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Crime prevention through environmental design

Rachel Armitage

INTRODUCTION

This chapter is concerned with the extent to which the individual design features of the built environment (such as a house, school, shopping mall or hospital), as well as the natural environment surrounding those buildings, impact upon crime risk, and subsequently, how these features can be altered to reduce that level of risk. This approach is known as Crime Prevention through Environmental Design (CPTED). CPTED draws upon opportunity theories that assert that those involved in, or considering, criminality are influenced (to some extent) by their immediate environment. A full account of these theories is discussed elsewhere in this book, but to recap, the basic assertions are that for a crime to occur, there has to be a suitable target - in the case of burglary, a vulnerable property. There has to be a likely offender - someone motivated to commit this offence, and the absence of a capable guardian – a resident, neighbour or passer-by who would challenge the offender, call the police and draw attention to the potential event (Routine Activity Theory). Opportunity theories also argue that offenders select targets based upon what they become aware of as they go about their day-to-day activities and move between the places that they frequent (see Crime Pattern Theory this volume), and that offenders will seek to maximise the benefits and minimise the risks when making decisions about their offending choices (see Rational Choice Perspective, this volume). Whilst it was C. Ray Jeffery (1971) who coined the phrase *Crime Prevention through Environmental Design* in his book of the same name, it is the more practical interventions suggested by the architect Oscar Newman (1972) that shaped the

CPTED that that we see implemented by police, architects, planners and developers in the design, build and management of places and spaces today.

This chapter begins by defining CPTED and outlining the theories or perspectives upon which it is based. The principles (or elements) of CPTED are explained, with reference to their practical application and the empirical evidence to support the efficacy of such interventions. There follows a discussion of how CPTED is applied in three countries – England/Wales, Australia and The Netherlands, including consideration for crime prevention within planning policy, guidance and legislation. The chapter concludes with critical considerations and a discussion of the limitations of this crime prevention approach before posing a number of questions for review.

WHAT IS CPTED?

CPTED, pronounced *septed or sipted,* is a practical response or intervention to the crime risks hypothesised by these theories. The aim is to prevent or reduce crime (the *CP* part of CPTED), by (the *T* part of CPTED) influencing the design, build and management of the built (and sometimes natural) environment (the *ED* part of CPTED). For example, in avoiding the risks asserted by Crime Pattern Theory, places are designed to limit the likelihood that potential offenders will pass by, and therefore become aware of, properties as suitable targets for offending. This is achieved by limiting unnecessary through movement in the form of connecting footpaths. In avoiding the risks asserted by Rational Choice Perspective and Routine Activity Approach, places are designed to maximise the likelihood that offenders will be observed (or that they perceive they are being observed), by those using or passing through an area. Opportunities for surveillance are thus maximised through the

orientation of buildings, the size and positioning of windows and the absence of visual obstructions. Recognising that these measures, directed at the wider environment, may not always be sufficient to deter offenders, and as a means of increasing the risk involved in offending, CPTED measures also often incorporate specific standards of physical security (including doors, windows, locks, glass) to increase the time and effort required to successfully break and enter into a building.

A commonly used formal definition of CPTED is that used by Tim Crowe who characterised it as: "*The proper design and effective use of the built environment, that can lead to a reduction in the fear or incidence of crime and an improvement in quality of life...The goal of CPTED is to reduce opportunities for crime that may be inherent in the design of structures or in the design of neighbourhoods*" (Crowe, 2000, p. 46). Ekblom (2011) proposed a redefinition and presented an alternative that included several points not included within Crowe's definition - including the balance between security and contextually appropriate design and the possibility of intervening at different stages between pre-planning and post construction. According to Ekblom CPTED is: *"Reducing the possibility, probability and harm from criminal and related events, and enhancing the quality of life through community safety; through the processes of planning and design of the environment; on a range of scales and types of place, from individual buildings and interiors to wider landscapes, neighbourhoods and cities; to produce designs that are 'fit for purpose', contextually appropriate in all other respects and not 'vulnerability led'; whilst achieving a balance between the efficiency of avoiding crime problems before construction and the adaptability of tackling them through subsequent management and maintenance"* (Ekblom , 2011, p. 4). More recently, research within the field of CPTED has focused

upon the *effectiveness* of both the individual and collectively applied principles of CPTED measures in reducing crime and the fear of crime (e.g., Armitage, 2000; 2006; Cozens, 2008; Cozens *et al*, 2005; Hillier and Sahbaz, 2009; Pascoe, 1999), the *process* of applying CPTED principles within police and planning environments (e.g., Monchuk, 2011; 2016), the development of CPTED based *risk assessment tools* to predict (and prevent) risk (e.g., Armitage, 2006; Armitage *et al*, 2010; Van der Voordt and Van Wegen, 1990; Winchester and Jackson, 1982), and a wider approach to the potential benefits of such interventions including the impact upon environmental and social *sustainability* (e.g., Armitage and Monchuk, 2011; Cozens, 2007; Dewberry, 2003). Given a widening of the focus to include the process of application and consideration of benefits beyond crime reduction, such as social and environmental sustainability, a more appropriate definition of CPTED might be: *The design, manipulation and management of the built environment to reduce crime and the fear of crime and to enhance sustainability through the process and application of measures at the micro (individual building/structure), meso (neighbourhood) and macro (national) level*.

THE PRINCIPLES OR ELEMENTS OF CPTED

Explaining CPTED requires some discussion of the principles (or elements) that form the basis of this approach. The principles of CPTED have been presented by several authors, including, but not exclusively, Poyner (1983), Cozens *et al* (2005) and Armitage (2013), and these principles have been adopted to form the basis of planning policy and guidance as well as CPTED based interventions such as Secured by Design (SBD) in England and Wales, and Police Label Secure Housing in the Netherlands. Poyner (1983) outlined the principles as surveillance, movement control,

activity support and motivational reinforcement. Cozens *et al* (2005) extended this to the seven principles of defensible space, access control, territoriality, surveillance, target hardening, image and activity support. Montoya *et al* (2014) in their study of CPTED in the Netherlands, referred to the six principles of territoriality, surveillance, access control, target hardening, image/maintenance and activity support. Hedayati and Abdullah (in press), in their study of CPTED in Malaysia, proposed four primary dimensions - surveillance, access control, territoriality and maintenance, and eight subdimensions – visibility, lighting, physical barrier, security system, markers, landscaping, front house maintenance and backlane maintenance. Armitage (2013) offered yet another combination of physical security, surveillance, movement control, management and maintenance and defensible space.

