

Plenary IV

Learning from Sociology

Diversifying what we mean by space usage behaviours in space syntax

Kerstin Sailer, The Bartlett School of Architecture, UCL, k.sailer@ucl.ac.uk

ABSTRACT

Space syntax is aiming to elaborate on the complex relationship between space and society, explaining how spatial structures lead to a patterning of behaviours and social outcomes. Some of the major theoretical breakthroughs in space syntax research – for example the understanding that movement flow corresponds to spatial configuration is based on aggregated patterns of use, collected by methods of observation. This picture of collective use has spawned a whole range of relevant and important research insights, however, can be critiqued for being agnostic towards social differences between users. It could be argued that the same spatial structures offer different opportunities for use depending on user characteristics.

In this keynote I will argue that as a community we have a lot to learn from sociology, where the principle of social stratification, i.e., the classification of people into groups (by socioeconomic status, class, race, gender, age, religion, sexuality and so on) as well as the resulting hierarchies and inequalities are foundational to the discipline and bring forth elaborate and detailed insights into human nature. I will present several examples from my ongoing research into space usage behaviours in buildings that highlight how we can study diverse usage patterns in different ways, leading to a more nuanced understanding of the role that space plays inside a multitude of different buildings and building types.

KEYWORDS

Sociology, stratification, diversity, space usage behaviours, complex buildings

1 INTRODUCTION

Space syntax as a research domain can look back on more than four decades of engaging with the ‘social logic of space’ (Hillier and Hanson, 1984). The approach has introduced new ways of thinking about architecture and urbanism, but also sparked interdisciplinary research in disciplines as diverse as archaeology (Dawson, 2002), history (Griffiths, 2012), management and organization science (Thomas, 2019), neuroscience (Javadi et al., 2017) and biology (Varoudis et al., 2018). With few notable exceptions (Suonperä Liebster and Griffiths, 2019), however, the engagement with sociology as a field has been surprisingly sparse given the aim of space syntax research to investigate *social* aspects of spatial structures. At the same time, in architecture social aspects such as space usage or a focus on users have often been neglected. Users were treated as an ‘unknown person’ at best, or at worst *“a positive threat, the personification of uncontrollable disorder that frustrated the architect’s intentions”* (Forty, 2000: 314).

In this talk I want to bring both positions together: firstly, to trace some reasons why sociology and space syntax are not more fruitfully engaged with one another, and secondly, to suggest ways in which the space syntax community can learn from sociology in differentiating our view of users, thus contributing more fully to an understanding of the socio-spatial realities of everyday life. I will do this by briefly sketching three of my current and ongoing research projects.

2 SPACE SYNTAX MEETS SOCIOLOGY

Space syntax draws heavily on structuralism, a branch of sociology that aims to reveal the structural patterns of human life, and its relationships to broader systems of society and culture. Hillier and Hanson argued that they found Durkheimian thinking, particularly the distinction between organic and mechanical solidarities profoundly suggestive and that it formed the *“missing component of a theory of space, in the form of the elements for a spatial analysis of social formations”* (Hillier and Hanson, 1984: 18).

Despite this sociological foundation of space syntax, it was hardly noticed as a theory and contribution by sociology itself, as evident by a lack of citations and mentions across most sociological journals. A critical book review of *The Social Logic of Space* in the *Journal of Environmental Psychology* published in 1987 is insightful, as it maintains that Hillier and Hanson might find themselves regarded as too scientific for architectural theory and too unscientific for empirically oriented social scientists. They argue: *“Unless the reader adopts a structuralist approach, he or she is likely to experience difficulty getting into the book itself, accepting certain conclusions (e.g., the use of examples and simulations to prove assumptions), and understanding what the authors are saying.”* (Margulis and Connell, 1987: 253)

This issue has only deepened over the last decades. Sociology has moved to a predominantly empiricist approach, which focuses on social experiences as observed rather than on experiences as pre-structured categories, resulting in the view that an ‘a posteriori’ mode of thought provides more adequate sociological reasoning for a world in flux, which sharply contrasts the structuralist ‘a priori’ mode of thought (Lash, 2009).

