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A comprehensive and accessible approach to crime prevention in the planning and design of public spaces

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Abstract   Crime and fear of crime are two of the main aspects that can influence, in a negative way, society and the life of urban citizens. In an attempt to approach this complex issue through urban design measures, a new discipline emerged in the 1960/70s, based in particular on the works of Oscar Newman. Today there are several best-practice manuals, which have their limitations and are seldom known or applied. The first part of the article wishes to introduce the nature of the current theoretical debate related to this issue. The second presents an innovative proposal for a more complete, comprehensive and accessible 'best practices' manual addressed to local planning authorities, planning professionals and the public. This presentation is embodied in a case study of a housing estate in Porto, illustrating the potentials and limitations of the application of the manual's checklists and design guidelines.

Introduction – Misdemeanors and the Missing Design

Crime and fear of crime are often a major concern in present day communities. Not only does crime contribute to the physical and economic degradation of spaces, but the fear of crime also prevents inhabitants from actively experiencing pleasant day-to-day lives.

Yet there may be an overblown perception of urban crime. The great majority of crimes are still spontaneous and of a non-violent nature, targeting dwellings or shops (without the owners being present), or pedestrians.[1] They occur not by premeditation, but because the criminal sees a window of opportunity. Therefore, assuming that a criminal goes through a rational choice process before acting (Geason and Wilson, 1989), weighing variables such as risk (of the act, of being seen), effort and the potential rewards (see for example Stollard, 1991; Lismore City Council, 2000), preventing crime is to minimize the conditions in which the decision to act is triggered in

the criminal's mind, placing the criminal both physically and psychologically at a disadvantage.

Usually, this is achieved through *target-hardening measures*, which make the target more difficult to penetrate, remove or damage (locks, alarms, CCTV, stronger materials). Despite being successful to a certain extent, these measures have two consequences: (i) the problems are not solved, but just avoided, and social issues may arise from the reinforced separation of public and private space; and (ii) the legitimate use of space can be hindered if people are constantly being reminded of existing security measures and precautions. The excessive use of *target-hardening* may also lead to a 'fortress mentality', which is pointless once the criminal penetrates the system or if he/she is already a part of it. Reinforcement of police patrolling is considered as the next best thing, but the same problems arise, and successful long-term results are rarely seen.

Seldom has the planner or designer effectively contributed to crime prevention. Yet it is apparent that criminals are aware of the essence of space,

committing crimes in places with good escape routes or where they are unobserved. On the other hand, the citizen is also inclined to feel safer in well-lit areas or in those with spatial permeability. Therefore there appears to be a missing link between current crime prevention strategies and the design of public and private urban space.

Yet that connection has already existed as an area of research since the 1960s, established first by Jane Jacobs and later by Oscar Newman. Today, programs such as the American 'Crime Prevention Through Environmental Design' (CPTED, first coined by Jeffery, 1971) or the Australian 'Design Out Crime' (Government of South Australia, 2004)[2] exist. These policies are based on the belief that some specific detailed features of the built environment can promote or inhibit criminal activity. Manipulating these features may well reduce the opportunities for crime, and therefore crime rates are likely to be lowered. There is a common notion that much can be achieved at the design stage and, also, that a 'sense of place' makes individuals more willing to play a positive and active role in crime prevention.

In countries such as the United States, United Kingdom or Australia, these practical design principles that may lead to crime reduction have already been successfully applied in recent years, through the use of specific manuals. Yet, most communities are still unaware of the existence of these principles. They are still unexplored and not used in most urban projects, and the manuals themselves are often incomplete or not replicable in other urban scenarios. This contrasts with the literature, where the debate is well established, although the most notable works are few and not recent. The principles are there, for sure. What is missing is their wider acceptance and application in design.

This article aims first to review both the existing theoretical debate and the existing practical manuals, and then to present a preventive methodology based on an improved manual of best practices, which it is hoped will contribute to a wider diffusion of such principles. The complete manual cannot be presented here, due to its size, but it can be consulted in Saraiva (2008).[3] Its application is also illustrated herein through the case study of a housing estate in the Portuguese city of Porto.

Crime will continue to exist no matter what we do about it. In addition, some crimes follow erratic behavior patterns and cannot be foreseen (such as drug-related ones), and badly designed places can make any defensive act futile or even dangerous. Yet, urban design solutions can be a viable response from authorities at an initial phase. Such solutions can be financially sound, encouraging the sense of self-help and contributing to 'prevention', as they attempt to isolate crime and reduce it to a minimum in places were normal security is more difficult to achieve.

