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Human congestion in new designed public spaces: researching its social interactional potential

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ABSTRACT

This paper examines an emerging optimal condition for informal public social interaction, which has not yet been fully accepted or theorized in sociology and urban design. The condition in question is human congestion and is the target of current sociological and urban design critiques. This paper employs empirical material from a case study which illustrates and problematises this condition and its critiques. It uses Goffman's "Interaction Order" as a theoretical and methodological framework, combining observational, interviewing, non-verbal communication, and spatial analysis methods, to examine the social interactional potential of a range of new public spaces designed with congestion in mind. In doing so, it problematises the critiques of human congestion demonstrating that informal public social interaction under such condition occurs more than it is necessary and that the spaces where it occurs can become valuable social spaces for a wide range of users.

Introduction

This paper examines an emerging optimal condition for informal public social interaction that has not been theorized as such. This is human congestion. In this paper, optimal conditions are understood as the best or most favourable, desirable, or satisfactory conditions for interactions among strangers to occur. According to Lofland (1998), a public or private space is or becomes an optimal social setting if it offers a space for people to come together; likewise, its social and spatial conditions (e.g. physical accessibility, social inclusivity) and types of interactions are optimal if they support or facilitate a high number and variety of social interactions. The "optimal" status of a space or condition is determined primarily by the people involved, if they are observed to interact or express that they do interact a lot there.

Contrary to the optimal social conditions recognised by the literature (e.g. events, "open regions" (Goffman 1963)), human congestion is neither so well documented nor accepted in sociology nor urban design (Forsyth and Southworth 2008; Lofland 1998). Ultimately, it is the target of an ongoing debate in urban planning for the past three centuries. The debate started in the late 18th century, with the advent of the industrial

revolution, and subsequent urbanization and mass urban migration from rural and European population, which led cities to experience an unprecedented growth in size and in population and to be associated with over-crowded living and unsanitary conditions and congested and filthy streets. Early observers described cities and their public life as too overwhelming, overstimulating, and unsafe, leading to growing anti-urbanisation and urban life movements throughout the 20th century (Engels [1887] 1993; Simmel [1903] 1997). However, the 20th century also brought profound societal, technological, and political changes, which transformed the nature of our cities, and the way we experience them. It experienced new urban developments, experiments, and higher environmental quality standards (with a focus for example on the integration of country and city, improved transport systems, provision of parks, just to mention a few) which sought to improve the cities' liveability whilst alleviating urban congestion, particularly traffic congestion, but also increasingly cultivated a strong culture of urbanity (Hall 1969; Sennett 1996). At the same time, the population of cities has not only grown in size but also diversity, rather than being homogeneous entities as the fixed notions of the public tend to define it. As a result, attitudes towards cities and their public spaces have changed and became more diverse. Although many early twentieth-century practices had sought to design out congestion through modernist, ordered, and ostensibly functionalist designs, which separated uses and maximised open space, air, and greenery, the practices that followed since the 1960s advocated something completely different. They would propose strategies for overcoming the deficiencies of modernist cities and their reductive sense of purpose. Whilst a main concern is still to alleviate traffic congestion, many planners and designers have sought to create spaces that are congested with people and uses, even if not using the term congestion, by creating more compact and dense urban centres (Bay and Lehmann 2017), nodes of activity (Dann 2019), and overlapping different uses (Nielsen 2019), among other strategies, to make the public realm sufficiently lively and to encourage social interactions among a diversity of users. However, it is noticeable that there are still mixed views about congestion and its positive and negative contributions to the public realm. Despite the growing trend to design with congestion, and the recognition of its strong social benefits, many new designed public spaces, particularly privately owned and/or managed, still seek to design it out, attesting their strong emphasis on efficiency of pedestrian movement and control of access and use, and thus offering little opportunity for unpredictable events or spontaneous social contact. This is the case for new public spaces of consumption, mobility, and recreation (Hajer and Reijndorp 2001; Sola-Morales 1992) which are often exclusive and behaviourally restrictive, but which are also popular spaces where many people gather for their necessary as well as optional and social activities. Because of the ambivalence of this debate, recent research calls for more analysis on the impact of congestion on the public realm, to understand both its positive and negative implications.

This paper wants to respond to this call. To do so, it employs empirical material from one case study of a new masterplanned neighbourhood in the periphery of Lisbon, Portugal's capital with a specific focus on a range of new public spaces that are privately owned and/or managed that have purposefully design out congestion but are nevertheless publicly accessible and well-used spaces.

It must be noted that in the context of Lisbon, human congestion, is often a desired condition, and even considered, among policymakers, as an indicator that a public space

is well used and lived, if not made unmanageable or unsafe (CML 2018). This is partly a reflection of a strong policy interest since the 1980s to make Lisbon a more cohesive, inclusive, and liveable city, after a long period of disinvestment in public space due to a significant increase in car use. We also cannot leave without acknowledging that Lisbon is also known for its vibrant culture of public space use not least because of its warm and sunny weather during most of the year, but also because of the value that its residents attach to its public spaces as places of socialisation. Surprisingly, however, it is still commonplace in Lisbon's current planning and design practice to design out congestion in many new urban developments, particularly in its periphery, often just for the sake of efficiency and safety – attesting the current tensions between policy and practice agendas on the subject.

The structure of this paper is as follows. It starts by introducing the context and related debates, namely the decline in public social life and informal social interaction among strangers, and how contemporary architecture and urban design are to be blamed. This is followed by a review of contemporary critiques and urban design trends related with designing with/out human congestion of urban public spaces, their critiques and counter-critiques, and impacts on the public realm. This review will then provide the groundwork for an empirical study, namely a social interactional theoretical framework and robust methodology (observations, interviews, non-verbal communication, and spatial analysis) to examine the social interactional potential of a range of public spaces that both illustrate and counter those critiques. The third and last sections discuss the implications of the findings for planning and urban design theory and practice.

The public realm of informal social interaction

This paper deals with informal public social interaction, and therefore an important and first consideration is to define the public realm territory where it occurs. The public realm has traditionally been defined as the social space or territory where public space and public life coincide and has been often referred as the realm of political action (Bridge, Marsh, and Sweeting 2013; O'Sullivan 2009) and the realm of social interaction among strangers (Karp, Allen, and Yoels 1991). In this paper, we focus on its social rather than political dimension, though we do not dismiss their inter-dependence. Social life is highly dependent and determined by the political context in which it is embedded.

While early sociological studies of urban encounter and wider social interactions in public spaces tended to focus on the anonymity of urban life and the figure of the distanced "stranger" (Engels [1887] 1993; Simmel [1903] 1997; Wirth 1938), throughout the 20th century a wide range of scholars, including planners, urban designers, geographers, and environmental psychologists, have become interested in examining their role in sustaining public life and shaping the way people experience their cities and communities (Hall and Ward 1998; Jacobs 1961; Lofland 1998; Lynch 1960; Milgram 1992; Tonnies [1957] 2001). More recent studies, however, have been paying considerable attention to the increasing social and cultural diversity of cities and the complexities that this brings (as we now are dealing with more complex types of encounter such as intercultural encounters) and to explore the spaces where encounters occur, whether spaces of work, leisure, and education, to understand how space shapes and is shaped by the social

interactions therein (Leitner 2012; Wilson 2017; Wood and Landry 2008; Worpole and Knox 2008).

