

CCTV AND DISPLACEMENT OF CRIME EVALUATING CASE STUDIES IN AMSTERDAM

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Organisation	DSP-groep
Location	■ Amsterdam, Netherlands
Trigger	■ Commission to evaluate CCTV and displacement
Causes of crime	<ul style="list-style-type: none"> ■ Lack of surveillance ■ Offenders' perception that risk of getting caught is low ■ Lack of capable guardians ■ Lack of detection and punishment of offenders
Objectives of evaluation	■ To determine whether CCTV results in crime being displaced
Interventions	■ CCTV
Enablers	<ul style="list-style-type: none"> ■ Funding for evaluation conducted by DSP-groep ■ Consultancy with experience of evaluating design-led crime prevention interventions
Tensions	■ Belief that CCTV is ineffective may undermine its ability to change offenders' perceptions of risk
Impact	<ul style="list-style-type: none"> ■ CCTV reduced crime ■ Crime was displaced only in relation to some types of crime and the net result was positive ■ The impact of CCTV on fear of crime is unclear
Lessons learned	<ul style="list-style-type: none"> ■ CCTV can reduce crime and does not necessarily result in displacement ■ A good research design and an understanding of crime prevention theory are essential to effective evaluation ■ Sometimes data collection is limited by time, resources and lack of availability of evaluators prior to a project starting ■ Further research is required to explore the mechanisms through which CCTV works.

Synopsis

CCTV is widely used in the UK and the Netherlands. Most studies that have tried to assess the amount of displacement caused by CCTV have found that displacement can occur, but that only rarely can complete displacement be observed. The net result has therefore always been positive, and an evaluation of three CCTV schemes in Amsterdam confirms these findings. These schemes showed positive results in the CCTV areas themselves. Police and survey data in and around the areas show that crime decreased, and a slight but significant reduction in fear of crime could be observed in one of the three areas. There were no signs that fear of crime had been displaced to adjacent areas. A slight decrease in crime in the streets surrounding the CCTV project could be observed. However, there are differences in the degree of displacement of different types of crimes. Assaults, muggings, and thefts from cars increased significantly in the so-called 'probable displacement area'. The reasons for these differences in displacement are explored.

Introduction

The first projects using security cameras—or Closed Circuit Television (CCTV)—in public spaces in the UK date back to 1990, when three town centres had approximately 100 cameras. In 1997, there were an estimated 167 schemes with 5,238 cameras and by the end of 2002, 500 schemes with 40,000 were predicted (Armitage, 2002). In the Netherlands, use of CCTV dates back to 1997. Only six years later in January 2003 more than 80 of the country's 550 municipalities were using CCTV in public places—in entertainment districts, shopping centres, car parks, industrial areas and public transport. In other European countries crime prevention experts, such as the Danish Crime Prevention Council, support the use of CCTV, although its level of implementation depends on national laws governing privacy. Denmark, for example, currently has no Act governing the use of CCTV, but it is forbidden to take unwarranted photographs of people when they are in a private area—somewhere that is not accessible to the general public. It is also forbidden for agencies other than the police to use CCTV to survey streets, public places or other ordinary traffic movement (Sanko and Davey, 2003).

The effectiveness and value of CCTV is the subject of much debate across Europe. A UK Home Office review of 24 methodologically sound evaluations in the UK suggests that effectiveness depends on context. Two of the four public transport studies and six of the twelve studies of city centres and public housing showed CCTV had positive effects, although the crime reduction effect was small—a 3 per cent reduction in incidents of crime. Five of the six car parks showed that CCTV had a significant positive effect, with crime reduced by 45 per cent compared to control areas (Armitage, 2002). However, the effect on fear of crime is less clear (Armitage, 2002; Ditton, 1998). The Danish Council for Crime Prevention warns that CCTV surveillance may create a false sense of security or, alternatively, make some people feel insecure because they perceive surveyed places as being of higher risk (Sanko and Davey, 2003). It should also be noted that crime prevention initiatives follow a finite 'life-cycle', with effectiveness of CCTV declining after eight to twelve months, unless publicity is maintained (Armitage, 2002; Armitage *et al*, 1999; Tilley, 1993).

