
A REVIEW OF CCTV EVALUATIONS: CRIME REDUCTION EFFECTS AND ATTITUDES TOWARDS ITS USE

by

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***Abstract:** This paper reviews studies that have evaluated the effectiveness of closed circuit television (CCTV) in reducing crime, disorder and fear of crime in a variety of sites. The guiding framework for the review is Tilly's (1993a) model for realist evaluation, which focuses on the mechanisms and contexts in which CCTV might operate. The paper concludes that CCTV can be effective in deterring property crime, but the findings are more mixed in relation to personal crime, public order offences, and fear of crime. Public attitudes towards the use of CCTV in public spaces are also considered, as is the issue of civil liberties and the targeting of marginalized groups.*

INTRODUCTION

In the last decade there has been a proliferation of closed circuit television (CCTV) installations, particularly in town centres, with Britain boasting the most extensive CCTV coverage in the world. This has, in part, been the result of proactive initiatives by central government whereby £38 million has been made available by the British Home Office to support over 585 local CCTV systems, with a further £170 million available for schemes over the next three years (Home Office, 1995, 1996, 1997, 1998). CCTV systems have been located in town centres, shops, shopping centres, banks, building societies, parking facilities, schools, colleges, hospitals, transport facilities, industrial estates, business centres, football grounds, police custody suites and, to a lesser extent, housing projects. The 1993 Commercial Victimization Survey revealed that 20% of retailers and 8% of manu-

facturers sampled in England and Wales had CCTV systems (Mirrlees-Black and Ross, 1995). In the public sector, Bulos (1994) reported that 43% of the councils surveyed had installed a CCTV system in a public place. In addition to funding by central government, the European community, local authorities, businesses, and extra charges on car park tickets have contributed to the financing of systems (Bulos and Sarno, 1996; Brown, 1995; Short and Ditton, 1996).

A common goal of most CCTV systems has been the prevention of crime and disorder through deterrence. It is also assumed that CCTV will aid detection through its surveillance capability and the opportunity it may afford to deploy security personnel or police officers appropriately. Claims are also made that CCTV provides public reassurance and therefore reduces fear of crime, which may, in turn, increase the use of public spaces (Bennett and Gelsthorpe, 1996; cf. Tilley, 1997 who suggests that CCTV may reduce crime as people are deterred from visiting CCTV-covered areas, believing them to be too dangerous). CCTV is also used as a site management tool, for example, to observe traffic patterns or for crowd control at football matches. CCTV may even indirectly increase trade and protect substantial property investments (Roberts and Goulette, 1996; Brown, 1995).

Alongside the expansion of the CCTV industry, there has been a wealth of information attesting to the effectiveness of CCTV in reducing and preventing crime and disorder, with little apparent scientific support for these claims (Groombridge and Murji, 1994a). Magazine articles abound that headline the success of CCTV, for example, "CCTV Works!" (*Security Installer*, 1998). Short and Ditton (1995) noted five types of problems with many of these claims. First, the time periods examined pre- and post-CCTV installation have been too short for adequate testing of the effects of the CCTV system, or they have not accounted for seasonal variations in crime. Second, crime is frequently considered as one category, thus obscuring increases or reductions in different types of crime. Third, in some cases there are no control areas, so there can be no assessment of crime patterns in other areas where crime may also be falling, indicating something other than a "CCTV effect." Fourth, little discussion of displacement or attendant publicity typifies these "self evaluations." Finally, the presentation of percentages only (without Ns) or inaccuracies in their calculation can also lead to erroneous claims of success. Bulos and Sarno (1996) report that very few CCTV schemes have been comprehensively evaluated by independent researchers. Indeed, it has most

often been the case that those who have installed or commissioned CCTV systems are the ones who have come to these conclusions. Moreover, as Groombridge and Murji (1994b: 288) have warned "CCTV can only ever be a tool, it is not a panacea. But while there are powerful commercial and political interests behind its promotion, it seems that hype will continue to achieve prominence over the more prosaic series of questions that should be asked about CCTV before it is possible to evaluate its usefulness and whether it represents value for money." Even among staunch supporters of CCTV, it has been accepted that evaluative evidence of crime reduction effects must be provided to justify future investment (Speed et al., 1994; Farish, 1995; U.K. Home Office, 1998).

Evaluating the effectiveness of CCTV is the central theme of this chapter. The first section will introduce a framework for evaluating CCTV that recognizes the importance of studying its specific purposes and the contexts in which systems are put into place. This framework will then be used to assess evaluations of CCTV systems. Consideration will be given to both the impact of CCTV on reducing property, personal and public order crimes, and its effectiveness in reducing fear of crime. This will be followed by a discussion of the public's attitudes towards the use of CCTV in public spaces, since, despite its many advocates, the potential abuse of the surveillance capabilities of CCTV has led to concerns about civil liberties and the targeting of marginalized groups (Liberty Briefing, 1989). The social control and segregation of such groups through the use of CCTV in public spaces has also been criticized, where the pursuit of commerce overrides the free use of the space (Reeve, 1998; see also Armstrong and Giulianotti, 1998). The chapter will end with a discussion of the issues arising from this review of CCTV evaluations and further research needs.

A FRAMEWORK FOR EVALUATING CCTV

At the heart of all program evaluations, according to Tilley (1993a) and developed further by Pawson and Tilley (1994, 1997), is the relationship between the crime prevention measure (in this case, CCTV), the outcome (e.g., the reduction in crime and fear), the mechanism through which the outcome is produced, and the context in which it occurs. How CCTV can reduce crime and in what circumstances becomes the critical evaluative issue. Nine potential *mechanisms* identified by Pawson and Tilley (1994, 1997) through which CCTV can be

expected to operate are summarized below. These are not mutually exclusive; more than one mechanism may be operating at one time.

- *Caught in the act* — CCTV could reduce crime by increasing the likelihood that present offenders will be caught, stopped, removed, punished and, therefore, deterred.
- *You've been framed*— CCTV could reduce crime by deterring potential offenders who will not want to be observed by CCTV operators or have evidence about them captured on camera.
- *Nosyparker*¹ — a reduction could take place because more natural surveillance is encouraged as more people use the area covered by CCTV. This may deter offenders who fear an increased risk of apprehension.
- *Effective deployment* — CCTV may facilitate the effective deployment of security staff and police officers to locations where suspicious behavior is occurring. Their presence may deter offenders or may mean they are caught in the act.
- *Publicity (general)* — this may assist in deterring offenders (but crime might be displaced by location or offence).
- *Publicity (specific)* — CCTV cameras and signs show people are taking crime seriously, and thus offenders may be deterred.
- *Time for crime* — CCTV may have less of an impact on crimes that can be done quickly as opposed to those that take a longer time, as offenders assume that they will have enough time to avoid the cameras or to escape from police officers or security staff.
- *Memory jogging* — publicity about CCTV encourages potential victims to be more security conscious and to take precautionary measures.
- *Appeal to the cautious* — those who are more security-minded use the areas with CCTV, driving out the more careless who may be vulnerable to crime elsewhere.

There are also a variety of *contexts* in which crime takes place, and these will influence the potential effect of the mechanisms specified above. Five such contexts identified by Pawson and Tilley (1994, 1997) are set out below.

- *Criminal clustering* — this depends on the offender-offence ratio. If it is one offender doing lots of crime, then the mechanism with the most potential is the *caught in the act* mechanism.
- *Style of usage* — if the area is always in use, then the *nosyparker* mechanism increases will have little effect on the pattern of

crime. If the area is little used, then any increases in usage and surveillance could increase the volume of incidents but reduce the number of people being victimized overall.