3 DIVERSIFYING USE

From its inception, space syntax has been interested in the relationship between spatial structures and the emerging social life that is embedded in these structures. The focus of space syntax research, i.e., how spatial structure was represented, what was included in accounts of social life and subsequently how their relationships were investigated, has shifted significantly over the decades, not only because of advancements in methods and technologies of capturing, analysing and visualizing data but also due to the growth of the field. While Hillier and Hanson (1984) focussed on systematic spatial descriptions and qualitative judgements, using case studies that spanned not only centuries and cultures, but scales, ranging from tents to palaces and complex buildings, from neighbourhoods and villages to cities, only twelve years later Hillier (1996) has progressed to a correlational paradigm, aiming to explain the distribution of observed densities of space use (mostly movement) through the spatial inequalities arising from the different positioning of spaces in an overall network. In this approach, users often remain anonymous and indistinguishable from one another. For example, gate counts, one of the most used techniques of capturing movement flows in space syntax research (Al-Sayed et al., 2015; Grajewski, 1992) typically aggregate individuals into hourly flow numbers. This was critiqued as a blind spot in space syntax, which was accused of remaining ‘mute’ on the topic of individual and group differences in response to spatial layouts (Montello, 2007).

Most attempts at diversifying an understanding of users have (again with exceptions) emerged only more recently, for example Griffith’s (2011) critique of Hillier’s ‘generalised individual’, or the consideration of users beyond anonymous collectives but also beyond the atomistic approaches of environmental psychology, thus describing usage behaviours as relational and contextual (Zook and Sailer, 2022).

Building on Peponis’ (2024) review of the history of space syntax that underlines the importance of description retrieval, i.e., how existing spatial structures can be captured systematically, I want to argue that the move to a more differential description retrieval investigating how spaces are used differently by different people at different times can build on an important sociological concept: that of stratification.

Stratification¹ describes structured inequalities between social groups in societies, based on attributes such as socioeconomic status, income, class, gender, age, religion but also sexuality, race, abilities and so on (Giddens and Sutton, 2021). Some space syntax approaches obviously already focus on spatial inequalities (see for example: Vaughan, 2007), however, a stratified perspective can be fruitfully applied in broader terms to provide a more nuanced understanding of space use and usage behaviours, and thus move away from the overly dualistic and structuralist thinking (Sailer, 2024) embedded in the early space syntax foundations.

In the following, I want to provide glimpses into three ongoing research projects that build on these ideas of diversifying use.

3.1 Project: Disabilities and Exclusion

Many contemporary buildings feature grand, open staircases to connect floors and create vibrant spaces. The Bartlett School of Architecture (BSA) building on the UCL campus is one such example, retrofitted by Hawkins\Brown in 2016 with a new foyer and staircase meant to open up circulation spaces and allowing “*staff and students to interact, explore and exchange ideas*”.² However, the building is not equally welcoming to all user groups. Who and what gets left out of architecture as a discipline (Boys, 2022) has long been the subject of disability studies, yet this has only been explored by space syntax research on the urban level to date (Koch and Legeby, 2022; Cutini, 2012; Heitor et al., 2013).

Taking my own experience of living with an energy-limiting condition (ELC), the BSA building presents itself differently to me, as the staircase does not offer a viable alternative for moving up the building. Mapping a path from the building entrance to my office on the third floor via the staircase (as a healthy user) compared to the path via the lift (as a disabled user) and highlighting the accumulated isovist areas along the way is illuminating (see figure 1). Using the lift results in a loss of visibility of 54%, which means fewer opportunities of seeing and being seen, engaging in encounters and thus being an active (and visible) part of the building community.

Investigating other buildings in the same way, engaging with stakeholders as demanded by the disability community (“Nothing about us without us”) and developing metrics of building experience beyond visibility (for example by blind people) will be interesting ways to expand this line of work in the future.

