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RELATION BETWEEN LANDSCAPE FACILITIES AND URBAN LOCATION IN THE SQUARES OF CAMOBI NEIGHBOURHOOD:

A space syntax analysis

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ABSTRACT

This paper presents an empirical research grounded on the theory that the diversity of landscape facilities in squares of suburban neighbourhoods is related to their location in the urban grid. Differences in relative accessibility induce uneven infrastructure distribution in the urban space, including the squares and their landscape facilities. Public authorities' disregards towards community demands for equipping leisure spaces and spontaneous popular initiatives to use existing but not equipped green spaces are remarkable social-spatial phenomena of local scope in Brazil. While some neighbourhood squares are merely highlighted in city maps, being barely furnished, others have more amenities, implemented through local dwellers demands. Based in the assumption that mixed co-presence patterns between inhabitants and strangers tend to weaken the spatial control of one category over another, the squares location could reduce or reinforce dwellers' organization to claim for or implement improvements in public spaces. Therefore, the research problem is as follows: does these squares location have any relation to the degree of implanted landscape facilities diversity? Our hypothesis is that squares that have greater diversity of landscape facilities are located in areas within local dwellers' domain and less accessible to strangers. Therefore, the aim in this work is to quantify the diversity of landscape facilities implemented in the studied area public squares, and analyse their location in terms of relative accessibility and strangers/inhabitants social categories movement potential in their surroundings. The research methodology consists of three steps: a) quantification of existent landscape facilities diversity in each square of the sample through systematic observation; b) relative accessibility and movement potential measurements through the syntactic measures of integration and choice; c) analysis of the statistical strength of the relationship among variables by calculating their correlation coefficients. The results indicate that where the presence of strangers is frequent, inhabitants reduce their organization to claim for or spontaneously implement improvements in the squares. Because we worked with a restricted sample of city's squares, results are insufficient to validate the hypothesis. However, the moderate correlations seem a promising step in understanding the phenomenon.

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KEYWORDS

neighbourhood squares; landscape facilities; urban location; space syntax

1. INTRODUCTION

Different locations in the city have different relative accessibility, which imply in inducing uneven land parcels valorisation (Villaça, 2001). One of the effects of this dynamics is the uneven infrastructure distribution in the urban space, which includes the squares and their landscape facilities such as planting, paving, benches and others. Public authorities' disregards towards community demands for equipping leisure spaces and spontaneous popular initiatives to use existing but not equipped green spaces (Kliass and Magnoli, 2006) are remarkable social-spatial phenomena of local scope in Brazil. Therefore, the research problem is as follows: does these squares location have any relation to the degree of implanted landscape facilities diversity? Our hypothesis is that squares that have greater diversity of landscape facilities are located in areas within local inhabitants' domain and less accessible to strangers. Therefore, the aim of this work is to quantify the diversity of landscape facilities implemented in the studied area public squares, and analyse their location in terms of relative accessibility and strangers / inhabitants social categories movement potential in their surroundings.

2. MOVEMENT PATTERNS

Space Syntax theory on natural movement states that urban grid morphological properties inform and differentiate movement potentials along axial lines, configuring a probabilistic field of potential encounters between two social categories: inhabitants and strangers (Hillier et al., 1993). Strangers' movement tends to be channelled towards lines with greater tendency to be used in global movements. Their access to any place within the settlement is mediated by adjacency between buildings and co-presence patterns in public spaces. On the other hand, inhabitants have a more pervasive control over the urban system, tending to establish static and local relationships. The more globally integrated the urban system is, the greater the tendency of mixed co-presence between inhabitants and strangers by even control over the spatial system (Hillier and Hanson, 1984). To analyse movement potential in the urban grid, we must consider both to-movement and through-movement, which correlate, respectively, with the syntactic measures of integration and choice (Hillier and Vaughan, 2007). In order to better predict pedestrian movement, we must restrict the calculation of measures to a certain number of depth steps, usually three or five (Hillier, 2007).

3. THE STUDY AREA

The study area is the Camobi neighbourhood, located in the eastern outskirts of Santa Maria city, Brazil (Figure 1). Although it is the city's largest residential neighbourhood in terms of territorial extension (20.35 km²) and absolute population (21,822 inhabitants), it is characterized by low demographic and built densities. Camobi has the largest absolute amount of public squares in the city (seven out of a total of fifty), but some of them are merely assigned in the urban plan, consisting of urban voids. On the other hand, there are two squares which landscape facilities were improved by local inhabitants, that raise an interesting question of a possible relation between these squares location and patterns of mixed co-presence in public spaces.

