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sommario

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El crimen: impactos sobre el planeamiento urbano y el ambiente

de P. SANTANA, R. SANTOS, C. COSTA, N. ROQUE, A. LOUREIRO

La investigacion criminologica ha confirmado que existen claros modelos de crimenes en lugares y tiempos específicos. Esto quiere decir que la incidencia del crimen no està repartida casualmente; más bien existen areas de la ciudad que son relativamente pequeñas donde, sin embargo, el crimen es presente con mas frequencia que en otros lugares (hotspots) que hacen que sean sumamente vulnerable. Este paper examina las relaciones entre los hotspots y las características del ambiente, de acuerdo con la teoria del CPTED (Crime Prevention Through Environmental Design), en una ciudad de la Area Metropolitana de Lisboa (Amadora). Los resultados destacan la necesidad revaluar los elementos especificos del proyecto urbano. Este asunto pone la atención sobre el estudio de las locadidades y del proyecto urbano.

Crimine: impatti sulla progettazione urbana e l'ambiente

La ricerca criminologica ha confermato che ci sono chiari modelli di crimine, che si concentrano in specifici luoghi e tempi. Ciò vuol dire che l'incidenza del crimine non è distribuita casualmente; piuttosto ci sono alcune aree della città, che sono relativamente piccole ma dove il crimine è presente più frequentemente che altrove (cosidetti hotspots) che le rendono altamente vulnerabili. Questo paper esamina le relazioni fra gli hotspots e le caratteristiche dell'ambiente, in accordo con la teoria del CPTED (Crime Prevention Through Environmental Design), in una città dell'area metropolitana di Lisbona (Amadora). I risultati sottolineano il bisogno di rivalutare gli elementi specifici della progettazione urbana. Questo fatto ha attratto l'attenzione sullo studio delle località e la progettazione urbana.

Crime: impacts of urban design and environment

The criminal research has confirmed that there are clear patterns of crime, with concentrations in specific places at specific times. That is to say, incidence of crime are not distributed randomly; rather, there are certain areas in cities that are relatively small, but where crimes occur much more frequently than elsewhere (the so-called "hotspots"), making them highly vulnerable and predictable. This paper examines the relationship between the "hotspots" and the characteristics of the environment, in accordance with CPTED Index, in one city from the Lisbon Metropolitan Area (Amadora). The results highlight the need to reassess specific elements of urban design. This fact has drawn attention to the study of localities and urban design.

Crime: impact sur le projet urbain et sur l'environnement

La recherche criminologique a confirmé le fait qu'il y a de clairs modèles de crime qui se concentrent en des lieux et des temps particuliers. Cela veut dire que l'incidence du crime n'est pas distribuée accidentalement. Il y a plutôt certaines zones de la ville qui sont relativement petites mais où le crime est présent plus fréquemment qu'ailleurs (soi-disant hotspots) qui les rend hautement vulnérables. Ce paper éxamine les relations entre les hotspots et les

caractéristiques du milieu, en accord avec la théorie du CPTED (Crime Prevention Trough Environmental Design), dans une ville de la zone métropolitaine de Lisbonne (Amadora). Les résultats soulignent le besoin de mieux apprécier les éléments particuliers du projet urbain. Ce fait a attiré l'attention sur l'étude des localités et le projet urbain.

Verbrechen:auswirkung auf die art der planung der staedte und der umwelt

Die Verbrechensforschung hat bestaetigt, dass einige Verbrechen an bestimmten Orten und auf bestimmte Zeitpunkte konzentriert sind.
Das heisst, dass das Vorkommen von Verbrechen nicht zufaellig verteilt ist, sondern dass es einige - meist relativ kleine - Teile der Stadt gibt, an denen Verbrechen haeufiger veruebt werden als an anderen.(sogenannte Hotspots) und die Stadt hochgradig verwundbar machen.
Dieser Artikel prueft die Beziehung zwischen den Hotspots und den Charakterzuegen der Umwelt in einer Stadt ders Grossraumes von Lissabon (Amadora) mit den Theorien des C P T E D (crime prevention throgh environmental design).
Die Risultate unterstreichen die Notwendigkeit, spezifische Elemente der Stadtplanung neu zu bewerten.

Crime: impacts of urban design and environment

de P. SANTANA[1], R. SANTOS[2], C. COSTA[2], N. ROQUE[2], A. LOUREIRO[2]

Introduction

In recent decades, crime levels have given increasing cause for alarm, bringing material and immaterial consequences that have still to be properly understood. Anti-crime strategies urgently need to be implemented in order to promote safe communities and contribute to their sustainable development (UN, 2005).