¹ Derived from strata, i.e., the layering of rocks in geology.

² See: <https://www.hawkinsbrown.com/projects/the-bartlett-school-of-architecture/> (Last accessed: 02 Dec 2024)

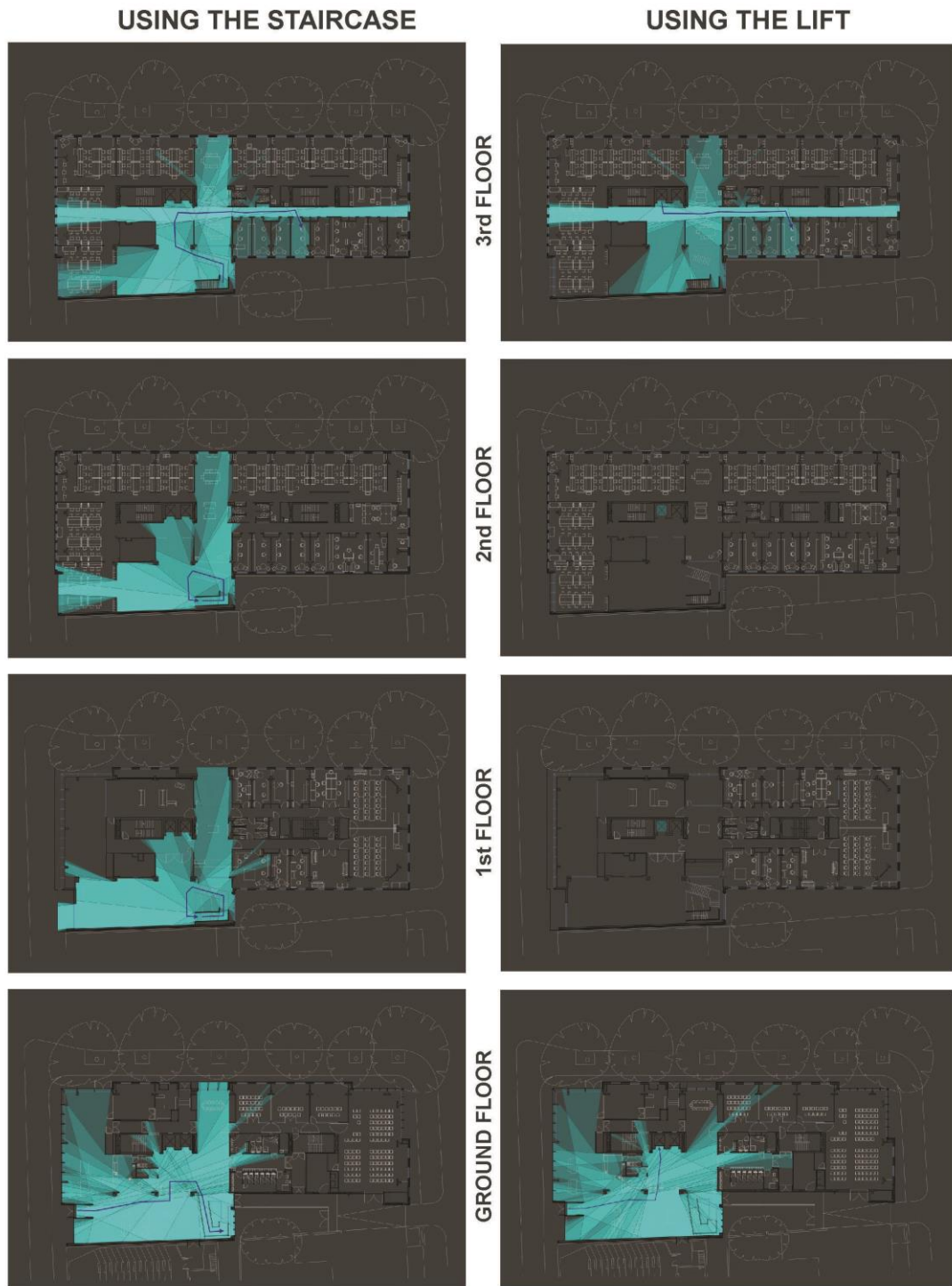


Figure 1: Overlapping isovists of two paths from the entrance of the Bartlett School of Architecture building on UCL campus to an office on the third floor, created with the isovist app (McElhinney, 2024).