Within this growing body of work, social interactions with strangers are typically understood as interactions between "unknown" strangers who never met before (Stevenson and Waite 2011). However, the public realm is also populated by other types of strangers including "categorical" who only know each other from a routinised relation in an occupational instrumental role such as a shop's clerk or police officer and "familiar strangers" who only share a daily path or round for example in public transport (Lofland 1998). For this paper, "unknown" strangers are the sociologically more interesting. Unlike the other type of strangers, their relations are unpredictable and always involve a certain risk. They are often brief and passive, but they can evolve into more active and long-lasting relations, allowing to study a broader conception of urban experience, of relational, unfamiliar, and unplanned environment-people relations (Sennett 1973; Stevens 2007). They may involve more bodily than verbal communication, but they make possible to understand how a space works in bodily and mechanical terms (Goffman 1963) and to understand its limits and opportunities for social use (Karp, Allen, and Yoels 1991). They are also the most sensitive type of social relations to the rules of behavior, types of users, and the comfort of the places where they occur. They usually only occur in public spaces that are open, accessible, and inclusive and have an informal and "loose" character (Goffman 1963). Social interactions among unknown strangers are thus good signifiers of publicness, inclusivity, and conviviality, therefore studying such interactions and their links with the attributes of space and the embodied experiences therein might give us good insights about what constitute optimal social and spatial conditions for informal public social interaction.

The public realm between narratives of loss and hope

Since the beginning of the twentieth century, the public realm has been surrounded by narratives of loss and hope. The narratives of loss have been persistently related with the decline of public space and public life and of social capital and civil society more broadly (Banerjee 2001; Carr et al. 1992). A lot of different explanations have been given for this decline. In the beginning of the twentieth century, sociologists tended to associate it with social overstimulation, the result of a large, dense, and heterogeneous population (Simmel [1903] 1997; Wirth 1938). Since the twentieth century, a wider range of scholars see it as the result of spatial under stimulation, as cities become duller and meaningless (Oldenburg [1989] 1997; Sennett 1977). The latter phenomenon has caused more debate. Many authors have pointed out that this is the result of a growing shortage and inequity in the distribution of public open spaces, while others also see it as symptomatic of larger societal, political, economic, and technological changes (Banerjee 2001). There are, however, divergent views about the current status of the public realm of our cities. While some authors claim that there is a steady decline in the provision and maintenance of public spaces, highlighting that this seems to be a worldwide trend. Others recognise that this decline is mainly visible in marginal urban spaces, as there have been huge investments in public space design and management, with a view to regenerate old and create new high-profile public spaces in inner cities and respond to new city marketing and neoliberal agendas (Carmona 2010; Madanipour 1999; Sorkin 1992). Indeed, with the rise of a

corporate economy and downsizing of governments since the 1970s, cities have witnessed a phenomenal retreat of the state from the provision of public goods and services, alongside an increasing dependence on private investment (Loukaitou-Sideris and Banerjee 1998). One of the major consequences of these changes is the commodification and privatization of new urban regeneration projects and public spaces (Cybriwsky 1999; Lofland 1998). Several authors also see the decline in public space provision as a by-product of a general decline in public life and social capital. According to Putnam (2000), this decline is associated with generational change, technology and mass media, mobility and urban sprawl, pressures of times and money which are leading to an increasing privatization of social and leisure activities. Other authors have been more persistent in relating this decline with the blandness and alienating features of contemporary architecture and planning (Liu and Freestone 2016; Relph 1976; Shaftoe 2008; Sorkin 1992; Wigley 2001). But many authors refuse this analysis for taking a more nuanced but also more positive stance towards the public realm, forcing us to look at new communities and forms of socialization and settings such as new public spaces of consumption, mobility, and recreation that are not truly public but are becoming positive valued public realms (Hajer and Reijndorp 2001; Sola-Morales 1992).[1] Although these conflicts remain unresolved, recent research points out that to engage more productively with these debates, we can no longer judge these new public spaces based on ownership or access (Benn and Gauss 1983; Németh and Schmidt 2011; Varna and Tiesdell 2010), after all they are becoming important social spaces.

Accepted optimal settings and conditions for informal public social interaction

The public realm has been a field of interest in a wide range of disciplines across the social sciences and built environment. Sociology and psychology are the disciplines with the longest tradition of public realm studies, and particularly of social interactional studies, and have been particularly helpful to uncover the main patterns and specific changes affecting our informal public social life. Insightful analyses have been taken from micro-sociologists and psychologists, particularly those who have focused on the "interaction order" to understand the rules and conditions underlying human social interaction (Goffman 1963; Lofland 1998) and used non-verbal communication to read people's body language in a social interaction (Fast 1971; Hall 1969; Scheflen 1972). They readily concluded that there is no such thing as an ideal type of informal social setting, but given the fragile nature of interactions among strangers, a setting must have certain conditions in place to facilitate them. They identified a few social conditions that can suspend social norms and make a place "looser" (e.g. "open persons" (e.g. children and elderly people), "open regions", "triangulation", "time-out"), whilst recognizing that only some types of public settings can be considered optimal spaces for social interaction (e.g. "third places").

The public realm has been certainly one of the most evoked themes and concerns of built environment disciplines, particularly when adopting a more user-centred approach (Hall and Ward 1998; Lynch 1960; Marshall 2012), though since the 1980s their interest has been more in applying than advancing new knowledge. Nevertheless, several influential urban design scholars have increased our understanding of the social potential of a wide range of public settings and the optimal and non-optimal conditions for informal social interaction, confirming previous sociological theories (Alexander, Ishikawa, and Silverstein

1977; Franck and Stevens 2007; Gehl 1971; Kaplan, Kaplan, and Ryan 1998; Marcus and Francis 1990; Mehta 2013; Whyte 1980). These authors have persistently claimed that public and private spaces can be optimal social settings if they are spaces where public sociability rules and that have a high degree of differentiation from work and home, inclusiveness, familiarity, and social comfort, and that these qualities are often associated with certain spatial features (e.g. low profile) (Oldenburg [1989] 1997) and activities (e.g. optional) (Gehl 1971; Whyte 1980). However, recent research (Cybriwsky 1999; Stevens 2007; Aelbrecht 2016, 2019) shows that anonymous, unfamiliar, and new designed public, semi-public, and private settings do not necessarily need to have all these conditions or qualities to become popular informal social spaces, calling for further research to examine them.

Not fully accepted or theorised optimal conditions for informal public social interaction

In the last four decades several authors have indicated a strong correlation between architectural and urban design trends and the decline of public life (Relph 1976; Shaftoe 2008; Sorkin 1992), though more recent work offers a more nuanced view, showing that a lot of new public spaces are emerging, while old ones are being retrofitted for new needs (Carmona 2010; Mehta 2014).

Many authors have been blaming new typologies of public spaces such as stations, shopping malls, and themed parks for being not only bland and placeless but also socially alienating and highly exclusionary, due to privatisation, and therefore, their excessive reliance on control, themed designs, and efficiency and consumption over equity of use and access (Relph 1976; Shaftoe 2008; Sommer 1974; Sorkin 1992). Yet recent research also shows that a lot of these new types of public spaces, even if privately owned, and/or managed, are not necessarily dead, rigid, or alienating, as they can still be reshaped by their users and generate new meanings and uses and become preferred social spaces (Carmona 2010; Mehta 2014). Recent research also identified that some of these new public settings can have similar social and behavioural characteristics as "third-places" (Author 2016, 2019). However, some of these conditions are key to make them optimal social spaces but are not yet fully accepted or theorised in sociology and urban design, asking us to examine them. This is the case of human congestion, which became a key feature of many new designed public spaces that are privately owned and/or managed, though many seek to design it out.

Human congestion

Congestion has often been associated with stressful experiences and negative feelings which occur when the carrying capacity of a space is exceeded and peoples' personal space are violated (Bryon and Neuts 2008; Lofland 1998). The terms congestion and crowding are often interchangeable in the literature. In this paper, we prefer to use the term congestion in place of crowding because it can be more objectively measured than crowding, as it refers to the true state of use level, which is determined by the number of people and attractions against the surface and material configuration of the place where they are located which can vary with the time and season, availability, accessibility, and the type of usage (Arnberger and Haider 2007; Shelby, Vaske, and Heberlein 1989).