Policy-makers considering implementing CCTV have to consider whether it is cost-effective. Westminster City Council in the UK (www.westminster.gov.uk) estimated that the capital cost for each camera was around £20,000 and the annual revenue costs around £12,000, although actual costs obviously depend on level of monitoring. Undesirable consequences of CCTV include discrimination towards males, particularly black males (Armitage, 2002) and invasion of privacy (Sanko and Davey, 2003).

In recent years, more and more Dutch and UK research has been published on the effects of CCTV (see reviews by Armitage, 2002 and Hesseling, 1994). However, few studies have been methodologically valid due to (Armitage, 2002):

- Inadequate pre and post CCTV time periods in which data is collected
- No account taken of seasonal variations
- No control areas for comparison
- Presentation of percentages without 'n' values (i.e. the size of the sample was not specified); lack of independent evaluation
- Little discussion of displacement or diffusion of benefits.

Indeed, displacement of crime has received relatively little attention in the research, despite being at the forefront of political and public debate on the effectiveness of CCTV and crime prevention interventions. This paper will focus on displacement by presenting the empirical results of a CCTV evaluation in the city of Amsterdam. But first, this paper examines theoretical issues regarding displacement and international research on its relationship to CCTV.

Displacement theory and international empirical findings

Displacement means that criminal behaviour is continued at a different location or in a different way as a result of preventive measures. In the literature a distinction is made between five types of displacement (Felson and Clarke, 1998).

- *Geographical displacement* – The same offence is committed in a different area.
- *Temporal displacement* – Offenders commit the same offence, but at a different time, for example during the period when the camera is not operating.
- *Tactical displacement* – The way in which the offence is committed (the modus operandi) changes. For example, offenders take measures to ensure that they cannot be identified.
- *Target displacement* – Criminal behaviour focused on a different target.
- *Crime type displacement* – In this type of displacement, an offender switches the type of crime they normally commit to one that is less easy to recognise on camera.

Combinations of the above types of displacement are also possible.

Almost all international research on crime displacement shows that the net result of the preventive measures taken is positive. Sometimes there is displacement, but it is never complete. The first systematic research on crime displacement was conducted in the 1990s. The first studies from Canada (Gabor, 1990) and the United States (Eck, 1993) showed that displacement was a much smaller problem than was generally assumed. The most authoritative international study came from the Netherlands (Hesseling, 1994). A total of 55 projects from eight countries, including Great Britain, the United States and the Netherlands, were studied. In 16 studies, no displacement effect was observed and in 33 studies, partial displacement was observed. In six studies, the preventive measures had an effect not only in the project area but also beyond—a positive knock-on effect known as a 'diffusion of benefits'. The study concluded that displacement is a possibility, but that it is certainly not a natural consequence of crime prevention or crime reduction schemes.

A striking finding was that the limited nature of displacement appeared to be true for all offences. Striking because it was generally assumed that certain offences, for instance drug-dealing, are almost completely autonomous and not able to be influenced by preventive measures. Addicts and drug-dealers depend on this type of crime and will therefore find another place, time or way to close the deal. This assumption proved to be untrue; Cromwell *et al* (1991) showed that addicts take into account the consequences of their actions and are in fact influenced by preventive measures. Other research showed similar findings (Chenery *et al*, 1991; Brown, 1995).

Research into crime displacement as a result of CCTV is still quite rare, although some research into CCTV does pay explicit attention to this issue:

- In Birmingham, England, it appeared that CCTV did not lead to geographical displacement, but that it did lead to functional—or crime type—displacement: mugging and pickpocketing decreased, whereas theft from cars increased (Brown, 1995).
- In Newcastle, England, no geographical or functional displacement effects were observed. Here, there was even a positive knock-on effect outside the camera area and in particular with respect to vandalism and burglaries (Brown, 1995).
- In Airdrie, near Edinburgh in Scotland, indications were found that CCTV led to positive effects in the camera area *and* outside the area (Short and Ditton, 1995)
- In the centre of Copenhagen, CCTV led to a decrease of mugging in the group of offenders who were not dependent on the money. Among those who were dependent on the money, mugging increased (Carstensen and Birkholm Frederiksen, 1995).
- In Doncaster, England, no displacement was observed. According to the author, the observed increase in the control area was a consequence of 'pre-existing trends' (Skinns, 1998).
- In Ilford, England, it was shown that mugging and burglary was displaced from the city centre, where the cameras were located, to the surrounding neighbourhoods (Squires, 1998).