3.2 Project: Dual networks of people and spaces

Exploring the same building yet from a different perspective allows an understanding of behavioural preferences, i.e., which paths people prefer taking if they have a choice. This builds on the idea of spatial culture as constructing or reinforcing predispositions and “*to bring to light the principles that differentiate different kinds of predisposition*” (Peponis, 2024: 7). The BSA building lends itself to this type of analysis, as it offers two enclosed staircases for vertical circulation in addition to the open staircase and the lifts.

I am borrowing a concept and methodology from the social networks community here for the analysis: that of duality. In his seminal paper, ‘The Duality of Persons and Groups’ Breiger (1974) considered how individuals intersected with groups, and argued that people participating in the same events are connected by having interests in common, while groups populated by the same people also share commonalities that highlight their characteristics, which can be expressed as network connections among groups. Applying this approach to people and spaces enables an investigation of what actors using the same spaces have in common.

In this exploratory project, I have collected data from 13 colleagues and fellow building users (six professors, seven PhD students), who completed excel sheets on their most typical everyday routines (arrival, departure, teaching, attending a meeting / tutorial, lunch, getting a coffee, etc.) and which paths in the building they took. From this data, a two-mode network was constructed consisting of 13 people connected to 117 nominated spaces (rooms, parts of corridors, etc.) via 473 ties of varying tie strengths (i.e., instances of using that space).³

As highlighted in figure 2, the sociogram of the network of all ties (Fig. 2a) shows some degree of distribution and as expected a relatively low-density network, as not everyone uses all spaces highlighted by any one of the participants as part of their most important routines. A clearer structure emerges with a focus on repeated use of particular spaces, hence an increased threshold for tie strengths as illustrated in figures 2b-c (tie strength > 3) and figures 2d-g (ego-networks of tie strength > 1). We begin to see distinctive communities of space usage behaviours. If the 2-mode network is transformed into a 1-mode network of people, whereby people are connected to one another if they use the same spaces (Fig. 2c), two separate components emerge with the larger component split into two communities. Who is tied to whom does not cut along the obvious categorisations of role or research group / programme that people are affiliated with (shown as colours and shapes), which means they are likely guided by the preferences of individuals. These preferences for space use become even clearer by looking at the ego-networks⁴ of four circulation spaces: the enclosed staircases east (Fig. 2d)

³ Tie strengths varied greatly with a maximum of 24, a median value of 2 and an average of 2.77.

⁴ An ego-network is the network of one node (ego=spaces), and everyone directly linked to it (immediate alters=people).

and west (Fig. 2e), the open staircase (Fig. 2f) and the lift (Fig. 2g). None of these is used by everyone in this small sample, pointing towards the emergence of distinctive spatial cultures and communities of use in the building.