Crowding, on the contrary, is related to the user's perception of that use level, and is mainly considered a psychological state or construct which is shaped by a multitude of factors from personal (motivations, expectations, and past experiences), to situational (refers to the variable of congestion), and characteristics of people and their behaviours therein (intensity of contact), which are not always easy to grasp (Stokols, Smith, and Prostor 1975, Chowdhury and Mcfarlane 2022; Winsborough 1965). We use the term human congestion because we are interested to understand how people interact with other people in places filled with people, rather than why they do it, as we do not wish to explore their psychological motivations.

Initial research on human congestion and crowding was mainly focused on its negative effects (Calhoun 1962), however more recent studies paint a more complex picture, showing that these effects can either be mediated by people's perception of use level (Bryon and Neuts 2008) or the situational attributes of the setting, particularly its material configurations – the latter being one of the main focus of this paper (Abusaada and Elshater 2020). From this unresolved scenario emerged different theoretical perspectives on human congestion – stimulus-overload, behavioural constraints, and ecological formulations – with the aim to explain the situational conditions in which congestion affects behaviours. The most insightful studies have been those that adopt a stimulus-overload approach to analyse the relationship between design factors and congestion and crowding carry out research in natural settings and consider dissimilar situations of intensity and duration (Stokols, Smith, and Prostor 1975; Bryon and Neuts 2008; Abusaada and Elshater 2019). However, despite these studies, its noticeable that the majority still see congestion as a condition that is not wanted and therefore should be reduced or avoided. These are often driven by a common goal which is to identify strategies to reduce the experience of crowding in public or private settings. It is not surprising though the obsession of planning and design practices from early twentieth century to today to design out congestion through modernist, ordered, and ostensibly functionalist designs and to separate uses and maximise open space, air, and greenery (Nielsen 2019; Relph 1987). However, sociological research has long suggested that in certain circumstances human congestion can "evoke pleasure," because of the "diversity of stimuli and spectacle" that it creates (Lofland 1998, 86) and can be considered as a positive indicator that people use public spaces (Whyte 1980). Several contemporary planning and urban design scholars and practitioners have even proposed that we should perhaps seek to create spaces that are congested with people and uses, to make the public realm sufficiently lively and to encourage social interactions among a diversity of users (Bay and Lehmann 2017; Author 2019). They acknowledged that designing with congestion in mind can overcome the deficiencies and reductive sense of purpose of contemporary temporary designs and make public spaces more multiplicitous and informal. However, the current Covid pandemic has renewed public awareness about the health risks involved in congested spaces and crowding situations (e.g. spreading the virus), bringing with it a preference for larger and more spacious and out-of-town public spaces over the more crowded town centres, though this seems short term, as life begins to return to normal, and people are starting to reconnect with each other and longing for social contact (Carmona 2021; Mehta 2020). Despite the rising Covid concerns, recent studies showed the benefits of a balanced approach to designing with and without congestion because of its potential to create more lively environments whilst reducing the negative experiences of congestion

(Abusaada and Elshater 2019). Such studies suggest that urban designers need to pay closer attention to the relationships between the multisensorial, social, and physical dimensions of a place, as only then, they will be able to design to alleviate the level of congestion of a place but also increase its social performance. However, to date, there is still limited research on how this can be achieved, providing the impetus for this paper.

Theoretical and methodological framework

To investigate the social interactional potential of new public spaces designed with/out congestion in mind, this paper uses Goffman's "Interaction Order" as a social interactional theoretical framework to collect and analyse the fieldwork data (Table 1). This framework is useful because it helps to identify the constituents of social interaction among strangers. It consists of a "normative context" that frames them which typically includes behaviours associated with civility, civil inattention, or indifference; the "definition of the situation" which helps to identify when, how and where interactions occur against a comprehensive list of theoretical hypothesis (linking Goffman's theory with existing studies and includes the types of optimal spatial settings, events, spatial and social conditions for social interactions); and "the construction of actions" i.e. the resultant types of social interactions, such as active (when verbal interaction occurs) or passive in the case of little (only visual interaction) or no involvement and the key behavioural cues that can attest them. This framework acts therefore as the analytical frame of this study, helping to define the type of data that needs to be collected and analysed. Furthermore, it is complemented by a methodology consisting of a combination of sequentially nested methods of data collection including observations and interviews, followed by behavioural and spatial analysis, as described in Table 2.

To collect a large and optimal opportunity sample of instances of informal social interactions, fieldwork was undertaken during two consecutive years in 2009 and 2010 and revisited in 2012, 2014 and 2018. This was meant to allow comparison and clarify outstanding issues raised during the analysis.

Case study

This paper employs the original empirical material from one case study, the Parque das Nações [Park of the Nations] (PN), a new masterplanned neighbourhood built for the World Expo' 98 in a former harbour and industrial area in the eastern periphery of Lisbon. The PN has been widely considered as a good precedent of using a mega event as a catalyst for urban regeneration (Rosa 2010, Author 2016). Besides being part of a European initiative called *Urban* which aimed to promote equity, social inclusion and regeneration of urban, industrial and brownfield sites, it was also designed with a double plan in mind: to organize a mega-event with an end-goal to become a thriving neighbourhood, following the values of vibrant city neighbourhoods with a mixed-use centre, a variety of public spaces and amenities along its 5 km of riverfront (Machado 2006). Despite its good intentions, like many other projects of this kind, it has been heavily criticized because it prioritized private interests over the needs of existing communities (Carrière and Demazière 2002; Machado 2006). This is visible in its creation of housing primarily for the affluent and commodification and privatization of public spaces (e.g.

Table 1. Goffman's 'Interaction Order' (1963): normative context, definition of situation and construction of actions.

Normative context (basis of social interactions)	Definition of situation	Construction of actions/ outcomes
Public social order requires cooperation (Cooperative motility) (Goffman 1963): - Civil inattention (the majority of our social interactions). - Audience role prominence. - Restrained helpfulness. - Civility towards diversity.	**(1) Reputation or Behavior-place association (Goffman 1963, Karp et al 1991):** (a) Type of behaviors formal/tight vs. informal/loose (the most favorable) (Goffman 1963, Sommer 1974). (b) Nature of dominant relations: public sociability (the most favorable) (Lofland 1998). (c) Type of regular users: - Place-selective users: single people, 'withs' and/or groups (Goffman 1963). - Open persons (elderly and children). - Sensitive users: women, elderly, and children. - 'Undesirables' users (homeless or youth) (Shaftoe 2008). **(2) Extraordinary events (Goffman 1963):** - E.g., carnivals, festivals, fairs and spectacles and unexpected events. **(3) Favorable social conditions (suspension of norms) (Goffman 1963):** - 'Open persons' (Goffman 1963): more available for an encounter than others, such as children and elderly people. - 'Open regions' (Goffman 1963) 'places in which all the inhabitants are mutually accessible to one another' like cafes and bars. - 'Triangulation' (Whyte 1980): a process by which some external stimuli of a varied sort from physical objects, sculptures or street views can improve the scale and sense of place and have strong social effects, such as to trigger social interaction between strangers. - 'Time-out' (Goffman 1963): Its availability either in the form of free time or holidays can also be an effective condition to suspend the social norms and make people more socially accessible. - 'Self-congestion' i.e., What attracts people most (…) is other people' (Whyte 1980:19).	**(1) Passive outcomes: little or non-involvement (Goffman 1963, Lofland 1998):** - Maintenance of social order (norms). - People-watching. - Public solitude. **(2) Active outcomes: Sociability (Goffman 1963, Lofland 1998):** - Suspension of norms. - Fully focused visual and or verbal encounters. **3) Behavioral cues of an interaction:** - Social distance (between personal and social) (Hall 1969). - Body orientation (60- or 90-degree positions) (Scheflen 1972). - Tie-signs: greeting behaviours, formation of 'withs' and groups (Goffman 1963).