- *lie of the land*— those in blind spots will be unaffected if it is presumed that CCTV will operate through increasing the likelihood of evidence being caught on camera (*you've been framed*), but not if it leads to people being more security-conscious (*memory jogging* mechanism) or increasing the likelihood that security-conscious people will use the area (*appeal to the cautious* mechanism).
- *Alternative targets* — regardless of a specific area's CCTV coverage, displacement may occur depending on the motivation of offenders and whether there are alternative targets.
- *Resources* — there may be few or no security staff to be deployed who can deter crime, as in the *effective deployment* mechanism.

To these can be added: the physical layout of the area, the cultural traditions and concerns of those within the area covered, the way the CCTV system is managed and operated, and attitudes towards its use (Tilley, 1997).

The utility of this framework for the current review is somewhat limited because most studies of CCTV schemes have tended to collect only data that can explore the *you've been framed* and *effective deployment* mechanisms, and sometimes the *publicity (general)*, *publicity (specific)* and *nosyporker* mechanisms. Less often have they included information on detections (*caught in the act*). Typically, researchers have been only able to speculate on the role of the *time for crime*, *memory jogging* and *appeal to the cautious* mechanisms. Indeed, as Pawson and Tilley (1997:80) note: "These hypotheses frame the requisite data and research strategies, and thus call upon a range of evidence entirely different from the standard comparisons." Thus, the extent to which the evaluations of CCTV lend themselves to the Tilley (1993a) framework is variable, but, where possible, it will be used to guide the understanding of how CCTV has operated in the sites under study.

Complicating the Picture Further: the Three Ds

In addition to the mechanisms and contexts through which CCTV operates, it is also necessary to explore the possibility that *displacement* has occurred following the installation of a CCTV system. The various types of displacement — functional, geographical, temporal, tactical, target and perpetrator² — may all be applicable in the CCTV context, and yet none of the evaluations reviewed below have been

able to consider all of these; only some have examined functional, geographical and temporal displacement. An additional concern has been that the proliferation of CCTV in more affluent commercial and residential areas will lead to the displacement of crime to poorer areas, which has implications for the social ecology of such areas (Davies, 1995).

The flip side of displacement is *diffusion of benefits*. This occurs when the crime-reduction effects of CCTV are spread out and benefit surrounding areas beyond those targeted by CCTV (Clarke and Weisburd, 1994). This may understate the effect of the CCTV intervention, since when compared with so-called control areas, crime there will have also dropped (Clarke, 1995).

A third complication in evaluating the effects of CCTV is that increases in crime may actually reflect an increase in *detections* as a result of CCTV. There is also the possibility, as Groombridge and Murji (1994a) suggest, that CCTV could lead the public to feel a reduced responsibility for policing because they assume that this is the responsibility of the cameras. This may, in turn, reduce the likelihood that incidents are reported to the police as individuals may be less willing to report what they see if they assume they do not need to, and this would certainly affect crime rates for incidents not picked up by CCTV operators. Conducting a pre- and post-installation victimization survey might be the only way to shed some light on whether or not changes in recorded crime rates are real, related to increased detections, or the result of underreporting by victims.

RESEARCH EVALUATIONS

The Impact of CCTV on Crime

Research evaluations of CCTV systems have attempted to assess whether any observed reductions in crime could be attributed to CCTV, general trends in local and national crime rates, other crime prevention activities, social and economic factors, or whether they are purely statistical artifacts.³ To a lesser extent, studies have looked at the negative effects of CCTV, the use of CCTV by shop staff and the police, and its cost-effectiveness. The pretest posttest model that has guided much of the evaluative research has meant that researchers have typically collected police recorded crime figures or incident data to examine changes over time; sometimes this has extended to the collection of victimization, arrest and detection data. User surveys,

offender interviews, and observations of offenders' behavior and risk perceptions have also been undertaken. The evaluations have been carried out in a variety of sites, including town centres, shopping centres, parking facilities, public housing, and small businesses, and on public transport. Although the operational requirements of CCTV systems may differ according to the site, for the purposes of this review the research evidence is evaluated according to the level of success in reducing crime. Since the majority of CCTV systems have targeted property crime, the results from these evaluations are considered first. This is followed by a discussion of the research findings with regard to personal crimes and public order offences. Table 2 on page 144 provides a summary of the findings from these evaluations.

Property Crime

(A) Promising Results

Using the Tilley model, Brown (1995) examined the effect of CCTV in Newcastle town centre, a northern English metropolitan area consisting mainly of commercial and entertainment establishments. Sixteen pan, tilt and zoom cameras were installed and continuously monitored at the police station. Operators were equipped with radio links to local retailers and police officers on patrol. Table 1 below presents the findings reported by Brown (1995) of average monthly totals for a 26-month pre-CCTV period, and for 15 months after installation. For all property crime types examined, there was a reduction in the number of incidents in the CCTV areas compared with the non-CCTV areas, and this was also true in the areas that had only two cameras. Incident and arrest data confirmed a deterrent effect (*you've been framed*), especially when the cameras were first installed and then were fully operational. This was sustained for burglary and criminal damage, but for some offences such as thefts of and from vehicles the effect seemed to fade over time. There was no evidence of displacement, but there was some evidence of diffusion of benefits to the neighboring area.

The potential of CCTV for reducing property crime was also demonstrated by the system installed in the English market town of Kings Lynn, also studied by Brown (1995). Nineteen pan, tilt and zoom cameras were installed to cover surface parking facilities and problem locations. The cameras were continuously monitored by security staff, with radio links to in-store security staff.

Table 1: Newcastle Town Centre: Difference in Monthly Incident Totals Pre- and Post-CCTV Installation

Crime	CCTV (14 cameras) %	No CCTV (2 cameras) %	Control (No cameras) residential %	Force Other %
Burglary	-57*	-39*	-3	-2
Criminal damage	-34*	-25*	+4	+8*
Theft of MV	-47*	-40*	-13*	-11*
Theft from MV	-50*	-39*	-11	-16*
Theft other	-11*	-18*	+1	-8

Notes:

1. Source: Brown (1995)
2. *=significant difference in the incidence of offences ($p < .05$)
3. MV=Motor Vehicle

A perennial problem in evaluating programs such as CCTV occurs when the original pre-installation crime rate is low, and this was the case in Kings Lynn. This made it difficult to discern any displacement effects following CCTV installation. The data for the period February 1991 to October 1993 showed that thefts from vehicles were reduced in the areas covered by CCTV, but this decline had started before the cameras were installed. Brown (1995) observed reductions in all areas for thefts of vehicles, but this was most dramatic in the CCTV areas. Burglary decreased in the CCTV area while increasing in the rest of the division and force, and this may have indicated geographical displacement. Importantly, as has been found with many crime prevention measures, the effect fades over time, and this was true in the case of criminal damage in Kings Lynn and to a lesser extent burglary, where the initial reduction effect faded 12 to 15 months after camera installation. It can be surmised that the crime-reduction effects were produced through the *you've been framed and caught in the act* mechanisms, since over 250 arrests resulted from the use of CCTV in the town centre.

The success of these two town centre systems can be viewed alongside that in Airdrie, Scotland (Short and Ditton, 1996). There, 12 cameras covering the town centre and one outlying area became operational in November 1992. The cameras were monitored by civil-

ian operators based in the police control room. Recorded crime and offence data for two years pre- and post-installation showed a reduction of 21% or 772 incidents, and this effect did not seem to fade over time. Crimes of dishonesty (housebreaking, theft from and of motor vehicles, taking and driving away, fraud, shoplifting, etc.) dropped by 48%, while fire-raising and malicious mischief fell by 19%. Even after careful study, functional and geographical displacement seemed not to have occurred during this period. However, Short and Ditton (1998) noted that some offenders travelled to Glasgow to commit crime there, and some who came from Glasgow to Airdrie to shoplift probably went further afield following camera installation. There was no evidence of a diffusion of benefits to areas without CCTV. The 116% improvement in detections across the evaluation period does point to the influence of the *caught in the act* and *effective deployment* mechanisms, and it was probably the case that the *you've been framed* mechanism was also in operation.

