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12. CCTV in Three Town Centers in England

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***EDITOR'S NOTE.** CCTV, or video cameras, have been used in many business and other semi-private settings, including stores, banks, ATM machines, buses (Poyner, 1988), parking lots (Tilley, 1993c) and subway systems (see Case Study #22). They have also been used successfully in residential accommodation for seniors to reduce burglary and frauds by unsolicited callers (Chatterton and Frenz, 1994), and in schools to help keep order in cafeterias and sports stands (New York Times, January 31, 1996, p.A15). Their more widespread use in city streets and centers has been resisted by civil libertarians, alarmed by the specter of intrusive State control (New York Times, February 7, 1996, p.A12). In Britain, however, they are beginning to be used more widely in these settings and, as mentioned in this study, condensed by Helen McCulloch from a Home Office report (Brown, 1996), they have generally been welcomed by the public. The evidence in Brown's report of their effective use in Newcastle-upon-Tyne city center will undoubtedly accelerate their use elsewhere, but less satisfactory results from two other cities studied should sound a warning: The cameras will only be effective if systems are designed with close attention to the setting and its specific crime problems.*

Introduction

Closed circuit television (CCTV) cameras are becoming a common feature of public life in Britain. They can be found in shopping facilities, town center streets, banks, building societies, car parks, schools and colleges, transport facilities and housing estates. The presence of CCTV cameras within shopping centers is common. Center managers often install cameras as part of an overall management package which deals with a range of activities, including criminal and anti-social behavior. In an attempt to match the standards set by shopping centers, many local authorities have installed or are planning to install CCTV cameras in their town center streets. A recent estimate indicated that over 200 areas across the country, ranging from metropolitan cities to small market towns, have installed or are planning CCTV systems (Clarke, 1994).

Despite early fears concerning civil liberties, the general public, at the moment, does not appear to be concerned about the proliferation of such schemes within the public domain. Research conducted for the Home Office in 1992 showed that very few people - 6% of respondents - were worried about the presence of CCTV cameras (Edwards and Tilley, 1994).

The success of cameras in reducing overall crime levels within different locations, however, has rarely been assessed (or indeed questioned). In their recent survey of retailers carried out on behalf of the British Retail Consortium, Speed *et al.* (1995) found that this lack of empirical evidence concerning the effect of cameras on overall crime levels is causing some concern. Although retailers have contributed considerable sums of money to support public CCTV schemes, they remain unconvinced about the effectiveness of cameras (for example, on apprehension for theft). They also do not believe that CCTV schemes in public areas have increased either turnover or profits. The lack of empirical evidence for the effect of CCTV, therefore, may affect the willingness of retailers to fund such schemes in the future.

There are a few small scale evaluations that have attempted to assess the impact of security cameras on crime and disorderly behavior within different locations. Van Straelen (1978) claimed that the installation of CCTV cameras in a large French supermarket had reduced losses by 33 percent. More recently Tesco launched an internally-developed security package known as the "Totally Integrated Security System" (TISS) to tackle losses incurred at their stores. Although TISS involved changes in store design and procedure, its main component was the provision of CCTV which allowed the monitoring of all vulnerable areas both within and outside the store. When TISS was first introduced into an existing "problem" supermarket, unknown losses dropped from some \$12,000 a week to \$5,000 a week (Burrows, 1991). In addition cash losses from tills dropped considerably and violent incidents almost disappeared. This indicated that when CCTV was installed within a shop as part of an integrated security package, it deterred crime within this environment. There were also other benefits in that

... the "quality" of arrests of more professional thieves is improved and that taped evidence increases the likelihood of "guilty" pleas in the courts. (Burrows, 1991:9).

In 1985, a bus company in the North East of England launched a security program aimed at deterring vandalism on buses (Poyner, 1988). Initially, one bus was equipped with a CCTV camera on the upper deck. In the first month of operation, this camera filmed a

number of incidents involving damage caused to the upper deck of the bus. The bus company, with the assistance of a local school, soon identified the perpetrators and took action against them. The success of the video bus was well publicized in the local media. Staff from the bus company visited schools and demonstrated the effectiveness of the system by filming pupils on the top deck of buses and then showing them the tapes. More buses were then equipped with video equipment and incidents of vandalism decreased further.

CCTV cameras can also reduce crime in car parks. Poyner (1991) showed that when security staff at the University of Surrey installed CCTV cameras in their car parks, car crime (especially theft from vehicles) declined. The author suggests that this effect was because the system had been used to arrest and take action against offenders and that these successes were publicized in the local press. It is important to note that other improvements were made to the car parks at the same time: the lighting was improved and bushes were pruned in order to improve the opportunities for surveillance. Tilley (1993c), in possibly the most thorough evaluation of the effect of CCTV on crime to date, also found that the presence of CCTV cameras within car parks could reduce car crime. He too remarked that:

The effect of CCTV appears to be enhanced when it is installed alongside other complementary measures, raising its credibility as a source of increased risk to the offenders. (Tilley, 1993c:23).

However, he also discovered that the systems did not have to be technically sophisticated or monitored continuously to have an impact on car crime in car parks. Since he found that very few arrests took place in the car parks included in the study, he concluded that the

... removal of offenders does not constitute the mechanism through which CCTV currently reduces car crime. (Tilley, 1993c: 23).

