CRIME AND URBAN ENVIRONMENT: IMPACTS ON HUMAN HEALTH

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Abstract

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.

Crime needs to be taken into account during the planning process, as valuable components can be provided that can offer effective approaches to crime prevention and the improvement of community safety. These almost inevitably require long-term, strategic and multi-disciplinary interventions for urban and suburban areas, such as Amadora in the Lisbon Metropolitan Area (LMA).

Crime, and especially the fear of crime, affects the mental and physical wellbeing of victims, causing behavioural alterations, with serious consequences for the whole community. It is also the main contributor to the decline of quality of life in urban areas in Portugal.

This paper assesses: i) the relationship between (participated) crime in an urban area (Amadora) located in the Lisbon Metropolitan Area, and the characteristics of the area of occurrence, in accordance with "Crime Prevention Through Environmental Design"; ii) areas (with high rates of crime and fear of crime) that are considered to pose a health risk in Amadora, as demonstrated by multivariated, spatial statistics techniques and the Geographic Information System (which reveals the geographic distribution of certain health factors,
thereby offering a potentially useful tool for strategic urban planning). In the municipality of Amadora, vulnerable situations tend to cluster together, leading to the co-occurrence of various factors that magnify crime and fear of crime, and cause the place to be less healthy.

The spatial variations found in the Amadora crime records indicate that crime is not distributed randomly, but that there are certain "hot-spots" (i.e. areas that may be relatively small, but where crimes occur frequently, making them highly vulnerable and predictable). Fear of crime was reported by the residents as the main problem (54%), increasing by 28% the likelihood of reporting bad health.

Recognition of the environment's contribution to quality of life and health has meant that place is now considered an important factor in explaining health and quality of life.

These results highlight the need to reassess specific elements of urban design and their relationship with crime levels, particularly as regards citizens’ fear of crime and its consequences on health.

We aim to answer two questions: 1. Can urban planning help reduce urban crime and violence? 2. How can planners create safe and healthy places?

**Keywords:** Crime, CPTED, Urban Planning, GIS, Health Impact Assessment

### 1. Introduction

Crime, in the Lisbon Metropolitan Area, and in Amadora in particular, has risen to worrying levels in recent decades, bringing material and immaterial consequences that it is important to understand. There is also an urgent need for strategies to combat crime, promote security in communities and contribute to their sustainable development (UN, 2005).

Across Europe, the spatial distribution of reported crime is very heterogeneous, though there is a general tendency for it to decrease from the North to the South. In 2007, the average for the European Union was 54 reported crimes per 1000 inhabitants. At the top of the list were Sweden, and England & Wales, where levels of reported crime were more than double the European average. In the Mediterranean countries and those that have more recently joined the European Union, the levels are much lower, with Cyprus
registering the lowest rate of all, with only 10 reported crimes per 1000 inhabitants. However, these figures (see Fig. 1 and Chart 1) do not necessarily mean that there is in fact more crime in the countries with the worst results, since the data refers only to reported crimes. That is to say, higher figures may merely show that crimes are reported more in some countries than in others, perhaps reflecting the maturity of the society and the degree of trust that citizens have in their police force, or in other specific factors.

![Figure 1. Number of crimes per thousand inhabitants in 2007 in European countries, the Lisbon district and Amadora.](image)

Note: the data from Malta, Bulgaria and Hungary concerns the year 2006, while data from the county of Amadora concerns 2005.

Source: 2007 Internal Security Report (MAI, 2008); the EUROSTAT database, and information provided by the Amadora Public Security Police (PSP).

