-oriented policing (with the figure taken from Spelman and Eck, 1987). It clearly illustrates the difficulties for the police in following this path. Convinced that the solution to wide-scale thefts from vehicles in shipyard parking lots was substantially improved security, the police quickly found that nobody was interested in providing the necessary funds. They fell back on traditional policing methods, but with some imaginative variations. In particular, they made use of offender interviews to identify the groups of offenders involved and to gain insight into their motives and methods. This information was used successfully to redirect surveillance and patrol activi-*

ties with the result that many of the persistent offenders were arrested. The case study also shows that quite different groups of offenders might be attracted by essentially the same opportunities for crime. Thus, one group of white, working class thieves operating in the lots was principally interested in drugs and looked for cars with evidence that the owner might be a marijuana or cocaine user (e.g. "muscle" cars with bumper stickers for local rock and roll stations). Another group of black offenders was principally interested in items such as stereo equipment and guns that could be easily fenced. These facts have preventive implications for the victims concerned.

NEWPORT NEWS Shipbuilding is the largest employer in the state of Virginia. Each day over 30,000 workers enter the shipyard's main plant in the southwestern section of the city. Many drive, leaving their cars, pickups, vans, and motorcycles unattended in one of the many parking lots surrounding the shipyard. Thefts from these vehicles comprise a serious problem for the police department: over 700 thefts from these vehicles were reported in 1983, for example.

Like the problem of burglaries in New Briarfield, the police have long recognized that the shipyard parking lots posed a problem. Unlike New Briarfield, however, the thefts from vehicle problem has always been considered a trivial nuisance by most police officers. Despite the volume of offenses, and despite periodic attempts to arrest offenders, the Crime Analysis Unit did not even track thefts from vehicles. In fact, when the problem was first posed for study by a member of the Task Force who had once patrolled the parking areas, the idea was met with much joking and criticism.

The shipyard and the surrounding lots largely define this section of the city. There are few other buildings, most of them bars and fast food diners catering to shipyard workers. Most of the rest of the land in the district consists of a hodgepodge of vacant lots. Some are owned by the city, some by the shipyard, others by local residents and private companies. They result not only from the need for parking, but from urban renewal projects in the nearby downtown area. Many of the buildings that had been in the area in the 1960s were removed but never replaced. Because there is little demand for commercial building in the downtown area, the present owners make do by turning their vacant land into parking lots.

Security and other amenities vary considerably among the lots. The fanciest lots are owned by Newport News Shipbuilding and are used by its managers and executives. They are paved and have well marked spaces. They are also relatively secure, having high fences, limited access points, and guards. At night, these lots

are well-lit. At the other extreme are the lots used by shift workers. They are owned by parking lots companies, individuals, and the city. These lots are often merely gravel open areas with no marked spaces. Security is not provided in these lots: there are no fences and many access points to the street; none of these lots are guarded, and many are unattended during the day; lighting is minimal, mostly provided by street lights.

Over the years, the police had made several attempts to deal with crimes in and around the parking lots used by shipyard workers and Navy personnel. In 1982, following the murder of two sailors in one of the lots, the Navy and the police created the SPAN unit — Special Patrol to Aid the Navy — to patrol the area. The Navy purchased two cars and pays the overtime of police officers to patrol the downtown area around the shipyard. While it increases police presence, SPAN does not seem to deter the thieves. A SPAN stakeout in 1983 aimed at arresting thieves netted several minor drug dealers, but no auto burglars.

When this problem was first considered by the Task Force, Detective Bill Liddell was assigned to take a preliminary look at the problem. Liddell confirmed that over 700 vehicle break-ins were reported each year. In 1983, thefts from vehicles in these lots accounted for 10 percent of the index crimes committed in Newport News. The average loss was $250. This put a dollar value of more than $150,000 per year in reported losses, and this did not include unreported thefts and the damage done to vehicles. The Task Force selected the problem for further study, and assigned Officer Paul Swartz to handle the analysis.

Analysis and response

Swartz soon found that the theft from autos problem was more complex than he had imagined. Rather than analyze the problem and then develop a response, he attacked the problem in an iterative process: he analyzed a facet of the problem, then developed an appropriate response; then he studied another facet and developed a further response; and so on. This satisfied both the task force and command staff's desire for immediate action, and Swartz's conviction that thorough study was needed for long-term success.

Building on Detective Liddell's preliminary work, Swartz took three approaches. First, he examined police records to get a better idea of when and where the thefts were committed. Then he gathered information about the offenders. These two information sources led him to develop an effective, short-term response to the problem. Finally, he began to talk with the shipyard security force, residents of the neighborhood, and others with a stake in solving the problem, to get their views as to what needed to be done. This was useful in the development of a long-term solution.

Reported crime analysis. Swartz used the city's computer to obtain a printout containing information on all thefts from vehicles committed in the shipyard area between January 1982 and March 1985. Swartz then hand-tabulated the data in literally dozens of ways, focusing on three characteristics: when the thefts were committed, where they were committed, and who (probably) committed them.

Officer Swartz looked at daily, weekly, monthly, and yearly time patterns. He found that most of the offenses were committed on weekdays during the day shift. This was hardly surprising, since these were the times when the lots were most full and there was most to steal. But a sizeable proportion of thefts were committed at night, and even Sunday churchgoers were sometimes victimized. In fact, the likelihood of victimization per car seemed to be highest on weekends, suggesting that the thieves were simply opportunists.

One of the first questions Swartz asked was whether there was a pattern of thefts related to the security measures provided. The secured lots owned by the shipyard did seem to have a lower rate of thefts. But because there was no count of the automobiles parked in the lots at various times, it was difficult to determine if this was due to better security or fewer cars at risk. In any case, it would be prohibitively expensive for the city or the private lot owners to provide fences, lights, and guards, so Swartz abandoned this line of inquiry for the time being. Instead, he focused on trying to identify parking lots with exceptionally high numbers of thefts, regardless of the number of cars using them.

Using spot maps, he was able to identify seven lots with more than 25 break-ins each for the years 1982 to 1984. Two of these lots, including the most often victimized lot, were owned by the city. Another 20 lots with 15 to 24 break-ins during this period were also found; two more city lots were found in this group. Not surprisingly, none of these lots were owned by the shipyard.

Swartz also examined a variety of other characteristics of the offenses, including the type of goods stolen, the method used to break into the car, and so on. He found that the incident reports often failed to include some data important to his analysis; working through the chain of command, he convinced patrol officers to add these data elements to any reports they took of thefts from autos in the Shipyard area. Finally, Swartz developed a detailed daily tracking procedure, so that he or anyone else who took over the problem could stay on top of changes in offense patterns.

This analysis suggested two solutions. For the short term, it gave patrol officers in the area an idea of where and when they should focus their attention. This might help to arrest frequent thieves, for example. Second, it suggested a long-term option: work with the city and private lot owners to improve security in the most frequently victimized lots. The long-term solution was made more difficult by the fact that only four of the worst lots were owned by the city; to

make a serious dent in the problem, it would be necessary to convince the private lot owners to adopt fairly expensive security measures.

Although his analysis of police records provided much useful information, Officer Swartz felt that he needed to go beyond reported crime data to understand the problem fully. He next concentrated his efforts on identifying the offenders.

Offender analysis. Swartz discussed the problem with patrol officers and detectives who worked the area and followed up cases of parking lot thefts. These officers believed that there were two important groups of thieves. One group consisted of a loosely knit gang of white, working class youths who lived in the neighborhood just north of the shipyard. Officers felt this group was responsible for many of the thefts in the northern section of the parking area. The other group consisted of young, black adults who lived across the C&O railroad tracks in the city's southeast community. Although the officers suspected that these offenders knew one another, they appeared to work by themselves rather than in groups. There was apparently no connection between the northern group of white thieves and the southern group of black thieves.

Armed with the names and addresses of the thieves that had been identified by other officers, Swartz resolved to interview them when he had the chance. The opportunity came early that summer, when a youth we will call Brian Thrush was arrested for possession of marijuana. Swartz suspected that Thrush was one of the northern thieves; Swartz promised the offender that nothing he said in the interview would be used against him.

Swartz learned that drugs were a prime target of the northern thieves, but stereo equipment and car parts were also targets. They especially looked for "muscle" cars, cars with bumper stickers advertising local rock-and-roll radio stations, or cars with other evidence that the owner might be a marijuana smoker or cocaine use. (Thrush related that a roach clip or a feather hanging from the rear view mirror, or a corner of a plastic bag sticking out of the glove compartment were dead giveaways.) Thrush confirmed that the northern thieves worked together, and seldom ventured into the lots south of 40th Street. Hesitantly, he also provided Swartz with the names and addresses of other member of the group.

Further interviews confirmed and extended Thrush's testimony. The southern thieves were after money, rather than drugs; as a result, they concentrated on car stereo equipment, auto parts, guns, and other goods that could be fenced easily. Although they worked independently, they did know one another. Thus Swartz was able to increase his list of active offenders, and confirm that a few were particularly frequent offenders.

The combination of reported crime and offender interview data gave Swartz a good idea of who the most active offenders were and where they were most

likely to strike. Beginning in April, he issued a series of crime analysis bulletins to Patrol South officers. The bulletins detailed his findings about the time of day, day of week, and locations of the offenses; they also included the names, addresses, and detailed descriptions of the worst offenders. After Swartz made presentations at lineup, officers began to use his findings to direct their own patrol activities.

Swartz also enlisted the help of a special police unit and, indirectly, the U.S. Navy. The Navy was mostly concerned with robbery and assault, so most SPAN officers worked evenings. But Swartz was able to show the SPAN coordinator that more than one-third of the victims of parking lot thefts were Navy employees, and that these thefts took place during weekdays. The coordinator agreed to assign some of the SPAN units to work the times and locations for which thefts were most likely. To help guide their surveillance, Swartz also provided SPAN officers with his list of active offenders.

Perhaps because the crimes were committed so frequently, these directed patrol efforts were productive. Shortly after the first crime analysis bulletin was issued, patrol officers began to catch the offenders on Swartz's list in the act. Within a three-week period, three of the offenders Swartz and his colleagues suspected were the most active were caught. Almost immediately, the theft rate began to drop.

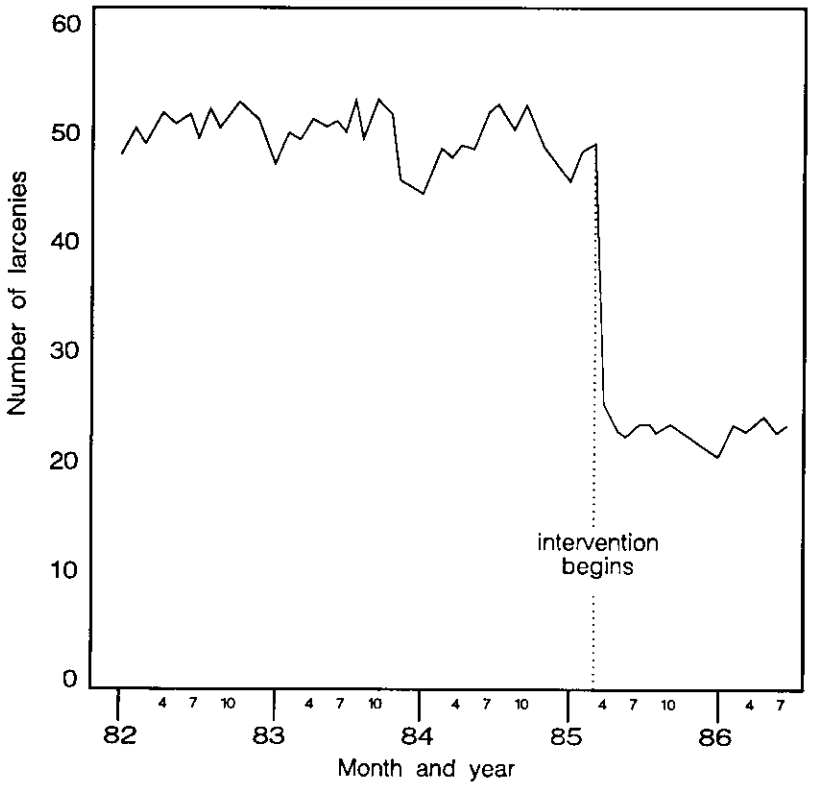
Other interested parties. With a short-run response apparently well in hand, Swartz turned to development of a long-term solution. Up to this point Swartz's work was basic crime analysis, but he suspected that other agencies and businesses would need to be involved if the long-run response was to be effective.

Although the Shipyard security force was willing to be helpful, they were unable to commit many resources to surveillance of the lots: the Shipyard's emphasis was on internal security, to guard against employee theft and leaks of sensitive military information. But the security chief did promise to put theft prevention literature in pay envelopes, and to try to convince some of the shop newsletters to publish stories on the theft problem.

Swartz had hoped that insurance companies would be willing to help, too, but the auto insurance agents he discussed the thefts with did not consider the problem serious. Although they paid a substantial amount in claims to their clients, the amount was small relative to other claims. Moreover, it was stable, so they were able to charge high premiums for comprehensive insurance and gain a tidy profit each year. A one-year reduction in thefts would mean a windfall profit for the insurers; but this would force them to reduce premiums, and they might lose money the next year if thefts returned to their earlier levels.

The Department of City Planning proved more helpful. The city was planning a massive downtown development project, Newport Center. As part of

FIGURE 1
LARCENIES FROM AUTOS:
AN AVERAGE REDUCTION OF 53 PERCENT IN THE DOWNTOWN AREA



The time series has been exponentially smoothed to account for the short-term fluctuations, long-term trends, and seasonal varriations. The estimated crime reduction due to police action is statistically significant at the .01 level.

the Newport Center plan, the Planning Department had conducted an extensive study of the need for parking downtown. Many of the existing parking lots would be replaced with multi-level parking garages; these took up less space, and would presumably be less prone to theft. Detective Bill Morgan of the police Crime Prevention Unit obtained a copy of the plan, and convinced the city's Planning Director to put him on the site review board. Morgan's role has been to offer ideas on crime prevention through environmental design of parking lots and other

Newport Center buildings. The Crime Prevention Unit hopes that this will help provide a long-term solution to the problem.

Swartz and other officers undertook a variety of other activities. Crime prevention officers established a neighborhood watch group in the residential neighborhood north of the parking area. Apprised of the seriousness of the problem, the Commonwealth Attorney agreed to seek jail sentences for repeat thieves. And Swartz began to collect information on how thefts from autos were handled in other departments. This led him eventually to begin drafting an amendment to the Virginia Penal Code, classifying these offenses as burglaries from autos, rather than as petty larcenies. This amendment would increase the likelihood and probable length of jail sentences issued to convicted thieves.

In November 1985, Officer Swartz accepted a new assignment in another unit. He turned the problem over to other officers on the day shift. After a period of confusion as to who would do what, offender and offense tracking resumed, and the results used to direct patrol activities. In July 1986, for example, their tracking procedure indicated that thefts were beginning to climb back to 1984 levels. In response, day shift Sergeant Tom Penny organized a plainclothes stakeout of the hardest-hit lot. Two juveniles were caught in the act of breaking into a car, they confessed to some two-dozen offenses, and the theft figures returned to the low levels of 1985.

Assessment

The police department's response to the theft from vehicles problem involved mostly traditional tactics—interception patrol, plainclothes stakeouts, and the like. But these tactics were directed in nontraditional ways, through extensive analysis of police records, through the pooling of the street information known to individual officers, and through development of a new data source, the offenders themselves. As a result, patrol officers knew where and when to look, and for whom. Their efforts led to the arrest and eventual incarceration of the thieves many regarded as the most active.

As can be seen in Figure 1, this combination of the traditional tactics and nontraditional direction seems to have been successful. Time-series analysis of 39 months of reported thefts prior to the intervention and 16 months after shows that the *number of reported thefts has been reduced by more than half* since the directed patrol tactics began in April 1985. This works out to a reduction of nearly one theft per day, or nearly 450 thefts prevented as of July 1986. Losses due to theft from Shipyard and Navy workers have been reduced by over $100,000; and since many of the thefts involved damage to the vehicle, and many other thefts go unreported, the true amount of losses prevented may be as high as $200,000.[1]

As the recent, short-lived increase in thefts shows, however, the lots still

present a tempting opportunity for new thieves. This problem-solving effort, though successful, illustrates the need for police officials to pursue courses of action that involve non-criminal-justice responses. For example, there has been little concerted effort to work with the union representing employees of the shipyard. Perhaps a crime prevention campaign in cooperation with the union would be effective.

There is another lesson to be found in this case study: the movement of officers among shift, geographical, and unit assignments can be disruptive to effective problem-solving. Similarly, promotions and resignations can be disruptive. Much of this movement is necessary or unavoidable in a police agency. Police officials, however, need to find ways of minimizing the impact of these movements, and if possible, reduce the frequency of some types of movement.

Finally, like the New Briarfield effort, the theft-from-vehicles effort shows that sometimes the best solution will take a long time to implement. And implementation is largely out of the hands of the police. Until the city redevelops the area, perhaps replacing the quilt work parking area with easy-to-secure parking structures, maintaining the current low theft rate will almost certainly require constant attention from the police department.

NOTE

1. After analyzing the problem, Officer Swartz concluded that the theft-from-auto problem could be cleanly divided into two parts: a large Shipyard factory located between 39th and 42nd streets separated the lots into two parts. Thus two time series were examined, a northern series and a southern series. Both include all reports of theft from automobiles, theft of automobile parts, vandalism of automobiles, and tampering with automobiles reported between January 1982 and July 1986.

   Although the thefts in the northern and southern section of the area were apparently committed by two different sets of thieves, there was a strong presumption that the two time series would be generated by similar processes. In addition, the police intervention began at the same time in each area, and was of similar form in each. Thus a decision was made to add the two series together and analyze the aggregate series. Examination of the raw time series, ACF, and PACF for the preintervention series suggested no trends, but a weak seasonal component. After taking 12th-order differences, a spike at ACF(1) suggested that a first-order moving average model would work well. Experimentation with other forms confirmed that an $(0,0,1)\ (0,1,0)_{12}$ form minimized the value of the Akaike criterion. The residuals were close to normally distributed, homoskedastic, and not serially correlated.

   The police intervention began with an increase in surveillance leading to the arrest of three persistent offenders in April 1985. A cursory glance at the raw series shows that the effect of this intervention was immediate and constant; thus there was

no need to experiment with various functional forms. The question was, how big an effect did the police intervention have on the number of thefts committed? When a zero-order transfer function was applied to the full time series, the following parameters were obtained:

MA(1) =	-.212
	(.121)
I(0) =	-26.461
	(3.824)

After controlling for short-term effects of random shocks (through the MA term), pre-intervention average was 50.9 thefts per month; the post-intervention average of 24.4 thefts per month represents a reduction of 52 percent. It is 90 percent certain that the percentage reduction is greater than 40 percent, and less than 64 percent. Simply put, the police intervention appeared to cut the incidence of these crimes in half.

As mentioned in the text, the average losses per theft were $250, not including damage to vehicle. Thus a conservative estimate of the dollar losses prevented by the police intervention since April 1985 would lie between $80,000 and $130,000; the best guess would be about $105,000. Since many vehicles were damaged in the thefts, and many of the minor thefts go unreported, the amount of true losses prevented is probably closer to $200,000.

14. Situational crime prevention in two parking facilities

Barry Poyner

EDITOR'S NOTE: This case study, originally published as a Security Journal *article (Poyner, 1991a), is one of three reprinted in this volume directed by Barry Poyner. Like the other two, concerned with sneak thefts in markets (Case Study #6) and vandalism and graffiti on buses (Case Study #15), it provides some evidence of diffusion of benefits. In the present instance, security improvements made to parking facilities appear also to have benefitted other nearby lots. A second general lesson provided by the study is that surveillance, whether formal or informal, is essential for the security of parking facilities. (It will be recalled that the shipyard parking lots of Case Study #13 were unattended, had no fences, were provided with no security patrols and were minimally lit at night). Thirdly, the case study once again shows just how specific situational measures need to be. While theft of cars was reduced at a city center parking garage by preventing unauthorized access and improving natural surveillance at the exit, these measures had little impact on theft from cars. As Poyner notes, stealing gasoline or tires would not be difficult for people entering and leaving the garage by car. In*

the university parking lots, theft of cars was not a problem, probably because the lot entrances were supervised by a manned security post. On the other hand, theft from cars had been a persistent problem, probably because of poor surveillance. This was successfully remedied by the installation of CCTV manned by security officers, which quickly resulted in arrests of some offenders and presumably in the deterrence of others.

PERHAPS THE simplest way to demonstrate the effectiveness of situational measures for crime prevention is to introduce them into an otherwise stable setting and monitor the effect on crime. This paper summarizes the effect on auto crime of introducing measures in two car parking lots in England.

Two kinds of auto crime are considered: stealing cars and the theft of items from cars. What the two case studies show is that these two types of auto crime require quite different preventive measures.