This failure to apprehend offenders might have affected the long term effectiveness of some of the camera systems evaluated by Tilley. In some cases the cameras became less effective at deterring crime as time passed, an effect that is common to many crime prevention efforts. Regular publicity concerning the role of the cameras in apprehending suspects was recommended to maintain the perceived effectiveness of the system amongst offenders.

Both Webb and Laycock (1992b) and Mayhew et al. (1979) found that installing CCTV cameras as part of a general security package at selected London Underground stations had reduced the number of robberies within these premises. Webb and Laycock found that after 12 months the effect of the project began to wear off, possibly because offenders realized that the risk of being caught had not increased. Mayhew et al. also found that the number of thefts from the person had declined, but their data indicated that these offenses might have been displaced to neighboring stations.

One of the main arguments against the effectiveness of cameras is, indeed, that they simply displace rather than deter or prevent crime. Evidence indicates, however, that cameras within some locations may in fact lead to a "diffusion of benefits." For example Poyner (1988,1991) found that the presence of cameras within one location had a beneficial effect on the number of offenses within another, unprotected location. When cameras were introduced to reduce vandalism on buses, reductions in the incidence of vandalism occurred on all buses and not just those which had cameras. When cameras were installed at University of Surrey parking facilities, car crime decreased not only in the car parks that

were covered by cameras, but also a nearby car park where there was no camera coverage.

How might CCTV Cameras Reduce Crime?

Installing CCTV cameras to tackle criminal and disorderly behavior is an example of what Brantingham and Faust (1976) refer to as primary crime prevention, and what Clarke (1992) refers to as situational crime prevention. The theoretical approach to this type of crime prevention refers to the reduction of criminal opportunities, and so

... has turned to theories of the crime *event* rather than the motivated offender, for its inspiration. (Pease 1994: 662).

Cohen and Felson (1979) in their routine activities theory state that for an offense to occur three elements must converge in time and space during the course of people carrying out their routine activities. These are a motivated offender, a suitable victim and the absence of a capable guardian. As Tilley (1993c) points out, it is possible that the presence of CCTV cameras may deter crime by impinging on any one of these elements. For example, the presence of cameras may remove the motivated offender by increasing the perceived risk. Alternatively, the cameras may allow the police and/or other security agencies to respond more quickly to an offense therefore introducing the presence of a capable guardian. Another possible alternative is that the presence of CCTV cameras may remove suitable victims by making potential victims more security conscious and therefore less vulnerable to crime. However, the lack of empirical evidence means that it is impossible to say which of these three elements is affected by the presence of CCTV cameras within an area.

A complementary theoretical approach is provided by the rational choice theory of Clarke and Cornish (1985). This suggests that offenders are involved with making decisions and choices, and these choices exhibit a measure of rationality. The focus of this approach is on both the offender and the immediate situational context of crime. Installing CCTV cameras within an area increases the opportunities for surveillance and thus the risk associated with offending. Offenders would be deterred by cameras only if they interfered in some way with the likelihood of offenders benefiting from this behavior within that particular context. In Felson's language, this is equivalent to de-motivating the offender.

Different groups of people may have different ideas about how CCTV might affect criminal behavior. As part of their research into the acceptability and perceived effectiveness of CCTV, Honess and Charman (1992) found that the public believed that the main purpose of camera systems was to help with the detection and investigation of crime. Honess and Charman also asked the managers of various different types of schemes (such as car park, shopping center and town center schemes) what they perceived the use of the camera systems to be. For managers, crime prevention rather than detection was the dominant aim of CCTV.

Aims of the Research

Although CCTV is also used in town centers to supervise internal and external private areas such as inside shops and in shopping malls, the focus of this report is on schemes that cover external public town center streets. It looks at how the police and other agencies use CCTV systems to tackle crime and disorderly behavior within town center streets. It also examines the effect of installing cameras on the number of incidents that occur within the town center and surrounding areas. In doing this, we may begin to understand the

circumstances and conditions that are needed for CCTV to have the greatest impact on these types of behavior. Three cities were looked at in depth; Newcastle, Birmingham and King's Lynn although only the experience in Newcastle is discussed fully in this paper.

Newcastle upon Tyne

Newcastle upon Tyne is a large provincial city situated on the mouth of the river Tyne in north east England. The city center is typical of large English metropolitan city centers, if a little more compact. The area has a low resident population but has many public houses, night clubs, restaurants, shops and offices. It also plays host to a number of major events, including royal visits. In addition, St James's Park, the football ground for premier league Newcastle United is situated near to the center. The city center, therefore, attracts large numbers of people and vehicles, and the police officers working here face a number of problems, including those associated with public order, personal safety, property crime, traffic congestion and terrorism.

To help the local commander deal with these problems, a 16-camera monochrome CCTV system was installed in December 1992. All the cameras have a pan, tilt and zoom function. Images from these cameras are transmitted by microwave to four monochrome monitors which are located in the front desk area of the local police stations. Two of these monitors are split screen and two are single image. The system records images in time lapse mode but operators can switch to real time recording if required. Attached to the monitors is a facility for producing hard copies of images which are used to provide additional evidence for prosecutions.

