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RESEARCH ARTICLE

Representational Structures as Stances: Examining Relationships to the City Under the Lens of Socio-Spatial Representations

Pierre Dias and Thierry Ramadier

This paper puts spatial cognition to the test of the social representations paradigm, drawing on insights from the positional and structural approaches of representation, to complement existing findings on social groups pre-constructed on the basis of an approach focused on the social cognition of space.¹ We posit the hypothesis that different relationships to urban space and their underlying spatial representations relate to distinct social positions. To confirm this, we developed a quasi-experimental method based on a questionnaire inducing hierarchized mentions of places in Strasbourg, submitted to employees with different statuses in the same institution, the University of Strasbourg. Five spatial representations are identified using hierarchical agglomerative clustering and described in prototypical analyses. Relationships to urban space are also investigated using an analysis of the functional and/or evaluative dimensions of representations. The sociological characteristics associated with each type of representation support the general hypothesis of a structural homology between spatial representations and social positions. The structure of the representational content (places) of Strasbourg indeed varies according to the socio-occupational status, level of education and age of the agents of the University of Strasbourg. The relationship to space of members of the lower social classes is instrumental, whereas that of the most economically and culturally privileged is symbolic/aesthetic. The salient features of spatial representation and their functional and/or evaluative dimension are the cognitive components of a stance that inseparably relates to the individual's social position.

Keywords: representation; urban space; social position; functional; evaluative; structural homology

Introduction

Starting from Jodelet's argument (1982) that representations of urban space are social representations, we ask here whether these representations are mainly cultural or social constructs or both cultural and social constructs. We consider the contributing factors in the elaboration of different conceptions of a large-scale geographical space: is this construct based on information, perceptions and evaluations that are exchanged and circulate between the persons and groups that an individual frequents from a given place (cultural construction), or do the relationships between social groups, and by extension the social structure within which the individual is also situated, inform this internalization of geographical space (social construction)? In other words, does the construction of spatial representations reflect a primarily geographical positioning, whereby social and environmental experiences that circulate within a group construct shared representations, a social positioning, affecting most social and spatial relationships, or a

double position in the person's environment (a geographical positioning that may or may not match their position in another environment – social space)?

To our knowledge, geographical space has never been questioned in these terms – under various approaches it is often considered either (1) as a socio-physical context that informs social interactions in situ (the spatial analysis approach in geography) or (2) as an object as such, but analysed from the distant point of view of intersubjective knowledge and communication (the social approach to geographical space). We believe it is important to combine the two approaches and consider both individual engagement vis-à-vis geographical space (Ramadier & Moser, 1998) and the sociological roots of spatial representations (Montlibert, 1995). This double positioning has been envisaged in sociology but focused on the analysis of environmental significations (i.e., conceptual evaluations and representations of places) rather than spatial representations (i.e., the ways in which places are organized and arranged in relation to each other). By jointly examining spatial representations and environmental significations (Ramadier & Moser, 1998) from the angle of social and environmental psychology, we will be able to establish

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whether spatial representations are the result of a double positioning, both social and spatial.

We believe conducting fieldwork is important, in order to avoid merely studying a generic object among a class of objects. We consider it best to study a concrete, everyday object for the individual, which is done infrequently in the study of social representations (Clémence, 2001). Methods have been devised in environmental psychology, such as 'quasi-experiments' (Matalon, 1988), to put this investigative principle into practice. Thus, rather than working on the 'city' in general as an object, we prefer to focus on a very concrete spatial category (a specific street, neighbourhood, municipality or urban area – here: Strasbourg, France). While this might appear to raise the risk of reintroducing the limitations of monographic studies, it is possible to avoid the pitfalls of idiosyncrasy by fostering engagement among the respondents during the data collection process. Representations are reconstructed based on what spatial features are worth to the individuals who mention them, which is an important principle of social cognition (Beauvois et al., 1987), instead of seeing them for what they are (the cathedral, a particular square, street, etc.), as is often done in spatial cognition, as a social group's 'mental map' is very often compared to the topographical map rather than to the mental maps of other groups. Another novel aspect in our approach consists, as in the geographical dimension, in refraining from indulging in an intellectualized elaboration of social positions. Instead of defining social groups on the basis of scholarly indicators derived from a general social structure (for instance, defining the upper class on the basis of socio-occupational status), we consider the different professional statuses that exist within the same institution, i.e., within the interviewee's professional world. By doing so, for instance, we avoid comparing factory workers with the foremen in other factories, employees in public organizations with managers in private companies, etc.

Our objective is to understand individuals' relationships to space based on the relation between their spatial representations and their social positions. Introducing the structure of social relations into the analysis of cognitive representations of geographical space entails embracing the general hypothesis of a correspondence between cognitive and social structures (Durkheim & Mauss, 1903; Bourdieu, 1992). Testing this hypothesis on representations of urban space is ultimately this research's main original contribution; doing so requires combining the positional approach of social representations developed by Doise (1992) and the structural approach proposed by Abric (1994) – we will return to this shortly.

Only by drawing on this set of theoretical and methodological foundations will we be able to establish to what extent the relational system of social positions contributes to the construction of spatial representations and to the dynamic of the constant adjustments between geographical and social positions.

