Urban configuration and crime: the case of Brasilia, Brazil

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ABSTRACT

This paper analyses relations between urban configuration and the spatial distribution of crimes in Brasilia, Brazil’s Federal Capital. Cross-fertilization among urban morphological, juridical and sociological theories is explored. Data were provided by the Public Security State Secretariat in the modalities of thefts, burglary and kidnaps, all related to space. The period under analysis ran from 2009 to 2013. From the 31 Administrative Regions, 10 were selected for scrutiny, because they concentrate 77.19% of all crimes. Criminal offences were geo-referenced in GoogleEarthPro®, which was also useful in depicting morphological variables as street and sidewalk widths, plot frontages, and number of doors per 100 m. Space Syntax variables were calculated in segment maps processed in Depthmap®. The variables were: segment length, integration (global and radius 800 m), and choice. Socio-economic variables were income level and education. Criminal events were geo-referenced and imported in Qgis® software, and thus related to syntactic variables. Spearman correlations were calculated for pairs of variables, the number of crimes being the dependent variable. Results show weak or moderate correlations with syntactical or geometrical attributes, suggesting that urban configuration, in Brasilia, is poorly related with criminal behaviour. Global results suggest that criminals specialize in certain crimes and they choose places according to crime type, e.g. thefts occur in great agglomerations of people and car burglary in large parking spaces, which are not intensely surveyed by police officers. However, in Brasilia, agglomerations do not relate to configurational variables, but mainly to land use. Therefore, deployment of crime in this city presents other patterns than those pointed out in previous literature.

KEYWORDS

Brasilia, crime, spatial configuration
1. **Introduction**

This article aims to investigate relations between urban configuration and crime in Brasília, Brazil’s Federal Capital. The country presents one of the highest crime ratios in the world. Data for 2017 indicate 28.9 homicides per group of 100,000 inhabitants. In absolute terms, numbers have been increasing each year: in 2005 there were 48,136 criminal events, compared to 59,080 in 2017 (IPEA, FBSP, 2017), an increase of 22.74%. Brazil concentrates circa 10% of all homicides in the world, while its population is 2.72% (UNODC, 2017).

In this paper, the focus is not the sociological dimension of the phenomenon, although some socioeconomic data are considered. The inquiry focuses on the spatial logic of crime: its distribution in the city, and the physical attributes of the places in which it happens. However, a general picture is offered in the beginning, concerning all criminal offences in the city.

Analytical variables have been retrieved from space syntax segments maps, particularly the measures of global integration, integration radius 800 m, choice, choice radius 800 m and segment length. Geometric measurements were added: plot fronts, and sidewalk and street widths. Socio-economically, schooling and per capita income have been considered. The selected criminal events were robberies to passers-by, “quick” kidnapping (usually drivers and cars being taken under the threat of a gun, to withdraw money from electronic cashiers), robbery to homes, theft and robbery of vehicles. The first four modalities were selected because of the violence or the serious personal danger that characterize them. The last type, vehicle theft, was chosen because it is the offense with the highest number of records.

The work is thus structured:

- Introduction, with a review of the literature and of previous findings;
- Datasets and methods;
- Results: the empirical findings, with the processing and the analysis of data;
- Conclusion: comparison with previous findings, analysis of correlations between criminal events, land use, and spatial and socio-economic variables.

**City and crime**

Relations between crime and the city have been addressed at least since Jane Jacobs, in her classic Death and Life of Great American Cities (JACOBS, 2000; for a special issue on Jacobs’ legacy, see RPPC, 2018). However, in this book, relations between city and crime are a by-product of her thinking on the vitality of streets, concerning the diversity of activities, favourable conditions for pedestrians, small blocks favouring greater permeability of the urban fabric, and of conditions of "natural surveillance” on the part of the inhabitants through doors and windows opening frequently to public space – the "eyes of the streets", her famous expression. And yet, the morphological variables she addresses are few and unsystematically treated (Kevin Lynch, for example, in a pioneering book,
and practically contemporary to her, would do so much better, but with other goals – less sociological, as it were, and more cognitively, for he was interested in the formation of images of the city in one’s mind (LYNCH, 1960).

Twelve years later Oscar Newman published Defensible Space (NEWMAN, 1973; for a demolishing critique of Newman, see HILLIER, 1973), explicitly targeting relations between architecture and crime. Despite the favourable reception, it was a huge setback to Jacobs’ perception of the vitality – and safety – of streets. For Newman, safeness would result from safeguarding neighbourhoods from strangers, a “soft” version of gated communities, as addressed, for example, by Caldeira (2000), in Brazil.