The initial funding for the system came from the City Center Partnership Security Initiative, a corporate initiative set up using a grant from the Department of the Environment and funds from the local private sector. Northumbria Police Authority is responsible for paying the on-going maintenance cost and that of the salaries and costs relating to the civilian operators who monitor the system.

Camera positions were selected using crime pattern analysis. The area covered by the cameras contains a number of major vehicular thoroughfares, is partly pedestrianized and is made up of shops, commercial and financial properties, and an extremely high number of licensed premises. There is also a large covered shopping mall within Newcastle city center - Eldon Square - which has its own privately operated camera system.

Newcastle city center is highly conducive to camera surveillance. The streets are wide and relatively straight; there are few pedestrian underpasses and few obstacles which block the view of the cameras. The area covered by each camera is considerable and overlaps with those areas covered by neighboring cameras. Very few streets within the city center do not have some form of camera coverage. Most vulnerable premises are located in the streets that have full camera coverage.

THE AIMS OF THE SCHEME

The main aim of the system is to support the operational policing of the city center area. The system is therefore used as part of a wider policing package to tackle burglary (including ram-raiding, i.e. use of a vehicle to break through a shop front), public disorder, theft from the person, robbery, the selling and using of hard drugs, traffic congestion, security and terrorism. In general terms:

The purpose of the use of the CCTV to monitor public places, by a police approved system, is to assist with the prevention and detection of crime. Closed circuit television will also assist greatly in the maintenance of public order, reducing nuisance and vandalism offenses and enhancing a sense of safety by members of the general public. (Use of closed circuit television system, codes of practice for Newcastle city center, paragraph 2.1).

OPERATIONAL PROCEDURES

The system is controlled entirely by the police. All monitors are located within the front desk office in the police station. The team of police officers and civilian staff who work in the office are responsible for monitoring the cameras 24 hours a day. They work on exactly the same shift pattern as the operational officers and so form part of a wider operational policing team. Although there is always one member of staff who is designated as the CCTV operator working at any one time within the front office, any member of the front desk team can and does operate the camera system. This ensures that the system is monitored constantly and helps to reduce fatigue in the operators. Each member of staff will sit with a more experienced operator until he or she learns the basics of the system.

When the scheme was first launched, it had a radio/phone link to the area operations room at Byker. However the staff who monitor the system now have their own personal radios which they can use to communicate directly with officers on the beat. The operators believe that this is a great improvement because it provides the facility for immediate communication. This allows them to co-ordinate a much quicker response to an incident. There is also a separate radio link to local retailers and to the operators of the privately owned and monitored system in the Eldon Square shopping center.

HOW THE CCTV SYSTEM IS USED

The operators use the cameras to "patrol" the city center, in much the same way as would an operational officer: they search for suspicious incidents, monitor potentially difficult situations as they happen and keep an eye on the local "characters." They know that there are likely to be problems in certain areas at certain times. During the day, they tend to concentrate on the busy shopping areas whereas during the evening and night they tend to concentrate on those areas where the majority of the pubs and nightclubs are located. They also know that certain areas are associated with different types of crime. Licensed premises within a particular street, for instance, tend to be the location of many public order problems; a park area is often used by certain members of the public to roll and smoke cannabis cigarettes; there is also a certain area where children and youths tend to congregate which leads to problems of criminal damage. Even more organized criminal activity may be linked with a particular location and these problems can be tackled with the help of the camera system.

The operators also make use of local intelligence information. This may include keeping an eye out for wanted persons. Intelligence reports may also indicate that a certain area may be suffering from a spate of certain types of offenses. The camera operators can then be on the look out within these areas for these types of offenses. The police can also use the camera for gathering evidence as part of organized surveillance operations.

THE EFFECT OF CCTV ON CRIME INCIDENTS

The police in Northumbria made available final incident code data from a number of areas which allowed an assessment of the effect of installing the cameras in Newcastle city center. Final incident code data refer to incidents that the police have responded to and have assigned a code to. They are therefore similar to recorded crime as represented in recorded crime statistics.

The data examined in the study relate to 20 different types of incidents which took place in the following areas:

CCTV area - this is made up of four police beats of the Newcastle Central area. These beats cover the shopping, business and financial areas of the city center. Fourteen of the 16 cameras installed in the city center are located within these beats. The coverage of this area is very extensive and is integrated, i.e. the field of view for each camera overlaps.

No CCTV area - this is made up of the seven remaining beats of the Newcastle Central area which surround the central CCTV area. The area mainly consists of the two universities and the riverside district. St James's Park (the football ground of Newcastle United) is also located within this area. Only two of the 16 cameras are located within these beats.

Byker (Newcastle East) - this is one of Newcastle Central's neighboring divisions and consists mainly of residential housing. There are no cameras in this area.

Force - Data for all other divisions within the Northumbria force were collated and used to provide an additional control measure.

Table 1 shows the average monthly totals for the 26 months before the cameras became fully operational in March 1993 and for the 15 months following this date. Only those offenses which show significant decreases or increases have been included in this table.

The most marked results are for burglary. Although there is no change in the number of burglary incidents in Byker and the rest of the force, the numbers of such incidents in both the CCTV and No CCTV areas of the Newcastle Central division have dropped significantly. The greatest reduction is within the CCTV area where there has been a 56 percent drop in the average monthly figure for burglary incidents. There has also been a similar pattern in the number of criminal damage incidents. Within Byker and the rest of the force the number of criminal damage incidents rose but in the two central divisions it fell significantly. Once again the greatest reduction of 34 percent occurred within the CCTV area.