For reasons of simplicity and clarity, this chapter will focus upon the principles of CPTED as defined by Armitage (2013), which subsume the key categories that have been proposed by others.

Defensible space and territoriality

What does this mean?

The term defensible space was coined by Oscar Newman (1972) who suggested that the physical design of a neighbourhood can either increase or inhibit an individual's sense of control over the space in which they reside. Newman categorised space into public (for example, the road in front of a property), semi-public (for example, the front garden), semi-private (for example, the back garden) and private (inside the property). He argued that if space is defensible, it will be clear to the owner/user of that space, and to non-legitimate users, who should and who should not be in this

space. Territoriality involves the human response to the space that they define as their own. Physical responses to territoriality might include a resident marking an area as their own through the installation of a house sign or gate. Emotional responses to territoriality would include a resident's feelings of intrusion or infringement should a person enter what they consider to be their space. Thus, territoriality refers to the human motivation to control the space which they believe is theirs. Whilst many (for example, Cozens *et al.,* 2005) separate defensible space and territoriality, a more concise summary of CPTED principles might categorise defensible space alongside territoriality, given that the physical creation of defensible space aims to create territorial control over that space.

How is this achieved?

CPTED interventions ensure that space is clearly demarcated, that it is obvious who has ownership of that space and that potential offenders have no excuse to be in that space. This would rarely be achieved through the installation of physical barriers; rather, interventions would include subtle measures such as a change in road colour and texture or a narrowing of the entrance to the development to mark the area as private (see figure one). This is often referred to as a symbolic (as opposed to a physical) barrier. Offenders are not physically blocked from entering the area; the aim is to convince them that in entering an area they are crossing a boundary into private space and in doing so are more likely to be observed or challenged by those with ownership of that space.

Empirical evidence

Brown and Altman (1983) and Armitage (2006) found that, compared with non-

burgled houses, properties that had experienced a burglary had fewer symbolic (as well as actual) barriers. In their study of 851 properties in Enschede (The Netherlands), Montoya *et al* (2014) found that houses with a front garden had a burglary risk 0.46 times lower than those without.

Figure one. Symbolic barriers

Defensible space should, if working effectively, create territorial responses amongst the owners or managers of a space. This might take the form of challenging a stranger, calling the police, or simply making their presence known as a means of assuring the stranger that they are being observed. Brown and Bentley (1993) interviewed offenders, asking them to judge (from pictures) which properties would be more vulnerable to burglary. The results revealed that properties showing signs of territorial behavior (such as the installation of a gateway at the front of the property or a sign on the gate/door marking the area as private) were perceived by offenders to be less vulnerable to burglary. Montoya *et al* (2014) also found a significant relationship

between signs of territorial responses and burglary risk, but only for daytime (as opposed to night time) burglary offences.

Limiting through movement

What does this mean?

This principle has been referred to interchangeably as *through movemen*t, *access control*, *connectivity* and *permeability* and is based upon the theories of both Crime Pattern Theory and Rational Choice Perspective that suggest that offenders select their targets based upon what they become aware of as they conduct their day-to-day activities, and that their target selection is influenced by the desire to minimise risk.

The term *access control* implies a focus upon measures to restrict entry into buildings, or to specific rooms within buildings. Within CPTED, the aim of limiting movement is much wider than this. The term *permeability* can cause some confusion when transferring the concept to other disciplines. Often practitioners working within the built environment (architects, planners, developers) interpret permeability as referring to the extent to which materials are transparent/see through.

The principle of *through movement* focuses upon: 1) Limiting the likelihood that offenders will become aware of that area as a potential target; 2) Making it more difficult for offenders to navigate into, out of and within an area; 3) Increasing the physical difficulty of entering a building/space; 4) Enhancing the offender's perception that their movement through an area will raise concern amongst legitimate users of the space; 5) Removing offender's excuses should they be caught in an area, and increasing the confidence with which legitimate users can challenge non-legitimate users of that space.

How is this achieved?

The most effective way to reduce through movement is to limit the number of footpaths through a development, or, should these be essential to the flow of the area, ensuring that these are designed appropriately and in consultation with a crime prevention specialist. Where footpaths are included within an area they should be straight – avoiding bends that obstruct sightlines (see figure two), short, wide, well-lit, and, of key importance, be required/desired so that they are well used. Jane Jacobs (1961) introduced the concept of *eyes on the street* and argued that not only should buildings be oriented towards the street (to increase the level of natural surveillance), but also that streets should be used as continuously as possible thus bringing more people (and surveillance) to the area. Whilst many use Jacobs' work to argue that there should be through movement as a means of encouraging pedestrians to use the area, and therefore act as *eyes on the street*, there is a tendency to neglect the fact that her research focused on cities (busy spaces) as opposed to residential housing developments within towns and villages. Many people choose to live in cities for the very reasons that make them different from towns or suburban areas – such as flexibility, mobility and relative anonymity. For these reasons, the dynamics of those living and working within a city will not necessarily translate to suburban areas. As Jacobs herself stated:

> "*I hope no reader will try to transfer my observations into guides as to what goes on in towns, or little cities, or in suburbs which still are suburban. Towns, suburbs, and even little cities are totally different organisms from great cities…To try to understand towns in terms of big cities will only compound confusion*" (Jacobs, 1961 p.26).

Where footpaths are required within a development they should not run at the rear of properties (see figure three) and, where possible they should be overlooked by the surrounding dwellings.

Figure two. Footpaths with bends that obstruct sightlines should be avoided

Research (discussed below) suggests that true, sinuous *culs-de-sac* are the safest (in terms of crime) road layout. True *culs-de-sac* are those with no footpaths connecting the development to other areas (leaky *culs-de-sac*). Sinuous (as opposed to linear) *culs-de-sac* are those where, if standing at the entrance to the estate, you are unable to see to the end of the development.