Newman argued that neighbourhoods should have a clear transition between public, semi-public, and private spaces. The idea was that as people entered spaces predominantly occupied by residents, they would feel uncomfortable and leave. On the other hand, residents would be more acquainted with neighbours, and would easily depict the presence of strangers, exerting an easier surveillance of the place. In the system proposed by Newman community participation would be fundamental, exercising in a systematic way the strategy of visual control of Jacobs.

On the occasion of his master's thesis, Ferraz (2013) went to the Connecticut state capital of Hartford to visit the Asylum Hill neighbourhood. Changes had been made in urban design by Newman in order to improve safety. The result was a ghostly neighbourhood with no people on the streets. According to the police officer who accompanied the researcher, Linze Brown, of the state police of Connecticut, crime rates in Asylum Hill were higher than in other neighbourhoods of the capital (but no figures were provided).

Proceedings of the Space Syntax International Symposia (SPACE SYMPOSIA - PROCEEDINGS) have published many studies on the subject. The text by Orelm Sahbaz and Bill Hillier, “The story of the crime: functional, temporal and spatial tendencies in street robbery” (2007) stands out. The survey was conducted in a London borough with more than 260,000 inhabitants (2001 census), with 2,620 thefts recorded over five years. The findings indicated a concentration of occurrences in places with more central services and with more people moving through them, though not on the busiest streets, but in those immediately adjacent to them. This contradicts Jacobs’ classic observations on how busy streets would favour surveillance and inhibit crime. In contrast, higher densities in ground floors were associated with lower number of offenses.

In Florianópolis, Brazil, Vivan and Saboya (2017) sought to investigate crimes more directly related to the spatial characteristics of the public places of perpetration and of the interface with the buildings. They examined robbery and theft to passers-by, and residential burglary. The study reveals that central land uses, which imply more people on the streets, are positively, not negatively related to offenses, in contradiction to Sahbaz and Hillier’s findings (2007): apparently there is a “spurious variable” in action, that is, the number of possible targets available, not the morphological aspects of the locations. The presence of strangers and the potential availability of money in cash with the victims seem to be decisive. Regarding residential densities and the measure of global integration of streets, no significant correlations were found.
In Recife, Monteiro and Cavalcanti (2017) analysed only robbery to passers-by and also found results that contradict the literature. Crimes can occur in places with strong or weak diversity of land uses, low or high demographic densities, low or with high permeability at the interface between public and private space. The authors therefore question "crime prevention manuals through urban design... in the absence of an understanding of cultural, social, spatial and especially temporal aspects of the phenomenon of local crime” (idem, 2017). On the one hand, busy streets in the transition from shopping to non-shopping hours present a high number of crimes; on the other, routes integrated only locally, but close to the entrance of a shopping-mall, which imply a large number of people, although in a place of little or no land use diversity, increase the incidence of crimes.

We shall see how these findings compare to the ones in Brasilia.

2. DATASETS AND METHODS

Legal and Sociological Scope

Feeling safe means being able to prevent criminal offenses to occur, or, at least, to avoid its worst consequences.

Wild, dark places naturally convey the sense of fear, although there may be no crime there – people sense that they are dangerous and avoid them. And vice versa: people tend to go to busy places as if they were safer, because of the great flow of pedestrians. When investigating factors affecting the choice of routes in public transport access routes, Vargas (2017, p. 80) confirms the tendency to search for routes that the author calls "safe against crime", related to the sensation arising from the presence of business and people.

Because it is a research that involves violence and urban design, the approach to the theme demands knowledge from the areas of Law, Sociology and Architecture, as well as data processing tools, as Geoprocessing.

From Criminal Law, the central concept is crime, described as a typical, illegal and culpable fact. "Typical" means to be described in law as a crime; “illegal” is understood as contrary to law; "culpable" indicates that there is a penalty imposable to whoever commits the act. This research uses definitions of crimes as they are presented in the Brazilian the Penal Code.

Figure 1 shows how this research categorized the offenses according to the object of the offense. At the top of the diagram there appears crime as a general concept; at the second level, the criminal types analysed; at the third level, targets / victims of criminal types; finally, the subdivision of the third level.
Proceedings of the 12th Space Syntax Symposium

Figure 1. Categorization of crimes

Source: Authors

For the sociological terms, the starting point was Emile Durkheim's theory (DURKHEIM, 2007), where social facts and crimes are defined. The choice for Durkheim is due to the way crime is approached, without labelling criminals or considering them human aberrations. The assumption is that criminals, except sociopaths, are common people, and their acts are regular social phenomena. The author conceptualizes crimes as social facts. Its typicity varies over time and the nature of each society.