The numbers of vehicle crime incidents have dropped in all the areas. The most marked reduction however is within the CCTV area where the average monthly numbers of incidents for both theft of and theft from vehicles have almost halved, although it is important to note that the numbers for these incidents are small. "Other" thefts (i.e. other than vehicle-related) also fell significantly in the Central division, but in this case the greatest reduction of 18 percent occurred in the No CCTV area. Finally, there is some evidence for an effect on juvenile disorder. Although there was no reduction in the numbers of these incidents for the Central division areas, there were significant increases in Byker

TABLE 1
AVERAGE MONTHLY TOTALS AND PERCENTAGE CHANGES FOR INCIDENTS BEFORE AND AFTER THE CAMERAS BECAME FULLY OPERATIONAL

	CCTV		NO CCTV		BYKER		FORCE	
	Before CCTV	After CCTV						
Burglary	40	17	75	46	110	107	2307	2260
<i>% change</i>		-57%		-39%		-3%		-2%
Criminal Damage	32	21	111	83	217	225	4107	4441
<i>% change</i>		-34%		-25%		+4%		+8%
Theft of Motor Vehicle	17	9	168	100	141	122	2590	2298
<i>% change</i>		-47%		-40%		-13%		-11%
Theft from Motor Vehicle	18	9	106	65	110	98	2146	1803
<i>% change</i>		-50%		-39%		-11%		-16%
Other Theft	223	198	197	161	153	154	2437	2233
<i>% change</i>		-11%		-18%		+1%		-8%
Juvenile Disorder	13	15	19	20	158	204	2601	3183
<i>% change</i>		+15%		+5%		+29%		+22%

1. Figures in bold indicate a significant difference in the incidence of offenses. $p=0.05$.
2. Where the base figure is low (i.e. less than 20), the percentages are expressed in brackets).

FIGURE 1
BURGLARY INCIDENTS, JANUARY 1991 - MAY 1994, FOR NEWCASTLE AND NORTHUMBRIA POLICE REGIONS

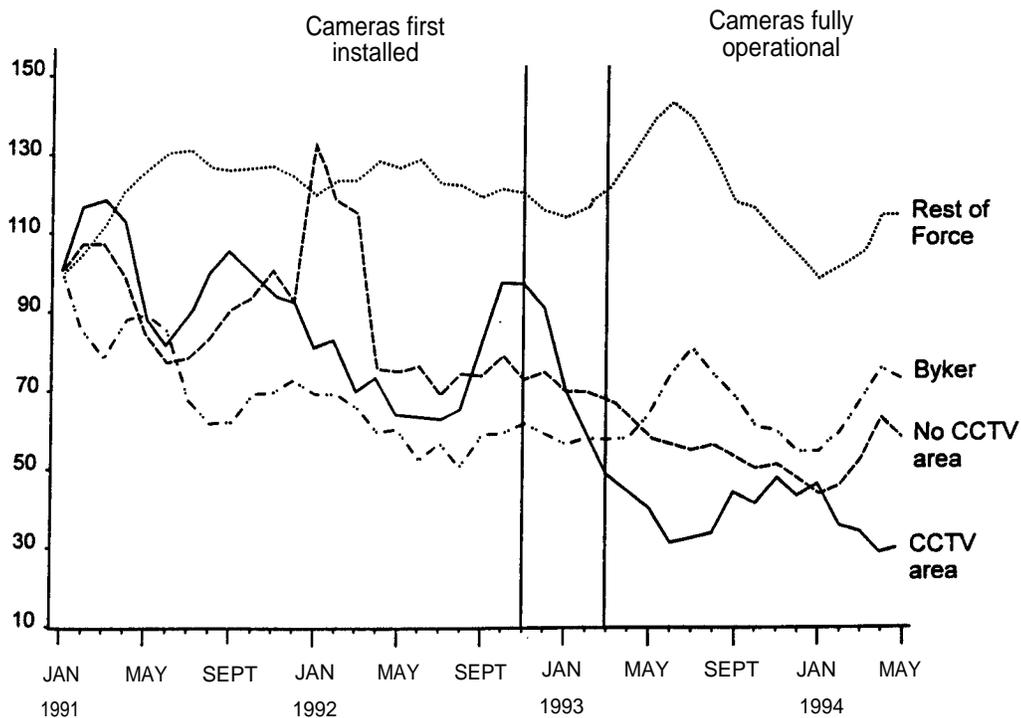
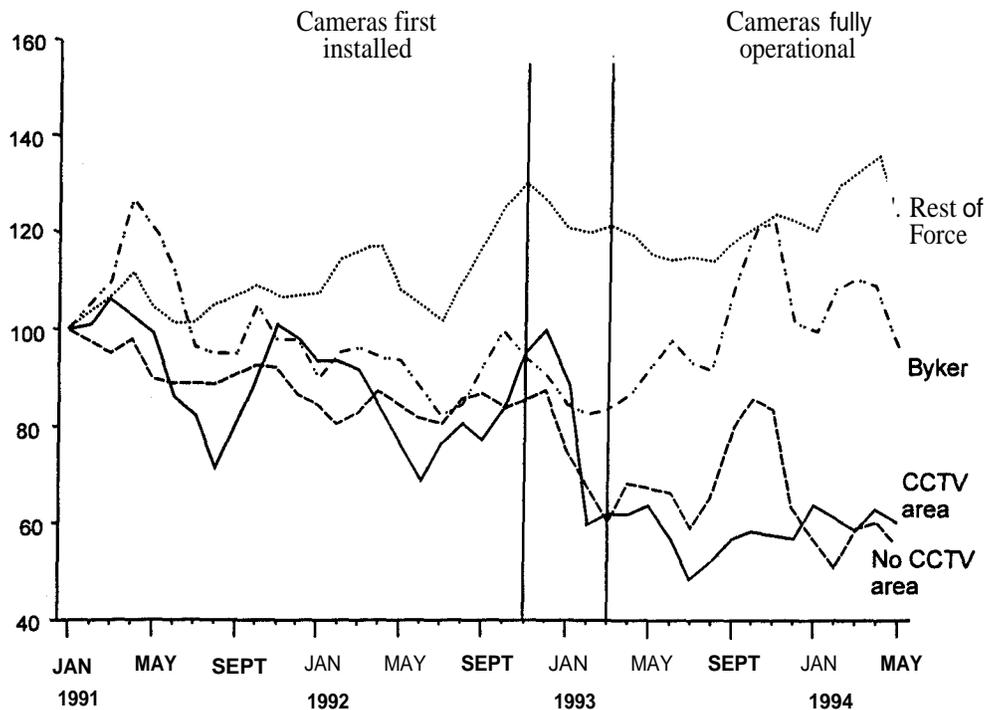