Jane Jacobs and Other Early Approaches – How It Began

Jane Jacobs' groundbreaking book 'The Death and Life of Great American Cities' (1961), which introduced many innovative planning issues, also presented the concept of defensible space for the first time, by relating crime control to more creative urban planning.

By observing that regular patterns of window-gazing were efficient in reducing crime, Jacobs had the foundations for a theory that she expressed in her book through three distinct points: (i) the clear distinction between public and private space; (ii) the role of residents – as most crimes occur in public space there should be 'eyes on the street' to give it natural protection, therefore building design should face the street; and (iii) areas with fewer persons will have increased crime rates, hence streets and green spaces must be able to generate movement.

After Jacobs called attention to this problem, other works followed. Notable among these are Elizabeth Wood's 1967 book 'Social Aspects of Housing in Urban Development', and C. Ray Jeffrey's 1971 work, which introduced the concept of CPTED. According to him, urban design could be conceived so that 'opportunities' are reduced. The concept of 'opportunities' was further developed by Mayhew *et al* (1976), Clarke and Mayhew (1980) and Bratingham and Bratingham (1981).

Newman's Theory – The Breakthrough

In his breakthrough book 'Defensible Space', Newman argued that architectonic design could be molded so as to create easily observable spaces, clearly marked as public or private, and not located near other areas of high crime. Such spaces could, due to the above-stated and other characteristics, give a sense of territoriality and community to dwellers. This would lead to an acceptance of responsibilities for preserving a

safer and well-kept environment (Newman, 1973, 1976).

This concept arose from the comparison of two different housing estates, one high-rise and another walkup, very near to each other and with similar density and social status of the residents. The high-rise had 3.5 times more robberies, and disrepair and declining occupancy led to it being demolished in less than a decade.

Newman attempted to justify this discrepancy by means of notions of space and territoriality (Newman, 1996). Inhabitants would keep and control areas that were clearly defined as theirs. The more families there were sharing a common space the more difficult it was to monitor activities, it was more difficult to recognize friend from foe, less 'commitments' could be made as to what was or was not allowed there, and the sense of identity was lost. In walkups (or less occupied floors in high-rises), the sense of place was much more present. Scrutiny by others and the perception of being in restricted property could be strong inhibitors of unwanted activity. Therefore the way space was distributed and to whom it belonged was crucial. Two housing estates with similar social characteristics would have very different indexes of safety depending on their ratio between floors and area, their orientation and number of entrances, and the existence of recreational areas or gardens between the entrance and the street.

Newman formulated four major principles based on these findings (Mawby, 1977; Merry, 1981; Geason and Wilson, 1989): (i) *Territoriality*; (ii) *Natural surveillance*; (iii) *Image* (one that would not suggest vulnerability and could also grant uniqueness and a sense of belonging); and (iv) *Environment* (harmony between the neighborhood and its surroundings, and its location in safe-zones).

This theory, by suggesting that communities could self-regulate, generated a considerable social impact. Shortly afterwards other authors tackled the issue, such as Repetto (1974), Pyle (1976), Duffala (1976) and Molumby (1976). Others, like Mawby (1977), presented the first criticisms. In response, Newman resorted to studies, mainly through mathematical correlations, which introduced social variables. Using a stepwise analysis,[4] he saw that the most important variables relating to crime were the percentage of residents receiving welfare, building height and number of families sharing the same entrance. Correlating crime only with physical variables, the model revealed the biggest problems to be the size of the project and the numbers of surrounding social housing. Not only do the greatest correlations occur between crime and design variables, but these variables also strongly correlate with themselves.[5]

Second Stage of CPTED – People, Programs and Processes

From the 1980s onwards, Newman's theories gained increased attention, first because the theoretical debate added new components, and second due to the creation of specific programs and a wider practical application by specialized teams.

Initially, most post-Newman movements (second stage or CPTED Plus) added a social component. Mayhew *et al* (1979) introduced 'employee surveillance' (through shopkeepers or bus drivers). This evolved into the social surveillance concept of Rubenstein *et al* (1980), defining residents' intervention. Perlgut (1981, 1982) discussed a 'self-manageable space' by the residents, in coordination with the police, and Murray (1983) then approached the concept of Neighborhood Watch. Accordingly, residents accepted, and even looked for the responsibility. Furthermore, the community is not perceived as just a catalyst for natural surveillance, it is also an active element in the design process. Sarkissian (1989) dwells on these principles of consultation, and more recently community intervention has also been explored in Sarkissian and Perglut (1994), Sarkissian and Walsh (1994), Saville (1995, 1996), Sarkissian *et al* (1997) and Plaster Carter (2002).