Theoretical approach

Drawing on one of the founding ideas on social representations – namely that representations are in conflict with one another (Moscovici, 1961), we will seek to show that

representations of geographical space are based on local relationships between different positions in social space. In that sense, the aforementioned double (spatial and social) positioning reflects the relation between cognitive processes and social structures whose expression (representations/significations and practices) constitutes the cultural content perceived and experienced by individuals. This means the opposition between culture and position is an impasse, in the sense that it puts different levels of analysis into play. According to the categorization by Doise (1982), culture pertains either to an intra-individual level of analysis, as in the hypothesis of 'cognitive styles' (Evans, 1980), an inter-individual level, when communication and the circulation of information are emphasized (Barker, 1968; Jodelet, 1982), or an ideological level, when references to collective memory are made (Haas, 2004) but rarely to a positional level, as we show in the brief history of scientific conceptions on spatial representations which follows.

From the accumulation of experiences...

Analyses on the perception and representation of geographical space tend to seek an explanation that focuses either on the physical characteristics of space in isolation or on the characteristics of individuals in isolation. With the exception of Halbwachs (1941), early studies on 'mental maps' (Tolman, 1948) indulge in one of those two approaches. This is in part because these studies sought to show that the mental arrangement of spatial knowledge is an individual learning process. For instance, research by Lynch (1960) evidenced the effects of urban forms on the mental arrangement of spatial configurations of the city, reflecting a universalist, bio-physicalist approach to spatial cognition (Jodelet, 1982). Conversely, research by Canter and Canter (1971) on adults and Lee (1976) on children compared spatial representations according to modes of transport, emphasizing individual characteristics and experiences, focusing on explaining the diversity of representations. In both cases, social significations associated with the content and structure of these 'mental maps' are rarely addressed. These 'maps' are compared to geographical maps, used as 'objective' references to analyse 'biases' in the distribution and spatial configurations of the places under discussion. Interdisciplinary exchanges between psychology and cognitive geography (Down & Stea, 1977; Garling & Golledge, 1993; Kitchin & Blades, 2002) largely contributed to the development of a brand of 'psychological geography' (Hardy, 1939) that raised questions as to the emphasis on individual rather collective dimensions at a very early stage (Demangeon, 1940; Halbwachs, 1941). Since then, the social dimensions of the individual (and of these 'subjective maps') have been primarily conceptualized on the basis of the person's situation (for instance, whether or not they have the economic resources necessary to own a vehicle and represent and practice their everyday space based on their network of relations, whose geographical scope is known to differ between social groups, etc.). In other words, social dimensions are addressed as individual experiences, hinging on social and cultural aspects of individual lives. The socio-historical context of these experiences, which may also serve as the basis for defining social living conditions, is neglected.

Yet, we may also form a view on a city, a neighbourhood, a street, etc., based on ‘indirect experiences’, such as an actual map, a film, a novel, a friend’s story, rumours, etc. In each case, this information is based on a point of view and reflects the individual’s social and cultural life. It goes far beyond sensory experiences and interactions between individual and milieu. The significations associated with places, which Lynch (1960) disregarded precisely because he lacked the conceptual tools to study them, cannot be neglected in our efforts to understand how ‘mental maps’ are built.

... to the social construction of representations

Geographical space and its representation in the form of social constructs and socially significant objects were analysed at a very early stage in the history of sociology (Halbwachs, 1909, 1941; Lefebvre, 1968). However, ‘urban sociology only rarely studies cities; it analyses phenomena that occur in cities’ (Löw, 2015: 3). Consequently, the processes and topological principles of social groups (i.e., the arrangement of the constitutive elements of their geographical knowledge in a spatial image) are rarely analysed. In psychology, the ecological model has brought some complexity into the analysis of the impact of individual experience in the construction of spatial representations. Still, the processes that alter the influences of places have remained a blind spot (Gärling et al., 1984). The concept of behaviour setting (Barker, 1968) remains a physicalist one, as is that of affordance (Gibson, 1979). The topological rules used to find one’s way in space have especially been studied with a culturalist approach (Cornetz, 1909; Hund et al., 2012), in what is now known as ‘wayfinding studies’. Yet a small body of research on the social representations of a geographical space has yielded insights that complement those on spatial cognition in environmental psychology. The structure of spatial representation is now analysed as a social construct – no longer limited to individual experiences, but linked to ideologies and collective memory (Jodelet, 2013). There is no longer, on the one hand, a geographical content, and on the other, a mental arrangement of this content. The content of representation is elaborated socially and contributes to the construction of its spatial organization (Ramadier & Moser 1998; Ramadier, 2010).

It is first worth noting that the three main models of social representations have taken urban space as an object of study. The first so-called ‘sociogenetic’ model (Moscovici, 1961) is the basis of the social representations paradigm. Research by Milgram and Jodelet (1976) on Paris and, more recently, by De Alba (2002) on Mexico, Hass (2004) on Vichy or Felonneau (1994) on Bordeaux, are all based on the socio-cognitive principle of focalization, which is specific to this model and is broken down into two processes: anchoring (the object’s place in the thought system) and objectivization (whereby the object is simplified and naturalized). Ultimately, this model is based on the general idea of a selective treatment of information, which depends on the group’s core perspectives and beliefs. The structural model (Abric, 1976, 1994) detailed the objectivization process. It is based on the idea that not all the elements of representation have the same cognitive status. Some are central and unconditional, orient

the object’s signification and organize representation. Others are peripheral, more operational and conditional, and serve as interfaces between the ‘central core’, whose construction is based on the group’s social history and the concrete situation in which the representation is being developed. Studies by Abric and Morin (1985) or Marseille and by Marchand (2005) on the comparison of the central cores of Rennes and Le Havre implement this analytical model. Lastly, the socio-dynamic model (Doise, 1992) further specifies the anchoring process. It focuses investigations on the paths and reasons leading to the attribution of different significations to the same object. This model proposes to introduce social relationships, stances and the socio-cognitive conflicts stemming from social positions as constitutive dimensions of the anchoring process. Within this theoretical framework, only one study that dealt indirectly with representations of two places (the region of origin and the future workplace among children schooled in Switzerland) showed that these representations depend on geographical trajectory and on the parents’ social position (Deschamps & Doise, 1988). A fourth model also deserves mention – the dialogical model (Markova, 2007), which emphasizes the relationship to the Other in the construction of representations. However, to our knowledge, no studies using that model have so far focused on geographical space as an object of study. Like the socio-dynamic model, it considers the individual’s social engagement as an important basis of representational processes. Its main difference lies in the fact that its analysis zooms in on the inter-individual level, whereas the socio-dynamic model favours the positional level.