Tilley's (1993a) post hoc evaluations of the use of CCTV in some parking facilities have also revealed crime reduction effects. In Hull, pan, tilt and zoom cameras linked to the police control room were monitored 24 hours a day. In addition to a reduction in car crime over the evaluation period, facility usage was up. Damage to vehicles was reduced by 45%, theft of vehicles was down 89%, and theft from vehicles declined by 76%. According to Tilley, this reduction was not associated with the operation of the *nosy porker* mechanism, because the increased usage was not large enough to have this effect. The same pattern of a reduction in theft of and from cars was observed in Bradford, although other crime prevention measures may have increased the perceived risk to offenders. The lack of arrests directly resulting from the monitoring of the cameras ruled out the influence of the *caught in the act* mechanism. In the Wolverhampton leisure centre parking facility, where car crime was slightly reduced, the CCTV effect may have been confounded by a decrease in the usage of the centre (Tilley, 1993a).

The success in the station parking facility in Lewisham, an inner London borough, demonstrated the crime-reduction benefits and cost-effectiveness⁴ of CCTV under different operational circumstances. The CCTV installation consisted of three fixed-lens, and one dummy, cameras that were infrequently monitored and that did not permit accurate identification. The launch of the system was accompanied by both positive and negative publicity. Notwithstanding this, data available only for a short period post-installation did show a smaller number of car crimes being committed. Evidently CCTV can

have an impact on crime even where the system is relatively unsophisticated. The mechanisms through which the reduction occurred could have been *you've been framed* and *specific publicity* or possibly the *memory jogging* mechanism.

CCTV has also been responsible for reducing vandalism on buses in Cleveland, England (Poyner, 1992a). Following the success of the first bus program in which CCTV was installed (damage ceased almost completely), a second bus was fitted with a CCTV system and three dummy cameras were installed on buses in August 1986. Poyner examined workshop seat repair data from the beginning of 1986 for the 80 buses operating out of the depot. These showed that there was a steady decline in damage to seat cushions on all buses over a nine-month period, to a third of what it was the previous year (which, in turn, led to a reduction in the number of cleaners required by the bus company). According to Poyner (1992a), the success could be attributed to coverage of the system by television and local newspapers, suggesting activation of the *general publicity* mechanism. Furthermore, the *Bus Watch* program (consisting of visits to local schools) showed children the likelihood of being caught on the cameras (the *you've been framed* mechanism). In addition, action was taken against some children in the first few months of the initiative, as a result of the *caught in the act* mechanism.

CCTV has also been shown to work effectively in public housing. Chatterton and Frenz (1994) evaluated the use of CCTV in a sheltered housing scheme where the elderly residents were frequently the victims of burglary. Cameras were installed in 15 housing units, and prominent signs were displayed at entrances. Between one and five dummy cameras were placed where they would be seen by offenders to act as a deterrent, and some operational cameras were concealed to maximize their apprehension potential. The cameras were not monitored continuously, but the images were recorded 24 hours a day so that they could be used to identify offenders, most of whom were already known to the police, but had proved difficult to charge because of poor identification by elderly residents.

Across the evaluation period, completed and attempted burglaries decreased by 79%, from 4.25 to 0.9 offences per month, a statistically significant decrease. Before the implementation of CCTV, the police had arrested and charged 13 offenders compared with only three in the post-installation period. Despite the lower number of arrests, this represented an improvement in the arrest rate (number of arrests as a percentage of the number of offences), from 25% to 33%. The *you've*

been framed and *specific publicity* mechanisms are likely to have generated this crime reduction effect.

Finally, CCTV appears to have assisted in reducing stock losses in a clothing store in Leeds, from almost £600 per week to £200 per week. Staff reported that CCTV gave them the confidence to approach customers who were acting suspiciously. CCTV images were used to detect two offenders during the study (Gill and Turbin, 1998).

(B) Mixed Impact

Other evaluations of CCTV systems have not reported the same unequivocal success documented above. For example, while theft of and from motor vehicles declined following the introduction of CCTV in Doncaster city centre, other crimes such as burglary, criminal damage, shoplifting, assault and other thefts did not (Skinns, 1998). Furthermore, although there was evidence of a diffusion of benefits to the areas immediately surrounding the town centre, displacement effects were also observed, with most offences increasing in outlying areas. Skinns calculated that there was an overall crime reduction effect from CCTV of 6%, once displacement and diffusion had been taken into account. Similarly, Squires (1998a) reported a reduction in criminal damage, robbery and theft-person offences following the installation of CCTV in Ilford town centre, but there was no associated drop in burglary, shoplifting, violence or drugs offences.

Tilley (1993a) found that CCTV had a mixed impact on car crime in Hartlepool and Coventry parking facilities. In Hartlepool, pan, tilt and zoom cameras were installed in April 1990, monitored by security officers with a link to the police control room. Over the evaluation period (1989-1992) there was a decline in theft of and from cars in the CCTV area, although this started to increase over time, suggesting a fading effect. There was also a strong indication that car crime was displaced to surrounding areas in Hartlepool when the cameras were first installed. Moreover, increased natural surveillance by shoppers and traffic wardens probably assisted the reduction in the CCTV-covered parking facilities. In Coventry, theft of cars fell over the period 1987 to 1992 (January-August); there was a similar reduction in Coventry as a whole, but this was followed by an increase. Across Coventry, theft from cars declined but the crime rate fluctuated, and the decline was most dramatic in the CCTV-covered parking facilities.

Poyner's (1992b) attempt to isolate the effects of CCTV in a university parking facility was frustrated by the implementation of a package of measures (improved lighting and the pruning of trees) intro-

duced to reduce car crime. A CCTV camera (later fitted with a loudspeaker) was set up on a tower covering two adjacent parking facilities in March 1986. The analysis for the whole campus showed a reduction in theft from cars. This crime type stood at 61 in 1984 (pre-installation), increased to 92 crimes in 1985 (the year the crime prevention measures were introduced), and dropped to 31 crimes in 1986. Crime was also reduced in the facility that was not monitored by CCTV. Poyner suggested that this was because there was both *specific* and *general publicity* surrounding the use of CCTV, and this enabled the police to make a few arrests (cf. Tilley, 1993a). There were also two loudspeaker warnings. It is possible that functional displacement of thefts from cars occurred, since the number of offences of theft of cars increased over the same time period. There appeared to be little effect in reducing criminal damage offences.

Some evaluations, including those carried out in Ilkeston and Leicester town centres have shown reductions in property crime in the CCTV-covered areas and in those without CCTV (Charter Consultancy, 1997; Leicestershire Constabulary cited in Bone Wells Associates, 1998). This same pattern was observed in Sarno's (1996) evaluation of CCTV in parking facilities in Sutton (a town in southern England), although it is possible that improved lighting and overnight locking of the facilities were partially or wholly responsible for this crime reduction. Generally speaking, it has not been possible to ascertain whether such universal reductions are related to a general downward trend in crime or a diffusion of benefits (Clarke, 1995). In other cases, crime reduction has occurred but only in relation to one crime type. For example, Squires' (1998b,c,d) evaluations of CCTV in three small town centres in southern England (Sussex) reported reductions, over and above those in control areas, only for criminal damage.

(C) Negligible Impact

The final category of CCTV evaluations includes those where CCTV has failed to demonstrate an impact on crime, or has had only a small effect, perhaps in containing crime increases relative to areas not covered by CCTV. Brown (1995), for example, found this to be the case in Birmingham town centre. Nine pan, tilt and zoom cameras were installed at problem locations around the city centre. The system was controlled by the police and civilian operators based in the police control room who had links to officers on the beat, city centre officers and traders.

