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A stroll in the park, a view of water: Quantifying older people's interaction with 'green' and 'blue' spaces in urban areas☆

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ABSTRACT

This article explores the extent to which 'green' and 'blue' (water-based) spaces in the environment are of interest to older people in their everyday lives and connects with research showing growing understanding of the importance of such spaces in urban areas and increasing numbers of active and mobile older people in societies around the world. We are concerned with both large-scale or formal 'green' and 'blue' features (open countryside, parks and lakes) and micro-scale patches of grass or cascading fountains. This article focuses on two groups of older people (60 years and over) living in Brighton and Hove on the South Coast of England, and Hackney in central London. A mixed methods approach involving the co-creation of data by means of geo-tagged digital photographs and GPS enabled tracklogs collected by 50 participants over a week of mobility away from their domicile. There was considerable variety in the extent of the 'green' and 'blue' space content of the photographs and in the distances travelled by participants, nevertheless some clearly focused on producing images of the natural environment in a range of settings spanning formal parkland, managed sporting grassland and relatively untamed countryside.

1. Introduction

This article sits at the convergence of two trends in contemporary societies: on the one hand a realisation of the growing importance of 'green' and 'blue' spaces in the mosaic of land uses that constitute contemporary, dynamic urban landscapes and on the other growing numbers of relatively healthy older people in comparison with their forebears actively ageing in public outdoor as well as private indoor spaces. A number of studies from different disciplinary perspectives including gerontology, geography, urban design and social policy have recognised social encounters outdoors as a significant factor in enhancing older people's quality of life and in determining the usability of public spaces in old age (e.g. Burton & Mitchell, 2006; CABE, 2008; Joseph Rowntree Foundation, 2004; Risser et al., 2010; Sauter & Huettenmoser, 2008). Enablers and inhibitors of access to outdoor environments have been the central focus of these studies in terms of design and service provision and 'good design' supports individuals' positive experience of public spaces. In other words, the emphasis has been on making the practical features of everyday indoor and outdoor living accessible to all. These include such actions as ingress to buildings and other places, movement along footpaths and pavements and creating surfaces, signage and other infrastructure that satisfies requirements for non-visual sensory perception. The emotional, perceptual and 'softer' aspects of older people living in the public realm, such as ambience, environment and social interaction have received less attention. There is some indication that this situation has started to change in recent years. For example, Buttazzoni et al. (2021) undertook a systematic review of literature concerning studies combining neuroscientific and mobile technologies to explore mental health, and Torku, Chan, Yung, Seo, and Antwi-Afari (2022) investigated older adults' responses to potentially stressful environments. This article attempts to go some way towards redressing this imbalance by exploring the extent to which 'green and blue spaces', in other words features comprising or incorporating vegetation with or without water register as elements worthy of attention in environments visited by older people and the ways in which they constitute public or semi-public venues in which older people can engage in social interaction.

The familiar environments that represent the everyday world of

Abbreviations: B&H, Brighton and Hove; LBH, London Borough of Hackney; IMD, Index of Multiple Deprivation.

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older people, especially their home or neighbourhood, have a long pedigree in studies of ageing, although examination of outdoor environments as distinct from indoor spaces remains relatively recent (e.g. Phillips et al., 2013; Walford et al., 2017). Geographical approaches to the study of ageing focus on the person-environment relationship, which considers the environment not as a fixed context but as a transformative one that changes alongside the evolving needs and abilities of the older person and his or her opportunities to exert control over the environment (Hooyman & Kiyak, 2008). The following section explores these issues in relation to ways in which this socio-environmental context has been explored in theories of ageing. The characteristics of the two study area locations are examined in the subsequent section together with our mixed methods approach to the co-creation and collection of qualitative and quantitative data from a group of 50 older people split equally between the study areas. The results of integrating and analysing these data are presented before discussing the lessons learnt and conclusions from this study. The concluding section also reflects on whether the procedures and findings would be different if the study were to have been replicated in 2021/22, for example noting how the restrictions on people's outdoor activity during the COVID-19 lockdowns differentially impacted on various sections of society (see for example Levinger et al., 2022).

2. Ageing and environment

Early theories on the relationship between socio-spatial environment and ageing, the ecological theory of ageing, notably the environment press model (Lawton & Nahemow, 1973) and docility hypothesis (Lawton, 1980), rather negatively described ways in which older people might adjust to their environments. However, Föbker and Grotz (2006) claimed that older people's wellbeing can be associated with both activity and disengagement, and their living environments should enable these possibilities. Findlay and McLaughlin (2005) stressed a shift towards a more positive emphasis on the person-environment relationship within theories of ageing as a consequence of demographic change that has resulted in increased life expectancy and a general betterment of health conditions. The emphasis in policy and academic research has now been redirected to the investigation of outdoor areas, focusing on accessibility and mobility in familiar and unfamiliar environments (Blackman et al., 2003; Burton & Mitchell, 2006; Matusoka & Kaplan, 2008; Open Space Research Centre, 2011; Risser et al., 2010; Valdemarsson et al., 2005; Phillips, Walford, & Hockey, 2011). Sugiyama and Thompson (2007) outlined three interrelated and overlapping ways in which older people engage with the outdoor environment to positively influence their quality of life and wellbeing: participation in physical activity; exposure to outdoor natural elements; and social interactions with friends and neighbours.

The extent to which older people have such encounters is typically related to their mobility, which in general tends to diminish with the passage of time. Older people's mobility in the public realm has been the subject of a substantial body of work in urban design and transport-related research, highlighting specifically the design features that may ease or impede their navigation of public spaces and the elements that may facilitate opportunities for social interaction (Burton & Mitchell, 2006; Day, 2008; Lavery et al., 1996; Risser et al., 2010; Valdemarsson et al., 2005). Studies on outdoor mobility of older people have engaged with a wide range of issues, notably the physical and psychological benefits of regular walking on people's health and wellbeing (Ruuskanen & Ruoppila, 1995; Simonsick et al., 2005; Van Cauwenberg et al., 2014). Older people's patterns of mobility in urban/suburban areas, experiences when travelling by pubic or private transport and impacts of mobility on quality of life have also been investigated (Banister & Bowling, 2004; Föbker & Grotz, 2006; Lord et al., 2011; Metz, 2000; Mollenkopf et al., 2007; Risser et al., 2010). Taking a longer term perspective, there is evidence across many European countries that older people now benefit from more active, healthy ageing and enhanced wealth compared previous generations as life expectancy has lengthened (Banister & Bowling, 2004; Wahl et al., 2007).