Figure three. Footpaths that run at the rear of properties and are not overlooked by neighbouring properties should be avoided

Empirical evidence

Research studies have utilised a variety of methods to establish the extent to which crime risk varies according to levels of through movement within a housing development. These include analysis of police recorded crime as well as interviews with convicted burglars.

In their study of the impact of through movement on burglary risk in Merseyside, England, Johnson and Bowers (2010) tested three hypotheses: 1) Risk of burglary will be greater on major roads and those intended to be used more frequently: 2) Risk of burglary will be higher on street segments that are connected to other segments, particularly where those to which they are connected have higher intended usage, and 3) risk of burglary will be lower in *culs-de-sac*, particularly those that are non-linear and not integrated into the wider network of roads. Their sample included 118,161 homes and used both GIS (Geographic Information System) software and manual identification to establish road networks and police recorded crime data to measure burglary levels. The results, which controlled for socio-economic influences, revealed that if a street segment is part of a major road[i], all other things being equal, compared to a local road[ii] there is an expected increase in the volume of residential burglaries on that segment of 22%. In contrast, for street segments classed as private roads[iii], compared to a local road, there would be a 43% decrease in burglary. In terms of road network, the study suggested that for each additional link to other roads, the predicted burglary count would increase by a factor of 3%. If a street segment had five more connections than another, there would be an expected increase in burglaries at that segment of 16%. In terms of connectivity, the results revealed that being linked to one other major road increases the expected count of burglary by 8%. In contrast, being linked to a private road decreases the estimated burglary levels by 8%. The study concludes that *culs-de-sac* are safer than through roads and that sinuous (as opposed to linear) *culs-de-sac* are safer still. Unfortunately, although *culs-de-sac* were manually identified within this study, there was no distinction between true (no connecting footpaths) and leaky (with connecting footpaths) *culs-de-sac*. Research

conducted by Hillier (2004), Armitage (2006) and Armitage *et al* (2010) confirms that leaky *culs-de-sac* are the road layout most vulnerable to burglary.

Armitage *et al* (2010) analysed the design features of over 6,000 properties on 44 housing developments within the three police forces of Greater Manchester, Kent and West Midlands (England). Individual properties, their boundaries and the layout of the development on which they were located were meticulously and manually analysed and compared with prior victimisation (at property and development level). The results revealed that, compared to true *culs-de-sac* (those with no connecting paths), through roads experienced 93% more crime and leaky *culs-de-sac* (those with connecting paths) experiencing 110% more crime. The analysis also identified that crime risk was lower on sinuous compared to linear *culs-de-sac* - confirming the findings from Johnson and Bowers (2010).

Several studies have also highlighted through-movement as a criminogenic feature in their production of crime risk-assessment mechanisms. Armitage's (2006) Burgess Checklist (derived from Simon's Burgess Points System, 1971) allows the user to predict a property's crime risk based upon its design features. The Burgess score is derived from the difference between the mean rate of crime suffered generally (by the whole sample) and the rate of crime suffered by houses with a particular design feature. Armitage identified through movement as a key factor associated with both burglary and crime-prone homes. Six of the 13 environmental factors which were associated with risk of burglary (at a statistically significant level), and eight of the 17 factors which were associated with total crime (at a statistically significant level) were related to permeability and through-movement. In their Delft Checklist, Van der

Voordt and Van Wegen (1990) also identified several factors relating to access and through movement which increased a property's vulnerability to crime. These were: the number of entrances and escape routes, the ease of access to entrance and escape routes, the physical accessibility of entrance and escape routes and the absence of symbolic barriers.

In addition to the analysis of police recorded crime data, Wiles and Costello (2000) used interviews with offenders as a means of investigating the decision making of offenders. The dominant reason given by offenders for selecting a target was chance (63% of offenders). Thirty-one per cent of the sample stated their reason for target selection as *'passing and security looked poor'*, 26% stated that they selected a target because they were *'passing and it looked unoccupied'* and 26% stated that they were '*passing and the property looked isolated*'. This confirms the premise that offenders will make target selections based on what they become aware of as they go about their daily activities and pass potential targets - each of these responses stating that the offender '*was passing'* when making that judgement. Limiting through movement would reduce the likelihood of an offender '*passing by'* a property.

Research conducted by Armitage and Joyce (in press) involved interviews with twenty convicted burglars in West Yorkshire, England. The research found that burglars favour developments with high levels of through movement for three major reasons. The first relates to the ease of access/egress that this allows – primarily giving them an advantage over police who will be less aware of the area. The second rationale relates to the extent to which footpaths enable search behaviour, and finally, linked to the second, the belief that footpaths legitimise the search behaviour – a

footpath is a public space and offenders are entitled to use that space. Confirming the second and third rationale, on being shown an image of a footpath running through a housing development, one offender stated:

> "*Yes, this is perfect! Easy pickings. I would first walk up and down this footpath. No-one would give me a second glance. Even if I was a tramp walking up and down I wouldn't look out of place – it's a footpath, no-one can question you."*

Offenders interviewed as part of this research also confirmed the findings from Johnson and Bowers (2010) and Armitage *et al* (2010) that true *culs-de-sac* are not an attractive target for criminals. The reasons given were that you are likely to stand out as a stranger because *'everyone knows each other'* and because, on a true *cul-de-sac* you have to exit the estate the way that you went it – increasing the chances of detection. One offender summarised these suggestions:

> *"I wouldn't go further into the cul-de-sac. There is no reason to be on a cul-de-sac unless you live there. You aren't going anywhere so you are a stranger. If it's a through road you can just keep walking through. I feel like people know each other and they will see me as a stranger."*

In a review of the evidence relating to the impact of through movement on crime, Taylor (2002) concludes that: "*Neighbourhood permeability is … one of the community level design features most reliably linked to crime rates, and the connections operate consistently in the same direction across studies: more*

permeability, more crime" (Taylor, 2002 p. 419). This assertion is over generalised. Whilst the vast majority of studies confirms that through-movement within residential housing increases the risk of crime, there are a small number of studies (usually conducted using Space Syntax techniques) that argue that, based upon the premise that more people equates to more surveillance (Jane Jacobs' *eyes on the street*), increased through movement reduces the risk of crime (Jones and Fanek, 1997; Hillier and Shu, 1998; Hillier and Shu, 2000 and Shu and Huang, 2003; Hillier, 2004). Whilst there is some disparity amongst research studies regarding the impact of through movement on crime, the majority of evidence supports the premise that increased through movement enhances crime risk.