<table>
<thead>
<tr>
<th>Country</th>
<th>Km2 per police officer</th>
<th>Inhab. per police officer</th>
</tr>
</thead>
<tbody>
<tr>
<td>Finland</td>
<td>40.68</td>
<td>635</td>
</tr>
<tr>
<td>Sweden</td>
<td>25.83</td>
<td>523</td>
</tr>
<tr>
<td>England and Wales</td>
<td>1.07</td>
<td>368</td>
</tr>
<tr>
<td>Denmark</td>
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<td>506</td>
</tr>
<tr>
<td>Germany</td>
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<tr>
<td>Ireland</td>
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<td>333</td>
</tr>
<tr>
<td>Austria</td>
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<td>312</td>
</tr>
<tr>
<td>France</td>
<td>2.28</td>
<td>262</td>
</tr>
<tr>
<td>Luxembourg</td>
<td>1.79</td>
<td>329</td>
</tr>
<tr>
<td>Belgium</td>
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<td>272</td>
</tr>
<tr>
<td>Spain</td>
<td>2.35</td>
<td>211</td>
</tr>
<tr>
<td>Portugal</td>
<td>1.92</td>
<td>220</td>
</tr>
<tr>
<td>Amadora</td>
<td>0.09</td>
<td>636</td>
</tr>
</tbody>
</table>

Chart 1. Proportion of police officers per km2 and per inhabitant in 2006.

(Note: data from the county of Amadora concerns the year 2005).

Source: Based on the 2007 Internal Security Report (MAI, 2008) and data provided by the Amadora Public Security Police (PSP).

Crime brings direct material costs, including not only the financial costs suffered by the victims but also expenses relating to the judicial system. In Great Britain, in 1999 and 2000, the Home Office estimated that around 67 billion euros were spent on the criminal and judicial system (Brand & Price, 2000:5), while in the USA, a study by Mandel & Magnussen (1993) estimated that, in 1992, the total expenditure related directly and indirectly with crime
represented around 5% of the American GDP for that year. In Australia, the total costs of crime represented 3.8% of the GDP in 2001, increasing to 4.1% in 2005; this represents approximately 25 and 26 billion euros respectively (Rollings, 2008:53). However, despite the costs, since 1918 crime has risen at an average rate of 5.1% per year (Cozens, 2002: 129).

In addition to financial costs, crime 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. Santana, *et al* (2008) examined the relationship between feelings of insecurity and community mental health, and found that this perception has a significant negative influence on the self-assessed health status of the population, affecting their general wellbeing.

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, today, crime is associated with societies that have great disparities of wealth and quality of life (Cozens, 2007a:232).

For people on lower incomes, such factors may make it easier to turn to crime as a form of subsistence and way of acquiring goods that would otherwise be out of reach, thereby increasing one’s social status. 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 exist certain areas in cities that are relatively small, but where crimes occur much
more frequently than elsewhere (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 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; 4. access control (Geason & Wilson, 1989; Newman, 1996; Saville & Cleveland, 1997; 2003; Cozens, 2002).

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 (Ulrich, 1984; Kuo & Sullivan, 2001; Kim & Kaplan, 2004). 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 and b).

Thus, the new lines of action in urban planning tend to favour compact spaces, with mixed uses/functions, “walkable” environments and the proximity of public transport, amongst other characteristics designed to reduce problems associated with urban expansion (self-mobility, congestion, pollution). One of the objectives is to improve health in these localities (Santana et al, 2008), and
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, facilitating vigilance. This 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 uses the CPTED Index to explore the potential associations between the incidence of (reported) crime and environmental characteristics in one city from the Lisbon Metropolitan Area (Amadora). It also suggests measures that might be implemented in order to help mitigate the problem. The paper is divided into 4 parts, focusing respectively on the following issues: 1. the distribution of crimes reported to the Public Security Police (PSP) 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); 4. possible measures to reduce the environmental effects (of the physical and social context) upon lack of security and the incidence of crime.

2. 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, 2005 and 2006 was provided by the Amadora police (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\(^1\) to enable larger-scale analysis that would closer to our definition of

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\(^1\) The statistical subsection is the maximum level of breakdown used by the National Institute of Statistics. It is “associated to a postcode and place name, corresponding to the ‘city block’ (whenever it is possible to define zones on the basis of roads or groups of buildings), to a locality or part of one, whenever that does not occur, and to the complementary area in cases where the previous definitions do not apply” (Geirinhas, 2001).
the ‘neighbourhood’. Information was also gathered from the Ministry of Internal Administration with the purpose of comparing rates of reported crime in Portugal with those of other European countries.