On the other hand, Newman's own original concepts evolved and were reshaped. Rand, as well as Gardiner (1978), re-named them as social control, access control, criminal justice and defensible space, and Poyner (1983) goes further, speaking of removing targets and changing accessibilities, while increasing natural surveillance. Presently, when programs such as 'DOC', the British 'Design Against Crime'[6] and 'Secured by Design'[7], as well as several design manuals exist, we may structure the repeated principles that each of them presents and establish nine focal points that are intrinsically connected: (i) *Natural or passive surveillance* (orientation of facades, lighting, location of leisure areas); (ii) *Access control/target-hardening measures* (signs, pavement texture, vegetation); (iii) *Territoriality* (drawing boundaries using physical elements);

(iv) *Hierarchy of spaces* (assigning private and public spaces and to whom they belong); (v) *Hiding places* (to be avoided); (vi) *Environment and activity support* (encourage use of public space); (vii) *Image/Maintenance* (a bad image may attract unwanted activity); (viii) *Extensive approach* (integration between areas because the best crime prevention design solutions may be incompatible with other project elements); and (ix) *Collaborative approach*. The particularities of each place are strengthened by a 3 D's approach (Singapore National Crime Prevention Council (2003), as each place has a purpose (Designation), has social, cultural, physical and legal contexts that guide behaviors (Definition) and all human space is designed to support and control such behaviors (Design).

Lastly, modern technology has substantially improved *target-hardening* (yet, the problems discussed earlier remain), and other ramifications of the theory have emerged, such as Crime Prevention through Product Design (Clarke, 1999; Lester, 2001; Cozens and Hills, 2003).

Ultimately, Cozens (2005) states than one must design out crime, but design in people. When the streets rule, crime fighting is done by the police, after the occurrence of the crime, and with known results. When the communities dominate (first stage), crime prevention is done through informal social control, most of the times unaided. But when social facilities dominate (second stage), then planners, architects, managers and the community dominate together, and therefore one must think in terms of physical design and kinetic management (Geason and Wilson, 1989).

Therefore, the process of implementing CPTED measures, as defended by recent approaches, should consist first of a consultation stage. This is followed by a research stage, collecting political and social-economic data for a given area. *In situ* research of physical and layout conditions is also carried out. With this in mind, CPTED teams must comprehend why the problems arose (due to design, management or others). Later, the team must propose several solutions to the community, to allow debate. When the final solution is decided upon, agreement must be reached regarding priorities of implementation. Constant monitoring and evaluation is recommended. Furthermore, training, education, management and marketing play an important role in the awareness of CPTED measures.

Debating a Theory – Then and Now

From the beginning, Newman's theory was challenged. Bottoms (1974) recognized its importance, but feared that its coldness would encounter risks of being neglected. Mawby (1977) criticized a methodology based on only two housing estates, as his own studies pointed to fairly similar levels of crime between high-rise and low-rise housing, with crime in high-rises sometimes proving to be even lower than other areas. In addition, Newman did not cross different types of variables and his conclusions were vague because he did not present social data or crime statistics by areas; therefore local conditions could change without that being noticeable in the study as a whole. Bottoms (1974) argued that this lack of evidence had to be compensated by a strong theoretical background that Newman failed to give, simplifying in excess. The concept is so vast that most projects present both good and bad defensible space qualities, the principles may contain contradictions, and Newman's 'sense of place' may not be that straightforward. Hence Merry's (1981) concept that defensible spaces can be undefended. Windows may be pointing in the right direction, but if there is nothing interesting to see outside then people will not naturally survey their surroundings. Fear, neglect or incapacity to identify a threat may cause 'bystander apathy' (Latané and Darley, 1969; Moriarty, 1976). Once inside the system, the criminal is covered by the same dissuasive design features. More apartments may mean more people and therefore more natural surveillance, but phone booths in more publicly used places are more vandalized, simply because they have many more users (Bratingham and Bratingham, 1975).

These examples not only show that Newman's theory can actually express contradictory statements but that CPTED measures may not be dissuasive at all because, as Steventon (1996) notes, the fear of being caught comes after the act most of the times and even if criminals are aware of the risk beforehand they may take a chance anyway. In addition, the safe zone concept of Newman can be proved wrong, as most criminals do not act in their own area but seek others. CPTED measures may also not reduce crime but only change it in type, or in time or space, although this relocation should inevitably bring reduction (Heal and Laycock, 1986) and allow for the confinement of crime in specific areas.

If spaces are badly designed, they heighten the opportunities and the sense of non-safety and people will not intervene, even though that may not necessarily bring about an increase in crime. If the spaces are good, this does not necessarily guarantee safety, and therefore a false sense of security can be given (Merry, 1981). Alternatives such as *target-hardening* measures and social services are strongly defended by some. S. Wilson (1978), for one, saw that defensible space indeed affected the incidence of vandalism, but the density of youngsters had much more weight as an influencing variable.