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Figure 1 - Location of the study area.

4. METHODOLOGY

The research methodology consists of three steps. First, existent diversity of landscape facilities was quantified in each square of the sample through systematic observation. For the purpose of simplification, landscape facilities types were classified in five categories, based on the open space survey tables of Pippi et al. (2011) as follow: paving; equipment; furniture; planting and seedlings. Each existing item was framed into one of these categories and scored, regardless its quantity, since the squares surface areas vary, disposing different facilities capacities. For example, one point for all existing benches. Then, movement potential was measured by syntactic measures of integration and choice, obtained from axial map (Salamoni, 2008) through the depthmapX0.30 (Figure 2). All variables were normalized in a range of 0 to 1 for the analysis (Figure 3). Finally, the Pearson correlation coefficients between each syntactic measures and landscape facilities scores were calculated in order to obtain the statistical strength of the relationship among variables.

5. RESULTS

Regarding the integration measure, it was verified that almost all squares have their values of local integration R3 and R5 close to the system global measure (Rn). Therefore, almost all squares have access and control by both categories of person: strangers and inhabitants. When such potential for mixed co-presence, the tendency is to weaken the control of one category over another and, perhaps, to weaken the territoriality of residents over the squares, reducing their organization to claim for or implement improvements in the squares. Poet's square has the lowest global and local integration values and, therefore, is less accessible to strangers, displaying the second highest score of landscape facilities. All other squares, located along axial lines where local integration is close to the system maximum (global), have the lowest scores of landscape facilities.

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In relation to the measures of choice Rn, R3 and R5, practically all squares have values near to the minimum of the system. Therefore, it reduces their probability of receiving global and local flows. As an exception, the Ademar Cantarelli square holds the highest values of choice (Rn, R3 and R5) and the lowest score of landscape facilities. On the other hand, two squares with the highest scores of landscape facilities have the lowest values of choice (Rn, R3 and R5).