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). Deprived areas were defined on the basis of a series of selected variables provided by the INE, such as illiteracy and unemployment rates, family housing without indoor toilet, etc (2001 Census – Statistical subsection). The variables were standardised (using the z-score method) so that each variable had the same influence upon the final result. The deprivation score was the sum of the variables, after standardization. This method enabled us to identify clusters of greater deprivation (Mcloone, 2000).

The CPTED Index (Crime Prevention through Environmental Design) used information collected 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). 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 existed spatial clusters (i.e. clusters of local spatial autocorrelation) whose security/insecurity effects might spread to adjacent spaces (Resende, 2005).

Information was also used from a questionnaire administered in 2006 and 2007 to a representative sample of the population resident in Amadora (N=1174)² in order to identify the main factors contributing to their feelings of insecurity. Using a binomial logistic model, it was possible to quantify the influence of different characteristics, such as demographic features (sex and age), behaviour (diet and physical activity), perceptions of the urban space (feelings concerning the area, and relationship with neighbours and people from other ethnic groups or from other neighbourhoods) and also health results (self-assessed health status and emotional disturbances). The response variable related to the perception of insecurity was classified into two categories: i) feels insecure, or ii) does not feel insecure in his/her neighbourhood.

² This survey used random representative criteria for the eleven parishes (Santana et al, 2007).
3. In(security) in Amadora

There are eight police stations (PSP) in the county of Amadora, of which two 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).

Our analysis revealed that the police stations are located in areas of greater population density, and that there is a significant negative correlation between population density and the distance on foot to the nearest police station in minutes. This implies that inhabitants of neighbourhoods in outlying parishes (São Brás, Mina and Venteira) would need to walk for over 30 minutes to get to their nearest police station.

Figure 2. Relationship between police stations’ areas of influence and neighbourhoods with highest population density.

Figure 3. Distance on foot from the neighbourhood (statistical subsection) to the nearest police station (PSP).
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, as mentioned above. 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.

3.1. Areas of socioeconomic deprivation and crime

In 2005, there were 33\textsuperscript{3} crimes committed per thousand inhabitants in the county of Amadora. This figure is not only lower than the Lisbon district average (48/1000)\textsuperscript{4}, but it is also lower than the average for the whole country (37/1000) and for Europe (54/1000). Just as occurred at national level, in 2005 there was negative variation in the total number of crimes, although this was more accentuated in Amadora compared to the rest of the country. In 2006, the numbers increased both locally and nationally; the positive variation was more accentuated in the county of Amadora (34%), with around 2000 more crimes reported than in the previous year.

Crime in Amadora is distributed similarly to the rest of Portugal, although the figures are higher for crimes against property (78% as opposed to 56%). On the other hand, crimes against the person are slightly lower (21% vs. 24%). The other categories of crime are under-represented in this county.

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

\textsuperscript{3} Crimes reported to the Public Security Police (PSP).

\textsuperscript{4} Figures concerning 2007.
and Damaia. Amongst those that reported the least crime were Alfonelos and Falagueira, which had less than 300 reported crimes per year, on average.

Those areas are generally considered to be zones of considerable socioeconomic deprivation, as we can see in Figure 6. 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 (Chart 2).

<table>
<thead>
<tr>
<th>Type of Crime</th>
<th>Moran’s I</th>
<th>P Value</th>
</tr>
</thead>
<tbody>
<tr>
<td>Pickpocketing</td>
<td>0.0344</td>
<td>0.0223</td>
</tr>
<tr>
<td>Home robbery</td>
<td>-0.0379</td>
<td>0.0113</td>
</tr>
<tr>
<td>Robbery of other establishments</td>
<td>-0.0343</td>
<td>0.0251</td>
</tr>
<tr>
<td>Vehicle break-ins</td>
<td>-0.0444</td>
<td>0.0036</td>
</tr>
</tbody>
</table>

Chart 2. Results of the application of the Moran I method to types of reported crimes (2004-2006).

Source: Amadora PSP.