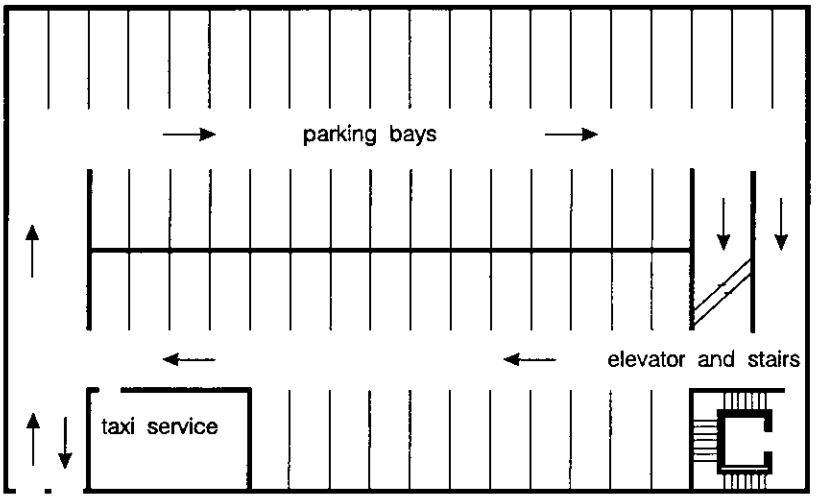
A town center parking garage

The first case study is a public parking garage in the town center of Dover in Kent. It is situated close to the main shopping street and next to the bus station and provides both short- and long-term parking. There are five floors of parking (11 split-levels) with about 400 parking places. There is only one entrance/exit for vehicles and one pedestrian access with a lift and staircase, as shown in Figure 1. The method of payment is "pay-and-display," which requires drivers to buy tickets from machines on each floor and display them inside the windshields of their cars. Such a payment system also means that there is no mechanical access control on entering or leaving the garage.

The building had suffered from vandalism and theft for a long time. Security for the garage had been provided by a private security company that patrolled at night, whereas inspectors from the town authority randomly visited the garage during the day. By 1983, it was recognized that this approach to security was not working. Vandalism had become a major problem with graffiti and frequent damage to windows, lifts, doors, and fire extinguishers. The staircase area was often used as a public toilet.

Auto crime was also a problem, with many thefts of and thefts from cars being reported to the police. Many of these thefts involved the cars of vacationers visiting the town, and this proved a serious embarrassment to local officials who became concerned about the image the parking garage presented of the town. There was also concern about the loss of revenue from local people who were

FIGURE 1
PLAN OF THE ENTRANCE FLOOR OF THE PARKING GARAGE
IN THE DOVER TOWN CENTER



not using the garage because of its reputation.

Improving security of the parking garage. A package of measures was developed by local officials in consultation with a police crime prevention officer. It was believed that much of the problem stemmed from the use of the parking garage by youths who could readily gain access by climbing over ground level walls along two sides of the building and who also hung about in groups in the stair and lift lobby.

To discourage this use of the building, the gaps above the low-level walls at ground level were filled in with wire mesh. The pedestrian entrance by the stair and lift lobby was fitted with a self-closing steel door so that it could only be used as an exit, making the only pedestrian entrance via the main vehicle entrance. Two further measures were used to enhance the surveillance of the main entrance/exit: The lighting was improved at the main entrance and the pedestrian exit door, and an office was constructed next to the main entrance and leased to a taxi company to operate from the parking garage. This taxi business has been able to operate from 8:00 a.m. to 12:00 midnight on 5 days a week and from 8:00

a.m. until 2:00 a.m. on Fridays and Saturdays. The effect of this package of measures was to restrict entry to the main vehicle entrance, which was well lit and provided with indirect surveillance for most of the 24 hours of each day.

Effect of the measures. The security measures were introduced during the last 3 months of 1983. Officials considered the measures a success because they saved in maintenance and repairs the cost of the improvements within the first year. In other words, damage to lifts, doors, lighting and windows, and graffiti was greatly reduced by the security package. Furthermore, the impression of greater security had begun to encourage greater use of the parking garage by the public. However, no formal assessment was made of the effect on auto crime.

To do this, permission was sought and gained by the author to access police records. Manual searches were made through crime reports from the relevant police subdivision that covered the town center, and notes were made of all crimes reported during the years 1982, 1983, 1984, and 1985 in the parking garage and in two nearby open parking lots that had a similar number of car parking places and that were operated by the same pay-and-display system. The 4 years chosen for the evaluation were the 2 years prior to the measures being installed and the 2 years after installation.

Table 1 summarizes the crime recorded in the three car parking facilities during these 4 years. It is quite clear that the parking garage had a more serious crime problem than did the two open parking lots, having a total 96 crimes compared with totals of 17 and 26 for the two parking lots. It is also clear that in the 2 years following the new measures crime in the parking garage was reduced to about half the level it had been in the 2 years prior to the measures being introduced.

TABLE 1
ALL CRIME RECORDED IN THREE TOWN CENTER PARKING FACILITIES

	Parking Garage	Parking Lot 1	Parking Lot 2
1982	43	11	9
1983	53	6	17
Total crime before measures	96	17	26
1984	24	5	8
1985	25	8	4
Total crime after measures	49	13	12

No displacement of crime. Since displacement is often assumed to occur with situational crime prevention, it is always useful to seek ways of testing this assumption. Here, the two nearby parking lots show no sign of crime being displaced from the parking garage. Indeed, there is some evidence of a reduction in crime in the two parking lots. The crime level in all three car parking lots was reduced even though no security initiatives were taken in the open parking lots. If the displacement theory is correct, it would be reasonable to expect at least some increase of crime in surrounding car parking lots following a reduction in the parking garage. The evidence here does not support the displacement theory.

Effects on car theft. Although the figures in Table 1 refer to all crime, including criminal damage to both the facilities and to vehicles, the main categories of crime were the theft of cars and the theft of items removed from vehicles (components such as wheels, radios, or personal property left inside vehicles). The number of incidents of these two types of theft are given in Tables 2 and 3.

These crime data show a considerable difference in reductions for the two types of car theft. Both theft of cars and theft from cars were a problem in the parking garage before the new measures were introduced. However, the measures appear to have reduced the theft of cars far more effectively than they did the theft of items from cars. Indeed, the level of theft of cars in the parking garage was reduced to the low levels already existing in the open parking lots. The theft of items from cars was reduced only by a small number.

TABLE 2
THEFT FROM CARS RECORDED IN THREE TOWN CENTER CAR PARKING FACILITIES

	Parking Garage	Parking Lot 1	Parking Lot 2
1982	19	4	4
1983	23	2	8
Total crime before measures	42	6	12
1984	17	0	4
1985	16	3	2
Total crime after measures	33	3	6

Conclusions. Perhaps the first and most obvious conclusion is that parking garages are much more susceptible to crime than are open parking lots. Although the measures introduced concentrated on reducing accessibility, it seems

TABLE 3
THEFT OF CARS RECORDED IN THREE TOWN CENTER CAR PARKING FACILITIES

	Parking Garage	Parking Lot 1	Parking Lot 2
1982	19	4	4
1983	19	3	6
Total crime before measures	38	7	10
1984	3	2	2
1985	4	3	2
Total crime after measures	7	5	4

unlikely that accessibility is the main reason why a parking garage is so vulnerable, because the parking lots are equally accessible. The real reason seems to be the lack of surveillance in a parking structure with 11 different levels. It must be comparatively easy for potential offenders to search upper floors for insecure or vulnerable cars without being observed. By comparison, the open parking lots can receive far more surveillance both from those using them and from people in adjacent streets and buildings.

Much more difficult is the explanation as to why the measures reduced the theft of cars but not theft from cars. The measures were designed to limit access by nonusers of the parking garage and to give some informal surveillance to the one entrance/exit. If these measures reduced the theft of cars, it could be that the main reason why car theft had been a problem was that youths hanging around the park had been tempted into stealing vulnerable cars. By making it more difficult to gain access, this would reduce the number of youths hanging about the parking garage, and by providing surveillance of the exit, it would increase the risk of a thief being seen and being recognized driving a car out of the garage.

If the measures did discourage the theft of cars but not the theft of items from cars, there must be some important difference in the methods used to commit these two crimes. What the author suspects is that much theft of items from cars actually requires a car to carry out the crime. Some of the reported thefts involved the removal of wheels and suitcases and the siphoning of gasoline. It would arouse suspicion to carry these out of a car garage on foot, but once loaded into a car, there would be no reason to suspect the driver of theft, as he or she would be driving the car in and out of the garage quite legitimately. The lack of surveillance on upper floors and the lack of entry and exit controls in a pay-and-

display system makes this kind of criminal activity comparatively easy, with little risk of being caught.

A university parking lot

The second case study is of security measures introduced to car parking at the University of Surrey at Guildford, England. Parking is generally located in several large parking lots located along a perimeter roadway around the campus some distance from the university buildings. Access to these perimeter parking areas is via the perimeter road that has a manned security gate close to the campus entrance. Nevertheless, the perimeter parking lots suffered a considerable amount of crime.

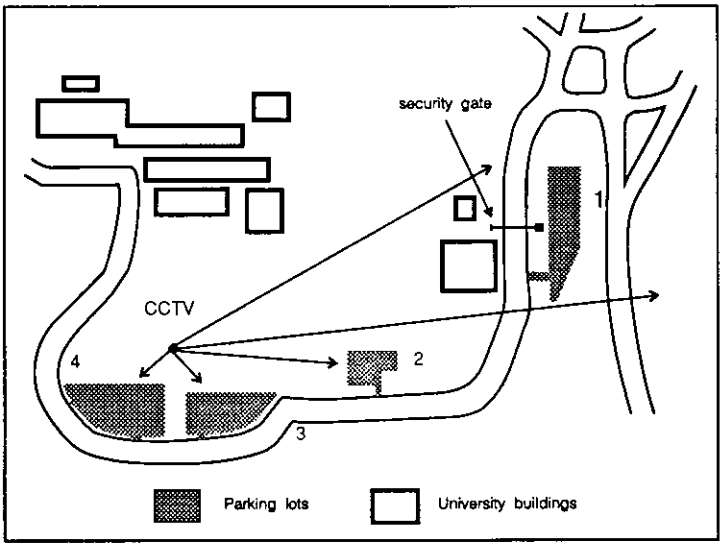
Following the arrival of a new chief security officer in 1980, a new system was introduced for recording incidents of crime, antisocial behavior, and safety problems on the campus. It was soon recognized that auto crime was one of the main security problems facing the university. It was proposed that measures be introduced to increase surveillance of the three main perimeter parking lots in the form of improved lighting (which had earlier been reduced as part of an energy-saving program) and by cutting back or pruning of landscape planting and trees in and around the parking lots. In addition, a CCTV camera would be set up on a tower overlooking the two largest and adjacent parking lots. It would be able to scan most of the parking facilities and was equipped with infrared sensing and loudspeakers through which the security guards could give warnings or provide information. A diagrammatic plan of the campus showing the location of the CCTV tower and the main parking lots is shown in Figure 2.

The improvements to lighting, which involved extending the period during which the lighting was switched on, and the cutting back of landscape foliage was done in September 1985, in preparation for the return of students in October. The tower for the CCTV installation was erected in January 1986, but the actual installation of the camera and monitoring equipment was delayed for technical reasons until March 1986.

Effect of the security measures on auto crime. The crime records for the university provided readily available information about auto crime for the whole campus. The data in Table 4 show the recorded incidents in 1984, 1985, and 1986. The figures show an increase in crime experienced in 1985 and a much lower number of incidents for 1986, suggesting that the measures had been partly successful. However, the figures also show important differences for the different types of crime.

First, theft from cars was a much more frequently reported problem and it also produced the most dramatic drop, from 92 in the year when measures were introduced to 31 in the year following the introduction of security measures. The

FIGURE 2
PLAN OF SURREY UNIVERSITY CAMPUS
SHOWING THE LOCATION OF THE MAIN PARKING LOTS



other two kinds of auto crime were not so frequent, and the degree of reduction much less certain.

Following from the findings in the Dover parking garage, it might be argued that the reason for relatively few thefts of cars was because the access to the campus was supervised by a manned security gate, and this might effectively reduce the risk of cars being illicitly driven off the campus passed this security point.

However, it is clear that the measures have been more effective in reducing the theft from cars.

The two largest parking lots (1 and 4) provide enough incidents to enable a more detailed month-by-month analysis of the theft from cars. Furthermore, it is interesting to compare these two parking lots because only one could be supervised by the CCTV camera. Lot 4 was easily covered by the camera, but lot 1 was out of sight of it (see Figure 2). Figures 3 and 4 show histograms of the pattern of thefts from cars during the 3 years 1984-86.

It is very clear from both histograms that in the period immediately following the installation of the CCTV system the level of thefts had been dramatically reduced, with many months having no reported incident. However, it is also clear that the cutting back of landscape foliage and increased lighting times had no

TABLE 4
AUTO CRIME RECORDED BY THE SECURITY ORGANIZATION AT SURREY UNIVERSITY

	1984	1985	1986
Theft from cars	61	92	31
Theft of cars	5	15	12
Damage to cars	16	31	22
Total incidents	82	138	65

apparent impact on this crime problem. Some might argue that these were necessary conditions for the CCTV surveillance to work effectively, but they are clearly not effective measures by themselves.

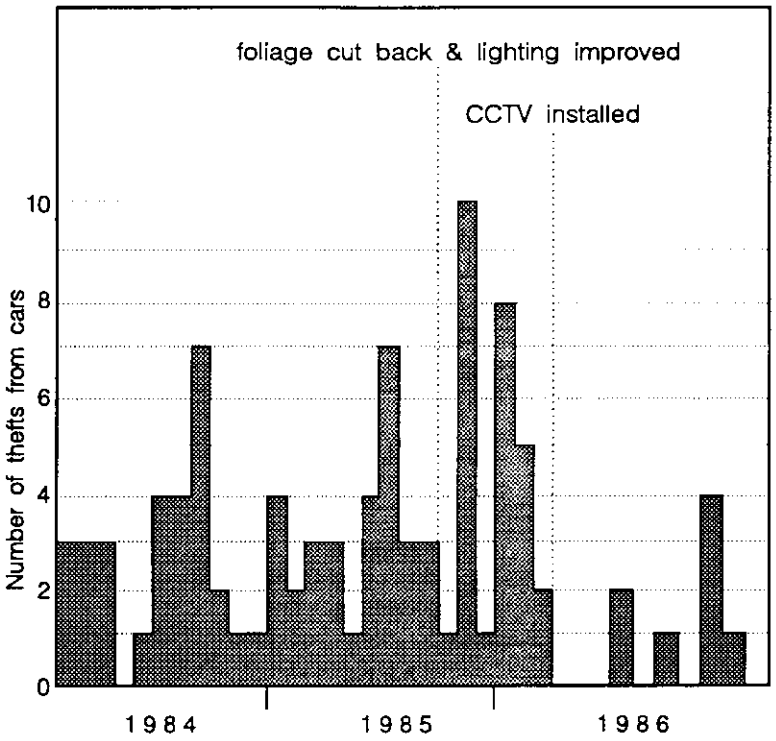
What is much more interesting is that parking lot 1, which could not be monitored by the surveillance camera, still seems to have been effectively protected by it. The reason for the immediate drop in thefts for parking lot 1, even though it could not be viewed by the camera, is probably because the CCTV system enabled the security guards to make three arrests immediately after the system became operational and three further arrests and two specific loud-speaker warnings in the following 3 months. In one incident a man was seen removing hubcaps from a car and putting them in his own car, an observation that supports the conclusion about these thefts suggested above.

Again, the fact that crime was reduced in a parking lot without the benefit of the surveillance system but close to areas with surveillance sheds doubt on the theory of displacement. Rather than displace crime to less well protected targets on the campus, the "good effect" has spread out beyond the immediate area of application. This is very reminiscent of the findings from another case study of surveillance on buses in the North of England by the same research team (Poyner, 1988). In that study, it was found that the impact of video cameras fitted to a few buses affected vandalism on the whole bus fleet. Indeed, although the data in Table 1 are rather weak for the two open parking lots in Dover, that case study also appears to reflect the same idea of the "good effect" of measures spreading beyond the immediate situation in which they were implemented. Is this not a cue for an alternative theory to displacement.

Conclusions from both case studies

It is clear that the design and management of parking facilities has a crucial influence on the risk of auto crime. It would appear that surveillance, whether

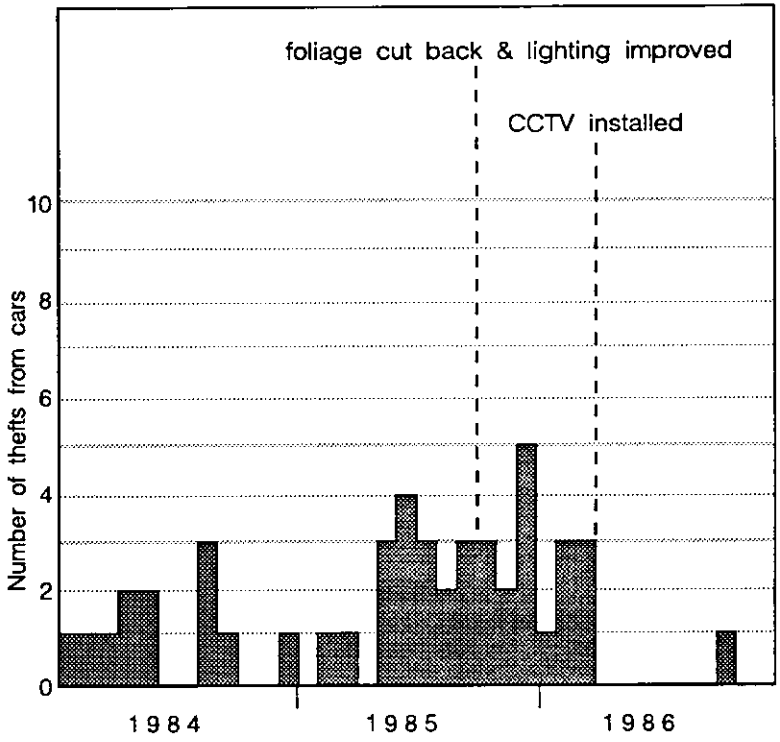
FIGURE 3
NUMBER OF THEFTS FROM CARS IN PARKING LOT 4 AT
UNIVERSITY OF SURREY IN EACH MONTH OF 1984, 1985, 1986



formal or informal, is probably the most effective situational measure at reducing both kinds of auto crime. The open parking lots in Dover that had more natural surveillance had less crime of both kinds than did the multilevel parking garage. It was also found that surveillance of the entry/exit points at the university and the modified parking garage seemed to keep the theft of cars down to a low level, and no doubt much tighter controls on access and exiting would have a more complete effect.

The lesson from this must be that secure car parking must permit a good deal of surveillance. This is easiest to achieve with parking lots that, if not naturally supervised by frequent movements of legitimate users or by being overlooked from surrounding streets and buildings, might be satisfactorily covered by properly monitored electronic surveillance. Security would be enhanced against the theft of cars by supervision of access and exit points.

FIGURE 4
NUMBER OF THEFTS FROM CARS IN PARKING LOT 1 AT
THE UNIVERSITY OF SURREY IN EACH MONTH OF 1984, 1985, AND 1986



If multilevel parking structures are to be used, the solution is more difficult. Certainly, what should be avoided is creating a large number of relatively small parking floors that are likely to be deserted for most of the time. How far electronic surveillance can be successfully adapted to multilevel parking garages is unclear. Surveillance might be achieved by a mixture of strategies to increase informal surveillance. Floors might be designed to be as large as possible to maximize the presence of legitimate users and to be as open as possible to maximize visibility across the floor. Other strategies might be to link garages at upper levels to other facilities such as restaurants or department stores to increase the presence of legitimate users. It may be that much tighter control of the entry and exiting of cars would limit the attraction of the garage for drivers intending to steal items from other cars.

ACKNOWLEDGMENT. The research from which this paper was prepared was originally funded by the Home Office in London.

15. Video cameras and bus vandalism

Barry Poyner

EDITOR'S NOTE: Mayhew et al. (1979) found that the installation of CCTV cameras on four London Underground stations plagued by robberies and sneak thefts was followed by a substantial decline in these offenses, but that some of the gains might have been lost through displacement to nearby stations. This case study, first published as an article in the Journal of Security Administration *(Poyner, 1988), also examines the use of CCTV in the context of public transport. In this instance, however, the cameras where installed on double-decker buses belonging to one bus company in the North of England, the problem addressed was vandalism, and the results were rather better. Even though only two buses in a fleet of 80 were fitted with live cameras and three more with dummy cameras, vandalism declined very substantially for the whole fleet. In particular, the costs of seat repairs and graffiti cleaning dropped by two thirds. This diffusion of benefits is likely to have been helped by the considerable publicity surrounding the scheme. The introduction of the cameras was attended by TV news features and was reinforced by a program of school visits. That the offenders were juveniles,*

who might more easily be deterred by the threat of being caught, could also have contributed to the result. The two case studies illustrate that, now it has been shown that situational measures can be highly effective, the next generation of evaluative research needs to establish the conditions under which they yield their greatest benefits.

THE PROBLEM of vandalism on buses is well documented. When Gladstone (1978) asked 584 schoolboys to report on their involvement in vandalism and petty crime, 55% said they had written on the seats or walls of buses in the past six months and 22% said they had slashed bus seats. Rose (1976) conducted a survey of London Transport staff to assess the problem of assault and other difficulties in dealing with the public. Bus conductors said that rowdiness by schoolchildren was one of the three most frequent problems they had to deal with.

One-person-operated buses are particularly vulnerable to this kind of damage. A study by Sturman (1980) found that the location and extent of damage on a bus was related to the amount of supervision that the crew could give. Upper decks on all types of buses suffered more damage than lower decks, and the upper decks on driver-only buses received nearly twice as much damage as upper decks on buses with conductors.

This paper documents the first use of video equipment in Britain on public service buses to deal with the problems of vandalism and general misbehavior. Go-Ahead Northern is a bus company which operates a fleet of 700 buses in northern England. Damage to their driver-only double-decker buses was costing the company about £250,000 sterling a year in repair bills. Upper decks were the target for much of this damage, and schoolchildren were considered responsible in many cases.

Although Go-Ahead Northern had no recorded data on the misbehavior of children, some data from another bus company, also in northern England, helps to describe the nature of the problem. Cleveland Transit had maintained records of all incidents reported to their radio controllers by drivers as part of an attempt to deal with violence to bus crews (for a case study on this see Poyner *et al.*, 1988). Table1 presents an analysis of incidents reported over a 16-month period from January 1, 1985 to May 3, 1986.