Two hypotheses on social positions and spatial representations

The socio-dynamic model of social representations thus remains the most compatible with the general socio-cognitive hypothesis of a match between cognitive structures and social structures. We investigate this hypothesis by drawing on a combination of this model and of the structural model of social representations, whose methods will be particularly helpful here.

Some studies, it should be mentioned, have already drawn jointly on the structural and socio-dynamic models of social representations to evidence a connection between social position and representation. This is the case of analyses on representations of friendship (Tafari & Bellon, 2001) and on the economy, with an emphasis on the link between social mobility and changes in representations (Viaud, 2003). Can we also observe this when geographical space is under study – particularly when looking at a space within a city that is very concrete for the individual, in the sense that it is their everyday environment?

Based on these developments, we propose a first operational hypothesis: the cognitive structure of the places involved in the representation of a city effectively matches the individual’s position within his socio-occupational organization located in that city.

Studies closest to urban sociology showed at a very early point that ‘images of the city’ vary depending on the individual’s position in social space (Ledrut, 1973). However, as in the study by Tafari and Haguel (2009) on the social

representations of Aix-en-Provence and Marseille, the concept of image relates to chiefly symbolic representations, supported by environmental significations – not spatial representations of the city, supported by places: ‘The image of the city does not so much express the city as it does man’s overall relationship to the city’ (Ledrut, 1973: 22). Still, these studies show that relationships to urban space are functional and pragmatic for working-class individuals, and hedonistic and aesthetic for members of the more privileged social classes. This distinction between functional and symbolic relationships to space has been regularly restated, in ethnology (Lévi-Strauss, 1955), sociology (Bourdieu, 1980) and social psychology (Jodelet, 2013) alike.

Where Ledrut (1973) established a link between these two types of social relationships to the city and ideological currents of urbanism (functionalist and modernist vs. naturalist and culturalist), we connect them with the two main cognitive dimensions of the constitutive elements of the social representations of an object. Indeed, the structuralist approach to social representations first evidenced two types of peripheral elements: functional and evaluative elements (Flament & Moliner, 1989). The central elements of representations were then also attributed these two cognitive dimensions (Rateau, 1995). The presence of one dimension or the other depends on the person’s relationship with the object (Abric & Tafani, 1995). As a result, a representation may rest either on an essentially functional or on an essentially evaluative relationship to the object, or on a mixed relationship, both functional and evaluative (Rouquette & Rateau, 1998).

In light of research in urban sociology and in social psychology on social representations, we posit the following second operational hypothesis: spatial representations based on a functional relationship to the city characterize individuals in more socially dominated positions; where representations based on a more evaluative relationship to the city characterize individual in the more dominant positions.

Method

Population and fieldwork site

Our population is composed solely of agents of the University of Strasbourg. This sampling choice has the benefit of introducing variations in the social positions of interviewees within the same institution, which means that the entire population shares the same place of work, which is known to be a particularly structuring factor in the relationship to the city of people in employment (Carpentier, 2010). The place of residence, on the other hand, is left to the segregation dynamics at work in the

city of Strasbourg, as this geographical anchoring variable contributes to the definition of social position. This enables us to analyse explicitly hierarchized social groups, i.e., people whose social position is not a theoretical construct, but the reflection of social statuses and clearly defined professional positions. The entire population thus also works for the same institution (the University of Strasbourg). This choice, inspired by the quasi-experimental approach to fieldwork (Matalon, 1988), helps us steer clear of the usual operationalization of social positions, whereby socio-occupational statuses relate to a broader (theoretical) social space as opposed to a localized social space (relevant to one social field).

The 5,234 agents of the University of Strasbourg (2,511 lecturers and lecturers-researchers, 2,230 library staff, engineers, administrative staff, technicians, service and health personnel (hereafter BIATSS – the French umbrella name for these categories of staff) and 493 contractual employees) were invited to participate in the study. A total of 1,092 responded, among whom 681 responses were used to build a database containing all the information necessary to analyse representations. It should be noted here that we did not aim at building a representative sample of the parent population. We sought to stratify a socially heterogeneous sample sharing the same spatial and socio-occupational anchoring, in order to be able to compare different spatial representations, and more broadly different relationships to the city.

Among the 681 agents considered in the study (see **Table 1**), there were 36.42 percent of lecturers-researchers (in the broader sense, including holders of the temporary assistant lecturer status and post-docs), 54.04 percent of library staff, engineers, administrative staff, technicians, service and health personnel (BIATSS) and 5.28 percent of students (PhD students and interns). The mean age of the sample was 43, broken down into 34.65 percent of men and 64.7 percent of women. Leaving out the 36 students, 524 agents had permanent positions (i.e., 81.24 percent of these individuals) and 114 were employed on a contractual basis (17.67 percent). Seven agents (1.09 percent) did not provide that information.

Study tools and design

These individuals responded to a self-administered online questionnaire sent to their work email from the central university administration’s mailing list. This ensured that responses were anonymous and voluntary. The first instruction presented the context of our research and the rules for participation: ‘[...] We would like to ask you to take part in a

Table 1: Breakdown of the 681 agents considered in the study according to sex and professional status.