'Green' spaces are long established features within the 'built-up' urban landscape, with many owing their existence to private benefactors and public authorities as well as commercial developers. For a number of years these spaces have earned epithets such as 'green lungs' (Cicea & Pirlogea, 2011; Hoskins, 2004) or 'green buffer zones' (Gupta et al., 2012), but their essentiality in the urban landscape serves a range of functions promoting health and wellbeing (Ministry of Housing & Communities and Local Government, 2019; Carpenter, 2013), environmental quality (Wolch et al., 2014), exercise and fitness (Pretty et al., 2006), creative arts (Dirsuweit, 1999; Kong, 2009) and economic vitality (Gore et al., 2013). Wolch et al. (2014) revealed that 'green' spaces in cities help to encourage activity and improve people's general physical and psychological health and wellbeing. In an urban context the term 'green' spaces is used in various ways indicating large open spaces such as the royal parks in London or Central Park in New York or small areas of vegetation within a range of settings; some 'green' spaces include facilities for organised activities or refreshment, others are present as part of the passive background landscape.

A quantity of evidence also now exists suggesting that encountering 'green', and by extension, 'blue' space potentially enhances wellbeing for all age groups (Cherrie et al., 2018; Ekkel & de Vries, 2017; Hartig et al., 2014; Richardson et al., 2013), although examples relating to 'blue' space as an environmental feature are comparatively rare as distinct from their use for swimming (Völker & Kistemann, 2013; Foley & Kistemann, 2013; Garratt et al., 2019). However, the simple presence of 'green' or 'blue' outdoor environments may not guarantee their use and Hitchings, 2013 and Bell et al., 2015 assert that it is important to understand the complexity of people's everyday lives and routines. This raises a second theme contributing to the background of this research relating to the use of alternative methods for collecting data and eliciting information about people's behaviour and actions, and in particular those concerning what Bell et al. (2015: 88) referred to as the "unremarkable or mundane" practices of everyday life. The aim of this article is to explore the extent to which 'green' and 'blue' (water-based) aspects of the environment are of interest to older people in their everyday lives. We are not only concerned with the formal or large-scale 'green' and 'blue' features, such as open countryside, parks, lakes and rivers, but also the micro-scale such as marginal trees, patches of grass or cascading fountains.

3. Data and methods

3.1. Mobile methods

The main focus of this article is on older people's everyday encounters with, and impressions of, 'green' and 'blue' spaces in urban settings. To aid with exploring these issues the "new mobilities paradigm" (Sheller & Urry, 2006) underpins the data collection framework by seeking to garner participants' responses as they occur rather than in situations of detached, remote, retrospective and static recall. Supporters of this approach argue that people live in a highly mobile world involving both physical corporeal movement as well as different forms of virtual and imaginative movement arising from global and local flows of information, objects and ideas coming into people's lived experience (Murray, 2009; Sheller & Urry, 2006). Büscher and Urry (2009: 101) argue that five types of interdependent mobilities produce people's 'social life': corporeal travel, physical movement of objects and commodities, imaginative travel from talk and social media, virtual, and communicative (e.g. letters, messages, etc.) travel. These authors further argue that the emphasis on propinquity and co-presence in social science has privileged corporeal and virtual mobility at the expense of the other forms.

The emergence of the new mobilities paradigm has been paralleled by an almost phrenetic adoption of 'mobile methods' throughout the

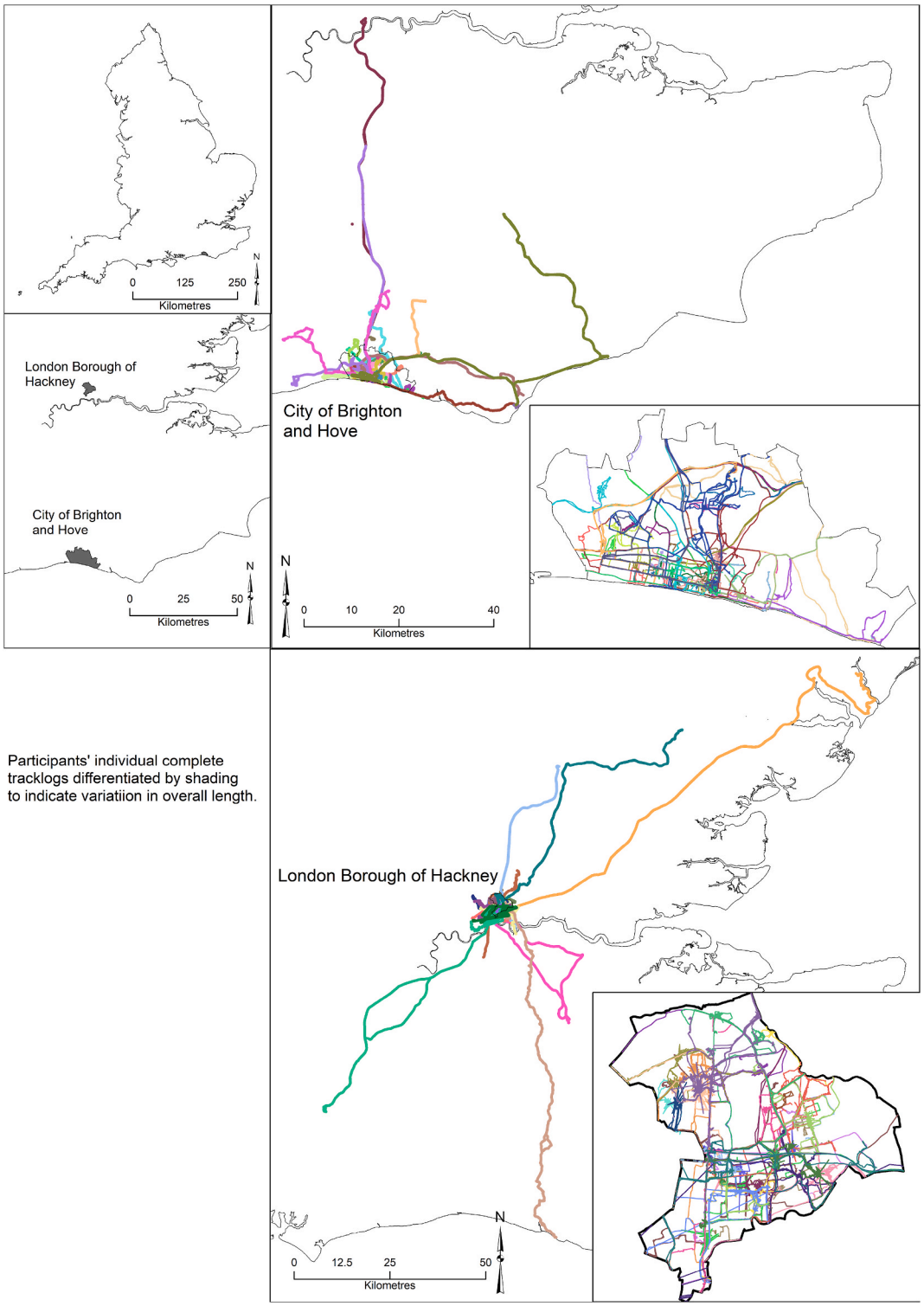

Fig. 1. Location of Brighton and Hove and Hackney in England and overview of participants' tracklogs.
Note: Insets shown only those parts of participants' tracklogs that were within their home local authority.
Source: Participants GPS tracklogs; Ordnance Survey, Edina. © Crown copyright and/or database right 2020 OS.