Schoolchildren were clearly a problem for Cleveland Transit. Together with "rowdy youths," they are responsible for virtually all damage inflicted on buses by passengers, according to this data. The kind of damage or mess caused by schoolchildren on these buses included windows being smashed; seats being slashed or thrown out; paint sprayed; eggs, water, bombs, fireworks, snowballs

TABLE 1
TROUBLESOME INCIDENTS ON CLEVELAND TRANSIT BUSES

Incident	Number of reports	Incidents where buses were damaged/trashed
Passengers refuse to get off overloaded bus	9	—
Arguments over fares	36	1
Glue sniffing on bus	10	—
Problems with drunks	7	—
Schoolchildren out of control	40	14
Rowdy youths	28	10
Fighting on bus	11	—
Troublesome passengers	21	—
Encounter with other road users	7	—
Objects thrown at bus	23	22
Damage to bus reported	5	5
Incidents away from bus	7	—
Theft on bus	2	—
Other	4	—
Totals	210	52

thrown; vomiting; and spitting. Tampering with the emergency door was another common complaint about schoolchildren on buses.

The video bus

Following discussions with staff representative at Go-Ahead Northern's Percy Main Depot in North Shields, it was decided to experiment with video cameras on buses. It was hoped that, apart from dealing with vandals, these cameras would also be useful in cases of assault on bus drivers. One bus was fitted with video cameras and recording equipment and monitored over a period of 4-5 months. Apart from its effectiveness in reducing damage, there were uncertainties about how much the movement of the bus and ambient lighting would effect the quality and usefulness of the recordings. The ability of the cameras to withstand abuse was also a concern.

Two video cameras were fitted on one bus. One camera was positioned at the front of the top deck in an armored glass mounting. From here it was possible

to supervise most of the top deck, particularly the rear seats. A second camera was mounted at the front of the lower deck above the driver's head. This camera covered the area around the driver, but the location of the staircase behind the driver meant that the rest of the lower deck could not be viewed from the camera. Videocassette recording equipment was concealed beneath the staircase in the space previously used to store passengers' bags and pushchairs. The driver had the choice of when the recording equipment was switched on. The video recorder could only record one of the cameras at a time, so the driver had to decide which camera to record. The switch was located out of sight of the passengers behind the driver's seat. When the bus was quiet or virtually empty, the driver would probably switch the recorder off and only switch it on again when a noisy group of passengers, such as schoolchildren, boarded the bus.

The video bus became operational in November 1985. It was used on routes regarded as something of a problem, particularly routes carrying children from school. At the end of each run the video bus was checked for damage or graffiti, and if any was discovered, the video cassette was examined. If a child had been recorded damaging or messing up the bus, it proved to be an easy task to work out which school the child attended by the uniform worn or by working out where the child had boarded or left the bus. The tape would then be taken to the school and shown to the head teacher in an effort to identify the culprit and get the parents to pay for the damage. In some cases the tapes have been shown to parents.

A number of incidents were recorded in the first month of operation. They were followed up at school and home. These included a case where a schoolgirl had been recorded writing with lipstick on the inside of a window on the bus. She was identified and her father was contacted. He refused to believe his daughter capable of such behavior, but when confronted by evidence on tape, he had to concede. The company demanded, and he paid £25 in damages. Other incidents, which were followed up, included a boy taking a seat out of the bus, kids fighting on the top deck, and one case where a boy was filmed sticking tokens over the camera lens in an effort to avoid being recorded damaging the upper deck.

It was found that once action was taken against a child, it was not necessary to do so again. It was claimed that after a few weeks and only a few follow-up actions, damage to the video bus virtually ceased. Moreover, damage to the other buses, working from the same depot, also reduced.

More video buses

As a result of this successful introduction of the video cameras, it was decided to install cameras in more buses at all the company's depots. The cost of installing video in one bus was approximately £3,000. It was not considered feasible to equip all 700 buses in the fleet with the full live system. It was decided to convert

24 buses into video buses, with the intention of fitting the remaining buses with dummy cameras at a fraction of the cost of a live system.

Publicity

One of the reasons for speed of improvement in behavior was that the "video bus" was well publicized. Two months after it began operation, Tyne TV's *Northern Life* magazine ran an item called "TV trap for vandals." It was reported that the company was "getting tough with hooligans." The program showed how the video equipment was used to record acts of vandalism and identify offenders. Clips of youths misbehaving on the bus were shown. The project was said to have "proved highly effective," and bus company staff reported that it had "exceeded our wildest dreams." It was also reported that the company was "thinking of fitting cameras to the entire fleet." More recently, local newspapers have carried stories of Go-Ahead Northern's efforts at reducing vandalism on their buses. One front-page headline in 1987 read "Bus spy camera traps thug."

Bus watch

At the same time that the video cameras were being introduced, the Deputy Manager at the Percy Main Depot, John Dodds, introduced a program of visits to local schools aimed at encouraging children to treat buses and the staff with more respect. Initially this scheme was called the "Our Bus Scheme," but after a few months this was relaunched in a more developed form as "Bus Watch."

Both schemes were very similar. The video bus would be taken to the school. John Dodds would give a short presentation to the children with the help of simple flip charts to describe the bus operation and describe the cost of damage to buses and its implications. The children would then be taken for a ride on the bus on the top deck, during which they were given a competition in the form of a quiz, each of them having to work out a series of answers on a piece of paper. They were then taken to the bus depot and shown around.

The high spot of the visit was when they reboarded the bus to be taken through the bus wash, an experience which always created a good deal of excitement. During both the ride to the depot and the bus wash, the video camera would be switched on and when the children were taken back to the school, they were shown the video recording. In this way it was hoped they would learn about the risk of being caught misbehaving on buses. The children were also told that cameras were fitted to all buses. They were told that the mirror, which had always been provided for the driver to see what was happening on the top deck, was a one-way mirror behind which was a camera watching them.

The video cameras have proved useful not only in cases of vandalism by schoolchildren, but also in cases such as driver assault, fare evasion, complaints

of bad driving, and also for carrying out passengers surveys. Following the experience of Go-Ahead Northern, many more bus companies have installed video equipment. At least one company has installed a live system in every bus in its fleet.

Evaluation

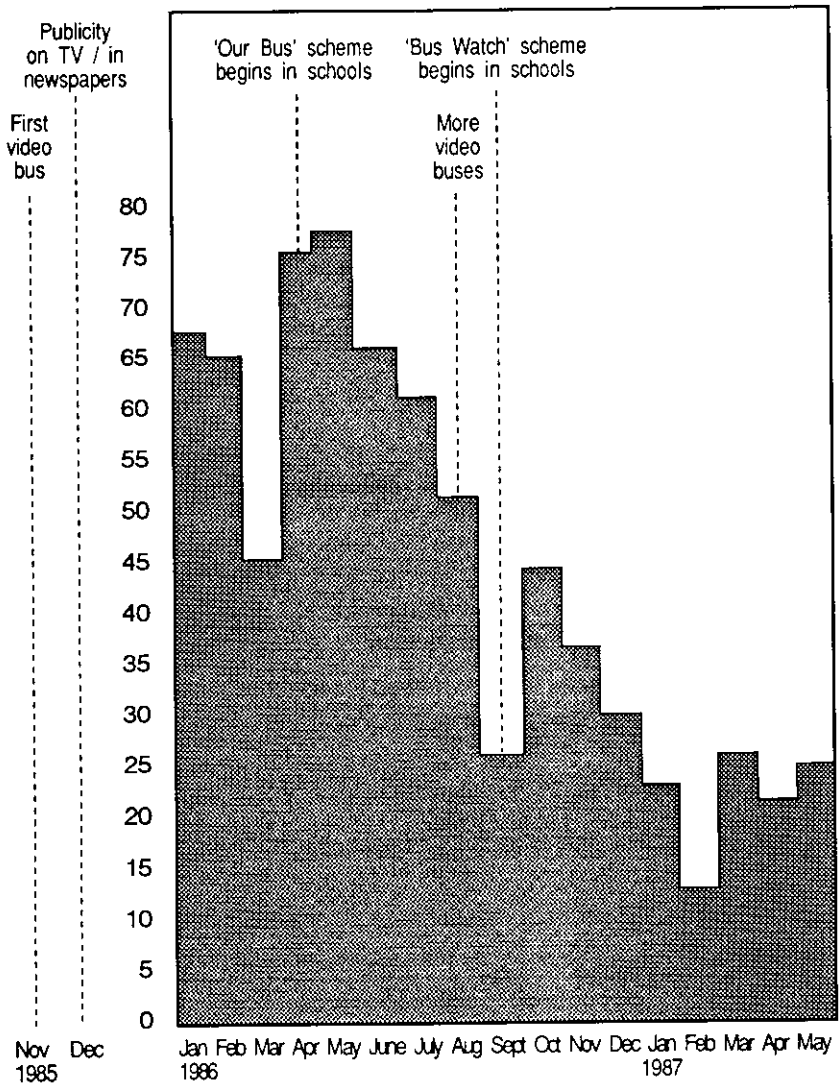
It was decided to focus this evaluation on the depot from which the first video bus began operating in November 1985, the Percy Main depot in North Shields. Altogether, about 80 buses run from this depot. In August 1986, a second bus at this depot was fitted with live video equipment and three other buses fitted with dummy cameras. The "Our Bus" visits to schools began in April 1986, and "Bus Watch" began in September 1986.

Video tapes, recorded on the two buses, were not systematically stored. Cost would be prohibitive. A potential source of objective data, which could be used to monitor misbehavior on the buses, had been lost. However, a master tape had been compiled of all those cases followed up in the first few months of the first video bus. Although no objective analysis could be made of tapes, it was quite clear from viewing the master tape, talking to those involved in monitoring the tapes, and viewing the tapes currently being recorded that behavior had very significantly improved on the buses.

Having failed to find a suitable method of monitoring the change of behavior directly from the tapes, the researchers sought alternative evidence of the change. One source of data, which was recorded and had been kept for a while, was the workshop record of seat repairs. Unfortunately, these records are only kept for a limited period. At the time of the study the earliest records only went back to the beginning of 1986, so it was not possible to describe the situation before the first video bus began operation. Neither was it possible to break down figures for individual buses. However, what figures were available turned out to be so dramatic that their imperfections did not invalidate the research effort. Figure 1 displays the total number of bus seat cushions repaired each month at the Percy Main depot between January 1986 and May 1987. A substantial reduction in damage to seat cushions on buses operating from Percy Main depot can be seen in this figure. This reduction is not a sudden drop but is a progressive decline over a period of nine months. By May 1987, seat repairs at this depot were a third of what they were one year earlier.

An additional piece of information, which provides more evidence of reduced vandalism on these buses, is that (in this period) the number of bus cleaners at Percy Main was reduced from six to two. There was no longer work for them.

FIGURE 1
SEAT CUSHION REPAIRS AT PERCY MAIN DEPOT



Conclusions

It is very clear that the number of seat repairs dropped dramatically — to a third of what it was the previous year, and the number of cleaners has been

reduced by a similar proportion. The company would claim this is due to the video cameras and their program of school visits. It has also been pointed out that deregulation of bus services could have led to lower standards and, hence, less repairs and lower cleaning standards. However, the standards for running buses are set by the Traffic Commission at the Department of Transport. Their inspectors still carry out the same inspections as before deregulation. Changes in local management could not be reflected in changes in repair and cleaning of buses. Another possibility was that the number of passengers using the buses might have reduced over this period, but, in fact, there has been a slight increase in passengers over this period.

The conclusion that must be drawn is that Go-Ahead Northern's measures to reduce vandalism and misbehavior on their one-person operated double-decker buses have been very successful. It is estimated that the cost of installing live video systems in two buses, dummy cameras in three buses, and conducting a program of work in schools over a period of one year has been about £20,000. Savings in seat repairs over a period of one year are calculated to be something in the region of £17,000. The savings made by not employing so many cleaners could amount to something like £30,000 each year. There is no doubt that these measures have proved very cost-effective.

The issue of displacement and rational choice

It is perhaps surprising that so few cameras were necessary to achieve these results in a depot operating approximately 80 buses. The school children whose behavior has been changed appear to have been convinced that the risk of being caught, doing damage, or misbehaving has been significantly increased with the introduction of cameras. The method was a combination of several powerful mechanisms, including TV news features and programs of school visits. Effective mechanisms were employed. The first was the school visits to the bus depot in which the effectiveness of the video was demonstrated directly to the children. Second, several individuals were caught and action taken through the schools. Because of the nature of the local community, and the fact that this applied to specific local schools, it is easy to understand how the message was communicated amongst the children.

A further and perhaps surprising finding is in relation to the issue of displacement. A widely held view argues that much crime prevention does not prevent crime but merely displaces it to other locations (see, for example Trasler, 1986). The evidence in this case study is the complete reverse of this theory. Damage and other misbehavior was not only reduced on the five buses with live or dummy video cameras, but damage and cleaning problems reduced throughout the whole fleet of 80 buses. It has not been a question of displacing crime from

the point of intervention, but that the controlling effect of the intervention has had a much wider effect than might have been expected.

The explanation for this can be related to rational choice theory. The children have learned from the information presented to them, no doubt reinforced by effective communication within their local sub-culture, that the cameras will enable misbehaving individuals to be picked out and that action will be taken. However, what they do not know is how extensive the risk is. They appear to believe that most buses have cameras, or at least they are uncertain about which buses have cameras. The possibility of being caught appears to be too great to be worth the risk, so their behavior has improved on all buses. It is possible, in time, they may become sophisticated in their understanding of how the system works. They may learn to discriminate between the buses with and without video. Their behavior may become less controlled on buses without video. It would be interesting to find out if this happens.

16. Preventing convenience store robbery through environmental design

Ronald D. Hunter and C. Ray Jeffery

EDITOR'S NOTE: As explained in the Introduction, *the development of situational prevention in Britain was assisted by the parallel development of Crime Prevention through Environmental Design, or CPTED, in the United States. The term was coined by C. Ray Jeffery of Florida State University, one of the authors of this case study. In fact, the prevention of convenience store robbery represents the most sustained CPTED effort, with work on the topic being conducted by Jeffery or his students from the mid-1970s until the present time. This case study is the only one written especially for this volume. It reviews the many CPTED studies undertaken of convenience store robbery, including those commissioned by the police and the convenience store industry. 7-Eleven in particular has been a pioneer in the field through support of the early research by Crow and Bull (1975). A variety of methods have been employed including site surveys, interviews with robbers and with victims, and experiments in which robbery rates are compared between*

samples of stores with and without preventive modifications. Numerous empirical relationships have been demonstrated between environmental factors and robbery risk, and changes that have been made in procedures and design have been found to reduce the risk of robbery. The preventive measures endorsed by the greatest number of studies are: (1) having two or more clerks on duty, especially at night (a form of employee surveillance); (2) cash handling techniques (target removal); (3) access control; and (4) natural surveillance.

Convenience store robbery

RECORDED INCIDENTS of robbery ("the taking or attempted taking of anything of value from the care, custody, or control of a person or persons by force or threat of force or violence and/or putting the victim in fear," Sessions, 1990:17), occurred at convenience stores within the United States on 36,434 occasions during 1989. This represented a 28 percent increase in convenience store robberies since 1985, the most rapid growth within all categories of robbery during that period (Sessions, 1990:21).

The dramatic increase in convenience store robberies is of major concern to public officials and the convenience store industry, not only because of the financial losses, but also due to the physical and mental harm to employees and customers which often occurs as a result of this violent offense. Aggravated assaults, abductions, rapes, and homicides have too frequently been the product of the convenience store industry's inability to protect itself, its employees and its customers from robberies.

The average value of property stolen during the commission of convenience store robberies in 1989 was $364. Yet, these losses are minimal when compared to the loss of business from customers who are afraid to shop in the stores, the loss of qualified employees who are afraid to work in them and successful litigation by individuals harmed because of convenience store robberies. In addition, the costs to local governments as a result of these robberies are high due, not only to criminal justice activities (preventive patrols, surveillance, emergency responses, investigations, apprehension and incarceration of offenders, judicial proceedings), but also to the adverse impact upon the quality of life of their citizenry.

The detrimental effects of convenience store robberies are felt not only by victims and their families, but by all residents and visitors whose shopping behavior is restricted due to fear of victimization.

Research

A number of studies have been conducted during the past twenty years to examine the relationship between environmental factors and vulnerability to robbery at convenience stores. The findings from these research projects have led to significant changes in the strategies utilized to prevent convenience store robberies. Some of the more important studies are summarized below.

Crow and Bull. The study which has had the most impact upon subsequent attempts to prevent convenience store robbery was that of Crow and Bull (1975). It began with an examination of 349 convenience stores owned by the Southland Corporation on the basis of which a scale was developed by which stores were ranked as to target attractiveness by former armed robbers. Those stores ranked as highly attractive were found to have been robbed more frequently. Based upon the robbers' input, Crow and Bull developed several robbery prevention strategies which they used in a field experiment involving 120 "24-hour" convenience stores in five Southern California counties. The prevention strategies included: cash handling procedures which limited available cash; signs indicating limited cash; enhanced visibility inside and out; elimination of escape routes; use of security devices; encouraging visits from police and cab drivers; enhancing employee alertness; and, keeping the stores clean. These were implemented in sixty experimental stores, which were closely matched with sixty control stores. The robbery experience of both groups was followed for eight months.

Crow and Bull found that the experimental stores experienced significantly fewer robberies than did the control stores. They concluded that: "The results support the concept that robbers select their targets and that physical and behavioral changes at the site can significantly reduce robberies" (Crow and Bull, 1975: ii).

Crow and Bull's study was perhaps the first application of crime prevention through environmental design (Jeffery, 1971) to the crime of robbery. While limited to a specific convenience store chain (7-11) in Southern California, their findings have influenced the entire convenience store industry. In fact, many of the prevention procedures found within the National Association of Convenience Store's Robbery Deterrence Manual (NACS, 1987) may be traced directly to Crow and Bull's work.

Duffala. Another well-known study which examined convenience store robberies from an opportunity perspective was conducted by Duffala (1976), who sought to test whether or not the vulnerability of convenience stores to armed robbery is associated with certain environmental characteristics. Thirty-nine convenience stores in Tallahassee, Florida, were included in the study.

Since the stores in the sample were similar in physical design, Duffala focused upon features of their location as being determinants of vulnerability to robbery. He believed that stores which were more readily accessible to robbers would have a greater likelihood of being robbed.

Duffala hypothesized that stores would be more vulnerable when they were located: (1) within two blocks of a major street, (2) on streets with light amounts of traffic, (3) in a residential and/or vacant land use area, and, (4) in an area with few surrounding commercial activities. His hypotheses relating to a store's location near a major street and in residential areas were not supported and those regarding light traffic and few surrounding commercial activities received only limited support. However, while no one environmental variable was very important in relationship to vulnerability to robbery, all four were significant when viewed in interaction with one another (Duffala, 1976:244).

Scott, Crow and Erickson. In 1985, Scott *et al.* attempted to study the effectiveness of the robbery prevention strategies advocated by Crow and Bull (1975) as well as certain other strategies which had been proposed by various local governments. They supplemented data from a earlier study by the Athena Research Corporation (1981) which had interviewed sixty armed robbers who were inmates at the Texas State Prison at Huntsville, with interviews from 181 robbers confined in prisons in California, Illinois, Louisiana and New Jersey. The robbers were questioned about the deterrent effect of target characteristics, which stores they would be more likely to rob and how much money they would want in order to make a robbery worthwhile.

Based upon the inmates' responses, Scott *et al.* (1985) recommended that Southland Corporation continue in its efforts to improve cash handling procedures which would limit the take from 7-11 Store robberies to less than $100. They further concluded that having two clerks in a store, and closing between 11 p.m. and 6 a.m., were not effective robbery prevention measures. The sex of the clerk was also felt to have little impact upon robberies.

Unfortunately, in the Scott *et al.* study, as well as in the earlier Athena study which it incorporated, the robbers' ratings were not supported by empirical analysis of the actual experience of robberies in convenience stores. As a result, the study may be considered more of an index of inmate attitudes rather than a valid test of environmental crime prevention strategies.

Degner, Comer, Kepner and Olexia. A study which produced contradictory results regarding the influence of environmental factors upon convenience store robberies was conducted by researchers at the Florida Agricultural Market Research Center (Degner et al., 1983). They found that: (1) "The peak robbery period for convenience stores occurred between 9:00 and 11:00 p.m. when nearly one-fourth were committed..." (Degner *et al.*, 1983: 26); and,(2) "Sur-

prisingly, the robbery success rate does not appear to decrease as the number of victims increases" (Degner *et al*, 1983:18). These findings may be used to challenge requirements that convenience stores close from 11 a.m. to 6 a.m., and/or utilize more than one clerk. However, other findings of the study reveal that: (1) 94.5 percent of all convenience store robberies had only one victim (Degner *et al.*, 1983:19) and (2) nearly 35 percent of all convenience store robberies in Florida in 1981 occurred between 11 p.m. and 6 a.m. (Degner *et al.*, 1983:27).

The Gainesville Studies. In 1986 the Gainesville Police Department contracted with James White to conduct a analysis of convenience store robberies within the Gainesville area. White (1986) evaluated seventy-two convenience stores within the Gainesville area based upon: lighting of the store and premises; visual obstructions to cashiers; and the number of clerks on duty. He concluded that the number of clerks working was the strongest predictor of convenience store robbery. The store environment was not found to be a statistically significant factor.

In a second study sponsored by the Gainesville Police Department, Swanson (1986) conducted a three-tiered analysis of convenience store robbery. He first interviewed sixty-five convenience store robbers incarcerated at three Florida facilities and asked them to rank order the most desirable characteristics in selecting a store to rob. He then interviewed twenty-four individuals who had been victims of convenience store robberies and asked them to rate the same characteristics. Based upon the responses of robbers and victims, Swanson then constructed a list of thirty-two store characteristics which he correlated with robbery data for forty Gainesville convenience stores.