Crime, in addition to the consequent financial costs (Mandel & Magnussen, 1993; Brand & Price, 2000:5; Rollings, 2008:53), also has profound emotional and physical effects upon the victims, causing behavioural alterations that may bring serious consequences for the whole community (Harries, 2000). These include fear of crime (anxiety and insecurity), the outcome of which may actually be worse than that of the criminal act itself (Carter & Jones, 1989) as it causes people to drastically alter their daily routines.

Yet, the spatial distribution of crime incidents varies in accordance with type. The most obvious difference is between urban and rural areas (Esteves, 1995; Ferreira, 1998), with a much wider range of crimes occurring in urban environments. This clearly results from the fact that there are far more goods available in cities to be stolen and sold. However, it also reflects the fact that increasing numbers of people have moved to the cities in recent decades, only to find themselves living in rundown areas in situations of social exclusion (Esteves, 1995; Cozens, 2007a). In fact nowadays crime is associated with societies that have great disparities of wealth and quality of life, and where there is also contact and interaction between the different sectors (Cozens, 2007a:232).

Finally, urban environments also offer less social control and more anonymity, which can benefit criminals (Esteves, 1999). Indeed, studies of crime distribution patterns within cities have shown that the absence of natural surveillance functions as a variable that influences the incidence of certain kinds of crimes in places where motivation and opportunities are plentiful (Harries, 2000).

Thus, criminal research has confirmed that there are clear patterns to crime, with concentrations in specific places and at specific times (Cozens, 2007a). That is to say, incidents are not distributed randomly; rather, there are certain areas in cities that are relatively small, but where crimes occur much more frequently than elsewhere (the so-called "hotspots"), making them highly vulnerable and predictable (Goldsmith & McGuire, 2000). This fact has drawn attention to the study of localities and urban design.

It was Newman (1972) who first identified the relationship between specific aspects of urban design and levels of crime. In his theory "Crime Prevention through Environmental Design" (CPTED), he argues that urban design influences the incidence of crime and the formation of hotspots. Other authors have also claimed that urban design and environment may play a part in the decision of whether or not to commit a crime (Geason & Wilson, 1989); for

1 Full Professor, paulasantana@mail.telepac.pt
2 Research Assistant

example, the lack of natural vigilance, poor lighting and other variables mean that a small area may easily be transformed into a potential crime hotspot.

According to Crowe (2000), urban design and the proper use of the urban space may help reduce fear of crime, and even its incidence, thereby contributing to an improvement in quality of life. This theory developed a sociophysical perspective in the 2nd generation of CPTED, within criminology and urban planning, becoming broader in scope and based upon four fundamental pillars: 1. territoriality; 2. natural vigilance; 3. community participation; and 4. access control (Geason & Wilson, 1989; Newman, 1996; Saville & Cleveland, 1997; 2003; Cozens, 2002, Cozens et al., 2005).

Other studies have assessed the influence of the physical environment upon violence, highlighting the contribution made by green spaces (i.e. the existence of trees and grass) in reducing the incidence of aggressive and violent behaviour in residents who live in the vicinity, particularly in inner-city social housing estates. However, studies have also shown that for those green spaces to be used (for physical activity, for example), other material and immaterial aspects play an important role. These include their accessibility, perceptions of security, the quality and comfort of the infrastructures and surrounding areas (existence of footpaths, pedestrian crossings, safe traffic, adequate lighting, maintenance and cleanliness of the public space, etc.), (Santana, et al., 2009a).

CPTED brings clear benefits in this regard, as well as reducing opportunities for crime by intervening in the urban environment. It also encourages the use of the space by the community and facilitating vigilance, which stimulates neighbourhood relations, fostering community cohesion, and promotes an active lifestyle amongst citizens by encouraging social and physical activities (Saville & Cleveland, 1997; 2003; Cozens, 2007a; Cozens, 2007b; Santana *et al*, 2008).

This paper is divided into 3 parts, focusing respectively on the following issues: 1. the distribution of crimes reported to the Public Security Police in one city from the Lisbon Metropolitan Area (Amadora) and the identification of high-risk areas (hotspots); 2. the association between the geographical distributions of socioeconomic vulnerability (Deprivation Index) and crime hotspots; 3. the spatial associations between aspects of urban design and crime hotspots (CPTED Index).