FIGURE 2
TRENDS IN THE NUMBER OF CRIMINAL DAMAGE INCIDENTS, JANUARY 1991 -
MAY 1994, FOR NEWCASTLE AND NORTHUMBRIA POLICE REGIONS



and the rest of the force.

By plotting the monthly figures for these offenses we can obtain a better idea as to how CCTV has affected these types of incident. Figures 1 and 2 refer to burglary and criminal damage respectively. In the graphs, each month's figures are represented as a percentage of the base figure, which for these charts is the number of incidents that occurred during January 1991. To make the comparisons clearer, quarterly moving averages of the monthly indices have been represented. The graphs show that for the CCTV area, the No CCTV area and Byker, the numbers of burglary and criminal damage incidents were all declining before the cameras were installed. After the cameras were installed, the rate for these incidents fell dramatically within the CCTV area. There have also been reductions in the No CCTV areas, but these reductions are more gradual, especially in the case of burglary. It is particularly interesting to note that the fall within the CCTV areas occurred after the cameras were installed but before they became fully operational. This suggests that in the first instance the presence of cameras was deterring crime. Unlike many other crime prevention initiatives, however, the effect has been sustained which suggests that further action has consolidated and continued the initial effect.

The effect of cameras on vehicle crime is harder to discern (data can be found in Brown, 1996). Thefts of and from vehicles were declining in the CCTV area, the No CCTV and the Byker division prior to installation of the cameras. After the cameras were installed, thefts of vehicles have continued to decline sharply within the whole of the central division whereas the vehicle theft rate for Byker seems to have stabilized. In the CCTV area,

however, this effect appears to fade after 8 months and the number of thefts of vehicles rises sharply. After September 1993 the trend for the CCTV area becomes similar to that in other areas.

The effects of cameras on juvenile disorder incidents and 'other' thefts are not as clear as for burglary (see Brown, 1996 for data). Incidents of juvenile disorder were increasing sharply in the CCTV and No CCTV areas of the central division prior to installation of the cameras. Such an increase is not evident in the figures for Byker, or indeed the rest of the force. When the cameras became fully operational, juvenile disorder incidents fell very sharply in the CCTV area, despite a sharp increase in such incidents prior to Christmas 1993, the figures have continued to fall. During the same period, there have been gradual increases in the numbers of this type of incident within Byker and the rest of the force. There has also been a sharp decrease in juvenile disorder in the No CCTV area, but the reduction does not coincide very well with either the installation or operational use of the cameras. Other thefts also appear to have decreased in the CCTV area since the installation of cameras despite a rise in the number of offenses prior to Christmas 1993. However, evidence for the effect of cameras is weaker.

EFFECT OF THE CCTV SYSTEM ON ARRESTS AND INVESTIGATION

In order to look in more detail at how the cameras may be affecting crime rates within the Newcastle Central area, figures concerning arrest rates were made available to the researchers. Unfortunately these figures were only available on a divisional basis and could not be broken down into the CCTV and No CCTV areas. Moreover, there were no directly comparable categories for 'other' thefts and juvenile disorder. However, they can be used to give some indication as to whether or not the camera system is helping to improve the arrest rate for some types of offense.

Table 2 shows that the average monthly number of arrests for both burglary and criminal damage have fallen since the cameras became fully operational. In both cases, however, the reduction in the arrest rate is considerably lower than the decrease in the number of incidents. This means, therefore, that for burglary and criminal damage the risk of arrest has increased since the cameras were installed within the central division.