Analysis of the relationships between store characteristics and number of robberies led him to conclude that having two clerks on duty seemed to be the primary element in deterring convenience store robbery in Gainesville. The use of security cameras and time release safes, the presence of other 24-hour businesses, and closing stores at midnight were also found to reduce the potential for robbery.

The Tallahassee Studies. Jeffery, Hunter and Griswold (1987) studied thirty-four convenience stores which had been continuously operating within the City of Tallahassee from January 1, 1981, to July 1, 1985. Each site was visited by the researchers and assessed on a series of environmental characteristics thought to be related to robbery. The number of robberies occurring at each site from January 1, 1981, through July 1, 1985, was then obtained from the Tallahassee Police Department.

It was found that convenience stores were less likely to be robbed if: the cashier was located in the center; more than one clerk was on duty; there was clear visibility within the store; there was clear visibility from outside the store; stores

were located near commercial property; they were located near residential property (better than near vacant lots or woods); they were near other evening commercial activities; concealed access/escape was eliminated; gasoline pumps were operational on the property; and, good cash handling policies were followed which limited available cash.

Jeffery *et al.* (1987:69) concluded that "convenience store robberies were highly responsive to both internal and external physical and geographical features which involve the design of the store and the external environment." Their findings were utilized in justifying an ordinance restricting convenience store operations in Gainesville, Florida, and served as a partial basis for a later statewide analysis of convenience store robbery (Hunter, 1988).

Hunter (1990) re-examined the Tallahassee stores some four years later to determine what changes might have occurred. He found that the number of significant variables had declined from those identified in the earlier study. In 1990, Tallahassee convenience stores were less likely to be robbed if: the cashier was located in the center of the store; more than one clerk was on duty; concealed access/escape was eliminated; the stores were near other evening commercial activities; and, gasoline pumps were operational on the property.

In addition to finding that fewer variables seemed to play a significant part in robbery, Hunter also found that their influence was not permanent. There was a general decline in robberies of 24 percent from June 1985 through December 1989, with robberies of some stores decreasing by as much as 86 percent, whereas other stores experienced increases of up to 50 percent. Stores which had implemented new robbery prevention strategies had fewer robberies, while those that had failed to develop new techniques experienced increased robberies. These findings demonstrated that the influence of environmental factors varies over time. Therefore, robbery prevention strategies must constantly be upgraded and improved.

The Florida Study. In a study funded by the Florida Department of Legal Affairs, Hunter (1988) undertook a statewide survey of convenience store robberies in order to test the application of CPTED principles derived from the local area analysis in Tallahassee to a state-wide area. The sample surveyed consisted of 200 stores selected at random from the population of convenience stores operating within the State of Florida. Seventy-four stores were eliminated from the sample due to not having operated continuously from January 1, 1984, through December 31, 1986, or having changed ownership (an exception was made for Little General Stores purchased by Circle K in that design and marketing strategies were not affected by the transfer). One hundred and twenty-six stores remained within the sample.

A list of pertinent characteristics thought to impact upon a store's vulnerabil-

ity to robbery, as measured by the number of actual robberies, was selected from those analyzed in earlier studies by Crow and Bull (1975), Duffala (1976), and Jeffery *et al.* (1987). This list incorporated the characteristics found to have significant positive relationships with the number of store robberies within those studies. During the Fall of 1987, each store site was evaluated as to the environmental characteristics inside, immediately outside, and in the surrounding area. An additional sixteen stores were eliminated during the on-site evaluation process as a result of substantial store alterations since 1984. Information about robberies and attempted robberies at each store was then obtained from the law enforcement agencies in whose jurisdictions the stores were located. Data were obtained on 107 stores indicating that 212 robberies had occurred (accurate robbery information was not available for three stores). Data analyses were then conducted using a variety of statistical techniques at the state, regional and local levels.

Based upon his findings, Hunter (1988) recommended the following measures: eliminate concealed access; utilize more than one clerk; enhance visibility from outside the store; close stores between midnight and 6 a.m.; enhance visibility within the store; locate the cashier in the center of the store; install gasoline pumps to increase customer activity; locate the store on a busy street; locate the store in commercial or residential areas; locate the store near other evening commercial activities; and, use good cash handling procedures.

The last recommendation, utilizing good cash handling procedures, was made despite a negative finding regarding its usefulness as a deterrent. Hunter explained this negative finding as the result of three factors: over-dependence on cash handling as a prevention technique while neglecting other environmental factors; failure of store management and employees to adhere to cash handling policies; and disbelief on the part of offenders that the amount of cash was actually limited. Hunter (1988) argued that, when used in conjunction with other prevention techniques, cash handling would have a positive effect.

Summary

The studies reviewed herein, clearly demonstrate a linkage between convenience store robbery and environmental influences and, based upon the findings, a variety of robbery prevention strategies have been developed for convenience stores. Among these strategies, having two or more clerks on duty has received the most support, followed closely by: good cash handling practices; elimination of concealed access; and location in areas with evening commercial activities. The results are summarized in Table 1.

Some strategies may require clarification. Good cash handling includes: limiting the amount of cash available; posting signs indicating limited cash;

TABLE 1
ENVIRONMENTAL FACTORS WHICH HAVE BEEN FOUND TO REDUCE THE POTENTIAL FOR ROBBERY AT CONVENIENCE STORES

Factor	Supporting Research
Two or more clerks	E, F, G, H, I, J, K, L, M,N
Good cash handling	A, C, D, F, H, J, M, N
Concealed access eliminated	A, D, H, I, J, M
Store near evening commercial activity	B, F, H, I, J
Exterior visibility enhanced	A, H, J, M, N
Store closed from 10 p.m. to 6 a.m.	E, F, J, M, N
Security devices in use	A, F, J, M, N
Cashier located in security enclosure	C, K, L, M
Employees trained in prevention	A, J, M, N
Interior visibility enhanced	A, H, J
Store in commercial or residential areas	B, H, J
Gasoline pumps present in front of store	H, I, J
Cashier located in store center	H, I, J
Store on busy street with heavy traffic	B, J
Security guard on premises	C, M

A = Crow and Bull, 1975; B = Duffala, 1976; C = Athena, 1981; D = Scott, Crow and Erickson, 1985; E = Degner, Comer, Kepner and Olexia, 1983; F = Swanson, 1986; G = White, 1986; H = Jeffery, Hunter and Griswold, 1987; I = Hunter, 1990; J = Hunter, 1988; K = Wilson, Rivero and Demings, 1990; L = Vogel, 1990; M = Butterworth, 1991; N = Clifton and Callahan, 1987.

utilizing time release or drop safes; and, training employees to adhere to strict cash-control policies. Eliminating concealed access/escape includes: enhanced lighting at the rear and sides of the store; erection of fencing and walls to prevent or slow the escape of robbers; and removal of sight obstacles which robbers might use for concealment. Enhanced exterior visibility includes: removing obstructions that inhibit seeing into or out of the stores; and ensuring visibility within the parking lots by removing obstacles and increasing available lighting. Security devices include: robbery alarms; camera or video systems; controlled access safes; mirrors; and, other prevention devices. Training in robbery prevention includes: compliance with cash-control policies; encouraging visits from police and others; alertness to potential danger; store cleanliness; utilization of prevention devices; and, safety procedures in case of robbery.

Findings from Clifton and Callahan (1987) and Butterworth (1991), which

will be discussed in the following section, are also included within Table 1. In addition, recent studies on the benefits of multiple staffing and bullet-resistant enclosures (Vogel, 1990; Wilson, Rivero and Demings, 1990) are included.

Results of prevention programs in Florida

The City of Gainesville provides perhaps the most notable example of the impact of environmental prevention strategies upon convenience store robberies. Based upon the research findings of White (1986) and Swanson (1986), the Gainesville Police Department proposed an ordinance to the Gainesville City Council to regulate the operation of convenience stores. The original ordinance required: limitation of cash; a security safe; parking lot lighting; removal of visual obstructions; robbery detection cameras; and training of clerks.

Following the implementation of the original ordinance in July 1986, convenience store robberies continued at an alarming rate. After efforts by the convenience store industry to reduce the rate failed, the City of Gainesville implemented a second element of the ordinance requiring that stores either utilize two clerks during the hours of 8 p.m. to 4 a.m. or that they close between these hours. Following implementation of the ordinance in April 1987, the Gainesville Police Department reported a dramatic decline in convenience store robberies during that year (Table 2) which has continued each year (Clifton and Callahan, 1987).

Another example of success in deterring convenience store robberies may be found in Jacksonville, Florida, where convenience store robberies increased dramatically during 1987. In lieu of an ordinance, voluntary compliance was sought in limiting cash handling, enhancing lighting, removing visual obstructions and training of clerks. By 1989, robberies had declined by 65%. In 1990 (during which time an ordinance requiring adherence to state-mandated prevention strategies was enacted) robberies declined another 26%.

The Florida Department of Legal Affairs began investigating the alarming increase in convenience store robberies within the State of Florida during the 1980s. Utilizing data from Hunter (1988), Clifton and Callahan (1987) and prior studies, the Department of Legal Affairs produced videos on crime prevention through environmental design and preventing convenience store robbery which were provided to every city and county government within the State of Florida. Their recommendations (see Table 3) were enacted by many city and county governments during 1988 and 1989.

In 1990, the Florida Legislature enacted Florida Statute 90-346, the Convenience Store Security Act. This legislation requires local governments in which a death, serious injury or sexual battery has occurred during a convenience store robbery to develop an ordinance mandating the recommendations listed in

TABLE 2
CONVENIENCE STORE ROBBERIES IN GAINESVILLE, JACKSONVILLE, AND THROUGHOUT THE STATE OF FLORIDA, 1986-1990

	Gainesville	Jacksonville	Florida
1986	97	478	5, 288
1987	39	863	5, 222
1988*	—	—	—
1989	29	567	5, 548
1990	18	422	4, 909

Source: Florida Department of Law Enforcement.
* FDLE did not compile UCR data for 1988.

TABLE 3
PREVENTION TECHNIQUES RECOMMENDED BY THE FLORIDA DEPARTMENT OF LEGAL AFFAIRS

Silent robbery alarms.
Security cameras capable of identifying robbery suspects.
Drop safe or other cash management devices.
Well lighted parking lots.
Posted signs indicating less than $50 cash on hand.
Clear and unobstructed windows.
Height markers at entrances.
No concealed access/escape.
Cash handling policies to limit available cash.
Employees trained in robbery deterrence and safety.
Two clerks during night hours.

Source: Butterworth, 1991.

Table 3 (with the exception of concealed access and two clerks). At the time of this writing, 45 municipalities and 24 counties had enacted such ordinances (FDLA, 1991). Many of those passed prior to September 30, 1990, also mandate two clerks, security enclosures or closing during night hours. Based upon data provided by the Department of Legal Affairs (Butterworth, 1991), the Florida Legislature is considering supplementing Statute 90-346 by requiring one of the following between the hours of 10 p.m. to 6 a.m.: (1) close the store; (2) provide two clerks; (3) install safety enclosures; or, (4) provide a security guard.

The results of Florida's robbery prevention efforts are being felt immediately. Convenience store robberies in Florida declined from 5, 548 in 1989 to 4,904 in 1990 (Table 2) despite an overall increase in violent crimes (from 145,473 to 160,544) during the same period. While the rest of the nation is experiencing an increase in convenience store robberies, mandated prevention strategies are working in Florida.

Implications for the future

It is clear from the research reviewed above and from the experience in Florida that crime prevention through environmental design deters convenience store robbery. Nevertheless, the measures developed in Florida may not be as beneficial in other parts of the nation. Indeed, it is doubtful, that many states will enact such stringent legislation. Therefore, the success of future robbery prevention efforts may well depend upon voluntary compliance by the convenience store industry.

The National Association of Convenience Stores (NACS) is now playing an important part in the development of robbery prevention strategies. In addition to the publication of the Robbery Deterrence Manual, NACS provides seminars on robbery prevention and commissions research to develop new prevention strategies. NACS has been both an advocate and an opponent of the establishment of industry-wide standards for robbery deterrence. This contradiction is a result of the industry's need to provide protection while holding operating costs to a minimum.

Current prevention strategies endorsed by NACS rely upon: signs indicating limited funds; good cash handling procedures; enhanced visibility within and without the stores; alteration of escape routes; use of security devices; encouraging activity in or near the store; employee alertness; and store cleanliness. NACS argues that if these strategies are followed, additional actions are unnecessary and that multiple staffing of stores, security enclosures, or closing at midnight are needless expenses.

As prevention research provides additional support for more stringent robbery prevention policies (including provisions specifically designed to protect clerks during the hours of darkness), it is anticipated that the National Association of Convenience Stores will begin encouraging its members to implement these policies. Such policies are "good business" in that they will protect employees and customers and improve public relations. Implementing them may also prevent mandatory legislation which might limit corporate discretion, and avoid costly lawsuits from injured parties.

17. Crime prevention and commercial burglary: a time series analysis

David B. Griswold

EDITOR'S NOTE: This case study, first published as an article in the Journal of Criminal Justice *(Griswold, 1984), reports results from an ambitious CPTED project funded by the National Institute of Justice in 1974. The contract was awarded to the Westinghouse Corporation and specified that CPTED concepts, largely developed in the context of Oscar Newman's work in public housing (see* Introduction*), would be tested in a number of other urban settings: schools, commercial areas and areas of private housing. This case study summarizes findings from the most successful of the three tests, that conducted in the commercial area, the Union Avenue Corridor in Portland, Oregon (Wallis and Ford, 1980). In brief, rates of commercial burglaries were reduced by a combination of security surveys and improved street lighting. The relative contribution of these measures could not be determined from the analysis and Griswold argues that both might have been needed in combination to achieve success. The public believes in the crime*

prevention value of good lighting, though researchers have been more sceptical (e.g. Tien et al., 1976). However, the tide of professional opinion may now be turning (Atkins et al., 1991; Ramsay and Newton, 1991). In their recent Home Office Crime Prevention Unit report, Ramsay and Newton (1991) conclude that "in localized 'blackspots', where lighting is particularly inadequate, crime and incivility may be reduced in addition to pedestrians' sense of security being improved." The covered markets in Birmingham, where improved lighting helped to reduce theft (Case Study #6), would be one example of such a "blackspot", but it is not clear whether the Union Avenue Corridor before the improvements would be another. If not, the conclusions on lighting may need to be further re-stated.

> STREET LIGHTS can be like that famous stone that falls in the desert where there are no ears to hear. Does it make a noise? Without effective eyes to see, does a light cast light? Not for practical purposes (Jane Jacobs, 1961).

The influence of the physical environment on crime has drawn increasing attention in recent years. The pioneering work of Jacobs (1961) represents an early attempt to explain how contingencies in the physical environment can influence the crime rate in an area. More recently, Angel (1968) and Newman (1972), among others, have examined how various physical elements of the environment can affect the level of crime. Generally, these studies suggest that certain physical changes may reduce the opportunity for committing crimes, and several techniques have since been devised to reduce crimes through environmental design. The study described here is part of a larger replication of a crime prevention through environmental design (CPTED) project which was undertaken in Portland, Oregon, from 1975-1977 (Kaplan *et al.*, 1978). In the original study, it was hypothesized that opportunities to commit crimes were related to the target, and to risk, effort, and payoff. To the degree that there are few easy crime targets in an area, that the risk of detection is high for criminals, that the effort needed to commit crimes is high, and that the payoff for committing a crime is low, it was predicted that the level of crime could be reduced. Several crime prevention techniques were implemented in the original study to reduce crime. For our purposes here, the installation of street lighting and commercial security surveys are of primary importance.

Unfortunately, although there have been numerous attempts to evaluate the efficacy of a variety of crime prevention measures, many of these studies suffer from serious methodological flaws. This point is emphasized in a recent critique

of street lighting studies (Tien *et al.*, 1979). The use of inappropriate statistical techniques and the lack of control areas are two problems which have often plagued earlier research.

The present study represents an effort to redress some of the methodological problems of previous studies through the use of a control area, as well as of interrupted time series analysis.

The setting

In the mid-1970s, the Union Avenue Corridor (UAC) in Portland, Oregon, was chosen as a demonstration site to test CTPED theory in a commercial area. The corridor is three and a half miles long and four blocks wide and is a mixed-use commercial strip. Union Avenue runs north and south and is located in northeastern Portland; prior to the late 1950's, when the interstate freeway was completed, Union Avenue was the major interstate highway in Portland. There are a variety of businesses along the UAC, including car dealerships, grocery and variety stores, fast food and other restaurants, taverns, gas stations, drug stores, banks, light industry, and other small businesses. The residential area surrounding the UAC is comprised of low and moderate income individuals, and is racially mixed. About half of Portland's black population lives in the north and northeast areas surrounding the UAC.

In addition to the rerouting of traffic caused by the interstate, which was built in the late 1950's, a large mall (Lloyd Center) was constructed near the south end of the UAC in the early 1960's. This led to further economic decline in the area. Racial strife and disturbances in the 1960's also contributed to the deterioration of the UAC. By 1974, crime rates for robbery, burglary, assault, and purse snatching were about three times the rate for the greater city. The area was selected as a demonstration site not only because of its high crime rate, but because city officials in Portland expressed an interest in CPTED.

Methodology

The original study, as well as the replication (of which this article is a part), considered a number of issues, but the scope of the study under review here is limited to the consideration of the impact of two crime prevention measures (street lighting and security surveys) on commercial burglary.[1] Before continuing, two caveats concerning this study should be mentioned. First, since the security surveys and street lighting installation took place during the same time period, it was not possible to assess the independent effects of the two measures. Secondly, due to time and budgetary constraints, no separate data were obtained for nighttime commercial burglary, even though it was assumed (especially in the case of street lighting) that the two crime prevention measures would have

the greatest impact on nighttime commercial burglary. There is considerable evidence that a large majority of non-residential burglaries occur at night (Flanagan, Hindelang, and Gottfredson, 1980; Scarr, 1973). With the exception of the businesses that are closed on weekends, most of the businesses in the UAC have daytime hours, obviously precluding the possibility of burglary.

The rationale for using these two crime prevention measures follows the CPTED theoretical model outlined earlier. Street lighting would presumably increase the visibility of commercial burglars, thus increasing their risk of apprehension. The commercial security surveys were designed to encourage businessmen to employ various crime prevention measures that would make their establishments less vulnerable to burglary. Thus, not only could the number of businesses that are particularly susceptible to burglaries be reduced, but the effort required to burglarize more secure businesses, and the risk of detection (because of both the increased time which might be necessary to complete a burglary and the installation of alarms), would be expected to increase. In general, then, it was predicted that the implementation of these two measures would deter potential burglars and reduce the incidence of commercial burglary. In addition to assessing the impact of street lighting and security surveys on commercial burglary, the replication was also designed to determine whether these measures had a persistent impact on commercial burglary or whether burglary returned to pre-intervention levels. These, then, are the two central questions addressed by our research.

Implementation

An issue which is often ignored in the evaluation of programs is the extent to which the programs are implemented. In the initial evaluation (Kaplan *et al.*, 1978), 210 commercial security surveys were conducted in February 1976, and follow-ups were conducted in September 1976 and February 1977. The first follow-up indicated that 33% of the businesses had complied with initial recommendations; 52% had complied with recommendations after the second follow-up. The recommendations included: turning on inside and outside lights at night, installing burglar and silent alarms, and displaying crime prevention stickers. Businessmen were surveyed again in 1979; they generally adopted the same crime prevention measures as they had in 1977, with two exceptions. In 1979, only 74% indicated that they left inside lights on at night, and 33% noted that they displayed crime prevention stickers, while the respective proportions were 84% and 43% in 1977. In general, the findings suggest that similar proportions of businessmen employed similar crime prevention measures in 1977 and 1979.

The installation of street lighting began in January 1976 and was completed

in February 1977, but it is unknown whether there was a systematic pattern to the installation of the lighting. High intensity, 250 watt, high pressure sodium lights were installed the length of the entire UAC (these are the same lights that the city of Portland installs on major arterials). In addition, 175 watt mercury vapor lights were installed along residential side streets. The present study used a visual survey of the area that indicated that the current level of street lighting was identical to the 1977 level, and that street lights had been well maintained.

Sources of data

Monthly commercial burglaries reported to the police were obtained for the UAC and the remainder of the city of Portland from January 1975 to December 1979. Monthly UAC commercial burglaries were collected from Portland Police Bureau "run sheets" for the five year period. Run sheets include all crimes reported to the police as well as the *UCR* classification and place of offense. The *UCRs* for monthly commercial burglaries for the same time period were also collected for the whole city of Portland. The number of monthly commercial burglaries reported in the UAC were then subtracted from the monthly city-wide totals to provide a comparison group. (It should be noted that comparable data from the original evaluation were unavailable, preventing a direct comparison with the original findings.) Initially, an attempt was made to find a comparable area in Portland, but this was not possible given the large proportion of blacks residing along the UAC.

Another problem was that no data were available on the rate of street lighting installation. Still, it was assumed that the lights were installed at a gradual constant rate, rather than that there could be no effect from the street lighting until installation was completed.

Findings

A common problem encountered in analyzing monthly data is serial correlation (correlation of the residuals), a factor which limits the use of ordinary least-squares regression. Although there is some disagreement over whether this leads to biased parameter estimates, or to unreliable tests of significance, there is consensus that techniques other than ordinary least squares regression should be employed when there is serial correlation (McLeary and Hay, 1979; Ostrom, 1978; Rao and Miller, 1971). One method for dealing with autocorrelation of the residuals is various ARIMA (autoregressive integrated moving average) models first developed by Box and Jenkins (1976).