Data and Methods

The (in)security analysis conducted in Amadora was based upon information from a variety of different sources and at different scales. Information concerning crimes reported in the years 2004 to 2006 was provided by the Amadora police department (PSP). This was broken down into broad groups (crimes against property; crimes against the person; crimes against life in society; crimes against the state, and other crimes deriving from miscellaneous legislation), and referred to the 10 areas which recorded the highest number of crimes per parish. This data was then processed on the level of the statistical subsection to enable larger-scale analysis that is closer to our definition of the 'neighbourhood'.

The National Institute of Statistics (INE) provided the data for the Deprivation Index, which was constructed in accordance with the method used by Carstairs & Morris (1991).

The variables "illiteracy", "unemployment rates" and "family housing without indoor toilet" were standardised (using the z-score method) so that each variable had the same influence upon the final result. This method enabled us to identify clusters of greater deprivation (Mcloone, 2000). In addition to this statistical method, an exploratory analysis was also performed of spatial data (ESDA) using Moran I global and local spatial autocorrelation statistics (LISA) (Anselin, 1995). This analysis enabled us to identify whether there were spatial clusters (i.e. clusters of local spatial autocorrelation) whose security/insecurity effects might spread to adjacent spaces (Resende, 2005).

In order to gain a more precise notion of the environmental conditions associated to crime hotspots, the CPTED Index (*Crime Prevention through Environmental Design*) was implemented in Amadora in August 2007. It assessed specific features (eg. lighting, vegetation, cleanliness, conservation, etc.) of public spaces (streets, squares, parks) and buildings (conservation, architectural aspects, and relationship with the public space). The results of this analysis were classified between 0 and 1000, with 0 representing the area of highest risk (i.e. the lowest level of security established by this environmental design index) and 1000 corresponded to areas with physical conditions that are more conducive to security, and where there was therefore less potential risk of crime.

In(security) in Amadora

There are eight police stations (PSP) in the county of Amadora, two of which are substations; most are located in the central area. As regards the number of officers, there are 277 in total (1 for every 636 inhabitants and for every 900 m^2 of terrain).

The analysis of the geographical distribution of particular types of crime (pick-pocketing, 'mugging', vehicle theft and break-ins, home invasion robbery, and robberies of non-residential establishments) and their relationship with the walking distance to the police station revealed a negative correlation, if we consider the number of cases *per capita*. However, this correlation is due to the fact that the police stations are located in the areas of greater population density. When the same analysis was performed considering only the distance on foot and the incidence rate, we found that the correlation was positive and significant for home invasion robbery; that is to say, this kind of crime tended to occur further away from police stations. Thus, we can conclude that police stations are mostly located in areas of high population density where most crimes occur *per capita*, which in turn may be associated with the fact that these are the areas with the highest concentration of goods (Figures 1 and 2).

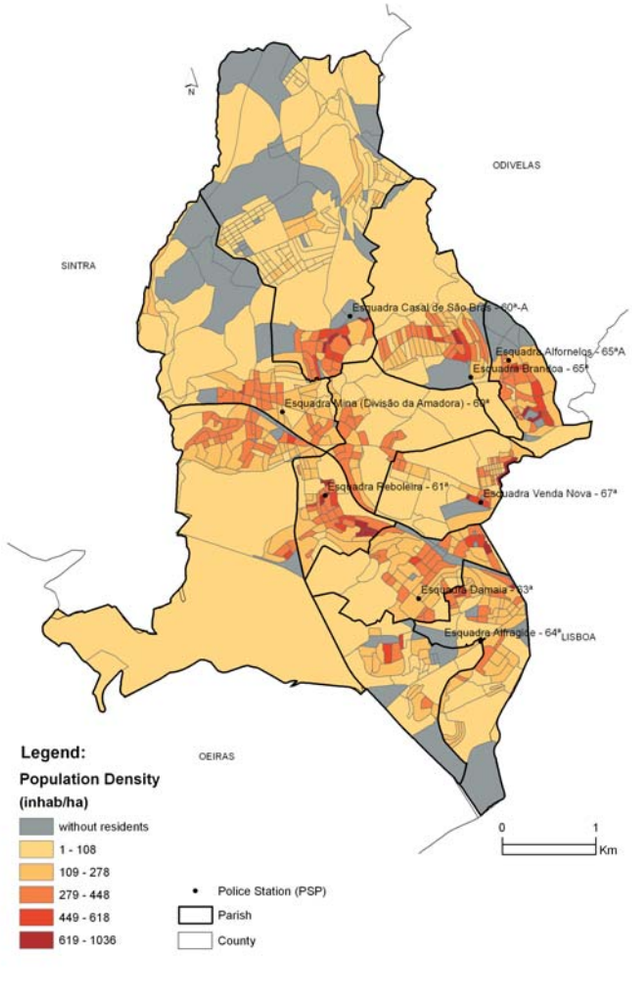


Figure 1. Relationship between police stations' areas of influence and neighbourhoods with hghest population density. Source: Amadora PSP and INE, 2001.