	Men	Women	Non-responses	Total
Lecturers-researchers	119	127	2	248
BIATSS	88	279	1	368
Students	17	19	0	36
Non-responses	12	16	1	29
Total	236	441	4	681

study on the city and urban mobility [...] Participation will take around 15 minutes of your time, and is on a strictly confidential and voluntary basis; no personal data will be recorded, and your responses will accordingly remain anonymous. Data will be analysed for the purposes of scientific research only.' Respondents were then directed to the questionnaire, which was divided into two main sections.

The questionnaire began with two questions on spatial representations of Strasbourg, leaving the geographical boundaries of the city to the respondent's discretion. The first question used a technique of hierarchized mentions (Abric, 2003), in which individuals spontaneously name the first five places that come to mind in response to the inducing term 'Strasbourg'. These places are then hierarchized by the respondent according to the importance they attribute to them in their representation of the city, in order to discern the structure of representations through prototypical analysis (Vergès, 1992) and spot salient elements. The second question requested additional information on the importance of physical and affective dimensions associated with each previously mentioned place (evaluative dimension) as well as the importance of the function and experience of each place (functional dimension). Likert scales were proposed for the following four questions, with four possible responses for each ('No, not at all', 'No, not really', 'Yes, a little bit', 'Yes, very much so'): 'Why do you know this place? To you, are the characteristics of this place: (1) physical (size, type of materials, colour, layout, etc.); (2) related to your own experience of it (your regular or exceptional use of the place); (3) functional (you define the place according to the function it fulfils, to what it is used for in general); (4) related to your feelings/emotions (positive or negative)'. As a result, all the features of the collected spatial representations were associated with four characteristics (physical, experience-based, functional and affective), graded 1 to 4 (respectively: not at all, not really, a little, very characteristic).

The second section of the questionnaire consisted of twelve socio-demographic questions designed to identify the respondents' social positions, by ascertaining the volume and structure of their economic and cultural capital (Bourdieu, 1979a). The first two questions pertained to sex and age. The third asked for the respondent's highest degree obtained, to measure their institutionalized cultural capital (Bourdieu, 1979b). A choice was offered between four levels of study based on the national statistics institute Insee's training levels² (no degree, two to four years after high school graduating degree, five years, over five years). A free entry field was also made available to provide additional information on any training level or degree that did not match the proposed categories. Other questions concerned professional status: lecturer-researcher, BIATSS or student; civil service rank (A, B or C) and type of contract (permanent or not). When combined, these data informed us on position within the institution and economic capital. The remaining questions probe other factors that may have implications on the respondents' daily relationship to the city. They are asked to indicate the number of individuals in their household (themselves included, mentioning the number of children

under and above 14), their marital status (in a relationship or single), their place of residence and time spent residing in Alsace on a gradient of five temporal modalities from 'since I was born' to 'less than a year'.

Results

We first sought to single out different representations of space, by identifying groups of representations, in order to then establish whether they are also characterized by social positions (instead of starting with social positions to analyse differences in their representations, which is how most studies proceed). The goal was to test our general hypothesis that the cognitive structure of representations closely relates to the structure of social relationships. These groups included individuals sharing the same structure of spatial representations of Strasbourg – i.e., they attributed the same importance to the same places. Our corpus of hierarchized mentions is made up of 3,140 associations, with 147 places mentioned 21 times on average.

Given the high number of variables to consider, we first conducted a principal component analysis (PCA) and then used hierarchical agglomerative clustering (HAC) on a smaller number of less strongly correlated variables (Lebart et al., 2000), to identify groups of representations (or 'cognitive groups'). To do this, following the prototypical analysis method (Vergès, 1992), we selected places mentioned more frequently than the average of 21 times. They account for 81.78 percent of all mentions in the corpus; i.e., 30 different places.

PCA was performed based on ratings of the importance attributed to the 30 places most often mentioned by respondents. For each individual, places not mentioned were rated 0 – and considered the least important. Other places were rated 1 to 5, from 'not very important' to 'very important', according to the individual's rating. Following this step (see **Figure 1**), PCA eigenvalues suggest retaining the first four factors (20.68 percent of the total variance).³ The first factor is importance of touristic spots vs. importance of the places of everyday life. The second is geographical surfaces vs. geographical points. The third is places known by city residents vs. idiosyncratic places (specific to the individual), and the fourth contrasts places with dissimilar functions.

HAC was performed on these four factors, using Ward's method on the 681 respondents, based on the coordinates of the four factorial axes of the PCA.

The HAC results evidence five groups of spatial representations of Strasbourg (see **Figure 2**), whose breakdown is as follows: the first group represents 23.79 percent (162/681) of individuals in the sample, the second represents 34.07 percent (232/681), the third represents 14.98 percent (102/681), the fourth represents 11.89 percent (81/681), and the fifth represents 15.27 percent (104/681). This appears to be the most statistically sound breakdown, as it precedes a significant loss (or gain) of interclass inertia. This division into five groups is also numerically balanced.