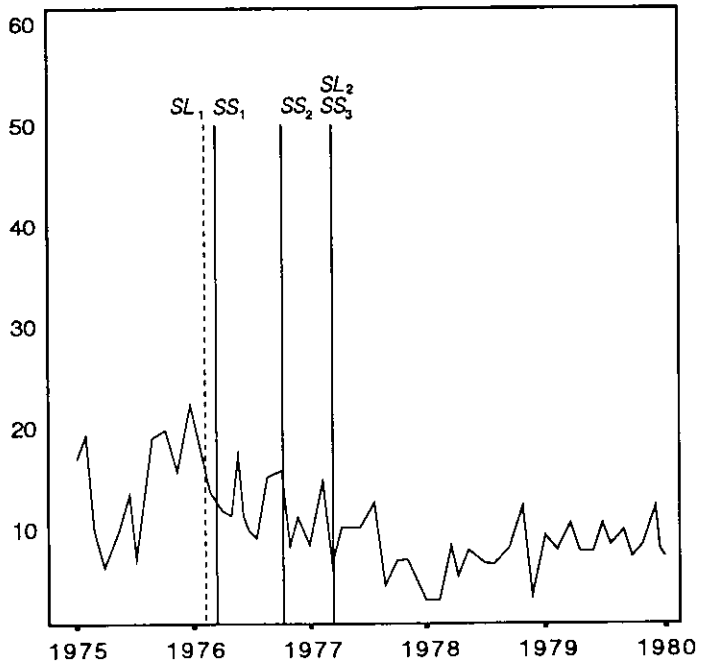
Three separate analyses were undertaken to test for intervention effects on commercial burglaries. (See Figures 1 to 3 for scattergrams for the UAC, the remainder of Portland, and the proportions of UAC to the remainder of the city).

Visual inspection suggests that the interventions may have affected commercial burglaries for the UAC (Figure 1) and the proportion of UAC to commercial burglary in the remainder of Portland (Figure 3), but not commercial burglaries for the rest of the city (Figure 2). However, the use of ARIMA models, adopting the procedure outlined by McLeary and Hay (1979), can provide a more definitive answer concerning the impact of the interventions. As noted earlier, a gradual intervention effect was hypothesized. This decision is based on the fact that even though the installation of street lighting began in January 1976, it was not completed until February 1977. Furthermore, even an abrupt intervention effect, following the security surveys, would not diminish the effect of the gradual installation of street lighting, which occurred simultaneously. Since no data on the actual rate of installation were available a linear intervention was assumed (a dummy variable was coded 0 for the pre-intervention months, .076 for the first intervention month, 1 for the month that installation was completed and for the remaining months). This model assumes that the intervention effects remained constant in the post-intervention period.

In examining the three time series, an attempt was made to identify the most parsimonious models. The results are presented in Table 1. Although there was a significant decline in commercial burglaries ($t = -3.35$, $p < .01$) in the UAC,[2] a corresponding decline was not found in the remainder of the city ($t = -.7$, n.s.).[3] Nonetheless, to more directly test the proposition that street lighting and security surveys would reduce commercial burglaries, the proportion of UAC to Portland commercial burglaries was examined. Like the UAC finding, a marked reduction was observed ($t = -2.23$, $p < .05$). The average monthly proportion for the pre-intervention months was 3.9%, as compared to 2.5% for the remaining months. To reiterate, examination of proportions is probably the most conclusive test, because the remainder of the city serves as a control, ruling out the possibility that some event or events occurring throughout the city during or after the two crime prevention measures were implemented led to the observed reduction in commercial burglaries. In addition, rhos (τ) were computed for the UAC to the remainder of the city. Both were negative and significant ($\tau_s = -.59$, $p < .01$; $\tau_s = .41$, $p < .01$). These findings support those of the earlier time series analysis.

There are several rival hypotheses which could account for the reduction in commercial burglaries in the UAC. Most obviously, since the UAC has been described as a deteriorating area, a reduction in the number of businesses in the area could reduce the opportunity for committing commercial burglaries. However, there were no dramatic changes in the number of ongoing businesses from 1975 to 1979. The greatest change occurred from 1975 to 1977, when there was an 8% decline in the number of businesses; but by 1979 the reduction in the number of businesses since 1975 was only 2%. Another hypothesis is that

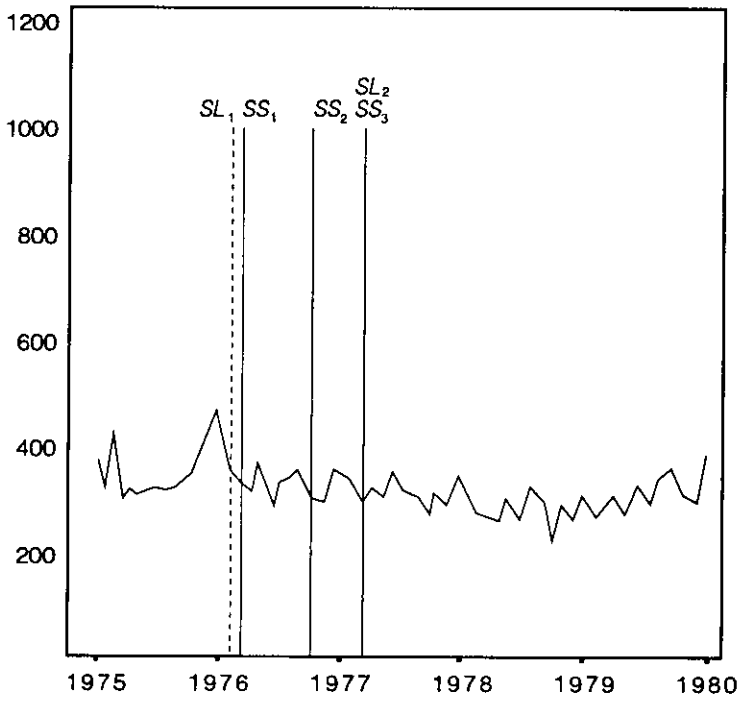
FIGURE 1
MONTHLY COMMERCIAL BURGLARIES IN THE UNION AVENUE CORRIDOR



because the UAC is a depressed area, business sales may have declined, making businesses in the area less desirable burglary targets. However, most businessmen reported gains in sales from 1970 to 1979, with the greatest increase from 1975 to 1977. Furthermore, land values for the UAC were only slightly lower than they were for other commercial areas in Portland.

An additional alternative is that there was a dramatic population decline during the period of the study, reducing the number of potential burglars in the area. A comparison of census data for 1970 and 1980 indicates that the population in the area has remained virtually unchanged (in fact, it has increased slightly).[4] Although these are not the only rival hypotheses which could explain

FIGURE 2
MONTHLY COMMERCIAL BURGLARIES IN PORTLAND



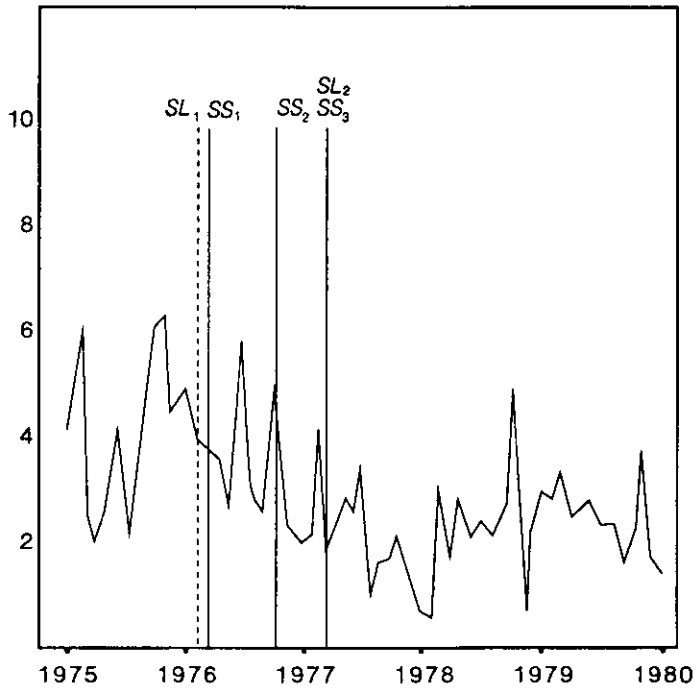
SL_1 =Beginning of street lighting installation
SL_2 =Completion of street lighting installation
SS_1 =First security surveys
SS_2 =Second security surveys
SS_3 =Third security surveys

the observed intervention effects, they are some of the most obvious explanations for which evidence is available.

Conclusions and implications

The findings tend to support the proposition that the combined effects of commercial security surveys and street lighting led to a significant reduction in commercial burglaries in the UAC, and that this effect has been maintained since the demonstration project was completed in the UAC in 1977. There is ample evidence that these two crime prevention techniques have been institutionalized

FIGURE 3
MONTHLY PERCENTAGE FOR PROPORTION OF UNION AVENUE CORRIDOR COMMERCIAL BURGLARIES TO PORTLAND COMMERCIAL BURGLARIES



SL_1 =Beginning of street lighting installation
SL_2 =Completion of street lighting installation
SS_1 =First security surveys
SS_2 =Second security surveys
SS_3 =Third security surveys

since the time the original study was undertaken. Not only have businessmen continued to employ a number of crime prevention techniques in the UAC, but street lights in the area have also been well maintained.

The research described here attempts to avoid a number of pitfalls of previous crime prevention studies. In addition to examining monthly commercial burglaries with ARIMA models, the city of Portland is used as a control, and several rival hypotheses have been assessed and rejected. However, even though evidence indicates that neither a population decline (a measure of potential

TABLE I
RESULTS OF TIME SERIES ANALYSIS FOR COMMERCIAL BURGLARIES

	Model	Constant (T-values)	β Intervention (T-values)	MA1 (T-values)	AR2 (T-values)
UAC Commercial Burglary	ARIMA (0,1,1)	-0.03 (0.41)	-7.73 (3.35)**	0.94 (18.14)**	
Portland Commercial Burglary	ARIMA (0,1,1)	-0.55 (0.29)	-41.17 (0.71)	.69 (6.60)**	
Proportion of UAC to Portland Commercial Burglary	ARIMA (2,1,1)	0.43 (0.88)	-26.12 (2.23) *	0.73 (7.15)**	-0.30 (2.33) **

β = Regression Coefficient
AR2 = Autoregressive Order 2
MA1 = Moving Average Order 1
* = Significant .05 level
** = Significant .01 level

commercial burglars), nor a deduction in the number of operating businesses (a measure of potential commercial burglary targets) can account for the observed reduction in commercial burglaries in the UAC, it is plausible that some unique event or series of events occurred only in the UAC and not in the remainder of the city. This research does not preclude such a possibility, but failed to discover any occurrence(s) of this nature.

The design of the study does have at least one serious limitation, however. It is not possible to assess the relative influences of the security surveys and street lighting. All that can be concluded is that the combined effect of these two interventions apparently resulted in a reduction in commercial burglaries. A more complex design is necessary to evaluate the relative effects of these two crime prevention techniques — for example, a comparison of four areas: one where street lighting has been implemented, one where security surveys have been undertaken, one where both crime prevention techniques have been employed, and a control area. Such a design could provide a more direct measure

of the relative efficacy of these two interventions. Most importantly, one of the reasons why street lighting studies may find no consistent impact on crime is that street lighting alone may be insufficient to deter potential criminals (Tien *et al.*, 1979). Instead, street lighting may have an impact only when it is employed in conjunction with other crime prevention techniques. The development of more sophisticated research designs in the future could begin to address these issues.

NOTES

1. In the original study as well as in the replication, the impact of the security surveys and/or street lighting on street crimes (assaults, purse snatching, street robbery, and rape), residential burglaries, and commercial robberies was also examined. These findings have not been reported here because no significant intervention effect was observed for any of these crimes. However, one of the reasons for examining commercial robberies and residential burglaries in the initial evaluation was to determine if reductions in commercial burglaries had the effect of displacing these crimes, resulting in an increase in residential burglaries and commercial robberies. In the present study, no displacement was observed.
2. Although the original study also found a significant reduction in commercial burglary (Kaplan *et al.*, 1978; Lavrakas, Normoyle, and Wagener, 1978), the findings are not directly comparable. Not only do the time periods for the two studies differ because an additional fifteen months of post-intervention data were examined in this study, but the sources of data are different, and no comparison area was included in the original evaluation. One of the reasons for conducting the replication was to determine whether the initial effects persisted, given the limited number of post-intervention months which were examined in the first study.
3. Both the raw data and autocorrelations and partial autocorrelations are available from the author upon request.
4. Likewise, it is plausible that less involvement in commercial burglary by blacks could explain the decrease in commercial burglaries. Admittedly, arrests offer only a very crude basis for determining involvement in crime. However, according to the UCR, from 1975 to 1979 the proportion of blacks arrested nationally has remained virtually constant at 29%.

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18. Exact fare on buses

Jan M. Chaiken, Michael W. Lawless and
Keith A. Stevenson

EDITOR'S NOTE: One element of the successful CPTED program to reduce convenience store robberies was good cash handling, including the use of time release or drop safes (Case Study #16). The strongest endorsement comes in Scott et al. (1985) where it was argued that cash reduction was the most important element in the 7-Eleven program that reduced the average "take" per robbery to less than $100 in 1981. This was less than half the sum in 1975 and less than the amount considered worthwhile by most of the robbers who were interviewed. Cash reduction policies were also identified by Clarke and McGrath (1990) as being responsible for the substantially reduced rate of robberies from Australian betting shops in the 1980s. The greatest successes, however, have attended cash reduction in the context of public transport. This case study, first published as part of a Rand report (Chaiken et al., 1974), shows that the introduction in 1969 of an "exact fare" system, including an on-board drop safe, brought about an immediate and dramatic reduction of about 90 percent in robberies of bus drivers in New York City. Similar results were achieved by exact fare systems for buses in 18 other cities (Stanford Research Institute, 1970). The Rand report was

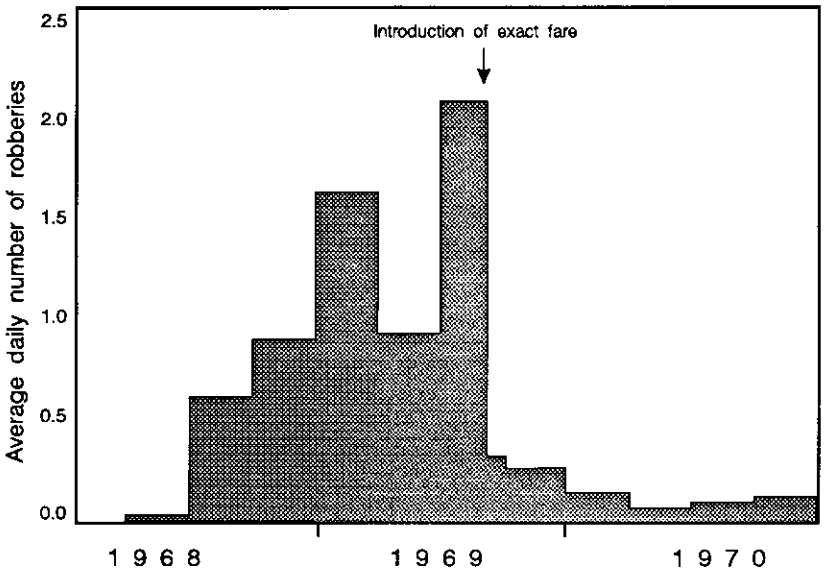
selected for reprinting because of its particularly sophisticated investigation of displacement. It found evidence of displacement between subway and bus robberies, and also some evidence of a "multiplier" effect: Offenders learn that certain offences are relatively safe and profitable which leads to very rapid increases in their incidence; conversely, when preventive measures are introduced the multiplier effect may operate "in the opposite direction, causing a decrease in incidence that may be even greater than merited by the effectiveness of the measure." Subways do not exist in many of the cities that introduced exact fare systems for buses. Even where they do, it cannot be assumed, without much more information, that the conditions in New York City favoring displacement also existed elsewhere.

ALTHOUGH "script" or "exact fare" systems were used over 30 years ago on some streetcar lines, they were gradually abandoned, and have only recently reappeared as anticrime measures. The first city to implement a script plan was Washington, D.C., in mid-1968. This development was precipitated by the shooting of a D.C. Transit bus driver during a robbery on May 9, 1968, followed by the murder of a driver on May 17, in much the same way as the subway murder in New York initiated the increased manning. During the following year, many cities adopted similar plans, and exact fare was introduced on New York City buses in August 1969.

The effect of exact fare plans on the rate of bus robberies was dramatic and convincing. Figure 1 shows the number of reported bus robberies in New York City, by quarter, beginning in 1968. Bus robberies jumped from virtually none in early 1968 to a high of 67 per month just prior to the institution of exact fare, when bus robberies then dropped to 7 or lower in every month after exact fare. The Stanford Research Institute (1970) reported similar results in a 1969 study of bus robbery rates in 15 cities that instituted exact fare plans. On the average, monthly bus robbery rates were 98 percent lower after the inauguration of exact fare than they were before.[1]

We are interested in whether the crime data indicate an inter-relationship between bus and subway robbery. Despite dissimilarities in the details of the two types of crime, the possibility of displacement between them warrants analysis. What actually happened is that the numbers of subway robberies, which had been increasing at an annual rate of 46 percent in the year prior to exact fare, suddenly began to increase at an annual rate of 92 percent. In addition, policemen who had interrogated arrested robbers were sure they had been displaced from other targets. In 1971, a reporter for *The New York Times* asked an unnamed Transit patrolman the cause of the increasing subway robbery rates. "It's very simple,"

FIGURE 1
AVERAGE NUMBER OF REPORTED BUS ROBBERIES IN NEW YORK CITY, 1968-1970



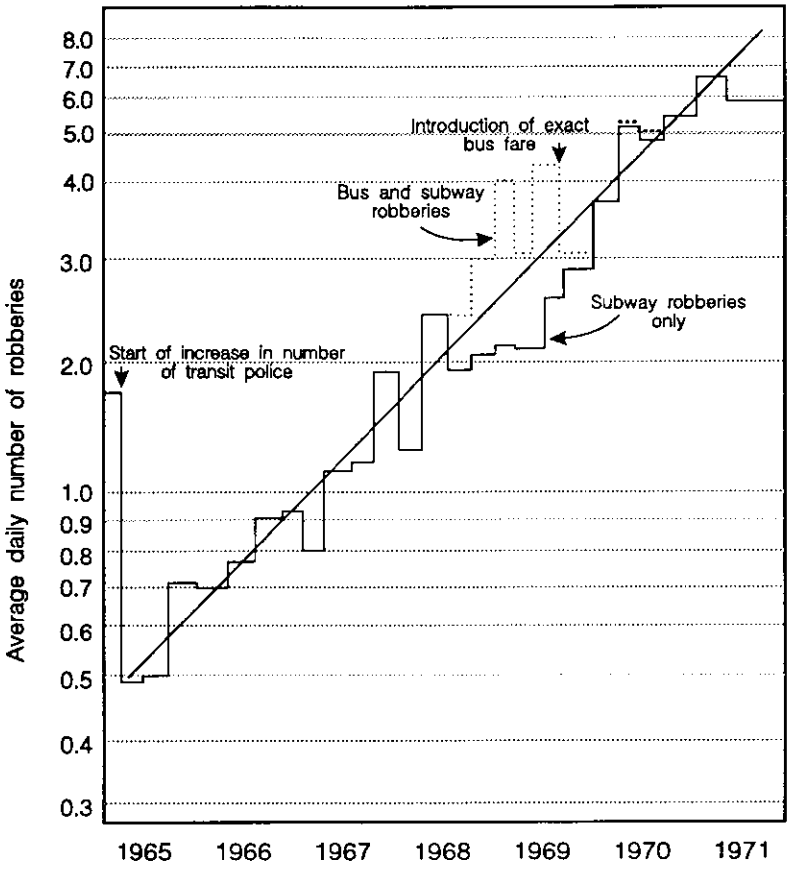
Source: NYCPD Planning Division

he said. "The guys who used to hold up buses and taxis now knock off change booths" (Prial, 1971).

Analysis of the data suggests a possible alternative explanation, however, namely that a partial displacement of potential robbers *away* from the subways took place in 1968 when robbing buses became "popular." Then, in 1969, when exact fare was introduced, the increase in subway robberies was only a fraction of the decrease in bus robberies. Figure 2 shows the total number of bus and subway robberies in New York from 1965 to 1971, averaged over three-month periods. The straight line on this figure is the least-square-error fit to the data for the periods before and after the precipitous increase in bus robberies.[2] It shows that subway robberies both before and after the spurt of bus robberies increased about 56 percent annually.