social sciences in recognition of the need for less static approach of engaging with research participants (Büscher & Urry, 2009; Fincham et al., 2010; Murray, 2009). These researchers question the adequacy of the traditional in-depth interview for capturing not only the habitual, the mobile, the momentary and the chaotic, but also the sensory, emotional and kinaesthetic. Because of the perceived inadequacy of such techniques, it is claimed that new 'on the move' research methods must be developed (Büscher & Urry, 2009; Law & Urry, 2004). Proponents of mobile methods argue that their strength lies in capturing what is happening when it is happening within the space and time dimensions of the actual experience. The range of 'experimental' mobile methods has embraced research participants video-recording their experiences of walking, driving and cycling or recording space-time diaries (Crosbie, 2006; Latham, 2003); or researchers observing video-recordings of

Table 1
Selected background characteristics of participants in Brighton and Hove, and Hackney.

Pseudonym	Gender	Age	Years in area	Lives alone	Living relatives	Marital status	Education	IMD score	Accommodation	Previous employment
Brighton and Hove										
B-A	2	71	37	1	1	2	6	5	4	Teacher
B–B	1	62	25	2	1	3	3	4	2	Lab technician
B–C	1	72	72	2	1	1	1	3	2	Bus driver
B-D	2	67	67	2	1	1	2	4	1	Librarian
B-E	2	68	34	2	1	4	3	3	3	Teacher
B–F	1	90	22	1	2	4	1	4	4	Civil servant
B-G	2	64	47	2	1	1	1	3	3	Administrator
B–H	2	72	30	1	1	4	3	4	4	Manager
B–I	2	63	37	2	1	4	6	5	3	Carer, landlady
B-J	2	67	37	2	1	1	4	4	2	Teacher
B–K	1	69	15	2	1	1	3	4	3	IT manager
B-L	2	71	4	1	1	4	1	5	4	Officer
B-M	1	70	35	2	1	1	3	3	1	Librarian
B–N	1	64	30	2	1	1	3	2	2	Librarian
B–O	1	65	30	2	1	1	4	2	2	IT manager
B–P	1	77	40	2	1	1	1	1	1	Plumber
B-Q	1	65	40	1	1	2	2	–	4	Occasional jobs
B-R	2	59	18	1	2	2	1	3	5	Cleaner
B–S	2	81	80	1	1	3	3	2	1	Part time judge
B-T	2	80	15	1	1	1	3	3	4	Psychologist
B–U	2	79	22	2	1	3	2	3	4	PR officer
B–V	2	72	38	2	1	1	5	4	2	Sales assistant
B–W	1	70	37	2	1	1	1	4	2	Machinist
B-X	1	74	54	2	1	1	1	4	2	Postman
B-Z	1	69	50	1	2	1	6	4	4	Teacher
Hackney										
H-A	2	60	34	1	2	2	6	5	4	Teacher
H–B	1	65	33	2	1	1	4	4	4	Professor
H–C	2	66	15	2	1	1	2	4	3	Secretary
H-D	2	66	44	2	1	1	1	5	3	Meal supervisor
H-E	1	63	15	1	1	2	5	5	6	Administrator
H–F	2	71	29	2	1	1	4	5	3	Consultant
H-G	2	63	18	2	1	1	4	4	4	Librarian
H–H	2	68	39	1	1	4	6	5	3	Administrator
H–I	1	63	18	1	1	4	1	4	3	General labour
H-J	1	69	38	2	1	4	4	4	4	–
H–K	1	65	31	2	1	1	4	4	3	Manager
H-L	2	76	23	1	1	2	2	5	3	Civil servant
H-M	2	68	28	2	1	1	5	5	3	Teacher
H–N	1	68	29	2	1	1	4	5	6	Manager
H–O	2	64	37	2	1	4	5	4	4	Teacher
H–P	1	62	18	2	1	1	4	4	3	Journalist
H-Q	1	85	40	1	1	4	3	5	3	Teacher
H-R	1	72	28	2	1	1	1	5	4	Postman
H–S	2	72	20	2	1	1	5	4	3	Secretary
H-T	1	72	72	2	1	1	1	5	3	Social worker
H–U	1	72	40	2	1	1	4	5	2	Consultant
H–V	2	68	–	2	1	1	4	5	3	Counsellor
H–W	2	79	30	2	1	4	5	5	3	Teacher
H–Y	1	70	70	2	1	1	6	4	3	Engineer
H-Z	2	60	30	2	1	2	6	4	4	Teacher

Notes:Variables are coded as follows: Gender: 1 male, 2 female; Lives alone: 1 yes, 2 no; Living relatives: 1 yes, 2 no; Marital status: 1 married, 2 single, 3 widowed, 4 divorced or separated; Accommodation type: 1 detached house, 2 semi-detached house, 3 Terraced house, 4 flat, 5 retirement housing, 6 other; Education: 1 left school 14–16, 2 left school at 18, 3 Bachelor's degree, 4 Higher degree, 5 vocational qualification, 6 other; IMD score: 1 (least deprived) through 5 (most deprived) with scores corresponding to quintile break points of the distribution for all (34,482) Lower Super Output Areas.
Source: Authors' survey.

people in specific contexts (Laurier et al., 2008; Pink, 2007; Spinney, 2009) and using GPS enabled technologies to record participants' movement and perceptions of space and place (Dennis, 2006; Dennis et al., 2009; Jones et al., 2011; Jones & Evans, 2012; Parks, 2001; Yen et al., 2015). Some methods involve the co-collection and production of data by participants and researchers in the form of the 'go-along', 'ride-along' or 'walk-along' according to the mode of transport used (Jones & Evans, 2012; Kusenbach, 2003), which may also be reinterpreted in virtual 'reality cave' settings (Walford et al., 2017). Such mobile methods are not without their critics, who question their newness in relation to traditional ethnographic and anthropological techniques and the inability to align the participants' and researchers' experience exactly (Hitchings, 2012; Merriman, 2013).

An increasing number of studies have incorporated qualitative GIS and GPS tracking to explore people's mobilities and everyday use of spaces (Dennis, 2006; Jones et al., 2011) and, since Jones and Evans (2012) argued there had been limited attempts to combine mobile research methods with geospatial technology, further development of this approach has been reported (Barrie et al., 2019; Bell et al., 2015). To overcome this paucity, Jones et al. (2011) used GPS enabled devices in combination with other methods for two different studies on fear of crime and studentification in Birmingham. In one case participants took GPS tagged photographs and in the other commuter cyclists recorded GPS located diaries to create a 'spatial transcript' (Jones & Evans, 2012).