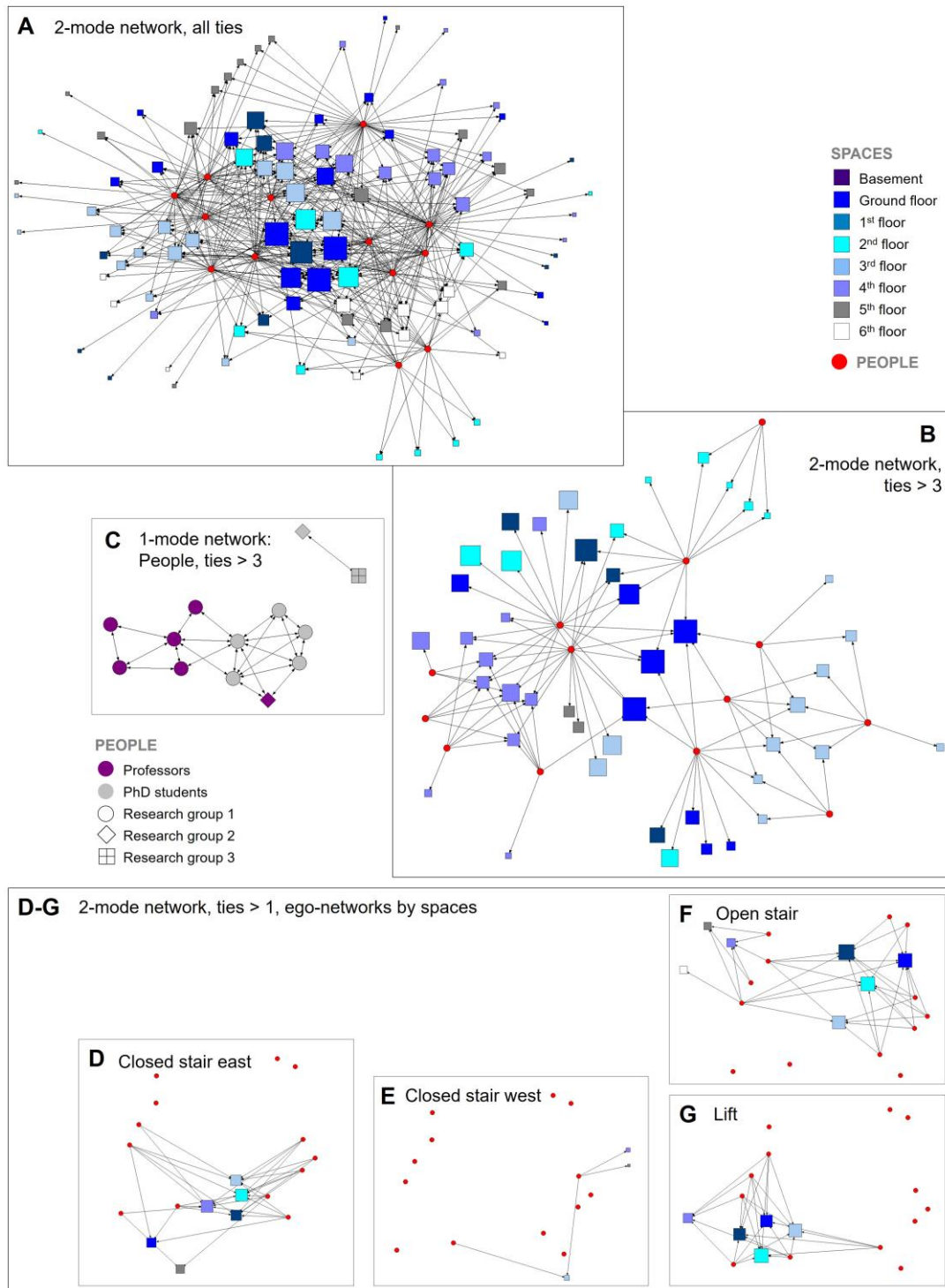


Figure 2: Sociograms of dual networks of people and spaces: A) 2-mode network of all ties; B) 2-mode network of ties >1; C) network of ties >1 transformed to 1-mode network of people (connected by sharing the same spaces); D-G) 2-mode ego-network of ties >3 for four separate spaces.

Extending the sample and exploring other building (types) but also adding a qualitative angle to the research will provide interesting insights.

3.3 Project: Improving patient flow in outpatient eye clinics

As part of project HERCULES in collaboration with Moorfields Eye Hospital NHS Trust (Muhundhakumar et al., 2024), which aimed at reducing Moorfields' ophthalmology waiting list by offering a technician-led service in a disused retail unit in Brent Cross shopping mall in Northwest London, we investigated the relationship between the patient flow from one diagnostic station to the next and visibility patterns between the stations.

The clinic was mostly open plan with 1.5-metre-high movable partitions to provide spaces for 30 diagnostic stations of six different types for both glaucoma and medical retina patients (see figure 3a).

