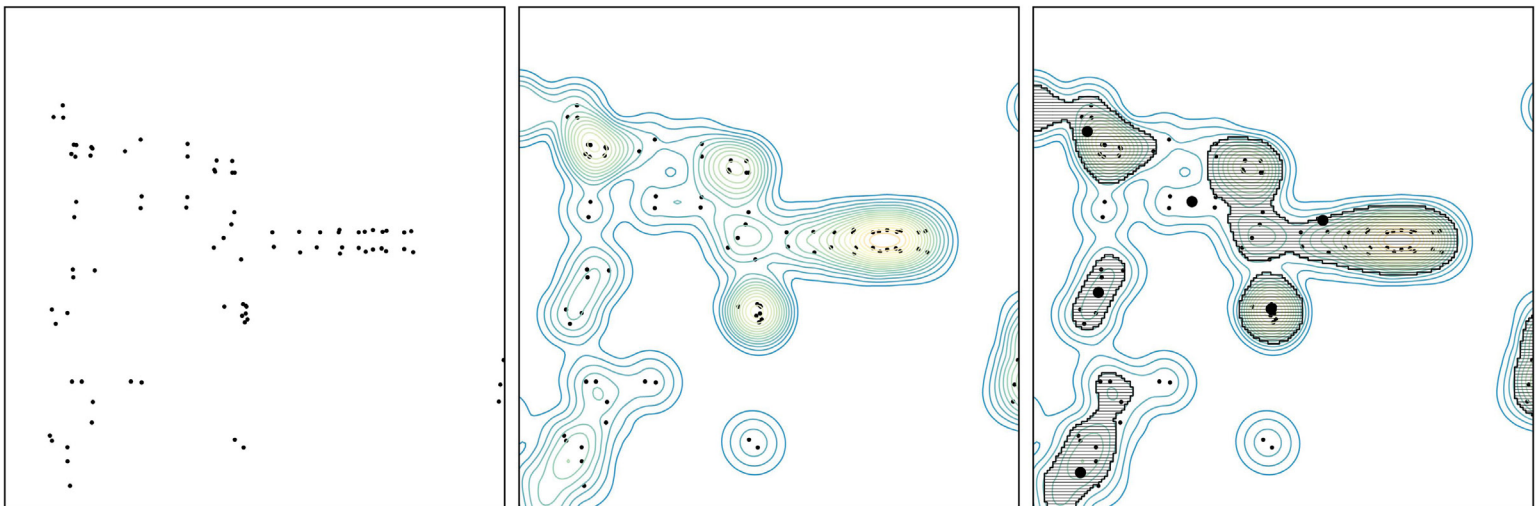


# Disciplined informality: Assembling unprogrammed spatial practices in three public libraries in Medellín

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# J O S S

## Disciplined informality: Assembling unprogrammed spatial practices in three public libraries in Medellín

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The Library-Parks of Medellín were built as part of major transportation and educational infrastructures that have been reshaping the city since the beginning of the 1990s, especially affecting the areas with the most underprivileged populations. This paper investigates the ways in which architecture influences the formation of networks of intervisibility between user groups. In particular, we look at three cases – San Javier, Fernando Botero and Belén libraries – focusing on how observed informal interactions associate with the libraries' organisational control. Rather than looking at these social practices as rates of activity, which is the normal research practice in studies of space and activity using space syntax, we develop a method to address them as socio-spatial network elements. This approach reveals phenomena that would not be made visible otherwise: that is, of the ways in which the Library-Parks structure informal interactions that potentially support the development of self-organised social groups and at the same time function as places that facilitate the exercise of institutional-bureaucratic power over society through spatial-disciplinary mechanisms.

*Keywords:*  
disciplinary tactics,  
clusters of interactions,  
intervisibility, public libraries,  
generative space

### 1. Unprogrammed as a park, but organised as a library

"Thus a courtroom stripped of judges and judged, and set in a funfair, ceases to be a courtroom and becomes a pure expression of the generative laws of space." (Hillier 1996)

Today libraries are becoming multi-functional places, housing many more activities than they did in the past. These activities used to mainly concern the organisation of knowledge and access to information. However, since digital technology has offered everyone rapid and wide access to information, libraries have undergone programmatic transformations (Sears & Crandall 2010; Verheul 2010). In fact, for some authors these buildings became a public "structure that just happen to house a library" (Shoham & Yablonka 2008). This programmatic transformation is embedded in the description of the Library-Parks Project in Medellín, which places a great value on the formation of 'informal' social networks – and which diminishes the importance of the range and size of the libraries'

material collection (Montoya 2014). These buildings are part of a greater project of 'urban upgrading' of the poor communities of Medellín (Dávila 2013; Brand & Dávila 2013), which includes the provision of transport systems, schools, public spaces and other public facilities. In the strategies utilised in this 'urban upgrading', there is an implicit idea that changing urban and architectural structures may improve the ways in which these neighbourhoods form social groups and participate in the wider society of Medellín. In other words, the underlying assumption is that urban and architectural space has the capacity to produce and alter society.

In the case of the Library-Parks Project, the aim is to construct this 'social role' through two main strategies (Montoya 2014). The first uses architecture as a means *to represent* an 'upgraded' society. This is expressed by the sites chosen for these buildings, all located in places that have a recent history of strong violence (executions camps, drug trafficking bases, prisons), reminiscent of the Medellín of the Cartels<sup>1</sup> (Melguizo & Cronshaw 2001; Montoya 2014). The intention in the programme is to

### Notes:

<sup>1</sup> In the 1970s and 1980s, Medellín used to suffer from the control of major drug trafficking groups known as Cartels.

use the sites and the 'monumental' architecture of the library buildings as symbols of successful social change – an idea that is broadcast internationally, influencing other cities (e.g. Rio de Janeiro, Brazil) which started similar strategies in their own contexts (González Vélez & Carrizosa Isaza 2011; Silva 2013).

The second strategy employed by the Library-Parks Project is to use these buildings to actually *produce* this social change. This aim is highlighted by the fact that the buildings are not just libraries, but also 'parks'. Indeed, the emphasis on the idea that these buildings are public spaces in the first instance is implicit in the name of the project (in Spanish), "*Parques-Biblioteca*" – where "park" comes first (Montoya 2014). This reflects that these facilities are supposed not only to *represent* urban change, but also *produce* it through the arrangement of spaces that can generate a new sense of community and citizenship through *informal co-inhabitation* (Fajardo Valderrama 2007; Montoya 2014; Empresa de Desarrollo Urbano 2014). In other words, great importance is given to the generation of informal interactions in the libraries, and to the social networks that are constructed by these interactions. The term 'library' in the project's title refers to a set of different programmes which aim through education to integrate the local users into a "21<sup>st</sup> century economy of production" (Peña Gallego 2011; Empresa de Desarrollo Urbano 2014). For this reason, these facilities offer courses in informatics, small business administration, literacy, language, arts, and so forth. Implicit in these programmes is the idea that the library should help organise this 'new society' into a productive one. Therefore, while the strategy of representing and broadcasting social change through architecture may be considered successful based on the extensive attention it has received in the media, the strategy of influencing a new society through the internal architectural operations of space and use remains to be fully understood.

The strategy of influencing a new society through the internal architectural operations of space and use is embedded both in the set of programmes<sup>2</sup> (as we briefly outlined above) and in the ways in which social practices take place in space (particularly if we consider two distinct kinds of users, namely visitors and staff members). The programmatic transformation in public library space suggests a weakening of the organisational control of interfaces and activities, and can be understood as a transition from a 'strongly programmed' to a 'weakly programmed' environment (Hillier et al. 1984; Hillier 1996). In a 'weakly programmed building', patterns of occupation and movement are influenced more by the configuration of spaces than by the programmatic labels assigned to each space. Therefore, this paper focuses on addressing how the tensions inherent in the Library-Parks Project – i.e. enabling informal interactions to form self-organised social groups while at the same time educating communities in the economic models of society – are embedded in space as 'spatial cultures'<sup>3</sup>. In particular, we focus on how groups of unprogrammed interactions created in the libraries associate with the libraries' organisational intentions.

## 2. On tactics of disciplinary control

The idea of knowledge is embedded in libraries (Forgan 1986; Koch 2004) through the organisation of architectural space and access to informational content. Similarly, social values are part of the structuring of spatial and social relations in library buildings. Public libraries have a fundamental role in hosting the ideal of democratic communication: they are places for unfettered investigation, collective discourse and culture (Buschman 2005; Gaiman 2013). The need to organise social practices in libraries might be related to many reasons, from security (Carporelli 1984) to generation of informal social relationships that strengthen communities (Scott 2011b; Scott 2011a). The way in which organi-

### Notes:

<sup>2</sup> The buildings studied have the same set of programmes, namely: a) adults' library; b) children's library; c) 'ludoteca' (play-ground), which is a room furnished for children to play in; d) adults' computers; children's computers; e) workshops, which are spaces with furniture and infrastructure for artistic works (mirrors on the walls, sinks, movable furniture, etc.); f) exhibition room; g) 'sala mi barrio' (local studies); h) studying area (with tables); i) auditorium; j) information and issue desk; k) cafe. The analysis and description of the ways in which these programmes are syntactically distributed in space is the topic of a forthcoming publication.

<sup>3</sup> The consistent ways in which social practices happen in a particular space (be it architectural or urban) may configure what space syntax research has termed 'spatial cultures' (e.g. Peponis 1985; Hillier 1989; Hillier 1996; Hillier et al. 1996).

**Notes:**

<sup>4</sup> For example: the detailed description of the Panopticon; the spatial organisation of military barracks; the timetable of monasteries; and the distribution of students in schools.

sation of social practices is made manifest in space as spatial practices implies significantly different types of social order and power relations (Bennett 1995), particularly between different categories of users (e.g. in public libraries, between staff members and visitors). In the Library-Parks of Medellín, authoritarian forms of control would constrain the construction of self-organised communities and would not be acceptable to the local users. Therefore, more subtle techniques of control are used for the library to meet its educational goals.