Ultimately, *defensible space* can be twisted to become something that no one defends, hence *undefended space* (Merry, 1981), as a direct consequence of fear of crime. Then, when a criminal is able to surpass a barrier, he/she is defended by the space itself to unobtrusively act, which generates *offensive space* (Atlas, 1991). In an extreme situation, the criminal wholly owns the space and therefore the space becomes *indefensible* (Cozens *et al*, 2002).

Lastly, problems regarding the physical implementation of these techniques have also been debated, from Moffatt (1982) onwards. Function, aesthetics and safety features have to be balanced into the same design, and that may give rise to incompatibilities. Architects and planners do not know who they are building for most of the times and the police may regard resident participation as interference. Other incompatibilities may arise, such as the need for noise reduction, energy efficiency or lighting that may go against CPTED principles (Government of South Australia, 2004).

Implementing the Principles – Why the Need for a New Best Practices Manual

As has been noted, there are few recent contributions to the theoretical debate and the basic pillars are well established. Though not an exact science, it has nonetheless been translated into success stories and the advantages remain clear, especially the easy-to-implement nature, the permanent impact and the reduced costs of improvements. Unfortunately, real examples are seldom discussed and the practical methodologies are not as formally organized as the theory. Present discourses on CPTED still primarily focus on target-hardening measures (which, of course, can be successful), and on the use of newer

technologies (such as space syntax[8]) or integrated urban management strategies. These, although more complex and costly, seem to be predominantly considered, leaving earlier and simpler notions of crime prevention through design principles to be mostly forgotten.

Little changes in design can indeed make a difference, and if these are planned before construction then the costs (financial and social) may be increasingly reduced. As crime still is (and probably always will be) a major concern in cities, the need for tools that can contribute to its prevention will always be pressing. Albeit more modern technological tools and integrated strategies can have decisive roles in later stages, design directives should constitute the first stage in crime prevention design and planning. This being the case, a coherent and accessible manual should exist that can provide thorough yet simple information to local planning authorities, planning professionals and the public. Various design manuals have been presented since Newman, of continuously greater importance. Yet these do not seem to fulfill the required needs, and therefore a new best practices design manual based on existing ones (which can be consulted in Saraiva, 2008) is proposed, for three major reasons.

First, existing manuals have various formats that can be divided into those that present the guidelines by themes (natural surveillance, lighting and so on) and those that present them by type of land use (green spaces, schools and so on). The problem with both these approaches is that the resulting guidelines end up being too vague due to their vastness, and inevitably repetitions will occur. For example, if the guidelines are divided by themes, then the directives for, let's say, lighting are generic and not separated by types of land use. On the other hand, if the guidelines are separated by types of land use, then repetition occurs because the same guideline may be used in a housing estate and a school, for example. Some manuals present the two approaches, each in turn, thereby doubling repetitions. Second, not all available manuals discuss all existing issues, some are more focused on a particular theme or on a particular type of land use, whereas some are too place-specific, which makes their successful replication uncertain. Moreover, many manuals studied by this investigation were complete copies of existing ones, disregarding any spatial specificities. And third, their legibility and intuitiveness is somewhat hindered because of the above-stated reasons.

Table 1 attempts to describe the most relevant existing manuals on which the new one is based.

Presenting the Manual – Structure and Illustration through a Case-study

The proposed manual presents three major inputs. First, it tries to compile in the same document all the major CPTED themes, as well as the most important designable types of land use in a city. The data used derive from previously existing manuals and were cross-referenced in order to verify each entry and eliminate repetitions. Second, a new type of presentation was devised – a double entry table, where the design guidelines were set against the land use types (an example is given in Table 2). For each theme, a brief theoretical description of its concept is given, followed by a checklist and the double entry table. And third, the simplicity of the presentation and the insertion