We focused in the analysis on the flow of glaucoma patients who required all six diagnostic tests in an ostensive routine (Feldman and Pentland, 2003), i.e., a clinically devised typical order. The analysis highlighted that the actual flow deviated from the ostensive routine and showed aspects of performativity, as seen in the loops of figure 3b. Hence, the question arises which factors contribute to the choices of technicians in leading patients to the next station. Line-of-sight relationships between stations were shown to be important in an earlier pilot project (Sailer et al., 2024), however, those were not easily modelled as visibility in this case depended on the height of the technicians and their exact positioning in space to be able to view across the partitions (Fig 3c). Therefore, we modelled not only visual step depth while seated (all partitions are obstacles, fig. 3d) and while standing (no partitions as obstacles, fig. 3e), but also a height-adjusted version of standing for a technician of 180cm height (Fig. 3f). This new and innovative approach will allow more nuanced ways of modelling visibility relations, also taking technicians of different height into account in the analysis, which is ongoing at the time of writing.

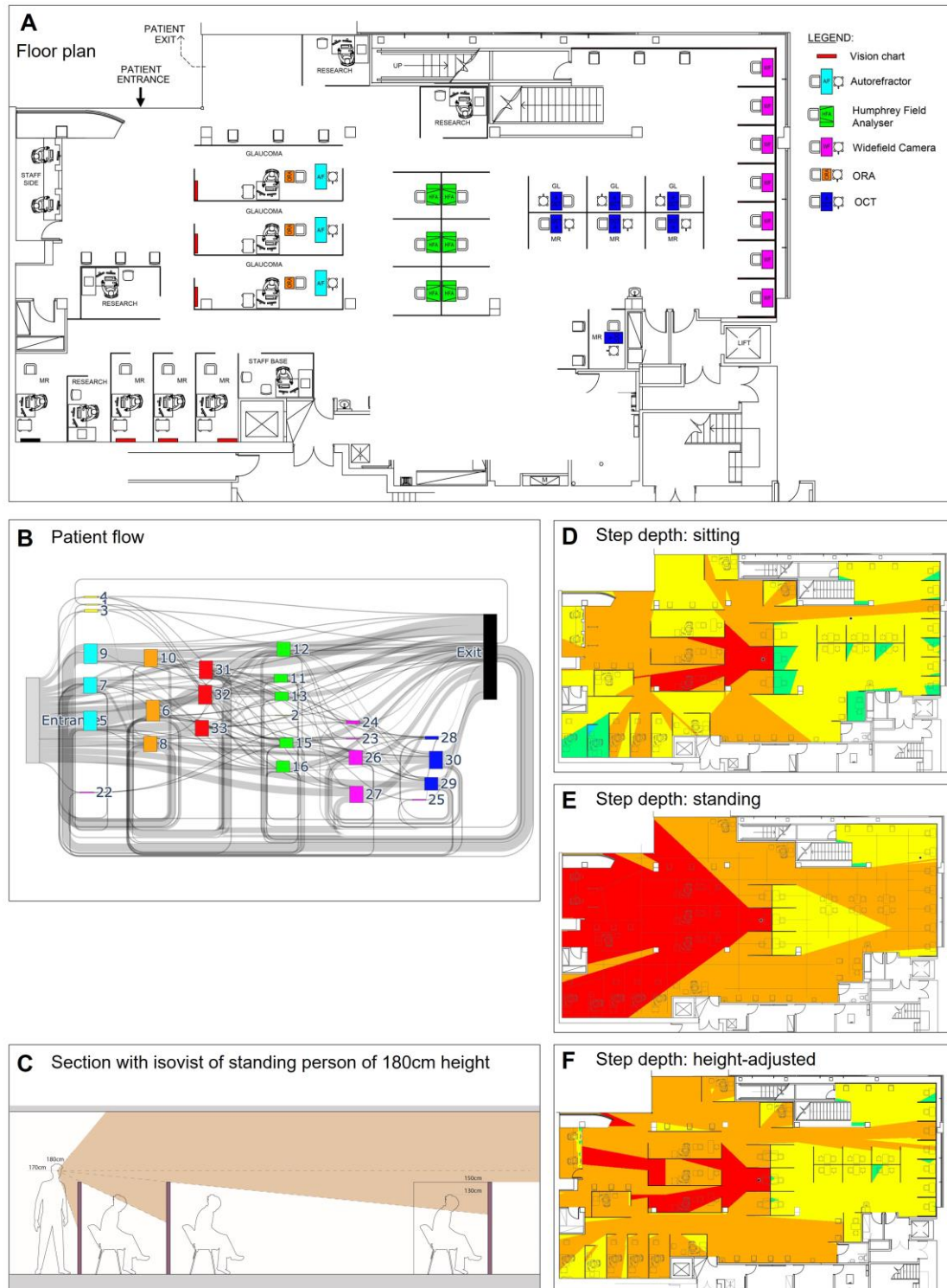


Figure 3: Moorfields Eye Hospital Brent Cross outpatient clinic: A) Floor plan of iteration 2; B) Sankey diagram of glaucoma patient flows; C) Diagrammatic section; D) Step depth from a HFA station while sitting; E) Step depth from a HFA station while standing; F) Step depth from a HFA station with height-adjusted standing. Thanks to Sam McElhinney for his help in modelling figure F in isovists.org.

4 CONCLUSIONS

Investigating human behaviours and space usage in buildings is a complex endeavour, not only because of the many intervening factors such as organisational cultures or building programmes but also because of the complexities of human nature itself. Space is not made equal. It offers different chances to different people.

The above projects open up opportunities of understanding the multiplicities of human experiences inside buildings and in relation to spatial structures in more nuanced ways, taking additional factors such as bodily capabilities and body stature but also preferences and habits into account, thus building on sociological stratification.