For theft of and from vehicles, arrests and incidents have dropped by similar amounts, which indicates that the risk of arrest for these offenses has remained more or less stable. It is interesting to note that the number of arrests for drunken offenses has increased sharply despite a small drop in the number of incidents. This means that the risk of arrest for drunken offenses has increased considerably since the installation of the cameras.

The personal experience of one of the five current camera operators supports these data. Between March and November 1994, one operator was directly responsible for just over 100 arrests. Almost half of these arrests were for drunken offenses, public order offenses or assault offenses. This shows how useful the cameras can be in controlling disorderly behavior, especially that fueled by alcohol. It is important to bear in mind that public disorder and assault incidents within town centers can have serious consequences. In late 1994, the operator noticed and alerted police officers to an assault which subsequently became a murder investigation. Just after 11:00pm one Sunday evening the operator saw a person lying in the street. He looked around the area and then noticed two people who appeared to be attacking members of the public indiscriminately. One of the assailants then walked up to another person at a bus stop and hit him. The victim fell over and, as he fell he knocked his head on the curb. At this moment a bus drew up. The assailants then got on

the bus, but by this time the CCTV operator had alerted police officers. The officers arrived on the scene just as the bus was leaving and they managed to stop the bus and arrest the assailants. The victim later died of his injuries.

TABLE 2
AVERAGE MONTHLY ARREST RATES FOR NEWCASTLE CENTRAL BEFORE
AND AFTER THE INSTALLATION OF CAMERAS

	Average monthly number of arrests			Number of arrests per 100 incidents	
	Before CCTV	After CCTV	% change in arrests	Before CCTV	After CCTV
Burglary	24	18	-25%	21	28
Criminal Damage	22	21	-4%	16	20
Theft of Vehicles	22	14	-36%	12	13
Theft from Vehicles	8	5	*(-37%)	7	6
Drunken offenses	101	127	+26%	65	85

*Base figure is less than 20

Two important points are raised by this particular case. The first is that officers have to be able to respond to incidents very quickly. Without a rapid response, the assailants may have escaped on the bus before officers attended the scene. It would then have been more difficult and more time consuming for investigating officers to identify the assailants from the pictures recorded by the system.

The example also illustrates the evidence gathering properties of the system and its value in directing investigations. Even though many people witnessed this event, the availability of a tape recording of the incident is estimated to have saved the force thousands of pounds in resources and time spent investigating the case. Recordings of disturbances, which sometimes involve several people, are especially useful because they provide the police with hard evidence which can be used to resolve discrepancies raised by the accounts of an incident given by different people.

Summary of Experience with CCTV in Newcastle

The findings presented here provide compelling evidence that initially the presence of CCTV cameras within Newcastle city center had a strong deterrent effect on the incidence of a number of offenses. However, there is also evidence to suggest that the effect of the cameras on some offenses began to fade after a period of time, although it is important to note that the central division is faring better than the control division and the rest of the force. The use of cameras has had a lasting effect on burglary and criminal damage. This may be due to the increase in risk of detection associated with these two types of offense in the central area.

On the basis of the evidence presented here, the number of public disorder incidents has remained unchanged since the installation of the cameras. But as the case study and arrest data show, the strength of CCTV systems might lie less in preventing these offenses (which, it is argued, will occur regardless) than with coordinating a quick, effective

response and gathering evidence should it be required. A quick response may mean that officers are able to diffuse a situation before it becomes serious, or at least reduce the harm done to one of the participants. Providing evidence can direct investigations, saving officers both time and money.

It was not possible as part of this study to collect any data concerning the use of CCTV evidence in the prosecution process. Peter Durham, the local police commander claims that:

Almost all of the 400 people arrested as a direct result of the scheme admitted guilt after being shown video footage, therefore avoiding the considerable costs associated with contested trials. (Durham, 1995: 20).

Although it is impossible to say how many of these 400 would have been arrested and then gone on to plead guilty in the absence of any video footage, the indication is that the system has contributed significantly to the prosecution process.

For all the offenses examined above, there is little evidence to suggest that crime has been displaced either to other locations or from one type of offense into another. In fact there is some evidence that there has been some "diffusion of benefit" to the No CCTV area especially for criminal damage and burglary offenses, i.e. the beneficial effect of CCTV extends beyond the area immediately supervised by cameras to neighboring areas which are not directly covered.

Summary of Experience with CCTV in Birmingham

Self report data concerning victimization indicated that crime had been reduced in streets where there was a good CCTV view. Moreover evidence from an analysis of crime data suggested that the presence of cameras had had most effect on robbery and theft from the person. There was also evidence to suggest that the cameras may have acted in conjunction with pedestrianization and other traffic calming measures to reduce the incidence of burglary within the city center.

Both the survey data and the recorded crime data indicated that offending had increased in areas where there was partial or no camera coverage which suggests that some locational displacement of crime may have occurred. This was most evident for robbery and theft from the person. It is unclear, however, how far the increases in these offenses in surrounding areas are a direct result of crime displacement, or of an increase in opportunities within these areas. It is possible that the extensive redevelopment that had taken place within areas outside the central zone, which had resulted in an increase in the number of entertainment venues, may have increased the number of potential targets for this type of offense.