There are at least three other analytical approaches in the literature that try to explain the possible causes of crime and violence:

- The economic, which emphasizes economic factors such as poverty, unemployment, economic inequalities and class conflicts in the growth of crime and violence;
- The political, which focuses on the inability of the state, and particularly the police, to reinforce law and order through the prevention and repression of illegal and violent actions;
- The social, which considers factors that diminish the capacity of civil society to ensure the rule of law and the civil, political and social rights that are fundamental to the majority of the population.

Architecture Scope

Within the scope of the discipline of Architecture, the Theory of Space Syntax (henceforth SE) stands out, whose biennial symposiums have been mentioned. The theory was presented thoroughly for the first time in Bill Hillier and Julienne Hanson’s book The Social Logic of Space (1984).
Proceedings of the 12th Space Syntax Symposium

In broad terms, the theory relates architectural space and human behaviour, particularly social encounter systems in space. The hypothesis, in this case, is that criminal offenses have to do with the presence or otherwise of people in urban public spaces, as a follow-up of the pioneer work of Jacobs’ in the 1960s, but by examining in much greater detail both the morphological properties of places and the number and type of people in them, in space as well as in time.

To do so, we have selected mainly the relational attributes of space potentially incident on this “city ballet” (Jacobs expression): inter-visibility interior / exterior and exterior / exterior, and inter-accessibility, both at a local and at a global scale of the city.

City space is here represented as “axial maps”: streets and roads are represented through straight line segments, and the map thus elaborated is run in specialized software: Depthmap®. The software then provides a series of numerical attributes of the map segments, i.e., the stretches between crossings.

The global integration variable (radius n, or Rn integration) measures how each street segment is, on average, accessible from the entire system: it represents its potential as a destination. However, considering that pedestrians do not move across large distances, the integration measure will not consider the whole city, but will be processed within the radius of 800 m – therefore the measure will be integration radius 800 m – compatible with the pedestrian movement. The street segment is well integrated if it is a probable strong destination or segregated if it is not.

The choice variable is based on the centrality (betweenness): it represents not the potential movement to a destination (like the previous one), but the movement through a given street segment; it represents the chance for a segment to be chosen as part of a route. Both measures are topological in that the metric distance is not considered, but only the number of route inflections amongst points.

In addition to the syntactic variables obtained from segment maps, geometric variables of urban configuration were considered: road and sidewalk widths, plot fronts, and number of openings along the blocks (interior / exterior interfaces). These variables rescue, in different ways, the idea of the “eyes of the street” and their “intensity”, both in one and in two dimensions, i.e. frequency along urban blocks and distribution vis-à-vis the area “fed” by them.

Socioeconomic data were household income and schooling, for we wanted to check the hypothesis of the incidence of such social factors on criminality. Data were extracted from the website of the Planning Company of the Federal District – CODEPLAN, the company responsible for gathering data on the city and elaborating urban plans (the specific inquiry was the PDAD – a sample survey of the Administrative Regions of the Federal District. (The Federal District coincides with the territory of the municipality of Brasilia, which is divided into 31 “RAs”, i.e. Administrative Regions. The originally designed plan for the Capita, the Plano Piloto – the Pilot Plan – will be henceforth called Plan, as it is usually referred to.)

Criminal records were provided by the Public Safety Secretariat of the Federal District Government, between the years of 2009 to 2014. We analyse events by addresses where they occur frequently, by days of the week and by the day periods. Special care was taken with data prior to processing, due to the non-standardization of the record.
As observed above, the Federal District has 31 administrative regions (henceforth “RAs”). Initially, records of all RAs were tabulated: a total of 235,085 events. It turned out that only 10 RAs concentrate most of the crimes: 77.19% of the total, thus 174,080 crimes. Restricting the records to the chosen criminal types, and removing events without an address, there were 140,549 occurrences. Of this total, the 10 addresses with most events were selected from each criminal type. After such clippings, 381 addresses were georeferenced, totalling 18,610 occurrences – this was the sample, which is statistically significant for the 10 RAs with most of the events (for the whole set of RAs, the research is exploratory).

Figure 2 shows the segment map of the Federal District. In red appear the limits of the territory of the whole Federal District, with 5,802 km$^2$ of area and the polygonal of the 10 RA's that have been analyzed. Table 1 shows the morphological variables.
The types of variables are summarized in Table 1.