To identify the content and structure of these groups of spatial representations, we performed a prototypical analysis (Vergès, 1992) for each of them, aimed at evidencing salient features. We cross-checked average frequency and

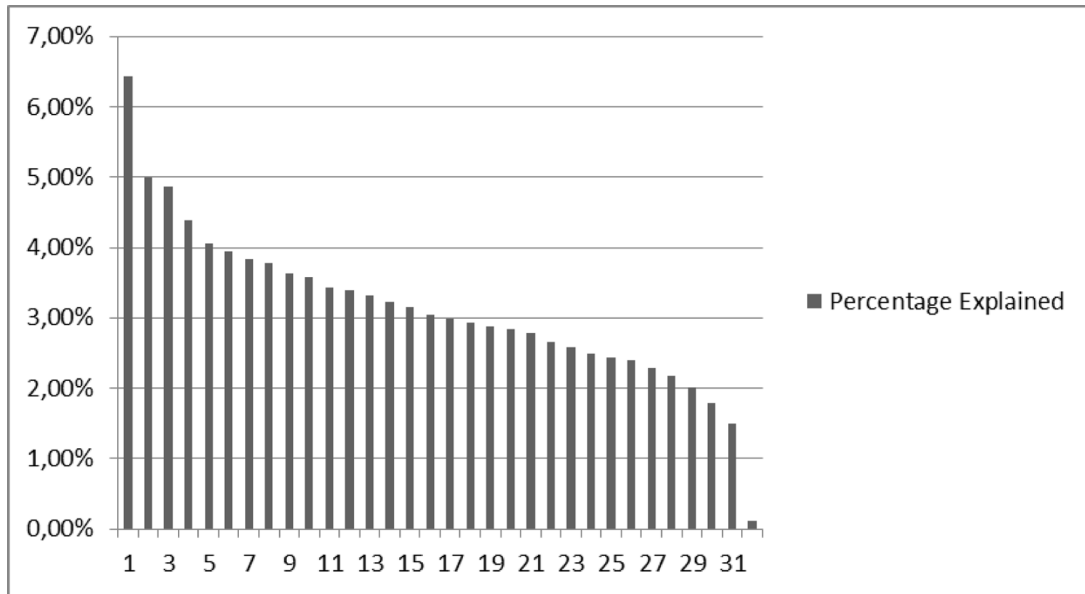


Figure 1: Explained variance for each PCA axis on representational structures.

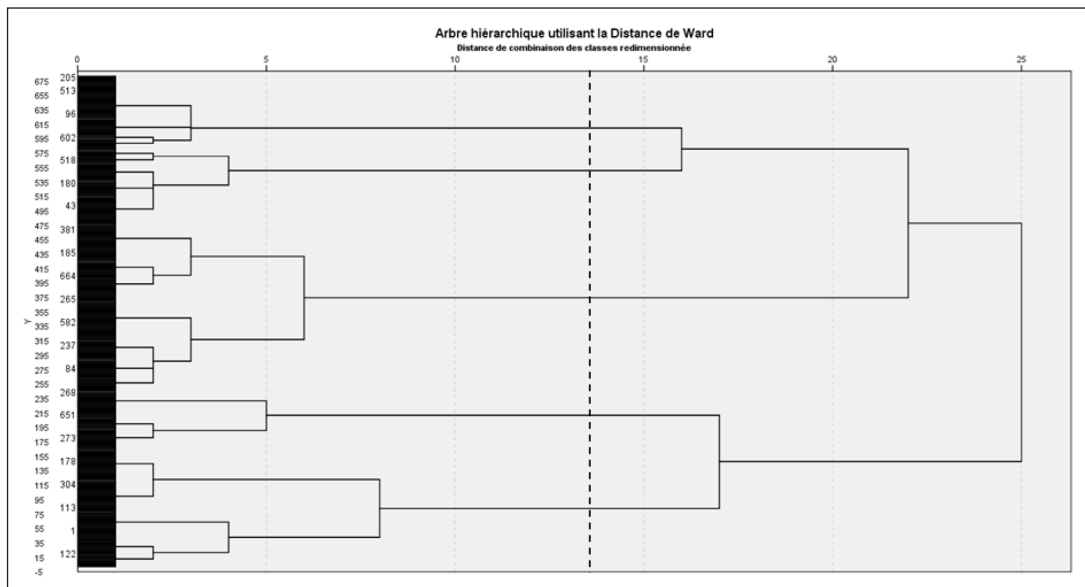


Figure 2: HAC tree based on the first four axes of PCA on representational structures.

average rating of places so as to only retain the most salient features of the representation in the analysis (see **Table 2**), mentioned by more than 10 percent of group members (Dany et al., 2014) and whose average rating of importance is below the overall group average (Abric, 1999).

Content and structure of spatial representations of Strasbourg

In the first group (frequency above or equal to 16 and average rating below 2.95), we observed five salient places suggesting an importance attributed to everyday life. These places are related to work (train station, university, hospital), residence (Krutenuau), shopping (city centre, Krutenuau) or services (hospital, train station, city centre). The group appears to be characterized by its **instrumental spatial representation of Strasbourg**.

In the second group (frequency above or equal to 23 and average rating below 3.64), the co-presence of eight salient

places projects a touristic, stereotypical image of the city. For instance, the Cathedral, the Petite France neighbourhood, the European Parliament and the Council of Europe are architectural symbols of the city, very often visited for their local and European character (the Strasbourg urban area has recently renamed itself Eurometropolis of Strasbourg). Likewise, the other places are featured in touristic circuits due to their major architectural and historic appeal. The group is overall characterized by a **stereotypical socio-spatial representation of Strasbourg**.

In the third group (frequency above or equal to 10 and average rating below 3.16), we found eight salient places revolving around leisure and recreation. All of these places are pedestrian spaces bordered by businesses (shops, restaurants, bars) or green spaces. They all lend themselves to lounging, strolling or spending some time on the premises. The group is characterized by what we call a **recreational spatial representation of Strasbourg**.

Table 2: Salient places in the five spatial representations derived from HAC.