Surveillance

What does this mean?

Surveillance refers to the way that an area is designed to maximise the ability of formal (security guards, police, employees) or informal (residents, passers-by, shoppers) users of the space to observe suspicious behaviour. It also relates to the extent to which offenders, or potential offenders perceive that they could be being observed, even if they are not.

How is this achieved?

Within CPTED, surveillance rarely relates to formal measures, such as CCTV. Rather, it relates to the informal surveillance created through measures such as ensuring that dwelling entrances face the street, that rooms facing the street are active (such as the kitchen or living room) and that sightlines are not obstructed by shrubbery or high walls. Figure four shows a development that has effectively turned its back on the street. The windows facing the street are small and are rooms not

likely to be used through the day – the bathroom and bedroom.

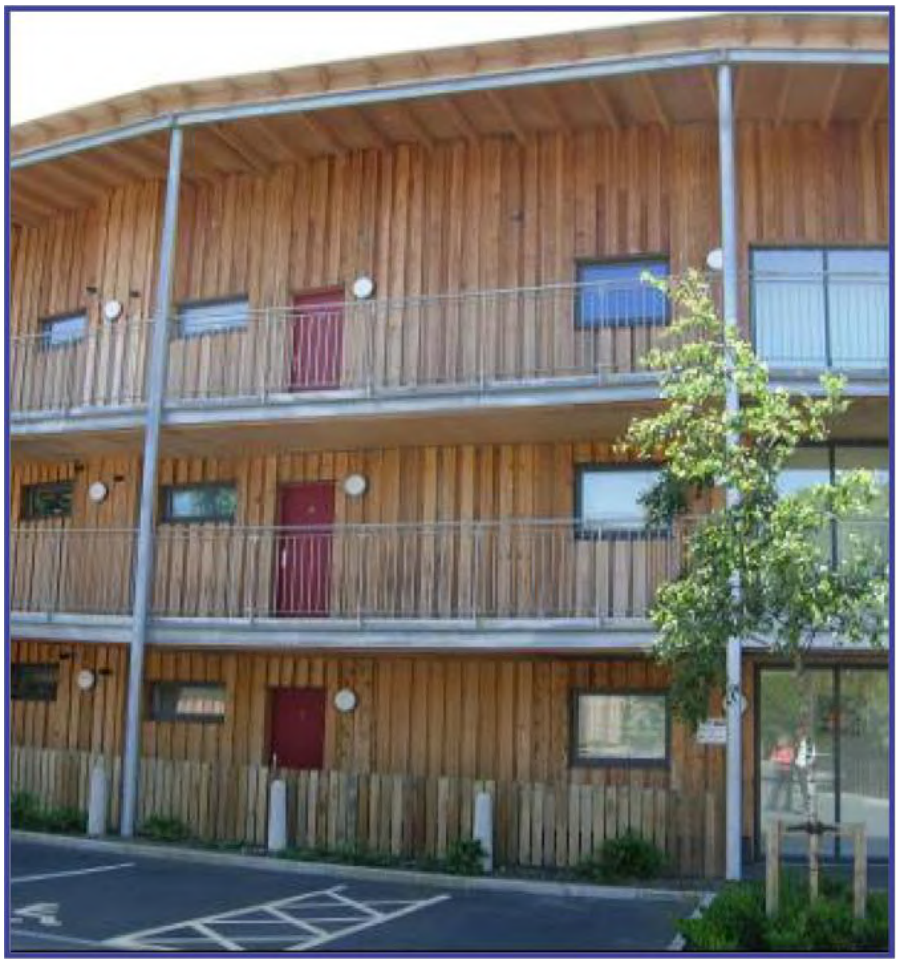

Figure four. Small windows and inactive rooms face the street

Figure five shows a property with high hedges and a high gate, both of which block the view to the street. Once offenders are inside this property boundary, they are unlikely to be observed by neighbours of passers-by.

The principle of surveillance requires users of that space to recognise that an individual is behaving in a suspicious manner (be that through their behaviour or simply their presence within a private/semi-private area) and to have the confidence to challenge them or intervene. Therefore, the term surveillance includes the operational tasks of active (formal) and passive (informal) surveillance, the

surveillability (Ekblom, 2011) of that space and the creation of the perception amongst offenders that they are being observed.

Figure five. This property has poor levels of surveillance

Empirical evidence

Research suggests that surveillance plays a major part in offenders' decision-making processes when selecting properties to offend against. Offenders prefer to avoid confrontation and, where possible, select targets which are unoccupied. Reppetto (1974) interviewed 97 convicted burglars and found that the most common reason for avoiding a target was that there were too many people around. Offenders stated that the possibility of neighbours watching them deterred them from selecting a property and that they would select targets where they felt less conspicuous and where there was less visual access to neighbouring properties. In interviews with a sample of 30

active burglars, Cromwell and Olson (1991) found that over ninety per cent of the sample stated that they would never enter a residence which they suspected to be occupied.

Brown and Bentley (1993) asked 72 incarcerated burglars to assess, from photographs, whether or not properties had been burgled. Across all ten homes, the houses judged to be occupied were perceived by the burglars as being those which had not been burgled.

Nee and Meenaghan (2006) interviewed fifty residential burglars in the UK. The findings confirm those presented above, that offenders prefer to select unoccupied properties, and properties with little or no surveillance from neighbouring houses. The most commonly referred to feature of attractive targets was the degree of cover (47 respondents). Three-quarters (38) of the sample preferred a property to be unoccupied, with two-thirds of that number checking this by knocking on the door or ringing the bell.