Table 1. Synthesis of sample cut-outs and choice of variables

<table>
<thead>
<tr>
<th>Type of data</th>
<th>Variables</th>
<th>Source</th>
</tr>
</thead>
<tbody>
<tr>
<td>Record of occurrences</td>
<td>Type of occurrences</td>
<td>SSPDF</td>
</tr>
<tr>
<td></td>
<td>Place</td>
<td></td>
</tr>
<tr>
<td></td>
<td>Numbers of occurrences</td>
<td></td>
</tr>
<tr>
<td>Spatial syntax data</td>
<td>Segment Length</td>
<td>Segment maps/Depthmap®</td>
</tr>
<tr>
<td></td>
<td>T1024_Choice</td>
<td></td>
</tr>
<tr>
<td></td>
<td>T1024_Choice_R800_Metric</td>
<td></td>
</tr>
<tr>
<td></td>
<td>T1024_Integration</td>
<td></td>
</tr>
<tr>
<td></td>
<td>T1024_Integration_R800_Metric</td>
<td></td>
</tr>
<tr>
<td>Geometrical data</td>
<td>Street width</td>
<td>GoogleEarthPro®</td>
</tr>
<tr>
<td></td>
<td>Sidewalk width</td>
<td></td>
</tr>
<tr>
<td></td>
<td>batch front width</td>
<td></td>
</tr>
<tr>
<td></td>
<td>Opening per 100 meters</td>
<td></td>
</tr>
<tr>
<td>Socioeconomic data</td>
<td>Family income in minimum wages</td>
<td>CODEPLAN DF</td>
</tr>
<tr>
<td></td>
<td>Education</td>
<td></td>
</tr>
</tbody>
</table>

Source: Authors

Once the sample was defined, segment maps for each RA were prepared separately in Depthmap®. Events were georeferenced in GoogleEarthPro® software. Maps with geo-referenced occurrences have given rise to KML files. After geo-referencing, geometric measurements of roads where crimes occurred were obtained, also in the GoogleEarthPro®. Segment maps were overlaid with maps with geo-referenced occurrences in Qgis® software. From the resulting maps we extracted the syntactic data of the addresses where crimes occurred. Xlsx tables were then prepared in Excel® software, into which socio-economic data available on the CODEPLAN / DF website were added, and then saved by RA and criminal type. A total of 60 tables gave rise to a single table with all elements. The objective was to identify which factor or factors are related to which occurrence and each type of event and the magnitude of the relation.

Statistical processing took place in two ways: 1) Statistical Consulting tabulated the data and processed the Spearman correlations of the whole sample; 2) RA calculations were performed by the authors.

After calculations for each separate RA, calculations were conducted for the entire data sample: the 10 RA’s, the six crime types, and the numerical variables. Figure 2 exemplifies a map produced for an RA, in this case RA-I, which comprises the Plan.
3. RESULTS

From the syntactic variables of urban design - weak correlations

Statistical tools of multivariate analysis and correlations between two variables were used. In the end, Spearman's correlations were more adequate.

Table 2 shows correlations between the number of occurrences and other variables for each RA, revealing, in general, low values (less than 0.5). The analysis of each variable per se reveals a little more.
Table 2. Spearman correlations of the 10 RAs studied