In the experimental zones covered by CCTV, Brown (1995) found that burglary from shops did not increase by as much as in the rest of the division, although this could not be attributed to the effect of CCTV (it may have occurred because of pedestrianization). Neither was Brown able to conclude that the decline in thefts of vehicles was the direct result of CCTV, since this may have been due instead to traffic-calming measures. Both criminal damage and thefts from vehicles increased in the areas covered by CCTV in Birmingham, whereas this was not the case in the rest of the division. Brown suggested that this may have been indicative of some functional displacement of offending into thefts from vehicles following the installation of the cameras, although there was no evidence of temporal displacement. Victimization survey data confirmed the pattern observed in the crime data.

Neither did the evaluation of CCTV in Sutton town centre replicate the crime reduction effects reviewed in the previous sections (Sarno, 1995; 1996). Notwithstanding this, success stories are frequently reported in CCTV evaluations, even where crime data do not support a crime reduction effect overall. For example, in Birmingham town centre, CCTV was used in 458 incidents, resulting in 173 arrests of suspected offenders (Brown, 1995).

One of the earliest studies of CCTV was undertaken by Musheno et al. (1978), and this too failed to find a crime reduction effect on a housing project, although some unusual features of this study make it rather difficult to generalize its findings. Cameras were placed in the lobby and elevator areas of three housing blocks in New York in August 1976. Images and sound were continuously transmitted to residents' TV screens. A victimization survey indicated that in four of eight crime types, there was an increase post-CCTV installation, while in the remaining four crime types there was only a tiny decline.

Musheno et al. (1978) concluded that CCTV failed to deter crime, although it is possible that their evaluation occurred too soon (before CCTV had had time to produce a deterrent effect). In addition, the *caught in the act* and *you've been framed* mechanisms were unlikely to have been exploited, since only 14% of residents interviewed said that they monitored the areas covered by CCTV at least once a day. Since it appeared that residents were often responsible for crime in the buildings, they would have been aware of the lack of monitoring. In addition, 33% said that they might not report crimes to the police because they feared retaliation from offenders.

In his study of the prevention of crime against small businesses, Tilley (1993b) looked at 10 businesses that, under the Salford Busi-

ness Security Grant Scheme, had installed CCTV to protect them against crime. Of the three businesses with CCTV that responded to a questionnaire sent out to study the effect of the CCTV on break-ins, vandalism and other offences, all were victimized in the year before the security upgrade, and all were victimized in the year after the security upgrade. However, the number of incidents did drop from 35 to 30.

Personal Crime and Public Order Offences

Evaluations assessing the impact of CCTV on personal and public order crimes have also produced mixed results. Brown (1995) found that in Birmingham town centre there was a small increase in robbery, theft from the person and criminal damage, although this compared with a dramatic increase in these offences in the rest of the police division. Squires and Measor (1996) reported the same findings in relation to violence offences in Brighton town centre compared with the division as a whole. In Kings Lynn, post-CCTV decreases in assaults and wounding may have reflected the extent to which officers defused situations so they did not lead to an offence, rather than incidents not taking place at all (Brown, 1995). This explanation does not fit easily with the 24% drop in recorded violent crime comparing two-year periods pre- and post-CCTV in Rhyl town centre in Wales (Sivarajasingam and Shepherd, 1999). There, despite the drop according to police records, emergency room records showed an increase in assaults of 35%. A similar pattern was observed in Swansea city centre. Conversely, Sivarajasingam and Shepherd (1999) found increases in police recorded assaults (up to 20%) in Cardiff town centre following the introduction of CCTV, although emergency room records showed a decrease of 12% in the number of assault cases. The large discrepancy between police recorded crime and hospital records found in Rhyl and Cardiff in opposite directions, highlights the importance of using data other than that collected by the police to assess the effect of CCTV. Overall, Sivarajasingam and Shepherd concluded that CCTV had little effect on violent crime.

The effect of CCTV on public transport has not been clearly demonstrated either, in part because these studies have typically involved crime prevention initiatives, of which CCTV only formed a part. A study by Burrows (1978) followed the installation of CCTV cameras in four London Underground stations in November 1975, which occurred just after the deployment of targeted uniform and plainclothes police patrols. Recorded theft was nearly four times lower in the post-installation period, compared with only 1.4 times lower in the other

15 stations in the southern sector not covered by CCTV. There did, however, appear to be some geographical displacement. At the 15 stations in the southern sector without CCTV, thefts fell by 27%, whereas at other non-CCTV stations of the Underground they fell by 39%. This difference was statistically significant. Although there were only a small number of robbery offences, these did decline in the CCTV stations, with an increase in other southern-sector stations and in other stations in the London Underground network. A follow-up study by Webb and Laycock (1991) also seemed to indicate a CCTV effect in the reduction of robbery offences, although a range of other measures were also implemented around the same time as additional cameras were introduced.

In a second project at Oxford Circus station, CCTV and other crime prevention measures failed to reduce thefts and robbery, but passenger assaults did slightly decrease in the second year after their implementation. The absence of a "CCTV effect" was probably due to the large size and complexity of the station with its six platforms, eight entrances/exits and 14 escalators. Webb and Laycock (1991:23) concluded that "CCTV does not seem very useful in large, complex, and crowded environments to deal with more surreptitious behavior such as pick-pocketing or shoplifting."

The successful intervention of CCTV in relation to public order incidents has also been less evident. In Airdrie, crimes against public justice and drug offences climbed 1068% (180 more crimes) in the two years following the installation of cameras in the town centre. Public order offences (petty assault, drunkenness, breach of the peace, etc.) increased by 133% (Short and Ditton, 1996). Other crime prevention techniques, such as reducing the number of those intoxicated, improving the training of security personnel, and other management and legislative approaches, appear to have shown more success in reducing these type of crimes (see, for example, Homel et al., 1998; Ramsay, 1990).

The Offender's Perspective

Offenders themselves also offer a means for studying the effectiveness of CCTV, particularly displacement. Yet few studies have sought information on CCTV from offenders, and those that have, have utilized small samples. Butler (1994) carried out in-depth interviews with 27 offenders in England who had committed commercial burglary offences. Forty-one percent said they would be deterred by an external or internal CCTV system; the majority said that they would not be deterred from committing a crime. Survey research with offenders

(N=130) in Essex has suggested that CCTV can be effective in deterring crime, particularly among adults, although the offenders surveyed had not committed offences in areas where CCTV was installed (French, 1996). In contrast, Gill and Turbin (1998) found that most of the shop thieves they interviewed did not fear apprehension as a result of CCTV. Only two-fifths reported that they would sometimes or always be deterred by mobile cameras, and few offenders were influenced by *specific publicity* advertising the presence of cameras.

Short and Ditton (1998) found that most offenders they interviewed (n=30) were aware of the existence of CCTV in Airdrie town centre, and they had a reasonable idea of the areas that were covered by the cameras. Half of the offenders had been filmed engaging in illegal actions and were thus convinced of the evidential power of CCTV (Ditton and Short, 1998). Despite this, on the basis of the offender accounts, Ditton and Short (1998) concluded that CCTV appeared to only limit the extent of violence used in public order incidents or to deflect their location, rather than to prevent them altogether, mirroring the findings of Brown (1995) in Kings Lynn. Moreover, it seemed that CCTV acted as a deterrent for only some of those who were engaged in property crime. Offenders reported that the limits to the cameras' range of vision, their ability to dodge the cameras, and the speed with which many offences (especially car theft) could be undertaken meant that CCTV was not effective in increasing the risk of apprehension. For public order offences, the disinhibiting effects of alcohol also played a part.