Table 2
Summary statistics for number of photographs and tracklogs captured by participants in Brighton and Hove, and Hackney.

	Brighton and Hove		Hackney		Total	
	Photographs	Tracklogs	Photographs	Tracklogs	Photographs	Tracklogs
Mean	7.0	13.2	16.0	13.0	11.6	13.1
Standard Deviation	3.6	4.8	12.1	5.9	9.9	5.3
Maximum	14	26	56	26	56	26
Minimum	1	5	1	2	1	2
Total	178	329	400	326	578	655

Source: Participants' photographs and tracklogs.

More recently, Yen et al. (2015) piloted GPS tracking to record 40 older people's activity patterns in San Francisco and Los Angeles with the purpose of assessing the effectiveness of such technology in the documentation of the modes of travel, the paths and the destinations. Walford et al. (2017) transferred aspects of these mobile methods into the virtual environment of a reality cave where participants viewed and responded to a filmed walking route in an unfamiliar town centre while physiological measurements and oral narratives were recorded. Underlying these approaches there is a clear emphasis on capturing the experience while it is happening, with the belief that the perfect match between time, space and action can generate a more valid and accurate kind of data.

Mobile methods were considered appropriate in this instance because of the focus on the outdoor and everyday experience of older people in the 'public realm'. The approach adopted allowed the 'debriefing' conversation with participants to show them where they went by mapping their GPS tracks, and to illustrate what they saw and did with geo-tagged digital photographs and recorded narratives. In addition to a week-long independent data collection phase, in which data for all journeys undertaken away from the participants' domicile were captured, each participant was accompanied for a few hours during one of his or her journeys. The intention of this 'go-along' was to aid understanding of the participants' experience through coincident and collaborative routine travelling. Guidance to participants emphasised that they should undertake their typical, normal mobility over the week in which they took part in the study, even if this involved the occasional longer journey, and they should not seek to undertake untypical or especially interesting outings.

3.2. Study area and participant characteristics

Two local authorities (LAs) were chosen as locations for the research: the London Borough of Hackney (LBH) on the basis that it constitutes an identifiable group of neighbourhoods within a substantial urban metropolis; and the City of Brighton and Hove (B&H) on the south coast of England some 70 km distant from London (see Fig. 1). These areas were selected to provide a degree of contrast and similarity. For example, LBH's population is relatively young with only 10 per cent aged over 60 years, whereas B&H has a somewhat older aged profile with 17.8 per cent in this cohort. The two LAs differ in their physical extent, LBH is 19 km^2 and B&H, whose boundary extends northwards over part of the South Downs, is 88 km^2, and although their total population counts are similar this difference in size produces differing population densities and has implications for older people's mobility and the opportunities to access to 'green' spaces. B&H, alongside the nearby settlements of Bognor Regis, Eastbourne, Hastings and Worthing in East and West Sussex, has traditionally fulfilled the role of a retirement destination, although overall both LAs have emerged as relatively cosmopolitan in character with a good range of cultural and recreational activities in recent times. Both LAs offered contrasts in respect of economic growth and social deprivation. LBH has recently shared in the benefits arising from a focus on economic development in East London, although it was ranked as the seventh most deprived LA in England according to the average rank of 2019 Index of Multiple Deprivation (IMD) (Ministry of Housing & Communities and Local Government, 2019), but was the sixth most diverse borough in London in terms of age, gender, ethnicity, religion and sexual orientation. B&H was ranked one hundred and fortieth in England in the 2019 IMD (thirteenth in the South East) (Ministry of Housing & Communities and Local Government, 2019) and has a reputation as a place where diversity in terms of ethnicity, religion and sexual orientation is welcomed and valued.

Local community and social support groups in each area were contacted to assist with recruiting participants and explaining the aims of the study with older people, following preliminary pilot work with a similar organisation for older people in a different area. Fifty participants aged 60 years or over were recruited divided equally between the two study areas with data collection occurring in LBH from September to December 2012 and in B&H from January to March 2013., and was completed both areas from April to June 2013. This pattern was adopted to limit and balance the possible impact of seasonality across the two areas. The aim was to recruit participants who were not employed affording them an equal amount of 'free time' and who were independent in terms of mobility and the capability of undertaking daily tasks without assistance, although having moderate physical impairment and health issues were not treated as reasons for denying participation. Individuals were not required to self-define themselves as 'active' or 'busy', but they would go out and about at least for basic trips during a typical week. In addition, the selection of participants depended on gender ratio, age mixing, social composition and geographical distribution within the study areas. Minor differences in detail occurred in the strategy for recruiting participants in the two areas, although they may be summarised as initial introductions facilitated by local organisations for older people, including the local authority in Brighton, and by an informal 'snowballing, word of mouth' approach. Participants' identities have been concealed by means of aliases when discussing the results and Table 1 summarises selected social and demographic characteristics of the participants. There were some participants aged 75 or over (16 per cent), but the majority were in the 60–69 years range. Overall participants came from a reasonably wide range of employment backgrounds, levels of educational attainment and all but 16 per cent had lived in their respective area for at least 20 years and in some cases since birth. A small minority were born outside the UK, but all of these people had migrated to the country when they were children. Table 1 also includes the 2010 IMD score for the Lower Super Output Area where the participants lived. Fifty-six per cent of participants in LBH in the most deprived category of LSOA, whereas only 12 per cent lived in such areas in B&H.

Three themes are considered in the following section in relation to the results obtained from analysing the photographs and tracklogs created by the participants. First, the photographic images have been classified in terms of their content focusing in particular on the extent to which 'green' and/or 'blue' space (features) were foreground, background or absent aspects of each image. This classification formed a basis for classifying participants in terms of the overall content of their photographic portfolio. Second, the tracklogs followed by the participants during their week-long engagement in the research have been examined in respect of characteristics such as length and frequency both within and beyond the participants' home local authority and within the two areas in the extent to which the tracks traversed or intersected with

Table 3
Classification of photographs (detailed and generalised) taken by participants and of participants according to percentage of images in generalised image classification classes.

Detailed classification of photographs	%	Generalised classification of photographs	%	Classification of participants	%
Urban (no vegetation or water)	52.3	Urban, buildings, people, events, etc - no vegetation or water	52.3	100% images of buildings, people, events, etc.	10.0
Mature (tall) trees with other (buildings, roads, etc.)	13.2			At least 67% of images with vegetation and/or blue 'space' dominant	24.0
Small, marginal or immature trees with other (buildings, roads, etc.)	12.6			50/50% between urban and predominantly vegetation or blue 'space'	16.0
Formal or informal parkland with/without people, dogs, etc.	9.8	Vegetation predominant	41.8	Mixed – other percentage combinations of generalised image classification classes	50.0
Sport or formal green space (e.g. cemetery)	1.3				
Open countryside, clifftop, etc with/without other (e.g. people)	4.9				
Distant background trees	1.0	Vegetation distant or non-dominant	3.2		
Building(s) with marginal branches	0.7				
Building(s) with foreground trees	0.7				
Patch(es) of grass	0.8				
Beach, canal or river	2.2	Beach, canal or river	2.2		
Fake vegetation (e.g. grass)	0.5	Fake vegetation (e.g. grass)	0.5		
Total	593		593		50

Fig. 2. Examples of photographs in generalised classification classes.
Source: Participants photographs.

natural and other 'green' space as recorded in the Ordnance Survey's MasterMap topographic mapping. Third, these aspects have been brought together in order to present a visualisation of selected photographic images from participants.