After exact bus fares were introduced, the number of subway robberies was not substantially higher or lower than would have been expected by extrapolating the trend from 1965 to 1968. During every quarter when bus robberies were more frequent than one every three days, however, we find that (1) the number of subway robberies was lower than the trend line, and (2) the total number of

FIGURE 2
AVERAGE DAILY NUMBER OF REPORTED BUS AND SUBWAY ROBBERIES IN NEW YORK CITY BY QUARTER, 1965-1971

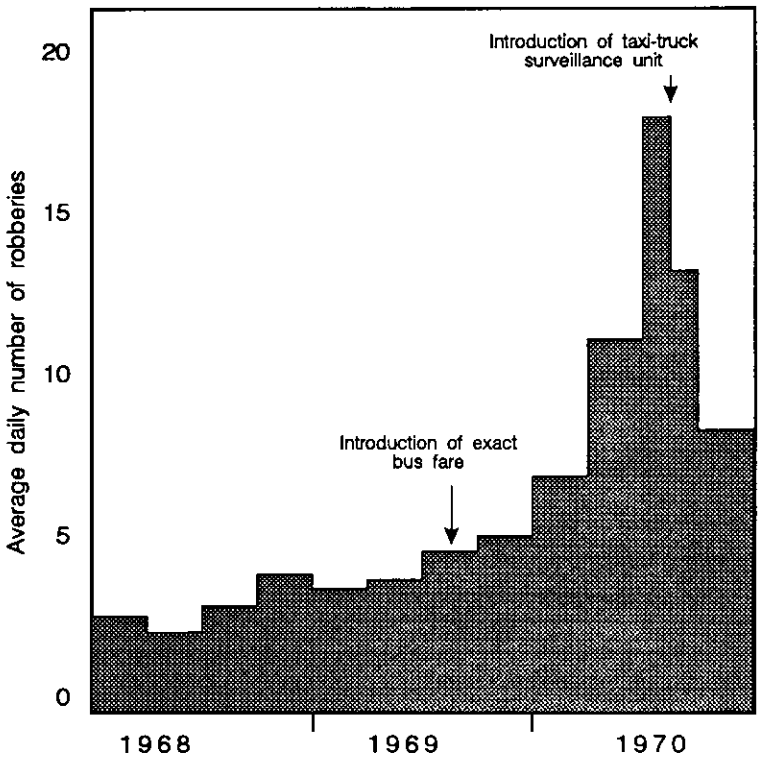


Source: NYCPD Planning Division

bus and subway robberies was above the trend line. These findings suggest quite strongly that some persons who would otherwise have been robbing in the subways found the buses a more attractive target, while in addition there were some bus robbers who were not being diverted from the subways.[3]

By virtue of the artificially induced "reduction"[4] in subway robberies during 1968 and 1969, the 1970 increase in subway robberies appeared to be extraordinarily rapid. But Figure 2 suggests that the robbery rates were merely readjusting to the levels that would have prevailed had the subways not been the beneficiary of a displacement effect to the buses.

FIGURE 3
AVERAGE DAILY NUMBER OF REPORTED TAXI ROBBERIES IN NEW YORK CITY, 1968-1970



Source: NYCPD Planning Division

We have no satisfactory explanation for the underlying exponential increase in the total of bus and subway robberies (i.e., the straight line on the logarithmic graph), which is a key element of our analysis of the displacement effect. However, an increase of this type was commonly observed for crime rates of various types in the period from 1965-1970, as well as in calls to police and fire departments for emergency services (cf. Chaiken and Rolph, 1971).

If a displacement of taxicab robberies to or from the subway system also occurred, as suggested by the Transit patrolman quoted above, the data indicate it was not very substantial. Figure 3 shows the average number of taxi robberies, averaged over three-month periods, from 1968 to 1970. In July 1970, the New York Police Department introduced a special taxi-truck surveillance unit, and taxi drivers implemented protective measures of their own (e.g., glass barriers,

limited cash). We note that the number of taxi robberies is somewhat larger than the number of subway robberies, so that even a partial displacement could be expected to appear as a large effect in subway crime statistics. But the 1970 increase in taxi robberies was not accompanied by decreased subway robberies, nor was the later decrease in taxi robberies associated with a clearly identifiable increase in subway robberies. The evidence for a displacement effect from the buses to taxis is marginal at best, but the sum of bus and subway robberies decreased slightly in the three-month period immediately following exact fare, accompanied by an increase in taxi robberies.

Multiplier effect

The data for subway, bus, and taxi robberies taken together indicate a form of "multiplier" effect. When a few people demonstrate that a particular type of crime or time of day is relatively safe and profitable, others are encouraged to try it, and the incidence of that crime increases very rapidly. Then, the institution of an anticrime measure demonstrates that the odds have changed and, at least temporarily, the multiplier operates in the opposite direction, causing a decrease in incidence that may even be greater than merited by the effectiveness of the measure. After a period of adjustment, however, at least a portion of the crimes reappear in a different form or at a different location or time of day. Therefore, the short-term effect of an anticrime program may not be a good measure of its overall value if continued indefinitely.

Our analysis indicates that if one has a good hypothesis concerning the target to which criminals are being displaced, then it is possible to detect the displacement effect from crime data. Without such a hypothesis the crimes may seem to disappear, but it appears more reasonable to believe that at least a portion of them are eventually displaced to unidentified targets. We therefore wonder what happened to the criminals who were deterred from subway crime in 1965 by both the direct and the phantom effect of increased police patrol on the subway. If any substantial number of them were displaced to above-ground crime, the net benefit to society created by the increase in Transit Police manpower was even smaller than we indicated in our discussion of subway crimes alone.

Danzig (personal communication) has considered the implications of this phenomenon from the point of view of the economist. He observed that, by virtue of displacement, the anticrime programs instituted in various parts of the transit system appear to be forms of suboptimization. "A transportation system administrator whose domain included buses, taxis, and subways might never have assented to bus system exact fares." In addition, insofar as total crime is not reduced by various anticrime measures, an externalization of costs occurs: the expenses of crimes that were previously borne by the subway, bus, or taxi

companies, their employees, and their passengers are shifted onto someone else. These effects are rarely taken into account when deciding whether to implement new anticrime activities.

The issue is made more complex by how little we know about police production functions and about the "costs" of crime to society. In most cases, a new anticrime measure will partly displace crime and partly deter it. Whether or not a particular program is suboptimal will depend on the extent to which crime is deterred, and also on the relative "costs" of the crimes (both the financial costs and the physical and psychological costs of victimization) to and from which activity is displaced.

A discussion of an externalization of "costs" as a consequence of crime displacement hinges on the yet undeveloped notion of an equitable distribution of these costs in a society. But it would seem to be true, in the light of the "multiplier" effect discussed above, that in some situations local anticrime measures are clearly necessary to *prevent* an externalization of costs. If a certain type of crime is demonstrated to be lucrative and as a result criminals are drawn into it and away from less rewarding activities, and if, furthermore, the victims of this new crime form a relatively small, confined group like token booth operators, bus drivers, and subway passengers, then doing nothing to deter this crime would force this small group of people to bear an increasing fraction of the total victimization costs of crime. To internalize these externalities, the victims should be reimbursed by the rest of the society. In the area of crime, this reimbursement typically takes the form of an anticrime measure, the costs of which the whole society bears and a subgroup benefits from.

NOTES

1. Study periods before exact fare ranged from one to six months; study periods after exact fare were four to nine months.
2. I.e., it is a fit to the logarithm of the average daily number of robberies for 19 quarters: the second quarter of 1965 through the second quarter of 1968 and the first quarter of 1970 through the second quarter of 1971. If only the data before 1968 are fit, the result is practically the same.
3. This conclusion might be unwarranted if the average "take" from a bus robbery was less than for a subway robbery. In this case, more bus robberies than subway robberies would be required to produce a given income for each robber. But we do not believe the disparity in "take" was very large, because the subway robberies include passenger robberies (which are generally less lucrative) as well as token booths, while bus drivers were the primary targets of bus robbers.
4. Subway robberies were not actually reduced; their incidence was only lower than would have been expected by extrapolating the trend.

19. Preventing burglary on a British public housing estate

Ken Pease

EDITOR'S NOTE: This case study, originally published as a Security Journal *article (Pease, 1991), summarizes the results of a Home Office supported project to reduce burglary on a public housing estate in the North of England. The strategy followed, of concentrating preventive efforts on previously victimized houses, achieved a 75 percent reduction in burglary for the whole of the estate, not just for the protected houses. In other words, there was a diffusion of benefits. One important element in this success was "cocoon" Neighborhood Watch, which involved the residents of the five or six homes around a previously victimized dwelling being enlisted to keep a special watch on it. This innovative idea might breathe new life into the fading concept of Neighborhood Watch. A second important element was the replacement of coin-fed fuel meters with conventional billing. Coin meters provide a convenient way of paying for fuel, especially for those on low incomes, but they are also attractive to burglars. In many areas of public housing in Britain, perhaps one third of the dwellings will have these meters and Hill (1986: 5) found that, "where coin meters are concentrated on an*

estate, the odds of a burglar finding a prepayment meter are raised to the point where he will burgle at random". He concluded that "the vulnerability of all homes on that estate is therefore increased, whether they have coin meters or not". (This may help to explain the diffusion of benefits observed in this case study when meters were removed from only a proportion of the homes). An additional problem is that some householders steal from their own meters and stage burglaries to cover their tracks. Finally, there is a risk of robbery posed to coin collectors employed by the utility companies. For these and other reasons, the gas and electricity providers are seeking to phase out meters in favor of other methods of prepayment, including electronic cards and keys (Hill, 1986; Cooper, 1989).

KIRKHOLT IS AN AREA of public housing near Rochdale, a town 10 miles north of Manchester, in northern England. It comprises some 2280 dwellings. In 1985, about one dwelling in four was burglarized. This was many times the national figure. Hough and Mayhew (1985) identified housing types associated with high, medium, and low levels of burglary. Kirkholt housing was of a type with a medium rate of burglary nationally. Despite this, the rate of recorded burglaries on Kirkholt was *double* the figure for recorded and unrecorded burglaries in housing types at *high* risk.

The Kirkholt Project is reported in two papers produced by the Home Office Crime Prevention Unit (Forrester *et al.*, 1988, 1990). The purpose of this paper is to give a personal overview of the project and its significance. The author jointly directed the evaluation of the project throughout its existence. The project had major inputs from local police, probation services, and victim support services. Systematic information was gathered from interviews with domestic burglary victims, their neighbors, and known burglars. The way in which the Kirkholt initiative grew out of the data is detailed in Forrester *et al.* (1988) and will not be repeated here.

It was found that (in 1986) the chance of a second or subsequent burglary was over four times as high as the chance of a first burglary; that is, a burglary flags the high probability of another burglary. Reference to the 1984 British Crime Survey showed this pattern to be national and is consistent with the pioneering work of Sparks (1981). Subsequent research in Canada (Polvi *et al.*, 1990) showed the same pattern and suggested that the period of greatest risk of repeat victimization is within 6 weeks of the first. To put the position as it applied

to Kirkholt in 1986 more concretely, nearly half of those burglarized in December 1986 had been attacked at least once before during 1986.

The elements of phase I of the Kirkholt Project

The central strategy was the prevention of repeat victimization. Elements of the initiative are summarized below.

Perhaps the most obvious factor in the burglary profile of Kirkholt was the taking of money from electricity and gas prepayment meters. These meters are a payment method whereby money is deposited in exchange for fuel dispensed. Deposited money is kept in a fuel meter in the home and emptied by the utility company once every month or 3 months. Forty-nine percent of burglaries on the estate involved the loss of meter cash [see Hill (1986) for a fuller account of the problem nationally]. In Kirkholt, utility boards agreed to the replacement of meters after a burglary, with the agreement of the householder.

Overwhelmingly, Kirkholt burglars entered a dwelling by the first route that was attempted. A security uprating of the homes of burglary victims was put in hand, together with postcoding of valuables. The primary requirement of the upgrading was that it did not consist of token locks and bolts, but, instead, dealt with the real points of vulnerability as evident in the entry methods described by burglars and their victims. The security rating was based on crime prevention officer advice in the light of our information and communicated through the local police officer. Alongside this uprating, a system of monitoring burglary techniques on the estate was set in place so that security advice could be based on changing burglary practice. The key agency in uprating security was the town's Housing Department, which agreed to disburse already agreed funds in the way suggested by the project.

The most publicized element of the Kirkholt scheme, initiated in 1987, has been cocoon Neighborhood Watch. By this device, the residents of the six or so houses or flats contiguous with a victimized dwelling were asked to look out and report on anything suspicious around the burglarized home to prevent repeat victimization. If they agreed to cooperate (as most did), they too were provided with security uprating. This kind of Watch scheme is triggered by a specific event and has a specific focus. These "cocoons" were intended to serve as nuclei of more conventional forms of organization and, in fact, developed into Neighborhood Watch schemes, which seem to be better rooted than many programs described elsewhere.

Community support was an element of phase 1 of the scheme. Project workers visited the homes of burglary victims on the estate, offering support and putting victims in touch with the appropriate agencies. In due course, project workers took over establishing cocoons, and they themselves carried out security

surveys and the associated postcoding of valuables. Workers also put in place a continual monitoring of relevant burglary techniques.

In brief, the rate of burglary on Kirkholt fell to 40% of its 1986 level within 5 months of the start of the program. Repeat victimizations fell to zero over the same period and did not exceed two in any month thereafter. There was very little suggestion that crimes had been displaced from Kirkholt to bordering areas. The time period of the first evaluation was very short and was acknowledged to be so. In the foreword to the first report, phase II was described as follows: "Further action is now under way in Kirkholt building on the initial success, but this time aiming to reduce the motivation for crime. With the aid of Home Office development funds, the probation service, the police, and university researchers are seeking to tackle the linked problems of alcohol and drug abuse, debt, and unemployment. A further report describing this second phase, and an evaluation, will be prepared in due course" (Foreword to Forrester *et al.*, 1988: iii). In what follows, I will describe the transition of the project from its first to its second phase.

Phase II

The aims of the project were described in the application for the development funds by the Greater Manchester Probation Service as being to:

a. maintain the target hardening/support to victims initiative.

b. secure community ownership of the project.

c. seek additional offender/community initiatives.

Alongside phase II elements, phase I remains in place in most relevant particulars. The Local Authority Housing budget of £75,000 set aside to improve the security hardware of victimized dwellings over 3 years has run out. The procedure has now been integrated into the normal Housing Development budget, so that burglary victims throughout Rochdale receive a priority response instead of being routinely added to the repair list, as happened prior to 1987.

Elements of phase II include a school-based crime prevention program, provision for offenders from the Kirkholt area to attend groups to address their problems, a cheap savings and loan scheme for Kirkholt residents, better informed probation officers, and better-served courts in consequence.

The change in the burglary rate on Kirkholt is presented in Table 1. The table shows a month-to-month scrutiny of burglaries from dwellings. To facilitate comparisons by individual month, the information is separated into four 12-month periods. The first is March 1986 to February 1987 (the pre-implementation year); the second is March 1987 to February 1988 (the first year of implementation); the third is March 1988 to February 1989; and the last March 1989 to February 1990. Table 2 presents a comparison between Kirkholt and the remainder of the police subdivision of which it is part. (For reasons of procedure

that need not be considered here, it is regretted that these comparisons are for calendar years, not periods as calculated for Table 1. Thus, data in Tables 1 and 2 are not exactly comparable, although their close similarity is evident). Comparisons with Rochdale more generally yield a similar picture. Provisional cost-benefit analysis (see Forrester *et al.*, 1990) suggests the project is well "in the black."

TABLE 1
NUMBER OF HOUSEHOLD BURGLARIES IN KIRKHOLT:
PRE- AND POST-PREVENTION INTERVENTION

	Year (March to February)			
Month	1986/7 (Pre)	1987/8 (Post 1)	1988/9 (Post 2)	1989/90 (Post 3)
March	54	42	14	18
April	61	30	21	10
May	52	17	15	9
June	28	10	5	8
July	40	10	7	2
August	39	16	13	14
September	42	22	29	18
October	27	16	9	9
November	36	14	9	12
December	23	16	18	18
January	64	10	17	6
February	60	20	10	8
Total for year	526	223	167	132
Average/month	44	19	14	11
% fall on previous year		58%	25%	21%
% fall on 2 years previous			68%	41%
% fall on 3 years previous				75%

The Kirkholt initiative has now relinquished its "demonstration project" status. The community now "owns" the program, and the Kirkholt Community Crime Prevention Group, comprising residents of the estate, now operate it. A second probation officer helps to translate the continuing data into application. For instance, newcomers to the estate are now disproportionately likely to become burglary victims, and this is leading to consideration of the modified reintroduction of cocoons for these people. Further, old people are highly

victimized during the traditional holiday period of early September; action is being formulated to combat this at the time of writing.

TABLE 2
COMPARISON OF HOUSEHOLD BURGLARIES IN KIRKHOLT WITH REMAINDER OF POLICE SUBDIVISION

	Kirkholt		Remainder of Police Subdivision	
Year	No. Burglaries	% Change on 1986	No. Burglaries	% Change on 1986
1986	512	—	2843	—
1987	317	-38	2880	+ 1
1988	170	-67	2311	-19
1989	145	-72	2160	-24

Just another crime prevention project?

As was stressed in the first published report of the Kirkholt Project (Forrester *et al.*, 1988), our choice was to prevent burglary by any means at hand. The disadvantage of this was and still is that the contribution of the various elements of the program were not distinguishable. We are aware of many limitations in both the conduct and the evaluation of the project, but we still believe that the Kirkholt experience does have some novel aspects that may be worthy of emulation.

The cornerstone of the Kirkholt Project was a recognition of the relationship between repeat victimization and crime prevention. To acknowledge that victimization predicts further victimization is to acknowledge that victim support and crime prevention are two sides of the same coin. Some of the advantages of the prevention of repeat victimization are as follows:

- Attention to dwellings or people already victimized has a higher "hit-rate" of those likely to be victimized in the future.
- Preventing repeat victimization protects the most vulnerable social groups, without having to identify those groups as such, which can be socially divisive. Having been victimized already probably represents the least contentious basis for a claim to be given crime prevention attention.

- Repeat victimization is highest, both absolutely and proportionately, in the most crime-ridden areas (Trickett *et al.*, submitted), which are also the areas that suffer the most serious crime (Pease, 1988). The prevention of repeat victimization is thus commensurately more important the greater an area's crime problem is.
- The rate of victimization offers a realistic scheduling from crime prevention activity. Preventing repeat victimization is a way of "drip-feeding" crime prevention.
- Even from the unrealistic view that crime is only displaced, avoiding repeat victimization at least shares the agony around (see Barr and Pease, 1990).

Most centrally, the strategy set out above creates a symbiotic relationship between victim support and efficient crime prevention, to their mutual benefit. In establishing the project, biological similes like symbiosis and cocooning constantly came to mind. In the first project report, the program was described as being more like horticulture than like engineering. Growth, osmosis, and suffusion were notions that repeatedly suggested themselves. This is important in suggesting that the protection of highly vulnerable places or people brings with it some process whereby the less vulnerable are also protected.

I have described the process whereby repeat victimization is addressed as "drip-feeding" crime prevention. Perhaps the drip-feeding metaphor should be elaborated a little to illustrate the point. The consistent "drip" response to victimization effort generates an effect that suffused throughout Kirkholt. This brought to mind the drip-feed that suffuses naturally throughout a body. More sudden or large-scale intervention could not be absorbed. In responding to victimization with crime prevention effort, a natural place is dictated for that effort. Unlike projects that seek, for example, to uprate security or give publicity to saturate an area, response to victimization is paced and focused. In practical terms, a smaller staff is required to drip-feed, rather than to bludgeon crime prevention activity.

The emphasis on repeat victimization that underpins the Kirkholt Project has emerged in our thinking as an important strategy of crime prevention generally. Whatever the particular and undoubted defects of the Kirkholt Project itself, we hope that this perspective is incorporated into other projects in the future. It is also to be hoped that the combination of agencies and interests in the program in the common pursuit of burglary prevention will also be found elsewhere.

20. Operation Identification, or the power of publicity?

Gloria K. Laycock

EDITOR'S NOTE: This case study, first published as a Security Journal *article (Laycock, 1991), reports a successful property marking project (Operation Identification) undertaken in a rural community in Wales. Burglary rates in three discrete but adjacent areas had declined by about 50 percent by the second year of the project. The reasons for the success of OI in this case, when it has frequently failed before, are spelled out clearly by Gloria Laycock in classic Home Office style, and barely require comment here. However, the case study has one very important lesson, supporting the conclusion reached by Poyner (1988) in his study of CCTV on buses (Case Study #14): Local publicity can exert a powerful effect in maximizing the impact of situational measures. In both instances, the local publicity comprised not just TV and newspaper coverage, but also more direct communication with the offenders concerned. The video bus in Poyner's study, which visited local schools to explain the problems of graffiti and vandalism and to demonstrate the cameras, no doubt succeeded in frightening some of the offending children. In this project, undertaken in a relatively isolated rural community, many of the burglars are likely to have been residents of Graig-*

y-Rhacca, the area of public housing with a "rough" reputation. "It is almost certainly the case that the police, in calling at almost every door as they did, were also calling at the doors of burglars". As Laycock concludes, it may therefore be worth considering, in the course of every situational project, how best to communicate to offenders that serious crime prevention efforts are being made.

THE MARKING of property as a means of identification is hardly new. There is a long-established belief that the branding or labeling of property with a personalized symbol will in some way protect it from theft or ensure its return should it be lost. In recent years, the practice has been given fresh impetus because, in the United Kingdom, we now have the "post code." The post code is rather different from the ZIP code used in the United States; it covers a very much smaller area, and in combination with the house name or number, uniquely identifies the household to which goods belong.

The development of the post code, together with the commitment of the police to search recovered property for signs of marking, led, in the mid-1980s, to widespread publicity in the United Kingdom aimed at encouraging the marking of property as a crime prevention device.

Earlier research studies of the efficacy of "operation identification" (OI) as it is known in the United States, were inconclusive. Work in the United States (Heller *et al.*, 1975) suggested that OI participants had significantly lower burglary rates than those not in the scheme, although there was no city wide reduction. There was no evidence that goods were more likely to be returned after marking, nor was there any suggestion that the apprehension of burglars increased.

In 1984, Knutsson reported the results of a comprehensive study of OI in Sweden. This initiative covered a residential area about 20 miles from Stockholm and included about 3500 houses. Over a 4-year period, the participation rate in the scheme rose from about 13% to just under 30%. The results failed to demonstrate a reduction in burglary even for those participating in the scheme (Knutsson, 1984).

Despite the mixed empirical results, the British police were enthusiastic proponents of OI. For example, the Metropolitan Police, who are responsible for policing London, spent almost £250,000 on advertising OI during 1983/84 with a further £90,000 on equipment. Partly in response to this expenditure, the Home Office Crime Prevention Unit set up a "demonstration project" on OI, the results of which were first published in 1985 (Laycock, 1985).