The Impact of CCTV on Fear of Crime

In addition to claims about its effectiveness in reducing crime, CCTV has also been proposed as a way of reducing fear of crime. The few studies that have examined fear of crime pre- and post-CCTV installation have produced similar findings. Chatterton and Frenz's (1994) study of the impact of CCTV in sheltered housing for the elderly, for example, reported that 46% of the respondents were very or fairly worried that their flat would be burgled before the installation of CCTV. The post-installation interviews revealed that 74% of respondents were less worried about being a victim of burglary, and more respondents reported that it was difficult for strangers to get in. Similarly, although the CCTV system in a New York housing project did not deter crime, 41% of respondents felt unsafe at night after the installation of CCTV compared with 50% pre-installation (Musheno et al., 1978). This may have been related to the small reduction in robbery victimization. The town centre research in Birmingham and

Sutton has confirmed this picture, with reductions in fear of crime following the introduction of CCTV, even where there has not been an associated reduction in crime (Brown, 1995; Mahalingham, 1996; Sarno, 1996).

The fear-reduction potential of CCTV has also been noted in public attitude surveys. Bennett and Gelsthorpe (1996) found that 73% of Cambridge (England) residents who were sampled believed that CCTV was effective in reducing fear of crime. In contrast, Honess and Charman (1992) reported that 45% of town centre respondents felt that CCTV was not very effective or not effective in this respect. Notwithstanding this, the enhanced safety aspect of CCTV was greatest in parking facilities (around 60% said they felt safer), followed by shopping centres (48%) and streets (35% during the day and 48% at night). In contrast, Brown (1998) has noted that transport facilities monitored by CCTV are still regarded as high-risk spaces for women, and that CCTV is unlikely to make women feel safer in town centres that are dominated by men at night.

PUBLIC ATTITUDES TOWARDS THE USE OF CCTV

Generally speaking, the public's attitude towards CCTV has been favorable in the U.K. In the most comprehensive survey of public opinion regarding CCTV, Honess and Charman (1992) conducted surveys in streets, shopping centres and parking facilities. Over 85% of respondents said they would welcome a CCTV system (see also French, 1996). Studies have shown that offenders, too, are supportive of CCTV, perhaps because of their own vulnerability to personal victimization (French, 1996; Short and Ditton, 1998). Very few respondents (around 8%) surveyed by Honess and Charman expressed worries about the use of CCTV in public places (see also Beck and Willis, 1995; Gill and Turbin, 1998). Notwithstanding this, Ditton (1998) has demonstrated that the contextualizing questions preceding the key question on the acceptability of CCTV can lead to a margin of 35% difference in those who support CCTV, depending on whether the questions are pro-CCTV, anti-CCTV or neutral — a point that should be borne in mind when reviewing the findings from public attitude surveys.

Honess and Charman (1992) also convened focus groups with white, black and Asian youths, mixed-race groups and student activists. The survey and focus group data showed that those who did worry about CCTV were concerned about the excessive surveillance of, for example, young black men, and the abuse of the system by

operators. In the survey of Cambridge residents, the civil liberties implications of CCTV concerned a larger proportion of the sample, although this did not mean they withdrew their support for CCTV in the city centre. Bennett and Gelsthorpe (1996) reported that 29% were very or fairly worried about civil liberties. In particular, respondents mentioned their dislike of being watched, their fear of greater state control, the possible abuse of recorded information, and a general erosion of civil liberties. Similar concerns were voiced in focus group discussions in Sutton among young people and ethnic minorities (Farish, 1995). In Brighton, opposition to CCTV led to a public demonstration against its use (Davies, 1998).

To some extent, fears about abuse and control may be alleviated by the regulation of CCTV. A study of 70 local authorities with CCTV systems in England, Scotland and Wales conducted by Bulos and Sarno (1996) showed that over 70% of those studied had codes of practice to govern their systems. However, these were not always operational and were principally concerned with protecting the public's civil liberties. A consideration of equal opportunities in relation to the use of CCTV was generally lacking, although in one local authority, consultation with minority groups had led to the cameras being directed towards a mosque entrance where graffiti and vandalism had occurred and to the route used by women students to get to residence halls. It was also recognized that operators needed training to overcome stereotypes that might be used to track and focus on certain individuals. The researchers, for example, found some examples of male controllers being more suspicious of black and Asian youths than of white youths.

DISCUSSION

To summarize the disparate findings on the impact of CCTV is a difficult task, not least because of the post hoc nature and limitations of some of the evaluations, the difficulties in establishing which causal mechanisms explained crime reduction effects, and contradictory findings. What does emerge from the review of CCTV evaluations, however, is that property crime has been reduced in certain settings where CCTV has been installed. This paper has noted examples of a reduction in burglary, thefts of and from motor vehicles (particularly the latter), and criminal damage in town centres, parking facilities, sheltered housing, and public transport facilities. Notwithstanding these successes, CCTV has had little effect in reducing" property crime in other sites (e.g., Birmingham town centre). Simi-

larly, where the logic behind the implementation of CCTV has been faulty (e.g., in the New York housing study that relied on residents to monitor activity) or oversimplified, (e.g., Oxford Circus station where its physical layout prevented it operating to its maximum potential), CCTV has had little impact on crime.

The picture in relation to personal crime, public order and fear of crime is less clear. Rather than deterring violence and public disorder incidents altogether, Brown (1995) argued that CCTV works to contain the seriousness of incidents by helping to ensure that the police or security officers are quickly deployed to the scene of incidents, thus minimizing the amount of harm. Any information recorded by the system can also assist the police in investigating the incident.

The Role of the Usual Suspects

Even where evaluations have demonstrated a "CCTV effect," this effect was found to sometimes fade over time, as has been found with other crime prevention measures (Berry and Carter, 1992). This waning of the deterrence effect was found in Newcastle and Kings Lynn town centres and in the Hartlepool parking facility. For this reason, both Tilley (1993a) and Brown (1995) have stressed the importance of continually demonstrating to offenders through publicity that the risk of apprehension with CCTV is high. This may be the only way to sustain any initial deterrent effects. The limited research on offenders' views about CCTV further supports this approach.

In addition, as Tilley (1993a) has observed, CCTV will most likely contribute to a reduction in property crime where other crime prevention measures are also implemented, even though from an evaluation point of view, it may be impossible to tease out the independent effect of CCTV when it is implemented at the same time as other situational measures.

Clearly important, too, is the role of crime displacement in assessing the crime reduction effects of CCTV; in the evaluations reviewed here there are examples of little or no displacement of crime. This was the case in Newcastle town centre, for example, and in Airdrie town centre where only a few offenders displaced their activities to another location. On the other hand, there was evidence of geographical displacement in Birmingham and Doncaster town centres. Displacement is also more likely where the layout of the area is complex and overcrowding obscures the view, providing a likely setting for pickpocketing and other types of theft, as at London Underground stations.

Alternatively, the opposite effect may also occur where the benefits of CCTV are diffused into a wider area than that covered by the system. A diffusion of benefits was found in the study of CCTV use on Cleveland buses. There, criminal damage to seats declined for all buses operating out of the same depot, even though the cameras were installed only on a few buses. Similarly, in Newcastle and Doncaster town centres, crime declined in the neighbouring areas that did not have camera coverage.

Ascertaining precisely the mechanisms through which CCTV operates is essential for determining whether it will be effective in other settings and contexts. To date, the evaluations demonstrating the success of CCTV have not been able to shed much light on the mechanisms through which it is effective. Where the evidence does exist, it can be concluded that the crime reduction effects of CCTV owe more to its deterrent value than its actual ability to apprehend criminals. This was exemplified in the Lewisham car park scheme, that utilized a rather unsophisticated system and was not able to deploy security personnel or police officers quickly. Particularly important in this regard is the use of *general* and *specific publicity* to highlight the perceived heightened risk to offenders, particularly since some offenders are skeptical about the capabilities of CCTV.