The correlations between the variable landscape facilities versus each syntactic measure indicate a negative tendency: high values of integration and choice (Rn, R3 and R5) tend to correspond to low scores of landscape facilities in the considered sample. However, an interesting point observed in the case of Ademar Cantarelli square - the lowest score of landscape facilities - is that both integration and choice measures (Rn, R3 and R5) are the highest of the sample. We verified a reverse behaviour for Poet's square, which holds the second highest landscape facilities score and the lowest values for the integration as well as choice (Rn, R3 and R5) measures. The behaviour of the landscape facilities variable seemed to be more sensitive to integration and choice variables (Rn, R3 and R5) performance, simultaneously, at their maximum or minimum values. The Pearson correlation coefficients were calculated between the landscape facilities scores and each of the syntactic measures as follow: -0.4485 (integration Rn); -0.6733 (integration R3); -0.5612 (integration R5); -0.4647 (choice Rn); -0.5448 (choice R3) and -0.4656 (choice R5). The measure of integration R3 would have a higher association degree with the landscape facilities and statistically, all obtained correlations are of moderated robustness.
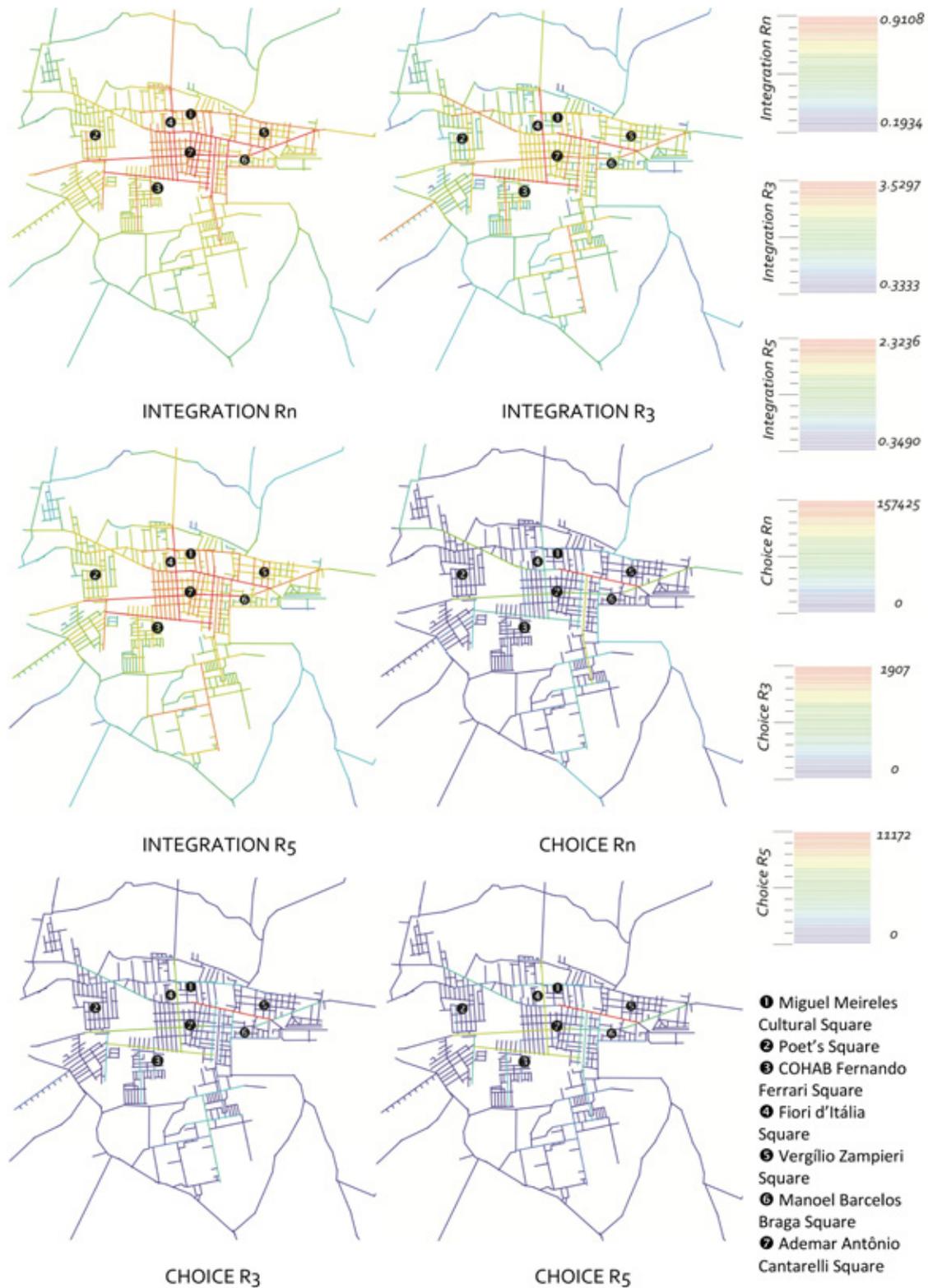
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INTEGRATION Rn   INTEGRATION R3

INTEGRATION R5   CHOICE Rn

CHOICE R3   CHOICE R5

❶ Miguel Meireles Cultural Square
❷ Poet's Square
❸ COHAB Fernando Ferrari Square
❹ Fiori d'Itália Square
❺ Vergílio Zampieri Square
❻ Manoel Barcelos Braga Square
❼ Ademar Antônio Cantarelli Square

Figure 2 - Axial maps of Camobi with the syntactic measures obtained.