The background to and some of the results of this scheme were fairly

complex and are summarized below. The main purpose of the present paper, however, is to describe the effect of the OI program on burglary in the second year following implementation.

The South Wales program

The primary aim of the South Wales initiative, where the Home Office demonstration project was set, was to determine the effect on domestic burglary rates for those participating in the program. In view of this, it was felt that, although the marking of goods might be important, the extent to which this was *advertised* was even more so. It was stressed to those participating that the use of the door or window decal was of crucial importance to the success of the scheme. It was assumed that the decal would convey not only the message that goods are marked and disposal may be difficult, but, also, and in practice more significantly, that the residents in this house are concerned about burglary and that the risks to the potential offender may thereby be increased. Displaying the decal was taken by the researchers as the only indication of participation.

A high take-up rate by residents in the target area was regarded as crucial. This was in order to make statistical analysis possible and to reduce the pool of unprotected homes, thus, hopefully, limiting the opportunity for the displacement of burglary. Three methods were employed to achieve this — the program was launched with as much publicity as possible, door-to-door visits were made by the police or special constables,[1] and free marking equipment and door or window decals were provided for the residents.

One week following the initial visit, all those participating were revisited by the police or special constables. A questionnaire was completed recording that goods were marked, whether any difficulties were encountered (help was offered if necessary), and whether, and if so where, the "property marked" label had been placed (e.g., front door, back window).

After 3 months had elapsed, a further letter was sent to residents from the chief constable reinforcing the aims of the program and enclosing another window/door decal. Finally, in order to check on the extent to which interest continued to be maintained, a further visit to those participating was carried out approximately 6 months after the initial launch. A record was made of the number of houses still displaying the decal and an extract from *Crime Prevention News*,[2] which ran a feature on the property marking scheme, was provided to each home.

The target area

The area chosen covered a part of the Caerphilly subdivision of the South Wales Constabulary. Three fairly distinct "villages" were included that covered the floor of a valley. Low-lying and largely uninhabited hills defined the area,

which limited the opportunity for displacement. Burglaries were not uniformly distributed throughout the villages. They were concentrated on a group of local authority homes that fell more or less in the middle of the valley. Thus, any displacement of burglary from the initially higher-risk area would be likely to fall on one of the other two villages within the program.

The three villages, Trethomas, Graig-y-Rhacca, and Machen, can be described as follows:

> *Trethomas:* a mixed area of detached, owner-occupied accommodation together with an area of older "mining" houses once owned by the coal board but now either local authority owned or owner-occupied. These houses are mainly back-to-back row houses. Approximately 800 dwellings are located in this area.
>
> *Graig-y-Rhacca*: an area of public housing arranged as condominiums or row houses. The estate is rather untidy in places, although some houses are well cared for and of good decorative order. Approximately 700 homes exist on this estate.
>
> *Machen:* an area of largely privately owned accommodation with gardens, garages, etc. Some houses are local authority owned but are less "estate-like" than those in Graig-y-Rhacca. Some of the outlying houses back onto picturesque woodland. Approximately 700 houses are found in this area.

Criteria employed in the evaluation

A *dwelling* was considered in the target area if it appeared on the electoral register and was part of the subdivision area. A total of 2234 houses were thus included in the target sample. A *house* was considered to have been burglarized if it appeared in the police list of "reported burglaries." A *household* was regarded as *in* the program if, following the second police visit, a "property marked" decal was on display on any outside door or window. Otherwise, it was regarded as a nonparticipating household.

Results

1. The take-up rate. The participation rate for households in the three areas is shown in Table 1. Those excluded from the scheme include households in which there was nobody at home or which were unoccupied at the time of the visit; those who declined to join; and those who, although agreeing to join the scheme, declined to display the decal.

Of the nonparticipants, 185 had joined the scheme, in the sense that they had claimed to mark their property, but had declined to use the window decal and were thus counted as nonparticipants. In almost all cases, their reluctance was

because they felt that they would be more likely to attract a burglar if they did so.

Interestingly, the incidence of the nonuse of decals appeared in small clusters in the data; i.e., it seemed as though neighbors had discussed whether or not to place the decals in the window and had decided as a group not to do so. Thus, there might be a small street or group of houses where the decals were not displayed, but where the response to the program was otherwise positive.

TABLE 1
PARTICIPATION RATE BY AREA

Area	In Program	Not in Program	Total	Take-up Rate*
Trethomas	618	203	821	75%
Graig-y-Rhacca	499	209	708	70%
Machen	497	208	705	70%
Total	1614	620	2234	72%

* Indicates display of decal, signifying participation in the program

2. Burglaries before and after the launch. In the 12-month period before the launch of the program, 128 burglaries were reported to the police. In the 12-month period after the launch, 74 burglaries were reported — a reduction of 40%. The effect of the scheme on the rate at which homes were victimized appears, of course, rather less dramatic. Allowing for the fact that some houses were burglarized more than once, the burglary rate before the launch was 5.1% and after it was 3.0%.

To determine whether the property marking scheme was relevant to these reductions in burglary rate, comparisons were made between those participating and those not participating. The results of these comparisons are shown in Table 2. The table records incidents of burglary rather than houses burglarized: that is, if a house was burglarized on more than one occasion, it is counted more than once.

Table 2 shows a reduction in the number of burglary incidents for those participating. While there was no reduction for the nonparticipants, there was also no significant increase in incidents; i.e., there was no displacement of burglary from one group to another.

The total number of 74 burglaries for the first year following the launch *fell* further in the second year, to 66. This was felt to be quite a surprising result. Analysis by month is shown in Figure 1. As can be seen, the drop in the number

of burglaries is particularly noticeable from June to November. This drop, from 49 in the first half of the period to 14 in the second, is statistically significant. Comparison with figures for the previous year does not lead to an explanation in terms of seasonal variation. Comparable half-year figures for the previous year were 41, dropping to 34 — an insignificant change. The probable reasons for this are discussed below.

TABLE 2
BURGLARY INCIDENTS FOR PARTICIPANTS AND NONPARTICIPANTS BEFORE AND AFTER THE LAUNCH OF THE PROGRAM

	Before	After	
Participants	91	35	(probability <.001)
Nonparticipants	37	39	(no significant change)

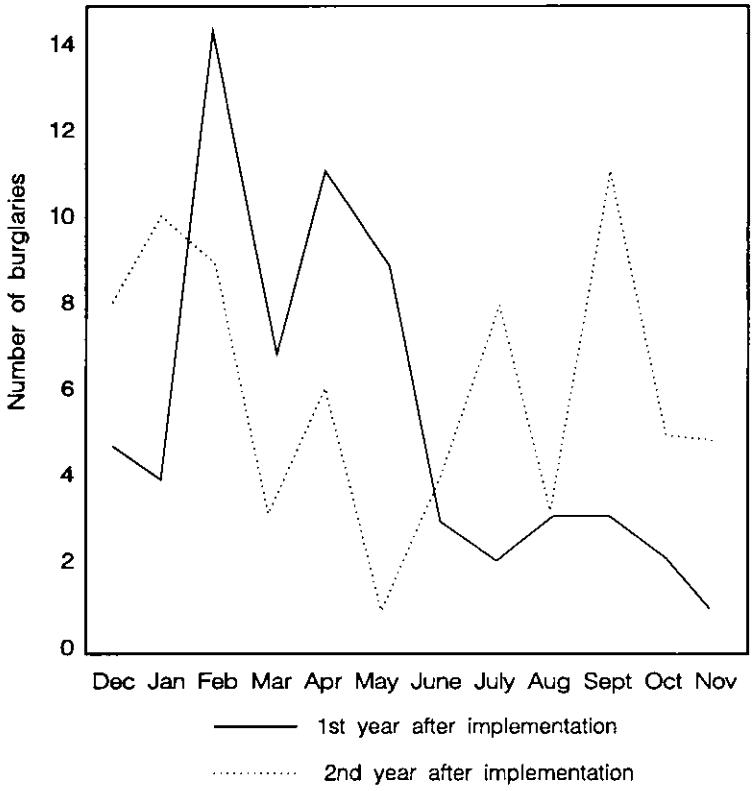
Discussion

A number of unexpected results from this study emerge that require some explanation. First, the high take-up rate; second, the reduction in burglary itself; and last, the greater drop in the second year. Each of these points is discussed in turn below, and this is followed by a consideration of the implications for prevention.

1. *The take-up rate.* The take-up rate of this program was almost twice as high as that achieved elsewhere. There are three factors of immediate significance. First, the considerable advance publicity given to the program in the locality; second, the door-to-door approach by the police; and, finally, the provision of free marking equipment. It is not possible to determine which of these three factors was of most importance, but the fact that the police were prepared to visit every home and to follow-up this with a further visit one week later must have played an important part in convincing the public of the worth of the exercise.

A more general point in relation to the high take-up rate is that whatever the public were being asked to do in protecting themselves against burglary had to be made as effortless as possible on their part; this was a guiding principle in the design of this program. It was helped greatly by the existence of the post code and the efforts by the post office to extend its use. In other OI schemes that have been launched, particularly in the United States, householders have been urged to register their personal code with the police or lodge with them a list of items marked with the appropriate marking recorded. This clearly requires far more effort on the part of the individual members of the public. In this respect, the

FIGURE 1
BURGLARIES BY MONTH, 1 AND 2 YEARS AFTER IMPLEMENTATION



existence of a nationally available post code in the United Kingdom is a considerable advantage.

Looking in detail at the take-up rate along the valley, and bearing in mind that the householders are from different social classes and live in remarkably different property, there was a notable similarity in take-up rate in the three "villages." It is particularly remarkable that a high participation rate was achieved on the public housing estate, the area that had the highest rate of burglary. The police were themselves surprised at the positive reception that they received in this area because it has a rather "rough" reputation and, they felt, housed some so-called problem families. Indeed, a few police officers were reluctant to include their homes in the door-to-door canvass. In retrospect, however, it is obvious that nobody likes to be the victim of a burglary, not even a burglar.

2. *Reduced burglary.* One of the major differences between the results reported here and those from other studies is that there was no apparent

displacement in burglary from participants to nonparticipants. The most plausible explanation for this seems to relate to the exceptionally high take-up achieved by police. Of the approximately 30% "unprotected" houses, a number would perhaps be less likely to be burglarized for other reasons; for example, they may have a burglar alarm or be particularly visible from the surrounding area. This would have the effect of reducing the pool of potential targets still further. Although it remains an empirical question to determine at what level of participation displacement ceases to occur, it seems to be that in the case of the present initiative that level was surpassed. This lack of displacement, combined with the high take-up rate, probably accounts for the area wide reduction in crime.

In other studies, it has never been as clear that in persuading the public to mark their property the police were at the same time persuading the potential burglars that the scheme would be effective. Bearing in mind the original distribution of burglary throughout the valley, it is almost certainly the case that the police, in calling at almost every door as they did, were also calling at the doors of the burglars. It seems plausible that this contributed to the impact of the scheme.

3. *The second-year drop.* The additional drop in the second year was quite contrary to expectation. The monthly figures that show when the fall occurred go a long way in offering an explanation of why it happened. The results of the first-year evaluation were *published* in June of the second year and resulted in an enormous amount of local publicity showing the effect of property marking. This report (Laycock, 1985) received some national publicity, but was very widely reported at the local level to the extent that the area was visited by the local TV company and a series of interviews was held with the chief constable and residents of the research area. While the burglary rate had been in the process of returning to its former relatively high level, at least on the central estate, this process was slowed dramatically following the considerable amount of publicity.

Interestingly, the published research report had not argued that OI reduced crime. Although crime levels had certainly been reduced, it was far from clear that the process underlying that reduction was as simplistic as marking property. The subtleties of the arguments that the researcher had liked to think were made were certainly lost, however, in the media presentation of the message, which came out along the lines of "crime crashes as a result of marking property."

Practical implications

There are a number of practical points that may be drawn from the experience in South Wales. These are summarized below:

1. Areas with high crime rates, including burglary, may welcome the launch of crime prevention initiatives even if the areas have a reputation for poor relations with the police.

2. The easier it is for the public to participate in crime prevention schemes the more likely they will be to do so.
3. It is probably as important to tell the burglars about the scheme as it is to tell the general public. It may be worth giving some thought as to how this can be achieved.
4. The evidence suggests that the use of a window or door label, indicating marked property, is effective in reducing burglary. The public can be reassured, therefore, that any anxieties that decals increase the chances of victimization are unfounded.

The increased reduction in crime during the second year suggests, in addition:

1. The positive effect of the initial reduction in burglary from the property marking scheme was transitory.
2. A dramatic illustration of the power of positive local advertising on the burglary rate in a small, clearly defined area. This probably rests on the fact that the offenders, certainly in the central area of the research study, were also the residents. With the benefit of hindsight, in the light of the second-year follow-up, the importance of local publicity at all stages of the implementation of this project is worth highlighting.
3. On a methodological point, the results bear testimony to the importance of detailed analysis. At first sight, there might have been a temptation to claim an increased reduction in burglary on the basis of the annual figures: Total pre-program burglaries were 128, first-year post-program were 74, and second-year post-program were 66. It is only the month-by-month figures which show that the drop was concentrated in the second period and only the local knowledge that leads to the explanation in terms of publicity.

NOTES

1. Special constables, who wear uniforms similar to that of police officers themselves, are volunteer members of the public who help the police in certain areas of their work.
2. *Crime Prevention News* is a bulletin published and distributed by the Home Office that reports on crime prevention initiatives around the country; it is circulated to police crime prevention officers among others.

ACKNOWLEDGMENTS. I am grateful to the chief constable of the South Wales Constabulary and his officers for their support in carrying out this study. Particular thanks are due to Superintendent M. Bowden and the crime prevention staff. I am also grateful to the head of the Home Office Crime Prevention Unit, Kevin Heal, for this unfailing support and good advice.

21. Subway graffiti in New York City: "Gettin up" vs. "Meanin it and cleanin it"

Maryalice Sloan-Howitt and George L. Kelling

EDITOR'S NOTE: This case study, first published as a Security Journal *article (Sloan-Howitt and Kelling, 1990), is perhaps the most remarkable of the collection. It documents the process by which the graffiti-ridden trains of the New York City subway were finally made clean, after years of failed initiatives involving a variety of law enforcement and target hardening measures. The successful idea adopted by management was a simple one: once a car had been cleansed of graffiti it would never again be allowed to enter service with graffiti. Underlying this principle was the notion that "getting up", seeing one's handiwork on public display, was the offender's main motivation and that the rewards of this behavior had to be removed. Implementing the policy involved formidable political and logistical problems (how the latter were solved will repay close study by other managers confronted with implementation difficulties), but the results are plain for anyone to see. The subway cars in New York are now no longer the disgrace that they once were. George Kelling, one of the authors of this study has*

been responsible in his career for some highly influential research. He directed the Police Foundation's Kansas City Preventive Patrol Experiment which prompted a re-evaluation of the concept of preventive patrol and, together with James Q. Wilson, authored the famous Atlantic Monthly *"broken windows" piece which advocated intervention at the first sign of persistent "incivilities" to prevent a community's decline into serious crime (Wilson and Kelling, 1982). The present case study is also likely to become a classic and to be further testament to Kelling's substantial contribution to criminal policy.*

THE IMPULSE toward graffiti writing — that furtive defacement of public property through the inscription of messages typically rich in political humor or sexual innuendo, or simple distress calls — can be found in all societies and is generally tolerated or even enjoyed when wittily or attractively executed. During the 1970s and early 1980s in New York City, however, the problem of graffiti writing on subway trains developed into a serious public policy problem. The phenomenon of random scratching of names on transit property blossomed until a well-defined subculture that included hundreds of youths were emblazoning subway cars with murals that covered entire trains, obscuring windows and subway maps. These young people not only developed the genre, but also transformed graffiti writing into a way of life — "getting up" — drawing their self-esteem from their ability to keep their names and other creative designs in constant circulation on the transit lines. The New York City government's and the New York City Transit Authority's (NYCTA) striking attempts — and failures — to outwit these youths and deter their spectacular defacement of public property only served to embolden the graffitists (Castelman, 1982).

Apologists such as Norman Mailer (1974) perceived the graffitists' work as vibrant folk art — the colorful self-expression of creative adolescents. Others, however, decried the graffitists' work as the criminal defacement of public property that created a climate of fear in the city's transit system. Giving voice to the majority opinion, Nathan Glazer (1979) argued persuasively that subway riders made an unconscious connection between the visual assault of graffiti and the more serious crimes of robbery, rape, assault, and murder. Riders also associated the chaotic graffiti with other maintenance problems — the shattered glass, broken doors, and vandalized maps — that diminished the quality of public transportation. Furthermore, and perhaps most compelling, the graffiti could be construed as hard evidence that authorities were incapable of controlling the environment and securing it against offenders.

Additional observations lent credence to Glazer's argument. Increased fear of the subway resulted in diminished ridership, which, in turn, led to increased danger to those riders who braved traveling at off-peak hours. As significantly, a connection was demonstrated between a youth's career as a graffitist and subsequent adult criminal behavior, suggesting that the subculture of graffiti vandalism served as a training ground for future adult offenders. Internal studies by the NYCTA Police, for example, indicated that a substantial proportion of those arrested for graffiti writing (40%) went on to commit robberies and burglaries (Glazer, 1979, p. 6). Moreover, graffiti writers typically stole the enormous quantities of paint required for their craft.

Myriad policies failed. Police knew who the graffitists were: They had detailed records about and profiles of the some 500 individuals who were responsible for the train graffiti — after all, the whole purpose of subway graffiti was to get one's "tag up" and be renowned. Yet, when police arrested graffitists, they were merely released by a juvenile justice system overwhelmed by more serious youthful offenders (Glazer, 1979, p. 6). Major antigraffiti efforts were launched by both Mayors Lindsay and Koch. The briefly popular program of punishment by detention of offenders, with the requirement of cleaning up graffiti-marred trains, failed for two reasons. First, the supervision proved too expensive. Second, the program furnished offenders with superior technical knowledge that then permitted them to create more durable graffiti on their release — for every technological "fix," there was a counter-technological response (Castelman, 1982). "Target hardening" of the train yards likewise failed to deter graffitists because of the vastness of the areas needing to be secured and the youths' ability to cut through those wire fences that were erected. Police urged that group and social work be targeted at graffitists to channel their talents, but few such efforts were initiated (Glazer, 1979). Various (and expensive) experiments with graffiti-resistant train paints failed. Media pressure caused the NYCTA to abandon plans to use attack dogs (Castleman, 1982).

After more than half a decade of failed policies, Glazer (1979: 10-11) summarized the problem as follows:

> Graffiti raise the odd problem of a crime that is, compared to others, relatively trivial but whose aggregate effects on the environment of millions of people are massive. In the New York situation especially, it contributes to a prevailing sense of the incapacity of government, and the uncontrollability of youthful criminal behavior, and a resultant uneasiness and fear. Minor infractions aggregate into something that reaches and affects every subway passenger. But six years of efforts have seen no solution.

The problem of graffiti must be seen within the context of the NYCTA during the late 1970s and early 1980s. The neglect of New York City's infrastructure, which had arisen from New York's 1970s fiscal crisis, was calamitous in the subway: Fires were epidemic; subway trains derailed on the average of one every 18 days; in 400 places in the system, track conditions were so bad that train speeds had to be reduced 75%; and on any given day, a third of the subway fleet was out of service during the morning rush hour. Moreover, as a consequence of liberalized pension laws, skilled and managerial personnel had been leaving the NYCTA in droves: When Robert Kiley, the current Chairman of the Board of the Metropolitan Transportation Authority (MTA), was appointed in 1983, 50,000 workers were directed by 300 managers (Kiley, 1989). As Kiley noted: "[T]he organization was in utter chaos, its spirit broken, its sense of purpose and effectiveness long since lost" (Kiley, 1988). The subway system was on the verge of collapse.

In April 1984, David Gunn, the new president of the NYCTA, announced the Authority's Clean Car Program (CCP). All new and overhauled cars would be placed in the program. Once placed in the CCP, no car would remain in service if it was vandalized. To implement and maintain the CCP, Gunn created the Car Appearance and Security Task Force (CAST), which represented 15 separate NYCTA departments.

At its initiation in May 1984, two trains were placed into the CCP: One train was composed of new R62 Kawasaki cars on the #4 line, and another, of 20-year-old reconditioned and repainted R36 St. Louis cars on the #7 line. On May 12, 1989, 5 years later, the last graffiti-covered car was removed from service and cleaned. Now, subway trains in New York City are not only graffiti-free, they are among the cleanest subway cars in the world.

The "Clean Car Program"

David Gunn had worked as Kiley's director of operations in the Massachusetts Bay Transit Authority during the 1970s, had gone on to direct Philadelphia's transportation system, and rejoined Kiley as president of the NYCTA in 1983. The NYCTA was one of three major units of the MTA, the other two being the Long Island Rail Road and the Metro North Rail Road. Each operates with considerable autonomy.

The transportation infrastructure Gunn inherited is massive. Not counting the bus system, he is responsible for a network of 230 route miles, having 26 transit lines that serve 468 stations. Trains are operated throughout the system 24 hours a day, with headways between trains as frequent as 2 minutes during peak periods and as long as 20 minutes during offpeak hours. Over 5,000 cars are used every day during the peak period, and the Transit Authority has an

inventory of approximately 6,000 train cars. When out of use, trains are stored in 25 yards and 45 layup sites. Over 3,700,000 riders are carried on the average workday.

Gunn also inherited "the financial means and... the political will" (Kiley, 1988) to improve the system. Richard Ravitch, Kiley's predecessor as chairman of the MTA, was responsible for the first 5-year $8 billion capital program that was initiated in 1982. Kiley extended the capital program and provided the administrative mandate to improve the system. Gunn was responsible for administering the renovation of the system.