Table 1: Most prominent design manuals

Manual	Guidelines by themes	Guidelines by type of land use	Themes/Land uses presented	Structure
Geason (1989)	—	X	Public housing; railways; schools; public telephones; public places	Concept and some guidelines
Geason and Wilson (1989)	X	—	Territoriality (*space hierarchies; transitional filters; penetrability; Image; management for security*); surveillance (*natural surveillance; formal, organized surveillance*); access control; target-hardening (*doors; sliding doors; upper windows; surveillance; alarms*)	Concept, guidelines, examples and implementation advice
Stollard (1991)	—	X	Site (*public open space; footpaths; external lighting; car parking; landscaping*); flats (*communal space within buildings; entry phones; CCTV*); houses (*layout; private space; individual dwellings; target-hardening*)	Concept and description
The city of Edmonton (1995)	X	X	Awareness of the surrounding environment (*sightlines; lighting; predictable routes; entrapment spots*); visibility by others (*isolation; land-use mix; activity generators; ownership, maintenance and management*); finding help (*signs and information; overall design*) Transportation (*parkades; surface parking; bicycle routes; sidewalks/walkways; pedways; surface and below grade transit stops*); neighborhood (*planning and design; residential streets; commercial streets; parks; high-rise residential areas; interior spaces in multi-unit housing, school yards*); downtown (*downtown area; parks and open spaces; commercial/ office developments*); other places (*industrial areas; back lanes; washrooms; River Valley;*[a] *major shopping malls; university/college campuses*)	Concept, guidelines, cross-references and checklist (The choice to present themes and land uses each in turn inevitably brings repetition)
CCAPS (1998)	—	X	Neighborhoods; houses; apartment buildings; parking lots and garages; public spaces	Guidelines
Lismore City Council (2000)	X	X	Surveillance (*siting and design of buildings; subdivision design; landscaping; lighting*); Access control and target-hardening (*access; target-hardening*); Territorial reinforcement; defensible space Single dwellings and dual occupancies; multi-unit housing – town house complexes, blocks of units, flats; commercial; car parking – both public and private	Concept and guidelines

Table 1 *continued*

Manual	Guidelines by themes	Guidelines by type of land use	Themes/Land uses presented	Structure
Singapore National Crime Prevention Council (2003)	X	X	Sightlines; lighting; concealed or isolated routes; entrapment areas; isolation; land-use mix; activity generators; ownership, maintenance and management; signs and information; overall design Condominiums and public housing; landed developments; CBD/regional centers/town centers; offices/retail/hotels; educational institutions and schools; industrial areas; car parks; parks/open spaces/playgrounds; back lanes; public washrooms; sidewalks/walkways; underpasses/pedestrian overhead bridges; bus shelters/taxi stands/MRT/LRT stations	Concept, Guidelines and Checklist (The choice to present themes and land uses each in turn inevitably brings repetition)
Government of South Australia (2004)	X	—	Lighting, sightlines; movement predictors; entrapment spots; isolation ear-and-eye; land-use-mix; activity generators; sense of ownership, maintenance and management; signage and other information; overall design	Concept and checklist
ODPM (2004)	X	—	Access and movement; structure; surveillance; ownership; physical protection; activity; management and maintenance	Definition, introduction, guidelines, examples and checklist
Wellington City Council (2006)	X	—	Informal surveillance; formal surveillance; lighting; concealment; entrapment; robustness; maintenance	Concept, objective and guidelines
Saraiva (2008)	Double entry table		Perception of the surrounding environment (*surveillance/sightlines; lighting; predictable routes; entrapment areas*); visibility by others (*isolation; variety of land uses; activity generators; maintenance, property and management*); find help (*signs and information*); design, layout and global planning (*global design; layout; target-hardening; planning*); citizens' good practices/ (i) urban space in general; (ii) low-rise; (iii) high-rise; (iv) green spaces; (v) car parks; (vi) streets; (vii) sidewalks and pedestrian ways; (viii) bicycle paths; (ix) tunnels and overpasses; (x) transport stops; (xi) commercial, offices and services zones; (xii) schools.	Concept, checklist and guidelines

[a]A location in the city of Edmonton.

at the end of the manual of directives on how to manage and implement the principles in question give it an accessible, clear, insightful and easily readable and understandable quality, which hopefully can be used not only by planners and city-makers, but also by the private sector and the community at large. This should undoubtedly aid the dissemination of CPTED practices, the development of public conscience and the continuous renovation of spaces considering crime prevention qualities, their functionality and their appeal.

Ultimately, the intention is not to create another bureaucratic step nor restrict the work of city planners or hinder innovation. Based on intuitive design solutions that are easy to implement, and not on costly technical building solutions, the CPTED manual aims to aid the design process in a first stage and not restrict it to the principles of the manual proper. Even so, the guidelines should not be taken merely by face value but considered in the light of local specifications. Furthermore, the process does not end with implementation. Monitoring and continuous adjustments are resolute for achieving safer places.