Foucault offers an account of different types of social control – from explicit to implicit ones. Studying the disciplinary frameworks of prisons, Foucault formulates that the transition from public torture to prison confinement as punishment of a crime underpins a subtle tactic of social control (Foucault 1991). He argues that this transition took place during the 18<sup>th</sup> and 19<sup>th</sup> centuries and is clear in the emergence of building typologies of this period – factories, schools, prisons, hospitals and barracks – all of which resemble each other and present different modalities of this ‘new’ form of control. As he terms it, the ‘disciplines’ are the set of technologies of social control that act through transforming the body of the person subjected to control into a docile, efficient (economic) and useful social force (1991). Foucault uses a variety of historical examples<sup>4</sup> to support his arguments for how this “architecture that would operate to transform individuals” (1991, p.172) actually performs such transformation through the system of social and spatial relations. Amongst the tactics outlined by Foucault, ‘constant surveillance’ is of particular relevance to the present work, since it is the most efficient technique as it would be always operating on the body with the minimal effort (politically discreet) (Foucault 1991, p.218). ‘Constant surveillance’ is a technique by which the exercise of power is made manifest through permanent visibility of subjects’ activities, assuring the automatic functioning of power (1991). Foucault suggests that all the techniques he

describes are acting towards the same goal – that of the “politically economic (...) ordering of human multiplicities” (1991, p.218). Indeed, perhaps one of the most influential ideas in Foucault’s work is the argument that modern society is characterised by the generalisation of disciplinary power. In other words, this modality of power was developed in the framework of prisons, then later ‘exported’ to society as a whole: the ‘disciplinary society’. However, in prisons, the exercise of disciplinary power is explicit and asymmetrical; that is, there is a clear distinction between subject and observer and both are openly aware of their roles. On the other hand, in the ‘disciplinary society’, power is implicit and symmetrically distributed to everyone. This distinction between explicit/asymmetrical and implicit/distributed disciplinary control becomes evident in institutions that deal with educational purposes (e.g. museums, schools or libraries). This is mostly due to the fact that these institutions organise the relationship between two main categories of users: educators (e.g. curators, teachers or librarians) and those subject to an educational purpose (e.g. museum visitors, students or library visitors).

The work of Basil Bernstein (2003) on schools illustrates the difference between educational institutions that apply explicit forms of control and others that use implicit ones. Using the term “classification”, Bernstein (2003) describes how knowledge may be separated into subjects with sharp boundaries, or integrated more holistically. Through the term “framing” he describes the context (schools’ spaces) and the practice of teaching (the relation between teachers and pupils), which may also have sharp boundaries, or be blurred into one another. Bernstein argues that the combination of these two aspects – classification and framing – may create two opposed social solidarities. When boundaries between different subjects have a clear-cut relationship, and the context also clearly establishes how the process is supposed to take place – i.e. when

a 'top-down' control over pupils learning process is explicit – then differences in individualities are ignored and a normalised “mechanical” society (Durkheim apud Bernstein 2003) is created. On the other hand, a teaching process where boundaries between subjects and the social positions of teacher and pupils are weak would allow individualities to be made manifest, leading to a society made up of differentiated parts. However, Bernstein reminds us that in this case an implicit form of control is established, since the more the individuality of each subject is publicly expressed, the less it can be hidden from the knowledge of the group. For Bernstein, this is perhaps an even more pervasive form of control. Considering Foucault's description of different forms of control, we can see that the first type of school applies explicit disciplinary control (or perhaps 'top-down disciplinary power'), as the disciplinary power is concentrated in an established authority<sup>5</sup> (the educator). The second type of school, on the other hand, is based on 'constant surveillance' performed by everyone. The latter therefore promotes a 'self-regulated disciplinary society', as power is distributed between all subjects involved in the educational process.

'Self-regulated' and 'top-down' disciplinary control are not mutually exclusive, and the work of Dovey (2008) suggests that explicit/implicit forms of control are in fact always present in space. He defines 'coercion' as a latent kind of force that operates by preventing subjects from ever forming intentions of resistance. It gains its power from being under the cover of voluntarism through situations that may appear to allow free choice, but actually prevent it. An open gate with guards standing on both sides is an example of coercion (Dovey 2008). In opposition, he describes 'authority' as a form of control marked by the absence of argument, relying on an unquestioned recognition and compliance. 'Authority' is, therefore, “integrated with the institutional structures of society such as the state, church,

private corporation, school and family” (2008, p.14). Although being unquestioned, “authority rests upon a base of 'legitimation'” (Arendt apud Dovey 2008, p.14), and “the need for legitimation increases as power becomes totalising” (Dovey 2008, p.17). In the case of the state, for example, this legitimation is understood as 'public interest'. Dovey considers that the notion of public interest is particularly complex in public buildings which “can serve at once to legitimise authority, reinforce a sense of community, gratify the political or architectural will, turn a profit and reinforce self-deceit” (2008, p.16). While 'authority' rests upon a conceptual (without spatial dependence and definition) form of submission, where (conceptual) hierarchies define limits of action, 'coercion' rests upon a conceptual and spatial submission, where space is being used as a tool to produce limitations to action.

What emerges from these studies is that disciplinary forms of control need to use space in order to function discreetly: be it through open panoptic vistas that allow surveillance, or through more complex coercive mechanisms. With these theoretical ideas in mind, the question is formulated as follows: how can we capture the structure of practices that only happen in situ and expose this controversial role of space? Our proposition is to explore them as networks of interactions between visitor-to-visitor relations and networks of social control formed by staff-to-visitor relationships.

### 3. Assembling architecture as networks of practices

Here we present a method developed in order to capture social networks of interactions and their spatial distribution inside the studied buildings. In particular, considering the topic of this paper, we address how we describe and map visitors' interactions and staff surveillance patterns. We capture visitors' clusters of interactions in space and visual connections among these clusters as a way to map the potential for the formation of 'spatial

#### Notes:

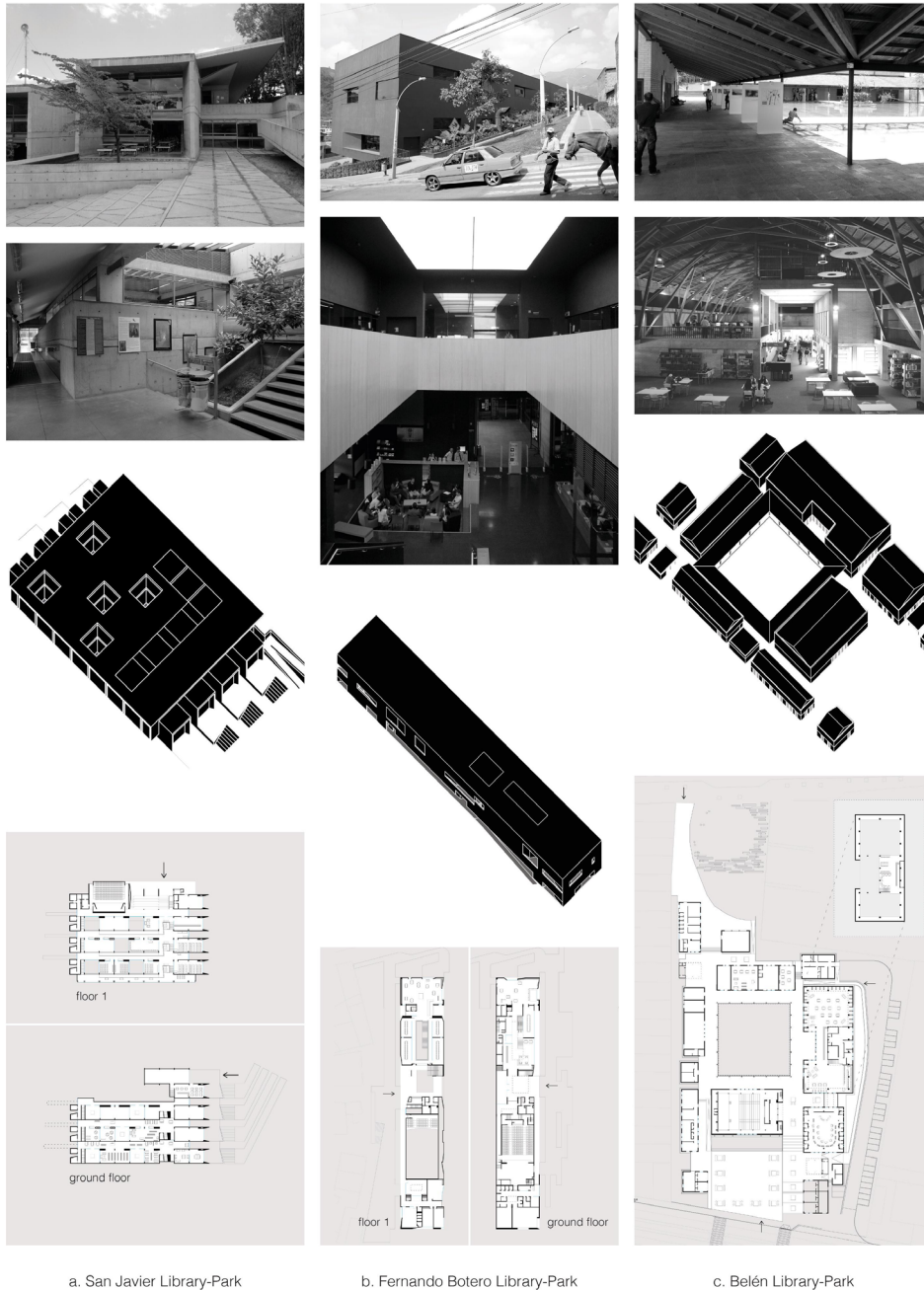
<sup>5</sup> 'Authority' here is not used in the same sense as defined by Foucault. For Foucault, 'authority' is related to the power of the sovereign, which is opposed to the disciplines.

cultures' based on intervisibility and co-presence. We capture staff surveillance by mapping visual awareness of visitors by staff. We analyse these maps by combining methods from space syntax and social network analysis. It is argued that the analysis using these maps reveals phenomena

that would not be seen otherwise: that is, of the ways in which the Library-Parks structure informal interactions, potentially leading to networks of self-organised social groups and at the same time defining institutional rules that discipline society.