	Salient places	Frequency of mentions	Average rating of importance
Group 1 Instrumental representation	Train station	57	2.32
	University of Strasbourg	56	1.52
	City centre	42	2.21
	Krutenau	22	2.6
	Hospital	16	2.75
Group 2 Stereotypical representation	Cathedral	229	1.55
	Petite France	166	2.75
	Place Kléber	89	3.56
	European Parliament	77	2.61
	University of Strasbourg	43	2.88
	Orangerie	39	3.56
	Train station	37	3.62
	Council of Europe	23	3
Group 3 Recreational representation	Place Kléber	61	2.69
	Parc de l'Orangerie	45	2.69
	Cathedral	37	2.81
	Place de la Cathédrale	32	1.53
	Petite France	31	2.97
	Campus Esplanade	16	2.37
	Place des Halles	15	2.47
	University of Strasbourg	11	2.27
Group 4 Neighbourhood-based representation	Esplanade	72	2.12
	Cathedral	39	2.97
	Place Kléber	36	3
	Train station	27	2.89
	Meinau	24	2.65
	Krutenau	22	3.04
	Cronenbourg	14	2.36
City centre	13	2.77	
Group 5 Node-based representation	Cathedral	77	2.17
	Place Kléber	77	2.18
	Train station	40	2.37
	Place de la République	28	2.93
	Place de l'Homme de Fer	25	3.04
University of Strasbourg	18	1.94	

In the fourth group (frequency above or equal to 8 and average rating below 3.21), prototypical analysis also evidences eight salient places. We noted that over half (5 out of 8) are neighbourhoods. These include central neighbourhoods, such as Esplanade and Krutenau, where a majority of students reside, and peripheral neighbourhoods, such as Meinau and Cronenbourg, featuring a mix of individual homes and large estates. In this group, spatial

cognition chiefly hinges on the geographical type of place (Lynch, 1960), reflecting a **neighbourhood-based spatial representation of Strasbourg**.

In the fifth group (frequency above or equal to 10 and average rating below 3.22), salient places are all geographical nodes (Lynch, 1960), meaning urban spots located at the intersection of several directions, rather than neighbourhoods (surfaces) or streets or limits (lines). Half (3 out of 6)

Table 3: Average ratings for the characteristics of salient places in the five representations of Strasbourg.

	Evaluative dimension		Functional dimension	
	Physical	Affect	Use	Functionality
Instrumental representation	2.64 (0.08)	2.49 (0.08)	3.67* (0.05)	3.58* (0.05)
Stereotypical representation	3.32* (0.04)	2.84 (0.04)	2.74 (0.04)	2.89 (0.04)
Recreative representation	3.19* (0.06)	2.89 (0.06)	3.16* (0.06)	2.99 (0.06)
Neighbourhood-based representation	2.5 (0.07)	2.42 (0.07)	3.48* (0.05)	3.17* (0.06)
Node-based representation	3.16* (0.06)	2.65 (0.07)	3.25* (0.06)	3.10* (0.06)

Legend: Average (Standard deviation).

Rating: * $p < .01$.

Table 4: Socio-demographic background of individuals for each representation.

	Relationship to the city	Status	Contract	Education	Age	Sex
Instrumental representation	Functional	BIATSS B and C	Permanent	High school or below	36–50	F
Stereotypical representation	Evaluative	Lecturers-researchers	Permanent	>HS+5	>50	M
Recreational representation	Mixed Practical	BIATSS B and C	Permanent	>HS+5; HS and below	36–50	F
Neighbourhood-based representation	Functional	BIATSS A	Permanent	>HS+5	>36	M
Node-based representation	Functional Practical	BIATSS A, B and C	Non-permanent	HS+2 to HS+5	< 36	F

are centrally located squares. Also noteworthy is that the two monuments mentioned (Cathedral and train station) both lend their name to the squares where they are located (Place de la Cathédrale and Place de la Gare). We call this group's representation a **node-based representation of Strasbourg**.

Functional and/or evaluative relationship to the city

A description of the characteristics associated with these places (see **Table 3**) tells us to what extent spatial representations of Strasbourg are based on an evaluative relationship (considering the average ratings attributed to physical and affective dimensions) and/or a functional relationship to the city (considering the average ratings attributing to dimensions of use and functionality).

The average ratings associated with the characteristics of salient places suggest that each group of spatial representations has a different relationship to space.

Two groups display a strictly functional relationship to space: in the instrumental representation ($F(1.183) = 128.30$, $p < .01$) and the neighbourhood-based representation of the city ($F(1.245) = 100.39$, $p < .01$), the functional dimension largely prevails over the evaluative dimension. In both

groups, average ratings are higher for use and functionality than for physical and affective dimensions – respectively ($F(3.55) = 91.99$, $p < .01$) and ($F(3.73) = 67.62$, $p < .01$).

In the so-called recreative representation group, the functional dimension is not more important than the evaluative dimension ($F(1.244) = 0.16$, *ns*). Salient places are characterized by higher average ratings on both physical and use dimensions ($F(3.73) = 5.44$, $p < .01$). This arguably reflects a practical relationship to urban space. Likewise, in the node-based representation group, average ratings are higher on the physical dimension, use and functionality ($F(3.77) = 19.76$, $p < .01$). Here, salient places have a significantly greater functional dimension ($F(1.256) = 11.4$, $p < .01$). Overall, the two groups draw on the most practical aspects of the evaluative (physical characteristics) and functional (use) dimensions of places, if not on all functional aspects.

Lastly, in the stereotypical representation group, the relationship to space is symbolic and evaluative. Physical characteristics are given higher average ratings than the others ($F(3.21) = 47.34$, $p < .01$). In other words, this representation is characterized by an evaluative dimension that largely prevails over the functional dimension ($F(1.698) = 38.08$, $p < .01$).