This has implications for future work, for example by enabling the modelling of experiences of children in space – another woefully understudied area – or exploring how people with different body-minds experience and navigate buildings, thus raising questions such as: how do buildings present themselves to individuals who cannot see? Or to individuals who cannot walk and thereby move their bodies in different ways? Or to neurodiverse people with a low tolerance for encounters and noise? Or to deaf individuals whose understanding of space relies mostly on vision?

If space syntax can move away from its overly dualistic view of the world, and embrace an ‘a posteriori’ perspective, weaving in qualitative methods into its quantitative approaches, this will open up exciting new ways of understanding the relationship between spatial layouts and the diversity of people’s behaviours.

REFERENCES

- Al-Sayed K, Turner A, Hillier B, et al. (2015) *Space Syntax Methodology*. A teaching textbook for the MSc Spatial Design: Architecture and Cities. London: Bartlett School of Architecture, UCL.
- Boys J. (2022) Care as active architectural practice. In: Lange T and Schaad G (eds) *Care*. Zurich: gta Verlag, 57-68.
- Breiger RL. (1974) The Duality of Persons and Groups. *Social Forces* 53: 181-190.
- Cutini V. (2012) Managing Accessibility - The Configurational Approach to the Inclusive Design of Urban Spaces. *Journal of Civil Engineering and Architecture* 6: 444-456.
- Dawson PC. (2002) Space syntax analysis of Central Inuit snow houses. *Journal of Anthropological Archaeology* 21: 464-480.
- Feldman MS and Pentland BT. (2003) Reconceptualizing Organizational Routines as a Source of Flexibility and Change. *Administrative Science Quarterly* 48: 94-118.
- Forty A. (2000) *Words and Buildings. A Vocabulary of Modern Architecture*, London: Thames and Hudson.

Giddens A and Sutton PW. (2021) *Sociology*, Cambridge: Polity Press.

Grajewski T. (1992) *Space Syntax Observation Manual* (2001 unpublished revised edition: L. Vaughan). 2001 unpublished revised edition: L. Vaughan ed. London: UCL Bartlett and Space Syntax Ltd., 18.