- In Burnley, CCTV had a positive knock-on effect for violent crime and car crime. Burglary did seem to have been displaced (Armitage *et al*, 1999)
- In Cincinnati, no displacement was found in one of the two projects studied; it was found in the other. In that project there seemed to be a shift in the offenders' activities, "given the increase in the number of civilian phone calls to the police" (Mazerolle *et al*, 2000).
- In Cambridge, England, where 30 cameras were installed in the city centre, crime proved to have dropped, but less than in the surrounding area. The researchers qualified this as an undesired effect of CCTV; the number of reports to the police and crimes logged by the police increased, while surveys showed that the number of offences had not decreased (Farrington *et al*, 2002).
- In England, an evaluation of two car-parking facilities found that an adjacent car park not covered by CCTV also showed reductions in crime (Poyner, 1992a).
- The same researcher also found evidence of diffusion of benefits when cameras were fitted to a selection of buses, as vandalism reduced throughout the whole fleet (Poyner, 1992b).

Summarising these results, partial displacement was observed in two cases. In the other cases, there was either no displacement at all (two projects), a positive knock-on effect outside the camera area as well (four projects), or the results were not clear. All in all, the balance in displacement research specifically focusing on CCTV seems to tend towards positive net results, thereby confirming the general theory on displacement.

The degree to which displacement occurs could well be attributed to the perceptions of potential offenders (Clarke, 1992). CCTV may act as a 'deterrence'—the potential offender becomes aware of CCTV, decides that the risk of offending in the location outweighs the benefits and chooses either not to offend or to offend elsewhere (Armitage, 2002). Indeed, this would explain why cameras have showed the most significant reductions immediately after being installed, even before they were actually operational (Brown, 1995).

If offenders perceive preventive measures to be limited to a specific area (or specific time, specific target, etc.) there is a high probability of displacement. When, on the other hand, offenders feel that this specific measure is just one of many ways in which the authorities are clamping down on crime in general, a specific preventive measure like CCTV can contribute to an improvement beyond the area in which the measure was originally implemented. Hence, the perceived scope of a preventive measure may be bigger than its objective scope. Some research even shows that preventive measures in one area can have a positive knock-on effect: not only did the situation in the target area improve, but positive effects were also measured in areas outside the target area itself (Bennet and Wright, 1994; Hesseling, 1994).

CCTV cameras may produce self-discipline through fear of surveillance, whether real or imagined. Victims may be reminded of the risk and alter their behaviour accordingly. Offenders may police their own behaviour, whether the cameras are monitored or not (Armitage, 2002). This may be linked to Foucault's discussion of Bentham's panopticon, where the threat of surveillance resulted in prisoners policing their own behaviour (Foucault, 1991).

Displacement probably depends to a considerable degree on the type of offender involved. One useful division in types of offenders is that between generalists and specialists. Generalists are flexible in their criminal behaviour and will find alternative ways to commit offences when confronted with preventive measures. For example, if there are cameras inside shops, these offenders could switch to street-mugging or car crime. Displacement is therefore likely if the offenders active in an area are generalists. Specialists, on the other hand, are not as flexible because they have a specific skill (e.g. burglary of a certain type of residence, or theft of or from a certain brand of car). Their ability to displace their criminal activities is limited. It may therefore be expected that the introduction of CCTV in a certain area, specifically targeted at protecting the objects they favour, will not lead to displacement but to a decrease of the number of offences they commit.

The potential for displacement or diffusion of benefits may also depend on how CCTV is used. CCTV may allow those monitoring the scene to act as *'capable guardians'* and determine whether police assistance is required, thus ensuring police resources are only called upon when required. Images of offences taking place may also be used to detect and punish offenders (Armitage, 2002). The removal of some prolific offenders could significantly reduce crime in the local area.