4. Results

Overall, the fifty participants took 578 photographs and generated 655 GPS tracklogs (see Table 2). The average number of tracklogs per participant was similar in both areas, but those from LBH on average took nearly twice the number of photographs than those from B&H, although the higher standard deviation in the former case suggests greater variability. The maxima and minima numbers of photographs and tracklogs both overall and in each of the areas indicates some participants made relatively modest contributions to the data collection whereas others achieved more substantial input. The reasons for this variation were in some instances connected with difficulties in using the digital camera or track-logging GPS device, while for others it indicated a lower level of activity during the week when they engaged with the research. Five participants shared between the areas were able to generate tracklogs on three or less days and 53 photographs were unclear or blank, nevertheless the total numbers given in Table 2 indicate that a substantial and robust set of data was collected.

4.1. Photographic images

Participants were guided to take photographs in public places that were meaningful to them, representative of their everyday life or had acquired significance because of a particular experience; participants could like or dislike the places they photographed. Initially a relatively detailed 12-fold classification of the participants' photographs was carried out, which was subsequently generalised into five groups (Table 3). Fig. 2 provides examples of photographs in the five generalised classes taken by participants living in B&H, and LBH. The content of nearly half of the images was essentially urban or relating to people in buildings or other urban settings, and this included a wide range of situations. Photographs where vegetation or 'green' space dominated ranged from open countryside, urban parkland, sporting venues (e.g.

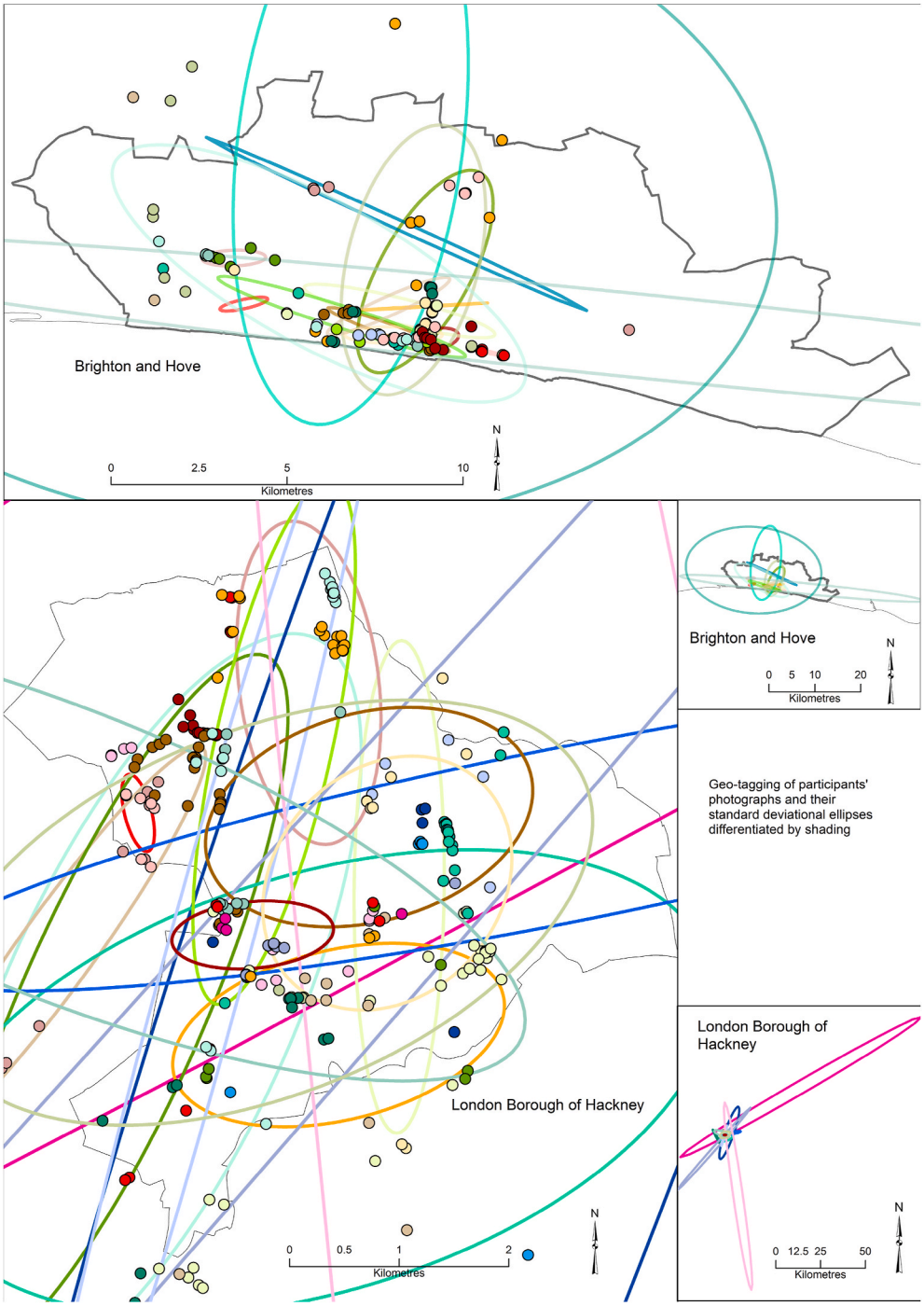

Fig. 3. Geo-tag location of participants' photographs and their standard deviational ellipses.
Note: Insets shown full extent of photographs' standard deviational ellipses (SDE), the main maps are shown to the extent of the local authority. SDE cold not be calculated for participants with less than four photographs (eight participants in B&H, two in LBH).
Source: Participants' photographs; Ordnance Survey, Edina. © Crown copyright and/or database right 2020 OS.

golf course or bowling green), to streets with prominent mature trees or low-lying vegetation. Images in which vegetation or water was distant or non-dominant included instances of marginal branches or shrubs and of individual distant trees: in both cases this vegetation occupied a very small proportion of the photographic image. There were only a limited number of photographs focused exclusively on water in the form of lakes, canals, rivers or the sea. Finally, an even smaller number of images presented artificial vegetation in the form of 'grass' on a flat roof surface. Classification of the images formed the basis of classifying the participants in terms of whether their photographs were spread across these five generalised categories or tended to be from one or two. Just over 10 per cent of participants only photographed what might reasonably be argued as 'urban' subjects, whereas nearly 25 per cent took images that were predominantly vegetation or 'blue' space, although nobody's photographs were all in this class and one participant classified in this way was responsible for the three images of artificial vegetation. A minority of the remaining participants took photographs that split approximately evenly between urban and predominantly vegetation or 'blue' space subjects, while the overall majority (50.0 per cent) had a mixed portfolio across several of the generalised categories.