(Continued)

Table 1. (Continued).

Normative context (basis of social interactions)	Definition of situation	Construction of actions/ outcomes
	(4) Favorable spatial conditions: - **Low profile, small-scale, accessibility and diminished visibility** (e.g., bars) (Oldenburg [1989] 1997), - High visibility (e.g., cafés) (Laurier and Philo 2005). - Spatial distinctiveness (e.g., function, form and uses) (Oldenburg [1989] 1997). - Diversity instead of quantity of activities (Gehl 1971). - Amenities supporting stationary and optional activities (Whyte 1980, Gehl 1971, Alexander et al 1977). - 'Milling area' i.e., place where people feel comfortable when standing (Cavan 1966) **(5) Favorable settings:** - **Traditional informal gathering settings** (e.g., streets intersections, thresholds, etc) (Mehta 2013); - 'Mixed locales' (Lofland 1998): spaces that are socially comfortable for everyone, especially to newcomers. - 'Liminal spaces': spaces where class distinctions and notions of publicness and privacy are blurred (Zukin 1991): moments of 'in-betweeness', of loss of social coordinates' and 'liberation from normative practices because of its interstitial nature' (Zukin 1991). - 'Loose spaces' (Franck and Stevens 2007): a space that can change use, it can encourage 'looseness' i.e., 'optional' or other unregulated and non-instrumental activities. - 'Third-places' (private businesses for public use e.g., cafes, bars, or shops) (Oldenburg 1989). - 'Fourth-places' (anonymous, unfamiliar, and new designed public, private and semi-public spaces e.g., circulation, consumption, and recreation spaces) (Author 2016).	

Table 2. Methodology

METHODS	AIMS	PROCEDURES	DATA	PRODUCTS
DATA COLLECTION				
1.Non-participant naturalistic methods of observation. Fieldwork started with observations which were done unobtrusively with a small video camera, which the researcher carried all the time not to lose any single event.	It aimed to collect a large opportunity sample of instances of informal social interactions. That implied observing and sampling situations of interactions which are representative of the best conditions considered in the literature (favourable social-spatial conditions and public settings in analysis, see Table 1) to understand how each works in social and interactional terms.	• The first year of fieldwork was undertaken in 4 months: April, June, July and December 2009. • The second year was slightly shorter, it took 3 months: August and December 2010. In each month, fieldwork observations were carried out in 2 weeks of 3 weekdays and allocated 4 x 20 min per location during the structured route/walks. This gave roughly a total of 48 hours per location. • The subsequent years of 2012, 2014 and 2018 consisted merely of a follow up during a week in August to compare findings and/or clarify outstanding issues.	On-site observations recorded through field notes, maps, photo-documentation, and video recording,	This method provided an understanding of the types of users, patterns of use and social interaction and behaviour in the public settings in analysis.

Table 2. (Continued).

METHODS	AIMS	PROCEDURES	DATA	PRODUCTS
2.Various interviewing methods including on-site interviews in one central location and walking interviews. Sample: 42 people. Selection criteria: 1.Participants for onsite standard interviews were selected at random based on their expressed availability (e. g., they were usually selected during lunch breaks or after working hours). 2. Participants for walking interviews were recruited through the neighbourhood's local newspaper 'Notícias do Parque' and local website 'Portal das Nacoes'. The researcher invited participants to have a guided tour while they were interviewed.	It aimed to compare, confirm, or contrast the data obtained from the observations and clarify outstanding issues. It aimed to collect information about interviewees' social experience of the PN as a whole and of the specific public settings in analysis.	Types of questions: the interviews consisted of a set of open-ended questions aimed for a minimum duration of 20 min but could be longer depending on the participant's availability. 1. Are you a visitor, worker and/or resident? 2.Could you tell me whether you use frequently the PN and/or this specific space? 3. If yes, how do you describe this space? Do you think it is a comfortable space spatially and socially (it has sufficient spaces for sitting, resting, and socializing?). 4. With which uses do you associate this space? And are there any variations of use? 5. Do you think this space propitiates informal public life, i.e., social contact between strangers? If yes, under which conditions they can happen? 6. More specific questions were asked if any relevant issues from the observations required clarification.	Tape-recorded and transcribed interviews.	This method provided detailed descriptions about the interviewees' social experiences and interactions in the public settings in analysis.

(Continued)

Table 2. (Continued).

METHODS	AIMS	PROCEDURES	DATA	PRODUCTS
DATA ANALYSIS				
3. Spatial analysis: from an urban design perspective	It aimed to analyse the public settings' spatial attributes where social interactions were observed.	This assessed the public settings' design quality and performance against a set of established urban design principles of good practice - e.g, Responsive Environments (Bentley et al 1985). These include permeability, variety, legibility, robustness, richness, visual appropriateness, and personalisation.	Annotated plans of the public settings in analysis.	This method provided understanding of the spatial conditions and affordances of the settings in analysis.
4. Behavioural analysis: non-verbal communication/ body language methods and techniques	It aimed to analyse the visual data obtained from the observations, to examine the spatial and social properties of individual social interactions in the public settings in analysis.	It drew on unobtrusive direct observations using the video footage cameras to enable later re-examination of behaviour. The behavioural and spatial dynamics of social encounters were analysed in terms of proxemics, tie-signs, affordances, reputation and behaviour-place association, and normative social contexts and favourable conditions for the suspension of norms (Table 1).	Video footage and photo documentation of analysed interactions.	This method provided an understanding of the spatiality and sociality of social interactions, the mechanics between people and people and space including list of types of social interactions and affordances that support them.

(Continued)

Table 2. (Continued).

METHODS	AIMS	PROCEDURES	DATA	PRODUCTS
DATA INTERPRETATION	As this study dealt primarily with qualitative data from multiple sources and with not so rigorously defined behavioural variables (Harrigan, Rosenthal, and Scherer 2005), and is conducted by one single researcher (the only person involved in the interpretation process), this could compromise the objectivity and rigour of the process of data interpretation.	Misinterpretation risks and mitigation risk strategies: So to overcome potential data misinterpretation, this paper identified a number of potential data misinterpretation risks and devised a number of appropriate risk mitigation strategies to avoid them: 1. how to avoid misunderstandings when observing strangers and interactions between strangers?: how do we know that the people involved in an interaction are strangers and are interacting with each other?	The proposed theoretical framework in Table 1 provided all the necessary information to identify the 'strangers' and their level of engagement in a social interaction in relation to the considered key degrees of involvement –social distances, orientation and 'tie-signs'– cultural differences and relationships within the spatial setting where they occur. ● People's 'social distances', immediately communicate their type of social relation, and level of intimacy (Schefflen, 1972). The 'social distance' between 1.2 to 3.6 m (the third scale of distance (Hall 1969) is the most comfortable distance for engaging with strangers in most Northern European. Beyond that distance people will have to raise their voices, this makes it difficult to have a conversation (Cavan 1966). ● **People's body orientation can give a lot of information about their degrees of engagement in a social interaction (Scheflen 1972).** Strangers usually adopt 'Parallel positions' which communicate no relationship, but they can make themselves open for interactions if they place their bodies in '60 or 90 degree positions'. ● **People's 'tie-signs' provide information about the type of involvement in an interaction (Scheflen 1972). They confirm the type of affiliation or cooperation.** This is the most important cue that attests if people know each other or are strangers. 'Greeting behaviours' are the most informative signs. They are the visible markers of the beginning and end of an interaction. Then there are 'tie-signs' which attest when people are familiar or acquainted with others and in doing so form interactional units such as 'withs' – of two people when their bodies are close, turned to each other or walking together – and groups – also 'withs' but involve a larger number of people. ● **1a) Whenever it was unclear whether the observed people involved are strangers, and/or the nature of their interaction, the observed interaction were not considered as relevant data.** ● **1b) Alternatively if the observed interactions in analysis were unclear but provided interesting data (e.g., contrast or disprove existing theories and/or hypothesis), then they were subject of verification and further examination by revisiting the setting.** For that reason, it was proposed a plan to revisit the studied area in subsequent years.	