When assessing the design characteristics of victimised properties (as measures using police recorded crime data), several studies have found that a lack of surveillance is linked to higher levels of crime (Armitage, 2006; Armitage *et al*, 2010; Winchester and Jackson, 1982; Van der Voordt and Van Wegen, 1990). Armitage *et al* (2010) compared victimisation rates with individual design features on a sample of over 6,000 properties across 44 developments in England. The research found that found that properties overlooked by between three and five other properties experienced 38% less crime than those not overlooked.

Winchester and Jackson (1982) found that, of the 14 design variables linked to heightened risk of burglary, eight relate to a lack of surveillance from neighbouring properties. These variables include: property is isolated, property is set in a location with less than five other houses in sight, property is set at a distance from the road on which it stands, property is not overlooked at the front by other houses, property is not overlooked on either side by other houses, the majority of the sides of the house are not visible from a public area, the property is set at a distance from the nearest house and the property frontage is obscured from roadside view.

Brown and Altman (1983) studied 306 burgled and non-burgled properties and found that burgled houses showed fewer indications of the probable presence of residents that non-burgled properties. These signs or traces included toys strewn across the yard or sprinklers operating in the garden. Brown and Altman also found that burgled properties had less visual access to neighbouring properties.

Van der Voordt and Van Wegen (1990) also developed a checklist for measuring the risk of crime – the Delft Checklist. Of the factors which they identified as predictors of crime risk, several related to surveillance and visibility. These were: visual contact between buildings, amenities and outside spaces, sightlines between buildings and adequate levels of lighting.

Recognising the difference between predicted/potential surveillance and that which actually takes place, Reynald (2009) conducted a study which measured the relationship between guardianship intensity and surveillance opportunities on a

sample of 814 residential properties in The Hague. Reynald measured guardianship intensity using a four-stage model which moves from stage one – invisible guardian stage (no evidence that the property is occupied), to stage two – available guardian stage (evidence that the property is occupied), to stage three – the capable guardian stage (fieldworkers are observed by residents), to stage four – intervening guardian stage (fieldworkers are challenged by residents). Surveillance opportunities were measured by observing the extent to which the view of a property's windows was obstructed by physical features such as trees and walls. The results revealed a positive statistically significant correlation between surveillance opportunities and guardianship intensity (0.45), suggesting that guardianship intensity increases as opportunities for surveillance increase. When assessing the relationship between crime and guardianship intensity, the results were positive and statistically significant. The analysis revealed that crime decreases consistently at each stage of the four-stage model. Crime drops significantly between the invisible and available guardian stages, decreasing even more at the capable guardian stage and slightly more at the intervening stage.

Physical security

What does this mean?

Physical security, sometimes referred to as *target hardening*, relates to the extent to which a property and its boundaries are protected through the physical features of the building's design, such as doors, windows, locks or fences. Security measures increase the difficulty in breaking in, they increase the time it takes to get in and, in some cases (CCTV), they increase the likelihood of detection, each enhancing the risk associated with offending.

How is it achieved?

CPTED focuses upon subtle changes in the design and layout of properties and places an emphasis on designing out the risk before crime problems emerge. Where good quality security is built into the design of a building, as opposed to bolted-on following the emergence of a crime problem, the enhanced security need not create a fortress appearance. There are several examples of the application of CPTED (to be discussed in more detail below) that specify the standard of security hardware to be including within new build properties. For example, within England and Wales, the Secured by Design (SBD) scheme has one of three sections devoted to physical security standards – including, for example, doors, windows, locks and intruder alarms. As of October 2015, the building regulations in England and Wales have also been updated to include security requirements (Approved Document Q). Whilst these standards fall slightly short of those required by SBD, this is a major step-forward for crime reduction within new housing. As is outlined below, countries such as the Netherlands and Scotland already have such requirements within their planning systems.

Empirical evidence

Research on the effectiveness of physical security as a means of reducing crime suggests that, all other factors being equal, burglars prefer to offend against properties with lower levels of physical security (Cromwell and Olson, 1991). Vollaard and Ours (2011) report the findings of an extensive assessment of built-in security in residential housing in the Netherlands. This study utilises the introduction of changes in building regulations introduced in 1999 which required all windows and doors (for

new build properties) to be made from material certified and approved by the European ENV 1627:1994 Class 2 standard, or the Dutch NEN 5096, Class 2 standard. Using data from four waves of the annual National Victimisation Survey (VMR), the results revealed that the regulatory change resulted in a reduction in burglary (within the sample) from 1.1 to 0.8 per cent annually – a reduction of 26 per cent. The evaluation also revealed that this reduction had not resulted in a displacement of crime to other acquisitive crime offences.

Tseloni *et al* (2014) conducted an in-depth analysis of the relationship between physical security measures and burglary risk in England and Wales. Using data from four sweeps of the Crime Survey for England and Wales (CSEW) they presented the crime reduction benefits of individual and combined security features reported to be present by those taking part in the survey. The research found that certain combinations of security features confer a crime reduction advantage, but that the protection conferred against burglary does not consistently increase with the number of devices installed. The analysis suggested that, if only one security device was to be installed, the most effective device would be external lights on a sensor. If one further device was to be added, the most effective pair of security devices would be window locks and external lights. The ultimate choice for balancing out the number of devices and protection against burglary was window and door locks together with either external lights or a security chain. The study concluded that individual security devices confer up to three times greater protection against burglary than no security and that combinations of security devices in general afford up to fifty times more protection than no security.

Management and maintenance

What does this mean?

This principle, sometimes referred to as *image*, brings together both Newman's (1973) concept of avoiding stigma and Wilson and Kelling's (1982) Broken Windows Theory. The former focuses upon the original design and build, and the latter upon management and maintenance following development. Newman argued that the proper use of materials and good architectural design can prevent residents from feeling stigmatised. Wilson and Kelling's (1982) Broken Windows Theory suggests that an area with existing deterioration such as graffiti and vandalism conveys the impression that a) nobody cares so apprehension is less likely and b) the area is already untidy so one more act will go unnoticed. Low level disorder thus having a *contagion effect* and leading to more serious and more extensive crime.

How is it achieved?