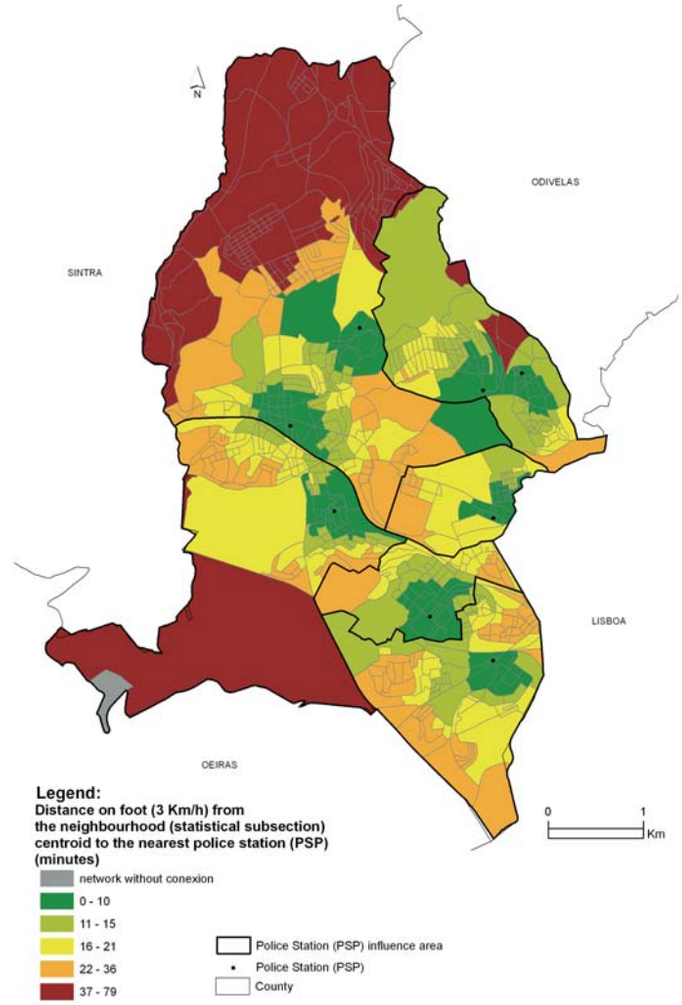
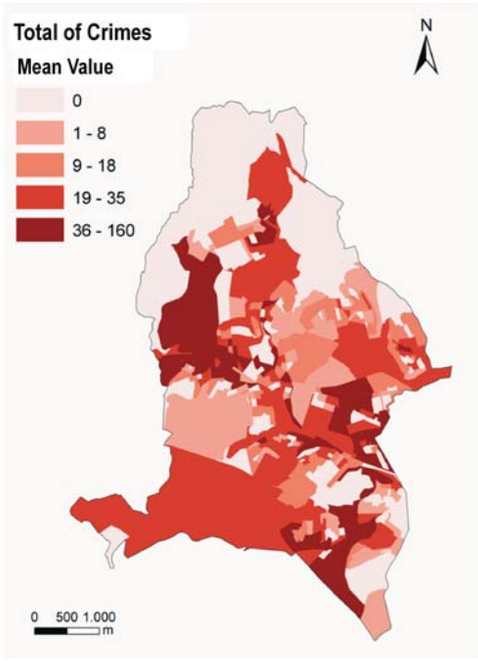


Figure 2. Distance on foot from the neighbourhood (statistical subsection) to the nearest police station (PSP). Source: Amadora PSP and CMA DAU-SIG, 2001.

4. Areas of socioeconomic deprivation and crime

In 2005, there were 33 crimes reported to the Public Security Police (PSP) committed per thousand inhabitations in the county of Amadora.