Future research will need to address the unanswered questions that remain. Directly examining the decision-making behaviour of offenders in a longitudinal study, particularly with regard to displacement and desistance offers promise (Short and Ditton, 1998). It will also be of interest to know whether CCTV affects surveillance by the public, their intervention in incidents, precautionary behavior, and the reporting of offences to the police. The role of CCTV evidence in getting offenders to admit an offence (offering criminal justice alternatives such as cautioning or sentence discounts for guilty pleas with reduced court costs) must also be examined. New research by Chenery et al. (forthcoming) has broached this subject from a different angle by examining the sentences imposed on offenders by magistrates where video evidence has been presented, compared with text-only presentations of the evidence. Following up on the work of Bulos and Sarno (1994) to assess the extent to which CCTV operators engage in abuses of privacy and the targeting of marginalized groups would also be an important step in examining the negative consequences of CCTV.

Finally, it is hoped that future evaluations will test and refine the framework proposed by Tilley (1993a) and by Pawson and Tilley (1994, 1997) by drawing on the expertise of practitioners and policy-

makers (Tilley, 1997). To empirically test which mechanisms are set in motion by CCTV in a given context, and to disentangle the cumulative or interactive effects of different mechanisms, will pose particular problems from an evaluation point of view (see also Gill and Turbin, 1998). Data on convictions resulting from CCTV, either through direct observation or taped evidence, will need to be collected. To assess the impact of the *appeal to the cautious*, *memory jogging* and *time for crime* mechanisms, data on the number of crimes, changes in the style of crime being committed, and security behaviour of potential victims must be gathered. Understanding the actions of undeterred offenders will assist in examining the *lie of the land* context, and will provide useful information for other CCTV schemes. Testing the influence of the *style of usage* context will mean collecting data on the time crimes occur alongside usage patterns. The effect of the *publicity* mechanisms and the *surveillance culture* context can only be examined by exploring the way individuals process publicity information about CCTV, once again highlighting the value of the offender's perspective.

Future developments in technology, such as license plate recognition, facial recognition, and algorithmic image interpretation to alert operators to unsanctioned events will also need to be monitored and evaluated, in terms of both their impact on reducing crime and their social control of citizens, particularly those who are already marginalized (Norris et al., 1998). It remains to be seen whether future evaluations — of which there should be many as funding agencies insist on this as a condition of funding — will meet these challenges.



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Table 2: Summary of Research Evaluations on the Effectiveness of CCTV

Site of CCTV/ Study	Evaluation Period	Measures	Findings ¹			Displacement/ Diffusion of Benefits	Notes
			Reduction	No Change	Increase		
<i>City centres</i>							
Sivarajsingam and Shepherd (1999) Swansea	24 months pre- 24 months post-	Recorded crime Emergency room records	Assaults (according to police records)		Assaults (according to ER records)	Geographical displacement to indoor locations, e.g., licensed premises?	
Rhyl	24 months pre- 24 months post-	Recorded crime Emergency room records	Assaults (according to police records)		Assaults (according to ER records)		
Cardiff	24 months pre- 24 months post-	Recorded crime Emergency room records	Assaults (according to ER records)		Assaults (according to police records)		

Site of CCTV/ Study	Evaluation Period	Measures	Findings ¹			Displacement/ Diffusion of Benefits	Notes
			Reduction	No Change	Increase		
Skinns (1998): Doncaster	12 months pre- 12 months post-	Recorded crime Victimization data Surveys of employees Young offender interviews	Theft of and from MV ²	Burglary Criminal damage Shoplifting Other thefts Assault		Geographical displacement to outlying areas, although not indicated in interviews with offenders. Diffusion of benefits	Victimization data were consistent with recorded crime data. Changes in policing practices, parking arrangements in the town centre, and growth of out- of-town commercial and entertainment centres may have been influential in the reduction.
Squires (1998a): Ilford	6 months pre- 7 months post-	Recorded crime Incident data	Criminal damage Robbery Theft- person	Violence Burglary Shoplifting	Drugs	Geographical displacement	Dramatic reduction of MV crime in all areas.
Squires (1998b): East Grinstead	15 months pre- 8 months post-	Recorded crime Incident data	Criminal damage	Burglary	Violence Shoplifting	Diffusion of benefits	Very small sub- samples.
Squires (1998c): Burgess Hill	15 months pre- 8 months post-	Recorded crime Incident data	Criminal damage	Burglary Shoplifting Violence		Geographical and target displacement	Very small sub- samples. Several other crime prevention measures in place.
Squires (1998d): Crawley	18 months pre- 6 months post-	Recorded crime Incident data	Criminal damage	Violence Burglary Shoplifting		Diffusion of benefits	'Control' area included shopping parades also covered by newly installed CCTV cameras.

Site of CCTV/ Study	Evaluation Period	Measures	Findings ¹			Displacement/ Diffusion of Benefits	Notes
			Reduction	No Change	Increase		
Short and Ditton (1996): Airdrie	24 months pre- 24 months post-	Recorded crime Offence data Detections data	Crimes of dishonesty Fire-raising and vandalism		Drugs	No functional displacement Some geographical displacement ³	The effect of CCTV on individual crime types not compared with control areas.
Squires and Measor (1996): Brighton	10 months pre- 13-17 months post-	Recorded crime Incident data	Selected offences combined ⁴	Violence (but increasing in division)			
Brown (1995): Newcastle	26 months pre- 15 months post-	Final incident code data Arrest data	Burglary Criminal damage Theft of and from MV			No displacement Diffusion	
Brown (1995): Birmingham	12 months pre- 36 months post-	Recorded crime Victimization data	Theft of MV	Assault and wounding	Robbery, theft-person and burglary (but lower than in control areas) Criminal damage Theft from MV	Geographical and functional displacement	Other measures included pedestrianization and traffic- calming. Fear of crime decreased after dark only for those aware of the cameras.
Kings Lynn	9 months pre- 21 months post-	Incidents monitored by operators Recorded crime	Burglary Criminal damage Theft of and from MV Wounding and assaults				Low levels of crime. Decline in vehicle crime began before the installation of the cameras.

Site of CCTV/ Study	Evaluation Period	Measures	Findings ¹			Displacement/ Diffusion of Benefits	Notes
			Reduction	No Change	Increase		
Sarno (1996) and Mahalingham (1996): Sutton	12 months pre- 12 months post-	Recorded crime Public perception survey	Vehicle crime Assaults Criminal damage	Burglary Shoplifting	Theft Drugs Robbery		Recorded crime decreased by 13% in the CCTV area, and 30% in the borough as a whole. The effect of CCTV was not compared with control areas, except for vehicle crime, where it dropped in the facilities covered by CCTV and those without CCTV coverage. Increased feelings of safety.
<i>Parking facilities</i>							
Tilley (1993a): Hartlepool	12 months pre- 24 months post-	Recorded crime	Theft of MV	Theft from MV (gradual decline then increase)		Geographical displacement?	Increase in natural surveillance from traffic wardens and shoppers.
Hull	8 months pre- 8 months post-	Recorded crime	Criminal damage Theft of and from MV				Increased usage following CCTV installation.
Lewisham	4 months pre- 4 months post-	Recorded crime	Vehicle crimes				The effect of CCTV was not compared with a control area.