Gunn, who holds a master's degree in business administration, is both deeply committed to public transportation and a self-confessed train "buff." In a very real sense, the NYCTA is "his." He identifies with the system, uses it regularly,[1] suffers as a result of its problems and incivilities, and was personally aggrieved by graffiti. Not daunted by the failures of earlier attempts to alleviate graffiti, indeed learning from them, he put out the word early in his administration: Ending graffiti was one of his highest priorities — kids were no longer going to make canvases out of Gunn's trains.

The NYCTA's CCP was based on a relatively simple idea: Once a car was cleaned and entered into the program, it would never again leave a storage, maintenance, or lay-up area with graffiti. Its implementation was difficult and included risks: If it meant keeping a car out of service, even during rush hours (as it did 10 times during the program's 5 years), so be it. No one would "get up" again on cars entered into the program.

The first step was to "chunk" the problem (Peters and Waterman, 1982, pp. 136-144). Two trains, a manageable number, were entered into the program. Crews, composed of supervisory and cleaning personnel, were set up at the end of each line (numbers 4 and 7) to immediately clean cars entered into the program if they had been "tagged" by vandals. All graffiti was to be removed within 2 hours or the car would be pulled from service. Police were assigned to ride these trains full-time while they were in service. When out of service, clean trains were stored in yards specially protected by the NYCTA's Property Protection Department. In these yards, lighting was upgraded, cleaning personnel worked 24 hours a day, fences were checked daily and mended within 24 hours if damaged, and police worked undercover as cleaners.

The CAST was created by President Gunn at the initiation of the CCP. Its goals were:

- To heighten the awareness of each NYCTA department about NYCTA goais;
- To focus on problems that have an impact on meeting those goals;

- To indicate the course of action required to resolve any problems;
- To monitor the progress of the CCP;
- To encourage an active role and participation in the program by each department; and
- To familiarize committee members, and through them their respective departments, with their duties and responsibilities to enhance the effort. (Transit Authority Police Department, 1988).

CAST met biweekly during the period 1984-1987; in 1988, its meeting schedule was reduced to once a month. Administrative authority and overall direction for the CCP was lodged with the chief mechanical officer of the Car Equipment Department.

Yearly goals were established for the CCP. By May 1985, 1720 cars were to be cleaned; by 1986, 3434; by 1987, 4707; and by 1988, 5946. The entire fleet was to be graffiti-free in 1989.

As the program expanded to more trains, and as a result of learning from the past experience with cleaning technologies, the Car Equipment Department tested and approved new cleaning commodities (40 new products were developed) and tools (14 were developed) to ensure swift and sure removal of graffiti. Although total hourly personnel declined in the Car Equipment Department during this period (from 5231 to 5201), cleaning personnel increased from 691 to 1622 (from 13% to 31% of the personnel) (Transit Authority, 1989).

Police tactics changed over time. As more clean cars entered the program, police switched from riding all clean trains to a random approach: ride a clean train for several stops, get off, and then ride another clean train in another direction. They concentrated on times and locations when students and youths tended to ride trains. No longer were summonses to be issued; if action was to be taken against a graffitist, it would be formal arrest. Police focused on repeat offenders by identifying their "tags," contacting their parents, threatening civil action for restitution, and requesting special prosecutorial and judicial responses. Undercover officers were placed on especially difficult lines. When the number of clean cars exceeded the capacity of secured lay-up areas, the police created the Anti-Graffiti Unit for two purposes: to consult about methods of improving security in lay-up areas and to safeguard the trains in unsecured or loosely secured yards until their security could be upgraded (Transit Authority Police Department, 1988:2-3).

Other departments of the NYCTA Police contributed their efforts to the program. Property Protection increased their patrol and improved security in yard and lay-up areas. Public Affairs developed programs to educate high-school

TABLE 1
CLEAN CAR PROGRAM, GOALS, AND ACHIEVEMENTS, 1984-1989

	Clean Cars	
	Goal	Actual
1984		400
1985	1720	1915
1986	3434	3454
1987	4707	4839
1988	5946	6077
1989	6221	6245

Source: "Clean Car Program," Car Equipment Department, NYCTA, May 1989.

and other youths about the effects and consequences of graffiti. Other departments contributed as well.

By May 1989, the trains were graffiti-free. The CCP not only achieved its overall goal, as Table 1 indicates it exceeded its annual goals every year.

Discussion

What is to be said about the success of the Kiley-Gunn administration in eradicating graffiti in the light of past failures and a resultant growing consensus that perhaps train graffiti was just one more element in "the complex of apparently unmanageable problems amidst which New Yorkers live" (Glazer, 1979: 11)? Three basic factors appear to be responsible:

- A management philosophy of "meaning it" — graffiti was going to be eradicated on subway trains — and an administration that delineated responsibility clearly, broke the problem into manageable portions, established attainable and challenging goals, and provided the resources necessary to attain those goals.
- A "problem-oriented" (Goldstein, 1979) approach that looked at the nature of the problem and crafted tactics based on understandings gained through such a diagnosis.
- The creation of a management matrix that coordinated and monitored the activities of responsible units, especially the Car Equipment, Rapid Transit Operations, Transit Authority Police, Property Protection, Station, and Track and Structures Departments.

We will briefly examine each one of these factors.

Meaning it

Gunn established early in his administration that graffiti eradication would be a priority. He lodged authority for achieving that goal with the department responsible for car maintenance, the Car Equipment Department. The plan included on-site supervision of cleaning activities and clear subgoals: Each car in the program, if tagged by graffitists, would be cleaned in 2 hours or removed from service. The program was initiated modestly, with two trains, and expanded as the organization gained unpretentious but real successes — at first protecting those two trains and later expanding the base of clean cars. Removing cars from service — a drastic measure in a transportation service that was plagued with quality-of-service problems at that time — was meant: Cars were removed from service during rush hour at least 10 times during the 5-year life of the program. Authority to remove those cars from service was lodged with the program's leader, the head of the Car Equipment Department. Moreover, internal transfer of resources within the lead department both emphasized the high priority of the effort and the willingness to commit additional resources to problem solution.

Problem orientation

The CCP redefined the problem of train graffiti as a maintenance rather than a law enforcement or police problem. Reading Glazer's paper, "On Subway Graffiti in New York," from the contemporary perspective, one is impressed by two things. First, the paper is prescient of the current concern about the impact of disorder and incivility on the quality of urban life, citizen fear, and, arguably, the level of crime in cities. One is also impressed by how strongly Glazer and others believed that the solution to the problem of graffiti was to be found in police or other criminal justice agencies. The focus of almost all early efforts was on arrest or deterrence through the action of criminal justice agencies.

The genius of the CCP, apart from its implementation and administration, was that by focusing efforts on immediate removal of graffiti, it attacked graffiti directly at the heart of its motivation: "getting up" — that is, getting one's work up on the sides of trains and having it seen citywide. This drive for recognition was so strong, and the penalties for getting caught so trivial, that it drove an entire subculture.

The CCP simply deprived youths of the satisfaction of having their work seen. Certainly not immediately, but slowly, however, graffitists learned that tagging trains entered into the program was hopeless — the work would be in vain, it would never be seen. In fact, the NYCTA got its first taste of ultimate victory when graffitists who broke into yards in which both program and nonprogram cars were stored, painted on previously marred rather than on clean

cars. Moreover, the ante had been raised. Not only would not one's work be seen, but police and other agencies would go to extraordinary lengths to ensure punishment of those who marred newly cleaned or purchased cars. For a while, there were plenty of trains to paint that were unsecured and without police or other protection. But gradually the graffiti-marred stock was reduced.

The role of the police, formerly the lead agency in the fight against graffiti, changed to one of support and assistance. The previous focus on the number of arrests as an indicator of success in dealing with graffiti was replaced by meeting the yearly goals of clean cars. Interestingly, as the various departments involved in the project worked toward achieving those goals, arrests plummeted (Table 2). When arrests were made, as noted above, they were targeted on particular offenders and offenses (against clean trains) and then processed with vigor.

TABLE 2
ARRESTS FOR GRAFFITI/VANDALISM, 1984-1988

	Felonies	Misdemeanors
1984	237	2681
1985	147	2560
1986	114	1984
1987	87	1063
1988	114	974

Coordination

The creation of CAST and its empowerment was an attempt to ensure coordination among the responsible departments. The NYCTA, like almost all large organizations, had been characterized by limited levels of interdepartmental cooperation. In fact, the atmosphere of disorganization, failure, and collapse that had dominated the NYCTA during its neglect worsened the problem. Fingerpointing (it's somebody else's responsibility or fault) and boundary maintenance activities ("tell 'em what we can't do, not what we can") were rife in the organization.

CAST, in contrast, emphasized accountability and coordination of activities. Accountability was obtained by closely linking CAST with Gunn. Rather than push the problem off to some committee for deliberation, Gunn developed a vision of the subway and specific goals, set goals for CAST, met regularly with it or its leaders, and monitored both its long- and short-term wins and losses. Coordination was achieved by regular meetings, working under a

strong mandate, linking CAST's activities to achievement of goals, and by noteworthy early successes.

In sum, by thwarting graffitists' delight with "getting up" through an effective maintenance program backed up by police, property protection, and public relations efforts, the NYCTA achieved a spectacular success over a seemingly insoluble problem — train graffiti. In retrospect, the solution now seems relatively obvious and attainable. The fact that train graffiti was so intractable a problem is a powerful example of the consequences that occur when unchallenged conventional thinking about the nature of problems and their solution dominates.

NOTE

1. Gunn is the first NYCTA president in recent history who has forgone his car and driver in preference to using the subway for all personal and professional local transportation.

22. From the Panopticon to Disney World: the development of discipline

Clifford D. Shearing and Phillip C. Stenning

EDITOR'S NOTE: Though it contains no evaluative data, this case study was too good to omit. First published in a book of edited readings (Shearing and Stenning, 1984), it describes the way that consensual control is designed into the environmental features and structural relations of Disney World. The broader societal implications have been discussed in the Introduction *and little more needs to be said here. However, I cannot resist paraphrasing the title under which the study was last reprinted (Shearing and Stenning, 1987): the Disney order may not be so Mickey Mouse!*

ONE OF THE most distinctive features of that quintessentially American playground known as Disney World is the way it seeks to combine a sense of comfortable — even nostalgic — familiarity with an air of innovative technological advance. Mingled with the fantasies of one's childhood are the dreams

of a better future. Next to the Magic Kingdom is the Epcot Center. As well as providing for a great escape, Disney World claims also to be a design for better living. And what impresses most about this place is that it seems to run like clockwork.

Yet the Disney order is no accidental by-product. Rather, it is a designed-in feature that provides — to the eye that is looking for it, but not to the casual visitor — an exemplar of modern private corporate policing. Along with the rest of the scenery of which it forms a discreet part, it too is recognizable as a design for the future.

We invite you to come with us on a guided tour of this modern police facility in which discipline and control are, like many of the characters one sees about, in costume.

The fun begins the moment the visitor enters Disney World. As one arrives by car one is greeted by a series of smiling young people who, with the aid of clearly visible road markings, direct one to one's parking spot, remind one to lock one's car and to remember its location and then direct one to await the rubber-wheeled train that will convey visitors away from the parking lot. At the boarding location one is directed to stand safely behind guard rails and to board the train in an orderly fashion. While climbing on board one is reminded to remember the name of the parking area and the row number in which one is parked (for instance, "Donald Duck, 1"). Once on the train one is encouraged to protect oneself from injury by keeping one's body within the bounds of the carriage and to do the same for children in one's care. Before disembarking one is told how to get from the train back to the monorail platform and where to wait for the train to the parking lot on one's return. At each transition from one stage of one's journey to the next, one is wished a happy day and a "good time" at Disney World (this begins as one drives in and is directed by road signs to tune one's car radio to the Disney radio network).

As one moves towards the monorail platform the directions one has just received are reinforced by physical barriers (that make it difficult to take a wrong turn), pavement markings, signs and more cheerful Disney employees who, like their counterparts in other locations, convey the message that Disney World is a "fun place" designed for one's comfort and pleasure. On approaching the monorail platform one is met by enthusiastic attendants who quickly and efficiently organize the mass of people moving onto it into corrals designed to accommodate enough people to fill one compartment on the monorail. In assigning people to these corrals the attendants ensure that groups visiting Disney World together remain together. Access to the edge of the platform is prevented by a gate which is opened once the monorail has arrived and disembarked the arriving passengers on the other side of the platform. If there

is a delay of more than a minute or two in waiting for the next monorail one is kept informed of the reason for the delay and the progress the expected train is making towards the station.

Once aboard and the automatic doors of the monorail have closed, one is welcomed aboard, told to remain seated and "for one's own safety" to say away from open windows. The monorail takes a circuitous route to one of the two Disney locations (the Epcot Center or the Magic Kingdom) during which time a friendly disembodied voice introduces one briefly to the pleasures of the world one is about to enter and the methods of transport available between its various locations. As the monorail slows towards its destination one is told how to disembark once the automatic doors open and how to move from the station to the entrance gates, and reminded to take one's possessions with one and to take care of oneself, and children in one's care, on disembarking. Once again these instructions are reinforced, in a variety of ways, as one moves towards the gates.

It will be apparent from the above that Disney Productions is able to handle large crowds of visitors in a most orderly fashion. Potential trouble is anticipated and prevented. Opportunities for disorder are minimized by constant instruction, by physical barriers which severely limit the choice of action available and by the surveillance of omnipresent employees who detect and rectify the slightest deviation.

The vehicles that carry people between locations are an important component of the system of physical barriers. Throughout Disney World vehicles are used as barriers. This is particularly apparent in the Epcot Center, the newest Disney facility, where many exhibits are accessible only via special vehicles which automatically secure one once they begin moving.

Control strategies are embedded in both environmental features and structural relations. In both cases control structures and activities have other functions which are highlighted so that the control function is overshadowed. Nonetheless, control is pervasive. For example, virtually every pool, fountain, and flower garden serves both as an aesthetic object and to direct visitors away from, or towards, particular locations. Similarly, every Disney Productions employee, while visibly and primarily engaged in other functions, is also engaged in the maintenance of order. This integration of functions is real and not simply an appearance: beauty *is* created, safety *is* protected, employees *are* helpful. The effect is, however, to embed the control function into the "woodwork" where its presence is unnoticed but its effects are ever present.

A critical consequence of this process of embedding control in other structures is that control becomes consensual. It is effected with the willing cooperation of those being controlled so that the controlled become, as Foucault (1977) has observed, the source of their own control. Thus, for example, the

batching that keeps families together provides for family unity while at the same time ensuring that parents will be available to control their children. By seeking a definition of order within Disney World that can convincingly be presented as being in the interest of visitors, order maintenance is established as a voluntary activity which allows coercion to be reduced to a minimum. Thus, adult visitors willingly submit to a variety of devices that increase the flow of consumers through Disney World, such as being corralled on the monorail platform, so as to ensure the safety of their children. Furthermore, while doing so they gratefully acknowledge the concern Disney Productions has for their family, thereby legitimating its authority, not only in the particular situation in question, but in others as well. Thus, while profit ultimately underlies the order Disney Productions seeks to maintain, it is pursued in conjunction with other objectives that will encourage the willing compliance of visitors in maintaining Disney profits. This approach to profit making, which seeks a coincidence of corporate and individual interests (employee and consumer alike), extends beyond the control function and reflects a business philosophy to be applied to all corporate operations (Peters and Waterman, 1982).

The coercive edge of Disney's control system is seldom far from the surface, however, and becomes visible the moment the Disney-visitor consensus breaks down, that is, when a visitor attempts to exercise a choice that is incompatible with the Disney order. It is apparent in the physical barriers that forcefully prevent certain activities as well as in the action of employees who detect breaches of order. This can be illustrated by an incident that occurred during a visit to Disney World by Shearing and his daughter, during the course of which she developed a blister on her heel. To avoid further irritation she removed her shoes and proceeded to walk barefooted. They had not progressed ten yards before they were approached by a very personable security guard dressed as a Bahamian police officer, with white pith helmet and white gloves that perfectly suited the theme of the area they were moving through (so that he, at first, appeared more like a scenic prop than a security person), who informed them that walking barefoot was, "for the safety of visitors", not permitted. When informed that, given the blister, the safety of this visitor was likely to be better secured by remaining barefooted, at least on the walkways, they were informed that their safety and how best to protect it was a matter for Disney Productions to determine while they were on Disney property and that unless they complied he would be compelled to escort them out of Disney World. Shearing's daughter, on learning that failure to comply with the security guard's instruction would deprive her of the pleasures of Disney World, quickly decided that she would prefer to further injure her heel and remain on Disney property. As this example illustrates, the source of Disney Productions' power rests both in the physical coercion it can

bring to bear and in its capacity to induce co-operation by depriving visitors of a resource that they value.

The effectiveness of the power that control of a "fun place" has is vividly illustrated by the incredible queues of visitors who patiently wait, sometimes for hours, for admission to exhibits. These queues not only call into question the common knowledge that queueing is a quintessentially English pastime (if Disney World is any indications Americans are at least as good, if not better, at it), but provide evidence of the considerable inconvenience that people can be persuaded to tolerate so long as they believe that their best interests require it. While the source of this perception is the image of Disney World that the visitor brings to it, it is, interestingly, reinforced through the queueing process itself. In many exhibits queues are structured so that one is brought close to the entrance at several points, thus periodically giving one a glimpse of the fun to come while at the same time encouraging one that the wait will soon be over.

Visitor participation in the production of order within Disney World goes beyond the more obvious control examples we have noted so far. An important aspect of the order Disney Productions attempts to maintain is a particular image of Disney World and the American industrialists who sponsor its exhibits (General Electric, Kodak, Kraft Foods, etc.). Considerable care is taken to ensure that every feature of Disney World reflects a positive view of the American Way, especially its use of, and reliance on, technology. Visitors are, for example, exposed to an almost constant stream of directions by employees, robots in human form and disembodied recorded voices (the use of recorded messages and robots permits precise control over the content and tone of the directions given) that convey the desired message. Disney World acts as a giant magnet attracting millions of Americans and visitors from other lands who pay to learn of the wonders of American capitalism.

Visitors are encouraged to participate in the production of the Disney image while they are in Disney World and to take it home with them so that they can reproduce it for their families and friends. One way this is done is through the "Picture Spots", marked with signposts, to be found throughout Disney World, that provide direction with respect to the images to capture on film (with cameras that one can borrow free of charge) for the slide shows and photo albums to be prepared "back home". Each spot provides views which exclude anything unsightly (such as garbage containers) so as to ensure that the visual images visitors take away of Disney World will properly capture Disney's order. A related technique is the Disney characters who wander through the complex to provide "photo opportunities" for young children. These characters apparently never talk to visitors, and the reason for this is presumably so that their media-based images will not be spoiled.

As we have hinted throughout this discussion, training is a pervasive feature of the control system of Disney Productions. It is not, however, the redemptive soul-training of the carceral project but an ever-present flow of directions for, and definitions of, order directed at every visitor. Unlike carceral training, these messages do not require detailed knowledge of the individual. They are, on the contrary, for anyone and everyone. Messages are, nonetheless, often conveyed to single individuals or small groups of friends and relatives. For example, in some of the newer exhibits, the vehicles that take one through swivel and turn so that one's gaze can be precisely directed. Similarly, each seat is fitted with individual sets of speakers that talk directly to one, thus permitting a seductive sense of intimacy while simultaneously imparting a uniform message.

In summary, within Disney World control is embedded, preventative, subtle, co-operative and apparently non-coercive and consensual. It focuses on categories, requires no knowledge of the individual and employs pervasive surveillance. Thus, although disciplinary, it is distinctively non-carceral. Its order is instrumental and determined by the interests of Disney Productions rather than moral and absolute. As anyone who has visited Disney World knows, it is extraordinarily effective.

While this new instrumental discipline is rapidly becoming a dominant force in social control it is as different from the Orwellian totalitarian nightmare as it is from the carceral regime. Surveillance is pervasive but it is the antithesis of the blatant control of the Orwellian State: its source is not government and its vehicle is not Big Brother. The order of instrumental discipline is not the unitary order of a central State but diffuse and separate orders defined by private authorities responsible for the feudal-like domains of Disney World, condominium estates, commercial complexes and the like. Within contemporary discipline, control is as fine-grained as Orwell imagined but its features are very different. It is thus, paradoxically, not to Orwell's socialist-inspired Utopia that we must look for a picture of contemporary control but to the capitalist-inspired disciplinary model conceived of by Huxley, who, in his *Brave New World*, painted a picture of consensually based control that bears a striking resemblance to the disciplinary control of Disney World and other corporate control systems. Within Huxley's imaginary world people are seduced into conformity by the pleasures offered by the drug "soma" rather than coerced into compliance by threat of Big Brother, just as people are today seduced to conform by the pleasures of consuming the goods that corporate power has to offer.

The contrasts between morally based justice and instrumental control, carceral punishment and corporate control, the Panopticon and Disney World and Orwell's and Huxley's visions is succinctly captured by the novelist Beryl Bainbridge's (1984) observations about a recent journey she made retracing J.B.

Priestley's (1933) celebrated trip around Britain. She notes how during his travels in 1933 the center of the cities and towns he visited were defined by either a church or a center of government (depicting the coalition between Church and State in the production of order that characterizes morally based regimes).

During her more recent trip one of the changes that struck her most forcibly was the transformation that had taken place in the center of cities and towns. These were now identified not by churches or town halls, but by shopping centers; often vaulted glass-roofed structures that she found reminiscent of the cathedrals they had replaced both in their awe-inspiring architecture and in the hush that she found they sometimes created. What was worshipped in these contemporary cathedrals, she noted, was not an absolute moral order but something much more mundane: people were "worshipping shopping" and through it, we would add, the private authorities, the order and corporate power their worship makes possible.

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