**Figure 1:**

*The three buildings, (a) San Javier Library-Park, (b) Fernando Botero Library-Park and (c) Belén Library-Park.*



### 3.1. Firstly, the three buildings

*San Javier* Library-Park is situated on a hillside between the districts of Comunas 12 and 13. It was the first Library-Park built in Medellín (Figure 1a) and was designed by the EDU (Empresa de Desarrollo Urbano) in 2006. The building plan offers an interesting solution to fitting floors on a slope: it is organised in cascading platforms, with each 'step' consisting of a corridor and rooms. A few courtyards open the building to daylight and break the sequence of rooms in the corridors. An aspect to be noted, however, is that the library was constructed with many entrances (one in each 'strip-step'); but the administration keeps only the main entrance opened.

*Fernando Botero* Library-Park (Figure 1b) was the first library in a second round of constructions of Library-Parks (it was built in 2009). It was designed by G-Ateliers in collaboration with the surrounding population (San Cristóbal neighbourhood). As a result of this collaboration, some of the library programmes were re-sized to meet the actual demands of the neighbourhood<sup>6</sup>. The building is situated on a very steep hillside, and uses this feature to create different entry points at different levels.

*Belén* Library-Park (Figure 1c) was built in 2008 and is situated in Comuna 16. Hiroshi Naito is the architect of this building, which seems to make reference to Japanese architecture. The library can be described as a collection of pavilions surrounding a courtyard with a reflecting pool. As it is situated between two roads, the building is constantly used as a public pathway. This is the only Library-Park that is almost entirely on one floor (the only exception being a mezzanine for informatics classes in one of the 'pavilions'). All three library projects were the winning schemes of open international architectural competitions.

### 3.2. Maps of aggregate practices

During fieldwork, we mapped the actual social practices in the spaces of the libraries through a sequence of 'snapshots' of occupation and 'traces' of movement paths<sup>7</sup> (Figure 2) and transferred all these data onto a single map, in order to capture the 'aggregate picture' of the social practices of each building (Figure 3). These maps are not just representations of phenomena (one cannot see this aggregate level when experiencing the buildings) but they work as tools to capture socio-spatial phenomena. We call these 'maps of aggregate practices', since they construct representations of how each library forms a field of collective spatial practice and use over time.

The interrelation of interior space and social practices is a key topic in space syntax research (e.g. Hillier et al. 1996; Penn et al. 1997; Doxa 2001; Peponis et al. 2004; Koch 2004; Psarra et al. 2007). Of particular interest to the study of public libraries, space syntax analysis has extensively shown how space affects the formation of distinct spatial cultures (e.g. Peponis 1985; Hillier et al. 1996), structuring probabilities of interaction patterns (e.g. Penn et al. 1997; Peponis et al. 2007) and influencing the transmission of educational content (e.g. Koch 2004; Psarra et al. 2007; Psarra 2009). The present work focuses on interaction and intervisibility as a way of exposing how groups of visitors involved in unprogrammed interactions associate *in space* with the libraries' organisational intentions. It has been shown that patterns of intervisibility affect the perception of curatorial messages in exhibition layouts (Lu & Peponis 2013). Similarly, intervisibility between different user groups in library spaces construct perceptions of collectivity and social participation (Zook & Bafna 2012).

Normally space syntax analysis collects observation data and translates them into occupancy rates. The relationship between space and occupancy rates is subsequently explored through

### Notes:

<sup>6</sup> For example, the auditoriums in the first libraries are considerably smaller than the one in Fernando Botero.

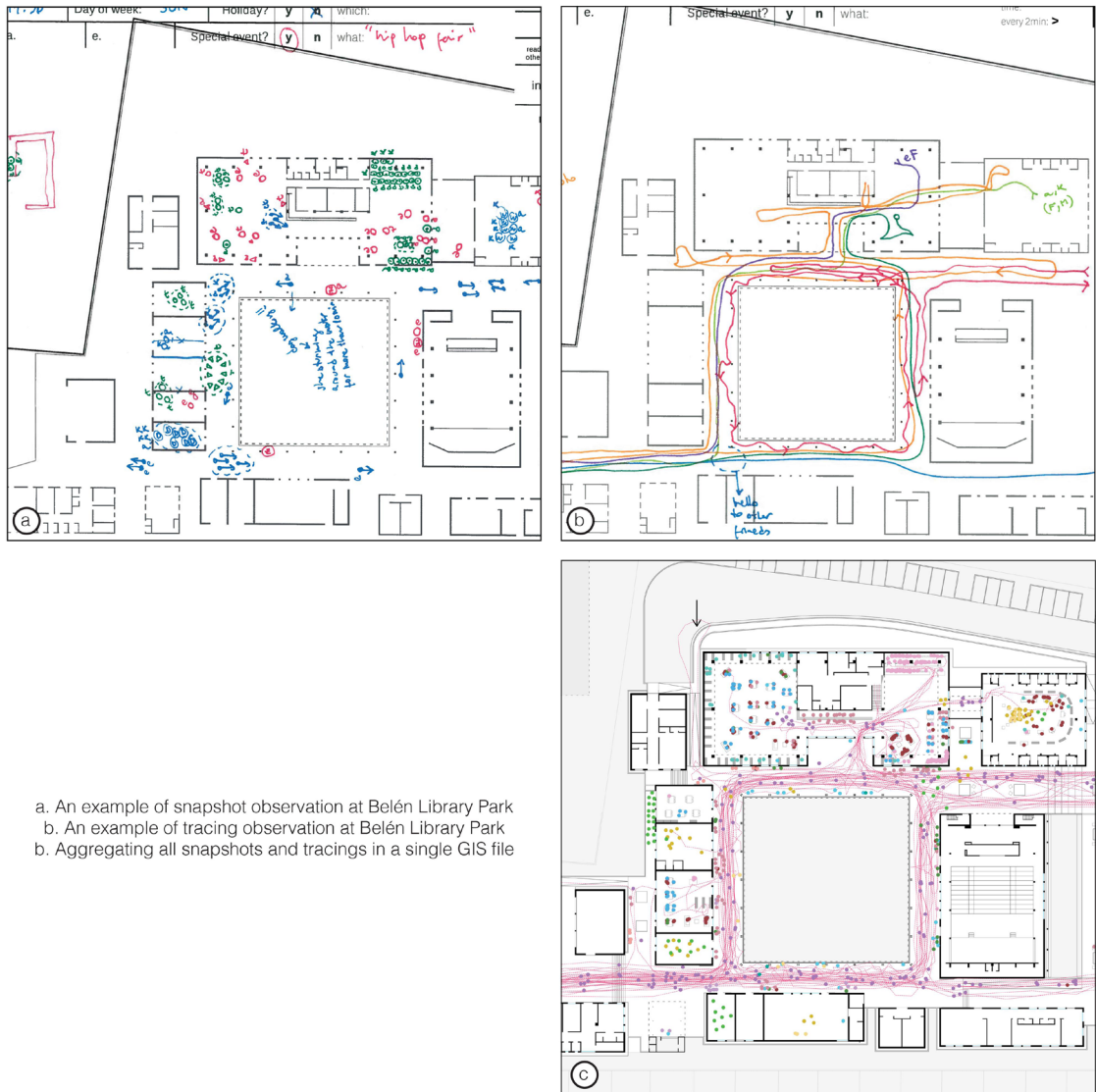
<sup>7</sup> Empirical observations: three days per library: two weekdays, one weekend day, spread across a whole month and interchanged between other libraries – in order to avoid the influence of specific dates, or weather conditions. Four 'snapshots' per day (12 in total) and 50 'traces' in total for each library. When mapping use and tracing people, we took notes of other demographic information, such as gender and age group.

statistical correlations looking at probability distributions. While statistical analysis can address the relationship between occupancy and spatial values, the actual networks of spatial and social relationships among different kinds of users are lost in the analytical process. Thus, instead of searching for regularities between space and rates of activities,

this work aims at mapping how the buildings form intervisibility networks as processes through space and time. Therefore, in order to analyse associations between structures of observed social practices and space, we developed a method to synthesise them into how they work as network elements – that is, as nodes and links.

**Figure 2:**

*The process of mapping aggregate practices. In (a), colours and shapes indicate different activities. In (b), colours indicate different traces.*



- a. An example of snapshot observation at Belén Library Park
- b. An example of tracing observation at Belén Library Park
- c. Aggregating all snapshots and tracings in a single GIS file





Figure 3:

Detail of a 'map of aggregate practices' of Belén Library-Park.

### 3.3. Co-inhabitation based on intervisibility

This section analyses how visitors form networks of co-inhabitation based on intervisibility. We looked particularly at interactions between people for two main reasons. Firstly, interaction is the activity frequently highlighted by the organisers of the Library-Parks as the *raison d'être* of these facilities (Fajardo Valderrama 2007; Montoya 2014). In fact, some authors even consider the 21<sup>st</sup> century public library as a place to access other people,

rather than information (Imholz 2008; Scott 2011b; 2011a). Secondly, 'interactions between people' is the activity (among the observed ones) that most explicitly exposed the difference between unprogrammed and programmed use of the library. The analysis differentiates programmed interactions (in classes and workshops organised by the library) from unprogrammed ones (which may be seen as a result of random encounters in space)<sup>8</sup>. Visitors involved in interactions form clusters in space over

#### Notes:

<sup>8</sup> Programmed interactions: those that cluster in spaces that can only be accessed with organisational permission of the library. Unprogrammed interactions: those that cluster in spaces with access that does not require organisational permission of the library.

**Notes:**

<sup>9</sup> *If that were so, restaurants and cafes would be great interaction network generators and social transformers.*

<sup>10</sup> *In this matter, it is worth mentioning Zook and Bafna's study on the Seattle Public Library (2012), in which they elaborate that intervisibility between different activities' paths generate distinct 'senses of publicness', potentially influencing how visitors see their role in space and in social practices. Intervisibility between different subject groups is also a crucial aspect in Peatross' study on institutions that deal with restriction of movement and occupation (namely Alzheimer units and juvenile detention centres) (2001). She exposes how different spatial arrangements of 'visibilities' influence relaxation and kinds of control over patients.*

<sup>11</sup> *In other words, the locations where interactions commonly happen.*

<sup>12</sup> *QGIS version 2.6.1*

<sup>13</sup> *This aggregate level indicates the probable 'common picture' of the buildings; in other words, it allows annulling particularities of each snapshot.*

<sup>14</sup> *Smaller distances were not capturing clustering, and larger distances were clustering all interactions into a few big clusters. Furthermore, this distance generated clusters that somehow corresponded to the intuitive picture of the phenomena that were observed on site.*

<sup>15</sup> *Since a proportion rather than a specific value was used, the analysis does not define in absolute terms what can be considered a cluster, but defines it relatively to the phenomena observed in each building.*

time (locations where interactions commonly happen) that are linked based on intervisibility, therefore forming networks of programmed/unprogrammed co-inhabitation.