The collection of photographs taken by the majority of participants (60.0 per cent and 69.9 per cent of photographs in LBH and B&H respectively) were from within the local authority in which they were domiciled, although 20 (40.0 percent) had ventured further afield (see tracklog section below) and included a few more distant images. This classification of participants in respect of their photographic portfolio

Table 4
Summary statistics for number of photographs and tracklogs captured by participants in Brighton and Hove, and Hackney.

	Brighton and Hove	Hackney
Number of MM 'green' land parcels	10,584	8626
Total area (m^2) of MM 'green' land parcels	46,283,377.0	4,045,662.6
Average area (m^2) of MM 'green' land parcels	4372.9 (SD: 27,360.1)	469.0 (SD: 6142.4)
Number of MM 10056 land parcels	9426	8386
Total area (m^2) of MM 10056 land parcels	39,975,735.6	3,380,732.1
Average area (m^2) of MM 10056 land parcels *	4241.0 (SD: 27,504.4)	403.1 (SD: 6127.3)
Number of MM 10111 land parcels	1158	240
Total area (m^2) of MM 10111 land parcels	6,307,641.8	664,931.4
Average area (m^2) of MM 10111 land parcels *	5447.0 (SD: 26,131.79)	2770.5 (SD: 6226.1)
Participants' Tracklogs		
Average length (m) of tracklog in LA *	7059.8 (SD: 3221.5)	5110.9 (SD: 2126.7)
Percentage of length of tracklog in LA	65.7 (SD: 32.6)	56.3 (SD: 26.8)
Number of sections on MM 10056	120.8 (SD: 62.4)	144.8 (SD: 146.2)
Average length (m) of tracklog on MM 10056	50.1 (SD: 30.5)	52.5 (SD: 75.0)
Percentage of length of tracklog on MM 10056	7.5 (SD: 4.1)	10.2 (SD: 8.8)
Number of sections on MM 10111 *	22.4 (SD: 25.9)	9.4 (SD: 13.0)
Average length (m) of tracklog on MM 10111 *	87.6 (SD: 57.4)	89.8 (SD: 297.0)
Percentage of length of tracklog on MM 10111 *	2.1 (SD: 2.0)	1.7 (SD: 5.1)
Participants' Photographs		
Total number of photographs in LA *	144	258
Average number of photographs in LA	5.8 (SD: 3.7)	10.5 (SD: 7.2)
Percentage of photographs in LA	83.0 (SD: 31.0)	70.7 (SD: 31.8)
Total number of photographs on MM 10056	15	14
Average number of photographs on MM 10056	0.6 (SD: 0.9)	1.5 (SD: 2.4)
Percentage of photographs in MM 10056	10.1 (SD: 17.1)	10.2 (SD: 12.9)
Number of photographs in MM 10056	10	12
Total number of photographs in MM 10111	2	4
Average number of photographs on MM 10056	0.1 (SD: 0.3)	0.3 (SD: 0.7)
Percentage of photographs in MM 10111	0.9 (SD: 3.2)	2.0 (SD: 5.2)

Note: * denotes statistically significant difference between participants in B&H, and LBH using Mann Whitney test at 0.05 level. GPS geo-tagging was unsuccessful for thotographs taken by one participant and these have been excluded from comparison in the table.
Source: Participants' photographs and tracklogs.

allows preliminary statistical analysis in relation to their characteristics as shown in Table 1, however none of these contextual, background variables resulted in a significant difference in respect of how participants were classified on the basis of their photographs. Fig. 3 shows the geo-tagged location of participants' photographs and their standard deviational ellipses (SDE). SDE represents the directional spread of the photographs' locations: if these tend toward being circular and relatively small the photographs were taken within a limited area; if they were elongated and narrow the photographs were captured along this axis potentially over a considerable distance; if they were elongated but 'bulging' there was a spread in the long axis direction, but also a notable deviation around this line. The SDEs for the photographs of participants from both areas showed this range of possibilities. The photographs for one participant from B&H and three from LBH produced highly elongated SDEs, although one distinction between this is that person from B&H travelled a considerable distance both westwards and eastward from this home area, whereas those from LBH each mainly journeyed away in one direction (northeast, south or southwest).

4.2. Tracklogs

It is evident from Fig. 1 that some of the participants ventured considerable distances during the week when they engaged with the research. Two participants from B&H journeyed to London, conversely one participant from LBH travelled to a destination on the South coast east of B&H, and other LBH residents visited Essex, Hampshire, Kent and Suffolk. In contrast 34 per cent of participants confined at least 85 per cent of the total length of their journeys to their immediate area and three did not venture beyond the boundary of their local authority. Although longer journeys were a feature of some participants' activity in the public realm, in order to provide a consistent basis for analysis the remainder of the results will focus on their tracklogs and photographs within the home area. In addition to the participant-generated data, the analysis also incorporated the Ordnance Survey (OS) MasterMap topographical data, in particular polygons forland parcels classified as Natural General Surface (feature code 10056) and Natural Environment (feature code 10111). The latter covers a wide range of environments including amongst others coniferous trees, non-coniferous trees, scrub, coppice or osiers, rough grassland and orchards (all alone or in combination).

The tracklogs and land cover data have been analysed within a GIS framework in order to quantify such characteristics as the total and average length of tracklogs within the LAs and passing over land classified as in these two feature codes. Table 4 summarises these results for the two study areas. Statistical testing has been carried out on some of the attributes shown (Mann-Whitney test) and the average area (m^2) of Natural General Surface and Natural Environment land parcels were significantly larger in B&H compared with LBH, which is unsurprising given the inclusion of part of the South Downs countryside within the former's boundary. Overall, the average length of tracklogs produced by participants in B&H is likewise significantly different from those in LBH. The same applies in respect of the number tracklog sections, their average length and percentage of the total on Natural Environment land parcels (feature code 10111). However, these differences in respect of tracklog sections on Natural General Surface land parcels (feature code 10056) were not significantly different between the two areas. Fig. 4 provides a context for these results by showing both types of land parcel together with routes of the participants tracklogs, with sections on the two types of land cover indicated separately.