<table>
<thead>
<tr>
<th>Variables</th>
<th>RA I</th>
<th>RA II</th>
<th>RA III</th>
<th>RA VI</th>
<th>RA IX</th>
<th>RA X</th>
<th>RA XII</th>
<th>RA XIII</th>
<th>RA XV</th>
<th>RA XX</th>
</tr>
</thead>
<tbody>
<tr>
<td>RA’s name</td>
<td>Plano Piloto</td>
<td>Gama</td>
<td>Tagua-tíngara</td>
<td>Planaltina</td>
<td>Ceilán-dia</td>
<td>Guará</td>
<td>Samanbaia</td>
<td>Santa Maria</td>
<td>Recanto das Emas</td>
<td>Águas Claras</td>
</tr>
<tr>
<td>Numbers of occurrences</td>
<td>8055</td>
<td>700</td>
<td>2612</td>
<td>453</td>
<td>2483</td>
<td>789</td>
<td>362</td>
<td>429</td>
<td>296</td>
<td>2431</td>
</tr>
<tr>
<td>Segment Length</td>
<td>0.028</td>
<td>-0.097</td>
<td>-0.18</td>
<td>-0.018</td>
<td>-0.306</td>
<td>0.129</td>
<td>0.101</td>
<td>-0.03</td>
<td>0.42</td>
<td>-0.03</td>
</tr>
<tr>
<td>Choice</td>
<td>-0.029</td>
<td>-0.053</td>
<td>-0.128</td>
<td>0.228</td>
<td>-0.128</td>
<td>0.183</td>
<td>0.145</td>
<td>-0.05</td>
<td>0.11</td>
<td>-0.11</td>
</tr>
<tr>
<td>Choice_R_800_metic</td>
<td>-0.12</td>
<td>0.176</td>
<td>0.213</td>
<td>0.037</td>
<td>0.409</td>
<td>0.082</td>
<td>0.266</td>
<td>0.03</td>
<td>0.38</td>
<td>-0.05</td>
</tr>
<tr>
<td>Integration</td>
<td>-0.095</td>
<td>-0.008</td>
<td>0.026</td>
<td>0.216</td>
<td>-0.239</td>
<td>0.308</td>
<td>0.05</td>
<td>-0.17</td>
<td>0.32</td>
<td>0.21</td>
</tr>
<tr>
<td>Integration_R800_metic</td>
<td>-0.145</td>
<td>0.029</td>
<td>-0.094</td>
<td>-0.084</td>
<td>0.207</td>
<td>0.049</td>
<td>0.099</td>
<td>-0.09</td>
<td>0.09</td>
<td>0.03</td>
</tr>
<tr>
<td>Street width</td>
<td>0.124</td>
<td>0.066</td>
<td>-0.148</td>
<td>0.444</td>
<td>0.023</td>
<td>0.277</td>
<td>0.048</td>
<td>0.09</td>
<td>0.60</td>
<td>0.05</td>
</tr>
<tr>
<td>Width of the sidewalk</td>
<td>-0.006</td>
<td>-0.260</td>
<td>-0.006</td>
<td>0.452</td>
<td>0.356</td>
<td>-0.084</td>
<td>-0.209</td>
<td>-0.08</td>
<td>-0.62</td>
<td>0.19</td>
</tr>
<tr>
<td>Batch front width</td>
<td>-0.086</td>
<td>0.492</td>
<td>0.108</td>
<td>0.666</td>
<td>0.446</td>
<td>-0.259</td>
<td>-0.22</td>
<td>-0.09</td>
<td>-0.56</td>
<td>0.11</td>
</tr>
<tr>
<td>Opening per 100 meters</td>
<td>-0.101</td>
<td>-0.408</td>
<td>-0.246</td>
<td>-0.116</td>
<td>-0.174</td>
<td>-0.156</td>
<td>-0.121</td>
<td>-0.05</td>
<td>-0.60</td>
<td>-0.05</td>
</tr>
<tr>
<td>Average</td>
<td>-0.047</td>
<td>-0.007</td>
<td>0.0505</td>
<td>0.202</td>
<td>0.066</td>
<td>0.0587</td>
<td>0.017</td>
<td>-0.049</td>
<td>0.016</td>
<td>0.038</td>
</tr>
</tbody>
</table>

Source: Authors

From the analysis of Table 2, the following aspects stand out:

1) Segment length: values are almost all null or negative (larger segments = lesser offenses). The exception is RA-XV with a positive value of 0.417; results show little relation, but in smaller segments there tends to occur more crimes.
2) Choice. Very low values, indicating very little relation; even so, greater choice = less offenses (which implies, in principle, more movement).

3) Choice radius 800 m. Correlations are greater and inverse to the previous result: greater choice (implying more local movement) = more crimes.

4) Global integration. All correlations are very low, although indicating that more integration = more crimes.

5) Integration radius 800 m, randomness.

6) Street width. In general, positive values, but low, indicating more width = more crimes. It is worth remembering that the wider ones are the busiest streets; also, perhaps this indicates the density of “constitutiveness” (i.e., more doors/windows) per public space surface area.

7) Width of the sidewalk. Another variable in which randomness is remarkable, but more width = more offenses (same reasoning of (6) could apply).

8) Plot front. Three positive high values and one negative high value; bigger plots lodge trade or residences of families with higher income, greater attraction for criminals.

Results show that criminals choose places of action according to two factors: potential victims or the desired good, in quantity and quality. Victims are sought after in places with greater concentration of people, more integrated places and preferred routes. Goods, when mobile, are searched in large parking lots and without constant presence of people, in case of vehicle thefts. When the object is real estate, in case of residences, those of better quality are chosen because they offer better products to be stolen and easily sold in the black or informal market.

When the 10 RAs are analysed as a set, the results are better than when each RA is analysed separately. Firstly, it was possible to measure the influence of the variables Household income in minimum wages and schooling. The results, according to Estat's report, show that:

- About 50% of the correlation coefficient values of the analysed variables with the number of occurrences are between -0.03 and 0.35, when analysed separately for each type of occurrence.
- They indicate positive correlations, but of little relevance in the perpetration of crimes.
- The variable "T1024_Integration_R800_metric" stands out for being the one with the most negative values for the correlation coefficient, besides having the largest negative association, -0.451, obtained when considered only vehicle and cargo theft. It means that sites with greater local integration have fewer records.
- The street width is the only variable that has a positive coefficient for all six types of occurrence, with values between 0.169 and 0.577. Highways have a greater number of commercial establishments and large urban facilities.
The highest value obtained, 0.835, for the variable household income in minimum wages, when considered only theft of and in vehicle, thus, a socio-economic correlation, not a spatial one.