We do not assume that seeing people interacting necessarily enables the expansion of one's own social network<sup>9</sup>. The focus of the study is to construct an aggregate collective picture of how interactions form spatial cultures, rather than the possibility of individuals' expanded social networks. Interaction is not simply based on a face-to-face communication with another person or group, but also on the awareness of possibilities of interaction inherent in the networked distribution of people and groups in space. This defines interaction not simply as an actual pattern of communication, but as the complex relationship of the actual (the interaction one has at a given moment in time) with the virtual or the possible (the possibilities for interaction that are visibly present in a given space). Links of intervisibility are used in order to capture how co-inhabitation forms collective patterns of programmed/unprogrammed co-awareness. This is a relevant issue in public libraries, as they are open to all comers (unprogrammed movement, occupation and interaction) and at the same time are hosts of ideals of democratic communication and collective values (Bennett 1995; Buschman 2005; Gaiman 2013). Thereafter, we could argue that the ways in which these two kinds of interactions (programmed/unprogrammed) are distributed in space influence how visitors see themselves as a community<sup>10</sup>.

Firstly, in order to capture the aggregate picture of the use of the buildings, the analysis mapped the locations where observed interactions concentrate into clusters<sup>11</sup>. This was done with GIS software<sup>12</sup>, using the plugin 'Heatmap', which uses Kernel Density Estimation to construct a density raster ('heatmap') of an input point vector data (Figure 4b). The density is calculated based on the number of points in a location, with larger numbers of clustered points re-

sulting in larger values. 'Heatmaps' allow easy identification of 'hotspots' and clustering of points. Since we constructed these maps at aggregate level, the 'heatmaps' expose the distribution of (aggregate) densities of interactions<sup>13</sup>. Three metres was the distance that better represented observed phenomena and exposed differences across cases<sup>14</sup>. In order to differentiate individual clusters in the 'heatmap', the areas that presented the same level of intensity of clustering of interactions were extracted ('hotspots', Figure 4c). The choice of this level was also based on better representing observed phenomena and exposing differences across cases. This choice was not based on a specific value, but on a proportion in each case's range of values of intensity of clustering: the cut-level was two thirds of the range. In other words, the 'hotspots' represent the area of the 66% more intensely clustered interactions of each building<sup>15</sup>. Finally, we calculated the centroids of each 'hotspot' (cluster) so that we could later understand each cluster as a single node with a specific location (Figure 4c). Summarising this method: we first analysed the distribution of densities of aggregate interactions ('heatmap'); second, we extracted the clusters ('hotspots') from this distribution of densities; and third, we calculated the location ('centroids') of each cluster (seen analytically in Figures 4a, b and c). In this way, we mapped the locations where interactions cluster (nodes) and represented connections in between clusters based on their intervisibility (links) (Figure 5).

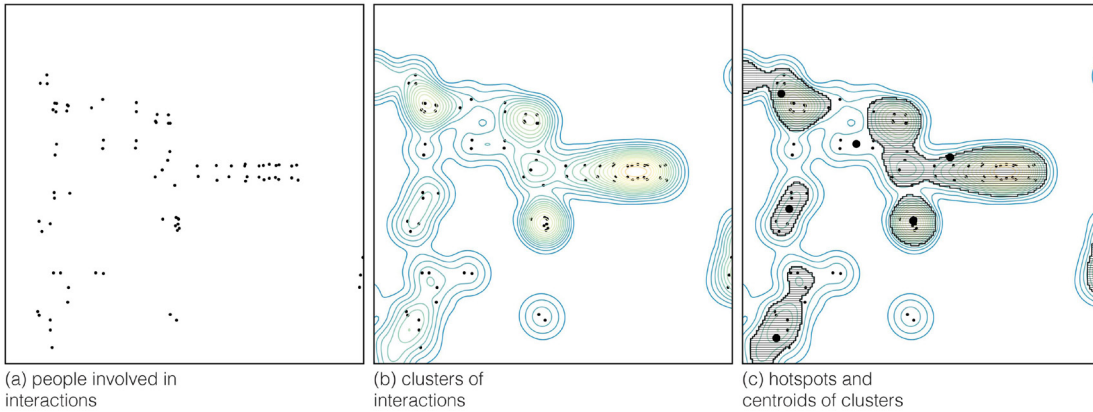


Figure 4:

Diagram explaining the progression of methods utilised to capture the distribution of densities of aggregate interactions ('heatmap'), then to extract the clusters ('hotspots') from this distribution of densities, and finally to calculate the location ('centroids') of each cluster.

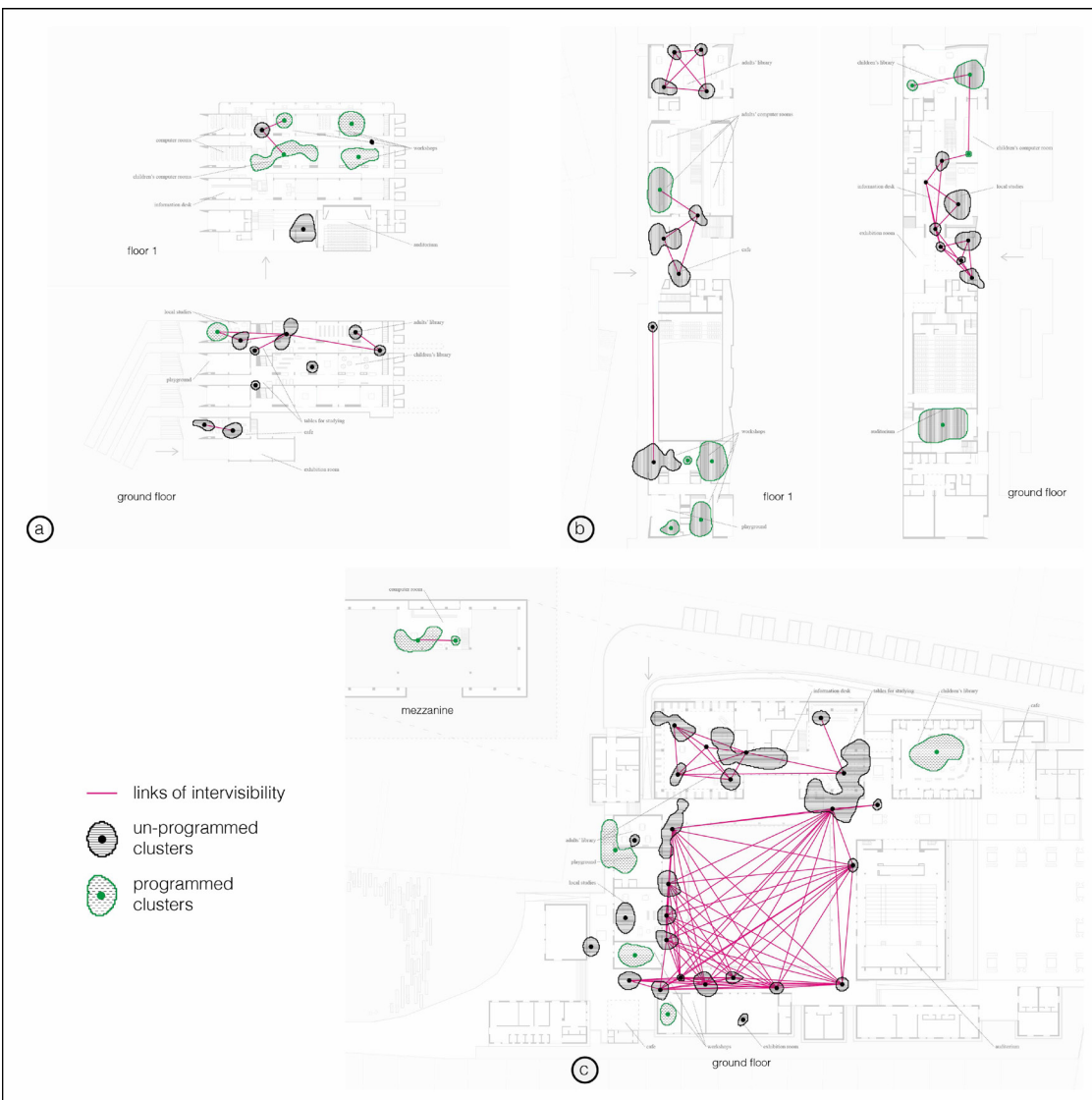


Figure 5:

Clusters of interactions of (a) San Javier, (b) Fernando Botero and (c) Belén. Magenta links represent intervisibility between clusters.

**Notes:**

<sup>16</sup> Density is measured in terms of the extent to which the actual graph is close to a graph in which every node is connected to every other node. It is given as a value between 0 and 1 (1 being the densest) as a result of the division of the actual number of edges by the number of possible edges. It is important to note that the number of edges is calculated considering the fact that the graph is undirected. In other words, two nodes that are connected generate two edges (one from node X to Z and another from node Z to X). The number of possible edges ('Te') is then given as:  $Te = (n-1)*n$ , where 'n' is the number of nodes in the system.

<sup>17</sup> 'Bridge', in social network analysis terminology, refers to the links that, if deleted, make the graph split into two disconnected groups.

<sup>18</sup> (considering a visit starting from the entrance).

This analysis indicates that the Library-Parks differ in terms of how clusters of interactions are distributed and how they form networks of intervisibility. A first characteristic observed refers to the number of clusters in each Library-Park and the ratio of clusters formed by programmed interactions against those formed by unprogrammed ones (Figure 5). In Belén, one finds four clusters of unprogrammed interactions for every cluster of programmed interactions. In both San Javier and Fernando Botero, around two in every three clusters of interactions are of the unprogrammed kind.