(Continued)

Table 2. (Continued).

METHODS	AIMS	PROCEDURES	DATA	PRODUCTS
		2.How to avoid misunderstandings in the data collection and analysis? 2a) A key strategy to avoid possible misunderstandings was to collect and analyse data in a consistent and objective and systematic way. • To do so, this paper adopted a behavioural sciences' approach of sampling behaviour (Scherer and Ekman 2005). Rather than observing every single interaction, it sampled situations of interactions which are representative of the best conditions considered in the literature. • The literature review revealed the behavioural and spatial cues (Table 1) that can be more objectively coded because they are readily recognized and considered invariant in most European cultural contexts. • The coding is consistent and systematic. After coding the sampled interactions, a quantitative and qualitative account and analysis of their content followed. This consisted of a content analysis, a well-known method of analysing images that does not rely on existing knowledge (Rose 2016). Likewise, this only required a selection of a set of coding categories that is clearly descriptive and representative of the most important spatial, social, or behavioural cues of an interaction (Table 1).		
ETHICAL CONSIDERATIONS	The primary ethical issues were concerned with maintaining respondent's confidentiality and rigorously complying with data protection legislation and best practice.	The project involved qualitative data provided by a range of methods and so particular care and attention was paid to thoroughly check that data to ensure the identity of the individuals and groups observed and/or interviewed could not be specifically identified in the sample cluster level.	All visual and written recorded data was held securely on secure university servers, and the project was put to all applicant's Research Ethics Boards prior to commencement.	

shopping malls and gated communities) and its resultant socially and culturally homogeneous demographics – a young well-educated community of Portuguese nationals, which largely contrasts with the surrounding neighbouring working-class communities (Fernandes 2005; Ressano Garcia 2010). However, the biggest critiques are towards its novel, large scale and highly thematic, ordered, and controlled urban design and its negative impacts to the public realm (Fernandes 2005). These critiques are partly influenced by the conventional wisdom that new masterplans and designed public spaces are generic and anonymous. However, according to a public survey, its publicly accessible spaces are very much appreciated and valued by the local community and the wider city (Moreno 2015). This observation offers a more nuanced perspective that resonates with more recent literature (Cybriwsky 1999; Talen 2002), asking us to consider both sides of this debate and further examine the PN's new designed public spaces to understand how restrictive or conducive they are for informal social life.
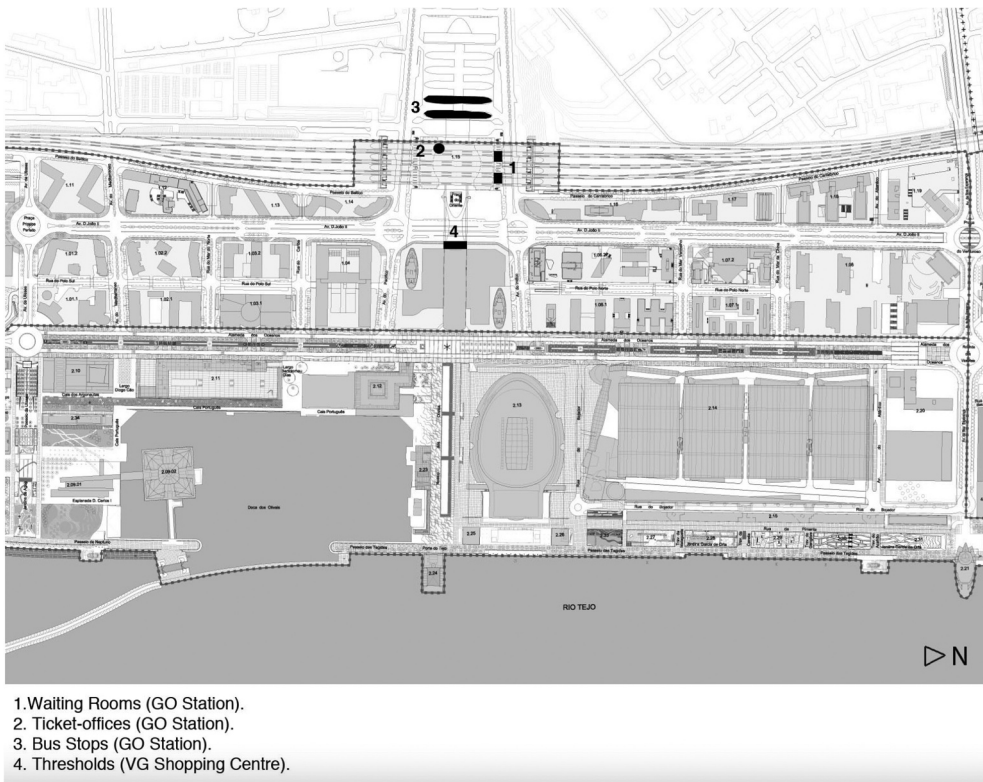
Empirical research

Human congestion was an idea that deserved further attention during fieldwork. Underlying the PN's urban plan was the world expo's design rationale with anti-congestion and crowding in mind of long, wide, and spacious public spaces, in other words, with a "scale appropriate for a World Expo exhibition, but not for a city." Preliminary fieldwork, however, revealed that the PN's public spaces can feel sometimes congested, and this can be a positive experience if they offer opportunities to bring strangers together. To understand how its public spaces can facilitate positive human congestion, four locations were examined (Figures 1 and 2): the stations' waiting rooms, ticket offices, bus stops, and shopping centre thresholds. The station is public owned but privately managed by a security company. All four locations are small-scale activity nodes where people spend a great part of their time stationary either in situations of "killing-time," waiting for their transport or the opening hours of a building, or queuing to buy a ticket.

Fieldwork in 2010, 2016, and 2018 revealed great consistency in terms of patterns of use, behaviour, and interactions, so there was no significant variation to report, apart from an increase in visitors during the summer months, though this had little impact on the social life of all these different settings and their most regular users.

Bus stops

Bus stops are the largest activity nodes at the station, having each the capacity for 120 people including standing and seating, particularly weekdays during peak hours. They cater primarily necessary activities (e.g. transportation purposes) but also attract a lot of other secondary uses (Latham and Layton 2019; Lofland 1998). Fieldwork observations revealed that bus stops are indeed good social mixers, attracting a fairly mixed number of 35% females, 40% males, 12% elderly, and 13% children throughout the weekdays, though with more working age groups during peak hours, early mornings and afternoons between 3 and 5 pm, and elderly outside peaks between 10 am and 3 pm after 5 pm. They are also

1. Waiting Rooms (GO Station).
2. Ticket-offices (GO Station).
3. Bus Stops (GO Station).
4. Thresholds (VG Shopping Centre).

Figure 1. Selected congested spaces for observation.

important social nodes where unknown, "familiar strangers" and acquaintances, mostly residents and workers in the area, meet each every day, when commuting to work.