The areas that most contributed to the high levels of crime in this county (the so-called "hotspots") are located in the parishes of Buraca, Mina, Venteira and Damaia. These areas are generally considered to be zones of considerable socioeconomic deprivation, (figure 4). However, despite the fact that the global spatial autocorrelation (Moran's I) is positive for levels of deprivation and crime (total no. of crimes), when an analysis is performed according to type of crime, the figures are found to be negative for certain groups (figure 5). For example, the most deprived areas have fewer cases of vehicle break-ins; moreover, home robbery and pick-pocketing are significantly higher in those areas or in their vicinity. In fact, the local spatial autocorrelation (LISA) shows that on the level of the neighbourhood, there tends to be an association between crime and deprivation clusters, with a large central cluster and also some isolated situations.



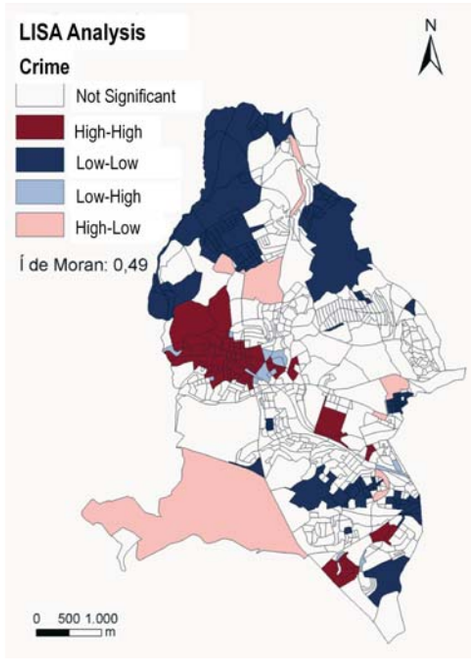
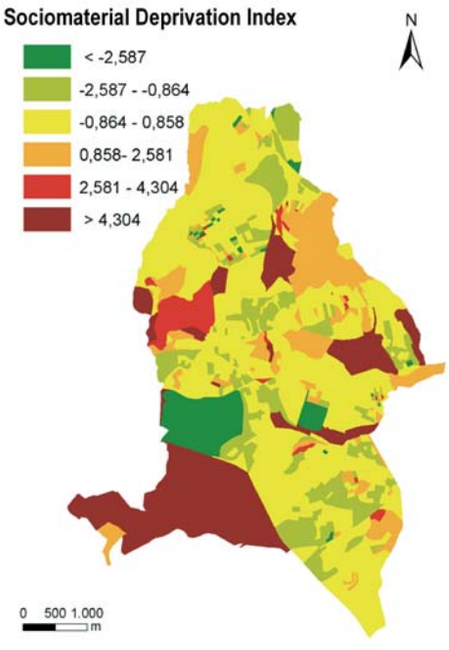


Figure 3. Reported Crimes. Average 2004-06 and according to LISA. Source: Amadora PSP.



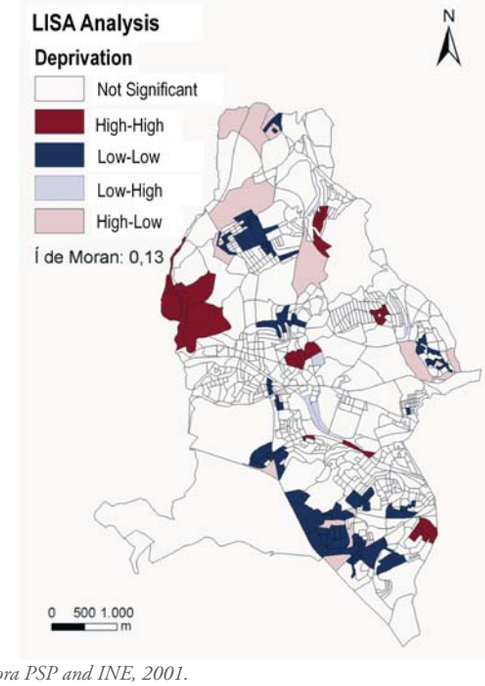


Figure 4. Sociomaterial Deprivation Index an according to LISA. Source: Amadora PSP and INE, 2001.

When analysing the total number of crimes according to deprivation quintiles, it was also found that the association between deprivation and crime is not direct; that is to say, the greatest level of deprivation is not always associated with the highest number of crimes (Figure 4). In fact, the highest crime levels are found in areas of intermediate deprivation (Quintile 3). It is interesting to note that the most deprived quintile has crime figures that are almost the same (slightly lower in fact) than those of the least deprived quintile (14.88% vs. 14.92%). However, the types of crime differ in each quintile. In the least deprived quintile, the most reported crime is vehicle break-ins, while in the most deprived quintile, it is robbery in the public thoroughfare ('mugging'). That is because in the first case criminals are prepared to run more risks to obtain less valuable goods, while in the second the reward is greater, since more valuable goods are available in less deprived areas.