Evidence from an analysis of recorded crime data, however, does point more convincingly to displacement of criminal activity to theft from cars and, in particular displacement of offending from robbery and theft from the person into theft from cars. The charts for these two offenses are almost mirror images of each other. In one area, robberies and thefts from the person remained relatively stable, whereas thefts from vehicles increased significantly; for the surrounding areas the opposite is the case.

It appears that the presence of cameras had a distinct and complex effect on the pattern of local offending. Within the city center area, the system had perhaps acted to curb the increase in certain types of offense, namely robbery and theft from the person, rather than reduce their overall incidence. It had achieved this by reducing crime in those areas with

good camera coverage but there was also considerable evidence that offending was more common in those areas where there was little or no coverage.

A number of factors may have been responsible for the apparent effects. The city center, unlike Newcastle, covers a wide area and extends well beyond the area covered by the cameras. There are also a greater number of natural obstacles, such as street furniture and trees. This presented a difficult environment for effective CCTV surveillance and meant that there were a number of locations that crime could be displaced to, and as crime was displaced over time from one area to another, it changed in nature. For example, the cameras may have helped to prevent crime, predominantly robbery and theft from the person, on those streets with camera coverage within the city center core area. However, crime may have been displaced to other local areas, such as the recently developed convention area of the city and car parks. Within the convention center area, robberies and thefts have apparently increased. Because of local circumstances, the displacement of offending to car parks has manifested itself in theft from rather than of vehicles.

It is also important to recognize that because Birmingham was one of the first city center schemes in the country, the police and county council could not learn from the experience of others and this may have been reflected in the way that they set up the scheme in the first place. Citywatch recently commissioned a review of the system which recommended that camera positions should be modified in the light of changes suggested by Aldridge (1994).

The failure of the camera system to reduce directly overall crime levels within Birmingham city center does not detract from the other less evident benefits of the system. The system has helped police officers working within this area deal with many problems, most notably a wide range of public disorder/public safety problems. It has also increased the public's feelings of safety when using the city center at night, and this may be as important for the city center as an area as any real reduction in crime.

Summary of Experience with CCTV in King's Lynn

There was evidence to suggest that the use of cameras within King's Lynn had reduced the incidence of various types of offenses, most notably burglary, but to a lesser extent assaults and possibly vehicle crime. The fact that the cameras had been involved in over 80 arrests for property offenses and almost 100 arrests for public order offenses reinforced the point that it was action precipitated by cameras which led to these effects.

The findings illustrate the extent of surveillance that the CCTV systems can provide in towns like King's Lynn. Operators noticed over 2000 incidents in a 32-month period, of which only 16% resulted in police officers contacting a suspect. In most of these cases, the police chose not to respond. There were also a similar number of incidents where the movements of people were monitored at the request of staff from other agencies.

The results illustrate how useful the camera system can be in helping the police carry out their day-to-day duties. Demands on the police are considerable but officers are often alerted to many incidents where a police response, especially an immediate police response, is inappropriate or unnecessary. Moreover, by the time many incidents come to the attention of the police, they cease to require a police response.

In an environment such as King's Lynn, the cameras were very helpful in determining whether an incident required a police response and what that response should be. In this respect, the system helped manage police resources more effectively.

The findings reinforce the point raised by the Newcastle case study, that the cameras

were at their most effective in dealing with crime when they were integrated into a command and control strategy, and were used to discover incidents and coordinate an appropriate police response. It was often the case that incidents occurred within range of the cameras but were not noticed by operators. In these cases, investigating officers viewed tape recordings of the area where an incident had taken place. Although these tapes were viewed regularly during the course of an investigation, they only provided useful information very occasionally.

Conclusions

THE POLICE USE OF TOWN CENTER CCTV SYSTEMS

The police use town center camera systems in a number of ways to tackle criminal and anti-social behavior. The primary use of camera systems within town centers is as a tool to "patrol" these areas effectively and discover incidents as they occur. The police use the information provided by the cameras to coordinate suitable responses to these incidents, whilst gathering evidence that can direct the investigation of an offense and secure the swift conviction of an offender. Although camera footage is used in helping detect an offender after an event has occurred, this is a less common and less effective way of having an impact on crime.

Overwhelming evidence from the case studies indicates that cameras are used most often to deal with conspicuous anti-social and criminal behavior, most notably various small scale public order problems, ranging from unruly nuisance behavior to fighting and assaults. Even though many of these offenses may appear trivial in nature, they can be a significant problem for town center management. If problems such as littering, vandalism and loitering within town centers are not tackled responsibly and effectively, they may get worse. A town center may be perceived as dirty and/or dangerous which, in turn, not only deters legitimate users (URBED, 1994) but also may attract potential offenders (Kennedy, 1990; Murray, 1983). It is also important to remember that a significant minority of arrests attributable to the camera systems relate to other types of crime such as robbery, theft and burglary.

The information provided by camera systems is also very useful in helping the police to manage their resources more effectively. Almost one third of all calls to the police are false alarms (Waddington, 1993; Ekblom and Heal, 1982). Camera systems, therefore, can give some indication as to whether or not a police response is required at all.