Newman's argument that developments should be designed and built to avoid stigma, relates to the desire to avoid the differentiation between different types of housing (for example, social and private housing). He argued that this concept of *image* can be maintained by avoiding building forms and layout which stand out as completely different – thus attracting attention. He also argued that the quality and finish of building materials should be robust, yet attractive to residents. In addressing the risks suggested by Wilson and Kelling (1982), there should be a maintenance system in place to ensure that low-level disorder such as vandalism, litter and graffiti is quickly removed. Whilst this can be addressed through requirements imposed within social housing, it is much more difficult to compel private owners of space to remove litter or to keep gardens tidy. The Secured by Design (SBD) award scheme historically

included a section on management and maintenance, advising that SBD estates should have a *programmed management system in place to maintain the area. This includes the removal of litter and graffiti* (Armitage, 2005). However, perhaps in recognition of the inability to control for such factors, the latest SBD standards (SBD New Homes, 2014) do not refer to management or maintenance of an area.

Empirical evidence

Empirical evidence linking the presence of low-level disorder with crimes experienced, or with perceptions of vulnerability is plentiful. Taylor and Gottfredson (1987), later tested by Keizer *et al* (2008), found that physical incivilities indirectly influence offenders' perception of risk in that they portray a resident's level of care or concern for the area in which they live, thus acting as an indicator for the likelihood that they will intervene if they detect an offence taking place. In a series of research studies, Cozens *et al* (2001, 2002a and 2002b) found that, when shown a series of images and asked to judge a property's vulnerability to burglary, residents, convicted burglars, planning professionals and police consistently selected the 'well maintained' option as the least vulnerable in five types of housing design.

In her study of the link between environmental design features and crime within West Yorkshire, Armitage (2006) found that 46% of properties which were judged (by two independent assessors) to have an untended garden, litter in the garden or newspapers/letters on the doorstep piles of letters/newspapers on the doorstep had experienced at least one prior burglary. This was compared to a sample average of 16%.

THE APPLICATION OF CPTED

Whilst CPTED is founded upon this set of principles, albeit with some divergence dependent on the author, the way in which CPTED is applied varies across, and even within, different countries. It is beyond the scope of this chapter to cover the different international approaches to implementing CPTED. Therefore, as a means of illustration, the focus will be upon three countries recognised as delivering good practice in incorporating CPTED into the planning system (England/Wales, Australia and the Netherlands). The section concludes by considering the transferability of CPTED approaches from one country to another.

England and Wales

Across England and Wales there are 43 police forces and within each force there is at least one individual whose role involves reviewing the planning applications which are submitted to the local planning authority (within the local council), and offering CPTED advice to mitigate any potential crime risks associated with the proposed development. This role is referred to as Architectural Liaison Officer (ALO), Crime Prevention Design Advisor (CPDA) or Designing out Crime Officer (DOCO). This differentiation is largely geographical with the term ALO used in the North, CPDA in the Midlands and DOCO in the South. Even within England and Wales (which share a government and associated laws and policies), the application of this role varies between police forces. Within some police forces the ALO/CPDA/DOCO role is a single function. In other forces, the role can be shared between other duties such as Licensing Officer, CCTV Officer, Crime Reduction Officer, or even operational policing duties. In some forces they are co-located as a team, in others they are located individually in divisional police stations, or even within local authority

planning offices. Within some forces this role is performed by warranted or retired police officers, in others (for example Greater Manchester Police), those recruited to the role must have a built environment background. Whilst historically there have been a number of ALO/CPDA/DOCOs within each police force, often supported by a Force ALO/CPDA/DOCO, austerity measures introduced by the Comprehensive Spending Review (2010) have led to dramatic cuts numbers. In January 2009 there were 347 ALO/CPDA/DOCOs, by November 2014 there were just 125.

The delivery of CPTED within the 43 police forces also varies in terms of process, with some local planning authorities *requiring* pre-planning consultation (for example, the local authorities within Greater Manchester), whilst other forces have a more reactive response, with the consideration for crime prevention being entirely dependent upon the ALO/CPDA/DOCO seeking out current planning applications and contacting the planning office to offer CPTED advice. The planning system in England and Wales is guided by national policy - at the time of writing the National Planning Policy Framework. This policy states that local planning policies and decisions should aim to create developments that are (amongst other considerations) safe and where crime, disorder and the fear of crime do not undermine quality of life. England and Wales also have planning guidance that directs local planning authorities, and those working within the built environment profession, as to <u>how</u> to develop safe neighbourhoods. Historically, this guidance had been *Safer Places – The Planning System and Crime Prevention*, however, this was cancelled as part of the Taylor Review of Planning Guidance (2012). In 2014, this was replaced by the National Planning Practice website. Although this is not specific to crime prevention, it does include references to the importance of considering safety, crime prevention and security measures. As was discussed earlier, a recent revision of building

regulations within England and Wales (the Housing Standards Review) has introduced physical security standards into building regulations (Approved Document Q).

Within England and Wales there is also an award scheme – the Secured by Design (SBD) scheme that is based upon the principles of CPTED. This scheme is managed by the Association of Chief Police Officers Crime Prevention Initiatives (ACPO CPI) and is delivered by police ALO/CPDA/DOCOs. The SBD award is given to developments that meet the relevant criteria, this being based upon design and layout as well as physical security standards. There have been five published evaluations of the effectiveness of the SBD scheme (Brown, 1999; Pascoe, 1999; Armitage, 2000, Teedon *et al*, 2009 and 2010; Armitage and Monchuk, 2011) each concluding that SBD confers a crime reduction advantage. Several studies have also concluded that the SBD scheme is a cost-effective measure (Armitage, 2000; Association of British Insurers, 2006; Teedon *et al*, 2009). The Association of British Insurers (2006) estimate that the over-costs of building to the SBD standard are £200 for a four-bedroom detached house, £170 for a three or two-bedroom detached house, £240 for a ground floor apartment and £70 for an upper floor apartment. Pease and Gill (2011) re-analysed the findings from Armitage and Monchuk's (2011) study of the effectiveness of SBD, and established that, taking the Davis Langdon (2010) figures for the cost of SBD and setting these against the crimes saved, SBD pays for itself in just under two years considering only burglary and criminal damage offences. The inclusion of other offences, they state, would reduce this period.