In planned cities (top-down decision-making processes) the characteristic of wider streets is more pronounced, especially with the strong sectorization and restrictions of use imposed by legislation. In cities of "spontaneous" growth, where decision-making involves large numbers of social subjects (bottom-up processes), specialization of uses is non-existent – bar some exceptions. In the case of Brasilia, where "rodoviarism" prevails – the high importance to the motorized subjects in cars, to the detriment of other modalities - the over-dimensioning of road stands out, which remain idle most of the day, and jammed in the rush hours.

The report for all RAs shows two variables with significant correlations. The plot front width is the variable that presented the highest coefficient of correlation with number of occurrences, 0.670, obtained when considered only robbery to passers-by. It can indicate higher income regions, or commercial plots, generally larger than residential plots. For robberies against passer-by the value is 0.577.

As for vehicle and cargo theft, the figure is 0.557. The most important, integrated pathways have wider streets, more people, more movement, more opportunities for criminals to succeed. Another possibility may be, in the case of cargo theft, in general the industrial and warehousing sectors have wider streets for truck manoeuvres.

In order to analyse relationships between the topological variables and criminal records, the addresses and their values for global integration were analysed.

Among the addresses with most occurrences of theft of and in vehicles, the Bus Station, in the Pilot Plan has the highest integration value and the lowest number of occurrences. The address with most events is the least integrated address (SCES, Trecho 2, Pilot Plan). In this case, therefore, topological segregation relates with increased crime, but it is worth remembering that, at the same time, is the area with less people in public space.

As for commercial theft, the address with most occurrences is the second least integrated (Setor M Qnm 25, Set E, Ceilândia) while the most integrated is the one with the least number of records (Qr 122, Set 1, Samambaia). Again, more people tend to relate to fewer occurrences.

In robberies to residences, the more integrated address has more occurrences (Setor de Habitações Individuais Sul 703, in the Plan). The least integrated address has the lowest number of occurrences (Setor de Mansões de Taguatinga Conjunto 4, Taguatinga). Here it does not matter the number of people in the public space, but the higher quality of property (in the case of the Plan).

Robberies to the passers-by occur in the most integrated place (the Plan’s Bus Station). The least integrated has an average number of occurrences (Feira da Ceilândia). The first is perhaps the busiest place in the entire Brasilia – this type of crime goes where people are.

Regarding cargo thefts, the address with most events is the least integrated address (BR 070). The most integrated address is the one with the least occurrences (Centro de Convivência do CAVE, Guará). Here, smaller movement coincides with greater occurrences.
Finally, when it comes to quick kidnapping, the site with most records is the least integrated (BR 070). The most integrated is the second place with the most records (Plan’s Bus Station), again coinciding with a greater number of passers-by, and parked cars. Therefore, places with more records vary from one characterised by wilderness to another which is very busy. Where there are many parked cars there occur many thefts of vehicles, in less integrated locations. Where there are many people circulating, with greater integration, there are more robberies of passers-by.

In summary:

- In the less integrated places, the crimes of theft in vehicles and of vehicles, including cargo ones, occur;
- In the most integrated places there occurs robbery to passers-by;
- Quick kidnappings showed random values, there was no detectable correlation.

High correlations

Socioeconomic variables

The numbers show that in the poorest RAs there are more homicides per capita than in the higher income RAs.

The correlation between income and schooling is high at 0.85, which is obvious: upper-income classes have more access to education. Correlations between income and homicides, and schooling and homicides are negative -0.39 and -0.29 respectively, indicating that study and income are inversely related to deaths; the higher the income and schooling, the lower the vulnerability to homicide. Not surprisingly, income and schooling go together. Other factors may be involved in the performance of homicides but are not the subject of this research (e.g. penetration of drug dealing in the lowest purchasing power has been pointed out by experts). RA-IX Ceilândia alone concentrates 19.1% of homicides and has one of the lowest average monthly family incomes in minimum wages: 3.7. As CODEPLAN considers the average of 4 persons per household, the average monthly income per capita is less than 1 minimum wage per month.