THE EFFECT OF CCTV ON PROPERTY CRIME IN TOWN CENTERS

The findings from the case studies indicate that CCTV camera systems can help reduce the incidence of property crime within town centers. In Newcastle and King's Lynn, and to a lesser extent Birmingham, property crime has reduced in those areas covered by cameras. This refers mainly to the burglary of shops, but also to theft of and from vehicles.

The evidence from the Newcastle and King's Lynn case studies suggests that initially the presence of cameras deterred all the types of property crime examined. It also appears that the effect of the cameras on some of these crimes may have faded over time to a certain extent. Within the time period examined, however, there were net reductions in these offenses in areas with camera coverage.

What appears to be the important factor in sustaining the effect of cameras on property

offenses is that the risk of arrest for these offenses is increased. In Newcastle, for those offenses where there is evidence for a sustained effect, the risk of arrest is increased. This suggests that the presence of cameras within an area may initially deter criminal behavior, thus accounting for dramatic reductions in crime often observed and widely publicized for schemes around the country. What sustains this effect, however, is a real increase in arrest rates for certain offenses.

THE EFFECT OF CCTV ON PERSONAL CRIME IN TOWN CENTERS

The effect of cameras on personal crime is less clear. In the large metropolitan districts, the cameras seem to have had considerably less impact on overall levels of public order and assault offenses. Within King's Lynn, a smaller market town, there is evidence to suggest that cameras have reduced assaults in those streets covered by cameras, but the numbers of incidents are small and this reduction occurred after the cameras had been operational for some months.

The benefit of the camera systems in dealing with offenses such as assault, however, may lie less in their deterrent effect but more in the way they help officers deal with such offenses. Camera systems can benefit police officers in dealing with assaults and disorder in two ways. First, they can help to coordinate a quick and effective response which may reduce the seriousness of the incident. Second, they can be used to gather evidence that might be used in the investigation of an offense and the swift conviction of an offender. Such evidence might be otherwise difficult and resource intensive to collect. In areas such as King's Lynn, where these types of offenses are relatively rare and where resources are less stretched at the relevant times, the incidence for these types of offenses may eventually decrease in areas covered by cameras.

The presence of CCTV cameras within the study areas has had little overall impact in the incidence of robbery and theft from the person. The rates for these types of offenses did not decrease after the cameras were installed in either of the two areas where these types of offense were examined. However the findings from the Birmingham case study suggest that the cameras have helped to contain the problem of robberies and personal thefts within an area, possibly by reducing their incidence in areas where there is a good camera view. The fact that the system in Birmingham has led to the arrest of offenders for these types of offense supports this notion. However, it seems as though these offenses are more easily displaced to town center areas or streets that are not covered by cameras, but are still routinely used by members of the public.

DISPLACEMENT AND DIFFUSION

The displacement of crime is a major issue in the evaluation of any situational crime prevention measure. It is very difficult, especially using quantitative crime data, to identify displacement correctly. To identify displacement (or even the effect of cameras on offending behavior) using these data, one has to infer the intentions and beliefs of offenders (Gabor, 1990).

There is evidence to suggest, however, that some displacement of crime has taken place. The findings that the likelihood of crimes being displaced by the cameras depends on the nature of the offense, the types of area the cameras are located in and the extent of the camera coverage within this area. Personal crimes such as robbery and theft from the person appear to be more easily displaced. This may be because the number of "suitable" victims is greater than for property crime, especially in locations where the town or city

center extends beyond the area covered by cameras and the layout is complex.

As evidence of this, some displacement of robbery and theft from the person seems to have occurred in Birmingham. In this location, the city center area extends into a neighboring police division, well beyond the area covered by cameras. There are many places within the town centers that have no camera coverage but are still used by potential victims; consequently offending may move from those areas that have coverage to that areas where there is partial or no coverage. Moreover in Birmingham, as crime has been displaced to different areas, it has manifested itself in different forms, especially theft from vehicles.

Property crime on the other hand, is easier to control using cameras and because of its nature is less likely to be displaced within town centers. In Newcastle, where the extent of camera coverage within the town center is high, there is no evidence which indicates that property crime has been displaced, either by location or offense type. In fact, it appears that there may have been some diffusion of benefits.

The implications of these findings are that in order for a camera system to be effective within a town center, there needs to be a high degree of coverage. There is also no guarantee that acquisitive personal crimes such as robbery will not be displaced to surrounding areas, especially if these areas are routinely used by both potential victims and motivated offenders. If a town center area has many side streets and other premises such as car parks, it will require many cameras and several operators to make such a system effective. This has obvious resource implications. However, the cameras can in some instances liberate resources by cutting down considerably on the number of false alarms that police patrols are required to attend.

A number of issues also emerge from this and other studies which have looked at the effect of CCTV on crime. The first is that CCTV seems to work best when it is part of a package of measures, which in this case is a general command and control strategy. With packages of measures it can be difficult to separate any individual element and point to it as a source of success, and so in this case simply installing cameras is no guarantee that crime will reduce in the long term. What is important is the way in which CCTV is used as part of an overall strategy for policing town centers. Secondly, as is common with many crime prevention efforts, the effectiveness of packages that include CCTV may wear off over time. In order to sustain an effect, the cameras must play a part in the apprehension of offenders, and other conditions must be altered to improve the potential of CCTV to have this effect. Camera successes can then be publicized, reinforcing the message for offenders that there is an increased risk of being caught.



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