Case study of three CCTV schemes in Amsterdam

In Amsterdam, three experiments with CCTV in public areas were conducted. One experiment started in 1997 (Kraaiennest), one in September 2000 (August Allebéplein) and one in mid-2001 (Belgiëplein). All three areas are medium-sized shopping areas surrounded by houses and apartment buildings. The character of the three areas differs considerably. The first, the Kraaiennest scheme is located in a part of Amsterdam generally regarded as a problematic area. The other two areas are less problematic, although here too, the level of crime and incivilities is relatively high compared to the average situation in the city.

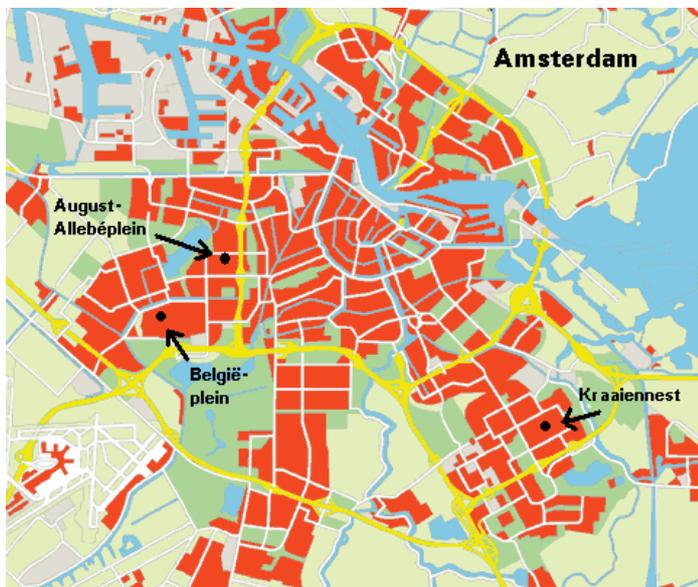


Figure 1: Map of Amsterdam showing the three CCTV locations

The CCTV scheme in Kraaiennest is not only older than the other two, but also larger. Here, twenty cameras are operational, the images are recorded permanently and preserved for seven days in order to enable police investigations after crimes have been committed. The monitors are watched by operators from Monday to Saturday from 8 a.m. until 10:30 p.m. The two other schemes in the western part of Amsterdam are smaller, with four cameras operating in August Allebéplein and five in Belgiëplein are operational there. An operator is only present during so-called 'peak hours', these being Thursday, Friday and Saturday from 3 p.m. until 11 p.m. Images are never recorded here, unless an operator is present and he or she decides it is useful to do so.

The aims of the three CCTV schemes differ. In the two projects in the West of Amsterdam (August Allebéplein and Belgiëplein), the aim was mainly to do something about loitering youth and, to a lesser degree, prevent street fights and robberies. The business community in these areas were a powerful voice for the introduction of CCTV. The other scheme (Kraaiennest) was mostly targeted at trouble caused by drug dealing and drug use. There were also a large number of muggings in the area. In an attempt to turn the tables, CCTV was chosen as one of a larger number of preventive measures to be introduced.

In the summer of 2003 CCTV will also be introduced in a notorious part of the old city centre—the Red Light District—known for its drug dealing, drug use and prostitution. Since a research design with two sweeps of surveys will be used here as well, results from that evaluation will not be available until 2005.

Research process

In the beginning of 2001, the city of Amsterdam asked the private research and consultancy bureau DSP-groep to carry out an evaluation of the three CCTV experiments then running (Flight and Van Heerwaarden, 2003). The research process consisted of the following four steps:

1. A literature study of national and international research on the effects of CCTV, with special focus on displacement effects.
2. An analysis of police records for the year before and the year following the introduction of CCTV in the three different areas. Also, in order to be able to control for large scale trends in recorded crime, police records were analysed for the wider areas surrounding the CCTV areas. These were the police team area (approximately 5,000 inhabitants), the police district (of which there are eight in the city of Amsterdam) and the police region of Amsterdam (with around three-quarters of a million inhabitants). Since the cameras were not installed at the same time, the time periods analysed differ by location. In Kraaiennest and August Allebéplein the research was divided into a 12-month period before and a 12-month period after September 2000. At Belgiëplein, the start of the project was later: therefore, the two periods analysed here were the year preceding and the year following March 2001.
3. A survey conducted in two sweeps one year apart—June 2001 and June 2002. It should be noted, however, that Kraaiennest (start of CCTV scheme 1997) and at August Allebéplein the first sweep of surveys (June 2001) was conducted after the cameras were installed. In the case of August Allebéplein the surveys were conducted a few months after the CCTV installation. Therefore, in these two areas, the first sweep of surveys cannot be regarded as a proper pre-measurement. Given the possibility that CCTV has its biggest effects in the first weeks after installation, the results for these two areas have to be interpreted with great care. Three groups of users of the areas were interviewed: shopkeepers in the squares (the same people were interviewed in the first and second sweep), inhabitants (minimum of 100 at each location), and visitors (minimum 100 at each location).

Overall, 2,000 questionnaires were completed; the number of inhabitants surveyed per sweep were as follows:

Number of respondents (inhabitants only) per sweep per location

August Allebéplein first sweep	126
August Allebéplein second sweep	113
August Allebéplein displacement first sweep	98
August Allebéplein displacement second sweep	117
Belgiéplein first sweep	175
Belgiéplein second sweep	179
Kraaiennest first sweep	96
Kraaiennest second sweep	121

4. In-depth interviews with police officers, camera operators, policy-makers and others involved in the organisation and deployment of CCTV in the three areas. This part of the research was mostly used to put the other findings into perspective, and it addressed crime and 'Incivilities'—a concept introduced by Skogan and Maxfield (1981). In the surveys in Amsterdam this concept was defined as '*verbal aggression*' and '*trouble caused by groups of youngsters*'.

The most important research questions to be answered were:

- Does CCTV reduce crime and incivilities (e.g. loitering youth, verbal aggression, etc.)?
- Does CCTV make people feel safer?
- Does CCTV displace crime and incivilities?
- Does CCTV lead to a shift in fear of crime or feelings of insecurity from the CCTV areas to other (adjacent) areas?

In view of the attention given to the problem of displacement, it was decided to invest a considerable part of the research budget in this subject. An area was chosen where there were no cameras, but which was likely to become a displacement area. The streets surrounding one of the CCTV-areas, the August Allebéplein, were chosen because of the high displacement risk in this specific area. The streets around August Allebéplein share some important characteristics with the square itself, as there are shops in both locations and the areas are similar in many other respects. The selected 'probable displacement area' is next to August Allebéplein, as it was envisaged that offenders would shift their activities 'round the corner' without too much trouble. In fact, immediately after installation of the cameras on the square, there was the feeling among some residents, politicians and police officers that car-thefts were displaced from the square itself to the other side of an apartment building located on one side of the square. Therefore, if displacement did occur, it would probably occur here, making it an ideal area to test the displacement hypothesis. It should be noted that as this square was specifically selected because its high probability of displacement, the results cannot be generalised to the two other locations, let alone to CCTV schemes in general.

To test the displacement theory, exactly the same research activities were undertaken in the streets surrounding August Allebéplein: two sweeps of surveys among inhabitants, visitors and local shopkeepers, an analysis of police records and in-depth interviews with local officials and police officers. Of course, it would have been even better if this 'extra' research could also have been carried out in the two other areas, but there was insufficient budget for that option. However, police records were analysed for the surroundings of the other two CCTV areas, and some extra questions were asked in the surveys among residents and visitors to assess the amount of displacement experienced or observed by them. So, an indication of the amount of displacement for the other two areas can also be given, albeit indirectly.

Reduction of crime, incivilities and fear of crime

Though not very reliable (due to the fact that a lot of crime goes unrecorded), the police figures for five types of crime (street robbery, assault, hold-up, burglary and car crime) show a collective decrease in the three CCTV areas from 436 a year to 362 a year (a drop of 74 incidents) Meanwhile, the figures for the surrounding police team area, police district and the whole Amsterdam police region show a rising or more or less constant trend.

The surveys among residents of the CCTV areas show a marked, 23% decrease in incidents as shown in table 1.