The highest positive socioeconomic correlation was between income and theft of and in vehicles. Most of these crimes occur in the Pilot Plan, where income is very high. The explanation for so many thefts is in the large parking lots in places with little circulation of people during the day, in the case of the Esplanade of the Ministries, or of the places in which big events occur with improvised parking lots, which is the case of the South Club Sector.

Land use

- The 10 addresses with the most records are of the crimes of robbery and vehicle; second, of the 10, 8 are in the Plano Piloto; third, outside the clubs, all other places
have a great movement of people. Consider the land use where more occurrences are recorded.

- SCES Tract 2: 1,279 occurrences. The South Sports Club Sector hosts clubs of public servants association, especially ASBAC and AABB, promote concerts with famous singers that attract large numbers of people. Due to the difficulty of being accessed by public transport and as there is no parking for everyone, most leave the cars on the sidewalks;

- University of Brasília: 983 occurrences. The largest university in the Federal District has around 27,602 students (2014\(^3\)) and about 50,000 people circulating daily. The few bus lines and the high income of Brasília cause a great number of students and teachers to go to the place by means of their own vehicle, which provides a great number of potential targets;

- Esplanade of Ministries: 756 occurrences. It houses 17 buildings, of which 9 have outbuildings. The eastern end is contiguous to the Three Powers Plazza, formed by the National Congress, Planalto Palace (presidential) and Supreme Federal Court. Again, the lack of public transportation and the distance from the Pilot Plan bus station, where there is also a subway station, means that some people use individual transportation; then there is the ideal setting for criminals who steal cars;

- Setor Médico Hospitalar Sul: 729 occurrences. In this sector are the Central Hospital, the largest in the DF, and the Sarah Kubitschek Hospital, configuring points with large flow of people and parking of vehicles;

- Setor de Diversões Norte: 613 occurrences. Conceived by Lucio Costa to be the meeting and leisure point of the residents of Brasília. It currently houses a shopping centre called Conjunto Nacional. Being next to the Road Platform it has a great circulation of people, besides having a public parking of medium size and a private (paid) parking lot.

- City Park: 98 occurrences. It is a large urban park, 420 hectares, located in the South Wing, has several leisure facilities and 12 parking lots;

- Printing Industries Sector: 490 occurrences. The name defines the activities foreseen in the initial project of the city; with the passage of time began to include housing, bars, nightclubs, schools, and is still close to the Court of Justice and the Legislative Chamber;

• Taguatinga Shopping: 463 occurrences. Hypermarket of Águas Claras, a neighborhood that previously belonged to Taguatinga, but today an autonomous RA. It only has private and paid parking. It attracts attendants of the closest RAs by reason of the size and easy access;
• Extra Hypermarket of Águas Claras: 14 occurrences. It is located in front of the Taguatinga Shopping Mall and has characteristics similar to it;
• SCES, Trecho 3: 336 occurrences. Next to SCES Tract 2, it has characteristics similar to this one;
• Pilot Plan Bus Station: 312 occurrences. About 700,000 people circulate daily around the place. In the back there are public parking lots that are always full of vehicles.

From the point of view of the insertion in the city, characterized by the SST measures, the places vary a lot, there is no relationship between the incidence of crime and measures such as integration or choice of places. However, the reasons for occurrences, where they occur, seem to be clear: they are always places of large concentration of vehicles, of large dimensions, and of little movement of pedestrians at the crime sites themselves (the car park), although there would be a great flow of people in their immediate vicinity, as in the Bus Station. The characteristics of the sites are therefore more local (large dimensions, isolation of the movements of people that are peripheral to them etc.) than global ones (the way in which they are inserted in the urban system as a whole).

Complementary analysis - Distribution of occurrences by day and time

Occurrences were broken down by day of the week and daily hours. It was analysed the distribution of the records of the entire FD to see how the crimes occur during the week and at what time of day. It should be noted that this analysis were also done for all 10 RAs individually, but are not presented here because of the paper size limits. The conclusions of the research are based on the analysis of the whole sample.

Graph 1 shows all occurrences, in all modalities, of the entire FD, by day of the week. The time distribution shows regularity on weekdays and Saturdays and a slight decrease on Sundays. Graph 2 shows the hourly distribution of the day.

The hourly range show dawns with minimum records, especially between 03:00 and 06:00, and progressive increase, with slight variations, from early morning to midnight. It cannot be said that the nights are safer because of this data, given the smaller number of people on the streets; to make an accurate analysis of the phenomenon we would have to have the information with the number of

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people in the streets during the 24 hours of the day, a data which has not been available within this research scope.