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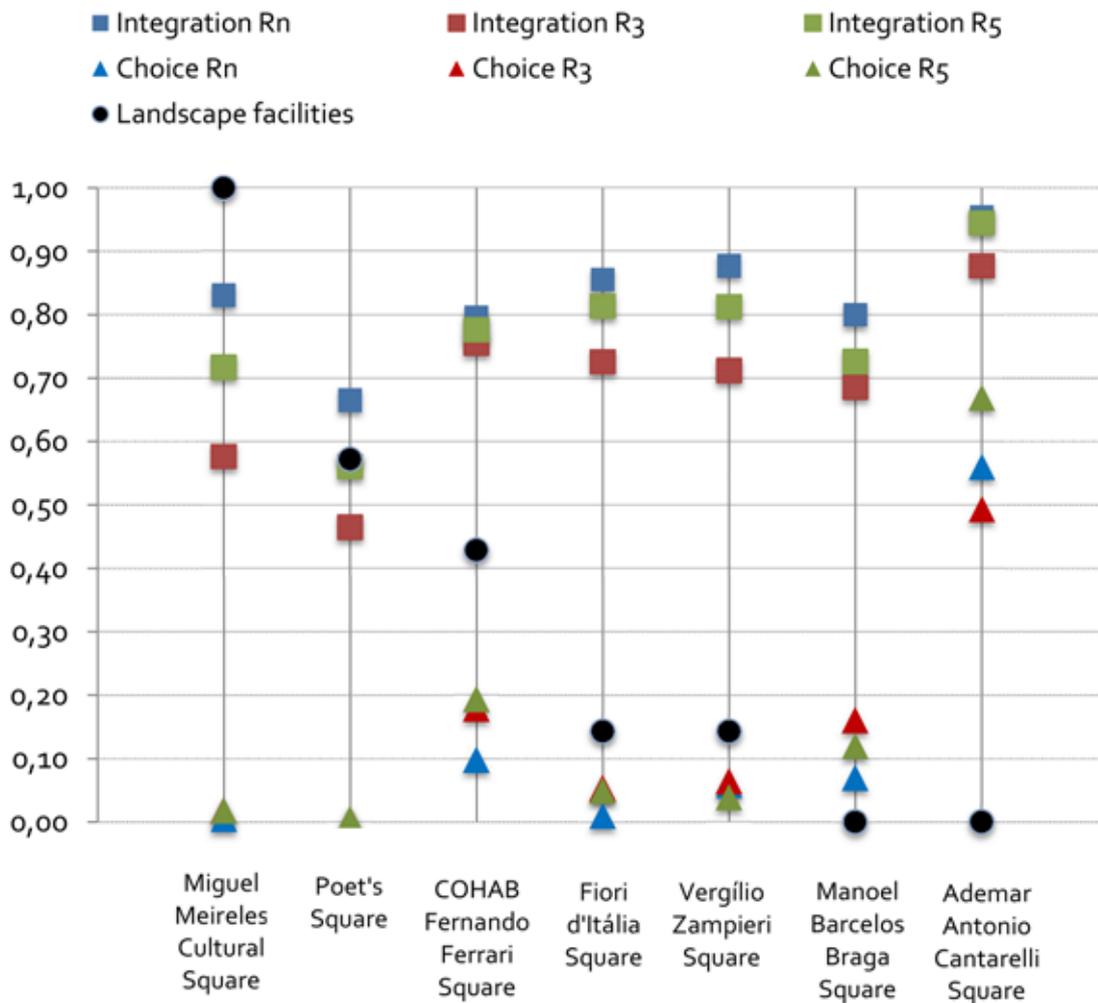
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Figure 3 - Scatter plot of syntactic measures and landscape facilities scores for each square of the sample.

6. CONCLUSIONS

The Camobi neighbourhood squares have good relative accessibility, at global and local levels, and their locations increase possibilities for mixed co-presence between inhabitants and strangers, creating a tendency to weaken the spatial control of one social category over the other. Thus, where the presence of strangers is frequent, inhabitants seem to not implement improvements in the squares. Analysing this phenomenon would also imply checking the influence of other used variables related to squares location that space syntax fails to capture, such as the hierarchy of its adjacent pathways. Likewise, Ademar Cantarelli and Poet's squares display differences in these characteristics. It is known that high speed motorized transit – highways - represents a risk to safety and leisure of potential square users, reducing the concern of inhabitants in controlling this space. On the contrary, local low speed transit tends to encourage the appropriation of public spaces as an extension of private spaces.

For the sample taken, analysis performed depicted opposite situations in which landscape facilities are better. Where global measures are higher, high movement potentials and shared spatial control between inhabitants and strangers, close to axial lines in which vehicular flows probability through the urban grid are high; or, where global and local measures are the lowest for the sample, informing low movement potentials and inhabitants spatial control, where flows through the neighbourhood are expected to be low.

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The slightly robust correlation between facilities and local measures indicate that most of the squares depicted in the sample, are due to be socially appropriated by neighbouring dwellers as an extension of their private space/household. Nevertheless, Camobi is a low built density neighbourhood, where suburban land developments abound. Therefore, the tendency to neglect public space segregated from axial lines where vehicular movement potentials and flows probabilities inform the emergence of functional centralities. The other extreme presupposes some kind of community organization at very local scale, where control over space exerted by neighbours incorporate the public square into the realm of privatized spaces denoting that segregation at local and global scales incite particular ways of spatial governance. The way in which social appropriation of the square space is driven by neighbours demands. Once the modest size of the sample analysed and the peculiarities of the neighbourhood where they are all located, results achieved are insufficient to confirm our initial hypothesis. Therefore, a wider and diversified sample is required for further and more accurate analysis of such phenomenon.

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