Spatial analysis identified that bus stops have their own specific social dynamics, and this depends on their specific context. The Gare do Oriente bus station has six waiting islands for the bus: two of which are for city buses and four for longer national and international bus routes. Each island has a total of 30-m length by 4-m width and is subdivided in six bus stops with three double-sided benches with central backrests. Among the available bus stops, the most used were often the first two islands of bus stops (B1,2) closer to the station with more regular buses. These bus stops were often congested during weekdays, particularly peak hours: early mornings and late afternoons after working hours, though with different patterns of use. One was of social convergence in orderly fashion when people kept themselves to the queue territory, i.e. they remained standing up queuing. Other times, they shared the only seating space available next to the queue, the bases of the beams (Figure 3). The second identified pattern of use was of non-orderly social convergence when people spread themselves across the platform, creating a "milling-area" (Cavan 1966). This occurred if they were not worried in keeping their place at the queue or if it was not yet time for their bus to arrive.
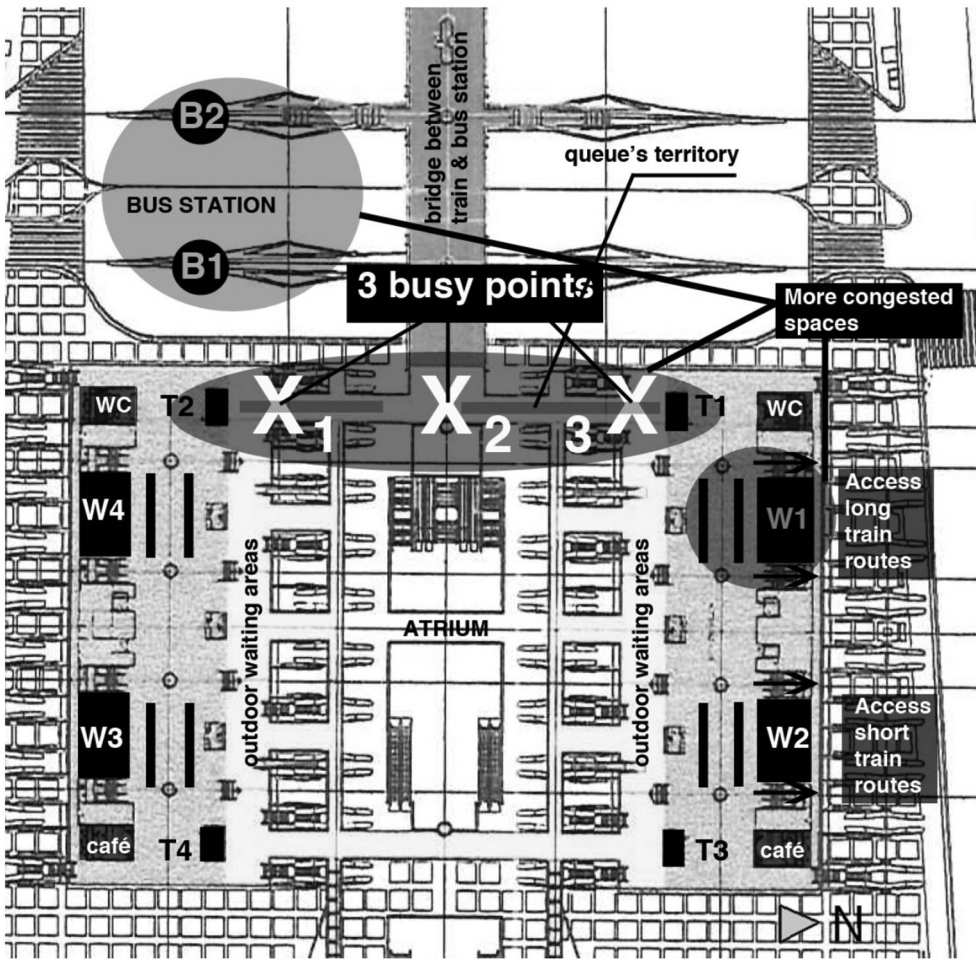
Figure 2. Map of distribution of congested spaces in the station.

Figure 3. Informal sitting spaces.

Figure 4. Encounter between two acquaintances and two women strangers (left); encounter between two strangers extends to three (right).

Figure 5. No encounter when the bench is full (left); one encounter when the bench is less full (right).

Behavioural analysis observed significantly more encounters among the people that kept themselves orderly to the queue than to those that were not (Figure 4). At the benches, only conversations among "familiar strangers" or acquaintances were registered (attested by their greeting behaviours). Even in extreme congested situations the benches did not help much for people to interact with strangers. Most people kept to themselves. This is explained by the limited space between the benches and the queue. In congested situations, the benches are facing a wall of people queuing. The only significant encounters among strangers sitting occurred when the bus stop was less congested, and the atmosphere a bit more relaxed and therefore "looser" (Figure 5). When this happened, people felt more comfortable to initiate a conversation, putting themselves in a more favourable orientation at right angles (Scheflen 1972).

As observed, positive congestion appears to be an important mediator of social interaction at the bus stops, and this is possible through social convergence of a large amount of people through the act of queuing. Unlike the ticket-offices, at the bus stop queuing can be both made in an orderly or less orderly fashion. In any case, when people keep themselves to the queue territory, they are more exposed to encounters with strangers. Standing at the queue puts them in close social proximity to each other and makes them more open for a conversation. It is in fact easier to start up a conversation when standing rather than sitting. When standing, one has more freedom of choice. One has the choice of orientation to the street or queue and can easily adjust one's social distance.

Figure 6. Opening times at the VG shopping centre threshold street level.

Building thresholds

The Vasco da Gama Shopping Centre's thresholds are the second-largest activity nodes near the station, some with capacity for up to 50 people standing at peak hours. They are important boundary and transitional spaces between public and private space (Norberg-Schulz 1971; Hillier and Hanson 1984; Bobic 2004) but are also key contact spaces where strangers are gathered by necessity when moving through them or waiting and meeting nearby (Stevens 2007; Whyte 1980; Stevens 2006).

Fieldwork observations demonstrated that publicly accessible thresholds bring a fairly mixed range of gender and age groups for a variety of necessary, optional, and social activities and purposes at different times. Thresholds can also become optimal social spaces when a certain level of congestion occurs. This is particularly visible during the opening times of the Vasco da Gama Shopping Centre and its west thresholds facing the GO station: one at street level, another at the level −1. These thresholds attract primary workers (35%) in the area who walk to work or come to have lunch and elderly (40%) and youngsters (25%) who come for shopping and socialising. However, social interaction among these groups is mainly noticeable around waiting activities at the thresholds, when there is some congestion. Waiting as an activity involves a certain degree of routine, regularity, and familiarity. Every day between 8 and 9 am, it repeats itself and often involves the same people: the workers of the shopping Centre and early shoppers, mainly elderly people ("open persons"), many of which are "familiar" or "biographical" strangers. In both thresholds, similar patterns of social density and convergence were observed, but with distinct patterns of social behaviour. Although, people tended to occupy both thresholds in the same way, each threshold has different social dynamics. These became apparent when analysing their urban design. The threshold at the street level is approximately 20 m wide and is facing immediately the main road and a crossroad (Figure 6). It is thus readily accessible by car and foot. As the overhang above is limited in size, it has good sun exposure. The threshold at the level −1, below the street level, is enclosed and protected from the street (Figure 7). It is only 12 m wide and is less physically accessible than the previous. It is only accessed by one flight of stairs and one lift from the street.

Figure 7. Opening times of the VG shopping centre and congestion at the threshold (level −1): at 8 am (left) and 9 am (right).

Figure 8. Encounters at the threshold during opening times and congestion (level −1): "milling area" and edges.

However, it offers plenty of amenities – a café and a shop at each side and a big overhang that offers protection from the adverse weather conditions.