It may be concluded, for example, that the most deprived areas have fewer cases of vehicle break-ins and home robbery. Also in Chart 2, we can see that pick-pocketing is significantly higher in those areas or in their vicinity. 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.

In order to produce a synthesis of the previous data and adduce more information to clarify the association between levels of deprivation and total number of crimes, an analysis was carried out according to deprivation quintiles (Figure 7). It was found, once more, 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. In fact, the highest crime levels are found in areas of intermediate deprivation (Quintile 3), throughout the whole county of Amadora. 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 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 to say, crimes like pick-pocketing and mugging, which undermine victims’ confidence, making them feel insecure, tend to prevail in areas of high and medium socioeconomic deprivation; while other types of crimes, which are materially more significant (vehicle theft and break-ins; robbery of non-residential establishments) have higher rates in less deprived areas. In the first case, the 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.
3.2. Perceptions of insecurity

This study of crime in Amadora has proved fundamental, because feelings of insecurity were identified as an important problem in the city, reported by over half the residents in a questionnaire administered to a representative sample of the resident population (Santana et al., 2009b).
The survey showed that the perception of insecurity seems to increase with the level of socioeconomic deprivation in the area of residence (61.4% vs 48.3%). However, this is not a direct relationship. In fact, it is not the most deprived group that reported the highest levels of insecurity, but rather the intermediate group (Cluster 2), where it was identified by almost 68% of the resident population.

Using the binomial logistic model, we were able to assess the contribution made by the area of residence to feelings of insecurity and concluded that individuals that live in the most and the least deprived areas (Clusters I and 3) were less insecure than those residing in Cluster 2 (area of transition between the zones of most and least socioeconomic deprivation). Moreover, the respondents that claimed to like living in Amadora also reported fewer feelings of insecurity in their neighbourhood (2.5 times less) than those that claimed not to like living there.

On the other hand, those that had a negative self-assessed health status were 1.3 times more likely to report insecurity.

When we applied this same model only to individuals residing in Cluster 2, we found that, in these areas of residence (the parishes of Reboleira, São Brás and Venteira), there were significant differences between some socioeconomic characteristics that were not found when the analysis was done taking into account all three clusters. For example, it is 2.4 times more likely that someone with a low level of education (less than 4 years of schooling) residing in Cluster 2 will feel more insecure than someone in the same area with between 5 and 12 years’ schooling. Similarly, those that assessed their own health status as negative also tended to feel more insecure (2.3 times more). On the other hand, certain groups of residents showed less tendency towards feelings of insecurity: older people (relative to the average age of 38, for each additional 10 years of age, 31% are likely not to feel insecure), housewives (5 times less insecure than employed people) and Africans (3.4 times less insecure than people with Portuguese nationality).

What environmental factors might help explain this pattern of feelings of insecurity, with consequences such as negative self-assessed health status, alterations in emotional state and even obesity?
3.3. The influence of the environment and urban design on incidence of crime

If we increase the scale of analysis, we find that criminal behaviour is differentiated within the clusters identified above. It is, therefore, necessary to seek other explanations for this distribution. In fact, 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).

In order to gain a more precise notion of the environmental conditions associated to crime hotspots, a survey was performed in 2007 based upon CPTED principles. This enabled us to collect information relative to features (lighting, vegetation, cleanliness and conservation, etc) of public spaces (roads, squares, parks) and buildings (conservation, architectural aspects, and relationship with the public space). This tool was applied in an area of Amadora that had been shown to have high levels of reported crime.

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). For its part, the figure 1000 corresponded to areas with physical conditions (environmental and urban design) that are more conducive to security, and where there was therefore less potential risk of crime.

The application of the CPTED to one area (case study) of Amadora (Figures 11 and 12) 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. Also on the subject of natural vigilance, it was found that there was a weak relationship between the interior and exterior of buildings: 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 11. Daily CPTED scores in Amadora streets.](source)

Source: Survey carried out on 24<sup>th</sup> and 25<sup>th</sup> August 2007.