A second aspect concerns the 'density'<sup>16</sup> of the networks of intervisibility and the 'bridges'<sup>17</sup> formed in each building. The densest network is found in Belén (0.180), followed by Fernando Botero (0.086), and then San Javier, which has the lowest value of network density (0.058). San Javier has in fact the highest proportion of 'bridges' in the network – that is, this building has a network of intervisibility that is very easily split into disconnected groups.

When looking at the spatial distribution of these networks, and considering some qualitative information gathered from fieldwork, a few other aspects could be highlighted. In San Javier, not only the sparseness of the network becomes evident, but also the fact that the largest group of clusters is the one found in the last 'step' of the ground floor (Figure 5a). These spaces are the deepest ones in the spatial layout (Figure 11a, spaces 65 to 76)<sup>18</sup>. They house adult lending library and reading rooms, which explains the fact that observed interactions refer to very quiet conversations between small groups of people.

In Fernando Botero's network (Figure 5b), intervisibility between clusters of programmed interactions is fragmented and forms bridges. On the other hand, intervisibility between clusters of unprogrammed interactions forms three main dense groups: one that is found in the entrance hall (ground floor); a second which is found in front of the

cafe (floor 1); and a third located in the adult lending library (floor 1). In the first, interactions concern mainly three kinds of activity: relaxing and eating in the hall space; interacting while walking to and from the main entrance of the library; and involvement in meetings that use the space allocated to 'local studies' ('sala mi barrio'). In the group in front of the cafe, most people are eating and interacting, while in the third group most are studying and reading, being involved in very quiet forms of interaction. It is significant to note that some clusters in each of these groups of clusters consist of small conversations between a staff member and visitors. In other words, even though these are clusters of unprogrammed interactions, the institutional control of the library is aware of social interactions and group formation (this topic will be developed in the following sections).

Belén's network (Figure 5c) forms two main groups of clusters: one in the courtyard around the reflecting pool, and another that occurs inside the spaces that house lending libraries and computer facilities. These groups are considerably different in terms of size and structure: the first is twice the size of the second (in terms of number of nodes). On the one hand, the first group of clusters concerns a variety of activities – for example, walking, eating, playing, dating, relaxing, meeting, or using the phone/tablet or computer – that may be associated with the Library-Park functioning as an extension of public space. On the other hand, the second group concerns activities that are related to the Library-Park functioning as a learning facility, where people are reading, studying, working on the computer, and so forth. Considering the different sizes of these two groups, Belén seems to work more as an extension of public space than as a learning facility (in terms of social awareness). In fact, unlinked clusters (that is, clusters that are not linked to other clusters by means of intervisibility) occur in spaces that are directly accessible to the spaces of the courtyard.

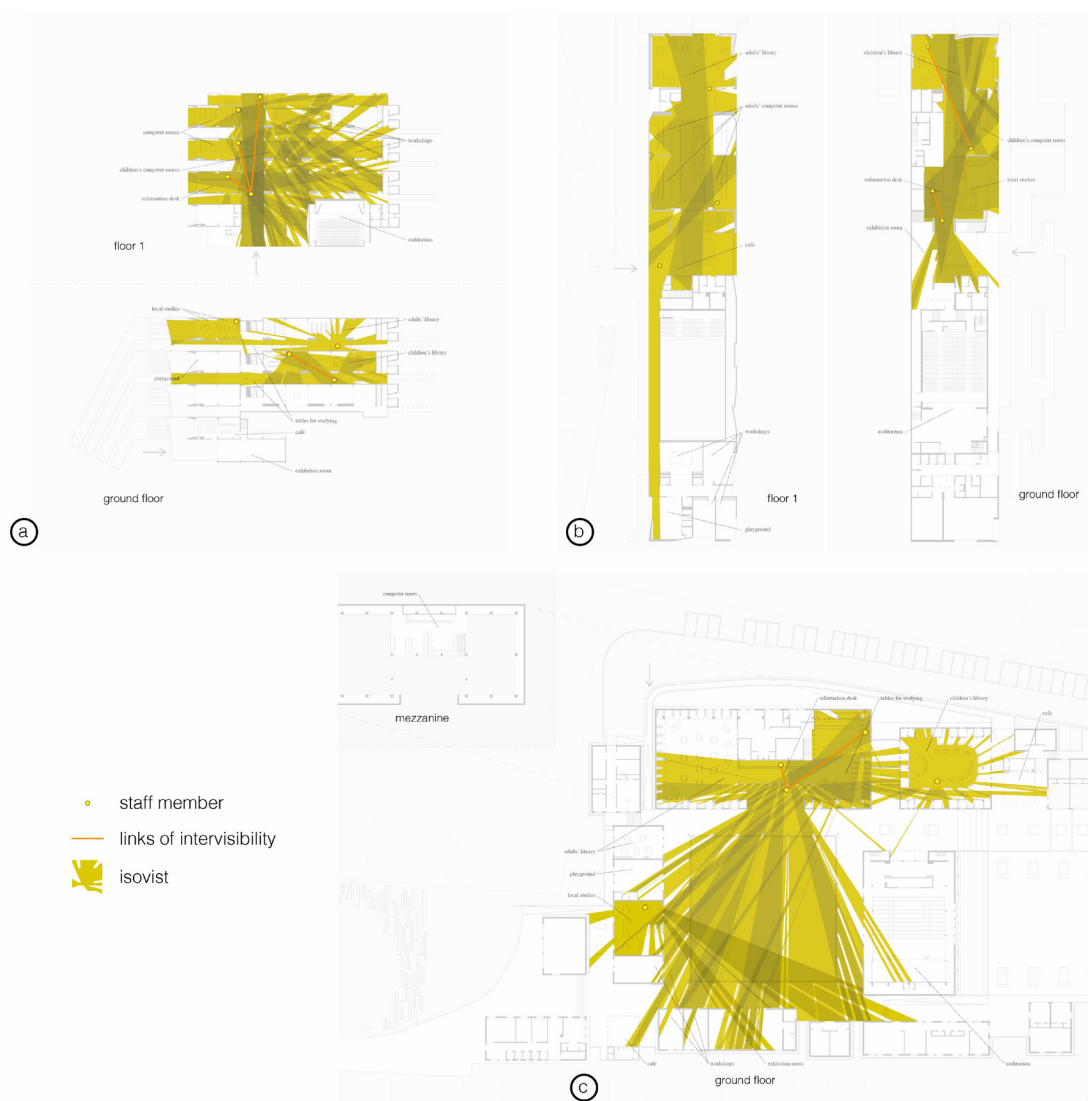
The spaces where these unlinked clusters were observed are purposed as educational spaces (lending libraries, workshops and exhibition room). This fact implies that the full educational function of this library is realised through its capacity to work as a public space, since movement from one educational programme to another necessarily crosses the spaces that are mostly used as an extension of public space.

### 3.4. Mapping implicit institutional control

Regarding library staff, in order to address their (potential) practice of surveillance, we mapped and overlaid the fields of view (isovists) from their common observed locations. These fields expose staff members' spatial associations based on visibility connections with other staff and spaces (this section of the paper, 3.4) and visitors' clusters of interactions (next section, 3.5).

#### Notes:

<sup>19</sup> (considering indoor space only)



**Figure 6:**

**Positions and combined isovists of observed staff members of (a) San Javier, (b) Fernando Botero and (c) Belén. Darker shades of yellow indicate where isovists overlay. Orange lines represent staff members' intervisibility.**

A first difference among the observed buildings refers to the number of staff members that are visible from the visitors' spaces in relation to the area of the building<sup>19</sup> (Figure 6, dots represent the position of staff members), where we see that in San Javier this ratio is one staff member per 240m<sup>2</sup>; while in Belén, it is one per 740m<sup>2</sup>; and finally, in Fernando Botero, the ratio of staff to area is one per 551m<sup>2</sup>. In other words, the number of observed staff members in San Javier is twice as high as Fernando Botero; and three times higher than in Belén when areas are taken into account. This is a significant characteristic to consider when looking at the formation of social groups among visitors. The constant and close surveillance of staff over visitors' occupation may constrain their activities and make their interactions less informal than if surveillance was not present.

In all three Library-Parks, intervisibility between staff members generates very sparse networks, where all links are 'bridges' (Figure 6, orange links represent intervisibility). In two of the cases (San Javier and Belén), one staff member sees most of the other peers on the same floor, but these peers cannot see each other. The staff member who sees the other staff members is generally responsible for guarding the entrance of the buildings. In fact, this same phenomenon happens in the other libraries. Effectively, the libraries' entrances and their surrounding spaces consistently feature in staff's visual fields (Figure 6, darker shades of yellow indicate higher number of overlay), showing that in-going and out-going movement in the libraries is highly observed. However, as we will develop in the next sections, the entrance thresholds are located in different positions in each Library-Park. While some are the actual entrances of the whole complex, others divide programmatic sectors inside the buildings. In summary, the analysis shows that each building supports distinct distributions of combined staff visibility. The impact of these differences in the formation of social groups based on

interactions between visitors will be analysed and discussed in the next section.

#### **4. Space and networks of intervisibility**

In this section we discuss associations between two groups of visibility relations: interactions among visitors through the clustering of their locations (section 3.3); and visibility relations among staff through their location and field of view (section 3.4). We construct representations in which clusters and staff are presented as nodes, and their associations as links based on intervisibility (Figures 7, 8 and 9, legends). The maps show how different categories of users (visitors and staff) interrelate in (spatially constructed) networks informed by intervisibility. In their turn, these networks expose two phenomena at the same time: the different ways in which visitors potentially form emergent social groups, and how staff members participate in networks of intervisibility, potentially serving as institutional surveillance that discipline these same social groups. We first explain how groups are formed and suggest that they may be characterised by considering the predominance of particular types of intervisibility links and particular types of nodes. We then describe each building based on the spatial distribution of these groups.