New South Wales, Australia

In countries such as Australia, delivery varies dramatically from state to state. The state of New South Wales is selected as an example for this chapter because of the model of delivery which includes a legislative requirement for a Crime Risk Assessment to be conducted for developments considered by the local council to pose a crime risk. Whilst this legislation shows a clear commitment to the importance of CPTED, the process of embedding this within the planning and policing system differs greatly to England and Wales. In New South Wales there is no equivalent of the ALO/CPDA/DOCO role and the closest position to this is the Crime Prevention Officer. In a similar vein to the Crime Reduction/Prevention Officer role in England and Wales, the post includes a variety of roles and responsibilities. Within New South Wales, this post also has the additional burden of covering a large geographical area. This means that in practice, the Crime Prevention Officer cannot systematically assess all planning applications from a crime prevention perspective. Therefore, the role of conducting the required Crime Risk Assessment and recommending alterations based upon crime risk is conducted either by private crime prevention consultants, planning companies or the developers themselves. Clancey *et al* (2011) conducted a review of 33 Crime Risk Assessments submitted between January 2007 and October 2010 and found that these were conducted by 24 companies – 11 of which were planning firms, eight were social planning firms, seven were development companies, five were private crime prevention consultants and two were engineering firms, with no Assessments conducted by police. Clancey *et al* (2011) question the extent to which these reports are written by independent organisations with no vested interest in the outcome.

The Netherlands

The Netherlands has one of the most comprehensive approaches to embedding CPTED within the planning process, and this applies to regulation, award schemes and the process of delivery. In terms of regulation all new-built homes in the Netherlands have to comply with specific security regulations for windows and doors and from the 1st January 1999, planning permission could only be obtained if the application met the legal requirements for built-in security. The Netherlands also has an award scheme (similar to the UK's SBD scheme) entitled Police Label Secure Housing. Unlike the SBD scheme, this award (which was originally owned and managed by the police) is managed by the Dutch government who adopted the police label into their planning policy guidelines and (since 2004) every new estate or dwelling must be built in accordance with the police label or an equivalent label. Although the award was modelled on SBD, there are several distinctions which mark the two schemes apart. The first is that the label is split into three different certificates – Secured Dwelling, Secured Building and Secured Neighbourhood. These can be issued separately but together they form the Police Label Secure Housing award. The label is also less prescriptive than SBD with more flexibility for developers aiming to achieve a secure development. The list of requirements is set out under five categories (urban planning and design, public areas, layout, building, dwelling) and these include performance requirements (what) and specifications which indicate the way in which those requirements will be met (how). As a means of encouraging creativity and avoiding the risk of developers 'designing down' to specific requirements, where a developer offers a solution which differs from that set out in the 'how', but can still demonstrate the same preventative effect, then this will be considered. The scheme also differs in that it is valid for ten years only and after this period, a re-assessment is

required. In terms of the delivery of the scheme, the system is very similar to that within England and Wales. Until 2009, each police region had a number of Building Plan Advisors (Bouwplanadviseur) whose role was very similar to the ALO/CPDA/DOCO role. As a response to budget cuts, the role has been civilianised and is run by the municipalities either through the employment of external consultants or civilian Building Plan Advisors located in-house.

Transferability

Several authors have discussed the dangers of presuming that CPTED principles can simply be transferred to different countries without consideration for the local culture, climate and context (Reynald, 2009; Ekblom *et al,* 2012; Armitage, 2013; Cozens and Melenhorst, 2014). Crime prevention solutions cannot simply be bolted on or imposed without consideration for local context. Because these mechanisms work through motivating and directing the action of residents, passers-by, offenders, they have to take into account the way that people use their surroundings. As Ekblom *et al,* 2012 highlight: "*Crime prevention designs for the built environment can rarely be mass-produced but must be customised to local conditions*" (Ekblom *et al,* 2012, p. 92).

Ekblom *et al* (2012) explored the extent to which the 'traditional' principles of CPTED can be transferred to the region of Abu Dhabi within the United Arab Emirates. The research used the seven principles - access and movement, surveillance, structure, ownership, physical protection, activity and management and maintenance as a starting point, and explored the extent to which any conflicts emerged in applying these in Abu Dhabi. The main tensions identified within the research related to limiting through movement, surveillance and territoriality. The aim

of limiting access and through-movement and of ensuring that pathways are wide, well-lit and free of hiding places proved difficult to impose within the Emirati culture and climate. As can be seen from Figure six, many pathways (*Sikkak)* were designed to maximise shade with high walls and vegetation bounding the path.

Figure Six. High walls and vegetation provide shade for users of footpaths in Abu Dhabi

Another issue specific to the principle of limiting through movement related to the cultural importance placed upon owning all boundary walls to your property. Where property boundaries were separated to ensure that residents each owned their own boundary walls a narrow space of leftover land was created (see Figure seven). These spaces were not official footpaths, nor were they designed to be used to access the properties, however, they were being used by offenders to access properties and were also being used as spaces to dispose of litter and waste.

Figure Seven. Space between property boundaries creates unofficial footpaths in Abu Dhabi

Some have also raised concern regarding the extent to which the principles and standards applied in countries such as England can be effectively implemented in countries experiencing high levels of violent crime such as South Africa or Honduras (Kruger, 2015; Cruz, 2015).

Even where countries or regions may appear to have the same climate and culture, there are still contextual differences that can impact upon the success or otherwise of CPTED interventions. Montoya *et al* (2014) explored the extent to which the design features of residential housing impacted upon levels of burglary. Whilst their findings supported research conducted on neighbourhoods in England (Armitage, 2006) they

found that the distinction between leaky and non-leaky culs-de-sac, found in research conducted in England, did not apply in Holland. They attributed this difference to the high level of bicycle use, suggesting that movement is not always restricted to formal pathways/cycle-ways.