	2001	2002	Change
Mugging	5%	7%	+ 2%
Burglary	4%	6%	+ 2%
Pickpocketing	5%	4%	- 1%
Theft from car	16%	15%	- 1%
Assault	8%	6%	- 2%
Bicycle theft	8%	5%	- 3% *
Trouble caused by groups of youngsters	28%	23%	- 5%
Verbal aggression	25%	18%	- 7% **
Other offences/incivilities	11%	4%	- 7% ***
Total number of crimes/incivilities (absolute)	438	362	-23%
Number of respondents (absolute)	397	413	

Significance level:

* $p < 0.10$

** $p < 0.05$

*** $p < 0.01$

Table 1: *Type of crime and incivilities:
Victim percentage among residents in all three CCTV areas*

The vast majority of residents do occasionally feel unsafe in all three areas investigated. This was shown in the 2001 survey as well as in the 2002 survey. The proportion of residents indicating they felt unsafe once in a while in 'their' CCTV area was roughly three in every four (Belgiëplein and Kraaiennest), but rose to 91 per cent (August Allebéplein, 2001 sweep). No significant improvement between the 2001 and 2002 surveys was found, except on August Allebéplein, where the percentage of residents feeling unsafe decreased from 91 to 82 per cent during the year. So, as far as feelings of insecurity are concerned, a slight improvement could be observed in only one of the three CCTV areas.

Displacement of fear of crime, crime and incivilities

The Amsterdam research on CCTV focused strongly on the displacement of crime and incivilities, as well as fear of crime. This was largely due to the widely held belief of local authorities and policy-makers that cameras "won't help a bit because crime will simply be displaced round the corner".

Table 2 shows the results for August Allebéplein (the CCTV area) and the surrounding streets (the 'probable displacement area'). The figures for fear of crime show the change in the percentage of residents that are sometimes afraid of crime on the street in the CCTV area and in the streets around that area. It should be noted that in August Allebéplein, surveys were conducted among residents of the CCTV area itself and a separate survey was conducted among residents of the streets around the square (the so-called 'probable displacement area') so in this case the figures result from direct measurement. The question that was put to both groups was how safe they feel in their own street. At Belgiëplein and Kraaiennest there was only one survey; here the question was asked how safe one felt in the CCTV area as well as in the surrounding area (indirect measurement). Though no extra displacement area surveys could be held next to the Belgiëplein and Kraaiennest CCTV areas, a rough indication of displacement was available since these residents were not only asked how safe they felt in their own (CCTV) area, but also how safe they felt in the streets surrounding their CCTV area. So for Belgiëplein and Kraaiennest, the scores presented in table 2 could be called 'indirect' measures as opposed to the 'direct' measures that are available for August Allebéplein and its neighbourhood.

	CCTV area			surrounding area		
	2001	2002	change	2001	2002	change
August Allebéplein	91	82	- 9 % **	81	80	- 1 %
Belgiéplein	77	76	- 1 %	63	64	+ 1 %
Kraaiennest	78	82	+ 4 %	89	85	- 4 %

Significance level: ** p < 0.05

Table 2: *Fear of crime (% of residents who feel unsafe)*

Source: survey in two sweeps among residents of the three CCTV areas and the 'probable displacement area' area surrounding August Allebéplein.

As mentioned before, a significant improvement in the levels of fear was found in the CCTV area of August Allebéplein where the percentage of residents feeling unsafe decreased from 91 to 82 per cent (see table 2: -9%). This improvement has not led to an increase of feelings of insecurity in the area surrounding August Allebéplein (the 'probable displacement area'). Here, the surveys show nearly no change: the percentage of residents feeling unsafe decreased from 81 to 80 per cent (-1%). In the other two areas the effects are very limited in the CCTV areas as well as in the surrounding areas. All in all there are no signs that feelings of insecurity have been displaced.

At August Allebéplein, surveys among inhabitants showed that the number of crimes and incivilities in the CCTV area itself had fallen substantially between the 2001 and 2002 surveys. The total number of crimes and incivilities dropped from 230 incidents in the 2001 survey to 154 incidents the following year. In the 'probable displacement area' around the CCTV area the number of crimes and incivilities also dropped, but by far less—from 103 in 2001 to 97 in 2002. Table 3 shows the difference in victim rates for nine crimes between first sweep and second sweep at August Allebéplein versus the 'probable displacement area' (the streets immediately next to the square). See table 3 below.