Also, if we increase the scale of analysis, we find that criminal behaviour is differentiated within the clusters identified above. When we analyse the distribution of crimes by street, we find that within the high crime clusters, there are roads where the levels are much lower. This observation led to a more detailed analysis, applying the CPTED Index (*Crime Prevention through Environmental Design).*

Type of Crime	Moran's I	P Score
Pickpocketing	0.0344	0.0223
Home robbery	-0.0379	0.0113
Robbery of other establishments	-0.0343	0.0251
Vehicle break-ins	-0.0444	0.0036

Figure 5. Results of the application of the Moran I method to types of reported crimes (2004-2006). Source: Amadora PSP.

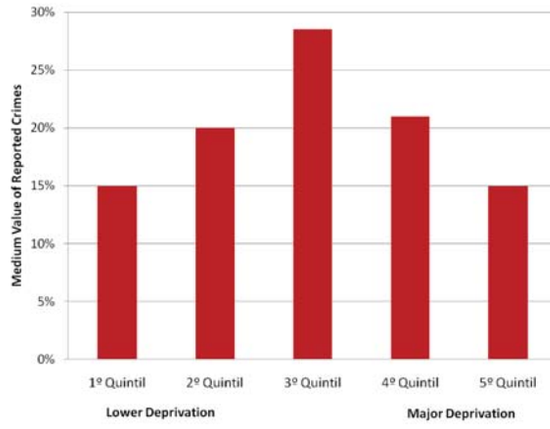


Figure 6. Participated crime in different levels of socioeconomic deprivation (quintiles)

5. Application of the CPTED Index in Amadora

5.1 Results

The application of the CPTED to one area (case study) of Amadora (Figure 7) allowed us to conclude that security generally improves from north to south. The best results were found in the south, which corresponds to an area where there are broader vistas and less potential escape routes for criminals. The highest level of high security was observed during the night (775).

However, the results also led us to the conclusion that the area under study was very heterogeneous as regards CPTED. The lowest night-time security scores were found in a small shanty-town area that was poorly lit and uncared for, while the opposite was found in most roads where there was adequate lighting, for example. The most widespread problem concerned the lack or inadequacy of a natural vigilance system; there were no urban facilities (such as benches, terraces, kiosks, etc) which would have enabled the users of that space to remain there for a few moments, and participate, albeit unconsciously, in the process of natural vigilance. It was also found that there was a weak relationship between the interior and exterior of buildings: the ground floor windows were frequently protected by bars, and commercial establishments did not have display windows giving visual access directly onto the street. This characteristic is quite possibly a consequence of the feelings of insecurity experienced by residents, who close themselves up inside their buildings (the paradox of "perceived security"). In fact, according to the CPTED, this kind of behaviour tends to reduce security in real terms, because it potentially lowers the levels of community participation in neighbourhood vigilance. This aspect is typical of urban areas with security problems.

Figure 7. Daily and Night-time CPTED scores in Amadora streets. Source: Survey carried out on 24th and 25th August 2007.

5.2. Proposals to reduce feelings of insecurity

Remedial actions to reduce feeling of insecurity should be directed, in the first phase, at aspects of urban design, by introducing urban facilities that would encourage the development of a natural vigilance system, ensuring that buildings and public areas are well-kept and clean, eliminating vestiges of vandalism and graffiti, and providing adequate night-time lighting.

A natural system of vigilance should also be implemented by residents within their own homes/institutions/establishments through an alteration in attitudes and behaviour. They should be more integrated into the community and encouraged to use shop windows, doors and windows that enable visual contact with the outside. We might expect this combination of factors to lead to better levels of security, with the consequent reduction of feelings of insecurity. However, these measures are by no means a panacea that will solve the crime problem once and for all; policies of territorial planning and inclusion should also be implemented alongside these, in order for positive effects to be seen in the area of crime prevention.

It is also important that studies continue in this area, in order to ensure that local territorial management policies are improved, not only to eliminate the negative effect of locality upon the development of violence and crime, but also to improve citizens' perceptions of the place where they live, thus encouraging them to engage in activities that lead to a healthier lifestyle.

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