CRITICAL CONSIDERATIONS

There is little doubt that the approach to reducing crime through the design, build and management of properties and their surroundings is a cost-effective and common sense approach to reducing crime. The critical considerations lay in the details – the disconnect between what are described (almost devotedly) as the *principles* of CPTED and the actual application of this approach on the ground. The extent to which this approach can be transferred to other cultures, to areas with high levels to violent crime and to countries without the planning or police infrastructure to implement CPTED. The lack of consistency in application, particularly relating to individual's interpretation of risk (see Monchuk, 2016 for a full discussion) and the dangers of stifling creatively by over-standardising to protect from such inconsistencies. The extent to which designing for security is at odds with other planning agendas such as sustainability/environmental protection, and finally, the extent to which the almost dogmatic pursuit of compliance with these *principles* risks failing to modernise, review, or even overhaul what is meant by CPTED and how relevant it is to the crime problems experienced now (as opposed to the 1970s and 1980s when it was conceived).

Whilst the purpose of this chapter has been to outline what is meant by CPTED, how it emerged and how it is applied in policy and practice, there is some concern (Monchuk, 2016; Armitage and Joyce, in press; Armitage and Monchuk, in press)

regarding the evolution of these *principles,* the extent to which they present an accurate reflection of how design influences crime risk and their relevance in 2016.

As has been outlined throughout this chapter, CPTED evolved from the writings of Jeffery (1971), Newman (1972), Jacobs (1961), and the new opportunity theories – Crime Pattern Theory, Routine Activity Approach and Rational Choice Perspective. CPTED was developed by academics in the UK and USA in the 1960s and 1970s and has changed very little since.

There is little doubt that design influences the decision making of offenders and other users of space, and that this approach has a significant part to play in crime prevention and planning policy. However, it must be acknowledged that there is some disconnect between what is proposed in theory and what actually happens on the ground. Armitage and Monchuk (in press) argue that CPTED should be radically overhauled with what currently constitutes *CPTED* being rebuilt using an inductive methodology. Their research asks both offenders and crime prevention practitioners to describe how *they* believe design influences crime choices - in their own words. Historically, research within this field has taken a deductive approach of testing existing theory – confirming or refuting what we already know, as opposed to proposing new information. A redefinition of CPTED, utilising this inductive approach allows consideration for different contexts – how does design influence decision making where offenders are committing these crimes whilst under the influence of drugs (Armitage and Joyce, in press) or where weapons are commonplace in burglary offences?

As well as redefining the *principles* or *elements* of CPTED, consideration should also be given to the application in practice and how that varies in different countries, across time periods and in different political environments. A system delivered by the police (who have knowledge of local crime risk) can work, but can this be sustained with limited police budgets and are police the most appropriate professionals to comment on building design or to influence architects, developers and planners?

Such considerations should not be taken as a critique of CPTED, but rather a plea to avoid complacency and to ensure that the approach continues to evolve and improve. Designing places and spaces to minimise crime risk is an extremely effective approach to reducing crime. It is simple, costs very little and involves agencies as diverse of developers, architects, planners and police (at the very minimum) working together to reduce crime risk – the very essence of multi-agency working (and of the legislative requirements such as Section 17 of the Crime and Disorder Act, 1998). Doing CPTED well reduces crime, improves feelings of safety, reduces the costs to the environment in responding to crime, of managing empty homes and of treating the social and physical consequences of victimisation. Above all else, when implemented effectively, CPTED has the ability to influence the crime risks of vast amounts of properties and the spaces surrounding them, and the benefits of *getting it right* will last for decades. Conversely, a failure to consider crime risk in the design and build of properties and spaces condemns properties, developments and even neighbourhoods to decades of enhanced crime risk, and potentially, costly regeneration before the natural lifetime of those places.

REVIEW QUESTIONS

1. The research presented within this chapter has outlined the debate surrounding the desire to limit through movement within and between developments. Many argue that limiting through movement reduces the risk of potential offenders becoming aware of a vulnerable property (searching behaviour) and reduces access and escape routes for offenders. However, in designing with consideration for the potential abuser, are we restricting the enjoyment of space for legitimate users – who may want a short cut (footpath) to the nearest shops or nearby housing estate? How do we balance the needs of the 'users' of the natural and built environment with considerations for those intent on 'abusing' those spaces?
2. Housing built to the Secured by Design standard is not publicised as such (there are no visible signs or notices). Those living in Secured by Design developments, those using that space and those passing by that space, are unlikely to be aware of the enhanced security 'status'. There are arguments to suggest that residents should be informed that their property is designed and built to resist crime. There are also arguments that this information could increase fear of crime, and, if publicised, could act as an 'invitation' or 'challenge' to offenders. How do we balance the potential benefits of publicising a development's Secured by Design status (such as deterring offenders and increasing feelings of safety), with the risks of enticing offenders and exacerbating levels of fear amongst users of that space?
3. At present, the vast proportion of housing built to the Secured by Design standard is social housing (that owned by local authorities or housing associations). This is because government has the opportunity to require certain standards as a prerequisite of funding offered to these housing providers. The private housing sector has been much slower to accept the benefits (to themselves and those purchasing their properties) of designing out crime. How do we encourage private housing developers to consider the benefits of designing properties with crime prevention in mind?

Should government be able to mandate that all new housing is built to the Secured by Design standard, and if so, what challenges might be associated with this?

4. Research shows that designing according to the principles of CPTED will reduce burglary and other acquisitive crimes (such as vehicle crime and burglary from sheds and garages). To what extent do you think that these principles can benefit other crime or disorder incidents – for example, Anti-Social Behaviour? Building on from this, do you believe that the principles can be transferred to societal grand challenges such as terrorism, child sexual exploitation and cyber crime?
5. Some argue that setting standards and regulations for buildings can limit creativity and impact upon the 'design quality' or aesthetics of housing developments. In your view, how do we balance the desire to encourage developers to build with consideration for crime prevention, with the risks of stifling individual design? Do you believe that designing for security can be aligned with designing architecturally attractive properties?
6. Finally, thinking about your own house or flat, do you think that improvements could be made to the standards of security (think physical security as well as design and layout)? Would these changes have any financial or practical implications?

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[i] Major roads connect cities, towns and the larger areas between them.

[ii] Local roads form the urban backcloth on which residential estates are built, and they facilitate easy travel between one local road to another. They are unlikely to be used for vehicular travel for anything other than local trips, but do connect neighbourhoods and allow travel within and between them.

[iii] Private roads are intended for use by residents alone and not for connecting places. Some of these will be culs-de-sac, some will be through roads.