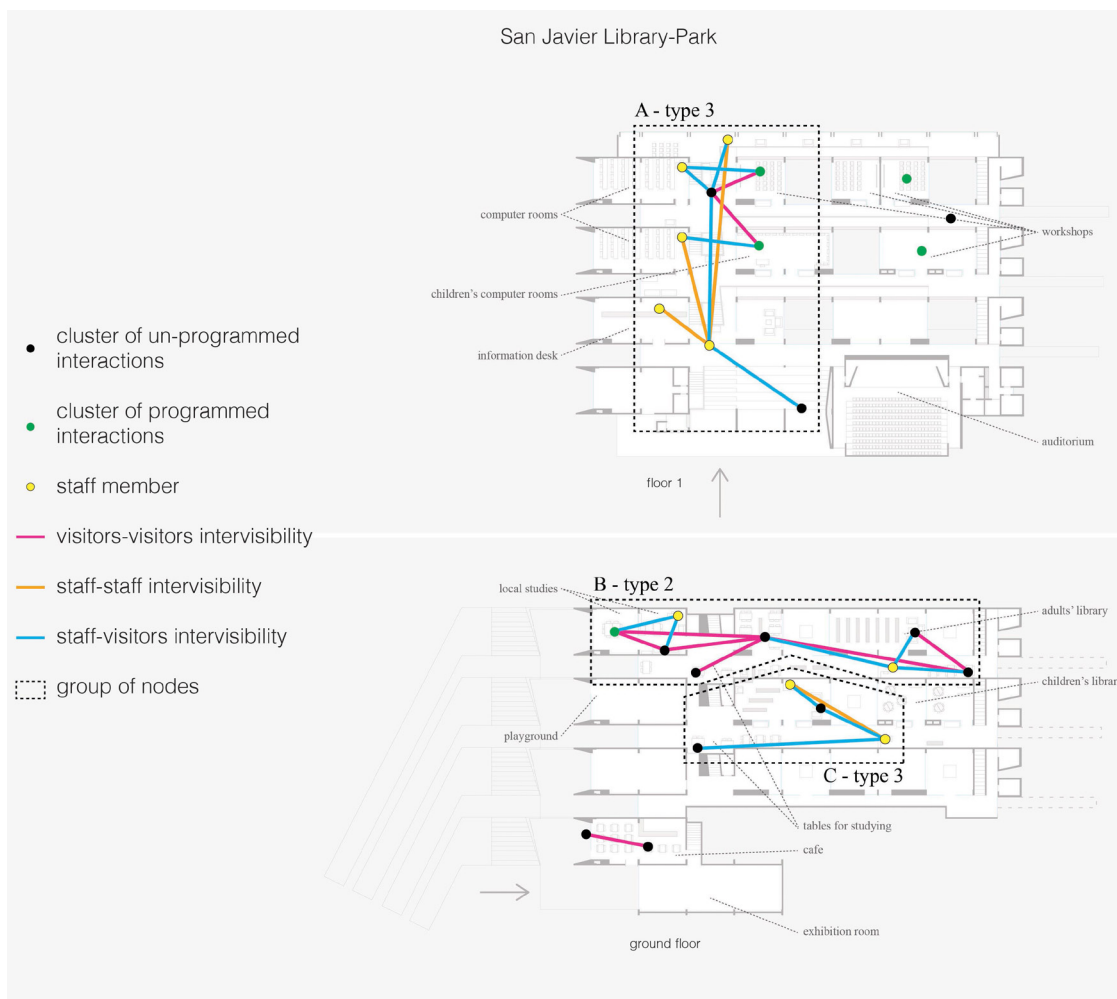
Clusters and staff members may form groups based on density and sparseness of their links of intervisibility (Figures 7, 8 and 9, groups are indicated by dashed lines). In most cases, groups are clearly defined by a clear disconnection between them (e.g. all groups in San Javier). In other cases, however, groups are linked by elements (either nodes or links) that work as bridges between groups. Fernando Botero presents both types of these bridge elements: Groups A and B are connected by a link that works as a bridge between both groups; whilst a node works as a bridge between Groups C and D.

When comparing all Library-Parks, the first characteristic to discuss concerns the importance of different kinds of links (visitors-visitors<sup>20</sup>; staff-staff; and staff-visitors). It is notable that some groups would not be linked together if one of the kinds of links were not considered. In some cases, groups are formed mostly through 'visitors-visitors' links (magenta links, e.g. Belén's Group B in Figure 9). In other cases,

groups would only be held together due to 'staff-cluster' links (blue links): e.g. San Javier's Group A (Figure 7) and Fernando Botero's Group B (Figure 8). These are significantly different kinds of groups: those in Belén can be considered as groups only because visitors interact and form clusters in space. In the other two libraries, groups only exist due to staff surveillance over visitors' interactions.

**Notes:**

<sup>20</sup> 'Visitors' in this case refers to 'cluster of visitors involved in interactions', as presented in the previous sections of this paper.



**Figure 7:**

**"Intervisibility Network" of San Javier Library-Park.** Colours of nodes indicate whether they represent a cluster of unprogrammed interaction (black), a cluster of programmed interaction (green), or a staff member (yellow). Dashed lines indicate groupings of nodes based on density and sparseness of links. Links indicate intervisibility between visitors' clusters of interactions (magenta), between staff members and visitors' clusters of interactions (blue).

**Notes:**

<sup>21</sup> In section 3.3, it was clear that clusters of programmed interactions do not form groups, but only dyads or bridges.

<sup>22</sup> In the paper we argue that a sequence of information desk (b-type), lending library (b-type) and children's library (a-type) makes the use of the children's library strongly programmed; whereas when associated with many other programmes in no particular order (associations between d-type of spaces), its use is weakly programmed.

A second characteristic concerns the different roles of programmed and unprogrammed interactions between visitors in the formation of networks of intervisibility. There are groups that can only be understood as such, due to programmed interactions together with staff surveillance<sup>21</sup> (e.g. Botero's Group C, Figure 8). We may call these groups 'programmed', since they are the result of programmed interactions and surveillance. In turn, the other groups may be seen as unprogrammed, which can be further characterised according to the predominance of each kind of link: there are 'unprogrammed' groups in which visitor-visitor links of intervisibility are essential (e.g. San Javier's Group B, Figure 7), other groups where staff surveillance links (staff-visitors) are the essential ones (e.g. San Javier's Group C, Figure 7) and groups where none of the links predominate (e.g. Belén's Group A, Figure 9, and Fernando Botero's Group B, Figure 8). In summary, one can identify four types of group: 1) groups of programmed interactions and surveillance; 2) groups made predominantly of unprogrammed visitor-visitor intervisibility links; 3) groups made predominantly of staff-visitor intervisibility links; and 4) groups that do not have a predominant type of link. The first type of group refers mainly to the use of programmed spaces. The other three types correspond to the use of unprogrammed spaces – that is, spaces that are weakly controlled, working therefore as an extension of public space.

Social groups formed by visitors' interactions in San Javier occur either in spaces strongly controlled by staff surveillance, or in spaces programmed for formal learning. The first type refers mainly to people moving and interacting in the integration core (Figure 7, Group A and 10a), while the second refers mainly to people engaged in socialisation while studying (Figure 7, Groups B and C). Activities related to public use concentrate only at the entrance of the building and do not form groups based on intervisibility. Staff members occupy the most

integrated spaces of the building (Figures 6a and 10a). These spaces are the ones that link different sections in the library. This aspect creates a strongly observed core in the building and it is noteworthy that, considering this integration core consists mainly of [d] type spaces (Figure 11a, picture and spaces 12, 15 and 16), visitors have the possibility of choosing different routes to move around the building. Nevertheless, despite the spatial affordance that allows free choice, staff positions in the network of spaces and social practices establish a structure of supervision of this movement (Figure 7, Group A is type 2). In short, this study indicates that San Javier Library-Park can be considered as a place for access to educational activities only, where social groups are under constant disciplinary surveillance.

Rooms in Fernando Botero Library-Park are separated by 'transition spaces', which simultaneously form the links and barriers between them (Figures 10b and 11b). These 'transition spaces' are stairs and passages that – due to their scale – become separate convex spaces adding steps in between rooms (Figure 11b, photograph and spaces 2, 11 and 21). Spaces 2 and 21 (Figure 11b, photo) are the most representative of this 'bridge' condition: since they are [b] type spaces, their links are crucial to the communication between different parts of the spatial network. In effect, most spaces in the library are connected through [a] and [b] spaces, and the rings of circulation (type [c]) are trivial, covering the same programmatic spaces. In a spatial system formed mainly by [b] spaces, moving and occupying space is based on sequence (Hillier 1996), and we argued elsewhere (Capillé & Psarra 2014) that the position of programmes in a spatially sequential order characterises a spatially strong programming<sup>22</sup>. In Fernando Botero, this sequence conserves social awareness in *communities engaging in similar programmed activity*. Different activities only mix in its lending libraries (both adults' and children's). In all other spaces, uses tend to be related to interactive



learning, particularly when enclosed in programmed rooms. A social group made predominantly of un-programmed interactions (Figure 8, Group A, type 2) occurs in spaces assigned to formal learning (namely the adults' lending library). At the same time, staff surveillance is predominant in spaces where unprogrammed interactions between visitors form groups that are not directly (programmed interactions) or indirectly (unprogrammed interactions in programmed areas) related to an educational content. This is evident in the two social groups formed

in unprogrammed spaces (Figure 8), namely group B ('type 3') – which exposes a situation where staff surveillance is predominant, and group D ('type 4') – which exposes a situation where staff members participate actively with social group formation (particularly through the organisation of meetings and other public gatherings). In other words, visitors go to use computers, attend programmed meetings and engage in artistic courses – activities that take place in the rooms programmed (and controlled) for each one of these uses.