Social position of 'cognitive' groups

The last analysis addresses the sociological characteristics observed in each of the five groups of respondents, in an attempt to identify the rationales and socio-spatial stakes associated with these spatial representations of the city. In order to do this, we describe the individuals' different types of capital as well as other related social characteristics liable to complement this analysis in positional terms (see **Table 4**). For instance, the age and sex of respondents are strongly correlated to indicators on economic capital (the older respondents tend to be better paid and have more permanent positions), cultural capital (education, measured based on the highest degree, is closely related to the respondent's job but also to age and sex) and symbolic capital (under the current social structures, men hold the most highly valued positions in their field).

We also observed that each of these groups is distinguished by its members' social position in the institution.

The distribution of respondents according to professional status shows significant differences between the five groups of spatial representations ($X^2(8) = 18.32$, $p < .05$). The groups whose representations of the city are instrumental or recreational are characterized by an over-representation of BIATSS staff belonging to categories B and C (respectively 34.03 and 41.38 percent). The stereotypical representation group includes a majority of lecturers-researchers. The neighbourhood-based representation group shows an over-representation of category A BIATSS staff (35.62 percent of individuals in that group). Lastly, the node-based representation group has an over-representation of BIATSS staff regardless of their category (35.29 percent of these individuals are category A and 31.77 percent are category B and C). Yet, it also includes 32.94 percent of lecturers-researchers, which ultimately makes it a particularly heterogeneous group in terms of professional statuses.

Types of contract (permanent or non-permanent) are also unequally distributed among 'cognitive' groups ($X^2(4) = 17.76$, $p < .01$). All groups are characterized by an over-representation of individuals with permanent positions (systematically above 80 percent) with the exception of the aforementioned one that is particularly heterogeneous in terms of professional statuses (node-based representations), which is conversely characterized by the over-representation of holders of non-permanent positions (29.90 percent of individuals in that group).

Education levels differ significantly between groups ($X^2(12) = 22.01$, $p < .05$). The stereotypical representation and neighbourhood-based representation groups (respectively 44.98 percent and 42.5 percent of individuals in these groups) are characterized by the over-representation of high degrees (over five years above high school level). The instrumental representation group is characterized by the over-representation of individuals who have a high school degree or below (17.61 percent of individuals in that group). In the recreational representation group, individuals with a high school degree or below (15.84 percent of individuals in that group) and with a master's degree or equivalent (five years after high school; 30.69 percent of individuals in that group) are over-represented. This

group is characterized by heterogeneous levels of cultural capital. Lastly, the node-based representation group is characterized by the over-representation of people with between two and five years of post-high school studies (64.42 percent of individuals in that group).

A significant difference between groups is also observed when it comes to age categories, based on three modalities corresponding roughly to early (20–35), middle (36–50) and late career (above 50) ($X^2(8) = 28.95$, $p < .01$). The instrumental and recreational representation groups are characterized by the over-representation of individuals in the middle age group compared to other groups (with respectively 47.17 and 51.96 percent of individuals aged between 36 and 50). The stereotypical and neighbourhood-based representation groups both have an over-representation of the older individuals in our sample (with respectively 30.30 and 28.40 percent of individuals over 50). The neighbourhood-based representation group, on the other hand, has an over-representation of individuals between 36 and 50 or above (77.78 percent of individuals in that group). Lastly, individuals in the node-based representation group are the youngest (with 50.96 percent of respondents aged 20 to 35). In that group, the proportions of each age class follow a chronological order – the younger group is the most represented, the middle age group comes second, and the older group third.

Marked differences between groups are also observed for the sex variable ($X^2(4) = 11.26$, $p < .05$). The stereotypical and neighbourhood-based representation groups are characterized by the over-representation of men (respectively 40.43 and 43.21 percent of individuals in these groups). The three other groups (instrumental, recreational and node-based) have an over-representation of women (respectively 67.7, 73.27 and 72.12 percent of individuals).

No significant differences are observed when it comes to household structure and environmental context. In all groups, over 75 percent of individuals report having lived in the Alsace region for at least ten years ($X^2(16) = 15.59$, ns), and in a couple with a child aged at least 14. They are also distributed evenly among the neighbourhoods of Strasbourg and report having lived there for fifteen years on average ($F(4) = 0.86$, ns). Spatial constraints or familiarities pertaining to type of household, time spent living in the area and place of residence ultimately do not appear to have an impact on the differences observed in the socio-cognitive constructions of the city of this specific fraction of Strasbourg residents.

Discussion

Our objective here was to gain insights into individuals' relationships to geographical space based on the relation between their spatial representations and their social positions. We considered whether the construction of spatial representations reflects a primarily geographical positioning or a double positioning in geographical and social space. Introducing the structure of social relationships into the analysis of cognitive representations of geographical space required re-examining the general hypothesis of a correspondence between cognitive structures and social

structures (Durkheim & Mauss, 1903; Bourdieu, 1992). To do this, we explored to what extent the relational system of social positions contributes to relationships to urban space, and to the dynamic of constant adjustments between geographical positions and social positions, through spatial cognition.

Our data collection process allowed us to operationalize the concept of 'social position' in a more practical way than usual, as we used a methodology akin to the field experiments (or quasi-experiments) conducted in environmental psychology. We were able to identify the role of social positions in the construction of social representations, based on a confirmatory and comprehensive approach rather than a causal one. In addition to keeping one of the respondents' two structuring places of everyday life constant (the location of the workplace), which also allowed us to keep the social field of everyday practices constant (the academic institution and its cultural specificity), our method allowed us to investigate social and socio-spatial dimensions (between groups) rather than cultural ones (communication and social relationships within groups) of the social construction of a spatial representation. This also required combining the positional approach to social representations developed by Doise (1992) with the structural approach advocated by Abric (1994).