	August Allebéplein (‘CCTV area’)			Streets around August Allebéplein (probable 'displacement area')		
	2001	2002	change	2001	2002	change
Verbal aggression	46%	34%	- 12 % *	23%	15%	- 9 %
Trouble by groups of youngsters	45%	36%	- 9 %	28%	19%	- 9 %
Bicycle theft	15%	7%	- 8 % **	11%	8%	- 4 %
Theft from cars	35%	27%	- 7 %	6%	13%	+ 7 % *
Assault	9%	4%	- 4 %	4%	10%	+ 6 % *
Pickpocketing	3%	3%	0 %	4%	7%	+ 3 %
Mugging	6%	7%	+ 1 %	6%	14%	+ 8 % **
Burglary	5%	8%	+ 3 %	9%	10%	+ 1 %
Other offences	18%	8%	- 10 % **	11%	3%	- 9 % **
number of respondents (absolute)	126	113		98	117	

Significance level:

* p < 0.10

** p < 0.05

Table 3: *Difference in victim rates for nine crimes between first sweep and second sweep*

Source: survey among residents 2001 and 2002.

Table 3 shows that the improvement is not equally distributed over all offences. Statistically significant results are found for verbal aggression (-12%), bicycle theft (-8%) and the group of 'other offences' (-10%). In the displacement area, the total number of crimes and incivilities also fell, albeit less spectacularly, by six per cent. However, three types of crime seem to have increased here: mugging (+8%), theft from cars (+7%) and assault (+6%). In the CCTV area itself, these crimes did not show a significant change; they either fell (theft from cars and assault) or stayed nearly constant (mugging). This suggests that these three types of crime might have been displaced.

For other types of crime and incivilities, positive effects can be signalled in the displacement area. A statistically significant improvement was found for 'other crimes' (-9%). Two types of crime suggest a positive development (verbal aggression and trouble caused by groups of youngsters; both -9%). Looking at these three crimes and incivilities, a decrease (sometimes statistically significant, sometimes not) can be observed in the CCTV area, indicating a positive knock-on effect.

The possibility of displacement was also a topic in the in-depth interviews held with experts in the CCTV areas: police officers, city council officials, the business community etc. Some of them were of the opinion that there was displacement, albeit partial, of crime and incivilities. They pointed mostly to loitering youth: after the introduction of CCTV these youngsters reportedly moved from the CCTV area in the middle of the square to the edges, into the doorways of houses and flats. This, in turn, has led to more minor confrontations between residents and youngsters. This has had a positive effect on their behaviour. When asked about more serious crimes such as car crime, muggings and bicycle theft, most experts seem to agree that there has been a partial displacement as well. However, these impressions were not supported by police and survey data.

One effect of CCTV has been the demand for more CCTV in other squares and streets. Officials hesitate to take this road because there may be other, less expensive, measures to tackle specific crime problems. Increasing CCTV schemes in problem areas could set in motion an almost insatiable appetite for ever more cameras among inhabitants of problem areas, shopkeepers and the public in general.

Discussion

Most studies that have tried to assess the amount of displacement caused by CCTV have found that displacement can occur, but that only seldom can complete displacement be observed. The net result has therefore always been positive (Armitage et al, 1999; Brown, 1995; Chenary et al, 1991; Gabor, 1990; Hesseling, 1994; Marerolle et al, 2000; Skinns, 1998; Short and Ditton, 1995). Our research in Amsterdam confirms these findings: some crimes may have been displaced, but the net result was positive: the total number of crimes committed in the CCTV area fell by 23 per cent according to the surveys, and there was also a slight crime decrease in the streets surrounding the CCTV project. The Home Office evaluation of CCTV in city centres and public housing found only a small reduction in crime of three per cent (Welsh and Farrington, forthcoming).