Photographs taken by participants were also connected geographically with their location in respect of the study area boundaries and the OS MasterMap data. The B&H participants took 83.0 per cent of their photographs in their home area, and although LBH participants took less where they were domiciled (70.7 per cent), this was still the substantial majority. Relatively small numbers of photographs were geo-tagged as having been taken on either the Natural General Surface or Natural Environment land parcels, but this does mean that the content of the photographs did not include such land. It simply records that the photographer was not standing, sitting or otherwise located on such land when capturing the image. Despite the small numbers involved, the analysis of the photographs suggests that participants in LBH were more inclined to have positioned themselves on land classed as in one of the two categories, possibly indicating the comparative sparsity of such sites within a largely urban, built-up location. Overall, only a small number of photographs were taken from the substantial area of green space comprising the South Downs to the north and east of B&H or on Hackney Marsh towards the east of the Borough.

4.3. Visualisation

This section brings together the participants' photographs and tracklogs within the study areas together with other mapping data in

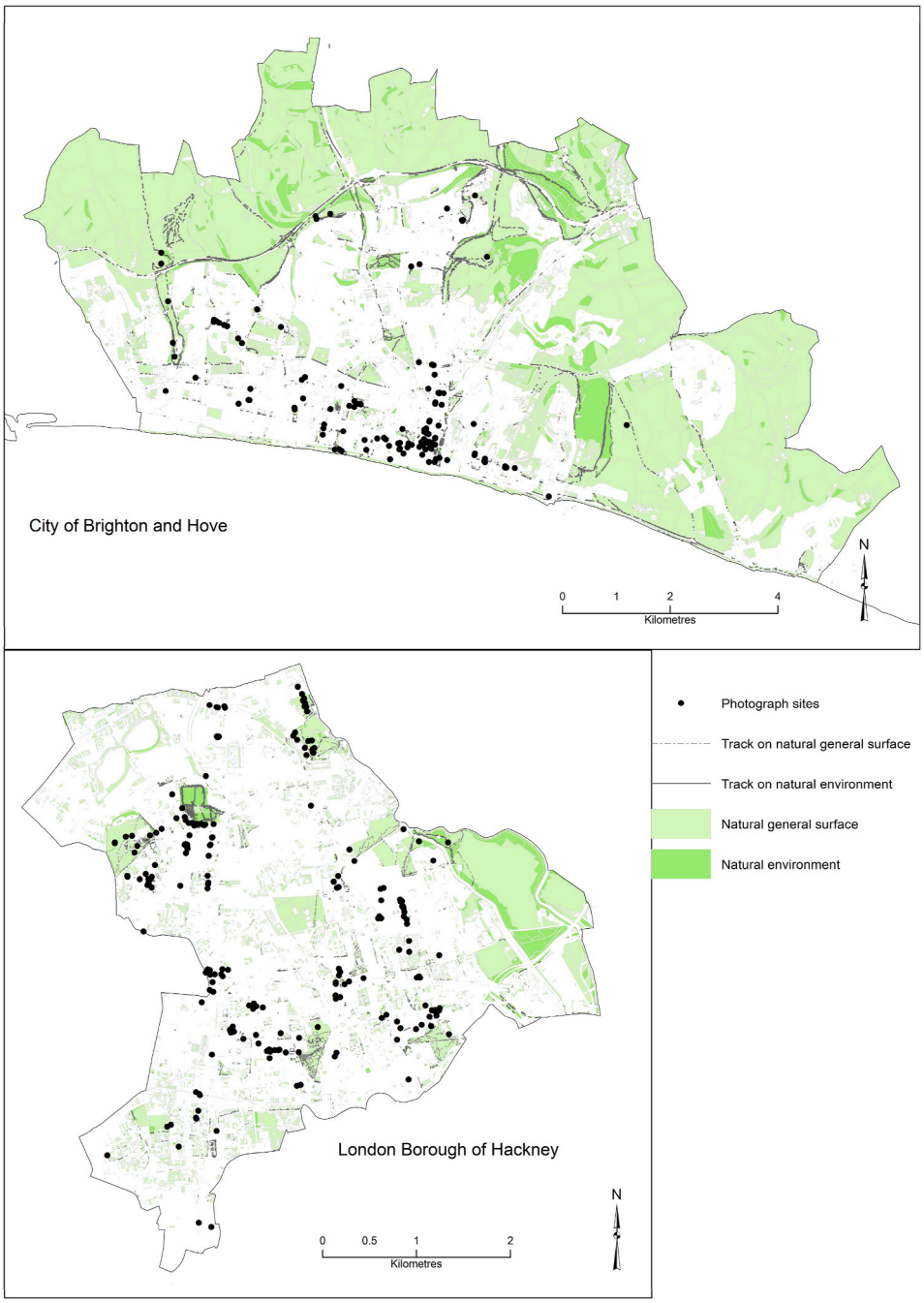

Fig. 4. Geo-tag location of participants' photographs and tracklogs in relation to natural general surface and natural environment land parcels.
Source: Participants' photographs and tracklogs; Ordnance Survey, Edina. © Crown copyright and/or database right 2020 OS.

order to visualise the images captured by a selection of the participants, in particular those classified as having taken some of their photographs with scenes composed predominantly of vegetation or 'blue' space (see above). Participants aliases shown on Fig. 4a and b connect with those used in Table 1 and photographs of identifiable individuals are excluded despite them having the captured in the public realm. Participant B–N had 88.9 per cent of the length of her tracklog within B&H, whereas B–U travelled outside of her home local authority for 75.8 per cent of her journey's length. although Fig. 5a focuses on tracklogs and photographs captured within B&H. Their photographs include extensive open green space areas as well as illustrating how both older and newer residential streets can incorporate mature trees. Both participants also included specific buildings or structures in their photographs, such as B–U's shelter on the seafront in Brighton and B–N's individual shop in the city's central area. Fig. 5b similarly shows the tracklogs of two participants from LBH. They had similar percentages of the length of their tracklogs in the local authority (H-G 26.6 per cent and H–H 25.6 per cent) indicating an inclination to travel further afield, although they displayed a similar choice of subject matter for their photographs to B–N and B–U. One of the photographs taken by H-G shows how an area used for sport (football in this instance) acts as green space with which a wider range of people can engage. There is some intermingling of the tracklogs followed by the two participants in both study areas, although H-G and H–H in LBH were rather more separate than B–N and B–U in B&H.