Site of CCTV/ Study	Evaluation Period	Measures	Findings ¹			Displacement/ Diffusion of Benefits	Notes
			Reduction	No Change	Increase		
Bradford	12 months pre- 12 months post-	Recorded crime	Theft of and from MV				Improved lighting and painting of walls.
Coventry	8 month- periods over 6 years	Recorded crime	Theft of and from MV				Variety of other crime prevention measures implemented.
Wolverhampton	12 months pre- 12 months post-	Recorded crime	Theft of and from MV				Usage of the leisure centre decreased by 28%. There was also a spate of thefts from cars.
Poyner (1992b): Surrey	27 months pre- 9 months post-	Recorded crime	Theft from MV	Theft of MV		Functional displacement? Diffusion	Foliage cut back and lighting improved.
Sarno (1996): Sutton	12 months pre- 12 months post-	Recorded crime	Criminal damage Theft of and from MV				Crime declined in almost all main car parks in the Sutton area. Improved lighting and overnight locking of the facility.
<i>Public transport facilities</i>							
Burrows (1978): London Under- ground	12 months pre- 12 months post-	Recorded crime	Theft- person Robbery			Geographical displacement	

Site of CCTV/ Study	Evaluation Period	Measures	Findings ¹			Displacement/ Diffusion of Benefits	Notes
			Reduction	No Change	Increase		
Webb and Laycock (1991): London Underground	47 months pre- 25 months post-	London Underground reports to the Department of Transport	Robbery				Variety of other crime prevention measures implemented.
Poyner (1992a): Cleveland buses	8 months pre- 8 months post-	Seat repair records	Vandalism			Diffusion of benefits	Bus Watch scheme also in operation.
<i>Housing projects</i>							
Chatterton and Frenz (1994)	12 months pre- 5-10 months post- ⁵	Recorded crime Arrest and convictions data	Burglary				Reduction in fear of crime.
Musheno et al. (1978)	4 months pre- 3 months post-	Victimization survey	Robbery Att. robbery Purse-snatching and pick-pocketing Attempted burglary (small decline)		Aggravated assault Simple assault Burglary Vandalism		Reduction in feeling of being unsafe at night.

Notes:

1 Findings are based on comparisons with control areas, unless otherwise indicated in the *Notes* section.

2 MV = Motor Vehicle.

3 This was uncovered through interviews with offenders (see Short and Ditton, 1998).

4 The selected offences included: wounding and grievous bodily harm, assault and actual bodily harm, indecent assaults, violent disorder, affray (where two or more individuals engage in violence together causing fear), criminal damage (and endangering life), robbery and assault with intent to rob, aggravated vehicle taking, theft of and from motor vehicles, and supply of scheduled substances.

5 If the installation of the first CCTV camera is used, the pre-installation evaluation period was 10 months.

REFERENCES

- Armstrong, G. and R. Giulianotti (1998). "From Another Angle: Police Surveillance and Football Supporters." In: C. Norris, J. Moran and G. Armstrong (eds.), *Surveillance, Closed Circuit Television and Social Control* Aldershot, UK: Ashgate.
- Barr, R. and K. Pease (1990). "Crime Placement, Displacement and Deflection." In: M. Tonry and N. Morris (eds.), *Crime and Justice: A Review of Research*, vol. 12. Chicago, IL: University of Chicago Press.
- Beck, A. and A. Willis (1995). *Crime and Security: Managing the Risk to Safe Shopping*. Leicester, UK: Perpetuity Press.
- Bennett, T. and L. Gelsthorpe (1996). "Public Attitudes Towards CCTV in Public Places." *Studies on Crime and Crime Prevention* 5(1):72-90.
- Berry, G. and M. Carter (1992). *Assessing Crime Prevention Initiatives: The First Steps*. (Crime Prevention Unit Paper, #31.) London, UK: Home Office.
- Bone Wells Associates (1998). "CCTV: Potential Crime Impact." (Unpublished report.) Bristol, UK: Bristol City Council.
- British Department of Education and Science (1991). *Closed Circuit TV Surveillance Systems in Educational Buildings*. (Building Bulletin #75.) London, UK: Her Majesty's Stationery Office.
- Brown, B. (1995). *CCTV in Town Centres: Three Case Studies*. (Police Research Group Crime Detection and Prevention Series Paper, #68.) London, UK: Home Office.
- Brown, S. (1998). "What's the Problem, Girls? CCTV and the Gendering of Public Safety." In: C. Norris, J. Moran and G. Armstrong (eds.), *Surveillance, Closed Circuit Television and Social Control*. Aldershot, UK: Ashgate.
- Bulos, M. (1994). *Closed Circuit Television and Local Authority Initiatives: The First National Survey*. (Research monograph.) London, UK: School of Land Management and Urban Policy, South Bank University.
- and C. Sarno (1996). *Codes of Practice and Public Closed Circuit Television Systems*. London, UK: Local Government Information Unit.
- Burrows, J. (1978). "The Impact of Closed Circuit Television on Crime in the London Underground." In: P. Mayhew, R.V.G. Clarke, J.N. Burrows, J.M. Hough and S.W.C. Winchester (eds.), *Crime in Public View*. (Home Office Research Study, #49.) London, UK: Her Majesty's Stationery Office.

- (1991). *Making Crime Prevention Pay: Initiatives from Business*. (Home Office Crime Prevention Unit Paper, #27.) London, UK: Home Office.
- Butler, G. (1994). "Shoplifters' Views on Security: Lessons for Crime Prevention." In: M. Gill (ed.), *Crime at Work: Studies in Security and Crime Prevention*. Leicester, UK: Perpetuity Press.
- Chatterton, M.R. and S.J. Frenz (1994). "Closed Circuit Television: Its Role in Reducing Burglaries and the Fear of Crime in Sheltered Accommodation for the Elderly." *Security Journal* 5(3): 133-139.
- Chenery, S., C. Henshaw and K. Pease (forthcoming). "Does CCTV Evidence Increase Sentence Severity?" Unpublished report to the Nuffield Foundation, U.K.
- Clarke, R.V. (1995). "Situational Crime Prevention." In: M. Tonry and D.P. Farrington (eds.), *Building a Safer Society: Strategic Approaches to Crime Prevention*. (Crime and Justice: A Review of Research, vol. 19.) Chicago, IL: University of Chicago Press.
- and D. Weisburd (1994). "Diffusion of Crime Control Benefits: Observations on the Reverse of Displacement." In: R.V. Clarke (ed.), *Crime Prevention Studies*, vol. 2. Monsey, NY: Criminal Justice Press.
- Davies, S. (1995). "Welcome Home Big Brother." *Wired* (May):58-62.
- (1998). "CCTV: A New Battleground for Privacy." In: C. Norris, J. Moran and G. Armstrong (eds.), *Surveillance, Closed Circuit Television and Social Control*. Aldershot, UK: Ashgate.
- Department of Education and Science (1991). "Closed Circuit TV Surveillance Systems in Educational Buildings." *Building Bulletin* 75. London, UK: Her Majesty's Stationery Office.
- Ditton, J. (1998). "Public Support for Town Centre CCTV Schemes: Myth or Reality?" In: C. Norris, J. Moran and G. Armstrong (eds.), *Surveillance, Closed Circuit Television and Social Control*. Aldershot, UK: Ashgate.
- and E. Short (1998). "When Open Street CCTV Appears to Reduce Crime: Does It Just Get Displaced Elsewhere?" *CCTV Today* 5(2): 13-16.
- Fariish, M. (1995). "The Response of Special Interest Groups to CCTV." In: M. Bulos (ed.), *Towards a Safer Sutton? Impact of Closed Circuit Television on Sutton Town Centre*. London, UK: London Borough of Sutton.
- French, P. (1996). "Inside the Offender's Mind." *CCTV Today* 3(3): 16-19.
- Gill, M. and V. Turbin (1998). "CCTV and Shop Theft: Towards a Realistic Evaluation." In: C. Norris, J. Moran and G. Armstrong (eds.), *Sur-*