Another comparison between sensation and real unsafety is the robbery of residence. In FD, it is common for single family dwellings to have high walls or fences, CCTV system and electric fences. The impression they convey is of places with high ratios of assaults to the homes. It happens that the numbers say the opposite. The RA-I Plano Piloto, for example, had between 2009 and 2013, 84 recorded robberies in a universe of 115,311 occurrences (0.073% of the total). Considering the number of households in the Plan (78,601 units), it is a robbery for every 4,678.63 households per year; the same in relation to houses (8,159 units): a robbery for every 485.65 house / year.
4. CONCLUSIONS

Space Syntax variables presented results with weak or moderate correlations, which suggests small or irrelevant influences of urban configuration attributes, on the global scale of the city, on the localisation of crimes.

When evaluating sites with more records, results indicate that land use is more closely related to the types of crime. Crimes against pedestrians occur in commercial or service places, characterized by the high circulation of people.

We found that sites with a large flow of people concentrate a greater number of occurrences of the crime of theft to passers-by. Such a result goes against established literature that presupposes that the surveillance of a large number of people inhibits crime.

The analysis reveals that criminals are drawn to the availability of victims or to crime objects in which they are specialized. If the criminal's specialty is robbery, the most sought after places are those with little movement, in the wilderness and with large numbers of objects; in the case of theft of vehicles, the large parking pockets. If the delinquency modality is the robbery to passers-by, the choice rests on places of great circulation of people; it is easy to choose the victim and to escape in the crowd.

Urbanistic theories of safe urban spaces over time were based on observations from the perspective of an ordinary person, a real or potential victim. What happens with the more integrated theories of locations is that the premise that criminals avoid busiest places and that people exercise natural surveillance over the environment and other people, has not been corroborated by our empirical research.

Jacobs, for example, states that her classic book is based on observations and inferences from the author's daily and professional experience. The look that grounded all her work was that of a middle-class person from the United States in the 1950s.

Newman was an architect and town planner working for New York City in the Housing Department. He developed his theory of defensible spaces based on computational processing data in the early days of the digital age. Newman himself reports that his great inspiration was Jacobs' work.

Shu and Huang (1999, 2003) concentrate their research on places, speculating on features that make some types most vulnerable or safest. The researchers' premise was that more integrated sites, with greater pedestrian movement and diversities of use were safer. This would mean features that from the citizen's point of view enhance the sense of security.

If the basis for explaining the decision to commit a crime is the Rational Decision on the part of the offender, it is to be assumed that his choices regarding the site of action are also based on logical conditions. The assailant does not choose isolated locations where no one passes or resides simply because the chances of finding a victim are minimal, so, irrational would be the choice.
In fact, the criminal chooses places according to the thing he wants to get, the object is what motivates the criminal's choice. We must keep in mind that the crowd is good for the criminal for two reasons: more victims and ease to mingle with the mass of people and quietly evade.

If the aim are objects left inside a car or components of the vehicle, the place should rather be a place with many cars and little movement of people, so that the action can be undertaken with minimum risk and without haste.

As for residences, families with higher income and places with little movement are preferred.

In order to kidnap someone and force him to make withdrawals and purchases, rather than occurring at the moment the victim enters his car, then the parking lots with a short stay are better, otherwise the assailant / hijacker would have to wait for hours a potential victim. If, for example, the chosen location is the Esplanade of the Ministries, the best times would be at the beginning and end of the day. The problem is that at these times the movement of people arriving to work and leaving is very large and may frustrate kidnapping.

We have arrived in Brazil - and in Brasilia - at such alarming levels of crime that a dictum as "natural surveillance" no longer apply: the most dangerous neighbourhoods are dominated by criminal factions that impose the "law of silence" - eyes that do not see, ears that do not hear, mouths that do not speak. In neighbourhoods with the greatest number of crimes, transparency and openness of homes to streets has disappeared: fortified enclaves cross social class borders. The "eyes of the street' have been long since blind.

Literature indicates high correlations, at the global level, between integration and occurrences. Here, yes, more integrated sites have higher correlations, but they are irrelevant.

Among those typologies that should be avoided are the large parking lots without other activities or people movement and the facades with little integration with the street. For example, the parking lots of the Esplanade of the Ministries: they are places without movement of pedestrians, without variety of uses, far from anywhere with offer of services.

This research relativizes, redefines and qualifies relations space vs. criminal occurrences. Our results suggest that the influence of urban design on the commission of crimes is not decisive, correlations are weak. Urban and urban infrastructure characteristics, for example, public lighting, are more important in the sense of fear (or otherwise) than in registered crime rates.

Finally, this research corroborates the refutation of traditional hypothesis, as was the case with other Brazilian studies as the ones by Vivan and Saboya, and Monteiro and Cavalcanti.

5. REFERENCES

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