As the manual is about 50 pages long, hence very difficult to summarize, some directives are

Table 2: Excerpts from the best practices manual, namely the 'Signs and Information' category

Design guidelines:	Urban space as a whole	Low-rise	High-rise	Green spaces	Car parks	Streets	Sidewalks and pedestrian ways	Bicycle paths	Tunnels and overpasses	Transport stops	Commercial and service zones	Schools
Signs should be large and legible, identifiable as such at a distance of 20 m	●	—	—	—	—	—	—	—	—	—	—	—
Signs that represent penalties for unwanted behavior should be picturesque and clear, because many trouble-makers are youngsters with poor school performance	●	—	—	—	—	—	—	—	—	—	—	—
Each floor must have signs that inform of the units therein, as well as all entry and exit points of that floor (such as elevators and stairs)	—	—	●	—	●	—	—	—	—	●	●	●
Signs should indicate paths through the use of colors, depicting distance and on-foot estimated time	—	—	●	●	—	—	●	●	●	—	●	●
Door numbers should be at least 7–7.5 cm in height	—	●	●	—	—	—	—	—	—	—	●	—
In commercial spaces, door numbers in canopies should be at least 15 cm in height	—	—	—	—	—	—	—	—	—	—	●	—

explained below through the 'Bairro de Francos' case study.

Bairro de Francos (Figure 1) is a public housing estate built in 1967. It has 15 four-story blocks, unevenly dispersed. Most blocks have two entrances with two apartments per floor, but a few are larger, containing up to four entrances. In the inner squares, the estate has four major infrastructural components: a school, a football field, a social center (a small, one story building), and a small fairground. It is crossed by a U-shaped street, starting and ending at its South side. To the West the neighborhood is bordered by a freeway, and to the North and East it is only accessible on foot. Initially quiet and calm, its demise was due to the departure of the initial families to safer and more modern neighborhoods and the subsequent relocation of low-income families from nearby derelict houses. Although not one of the most trouble-some neighborhoods in Porto, it still has drug- and crime-related problems.

After applying the manual's design guidelines to the case study, the results obtained show a neighborhood with several and interesting CPTED measures, namely the insertion of social facilities within the blocks, clear visibility from the windows, the existence of a nearby social/cultural center for residents, and enough space to create appealing leisure zones. Yet, despite these design features, the neighborhood fails to perform as a whole, which can be explained by two reasons: the opportunities were not taken to conquer and preserve the space, and due to fear.

In relation to the first reason, all public space is common space, it does not belong to any particular building, apartment or person, and therefore it becomes undefined, out of control and can easily be claimed by strangers. Furthermore, the neighborhood faces inward and the overall design is confusing. Stairways lead directly to the sidewalk (therefore, the only common area is actually the street), and the garden space is not related to any particular block (and therefore becomes neglected, or full of parked cars). The only exception is the conquering of sidewalks by ground floor residents, who, through the use of hedges or fences, create their own back yard. But even these can be hazardous to the safety of the neighborhood, as they give 'false clues' of the layout to unfamiliar crossers.

The blocks (which are all similar) have different orientations (which hinders natural surveillance and overall perception), and there is not a single

Figure 1: Bairro de Francos.
Source: maps.google.pt.

sign. The number of the blocks is on one single side of the building at the top, in a place that is likely to be unnoticed if one does not know where to look, and mail boxes are the only clue to knowing which apartments are served by each entrance. In addition, there is only one way into each block, and some of these entrances are not facing the main road. Nocturnal use and maintenance were not considered (neither appears to exist), lighting is deficient and many paths are isolated and may become entrapment areas, despite the overall accessibility to the neighborhood. The same happens with visibility; overall, it is good, but several local hidden spots exist and the vegetation grows uncontrolled. All in all, the environment is neglected and not aesthetically appealing.

In relation to the second reason, that is, due to fear, social facilities are always locked except during 'official' use, and the activity in the social center remains indoors. There is no safe place for children to play and little reason to be on or surveying the street, especially at night. Most balconies were closed by glass windows, and curtains are always drawn, and with the exception of locks on doors and windows, other target-hardening measures are inexistent. Stairwells and pedestrian paths are not closed, and there is no alarm, emergency phone or any other means of asking for help. It is also clear that the residents were not involved in the design nor informed of their potential role. Despite existing problems, no policeman was seen. The

neighborhood seems very vulnerable, and actions occur without control.

Based on this analysis, it stands to reason that the solutions must involve promoting more outdoor activities (promoting sporting events, place tables outside the social center), rehabilitating abandoned green zones (create leisure spaces and a children's playground), closing the entrances to the stairwells of the blocks, placing doors and doorbells, creating a network of signs, and officially attributing space to the dwellers of the ground floor, making it private or semi-private.

Presenting the manual's design guidelines used in this case is not possible because of their length, but the main ideas have been synthesized in the paragraphs above. Moreover, the manual's checklist is partially presented in Table 3. Figures 2, 3 and 4 illustrate particular areas of the neighborhood.

Conclusions

Currently, local leaders face a great amount of pressure to achieve safer communities, and therefore a lot of expenses are being made *after the fact*. Therefore, a strategy that works *beforehand* through local planning is a pertinent course of action.