Further, behavioural analysis demonstrated similar patterns of behaviour in both thresholds during opening hours. The first round of people to arrive always tried to be close to the doors. A second round of people spread out across the space, filling the edges. The next people to arrive started to fill the spaces in between, until reaching a higher socially density. The highest point of social concentration was at 9 am when people start entering the building. Despite the similarities in the threshold's occupation, the threshold at the lower level was always more congested (Figure 8). There, it was found a higher tendency for social concentration, or better said for "self-congestion", using Whyte's term (Whyte 1980). Yet people distributed themselves differently across the space, depending on the amount and location of people already there. Three locations were often selected (Figure 10). One location was the sort of "milling area" which Cavan (1966) described as the place where people feel comfortable when standing. The other two were the two areas at the edges, way from the "milling area", where people could lean against the wall or sit on the steps. Most people waiting did not seem worried about their position at the queue, quite the contrary. Their only concern was to be to close

enough to the door and to have some minutes of "time-out". This was attested by their activities. Some people read the newspaper, did "people-watching", had a coffee in the café next door, or engaged in conversations with elderly or "familiar strangers". Most conversations occurred in the "milling area" (which often achieved a social density of approximately 50 people), especially at the immediacies of the entrance doors and the café, which were the two areas where there was a highest concentration of people, particularly elderly ("open persons").

In the other threshold, at the street level, the concentration of people was always lower. People tended to spread out more and leave more space in between. They never filled the space totally neither they engaged in optional activities such as reading a newspaper. For that reason, social congestion was never reached, and there were fewer encounters among strangers. The only encounters observed were between the shopping's fellow workers, which were probably "familiar strangers". Here, the space is a bit more open and exposed to support social activities.

In short, positive congestion at the thresholds is the result of social density and convergence of people stationary waiting. Unlike the other activity nodes (e.g. waiting rooms), it happens with a larger amount of people in a significantly larger space. As observed with the lower threshold of the VG shopping, this was possible thanks to the provision of a certain level of social comfort, in other words, good enclosure and protection from the street, the provision of some amenities and of course the regularity and familiarity of the waiting event. These features were effective in reducing people's feeling of being observed by a large audience, which is always a strong inhibitor of social interaction (Worchel 1978). The provision of ample space at the edges also provided more possibilities for waiting locations. People could choose to be part of the crowd if they stayed in the middle in the "milling area," or at the edges, if they wished to be away from the crowd and searched for a safe place for "people-watching."

Waiting rooms

Waiting rooms are the third-largest activity nodes at the station with full capacity for 30 people seating during weekdays particularly at peak hours. They are also the locations where the greatest variety of uses and users, and longer social interactions were observed. Indeed, fieldwork observations showed that during weekdays waiting rooms cater a wide range of social and optional activities associated with waiting and killing-time and a fairly inclusive mix of gender and age groups, with a higher number of women (43%) than men (15%), and elderly (22%), and families with children (20%), attesting their safety and comfort. Interesting enough, these observations contrast with most interviewees' descriptions, 42% of whom reported their dislike of those spaces because "the environment is heavy" and "claustrophobic" and considered them socially "unfit" for informal interactions, though most recognised that they are not regular users.

Further urban design analysis revealed that waiting rooms seem to have all the favourable conditions to become optimal informal social settings. They are small scale, well enclosed and fairly comfortable for waiting long time. They are often publicly accessible and can be used by a diverse range of users besides the usual ticketed passengers. But their use also depends very much on the dynamics of their locations. In this case, all the waiting rooms are not only physically accessible from the street by stair,

Figure 9. Outdoor waiting area (left); waiting room (W1) next to the train platforms of long destination routes (right).

escalator, or lift but also visually well connected to the atrium, which is the station's central space where all core activities are located. Further analysis identified that there are more factors at play. They are small-scale transparent glass boxes (7 × 7 m), divided in half in two room divisions by a transparent partition wall but accessed by one single door. Each division room has a limited carrying seating capacity for up to 15 people, so 30 in total. The rooms are also well illuminated, ventilated, and heated during the winter, offering a greater level of comfort than the outdoor seating spaces. However, these waiting rooms have differences in terms of the uses and the crowds they attract (Figures 9). The two waiting rooms at the west side (W1,4) are often more used and congested than the other two at the east (W2,3). This is explained mainly because of their different location in relation to the train platform destinations, located above on the second floor. The two westside rooms (W1,4) are located next to the platforms of long destination routes to the north of Portugal; the other two east side rooms (W2,3) are next to the platforms of short routes, the suburban trains (Figure 2). Passengers of long distances tend to arrive earlier for their trains and mostly use the westside waiting rooms. They wait longer and in general are more available for conversations. The types of users are also more varied, from people alone, couples, groups, and families.

Subsequent behavioural analysis evidenced that Fridays are the days more propitious for encounters, as more people use the waiting rooms. On Fridays, there are a lot more encounters than other days, two times more, but also, they are often more long-lasting. According to the station's management team, this is the day when more people catch the train to go somewhere in the weekends or to visit their families that live in other parts of the country.

Most encounters observed occurred when there was a limited amount of people in each room division (Figure 10). When the amount of people was kept to a minimum of six people, people would be more prompt to interact. If the number of people increased, they would suddenly stop talking and engaged in another activity. It was also recurrent that people that sat laterally or frontally and often did not interact. These are not the most comfortable positions for strangers to interact. Only seating positions 60° and 90° angles communicate openness to engage with third parties. We confirmed that only in these seating positions, people would be comfortable to interact even if the room was barely empty. The transparency of the waiting rooms also played an important role. It provided

Figure 10. Two parallel encounters between two passengers: first (left) and second (right).

enough distraction and a causal focus (Bishop 2013; Worchel 1978). It inhibited the experience of congestion and increased interpersonal attraction in the groups whenever personal space was reduced or violated.

From these observations, we can conclude that the main factors that contribute to the sociability of the waiting rooms are their location in relation to the main pedestrian flows, waiting time and above all positive congestion. Positive congestion is made possible in a small-scale space with a small group of people. These conditions make people more predisposed to interact with strangers. They give people the feeling that they are more in private rather than under observation by a large audience. This finding confirms previous studies on crowding that focused on interpersonal interaction (Stokols, Smith, and Prostor 1975). It demonstrates that in crowded situations the bigger the group is, the less likely are people to behave cooperatively or interact with strangers. Furthermore, it also reinforces Alexander's notion of optimal size for public spaces (Alexander, Ishikawa, and Silverstein 1977), in terms of how many people are needed to enliven them, and how comfortable they are for social interaction. It shows that not only it is easier to enliven a smaller than a larger space but also certain spatial and social conditions still need to be in place, to make it comfortable enough for people to stay stationary for an extended period and to predispose them for social encounters.

Ticket-offices

Ticket-offices are the smallest activity nodes at the station, with capacity for 30 people standing. They attract a wide range of individual users or small groups and well-balanced gender mix (almost 50–50 split) though less in terms of age, as most users are working age (70%). But ticket-offices are somehow limited in the uses and interactions they can support. This is so because they serve a single purpose – queuing to buy tickets – which, as observed, can be a very demanding activity. However, fieldwork observations evidenced their great social interaction potential, whenever they attract high social gravity, and queuing involves long waiting.

As observed, the activity of queuing creates a particular type of waiting. People are channelled into a queue in an organized fashion and tend to keep their social distance independently of the amount of people there. They do not have any other choice than to be standing or to engage in any other activity than queuing. The focus remains always on the queue and on the people in front. But while queuing people are

Figure 11. Encounters at the ticket-office queue: asking directions (left); disruptions by passers-by (right).

attentive and can be predisposed for encounters, and this was confirmed by 65% of the interviews. As a visitor said, "Interaction with strangers is at the ticket offices, because it takes long time." Yet the type of encounters at the ticket-offices is often brief, only lasting a couple of seconds or minutes. However, further urban design analysis revealed that opportunities for encounters are very dependent on the dynamics of use of the location, type of queuing line and time of the day. The four ticket-offices on the first floor of the station are located at the four corners of the railway station at approximately 100 m far from each other, and at the intersection of the four main corridors. The two ticket-offices at the west side, similarly to the waiting rooms, are more used and have more pedestrian flows passing by them. They are located next to the train platforms of long train destinations.