Griffiths S. (2011) Temporality in Hillier and Hanson's Theory of Spatial Description: Some Implications of Historical Research for Space Syntax. *The Journal of Space Syntax* 2: 73-96.

Griffiths S. (2012) The Use of Space Syntax in Historical Research: Current Practice and Future Possibilities. In: Greene M, Reyes J and Castro A (eds) *8th International Space Syntax Symposium*. Santiago de Chile: Pontificia Universidad Catolica de Chile.

Heitor T, Nascimento R, Tome A, et al. (2013) (In)accessible campus: Space syntax for universal design. In: Kim YO, Park HT and Seo KW (eds) *9th International Space Syntax Symposium*. Seoul: Sejong University Press.

Hillier B. (1996) *Space is the machine. A configurational theory of architecture*, Cambridge. Online at: <http://eprints.ucl.ac.uk/3881/>: Cambridge University Press.

Hillier B and Hanson J. (1984) *The social logic of space*, Cambridge: Cambridge University Press.

Javadi A-H, Emo B, Howard LR, et al. (2017) Hippocampal and prefrontal processing of network topology to simulate the future. *Nature Communications* 8: 14652.

Koch D and Legeby A. (2022) Equal living environments: Universal design and (un)equal access from a syntactic perspective, Uppsala, Sweden. In: Van Nes A and De Koning RE (eds) *13th International Space Syntax Symposium*. Bergen, Norway: Western University of Applied Sciences, 466: 461-426.

Lash S. (2009) Afterword: In Praise of the A Posteriori: Sociology and the Empirical. *European Journal of Social Theory* 12: 175-187.

Margulis ST and Connell BR. (1987) Book review: The Social Logic of Space. *Journal of Environmental Psychology* 7: 251-277.

McElhinney S. (2024) *The Isovist_App: a basic user guide*. 1.7 ed.

Montello DR. (2007) The contribution of space syntax to a comprehensive theory of environmental psychology. In: Kubat AS, Ertekin Ö, Güney YI, et al. (eds) *6th International Space Syntax Symposium*. Istanbul: ITÜ Faculty of Architecture.

Muhundhakumar D, Clarke CS, Mills G, et al. (2024) Cohort profile: design and methods for Project HERCULES (Healthcare Exemplar for Recovery from COVID 19 by Use of Linear Examination Systems.) Multi-disciplinary implementation and evaluation of an asynchronous review clinic for monitoring chronic eye disease in English NHS services. *medRxiv*: 2024.2011.2005.24316762.

Peponis J. (2024) *Architecture and Spatial Culture*, Abingdon / New York: Routledge.

Sailer K. (2024) Book review of: *Architecture and Spatial Culture* by John Peponis. *Buildings & Cities*. https://www.buildingsandcities.org/insights/reviews/architecture_spatial_culture.html.

Sailer K, Utley M, Pachilova R, et al. (2024) Lanes, Clusters, Lines of Sight: Modelling diagnostic eyecare clinics to improve patient flow. *OSF Preprints* <https://osf.io/preprints/osf/bu8vk>.



Proceedings of the 14th International Space Syntax Symposium

Suonerä Liebst L and Griffiths S. (2019) Space syntax theory and Durkheim's social morphology: a reassessment. *Distinktion: Journal of Social Theory*: 1-21.

Thomas M. (2019) How space affects emergent strategy: A study of the role physical space plays in the generation of social interaction in organisations. *Business School*. Lancaster, UK: Lancaster University.

Varoudis T, Swenson AG, Kirkton SD, et al. (2018) Exploring nest structures of acorn dwelling ants with X-ray microtomography and surface-based three-dimensional visibility graph analysis. *Philosophical Transactions of the Royal Society B: Biological Sciences* 373: 20170237.

Vaughan L. (2007) The spatial syntax of urban segregation. *Progress in Planning* 67: 205-294.

Zook J and Sailer K. (2022) *The Covert Life of Hospital Architecture*. London: UCL Press.