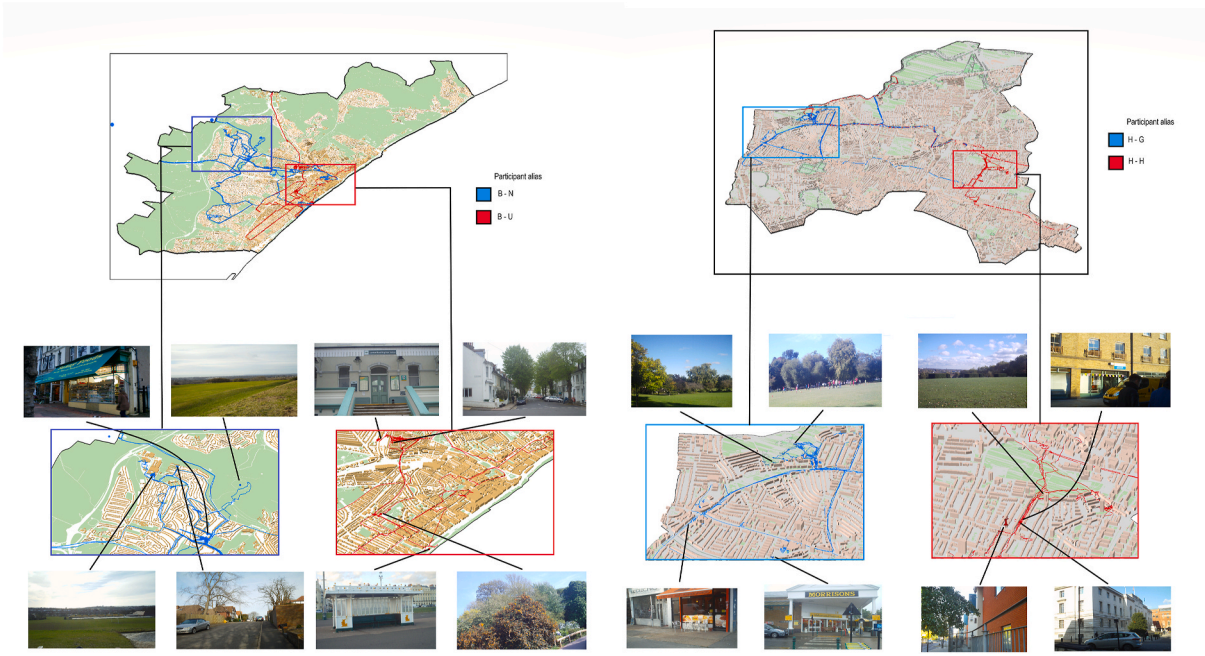

Fig. 5. Composite maps (photos, green space, tracklogs).
Source: Participants' photographs and tracklogs; UKBuildings [SHAPE geospatial data], Scale 1:5000, Tiles: GB, Updated: February 1, 2020, Verisk/Geomni, Using: null, <https://digimap.edina.ac.uk>, Downloaded: 2020-07-30 11:21:22.857; Ordnance Survey, Edina. © Crown copyright and/or database right 2020 OS.

5. Discussion and conclusions

The aim of this article was to explore the extent to which 'green' and 'blue' (water-based) aspects of the environment are of interest to older people in their everyday lives, which was part of research concerned with older people's mobility, social interaction and engagement in the public realm. This study has considered the positive contribution that experience of 'green' and 'blue' spaces can have on older people's lives and how these may go some way to towards counterbalancing challenges and anxieties potentially associated with some degree of physical and/or mental decline. The mixed methods approached involved the co-creation of data with participants, older people aged 60 or over evenly distributed between B&H or LBH. Inevitably there was some variability in the length, frequency and direction in which people travelled and some were prolific photographers while others captured relatively few images. Overall urban photographs accounted for the majority of those collected, nevertheless, vegetation was predominant in nearly 42 per cent and approximately a quarter of participants across both areas took at least two-thirds of their images in this category. These included not only formal parkland, sporting areas and open countryside, but also a large number showing trees, shrubs and grass in otherwise built-up settings (e.g. mature trees in residential streets). It is therefore important recognise a broad panoply of small- and large-scale 'green' and 'blue' spaces as of interest to older people during their movement through urban areas. The percentage of participants' tracklogs that passed across Natural General and Natural Environment Surfaces was similar in both areas, but this inevitably represents an underestimate of the extent to which such green space impacts on the participants' journeys as such surfaces may be entirely visible even if a person is not actually walking over this type of space.

The data collection methods, using mobile technologies, and procedures for engaging research participants in the co-creation of knowledge reflected the prevailing approaches nearly 10 years ago (Negrini, 2015). Subsequently there has been a degree of critical reflection on these approaches (Merriman, 2018; Spinney, 2015). Initial enthusiasm for mobile methods often emphasised the close interaction between the researcher and participant as enabling the former "to know and represent the experiences of their research subjects" (Merriman, 2013, p. 8) more accurately. Our approach was explicitly designed not to prescribe what images participants captured with the digital cameras or to influence the frequency or duration of travel behaviour during the week in which they participated. The accompanied journey with each person was intended to provide support and address any issues they may have encountered with the equipment, and during the meeting between participant and researcher at the end of the week the images and tracklogs were used as an aide memoire to stimulate the conversation. Two notable technological changes over the last 10 years that might influence any replication of the research are: first, the widespread availability, including among older people, of smartphones with camera and GPS functionality; and location-based social media allowing people to capture images and record their feelings about places as they occur (Cao et al., 2015; Zhang et al., 2021). Use of the latter would enable the setting up of private social media groups enabling participants in each study area to interact with each other. The methods adopted in a study define not only the practicalities of how it is carried out, but also the depth and scope of the outcome that can be achieved. Our concern was that participants should not be influenced by each other or by ourselves in where they travelled or what they considered worthy of being photographed.

Restrictions associated with the COVID-19 pandemic have differentially impacted on people and if our study was being undertaken now it would be necessary to allow for variations in participants' willingness to engage with others in society and to move in public spaces in the way they were accustomed to previously. Our findings indicated differences among the participants in their travel behaviour and the things they found sufficiently interesting to photograph. Such variety might be expected to persist as people rediscover their habitual mobilities or discover a 'new normal'. It perhaps too early to be certain about the longer-term implications of the COVID-19 pandemic on older people's mobility in public spaces, and early research has tended to focus on people with mental and physical disabilities and the effect of isolation and social distancing (e.g. Brooke & Clark, 2020).

This article has not incorporated information about the accompanied journeys, interviews and feedback sessions with the participants, but has

set the scene for a rather more qualitative exploration of these aspects of the data co-created by researchers and participants. This sought to develop "theoretical conceptualisations … through the analysis" of these different types of data (Negrini, 2015). The majority of participants fully engaged with the research and provided a rich data resource capable shedding new light on the importance and impact of both 'green' and 'blue' space on the everyday lives of older people from various walks of life as they navigate and engage with both the environment and other people in the public realm. The research emphasises the significance of natural or semi-natural environmental features in the daily lives of older people that is relevant to planners and urban designers across a range of national contexts.

Author statement

Nigel Walford: funding acquisition; conceptualisation; supervision; methodology; writing original draft; formal analysis; visualisation; writing reviewing and editing. Chiara Negrini: project administration; investigation; methodology; data curation; writing doctoral thesis, visualisation, writing reviewing and editing.

Ethical approval

Ethical approval was sought and granted through Kingston University's Faculty of Science Research Ethics Committee in 2012.

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Appendix A. Supplementary data

Supplementary data to this article can be found online at https://doi.org/10.1016/j.apgeog.2022.102808.

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