Although CPTED strategies are subject to criticism and present some contradictions (because they are dependent on the citizen, good management and dissemination of information, and are

Table 3: Checklist for 'Bairro de Francos'

Themes	Checklist questions that received a 'no' answer	
Surveillance/Lines of sight	Can 'blind' corners or sudden changes of gradient that reduce visibility be avoided or modified?	See Figure 2
	Is special care being taken concerning the visibility of places of higher risk?	
	Does the layout already consider future hindrances to visibility, such as the growth of vegetation?	
Lighting	Does lighting allow for adequate visibility?	
	Does lighting allow for enough visibility so that a person can recognize a face at a proper distance (10–15 m)?	
	Are lighting fixtures kept in good conditions? Is there maintenance? Is there someone properly assigned to do it?	
	Is there no need to illuminate back streets?	
Predictable routes; entrapment areas; isolation	If predictable routes are dangerous or not visible, can they be eliminated instead of attempting costly changes?	
	Can a pedestrian see what is on the path, as well as its end?	
	Are the routes evenly and consistently illuminated? Are shadows avoided?	
	Are alarms and other aid-seeking devices well signaled, and is help information available?	
	Are there no entrapment areas near a pedestrian path?	
	Is the place well lit? Are there formal surveillance methods?	
	If natural surveillance is not possible, are there emergency telephones or employees present?	
	Are the different land uses organized so as to encourage activity, natural surveillance, visibility and interaction between people, either during the day or night?	
	Is the area able to receive several events and activities?	
Maintenance, property and management	Can the various boundaries of the space be understood solely through the use of design measures?	See Figure 3
	Is the space well kept? Does the design allow for good and easy maintenance?	
	Are there signs instructing people on how to report maintenance problems?	
	Does the management of the space allow for priority maintenance measures?	
	Does the management of the space guarantee personal security?	
	Do the materials used minimize crime and vandalism opportunities?	
Signs and information	Are there signs? Are they adequate according to the guidelines?	
	Are the names of the streets and the numbers of the houses clearly visible so as to avoid non-intentional access?	
Global design	Do the environments take into account security issues?	
	Is the scale of the estate consistent with the neighboring ones so as to avoid 'empty spaces' in the surrounding environment?	
	Is the design simple and easy to understand?	
	Is the space used at night and was it conceived taking that into consideration?	
	Does the selection of building materials take into account the increase in security?	
Layout	Is there a good perception of the place as a whole?	
	Are the common areas and green spaces drawn so as to induce a sense of territoriality?	
	Is the layout appropriate to the type of crime identified therein? Does it respond to wider planning principles?	
	Does the layout allow for the maximization of efficient crime-fighting measures?	
	Are the private and public spaces well defined and delimited?	
	Does each place have unique intrinsic characteristics?	
Target-hardening	Are parking spaces and social facilities in appropriate places? Do they possess appropriate security measures?	See Figure 4
	Is the access to the space and the back of it restricted?	
	Were the houses planned and constructed so as to reduce opportunities of illegal access?	
	Were the spaces designed so as to reduce opportunities of theft and vandalism?	

Table 3 *continued*

| Themes	Checklist questions that received a 'no' answer
Other relevant planning questions/ global evaluation	Do the design and the street pattern promote safety?
	Are sidewalks and edge boundaries under the scope of natural surveillance, not allowing for any hidden area?
	Was all the quantity and nature of the paths considered?
	Do the paths lead to places where people want to go? Are all the paths necessary?
	Do the paths not allow quick and covered access to potential targets by potential criminals?
	Were the building types selected and drawn with security in mind?
	Do all public space serve a purpose and support an appropriate level of legitimate activities?
	Was the remodeling, removal or reuse of buildings and spaces vulnerable to crime considered?
	Are those who should feel a sense of 'property' toward the place involved in the definition of its identity?
	Will as many as possible good-natured people be attracted to the public space?
	Was a good quality space created?
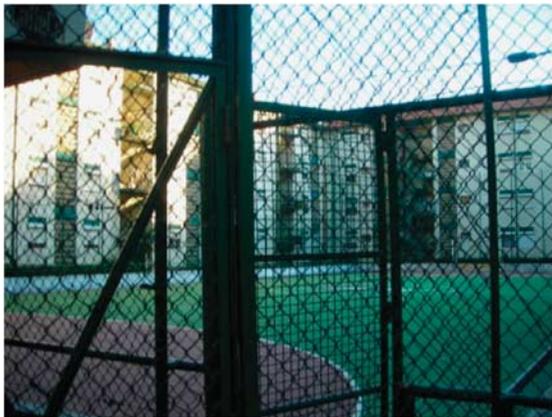
Figure 2: Square block facing the field.
Source: Authors.