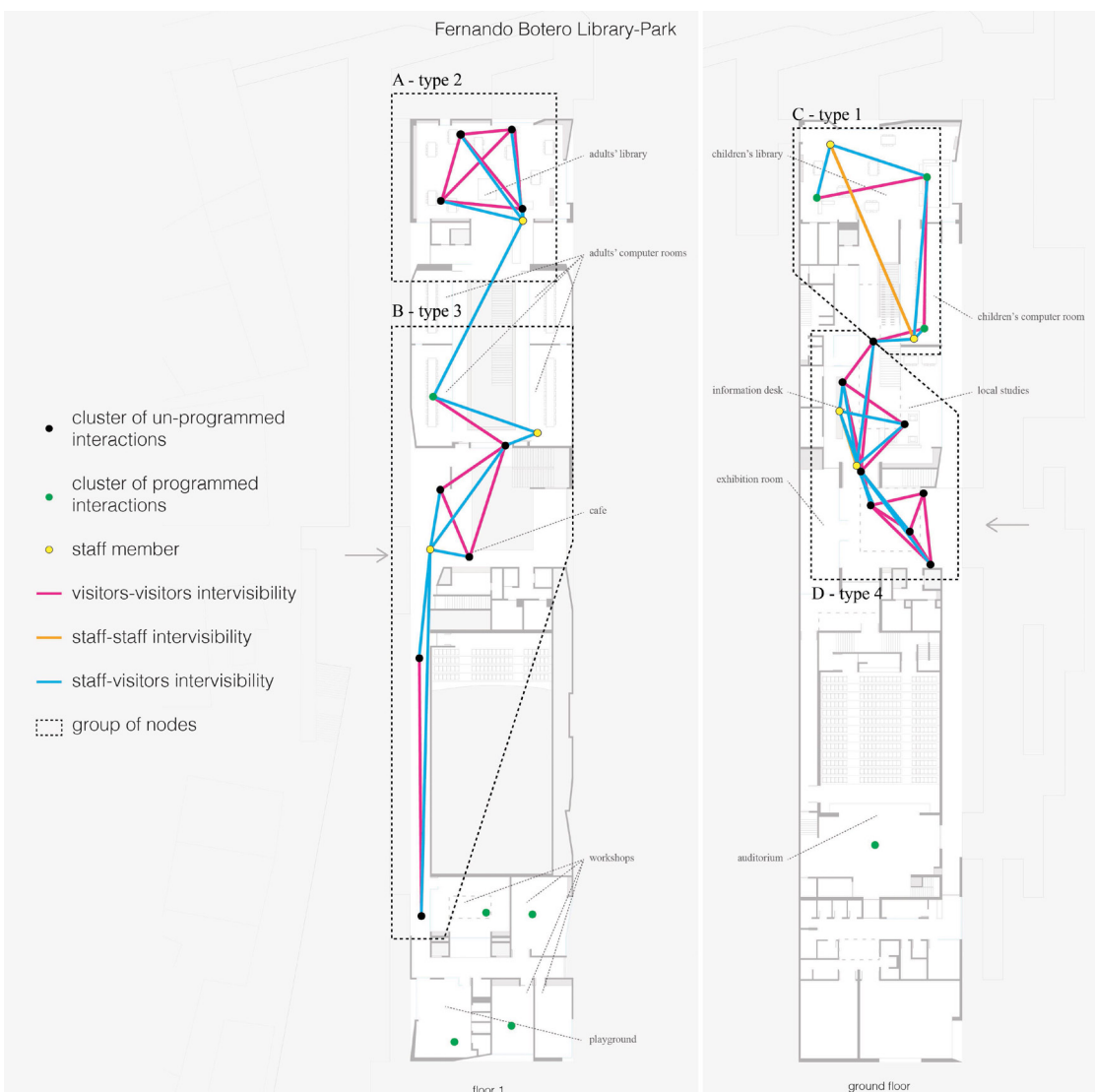


Figure 8:

*“Intervisibility Network” of Fernando Botero Library-Park. Colours of nodes indicate whether they represent a cluster of unprogrammed interaction (black), a cluster of programmed interaction (green), or a staff member (yellow). Links indicate intervisibility between visitors’ clusters of interactions (magenta), between staff members (orange) and between staff members and visitors’ clusters of interactions (blue). Dashed boundaries indicate groupings of nodes based on density and sparseness of links.*

**Notes:**

<sup>23</sup> (group types 1, 2, 3 and 4 defined above)

Belén Library-Park functions as a place that mixes different categories of users in its programmed spaces. At the same time, through its circulation system around the courtyard, it functions as a place mainly used as an extension of public space. Interactions between visitors form two main groups of clusters: one that occurs in the courtyard and another that is located inside the lending libraries and computer facilities. Only one staff member is present in the courtyard, even though it is twice the size of the other spaces – implying that Belén Library-Park works more as a public space than as a learning facility (in terms of social awareness). This first group is situated in the integration core of the building (Figure 10c), which consists of [c] and [d] types of spaces (Figure 11c, spaces 5, 9, 11, 12 and 17). These spaces are not programmed: they form the patio with a central reflecting pool that connects other programmes of the library. It mixes different activities, and through this co-presence emphasises the idea of a more informal type of social awareness. The rings of circulation, the connection to adjacent streets and the absence of surveillance support the formation of a twofold awareness: on the one hand, passers-by become aware of all the activities of the library; and on the other hand, users of the library programmes are constantly in contact with the movement from the adjacent urban spaces. Staff surveillance is only significant in the spaces programmed for activities related to formal learning.

In summary, the spatial distribution of these four types of group<sup>23</sup> is different in each Library-Park, and a close look at the kinds of programmatic labels assigned to their locations exposes another layer of information about each group (Figures 7, 8 and 9, see indication of each group type). In particular, some differences deserve attention with regards to group types 2 and 3. In San Javier and Fernando Botero, groups of type 2 (formed predominantly by unprogrammed interactions between visitors) are found in spaces with a programmatic label that

suggests a particular kind of use – namely lending libraries and reading rooms (Figures 7 and 8). In Belén on the other hand, these type 2 groups are found in unprogrammed spaces, such as corridors and passages. Therefore, we may suggest that these are completely different types of unprogrammed groups: the first are related to the Library-Parks working as places that offer access to formal knowledge (*through* social interaction), while the second are related to the buildings working as places for social interaction. In the first, social interaction is instrumental in the formation of an educated society, following predefined behavioural rules set by programmatic and institutional objectives. In short, it renders society useful to an economy based on educated roles. In the second, on the contrary, social interaction is not associated with a predefined educational end and is only 'useful' in assembling unprogrammed – therefore, unpredictable – social groups. It is therefore remarkable that the groups of type 3 occur in the unprogrammed spaces of San Javier and Fernando Botero. In other words, staff surveillance is predominant in those spaces where unprogrammed interactions between visitors could form groups that are not directly (programmed interactions) or indirectly (unprogrammed interactions in programmed areas) related to an educational content.