Confirming our initial hypothesis, the structure of the representational content (places) of Strasbourg effectively differs according to the socio-professional status, education level, sex and age of the agents of the University of Strasbourg. No representations are specific to a single professional status; instead, there are positions based on combinations of factors. For instance, male, highly educated and older lecturers-researchers highlight stereotypical places in the city. Category A BIATSS staff emphasize the city's neighbourhoods. Females BIATSS staff belonging to categories B and C tend to have an instrumental or recreational representation of the city, depending on their education levels. Lastly, the younger and more precarious female BIATSS staff have a node-based representation, especially mentioning the city's main squares. In sum, spatial representations are differentiated by structural sociological variables, not variables that operationalize social interactions (like dealing with colleagues with different statuses in the everyday activities of the institution's administrative, union and political bodies). What justifies that more educated, better paid individuals more readily mention a place in the city centre than another, if not the fact that they take a cognitive stance from the place they occupy in the social structure? In these socio-cognitive stances on geographical space, places are not simply significant localities, distant from other places, but socio-spatial positions that cannot be reduced to geo-localized significations. Consequently, the distinction process operates not only at a geographical level, but also on a sociological level. Even when social relationships are neither conflictual nor isolated, but complementary despite being asymmetrical, spatial representations remain means of building physical and symbolic borders between the different social positions.

These differences also relate to the interpretation of places. As our second hypothesis suggested, we observed that for holders of the most socially dominated positions, spatial representations rest on a functional relationship to the city (emphasizing use and functionality of places), whereas for holders of the most dominant positions, spatial representations rest on a more evaluative relationship (emphasizing the physical and affective dimensions of places). Indeed, the lower the individuals' position within the academic institution, the more practical their spatial representations of the city: they represent places based on what they use them for, for instance. Conversely, the more individuals have economic and cultural resources, the more their representations are based on physical and social evaluations of their environment (as is the case in the stereotypical representation). Lastly, we also noted that holders of intermediate social positions have mixed representations drawing from both sets of characteristics. In other words, there is a correspondence between social position and socio-cognitive stance (expressed in a functional, evaluative or mixed representation).

The validation of these two hypotheses confirms that social relationships underpin the construction of spatial representations, contributing to a double positioning, both geographical and social. This is all the more important as spatial constraints or familiarities related to the type of household, time spent living in the area and place of residence have no impact on the differences observed in the socio-cognitive constructions of the city.

Taking an altogether different route, Codol (1985) had already evidenced the existence of socio-spatial stances. Having asked interviewees to assess interpersonal geographical distances, he observed asymmetries in the evaluation of these distances depending on whether they assessed them from their own point of view or from the other's. In other words, social categorization impacts the estimation of geographical distances (Allen, 1981). These asymmetries also show that spatial cognition contributes to reinforcing social categories; similar observations have been made by researchers specialized in spatial categorization (Holyoack & Mah, 1982). First, all representations of space are based on the construction of spatial categories (Laponce, 2001). Second, they are structured on the basis of hierarchically higher organizing elements (Mandler, 1967; Stevens & Coupe, 1978; Wilton, 1979; Sadalla et al., 1980; McNamara, 1986; Couclelis et al., 1987; McNamara et al., 1989; Holding, 1992, 1994). As a result, social significations of space are also organized hierarchically (Hirtle & Jonides, 1985; Hirtle & Mascolo, 1986) according to spatial positions (Bourdieu, 1993). This makes it possible to envision that the schemes of spatial cognitive processing are social dispositions that steer relationships to geographical space (Dias & Ramadier, 2015, 2017). Thus, spatial (or socio-spatial) representation organizes spatial information on the basis of the socio-cognitive process of categorization and of the double (social and spatial) stance that it generates.

It is worth stressing that these relationships to the city are also expressed in practice, and where geographical space is concerned, contribute to spatial segregations, which in turn reinforce or give credit to these differences in representations between groups (Ramadier, 2010; Dias, 2016). One of the limitations of this study is that it does not address that dimension, which would be a useful complement to our demonstration on the effects of position. Indeed, while the culturalist approach analyses spatial segregations as differences of practices and values that drive different groups apart by hindering symbolic exchanges (Hall, 1971), the relational approach we propose looks at these same segregations as the material (practical embodiment) and symbolic (cognitive embodiment) of stances taken in social relationships. In other words, when social relationships are based on the edification of a social border between an in-group and an out-group, for instance due to identity-related tensions (Christen et al., 2017), spatial segregations contribute as much to the elaboration of social positions as social positions contribute to the making of spatial segregations. This finding calls for more refined study of the taking of stances in practice (considering place of residence, place of schooling of children, to account for the main dividing lines of urban segregation, and place of destination of daily mobilities) in the light of the taking of socio-cognitive stances, still drawing on the theoretical and methodological insights of both the structural and socio-dynamic models of social representations.

Notes

- ¹ The alphabetical order in which the authors are listed indicates simply that this is a work where the authors contributed equally and at the same level, as we believe that collective research is the foundation of scientific activity.
- ² We adapted the Insee's 2015 training levels to fit the institution.
- ³ The explained variance might seem low here, but this is in no way detrimental to this first level in our analysis. Indeed, the goal here was to condense information to perform HAC on those criteria most relevant to the entire sample – not to explain the total variance, which is strongly dependent on places mentioned by few individuals.

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Competing Interests

The authors have no competing interests to declare.

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