Figure 4: Stairwell.
Source: Authors.

Figure 3: Backyards made by ground floor dwellers.
Source: Authors.

influenced by irrational behaviors), it has already been proven that the advantages are greater. They are based on common sense, easy to follow, permanent, low-cost, especially if allowed to enter at a design stage, and will ultimately reduce costs (of police work, of maintenance). For these, they have gained respect in the literature.

The focus now shifts to the practical applications. But even if good design conditions exist, economic and especially social factors should also be taken into account. Workshops, campaigns and consultations are vital to gain the interest of communities, and planners need to take multidisciplinary approaches. The political sphere should also be a partner, managing and keeping public spaces and incorporating CPTED measures

into laws and projects. To be successful, one must pass from 'common sense' to 'common practice' (Cozens, 2005), yet much is dependent on context, and therefore flexible guidelines are needed. In addition, a good design is not a guarantee of success and there are other factors that may hinder the use of certain design solutions. The challenge consists of achieving a middle term between durability and appearance (Geason, 1989), because what is safer can also be unappealing. The durability aspect is important, yet constant monitoring is needed because CPTED measures are not for life and changes may be required according to shifting social or economic conditions.

A larger step in this direction may be made by the best practices manual presented here, which aims to be a working assistant, a catalyst for safer designs and an eye-opener, especially for communities. The compilation of all the major themes and land uses in a single set of double entry tables eliminates repetition and delivers a more focused approach to each theme. The fact that the manual is based on easily understandable and almost intuitive guidelines, and the easily readable and applicable nature of both the tables and the checklist, ensure that it can be relevant in disseminating CPTED best practices. It can also develop public conscience and create opportunities for the rise of small individual contributions that can further strengthen the sense of 'defensible space'.

Much of this is proven by the research made by Saraiva (2008), where the manual was applied not only to Bairro de Francos but also to a green space, a commercial street and a university, testing its accessibility and comprehensiveness. It was found that the lack of variety of land uses and the lack of activity generators were the two main causes of unsafe environments. The Bairro de Francos case study demonstrated an example of a neighborhood where CPTED measures exist, but their effectiveness has been negated by fear. The other case studies showed an historic center where only intuitive principles of CPTED were applied (albeit most likely unintentionally), a city park with excessive formal surveillance, and a university where CPTED principles are used and are successful. Except for the example of the university, it can be seen that formal surveillance is still the first choice when attempting to provide safer environments, and where CPTED measures exist (intuitively or not) they are not maximized due to lack of knowledge or fear of crime.

This is then the most important reason for the presentation of this new manual. It has been proven that it responds well to these different environments and it helped reach better conclusions and more systematic design solutions in answer to the various specific problems. It is possible that the manual may be used in other countries and in other city locations. Nevertheless, each case is a case, and any manual must be used wisely. In addition, it is only recommended in a first stage, to be complemented further downstream by modern solutions and management strategies.

Even so, it is evident that the manual focuses more on design than on social issues. But the fight for action (or against inaction) is as vital as, or more so, than the fight against crime itself. The problem is complex and the judicial system is not enough, making matters worse if used in excess through formal surveillance. There is a fine line between fear and quality of life. Integrated approaches are needed and top-bottom government approaches are required in order to secure the use of CPTED techniques in planning. CPTED techniques, though only part of the general solution, have proven to be indispensable to crime prevention, and therefore vital in present day communities.

Notes

1 Stollard (1991), regarding the UK scenario, noted that a person is only victim of robbery once every 200 years, of assault once every 100 years, of car theft once every 50 years, of house theft once every 37 years, and vandalism to property once every 6 years. These figures are now 20 years old, but they may not have changed much since.
2 See also www.designingoutcrime.com/.
3 As the manual derives from the work made on a Master's thesis, it is presented in this publication in the original Portuguese language. Contact the authors for an English version.
4 This method consists of selecting a series of variables and then determining which one contributes most strongly and independently to a given effect, and then the next variable after that, and the next, and the next, until the addition of a new variable no longer adds significance to the model.
5 Newman and Franck (1980) found that if a building size is increased by 1 (theoretical) unit, then the use of public areas will decrease by 0.5, neighbor interaction will fall by 0.31 and the sense of control will decrease by 0.29, but fear of crime (by 0.38) and instability (by 0.39) will grow. Social and economic variables also affect fear (0.59), instability (0.51) and crime (0.32).
6 www.designagainstcrime.com/.
7 www.securedbydesign.com/, focusing more on target-hardening measures.
8 See Hillier and Sahbaz (2008).

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