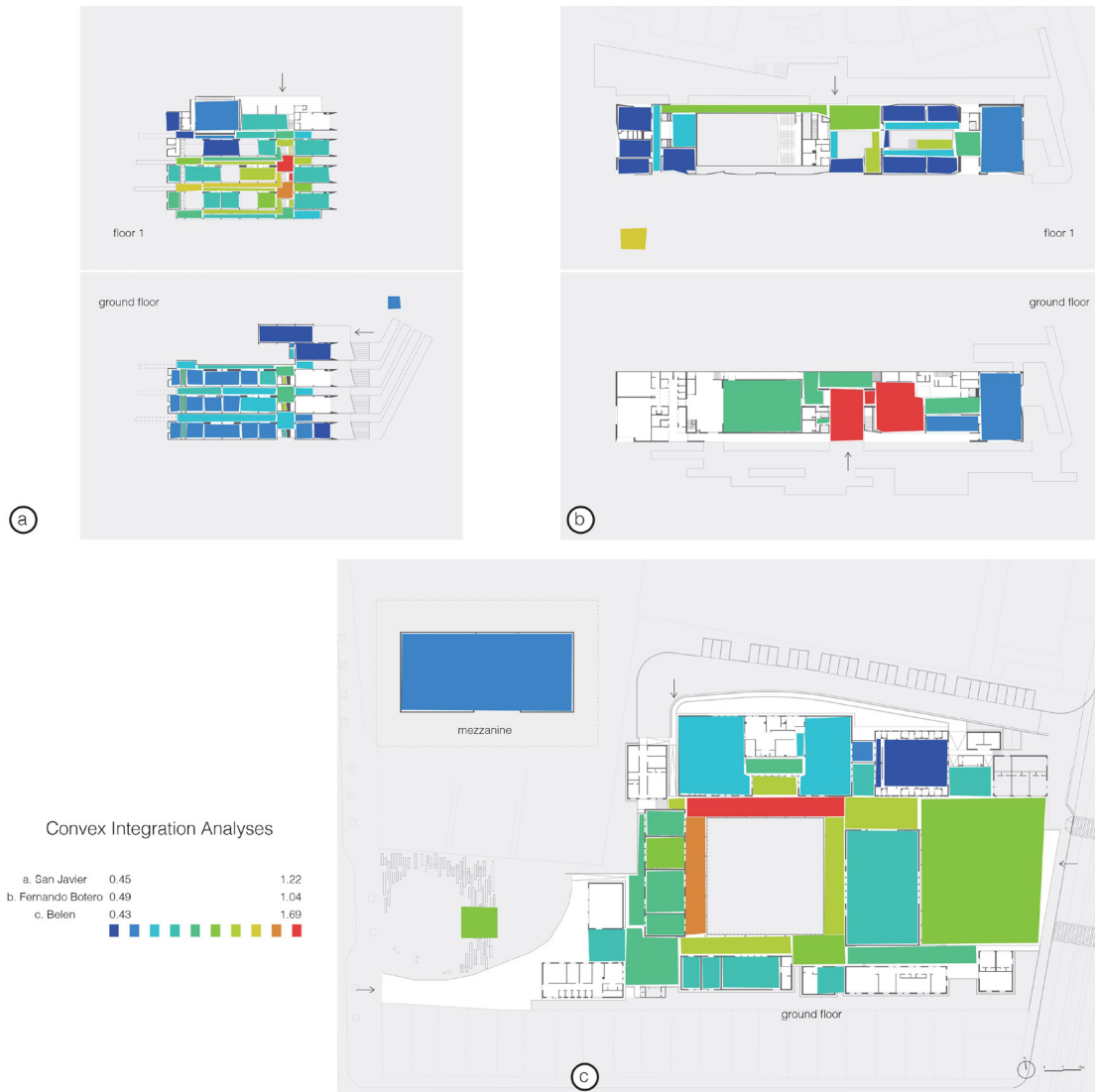


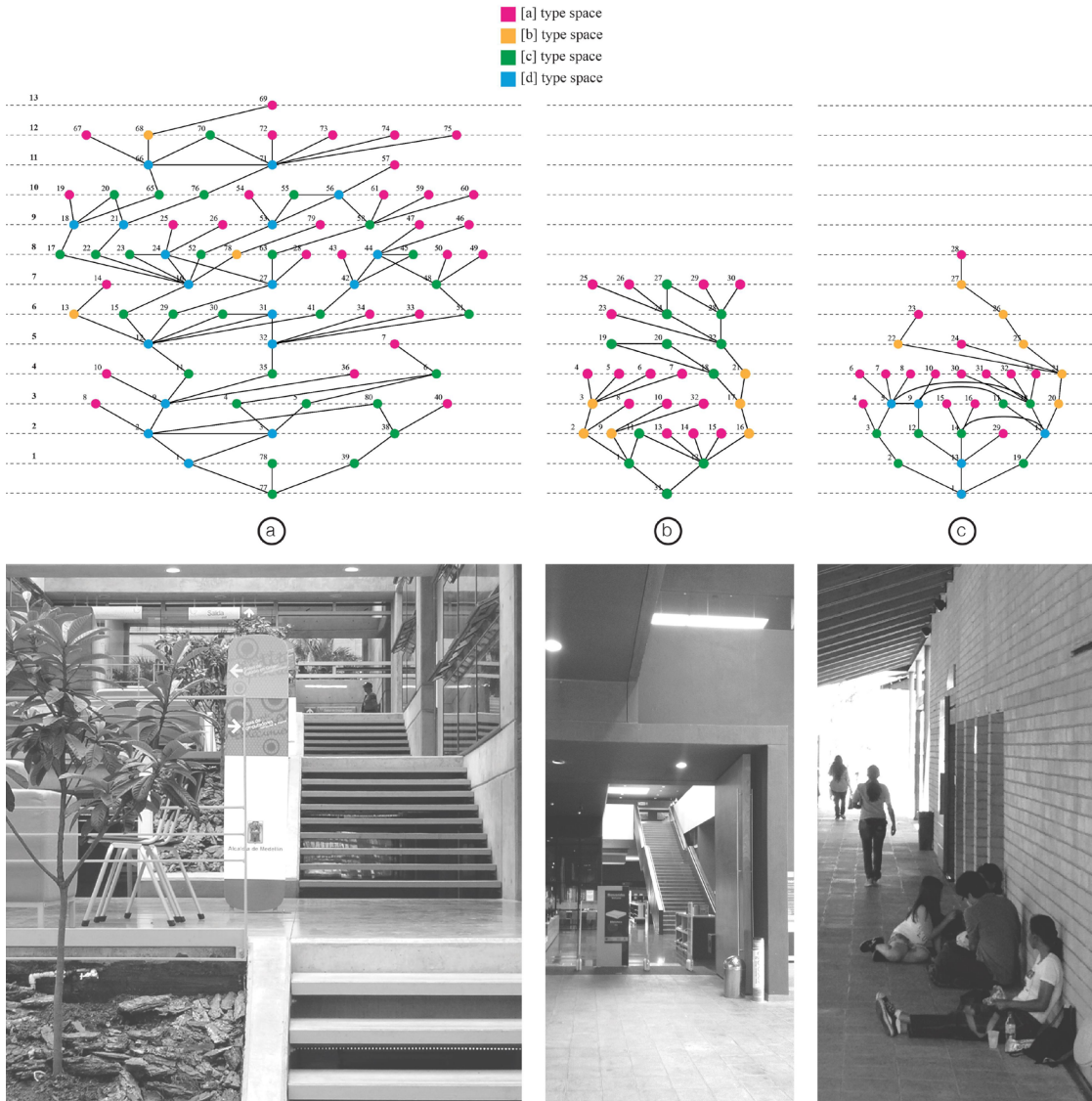
Figure 9:

**“Intervisibility Network” of Belén Library-Park.** Colours of nodes indicate whether they represent a cluster of unprogrammed interaction (black), a cluster of programmed interaction (green), or a staff member (yellow). Dashed boundaries indicate groupings of nodes based on density and sparseness of links. Links indicate intervisibility between visitors' clusters of interactions (magenta), between staff members (orange) and between staff members and visitors' clusters of interactions (blue).

Figure 10:

*Convex integration analysis of (a) San Javier, (b) Fernando Botero and (c) Belén.*





**Figure 11:**  
Justified graph of convex structure of (a) San Javier, (b) Fernando Botero and (c) Belén, exposing [a], [b], [c] and [d] types of spaces (Hillier 1996, pp.247–255).

**Notes:**

<sup>24</sup> As Dovey explains, his work focuses on the constraints of empowerment and liberation in built form (Dovey 2008 preface xi).

<sup>25</sup> The 'power of acting in concert' is a concept defined by Hannah Arendt in her acclaimed work 'The Human Condition' (1998, p.244 first published on 1958). The power of many men acting in concert is opposed to the power of a single entity (sovereignty) – be it one man or a collective entity of nation/state. The former has the capacity to limit the reality of the latter.

**5. Conclusion**

We see two trends with regard to how spatial and programmatic constraints affect co-inhabitation and interaction patterns: on the one hand, space may segregate users through programmatic sectors and room partitions; on the other, it may mix different user groups in unprogrammed areas. This research indicates that the first trend seems to lead towards patterns of use that are strongly defined by programmatic roles. In short, it seems to construct '*strongly programmed buildings*' through spatial distribution of programmes and user groups. Fernando Botero is representative of this first trend. The second trend, however, seems not to lead directly to what the affordances of space suggest: that is, it has been found that the mix of spontaneous encounters brought about by weakly programmed environments might be subjected to the surveillance control of staff. As a result, regarding the distinction between weakly/strongly programmed spaces, the weakly programmed pole may branch into two ends: one which is 'strongly under surveillance' – or perhaps 'strongly disciplined'; and another end which is 'weakly under surveillance' – or perhaps 'highly self-regulated'.

This aspect could only be identified through intense observation studies and fieldwork. In other words, in order to identify how a building works as a mechanism for social relations, it is fundamental to not only look at the nature of transpatial interfaces, nor only at these and the spatial affordances brought about by spatial configuration and architectural elements (virtual communities defined by space), but also at how social practices take place in space forming emergent spatial cultures. This paper indicates that only Belén offers 'highly self-regulated' spatial cultures; while the other two libraries construct 'strongly programmed' (Fernando Botero) and/or 'strongly disciplined' (San Javier) ones.

These findings confirm the ideas introduced by Foucault (1991; 1994), Bernstein (2003) and Dovey (2008) that 'coercive' practices are embedded in how space distributes and structures social relationships. Moreover, all three researchers put forward similar propositions regarding how space may produce the opposite effect of control, that is, empowerment. Foucault (1994, pp.355–456) considers that only through the convergence of three aspects – political practice, social relations and spatial distribution – is a condition of liberty created. For Bernstein (2003), an educational structure of weak framing and classification can only truly function when everyone involved in the educational process (both educators and pupils) is attuned with the purposes of such an educational structure. Dovey is admittedly<sup>24</sup> vague when referring to spaces that may produce the opposite effect of control. He uses the term "places of difference" and suggests that these places would encourage negotiation through the "power of acting in concert"<sup>25</sup>. We believe that the present work advances a small, but perhaps important step in exposing empirically how empowerment takes place in space, particularly considering the case of Belén Library-Park.

Hillier (1996, pp.255–256) argues that systems comprising a combination of [a] and [d] types produce "an emergent form of spatial use" due to "the overlap of movement in situations where movement is functionally neutralised". Our work contributes to this proposition, suggesting that intervisibility between different user groups affects the extent to which activities are 'functionally neutralised'. The present study shows that in the case of public libraries, '[a]-[d] spatial systems' can either contribute to the 'normalisation of behaviours' (e.g. the case of San Javier) or lend support to the emergence of self-regulated spatial cultures (e.g. the case of Belén). In the Belén case, the networks of intervisibility that occur in the unprogrammed areas strengthen the sense that social interaction is not associated with

a predefined educational end. It has been shown that patterns of intervisibility affect the perception of curatorial messages in exhibition layouts (Lu & Peponis 2013). Similarly, intervisibility between different user groups in library spaces construct perceptions of collectivity and social participation (Zook & Bafna 2012). In the case of Belén, social awareness in unprogrammed areas generates a sense that visitors' behaviours are only regulated by other visitors. This subtle 'call for participation' in the organisation of social practices in space, we believe, underpins the formation of a community that finds it habitual to govern itself.

One of the aims of this paper is to set a methodological framework for visualising and analysing the formation of these networks, and investigating their functioning. The analysis we propose does not capture formally defined social groups (such an ethnographic study escapes the scope set by the research questions of this work); nor does it capture the 'field of *probabilistic encounter*' that forms a 'virtual community' (Hillier et al. 1987; Hillier 1989) set by spatial and programmatic arrangements. Rather, it looks at *observed encounters* (in opposition to probable ones) and links them based on *observed co-inhabitation* (in opposition to linking them based on formally defined social groups). In this way, the libraries are described in terms of the networks of co-inhabitation that they generate *through space*. The relevance of such a description lies in the fact that space is the main element that constrains co-inhabitation patterns: in other words, this analysis exposes the role of space in giving structure to these forms of use as a collective whole.

The intention of this work is not to criticise the libraries for changing their original role. Instead, we seek to understand how this role relates to associations and formations of social interaction in the studied buildings. The understanding we try to construct stresses the difference between abstract definitions of what architecture means as a social instrument

of representation (since the Library-Parks Project has invested into architecture as image) and as an actual field of social interaction (which is what we try to measure). The ways in which the Library-Parks Project manifests its intentions through the symbolic use of architecture does not always guarantee what will be realised in everyday practice. It is argued that to empower space and communities to be generative rather than conservative is less about prescribing the use of space (and expressing the symbolic power of buildings), and more about creating the socio-spatial conditions that allow unpredictability to flourish. In this sense, this analysis indicates that environments such as Belén Library-Park support the formation of informal interaction, which is crucial to self-organised communities. In fact, this type of building is perhaps capable of being central to constructing social awareness that surpasses the limits established by the Library-Parks Project – both in spatial and transpatial dimensions.

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