A clear difference between different types of crimes was shown, however. Assaults, muggings, and thefts from cars increased significantly in the so-called 'probable displacement area'. Brown (1995) also found evidence of geographic displacement for personal crimes such as robbery and theft from the person. On the other hand, there are some types of crimes or incivilities where a positive knock-on effect was indicated. Statistically speaking, this can only be concluded for the category 'other offences', but with a little less statistical rigour, the same pattern is visible for trouble caused by groups of youngsters, verbal aggression, and bicycle theft. The percentage of victims of these types of crime decreased not only in the CCTV area itself, but also in the surrounding streets. But again, these last three findings are not statistically significant, so it is risky to draw firm conclusions. In that respect the same goes for the police figures presented in this paper.

This suggests that levels of displacement depend on the types of offence and the perceptions of the offenders (Clarke, 1992).

As well as the incidence of crime, attention was also paid to fear of crime or feelings of insecurity. It appears that CCTV had little effect on this subjective side of safety, although there was one exception: August Allebéplein. Here, a decrease in the number of people feeling unsafe could be observed. In the area surrounding the CCTV area (the 'probable displacement area') no increase was observed, indicating that there was no displacement.

The impact of CCTV on fear of crime may be less clear cut for a variety of reasons. Individuals may react differently to the presence of CCTV (Sanko and Davey, 2003), resulting in little change overall. Litter, graffiti and poor cleanliness can result in an area declining and residents and users feeling alienated, and may be more important in explaining fear of crime than the presence of CCTV (Town, Davey and Wootton, 2003). It should also be noted that CCTV can monitor the occurrence of crime, but does not guarantee that assistance will arrive in time to prevent an attack. Clearly, further research into the causes of fear of crime is required.

Armitage (2002) highlights the importance of evaluations: using adequate pre and post CCTV time periods in which data are collected; taking account of seasonal variations; using a control area for comparison; specifying the sample size; using independent evaluators; and taking account of displacement or diffusion of benefits. The Amsterdam case studies meet these criteria, demonstrating particular strengths in terms of research design. In particular, a range of methods for understanding crime patterns were used—police records, victim surveys and interviews. Data was collected one year before and one year after the intervention, although some victim surveys were conducted after CCTV was installed. Crime and incivilities in a CCTV area was compared with a probable displacement area, and with crime patterns in surrounding areas. However, lack of time and resources prevented further comparisons with potential displacement areas.

The choice of a specific displacement area makes it difficult to generalise the findings to other areas and to CCTV in general. Nevertheless, it seems justified to conclude that CCTV had a positive effect on crime levels, and did not lead to significant displacement of crime and incivilities.

Based on a theoretical view of offenders (Armitage, 2002; Brown, 1995; Tilley, 1993), we believe that the key to a successful CCTV project lies in changing the perceptions of offenders (Clarke, 1992). When they become convinced that their criminal or troublemaking behaviour is no longer tolerated—either in the CCTV area, or elsewhere—it is likely that they will adjust their behaviour. If we are correct in assuming that the success of CCTV depends to a considerable degree on the perceived scope of the measure, it would be advisable to invest more in this perceptive aspect of CCTV projects. For instance, pessimistic or fatalistic remarks from police and/or policy-makers implementing another CCTV project, i.e. *"We're doing the best we can but the offenders will probably just move to the next street"*, do not contribute to a change in mentality among offenders. In order for preventive measures such as CCTV to be effective in tackling crime and incivilities, it is important that actions are part of a coordinated approach to changing attitudes towards crime.

It should be noted that the actual installation of cameras is just one part of this procedure. After all, a camera itself is not much more than a box of optical and electronic technology. Only when all stakeholders involved (local council, public prosecutor, police, shop owners/keepers, housing associations, private security guards, etc.) work together in a well orchestrated partnership, and CCTV is part of a package of measures, can positive effects be achieved, both within and outside the camera area. Further research might usefully investigate differences in partnership working, the use of images for detection and the effect of publicity on the crime prevention properties of CCTV. Some of these issues are being addressed in an independent evaluation of CCTV in the UK conducted by the Scarman Centre, Leicester University (Armitage, 2002).

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- Links on CCTV in the Netherlands: <http://www.e-doca.net/Countries/Europe/Netherlands/Netherlands.htm>

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