- veillance, Closed Circuit Television and Social Control*. Aldershot, UK: Ashgate.
- Groombridge, N. and K. Murji (1994a). "Obscured by Cameras?" *Criminal Justice Matters* 17(Autumn):9.
- (1994b). "As Easy as AB and CCTV?" *Policing* 10(4):283-290.
- Homel, R., M. Hauritz, G. McIlwain, R. Wortley and R. Carvolth (1998). "Preventing Drunkenness and Violence Around Nightclubs in a Tourist Resort." In: R.V. Clarke (ed.), *Situational Crime Prevention: Successful Case Studies* (2nd ed.). Guilderland, NY: Harrow and Heston.
- Honess, T. and E. Charman (1992). *Closed Circuit Television in Public Places*. (Police Research Group Crime Prevention Unit Series Paper, #35.) London, UK: Home Office.
- Liberty Briefing (1989). "Who's Watching You? Video Surveillance in Public Places." *Liberty Briefing* 16 (October):.
- Mahalingham, V. (1996). "Sutton Town Centre Public Perception Survey." In: M. Bulos and D. Grant (eds.), *Towards a Safer Sutton? CCTV One Year On*. London, UK: London Borough of Sutton.
- Mirrlees-Black, C. and A. Ross (1995). *Crime Against Retail and Manufacturing Premises: findings from the 1994 Commercial Victimisation Survey*. (Home Office Research Study, #146.) London, UK: Home Office.
- Musheno, M.C, J.P. Levine and D.J. Palumbo (1978). "Television Surveillance and Crime Prevention: Evaluating An Attempt to Create Defensible Space in Public Housing." *Social Science Quarterly* 58(4):647-656.
- Norris, C, J. Moran and G. Armstrong (1998). "Algorithmic Surveillance: The Future of Automated Visual Surveillance." In: C. Norris, J. Moran and G. Armstrong (eds.), *Surveillance, Closed Circuit Television and Social Control*. Aldershot, UK: Ashgate.
- Pawson, R. and N. Tilley (1994). "What Works in Evaluation Research?" *British Journal of Criminology* 34(3):291-306.
- (1997). *Realistic Evaluation*. London, UK: Sage.
- Poyner, B. (1992a). "Video Cameras and Bus Vandalism." In: R.V. Clarke (ed.), *Situational Crime Prevention: Successful Case Studies*. Albany, NY: Harrow and Heston.
- (1992b). "Situational Crime Prevention in Two Parking Facilities." In: R.V. Clarke (ed.), *Situational Crime Prevention: Successful Case Studies*. Albany, NY: Harrow and Heston.

- Ramsay, M. (1990). *Lagerland Lost? An Experiment in Keeping Drinkers Off the Street in Central Coventry and Elsewhere*. (Police Research Group Crime Prevention Unit Paper, #42.) London, UK: Home Office.
- Reeve, A. (1998). "Risk and the New Urban Space of Managed Town Centres." *International Journal of Risk, Security and Crime Prevention* 3(1):43-54.
- Repetto, T.A. (1976). "Crime Prevention and the Displacement Phenomenon." *Crime and Delinquency* 22:166-177.
- Roberts, A. and S. Goulette (1996). "CCTV Surveillance: The Local Authority's Role — A Review of Current Practice." *Proceedings of the Institute of Civil Engineers-Municipal Engineers* 1996, 115(2):61-67.
- Sarno, C. (1995). "Impact of CCTV on Crime." In: M. Bulos (ed.), *Towards a Safer Sutton? Impact of Closed Circuit Television on Sutton Town Centre*. London, UK: London Borough of Sutton.
- (1996). "The Impact of Closed Circuit Television on Crime in Sutton Town Centre." In: M. Bulos and D. Grant (eds.), *Towards a Safer Sutton? CCTV One Year On*. London, UK: London Borough of Sutton.
- Short, E. and J. Ditton (1995). "Does CCTV Affect Crime?" *CCTV Today* 2(2):10-12.
- (1996). *Does Closed Circuit Television Prevent Crime? An Evaluation of the Use of CCTV Surveillance in Airdrie Town Centre*. Edinburgh, SCOT: Scottish Office Central Research Unit.
- (1998). "Seen and Now Heard: Talking to the Targets of Open Street CCTV." *British Journal of Criminology* 38(3):404-429.
- Sivarajasingam, V. and J.P. Shepherd (1999). "Effect of Closed Circuit Television on Urban Violence." *Journal of Accident and Emergency Medicine* 26:225-257.
- Skinns, D. (1998). "Crime Reduction, Diffusion and Displacement: Evaluating the Effectiveness of CCTV." In: C. Norris, J. Moran and G. Armstrong (eds.), *Surveillance, Closed Circuit Television and Social Control*. Aldershot, UK: Ashgate.
- Speed, M., J. Burrows and J. Bamfield (1994). *Retail Crime Costs 1993/94 Survey: The Impact of Crime and the Retail Response*. London, UK: British Retail Consortium.
- Squires, P. (1998a). *An Evaluation of the Rford Town Centre CCTV Scheme*. Brighton, UK: Health and Social Policy Research Centre, University of Brighton.
- (1998b). *The East Grinstead Town Centre CCTV Scheme: An Independent Evaluation*. Brighton, UK: Health and Social Policy Research Centre, University of Brighton.

- (1998c). *CCTV and Crime Prevention in Burgess Hill Town Centre: An Independent Evaluation*. Brighton, UK: Health and Social Policy Research Centre, University of Brighton.
- (1998d). *CCTV and Crime Reduction in Crawley: An Independent Evaluation of the Crawley CCTV System*, Brighton, UK: Health and Social Policy Research Centre, University of Brighton.
- and L. Measor (1996). *CCTV Surveillance and Crime Prevention in Brighton: Follow-Up Analysis*. Brighton, UK: Health and Social Policy Research Centre, University of Brighton.
- Tilley, N. (1993a). *Understanding Car Parks, Crime and CCTV: Evaluation Lessons from Safer Cities*. (Crime Prevention Unit Series Paper, #42.) London, UK: Home Office.
- (1993b). *The Prevention of Crime Against Small Businesses: The Safer Cities Experience*. (Home Office Crime Prevention Unit Series Paper, #45.) London, UK: Home Office.
- (1997). "Whys and Wherefores in Evaluating the Effectiveness of CCTV." *International Journal of Risk, Security and Crime Prevention* 2(3): 175-185.
- U.K. Home Office (1995). *CCTV: Winners by Government Regional Offices Round 1 1994/95*. London, UK: author.
- (1996). *Closed Circuit Television Challenge Competition 1996/97 Successful Bids*. London, UK: author.
- (1998). *Closed Circuit Television Challenge Competition (Round 4) 1998/99 Bidding Guidance*. London, UK: author.
- U.K. Home Office Crime Prevention Agency (1997). *Closed Circuit Television Challenge 3 Competition 1997/98 Successful Bids*. London, UK: author.
- Walker, A. (1998). "CCTV Works!" *Security Installer* (March): 11-12.
- Webb, B. and G. Laycock (1991). *Reducing Crime on the London Underground: An Evaluation of Three Pilot Projects*. (Crime Prevention Unit Paper, # 30.) London, UK: Home Office.

NOTES

1. Or "busybody."
2. See Repetto (1976) and Barr and Pease (1990).

3. For example, any reduction could reflect random fluctuations in local crime rates or "regression to the mean," where an effect will be achieved without any intervention simply because crime rates that are high will fall to the more normal rate (Tilley, 1997).

4. The cost-effectiveness of CCTV was assessed in a case study reported by the British Department of Education and Science (1991), although minimal information is provided for evaluative purposes. In the seven months prior to CCTV installation at a large secondary school in the Northeast of England (located close to a shopping center, bar, and near public footpaths) the estimated costs of vandalism were £8,700; in the first 12 months following the installation, £300 was spent on repairs. In this example, the cost of installing the system would have been recovered in less than two years. Burrows (1991), too, reported a reduction in losses following the installation of CCTV (as the key component in a security program) in nine large British supermarkets. Payback on the capital expenditure of the CCTV system was realised within six months in one store that was studied. Compare these findings with Tilley (1997), who argued that there is rarely enough data available to evaluators to determine which costs and benefits are directly associated with CCTV.