Behavioural analysis confirmed that most of the encounters observed were the result of the ticket-offices' exposure to the pedestrian flows at the location. After all, the queue is in a busy and somehow narrow corridor of only 2-m width that gives access to the main train destination platforms, the pedestrian bridge that links to the bus station, main stairs, and lift of access to the street (Figure 2). There are always many people passing-by coming from all directions and asking for directions. But it is when the queues become too long, the opportunities for encounters increase. As observed, when the queue is long it obstructs the passage to the pedestrian bridge that links to the bus stop. This increases considerably the waiting time and exposure for encounters with the people passing-by. In just 2 h (4–6 pm), eight encounters were observed: five were the result of enquiries or complaints among the people waiting at the queue, three were the result of sudden disruptions from passers-by who to pass had to pierce the queue (Figure 11). There were also obvious differences in the daily patterns of use. We registered far more encounters (70% more) at peak-hours (8:30–10 am and 4–6 pm) than off-peaks (10 am-4 pm).

All these findings led us to conclude that positive congestion is also an important element to the making of the sociality of the ticket offices. Yet in this case, it is the result of social convergence of a considerable amount of people queuing in an orderly fashion. In this context, to maintain the queue's order, people must keep themselves attentive to the people in front and to the dynamics of its location, namely the pedestrian flows passing-by it. Furthermore, the urban design of the location also plays an important role. The fact that the ticket-offices are in such busy nodes at the junction of so many access points makes people queueing more exposed to encounters with passers-by.

Discussion and conclusion

This paper explored human congestion, an ongoing condition, and critique of cities and urban public spaces for the past three centuries, with a view to examine whether it can become an optimal condition for informal social life and interaction. It focused on four types of public settings that illustrate and counter this critique well. It did so by using a sequentially nested combination of methods of observations, interviews, non-verbal communication, and spatial analysis to provide different types of data which combined offered well-rounded analysis on the observed and experienced sociality and spatiality of social interactions among strangers in the public spaces in analysis.

Taken together, the findings demonstrated that human congestion can generate positive social experiences. It can make public spaces livelier and encourage social interaction with strangers more than it is minimally necessary. As observed in the four types of public settings studied, positive congestion is enacted by activities such as waiting and queuing which in turn can make it a positive experience if specific social and spatial conditions are in place.

The activities of waiting and queuing may not be popular pastimes, but they are an inescapable part of our everyday life and have certain advantages for social interaction. First, if they are in-between other activities, they can establish the favourable conditions to engage in less serious activities and goals (Schwartz 1975). They create formally designated "micro-waiting zones" (Bishop 2013), which can be temporary or permanent, depending on whether they are or not allocated a dedicated space – e.g. the waiting rooms or ticket-offices, respectively – but which character is determined by the time involved in waiting and queuing, and types and duration of the interactions therein. In doing so, they create a liminal and in-between space where time and people's identities are temporarily erased or rendered less important, and thus creating opportunities to bring people together. Yet waiting and queuing do this differently. Waiting creates social density by concentrating a considerable number of people into one space while queuing enables social convergence by channelling people. These findings recognise the role of waiting activities and spaces in our social life, two aspects arguably under-theorised and researched in urban design, showing that these activities are not wasted time and do not occur in non-spaces (Alexander, Ishikawa, and Silverstein 1977).

Congestion can also be a positive experience if supported by certain spatial conditions. In the case of waiting, the social density of the location must be optimized, it needs to be a small-scale space and a small amount of people. In reverse, if the space's carrying capacity cannot be optimized, i.e. if it is a larger amount of people waiting, it must be compensated with additional spatial features such as the provision of more enclosure and reduced visibility. Both situations show that people prefer to be more in private, rather than being under observation by a large audience. This finding reinforces Alexander's notion of optimal size for public spaces, in terms of how many people are needed to enliven them (Alexander, Ishikawa, and Silverstein 1977). But the provision of distractors such as a lot of movement in and out and room transparency can also reduce the effect of congestion. They can redirect attention away from the group or increase their interpersonal attraction (Desor 1972; Worchel and Teddie 1976).

In the case of queuing, positive congestion can be achieved when social convergence at the location is increased. Queuing makes congestion more manageable and ordered, as

a result, people are more at ease to interacting with strangers. However, the opportunities for interaction depend on the queue's layout and the dynamics of the location. Queuing at the ticket office occurs in a narrow and somehow busy or prominent location with many access points, and thus very exposed to many pedestrian flows. Queuing at the bus stop, on the contrary, is less orderly and formalized. People have more freedom of choice whether to remain or leave the queue territory.

These findings provide important insights into the wider debates on designing with and without congestion in public spaces. First, they confirm that congestion can generate positive experiences and help to create more lively public spaces (Bay and Lehmann 2017) and that there are thus benefits in using a balanced approach to designing with and without congestion, confirming recent research in this area (Abusaada and Elshater 2019). They also confirm the need to pay closer attention to the relationships between the social and physical dimensions of a place, if we want to understand how to design for positive congestion. Indeed, the social interactional theoretical framework used in this paper offers new insights in this respect. It allows focused attention on the micro-scale social, spatial, and behavioural mechanics between people and space engaged in social inter-actions in congested public spaces and, in doing so, demonstrates that urban design plays an important role to play in shaping social interactions under conditions of congestion. But, more importantly, this study brings new understandings about the type of activities – "in-between activities" such as waiting and queuing – that are more likely to create congested but also more lively public spaces, and the specific social and spatial conditions that must be in place, for this to happen – e.g. the optimal carrying capacity of a space, the enclosure, transparency, layout, and dynamics of the location. In doing so, it places a stronger focus on the micro-scale analysis of public spaces, by offering new understand-ings on how urban design can optimise the correlation between design, management, and uses of congested public spaces. This is new knowledge, since most work to date on congestion in cities and public space has mainly focused on the macro-scale of planning and design interventions (at city and neighbourhood scales) through strategies focused on governance, planning, and building regulations, laws and incentives, with the aim to incentivise compact urban form and high density, optimize mixed land uses at the blocks and buildings, promote small-scale nodes of activity, integrate more green space, among other means (Bay and Lehmann 2017).

Ultimately, the findings of this paper also challenge old assumptions that see conges-tion as either a negative indicator of over-use, overcrowding or a fatal urban condition – following ideas inherited from modern planning and architecture (Relph 1987; Shaftoe 2008), which were then picked up again, more recently, in studies on the COVID-19 pandemic and its impacts on public space use (Mehta 2020) – or as a positive indicator that people use public spaces, as advocated in recent urban policy agendas such as in Lisbon (CML 2018; Whyte 1980). All these arguments about congestion are only informa-tive about the successes and failures of public space in terms of the amount of uses or users (Carmona 2010). They do not tell us that under certain circumstances, if people have the time or predisposition, or if the urban setting and its behaviour associations are favourable, it can become an optimal condition for social interaction. After all, as demon-strated here, a certain level of human congestion can be positive, and this should be acknowledged by planners and urban designers. However, the limitations of this research also need to be recognised. Because it was built upon a single-case study, its findings

cannot be easily generalised to other social and cultural contexts. More research is needed to further substantiate and expand this research through more empirical analysis of a wider range of congested public spaces and contexts to examine their urban design against the user's experiences and interactions, and the different ways in which congestion can become optimal – even if these are contingent on who the users are. More research is also called to better understand how to design for positive congestion, in a way that it is safe and beneficial for all.

Note

1. These divergent theories are the result of applying different concepts and models for defining public life and public space. On the one hand, the theories of decline are still guided by traditional ideals of small and homogeneous communities and uncommodified and inclusive public spaces (Madanipour 2003; Varna and Tiesdell 2010). They theorize public and private as two different realms and assume that mixing the two always represents a loss of something authentic. On the other hand, the positive theories consider that the blurring of the public and private can result in positive valued public realms, asking us to redefine our traditional notions of public life and public space.

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