![Figure 12. Night-time CPTED scores in Amadora streets.](source)

Source: Survey carried out on 24<sup>th</sup> and 25<sup>th</sup> August 2007.

4. Improving public health by intervening in insecurity factors

Crime levels have risen in recent decades to worrying proportions, bringing material and immaterial consequences. There is thus an urgent need to implement strategies that can promote safety in communities and contribute to their sustainable development. Crime also affects the emotional and physical
health of victims, causing behavioural alterations which may have serious consequences for the whole community.

Spatial variations were found that reveal that crime is not distributed randomly, but rather concentrated into “hotspots”, relatively small areas that are particularly vulnerable to crime. It was also concluded that citizens’ perceptions of the security level in their community have direct consequences on their daily routines (i.e. feelings of insecurity make people less ready to take advantage of locally available opportunities), and also indirect consequences, such as increased anxiety and nervousness. Emotional disturbances of this nature affect one's lifestyle and relationships, for people who feel insecure are less likely to engage in healthy activities (such as walking), use public spaces (such as squares and parks), and cultivate active relationships with neighbours and relatives, with negative effects upon physical and mental health.

These results suggest that there is a need to assess specific aspects of environmental quality, such as urban design, and its relationship to crime; that is to say, there is a need to ensure that local territorial management policies are directed towards fulfilling development goals that will promote healthier lifestyles, increase levels of security and raise confidence, by positively altering citizens’ perceptions of the place where they live.

The questionnaire administered to Amadora residents revealed a strong direct association between feelings of insecurity and negative health status, and an indirect relationship with psychic states such as depression or gloominess, and even with excess body weight and obesity (Santana et al., 2008).

The highest levels of insecurity were also observed in the intermediate cluster of sociomaterial vulnerability (the cluster that represents the transition between the areas of greatest and least deprivation), where it was reported by almost 68% of the population resident in the area (more than the county average of 54%). The cluster representing the greatest sociomaterial deprivation had the highest figures for home robberies, the type of crime most strongly correlated with a perception of insecurity amongst respondents. In accordance with this (high perception of insecurity and high levels of home invasion robberies), the areas for analysis and intervention were selected, namely the clusters representing the greatest and intermediate levels of sociomaterial vulnerability.
By associating a logical chain of events to the self-assessed health status model, a prediction was made of the potential effect of an urban policy, plan, programme or project that would improve perceptions of security.
These involved local interventions directed at the root causes of (the perception of) insecurity, bringing about increases in levels of confidence and feelings of security. One of the local actions (directed mainly at the parishes in the most deprived cluster) aims to reduce home invasion robberies, with potential implications for the reduction of feelings of insecurity.

To predict the effect of political measures upon health status, a simulation was performed of the hypothesis "residents in the most deprived cluster do not feel insecure in their neighbourhood". There was found to be an effect upon (self-assessed) health status; in fact, the health status of residents improved by 28% (Fig. 14).

The same exercise was then repeated for the cluster representing the intermediate level of deprivation, and here it was found that the change in health status affected more individuals (29% of residents of that cluster; see Fig. 15).

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5 The simulation was performed on the self-assessed health status model.
Figure 15. Changes in the self-assessed health status following simulation of perceived security (potentially 100%) on the part of residents of the cluster representing the intermediate level of deprivation.

5. Proposals to reduce feelings of insecurity

In order for this health gain to be achieved, a series of measures are suggested that focus on reducing feelings of insecurity.

It was found that people felt insecure and that this feeling had negative effects on their individual health and on the wellbeing of the community as a whole. Thus, remedial actions 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 would also be implemented by residents within their own homes/institutions/establishments through an alteration in attitudes and behaviour; that is to say, they would 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.

To sum up, urban design and the proper use of the urban space may help reduce fear of crime and even affect its actual incidence rate, contributing to an improved quality of life in the area.

As we have seen, citizens' perceptions of insecurity in their communities, even when unsupported by any concrete evidence, as in the case of Amadora, itself constitutes a pathogenic factor of ill-being, leading to the underuse of locally available opportunities.

It is therefore 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.

**BIBLIOGRAPHY**


